Check for updates

Journal of Clinical Periodontology

WILEY

Journal of Clinical Periodontology

SUPPLEMENT ARTICLE

Poster Discussions

PD001 | Structural and Biological Evaluation of Oil-Based Hydroxyapatite Bioinks for Three-Dimensional-Bioprinted Scaffolds in Bone Regeneration for Implant Dentistry

M. Razali[1], S. Masri[1], R. Tajau[2], N. Mohd[1]
[1]*Faculty of Dentistry, Universiti Kebangsaan Malaysia, Department of Restorative Dentistry, Kuala Lumpur, Malaysia,* [2]*Malaysian Nuclear Agency, Radiation Processing Technology Division, Selangor, Malaysia*

Background & Aim: Severe alveolar ridge deficiencies, particularly in the posterior region, often necessitate bone augmentation to support implant therapy. Standard vertical ridge augmentation techniques frequently fall short in achieving adequate bone volume due to insufficient structural integrity of graft materials. Three-dimensional (3D) bioprinting presents an innovative approach by enabling the fabrication of customized, volumetrically stable scaffolds for guided bone regeneration. In this study, we developed a hydroxyapatite-reinforced hydrogel bioink derived from palm oil, specifically tailored for 3D bioprinting applications. The objective was to evaluate the scaffold's structural properties, cell viability, and proliferative potential.
Methods: The bioink consisted of acrylated palm-olein (APO) in varying concentrations, combined with fixed amounts of hydroxyapatite (3%) and alginate (7%), forming four groups: Group 1 (1% APO), Group 2 (3% APO), Group 3 (5% APO), and Group 4 (10% APO). Scaffolds were printed via extrusion-based bioprinting. Human periodontal ligament stem cells (hPDLSCs) were seeded onto scaffolds and cultured for 7 days. Cell viability and proliferation were assessed via MTT assays at 24 h, 3 days, and 7 days, and scaffold characteristics and hPDLSCs morphology were analyzed by FESEM.
Results: Cell viability increased over time across all groups, reaching peak values by Day 7, indicating enhanced cell proliferation. Group 1 showed the highest viability (> 90%), while Group 4, with the highest oil concentration, had up to 85% viability, indicating the non-cytotoxic nature of APO. Differences in cell proliferation/viability between groups were not significant. At 24 h, cells retained a spherical shape, while by Day 7, cells exhibited an elongated, spindle-like morphology with protrusions. All scaffolds displayed needle-like apatite crystals with irregular but interconnected pores.
Conclusions: The oil-based hydrogel used in this study is porous and supports cellular growth and proliferation. Additional studies are needed to assess the printing fidelity of the bioinks and the mechanical stability of the printed scaffolds.

PD002 | Correction of Peri-Implant Buccal Bone Dehiscence Following Sub-Periosteal Peri-Implant Augmented Layer Technique With Either Block or Particulate Xenograft: A Retrospective Study

M. Severi[1,2], C. Franzini[1,2], A. Simonelli[1,2], C. Scapoli[1], L. Trombelli[1,2]
[1]*University of Ferrara, Ferrara, Italy,* [2]*Azienda Unità Sanitaria Locale (AUSL), Ferrara, Italy*

Background & Aim: To evaluate the effectiveness of SPAL performed in combination with DBBM in form of either particulate (pDBBM) or block (bDBBM) in correcting a peri implant bone dehiscence (PIBD). A group of implants showing peri-implant buccal bone plate (PBBP) ≥ 2 mm at implant placement was also examined.
Methods: Patients were categorized into 3 groups: patients with a PIBD ≥ 1 mm, treated with SPAL in combination with either pDBBM ($SPAL_{particulate}$) or bDBBM ($SPAL_{block}$), and patients with an implant showing a PBBP thickness ≥ 2 mm at insertion (CONTROL). Re-entry for implant uncovering was performed either at 6-months (SPAL groups) or 3-months (CONTROL). The rate of patients presenting no PIBD at re-entry was the primary outcome. Bone dehiscence height (BDH) and bone dehiscence width (BDW) measured at implant placement and at re-entry were secondary outcomes. Thickness of buccal tissues (BTT) was recorded after implant placement (CONTROL) or after grafting (SPAL groups) and at re-entry. Marginal bone level (MBL) was also measured on radiographs taken immediately after implant placement and at re-entry.
Results: Thirty-nine implants in 39 patients (14 in $SPAL_{particulate}$ group, 14 in $SPAL_{block}$ group and 11 in CONTROL group) were analyzed. No residual PIBD were found in $SPAL_{particulate}$ whereas in $SPAL_{block}$ one patient presented a residual PIBD. Two patients

© 2025 The Authors. © 2025 European Federation of Periodontology

in CONTROL presented a PIBD at re-entry. A significant reduction in both BDH and BDW was observed in both $SPAL_{particulate}$ (2.7 ± 1.6 mm for BDH and 3.9 ± 0.2 mm for BDW) and $SPAL_{block}$ (2.5 ± 1.8 mm for BDH and 3.8 ± 1.1 mm for BDW). $SPAL_{block}$ showed a significantly higher BTT than $SPAL_{particulate}$ at re-entry (3.6 ± 1.3 mm for $SPAL_{block}$ and 2.6 ± 0.6 mm for $SPAL_{particulate}$, $p = 0.0160$). All groups showed similar MBL values and changes.
Conclusions: SPAL performed with either a pDBBM or bDBBM is effective in correcting a PIBD as well as in increasing BTT.

PD003 | The Use of a Porcine Collagen Matrix for the Prevention of Buccal Bone at Implant Placement in the Esthetic Zone. A Randomized Controlled Clinical Trial

L. Papantonatou[1], I. Vouros[1], L. Batas[1]
[1]*Aristotle University of Thessaloniki, Department of Periodontology and Implant Biology, Thessaloniki, Greece*

Background & Aim: Restorative procedures aimed at replacing lost teeth in the upper anterior esthetic zone are demanding in terms of evaluating functional and aesthetic factors. The aim of this study was to provide a comparative assessment of the clinical, radiographic and histological effect of porcine collagen matrix when placed buccally at the time of implant placement in the esthetic zone.
Methods: A randomized controlled clinical trial with the participation of 36 patients in need of implant placement in the upper anterior esthetic zone was conducted. Participants were assigned to three groups: patients in group A ($test_1$) received at implant placement soft tissue augmentation with the use of a collagenous matrix of porcine origin. In group B ($test_2$) subjects received a subepithelial connective tissue graft that was utilized for the same purpose while in control group no soft tissue augmentation was performed. Measurements of soft tissue thickness were performed with the use of an ultrasound device, while a CBCT assessment for buccal bone plate thickness took place at baseline and six months post treatment. A soft tissue histological examination was carried out at the 6-month evaluation. Finally, patients reported their overall experience.
Results: CTG graft and porcine collagenous matrix seemed to enhance buccal soft tissue thickness similarly, while a statistically significant difference was found between the two test groups and the control group in this respect. No difference was recorded in terms of buccal bone thickness between baseline and the 6-month examination in either group. The clinical parameters (FMPS, FMBS) did not differ among groups before and after treatment. Histological examination regarding xenograft showed a well incorporated graft that did not differ from healthy connective tissue. Patients reported more pain in CTG group.
Conclusions: Porcine collagen matrix could be an alternative to increase soft tissue thickness at the time of implant placement in the esthetic zone.

PD004 | Alveolar Ridge Preservation With or Without Primary Wound Closure in Periodontally Compromised Sites With Clinical and Histomorphometric Results

C.-J. Chen[1], Y.-J. Chan[1], A. Chen[1], Y.-C. Liu[1]
[1]*Chi Mei Medical Center, Dentistry, Tainan, Taiwan*

Background & Aim: Ridge preservation could reduce the dimensional change of ridge and simplify the surgical procedure for implant surgery. Many studies showed that both open and closed wound technique can provide similar clinical outcomes. The purpose of this study was to evaluate the influence of wound closure for alveolar ridge preservation in periodontally compromised sites.
Methods: Patients who planned to be replaced a tooth by implant in posterior area during 2021–2023 were recruited in this study. They were randomly divided in to two groups: Group A (with open wound) and Group B (with closed wound). The surgical procedure included a full-thickness flap elevation after tooth extraction, thorough debridement, grafting by collagen-stabilized deproteinized bovine bone mineral then covered by a porcine collagen membrane. The socket wounds were sutured without primary closure for Group A while the others were sutured with primary closure for Group B. A bone specimen will be collected after 8 months of healing during the implant surgery and prepared for histologic evaluation.
Results: Eleven patients were included in this study with 5 people in Group A and 6 people in Group B. All patients had an uneventful healing and implants were placed successfully. The histomorphometric analysis revealed that new bone formation could be found in all specimens. The mean percentage of residual graft particles, newly formed bone, and fibrous connective tissue was 36.5%, 24.3%, 39.2% for Group A and 11.6%, 42.0%, 46.4% for Group B. The mean gain of bone height was 6.37 mm for Group A and 5.75 mm for Group B. Two out of eleven patients need additional guided bone regeneration after implant place in order to achieve more than 2 mm bone around implants.
Conclusions: With the limitation of this study, alveolar ridge preservation with or without would closure could achieve similar clinical and histomorphologic outcomes in periodontally compromised sites.

PD005 | Autogenous Demineralized Dentin Graft With Metronidazole-Loaded Injectable PRF Versus Autogenous Demineralized Dentin Graft Alone in Chronic-Infected Alveolar Ridge Preservation: Randomized Controlled Clinical Trial

K. Fawzy El-Sayed[1,2], M. Talaat Elbehwashy[1,3], A. Elfana[4], M. Mohamed Hosny[1]
[1]*Faculty of Dentistry, Oral Medicine and Periodontology Department, Cairo University, Cairo, Egypt,* [2]*School of Dental Medicine, Christian Albrechts University, Clinic for Conservative Dentistry and Periodontology, Kiel, Germany,* [3]*NewGiza University, Periodontology Department, Cairo, Egypt,* [4]*Indiana University, School of Dentistry, Department of Prosthodontics, Indiana, Bloomington, United States*

Background & Aim: To compare the effect of demineralized 'sticky' dentin with injectable platelets rich fibrin (I-PRF) loaded with metronidazole (SDMG, test-group) to demineralized dentin graft (DDG, control-group) in alveolar ridge preservation (ARP) chronic-infected extraction sockets.

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Methods: Sixteen patients with non-restorable teeth with chronic periapical infection in the upper anterior and premolar areas were randomized into 2 groups ($n = 8$/group). Following extraction and surgical curettage, demineralized particulate dentin graft was prepared from the respective extracted teeth (DDG-group), or mixed with I-PRF loaded with 5 mg metronidazole (SDMG-group) and applied in the socket. Cone-beam computed tomography (CBCT) at baseline and six months were compared to assess buccal ridge height (primary outcome), palatal ridge height and ridge width. Pain was assessed using visual analogue scale (VAS) every day for a week. At six months, during dental implant placement, bone biopsies of engrafted sites were harvested and analyzed histomorphometrically (secondary outcomes).
Results: Reduction was 0.99 ± 0.51 mm and 0.93 ± 0.42 mm in buccal ridge height, 0.82 ± 0.2 mm and 0.83 ± 0.4 mm in palatal ridge height and 0.72 ± 0.45 mm and 0.92 ± 0.45 mm in ridge width for the SDMG- and DDG-group respectively ($p > 0.05$). VAS score was significantly higher in the first 2 days after surgery in the DDG-group ($p < 0.05$). Histomorphometrically, new bone, residual graft and soft tissue occupied 52.81% ± 1.93%, 10.97% ± 1.6% and 36.22% ± 0.34% in biopsies of SDMG-group and 41.76% ± 1.2%, 16.66% ± 2.18% and 41.57% ± 0.97% in DDG-group, respectively with significantly higher new bone formation and fewer soft tissue in SDMG-group ($p < 0.05$, independent *t*-test).
Conclusions: DDG and SDMG are effective in ARP, reducing ridge dimensional changes following tooth extraction. SDMG seems to additionally enhance new bone formation and reduce post-extraction discomfort during ARP of chronic-infected extraction sockets.

PD006 | 3D Bone Reconstruction Using Polished Custom Made Titanium Meshes—A Retrospective Case Series

K. Fischer[1], P. Schmidlin[1]
[1]*Division for Periodontology & Peri-implant Disease, Clinic of Conservative & Preventive Dentistry, University Zurich, Zurich, Switzerland*

Background & Aim: Extensive bone reconstruction for implant treatment might be needed after severe periodontal disease in particular. Multiple options have been presented with, sometimes, extremely different success rates. Patient-specific titanium meshes have become a widely used approach in bone reconstruction, however, with rather high reported complication rates within the current literature (e.g., 37% flap dehiscence concomitant with graft loss). These 3D-printed titanium meshes usually are manufactured with a rough surface, hence, the question arose whether a smooth surface with a bone envelope driven design without over augmentation might reduce complication rates.
Methods: After CBCT scans and digital design, a total of 17 polished surface custom made titanium meshes have been used to correct vertical bone defects between June 2022 up to now. These 17 patient cases (6 males, 11 females; average age: 59) were consecutively treated by one surgeon in private practice. Bone reconstruction was done with titanium meshes filled with a mixture of 50% autogenous bone/50% allograft covered with ribose cross-linked collagen membrane. Patient, defect, healing and implant data was collected and assessed retrospectively.
Results: The average augmented volume was 1.7 cc (1.2–3.5 cc), average mesh size was 25 (L) × 11 (H) × 11 (W) over a 3–4 tooth gap. All surgical procedures healed without complication by primary intention independent of mesh pore size (5 small, 5 medium, 7 large) and, after 6 months, 34 implants were placed in the pre-planned position as well as dimension. During implant placement, in all cases, a relining augmentation was performed and, in posterior maxilla cases, a transcrestal sinus elevation was necessary. Three CTG in the anterior zone as well as five FGG were placed during uncovering. All implants integrated.
Conclusions: 3D bone reconstruction without over contouring using a polished surface titanium mesh might reduce complication rates independent of mesh pore size and defect location.

PD007 | Occupational Volume Ratio of the Mineralized Particulates Within the Grafted Sites Received Particulated or Collagenated Xenogenic Bone Substitutes

H.B. Kaba[1], N. Müller[2], I.-P. Hong[1], J.-Y. Park[1], J.-S. Lee[1]
[1]*Yonsei University, Department of Periodontology, Seoul, Republic of Korea,* [2]*Zurich University, Clinic of Reconstructive Dentistry, Zurich, Switzerland*

Background & Aim: This study aimed to (1) establish an 'occupational volume ratio (OVR)'—defined as the proportion of mineralized particulates within grafted sites—when treated with either saline or platelet-rich fibrin (PRF) in a standardized box-type model, and (2) assess the OVR of mineralized particulates within a collagenated soft-type bone block under varying conditions, such as hydration and mechanical manipulation.
Methods: To establish OVR in a controlled setting, three types of particulate xenogenic bone substitutes were utilized. Custom-designed box-type resin blocks (10 × 10 × 10 mm) were created to replicate a standardized 4-wall defect. These resin boxes were then filled with particulate materials treated with either saline or PRF. To evaluate the OVR of mineralized particulates within collagenated materials, the dimensions of three types of soft-blocks were measured before and after 10 min of hydration with saline. Additional collagenated samples were hydrated, manipulated with a periosteal elevator, and then filled into the resin boxes. Micro-computed tomography was performed on all samples to determine the volume of mineralized particulates, and OVRs were calculated based on the occupational area and sample dimensions.
Results: Overall OVRs of mineralized particulates were 48.45% ± 11.89% and 44.24% ± 10.37% in sites received particulated materials combined with saline and PRF ($p < 0.05$), however, there were significant differences between three types of xenogenic bone substitutes. In the collagenated soft bone blocks, the overall OVRs were 52.40% ± 7.37%, 41.91% ± 8.75%, and 33.66% ± 6.07% for the original, hydrated, and mechanically manipulated conditions ($p < 0.05$). There were also significant differences between three types of collagenated xenogenic materials.
Conclusions: Hydration-induced expansion and mechanical manipulation of collagen-based grafts limits bone particle

16000501x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

incorporation in equivalent defect sites. Reduced graft material volume, combined with rapid collagen resorption, may negatively affect the clinical efficacy of collagenated block grafts for optimal bone regeneration.

PD008 | Treatment of Gingival Recession Type 1 (RT1) Using a Coronally Advanced Flap With or Without Platelet-Rich Fibrin: A Randomized Clinical Controlled Trial With Digital Evaluation

N.B.M. Santos[1,2], G.V.O. Fernandes[3], T. Marques[1], M. Correia[4], A. Correia[4], M.P. Batalla Vázquez[2], J. Blanco-Carrion[2]
[1]Universidade Catolica Portuguesa, Department of Periodontics, Viseu, Portugal, [2]Universidade de Santiago de Compostela, Santiago de Compostela, Spain, [3]A. T. Still University – Missouri School of Dentistry and Oral Health, Periodontics, St. Louis, United States, [4]Universidade Católica Portuguesa, Viseu, Portugal

Background & Aim: Gingival recession poses significant clinical challenges, including esthetic concerns and hypersensitivity. The modified coronally advanced flap (MCAF) procedure, with or without the adjunctive use of leucocyte- and platelet-rich fibrin (L-PRF), is used to achieve root coverage and promote periodontal regeneration. Thus, this study aimed to evaluate the clinical outcomes for gingival recession type 1 (RT1) treatment using MCAF alone and MCAF combined with L-PRF after 6 months.
Methods: A total of 70 RT1 were included. Participants were randomly assigned to the test group (CAF+L-PRF, $n=42$) and the control group (CAF alone, $n=28$). Clinical parameters were assessed at baseline and six months, including percentual, mean, complete root coverage (%RC; MRC; CRC), gingival thickness (GT) and volume gain, recession area reduction, pills consumption, healing quality (IPR score), patient-reported outcomes (PROMs). Statistical analyses were performed to determine differences between groups.
Results: The test group achieved 89.30% root coverage, while the control group achieved 81.60% ($p=0.168$). The increase in gingival thickness and keratinized tissue width, patient satisfaction, and pain levels were similar between groups. There was no statistically significant difference in healing quality and PROMs ($p>0.05$).

Variables analyzed (p-value between groups)	Control group/ p-value baseline-6 months	Test group/ p-value baseline-6 months
%RC (MRC) ($p=0.168$)	81.60% ± 27.93% (0.95 ± 0.68 mm), $p=0.71$	89.30% ± 20.33% (1.01 ± 0.59 mm), $p=0.19$
%CRC	57.14%	73.81%
Mean GT gain ($p=0.048$)	0.11 ± 0.10 mm	0.16 ± 0.10 mm
Maximum GT gain ($p=0.54$)	0.55 ± 0.19 mm	0.58 ± 0.27 mm
Mean volume gain ($p=0.32$)	0.86 ± 0.84 mm^3	1.13 ± 1.25 mm^3
Esthetic satisfaction ($p=0.31$)	90% ± 7%	95% ± 5%
Willingness to undergo the procedure again ($p=0.22$)	88% ± 6%	93% ± 4%
Sensitivity reduction ($p=0.19$)	80% ± 8%	85% ± 6%
Mean number of pills ($p=0.04$)	2.25 ± 1.02	1.67 ± 0.98

Conclusions: Both treatment modalities resulted in similar outcomes treating RT1. L-PRF is a feasible material for RT1 treatment, significantly increasing GT gain.

PD009 | Five-Year Stability of Treatment of Multiple Mandibular RT2 Recessions With CAF Versus m-VISTA: Split-Mouth Design

A. Fernández-Jiménez[1], U. Puertollano-Esteban[1], X. Marichalar-Mendia[2], A.-M. García-De-La-Fuente[1], R. Estefanía-Fresco[1]
[1]University of the Basque Country (UPV/EHU), Department of Stomatology, Leioa, Spain, [2]University of the Basque Country (UPV/EHU), Nursery I, Leioa, Spain

Background & Aim: The prevalence of RT2 gingival recessions is very high in the general population. However, there is little evidence regarding which surgical technique could provide the best results in terms of root coverage. Furthermore, to our knowledge, there are even fewer studies comparing the long-term stability of the results obtained with the different mucogingival techniques in the treatment of RT2 recessions.
Methods: Two students of the Master's Degree in Periodontics of the University of the Basque Country performed two different mucogingival surgeries on 5 patients showing mandibular RT2 multiple recessions, following a split-mouth protocol: each patient's lower quadrant was treated with the m-VISTA technique or the CAF technique, randomly. All patients provided their informed consent. Both interventions were spaced at least 6 weeks apart, to assess postoperative pain independently. After each intervention, patients were initially scheduled for the removal of sutures after 14 days. Finally, all patients were enrolled in a periodontal/peri-implant maintenance and follow-up phase, at 6-month intervals.
Results: Based on the analysis of 18 recessions in each treatment group (mean baseline recession in the CAF and m-VISTA groups of 3.94 and 3.43 mm, respectively), a mean root coverage of 60% and 54% was obtained at one year follow-up, showing

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

stability at 5 years (62% and 49%). Concerning complete root coverage, it was achieved in 20% and 27% of the cases at one year and 25% and 13% at 5 years, respectively. No statistically significant difference was found, neither between the groups, nor between the two study time points.
Conclusions: After 5 years of follow-up, even though a small number of subjects was analyzed, stability of the results was observed in both CAF and m-VISTA groups.

PD010 | Long-Term Results (10 Years) in the Treatment of RT2 Gingival Recessions With Connective Tissue Graft: A Case Series

E. Ruiz De Gopegui[1], A.M. Garcia de la Fuente[1], R. Estefania Fresco[1], A. Fernandez[1]
[1]University of the Basque Country (UPV/EHU), Faculty of Medicine and Nursing, GIU21/042 Department of Stomatology, Lejona, Spain

Background & Aim: The key factors in the success of gingival recession (GR) treatment, as well as the technique of election and the factors influencing long-term results remain unclear. The technical determinants have been identified including flap tension, flap position relative to the cementoenamel junction and the need of a connective tissue graft in these challenging recessions. We also know the role of anatomical factors such as flap thickness and the amount of keratinized gingiva has been elucidated. In fact, recently the key role of keratinized tissue and gingival thickness in maintaining long-term root coverage results has been demonstrated.
Methods: This study presents a series of 14 Cairo RT2 recessions in 4 non-smoking patients and their evolution at 10 years in the upper and lower jaw with coronal advanced flap (CAF) or Raetzke technique with connective tissue graft (CTG).
Results: Two molars, three premolars, five canines, three lateral incisors and one central incisor were treated. All patients showed thick phenotype and only one of the recessions had no presence keratinized gingiva. Six of the fourteen recessions did not have de complete papilla (42.85%). In all the cases connective tissue graft, of more than 2 mm in thickness was placed. The mean initial recession was 3.71 mm and one year after the treatment the mean recession was 0.71 mm, so a mean root coverage of 78.41% was obtained. Additionally, six of the fourteen recessions achieved complete root coverage (42.85%).
At 10 years after the root coverage procedure, the patients were reviewed ant the results in all de cases remained stable.
Conclusions: Although the literature has described a decrease in long-term root coverage in gingival recessions after root coverage procedures, it is possible to achieve stable results over time in RT2 recessions; the determining factors for achieving these results remain to be determined.

PD011 | Treatment of Single/Multiple RT2 and RT3 Gingival Recessions in the Anteroinferior Region

A.-M. García-De-La-Fuente[1], A. Fernández-Jiménez[1], E. Ruiz-de-Gopegui-Palacios[1], M. Vilor-Fernández[1], L.A. Aguirre-Zorzano[1], R. Estefania-Fresco[1], GIU21/042 *University of the Basque Country (UPV/EHU), [1]Department of Stomatology, Leioa, Spain*

Background & Aim: The prevalence of RT2 and RT3 anteromandibular recessions is notably high (88.8% and 55.0%, respectively) in patients with periodontitis. However, there are few studies concerning their treatment, and the majority of which are case series showing a mean root coverage of 85% for RT2 and 60% for RT3 recessions. This treatment is usually challenging. In fact, the presence of certain factors, such as the position of the tooth to be treated, the presence of aberrant frenulae, a short vestibule, minimal or no keratinized gingiva, and others, will hinder achieving complete coverage. Recently, the use of tunneled techniques has been recommended in this type of situations.
Methods: This case series assesses the results of 30 RT2 and RT3 single/multiple recessions in the anteroinferior region treated with a variety of surgical techniques, including free gingival grafts and bilaminar techniques, such as the coronally advanced tunnel, m-VISTA, laterally closed tunnel, and a combination of a laterally positioned flap with a tunnel.
Results: A total of 30 recessions were treated, with RT2 recessions being the most prevalent (93%). Most of the teeth involved were rotated or vestibularized, showing minimum keratinized tissue. Most of the recessions were treated with tunnel techniques (93%). A mean root coverage of 91.92 (SD: 13.70) was observed (range: 50%–100%). Complete root coverage (CRC) was seen in 19 recessions (63%), all of them being RT2. Periodontal phenotype was increased in all cases, with a gain of keratinized gingiva.
Conclusions: While achieving CRC is not always possible in RT2 recessions, the thickening of the gingival tissues in association with partial root coverage may be considered a successful treatment outcome in these complex scenarios.

PD012 | Management of Interdental Papillary Defects Using a Customized Double-Layer Subepithelial Connective Tissue Graft Combined With Coronally Advanced Flap Technique: A Case Report

Q. Liu[1], Y. Huang[1], P. Ding[1], X. Li[1], Q. Wang[1], G. Qi[1]
[1]Zhejiang University School of Medicine, Stomatology Hospital, Hagnzhou, China

Background & Aim: Interdental papilla defects often lead to unpleasant functional and aesthetic issues for many patients with periodontal disease. Numerous innovative procedures have been implemented to reconstruct interdental papilla. This case report describes the clinical application of the coronally advanced flap technique combined with a double-layer subepithelial connective tissue graft for the reconstruction of interdental papilla.
Methods: The patient in this study was a 26-year-old male presenting with RT3 gingival recession and the gingival papilla defects of the mandibular central incisor (Jemt papilla score = 0, distance from the papilla tip to the contact point of adjacent teeth = 5 mm). A coronally advanced flap procedure was performed, utilizing a subepithelial connective tissue graft (CTG) prepared in both 'T' and 'I' shapes. The 'T' shape CTG was horizontally sutured into the buccal periosteum of the mandibular

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

central incisor, with a portion placed within the interdental periosteum. The 'I' shape CTG was then sutured into the interdental papilla defects on top of the 'T' shape CTG. Tension-free suturing and healing were crucial aspects of this technique.
Results: At 3, 6, and 12 months post-surgery, Jemt papilla scores improved to 2, 1, and 1 respectively; while distances from the papilla tip to adjacent tooth contact points reduced to 1, 2, and 2 mm, respectively. After one year following surgery, this case demonstrated clinical attachment level gain along with partial root coverage for the central incisor. Additionally, an increase in papillary height as well as reduction in black triangle formation between mandibular central incisors were observed.
Conclusions: This technique shows promise for augmenting gingival papilla and it is important to consider interdental papillary defect basilar width when ensuring sufficient space and blood supply for CTGs.

PD013 | Salvaging an Apparently Hopeless Tooth: Management of a Large Mucosal Fenestration Secondary to Trauma-Induced Periapical Pathosis

V.S. Yadav[1], K. Makker[1]
[1]*All India Institute of Medical Sciences, Division of Periodontics, Centre for Dental Education and Research, New Delhi, India*

Background & Aim: Mucosal fenestrations are relatively uncommon and often challenging to treat requiring an interdisciplinary approach. Despite several discrete reports in the literature, there are no definitive guidelines for the management of mucosal fenestration defects. This paper describes a novel, cost-effective, and biologically-driven treatment approach in a case of large mucosal fenestration.
Methods: A 23-years-old-male with history of dental trauma presented with a labial mucosal fenestration (5 mm × 4 mm) in maxillary right central incisor. The tooth was discolored, nontender, and exhibited grade-I mobility and complete absence of buccal bone plate. Radiographic examination of the affected tooth revealed periapical radiolucency and a wide canal with open apex. Root canal treatment was first performed using MTA as apical plug and gutta perch to fill the rest of the root canal. Subsequently, the surgical procedure was undertaken for debridement of the osseous defect, root end resection and reshaping to reposition the root within the alveolar housing. Connective tissue graft (CTG) was harvested from the palate using 'L-technique' and was positioned on the exposed root surface. Platelet-rich fibrin membranes (PRF) were prepared to fill the periapical bone defect. No bone grafts or GTR membranes were used considering their higher cost and risk of being infected in large soft tissue defects. Flap closure was achieved with 6-0 polypropylene sutures. Healing was uneventful and sutures were removed at 2 weeks.
Results: Complete closure of the fenestration defect with normal sulcus depth and increase in gingival thickness was achieved. No recurrence and any clinical sign of infection or inflammation were observed at 3 years follow-up.
Conclusions: Based on the outcomes of this case, use of autologous materials (CTG and PRF) may be considered as promising alternatives to regenerative biomaterials such as bone grafts and/or membranes for treatment of large mucosal fenestration with periapical bone defect.

PD014 | Evaluation of Wound Healing Following Free Gingival Graft (FGG) Procedures With Modern Adjunctive Healing Methods

N. Stefanik[1], R. Wiench[1], H. Hüpsch-Marzec[1], Z. Stefanik[1], D. Skaba[1]
[1]*Medical University of Silesia, Department of Periodontal and Oral Mucosa Diseases, Zabrze, Poland*

Background & Aim: Autogenous soft tissue grafts, particularly the Free Gingival Graft (FGG), are widely used for gingival augmentation, aiding in the widening of the gingival zone, deepening of the oral vestibule, and thickening of the gingival phenotype. Common complications during FGG procedures include postoperative pain, edema, and bleeding. With advancements in modern dentistry, innovative adjunctive methods, such as laser photobiomodulation (FBM), hyaluronic acid (HA), and advanced platelet-rich fibrin (A-PRF), are increasingly utilized to enhance healing.
Methods: This study aimed to evaluate the effects of three adjunctive healing methods—FBM (Group 1), hyaluronic acid Gengigel 0.2% (Group 2), and A-PRF (Group 3) — on wound healing at recipient and donor sites following FGG. A total of 48 patients (ages 18-60) were randomized into four groups (12 per group) using block randomization: three treatment groups and one control group. All patients underwent the standard FGG procedure. The Early Wound Healing Index (EHI) was used by the operator to assess postoperative wound healing. Additionally, patients evaluated their pain and discomfort (including swelling) after the procedure using a 10-point Visual Analogue Scale (VAS) through a structured questionnaire.
Results: On postoperative Day 7, Group 1 showed the best healing (100% with EHI = 2). By Day 14, Groups 1 and 3 demonstrated superior healing, while Group 2 and the control group lagged (EHI = 2 in 41.67% and 33.33% of patients, respectively). Pain assessments revealed the control group reported the highest pain levels on Day 2 (VAS = 7 for 66.67%), whereas the A-PRF group reported lower pain (VAS = 4 for 83.33%). By Day 7, over 90% of patients in Group 1 reported minimal pain (VAS = 1).
Conclusions: Each adjunctive method positively influenced wound healing, pain reduction and patient comfort after FGG. However, A-PRF and FBM produced significantly better outcomes compared to HA and the control group.

PD015 | Surgical Management of Drug-Induced Gingival Overgrowth: A Case Report of Valproic Acid-Related Gingival Hyperplasia

B. Acim[1], İ. Karagöz Akyazı[1], T. Songür[1], C. Ekşi[1], M.B. Yavuz[1], S. Kurt Bayrakdar[1]
[1]*Eskisehir Osmangazi University, Faculty of Dentistry, Periodontology, Eskisehir, Turkey*

Background & Aim: Valproic acid is a commonly used medication for the treatment of epilepsy. However, its long-term use can lead to side effects such as gingival overgrowth and hyperplasia. These growths can cause aesthetic concerns as well as functional impairments and periodontal diseases. Valproic acid-induced

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

gingival hyperplasia is a condition that requires treatment and often necessitates surgical management of the gingival tissue.

Methods: A 17-year-old male patient with a diagnosis of epilepsy presented to our clinic with complaints of gingival overgrowth in the maxillary region. The patient's medical history revealed that he had not had an epileptic seizure for the past 3 years and was using an anticonvulsant medication containing valproic acid. Before starting the treatment, a consultation with the patient's physician was conducted to obtain approval for treatment and to discuss the possibility of modifying or discontinuing the medication. Since medication modification or discontinuation was not possible, Phase I treatment was initiated as the primary approach. After completing Phase I treatment, the fibrotic gingival overgrowth was surgically excised using a scalpel and gingivectomy blades. Aesthetic contouring were made to ensure the maintenance of healthy gingival tissue.

Results: Although medication modification or discontinuation was not feasible, post-surgical healing of the gingival tissue occurred without complications. The patient, who adhered to optimal oral hygiene practices, showed no recurrence of gingival overgrowth during regular follow-ups at 3 months, 6 months, and 1 year post-surgery.

Conclusions: Valproic acid-induced gingival hyperplasia is a condition that requires treatment and is typically corrected through surgical intervention. In this case, although medication modification was not possible, successful results were achieved through surgical treatment and the maintenance of ideal oral hygiene.

PD016 | Surgical Management of Multiple Gingival Recession Defects Using an Innovative Xenogeneic Matrix: Preliminary Results of a Clinical Case Series

A. Dobos[1,2], S. Antal[3], F. Veress[1], B. Molnár[1], P. Windisch[1]
[1]Semmelweis University, Department of Periodontology, Budapest, Hungary, [2]Complutense University, Section of Periodontology, Madrid, Spain, [3]Semmelweis University, Budapest, Hungary

Background & Aim: Treating multiple gingival recession defects is challenging. The use of autologous connective tissue, regarded as the gold standard, necessitates a secondary surgical site, often from the palate, which increases patient morbidity. Additionally, the limited availability of donor sites can restrict the quantity of this graft type for covering recession areas. Recently, attention has turned to developing a xenogeneic graft that provides the predictability and effectiveness of autologous tissue. The aim of this study is to assess the effectiveness and predictability of the Modified Coronally Advanced Tunnel (MCAT) surgical technique combined with the innovative NovoMatrix (BioHorizons, Birmingham, Alabama, USA) xenogeneic graft in treating RT1 multiple gingival recessions, focusing on Mean Root Coverage (MRC) as the primary outcome.

Methods: At the Department of Periodontology, Semmelweis University, 15 patients with 75 teeth exhibiting multiple recessions were enrolled. Clinical and digital data were collected at baseline and at 3 and 6 months post-surgery. Currently, 6 patients, corresponding to 38 teeth, have reached the 6-month follow-up. Clinical parameters analyzed included MRC, Complete Root Coverage (CRC), Gingival Recession Depth (GRD), Gingival Recession Width (GRW), Keratinized Gingiva Width (KGW), Papilla-Contact Point Distance (PCD), Papilla Width (PW), Pocket Depth (PD), Keratinized Gingiva Thickness (KGT), and Bleeding On Probing (BOP). Patients received professional oral hygiene treatment prior to surgery, where a porcine-derived acellular matrix was sutured into the tunnel created by the MCAT technique.

Results: The mean GRD decreased from 2.28 to 0.59 and 0.66 mm, resulting in MRCs of 74% and 70.7%, and CRCs of 42% and 39.5% at 3 and 6 months, respectively. Excluding molars, MRC improved to 79.1% and 77.4%. Significant MRC variations were observed between jaw regions.

Conclusions: NovoMatrix demonstrates potential as an effective alternative for the surgical correction of multiple gingival recessions, especially in the maxilla and single-rooted teeth.

PD017 | Impact of Minimally-Invasive Non-Surgical Periodontal Treatment on Early Cardiovascular and Endothelial Dysfunction Risk Outcomes in Periodontitis Patients

G. Isola[1], A. Polizzi[1], A. Angjelova[1,2], E. Jovanova[1,2], L. Zanoli[3]
[1]University of Catania, Department of General Surgery and Surgical-Medical Specialties, Unit of Periodontology, Catania, Italy, [2]Ss. Cyril and Methodius University in Skopje, University Dental Clinical Center St. Pantelejmon, Faculty of Dentistry, Skopje, The Republic of North Macedonia, [3]University of Catania, Department of Clinical and Experimental Medicine, Catania, Italy

Background & Aim: Growing evidence suggests that a minimally invasive non-surgical periodontal treatment (MINST) approach could differently influence the reduction of certain cardiovascular endothelial early dysfunction outcomes in periodontitis patients. This study aimed to compare the impact of minimally invasive non-surgical periodontal treatment (MINST) with full-mouth subgingival instrumentation (FM-SI) on Carotid Intima-Media Thickness (CIMT), and on pulse wave velocity (PWV), distensibility coefficient (DC), flow-mediated dilatation ultrasound parameters and clinical periodontal outcomes in patients with periodontitis. Moreover, it was evaluated if baseline DC and CIMT levels impacted the efficacy of treatment protocols.

Methods: Through a randomized, controlled clinical trial design, periodontitis patients were treated by means of MINST ($n=27$) or FM-SI ($n=27$). CIMT, PWV, DC, probing depth (PD), clinical attachment level (CAL), full-mouth bleeding score (FMBS), and periodontal inflamed surface area (PISA) were assessed at baseline, and at 1-, 3-, 6-, and 12-months follow-up after treatment. Data were analyzed to assess the impact of treatment protocols on ultrasound and clinical outcomes.

Results: At 12 months, in comparison to FM-SI, MINST significantly reduced mean CIMT ($p=0.027$), PWV ($p=0.031$), mean PD ($p=0.014$), the number of pockets ≥4 mm ($p=0.041$), ≥6 mm ($p=0.032$), FMBS ($p=0.004$) and PISA ($p=0.005$). The generalized multivariate analysis evidenced that, at 12-month follow-up, high baseline CIMT ($p=0.017$), baseline PWV ($p=0.017$) levels and treatment with MINST ($p=0.024$)

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

were significant predictors of PD reduction. Furthermore, the Jonckheere-Terpstra test showed that patients with high baseline median DC and CIMT levels gained more benefits from MINST treatment at 1-year follow-up ($p = 0.022$) than compared to the FM-SI approach.

Conclusions: Patients who received MINST showed a greater reduction in CIMT and PWP ultrasound outcomes and periodontal outcomes than patients with FM-SI after 12 months of follow-up. Moreover, patients with high baseline levels of DC and CIMT gained more benefits from the MINST approach at 12 months follow-up.

PD018 | Non-Surgical Periodontal Treatment Using Laser and Photoactivation Adjuvant Therapy in Rheumatoid Arthritis Patients

M.-A. Martu[1], S. Solomon[1], I. Luchian[1], L. Foia[1]
[1]*University of Medicine and Pharmacy 'Grigore T. Popa', Department of Periodontology, Iasi, Romania*

Background & Aim: Periodontal disease therapy has a complex course. Current treatment models involve stratifying patients to allow practitioners to individualize therapy according to the pathology's complexity and systemic integration of risk assessment for each patient, such as a systemic disease that modifies the response to inflammation. Certain subjects have a more severe and rapidly progressive form and therefore, require intensive monitoring and adjunctive treatment. The aim of this study was to analyze clinical periodontal modifications and oxidative stress markers after three periodontal disease treatment techniques (scaling and root planning—SRP; SRP and laser; SRP and photodisinfection) in patients with rheumatoid arthritis and periodontal disease versus systemically healthy subjects affected by periodontal disease.

Methods: The study was conducted on 52 patients: systemically healthy subjects with periodontal disease—non-RA ($n = 26$); and test group ($n = 26$) subjects with rheumatoid arthritis and periodontal disease—RA. Clinical periodontal measurements (probing depth—PD; Löe and Silness gingival index—GI; papillary bleeding index—PBI; and periodontal community index of treatment needs—CPITN) and oxidative stress markers (8-hydroxy-2′-deoxyguanosine [8-OHdG] and 4 hydroxynonenal [4-HNE]) were analyzed at baseline (T0), after three sessions of periodontal treatment (T1), and 6 months after treatment (T2).

Results: Prior to periodontal therapy the RA group illustrated a worsened clinical aspect of periodontal tissues and increased values of oxidative stress. Periodontal therapy improved clinical periodontal measurements and oxidative stress markers in both analyzed groups, with supplementary benefits for laser- and PDT-treated periodontal pockets. The analyzed oxidative stress markers decreased significantly following non-surgical periodontal therapy in both rheumatoid arthritis and systemically healthy patients.

Conclusions: All the periodontal disease treatment possibilities analyzed in this study offered clinical and paraclinical improvements; however, the association of laser with SRP and photodisinfection with SRP yielded the best clinical and paraclinical outcomes when compared to SRP alone.

PD019 | Evaluation of Non-Surgical Periodontal Treatment on Salivary Biomarkers in Patients Undergoing Bisphosphonate Therapy

B. Karasu[1], G. Ozcan[2], S.C. Isler[2], G. Akca[3], O. Kaymaz[4], S. Bozkurt[5]
[1]*Cankiri Karatekin University, Faculty of Dentistry, Department of Periodontology, Cankiri, Turkey,* [2]*Gazi University Faculty of Dentistry, Department of Periodontology, Ankara, Turkey,* [3]*Gazi University Faculty of Dentistry, Department of Medical Microbiology, Ankara, Turkey,* [4]*Ankara University Faculty of Science, Department of Statistics, Ankara, Turkey,* [5]*Ankara Bilkent City Hospital, Department of Physical Medicine and Rehabilitation, Ankara, Turkey*

Background & Aim: Bisphosphonates (BPs) present anti-inflammatory effects and inhibit the release of proinflammatory cytokines. This study aimed to assess the impact of medical treatment for osteoporosis by BPs and non-surgical periodontal therapy on salivary levels of interleukine- 1 beta (IL-1β), interleukine-17 (IL-17) and 8-Hydroxy-deoxyguanosine (8-OHdG), as well as the clinical outcomes.

Methods: Three groups of 75 participants were assigned based on their systemic and periodontal health. Group 1 consists of 25 postmenopausal women with osteoporosis and periodontitis; Group 2 comprises 25 systemically healthy women with periodontitis; and Group 3 comprises 25 systemically and periodontally healthy women. Patients who used systemic alendronate once weekly (70 mg) for at least 3 months were included. Baseline and 1- and 3-month after periodontal therapy plaque index, gingival index, probing depth, bleeding on probing, and clinical attachment loss scores were assessed, as well as IL-1β, IL-17, and 8-OHdG levels.

Results: The clinical parameters were significantly higher in osteoporotic patients ($p < 0.05$). Following periodontal therapy, clinical parameters for groups 1 and 2 decreased at 1- and 3- month visits compared to baseline scores ($p < 0.05$). In periodontitis groups, the mean IL-1β, IL-17, and 8-OHdG levels were found to be significantly higher ($p < 0.001$). 1- and 3-month comparisions revealed significant reductions in IL-1β, IL-17, and 8- OHdG than the baseline values in periodontitis groups ($p < 0.05$). In the patients with osteoporosis, baseline 8-OHdG levels were significantly greater ($p < 0.001$). No significant differences regarding clinical measurements and biomarkers between the periodontitis groups were found following the initial phase of periodontal therapy.

Conclusions: Salivary biomarkers and periodontal parameters seemed to be similarly affected by the initial periodontal therapy in patients receiving BPs. Osteoporosis may lead to additional oxidative stress in periodontal tissues. Reductions in oxidative stress following therapy demonstrate that non-surgical periodontal therapy is crucial for osteoporosis patients.

PD020 | Clinical Trial on Effectiveness of the Hyaluronic Acid Adjunctive Non-Surgical Therapy of Periodontitis in Patients With Type 2 Diabetes Mellitus

I. Olszewska-Czyz[1]
[1]*Jagiellonian University, Department of Prophylaxis, Periodontology and Oral Pathology, Krakow, Poland*

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Background & Aim: Conventional periodontal treatment on diabetic patients have shown promising results, primarily focusing on glycated hemoglobin (HbA1c) levels as an end-point measure. The properties of hyaluronic acid (HA) have been harnessed in various periodontal therapies and it is a promising agent also in a non-surgical approach. The aim of this clinical trial was to assess the effectiveness of hyaluronic acid in a local adjunctive non-surgical treatment of periodontitis in patients with type 2 diabetes.
Methods: 80 adult participants with well-controlled type 2 diabetes (HbA1c 7% [53 mmol/mol] or less) took part in the trial. The clinical parameters of periodontitis as well as the glycated hemoglobin (HbA1) levels were evaluated and an analysis of the potential differences between the control (placebo) and intervention (HA) groups were performed.
Results: The decrease in all clinical values after the treatment were observed in the vast majority of patients in both groups. Differences in clinical parameters were observed after 12 weeks from the intervention between placebo and HA therapy patients. Bleeding on Probing (BoP) was reduced approximately 5.5% more in the intervention group and Clinical Attachment Level (CAL) decreased 1 mm more in the HA therapy patients.
Conclusions: Due to the bilateral relationship between diabetes and periodontitis, healthcare professionals seek advancements in managing periodontal inflammation. The results of this study indicate that non-surgical periodontal treatment with HA as an adjunctive agent is worth to be considered in the therapy of diabetic patients.

PD021 | Probiotics, Adjunctive to Subgingival Instrumentation, in the Treatment of Periodontitis in Patients With Diabetes: A Randomized Clinical Trial

R. Bujaldón[1], E. Montero[1], J.D. Gamonal[1], A. Abuelo[1], M.J. Marín[1], M. Iniesta[1], M. Sanz[1], D. Herrera[1]
[1]*Faculty of Odontology, University Complutense of Madrid, Madrid, Spain*

Background & Aim: Diabetes mellitus is a global public health issue, associated with important complications and high mortality. Given its bidirectional relationship with periodontitis, and the role of dysbiotic microbiota in the latter, investigating the adjunctive use of probiotics may be important. These could potentially optimize the clinical and microbiological response to periodontal treatment. To evaluate the clinical and microbiological effect of a probiotic formulation as an adjuvant to subgingival instrumentation in step 2 of periodontal treatment in patients with diabetes.
Methods: In this randomized triple-blind clinical trial with 6 months follow-up, patients with diabetes and untreated stages II-III periodontitis were included. Patients received steps 1 and 2 of periodontal therapy, including subgingival instrumentation in two sessions, and were randomized into two groups: the test received *Lactobacillus reuteri* probiotic tablets for three months and the control group, placebo tablets. Clinical and microbiological variables were measured, as well as glycosylated hemoglobin levels, at baseline, 3- and 6-months follow-up.
Results: Forty patients were included. Both groups showed a significant reduction in mean probing depth over 6 months, with the probiotic group decreasing from 3.71 to 2.84 mm and the placebo group from 3.59 to 2.72 mm ($p < 0.001$ for both), but no statistically significant intergroup differences were observed. Reductions in glycated hemoglobin were also similar at 6 months: 0.49% in the probiotic group and 0.47% in the placebo group ($p = 0.339$). No significant differences were found in the frequency or microbiological counts of the periodontal pathogens analyzed, except for *A. actinomycetemcomitans*, which showed a notable difference at 6 months ($p = 0.044$), being 1.82 CFU/mL higher in the placebo group.
Conclusions: The adjunctive use of probiotics did not provide added benefits to subgingival instrumentation in patients with periodontitis and diabetes, as similar improvements in clinical and systemic (i.e., glycated hemoglobin levels) were observed in both groups.

PD022 | Clinical Effects of Synbiotic Toothpaste Containing *Streptococcus salivarius* K12 and *Musa scuminata* Extracts in Non-Surgical Therapy of Periodontitis: A Randomised, Controlled, Pilot Clinical Trial

M.F.Z.I. Jalilluddin[1], S.H. Safii[1], C. Chia Wei[1], M.Z. Hussin[1]
[1]*Universiti Malaya, Department of Restorative Dentistry (Periodontology), Kuala Lumpur, Malaysia*

Background & Aim: Periodontitis, a chronic inflammatory disease, affects tooth-supporting tissues, characterised by a dysbiotic microbiome and irreversible tissue and bone loss. Although nonsurgical periodontal therapy (NSPT) with subgingival instrumentation is fundamental, daily adjunctive treatments may enhance clinical outcomes. This pilot study assessed the clinical effects of a synbiotic toothpaste with microencapsulated probiotics (*Streptococcus salivarius* K12) and prebiotics from banana peel (*Musa acuminata*) as an adjunct to NSPT on stage III periodontitis patient. Periodontal parameters were probing pocket depth (PPD), clinical attachment loss (CAL), bleeding on probing (BoP), and plaque score.
Methods: This 2-month, examiner-blind, parallel-arm, randomised pilot study involved six healthy adults with Stage III periodontitis. After a 1-week washout period with standard fluoride toothpaste and tailored oral hygiene instructions, participants were randomised to either a test group (using synbiotic toothpaste, Jardin) or control group (using standard fluoride toothpaste) twice daily for 8 weeks. PPD, CAL, BoP, and plaque score were measured at baseline and after 8 weeks following NSPT.
Results: All participants completed the study. Both groups showed significant reductions in PPD, with the synbiotic group showing a median reduction from 4.0 to 2.0 mm ($p < 0.01$), and the control group from 3.5 mm to 3.0 mm ($p < 0.01$). CAL improved similarly, decreasing from a median of 4.0 mm to 3.0 mm in both groups ($p < 0.01$). The synbiotic group showed greater improvements in PPD and CAL compared to the control group ($p < 0.01$). BoP and plaque scores also decreased significantly in both groups ($p < 0.01$), with more pronounced reductions in the synbiotic group (BoP from 64.1% to 10.4%; plaque from 62.2% to 15.3%) than the control group. No treatment-related adverse events were reported.
Conclusions: Within the limitations of this study, synbiotic toothpaste significantly enhanced periodontal treatment

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

outcomes compared to conventional toothpaste, supporting its potential as an NSPT adjunct. Larger, long-term studies are recommended to confirm these findings.

PD023 | Does a Miniaturized Pulsed Electromagnetic Field Device Impact the Modulation of Pathogenic Microbiome Dynamics of Implant-Associated Infections?

J. Shibli[1], C. Massari[2], S. Barak[1], R. Costa[3], T. Shiba[4], M. Feres[4], V. Barao[3], J.G. Souza[2]
[1]Guarulhos University (UnG), Guarulhos, Brazil, [2]UnG, Guarulhos, Brazil, [3]FOP-UNICAMP, Piracicaba, Brazil, [4]HSDM, Boston, United States

Background & Aim: Implantable devices are susceptible to adhesion and accumulation of polymicrobial biofilm, which often leads to an inflammatory response and tissue damage. Pulsed electromagnetic field (PEMF) technology has been introduced as a safe and effective modality for enhancing biological responses, including control of microbial growth. The effect of PEMF for controlling and modulating microbial diversity using human microbiome models has, however, not been tested experimentally. Thus, we tested a miniaturized PEMF biomedical device as a healing component for dental implants.
Methods: A Miniaturized PEMF biomedical device as a healing abutment for implant was used to evaluate the effect on microbial accumulation, and physical, chemical and electrochemical properties of the material. Activated PEMF was used as the experimental group (pulse). Surface roughness, wettability and surface chemical composition were evaluated before and after the activation phase. For early and late in vitro biofilm accumulation (24 and 72 h), stimulated human saliva was used as microbial inoculum for biofilm assay. In situ model, the same volunteers used a palatal appliance for 3 days containing the PEMF devices (control and pulse) to allow biofilm accumulation in the oral environment. Biofilms were evaluated in terms of live cell amount structure and microbial composition determined by DNA-DNA checkerboard hybridization and 16S RNA sequencing for the entire bacterial microbiome composition.
Results: PEMF activation did not change any of the chemical and physical characteristics of the implant. Positively, PEMF promoted salivary protein adsorption and controlled in vitro polymicrobial microbial accumulation by reducing the levels of 25 bacterial species. In situ model (3 days), PEMF showed a potent effect on reducing levels (by at least 5×) of 35 bacterial species, including pathogens associated with peri-implantitis. PEMF also changed bacterial interactions and promoted specific bacterial pathways.
Conclusions: PEMF has emerged as an effective strategy for controlling implant-related infections.
Support: Magdent, Israel; CNPq Grant no. 314479/2023-6.

PD024 | Peri-Implant Keratinized Mucosa in Partially Edentulous Posterior Mandible: 20-Year Outcomes

J.-C. Imber[1], A. Roccuzzo[1,2,3], A. Stähli[1], G.E. Salvi[1], A. Sculean[1], M. Roccuzzo[4,5,6]
[1]University of Bern, Department of Periodontology, Bern, Switzerland, [2]University of Bern, Unit for Practice-Based Research, Bern, Switzerland, [3]University Hospital (Rigshospitalet), Department of Oral and Maxillofacial Surgery, Copenhagen, Denmark, [4]University of Torino, Division of Maxillofacial Surgery, Torino, Switzerland, [5]University of Michigan, Department of Periodontics and Oral Medicine, Michigan, United States, [6]Private Practice, Torino, Italy

Background & Aim: To assess the 20-year outcomes at tissue level implants placed in the posterior mandible in patients with and without history of periodontal disease with respect to the presence of keratinized (KT) or alveolar mucosa (AM).
Methods: The original sample consisted of 128 patients (128 implants) rehabilitated with implant-supported fixed dental prostheses in the posterior mandible and enrolled in a tailored supportive periodontal care (SPC) program up to 20-years. At baseline, 86 patients had the implant surrounded by KT, while 42 were not (AM). During the first 10-years of SPC, 11 patients were treated with an additional free gingival graft (FGG) at buccal implant sites to improve oral hygiene measures and reduce patient's discomfort during oral hygiene. Peri-implant conditions were assessed according to the EFP S3 Clinical Guideline.
Results: Sixty-four subjects (KT = 42; AM = 22; drop-out rate: 50%) were analyzed after 20 years. Baseline patient's characteristics (i.e., age, gender, smoking habit and history of periodontal disease) did not differ between groups ($p > 0.05$). Eleven (50%) AM versus 2 (5%) KT patients required additional treatment during SPC ($p < 0.01$). Implants in AM presented statistically significantly more marginal bone loss, bleeding on probing and soft tissue recession compared to KT implants ($p < 0.01$). The application of a FGG (AM + FGG = 6) had a preventive effect on the peri-implant conditions at the 20-year follow-up examination: peri-implant health $n = 35$ (73%) (KT + AM/FGG) versus $n = 7$ (43.8%) (AM) and peri-implant diseases (i.e. peri-implant mucositis and peri-implantitis) $n = 13$ (27%) vs. 9 (56%) ($p = 0.03$).
Conclusions: These results indicate that implants placed in the posterior mandible not surrounded by KT presented more bleeding on probing, marginal bone loss and soft tissue recession. The application of a FGG had a preventive effect on long-term peri-implant conditions.

PD025 | Short-Term Clinical and Microbiological Evaluation of the Effect of Non-Surgical Treatment of Peri-Implantitis in a Non-Smoking Population

S. Tsantila[1], K. Kyriakidou[1], C. Kaddas[1], X. Dereka[1], S. Vassilopoulos[1], Y. Bobetsis[1]
[1]National and Kapodistrian University of Athens, Department of Periodontology, Athens, Greece

Background & Aim: The aim of this study is to assess the 6-week clinical and microbiological impact of non-surgical mechanical peri-implantitis treatment in a non-smoking population. Secondarily, a comparison of the microbiological profile of implants with peri-implantitis before and after treatment with that of healthy implants was also performed.

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Methods: A total of 39 subjects/implants were enrolled in the study. Diseased implants ($n = 19$) were decontaminated by means of PEEK ultrasonics. Presence of plaque (PI), bleeding on probing (BoP), intensity of bleeding (MBI), suppuration (SoP), and probing depth (PD) were recorded at baseline and at 6 weeks after treatment. At the same time points, submucosal plaque samples were collected from each implant. Probe-based quantative polymerase chain reaction was applied to analyze changes in the levels of five periodontal pathogens (*Porphyromonas gingivalis*, *Tannerella forsythia*, *Prevotella intermedia*, *Fusobacterium nucleatum*, *Campylobacter rectus*).

Results: After 6 weeks, non-surgical treatment led to a significant improvement in all clinical parameters ($p < 0.05$), except SoP. There was a reduction in median PD by 0.5 (0–1.2) mm. In deep pockets (≥ 7 mm), a mean reduction of 0.92 ± 0.65 mm was recorded. In addition, there was a significant improvement in bleeding indices (MBI, BoP). Profuse bleeding was reduced from 45.6% to 14.9% ($p < 0.05$). However, treatment end-points (residual PD ≤ 5 mm with no BoP at more than one point and no suppuration) were not reached for any implant. Non-surgical debridement failed to reduce the microbial loads of periopathogens, which remained at similar levels to the pre-treatment examination and consistently at statistically significant higher levels compared to healthy implants.

Conclusions: Despite clinical benefits, non-surgical treatment does not seem to predictably meet treatment end-points. Therefore, timely application of surgical treatment is deemed necessary. However, a stepwise approach should be implemented to ensure that surgical therapy is provided to periodontally stable patients with optimal biofilm control.

PD026 | Impact of Peri-Implant Therapy on Inflammatory Cytokine Expression in Mucositis and Peri-Implantitis Patients

E. Veras[1,2], M.K. Silva Teixeira[1], L. Gonçalves[1], C.M. Figueredo[3], D.M. Telles[1], G.S. Teixeira Neves[1], M.C. Alverca[2]
[1]Universidade do Estado do Rio de Janeiro – UERJ, PPGO, Rio de Janeiro, Brazil, [2]Universidade Veiga de Almeida, UVA, Rio de Janeiro, Brazil, [3]Griffith University, Gold Coast, Australia

Background & Aim: The pathogenic pathway of peri-implant diseases shows that both mucositis and peri-implantitis result from an imbalance between the microbiota and host response, presenting a dense inflammatory infiltrate in the connective tissue, predominantly characterized by macrophages and polymorphonuclear leukocytes. This study aimed to evaluate the effect of peri-implant treatment on the expression of Th17 response-related cytokines (GM-CSF, IFN-γ, IL-1β, IL-4, IL-6, IL-10, IL-12(p70), IL-17A, IL-21, IL-23, and TNF-α) in the peri-implant fluid (PIF) of patients with mucositis (MU) and peri-implantitis (PI) after a three-month follow-up period.

Methods: Thirty-seven patients were included with an average age of 59.14 years (±10.37), of which 22 were female (59.46%). Twenty patients were diagnosed with MU and 17 with PI. Patients were evaluated at baseline (T0) and three months post-treatment (T1), considering probing depth (PD), clinical attachment level (CAL), percentage of sites with plaque (% plaque), and bleeding (% bleeding). PIF collection was done using absorbent paper strips at T0 and T1. The MU group received non-surgical treatment, while the PI group underwent surgical debridement of implants. Samples were analyzed using a high-sensitivity multiplex assay kit.

Results: In the MU group, implants showed a significant reduction in PD, CAL, % plaque, and % bleeding ($p < 0.05$) after treatment. The PI group also showed significant reductions in PD, CAL, and % bleeding ($p < .05$). Immunological analysis between groups revealed no significant difference in cytokine expression at T0 or T1 ($p > 0.05$). Post-treatment, significant reductions were observed in the expression of IL-17A ($p = 0.010$) and TNF-α ($p = 0.035$) in the MU group and in IL-1β ($p = 0.049$), IL-6 ($p = 0.010$), and TNF-α ($p = 0.011$) in the PI group.

Conclusions: The treatment may modulate the expression of cytokines responsible for the inflammatory response and osteoclastogenesis.

PD027 | Efficacy of Submucosal Erythritol Powder Air-Polishing in Treatment of Peri-Implantitis: A Prospective Controlled Clinical Study

S. Dai[1], X. Feng[1], D. Shi[1]
[1]Peking University School of Stomatology, Beijing, China

Background & Aim: To compare the clinical effects of submucosal erythritol air-polishing and traditional subgingival debridement with an ultrasonic and manual scaler in the non-surgical treatment of peri-implantitis.

Methods: A randomized controlled clinical study was carried out on patients diagnosed with peri-implantitis in the Department of Periodontology, Peking University School of Stomatology, between September 2021 and May 2023. 41 patients with 55 diseased implants were enrolled. The patients will be randomized into two groups for further non-surgical treatment of peri-implantitis. The test group will receive subgingival erythritol powder air-polishing and the control group will receive subgingival scaling with ultrasonic and manual instruments. At baseline, 6 weeks and 3 months after treatment, the following clinical parameters will be recorded: modified implant plaque index (PLIi), peri-implant probing depth (PDi), peri-implant bleeding index (BIi) and suppuration. Repeated measures ANOVA will be applied to detect the intragroup differences between different time points. The unpaired *t*-test will be used to identify differences between the two groups.

Results: All clinical parameters between the two groups had no significant differences at baseline. Mean PLIi, PDi and BIi of both the test group and control group significantly reduced 3 months after non-surgical intervention ($p < 0.05$). Compared with the control group, the test group achieved more reduction of PDi and BIi after non-surgical intervention (1.58 ± 1.59 mm vs. 0.92 ± 1.83 mm and 1.32 ± 1.30 vs. 1.04 ± 1.36). Meanwhile, the percentage on probing on implants' level in both groups decreased from 31.3% and 23.8% at baseline to 0% respectively.

Conclusions: Submucosal erythritol air-polishing and subgingival scaling with ultrasonic and manual instruments could relieve the peri-implant soft tissue inflammation, while submucosal erythritol air-polishing had better effects on peri-implant probing depth and bleeding index.

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

PD028 | Long-Term Effects of Focused Pulsed Electromagnetic Field Therapy on Peri-Implantitis: A Multicenter Trial

A. Younis[1], Y. Mayer[1], E. Gabay[1], O. Ginesin[1], R.S. Siroma[2], Y. Friedlander[1], H. Giladi Zigdon[1], J.A. Shibli[2]
[1]Rambam Health Care Campus (RHCC), Periodontology, Haifa, Israel, [2]Guarulhos University, Periodontology, Guarulhos, Brazil

Background & Aim: Pulsed electromagnetic field (PEMF) therapy, renowned for its immunomodulatory effects and established efficacy in orthopedics, shows promise for managing peri-implantitis by reducing soft tissue inflammation and marginal bone loss. This study aimed to compare the long-term clinical and radiographic outcomes of non-surgical peri-implantitis treatment with and without PEMF therapy.
Methods: Thirty-one patients, with 45 implants displaying peri-implantitis with pocket probing depths (PPD) of 6–8 mm, bleeding on probing (BoP%), and bone loss ranging from 3 to 5 mm, completed this multicenter study. A novel healing abutment integrating active (15 test) or inactive (19 control) PEMF was employed, delivering PEMF at an exposure ratio of 1/500–1/5000, intensity: 0.05–0.5 mT, and frequency: 10–50 kHz for 30 days. Non-surgical debridement of implant surfaces was conducted before abutment placement. Patients were evaluated at baseline (T0), 3 months (T1), and 12-24 months (T2), assessing plaque index (PI), bleeding on probing (BoP), pocket depth (PD), recession (REC), suppuration (SUP), and radiographically measured vertical bone loss (VBL).
Results: Follow-up revealed significantly lower mean BoP, and SUP in the test group after 12–24 months compared to the control (17.1% vs. 97%, and 0 vs. 10%, respectively; $p < 0.05$). Furthermore, Within the test group, PD at the deepest site and mean PD decreased significantly between T0 and T2 (7.1 ± 0.90 mm to 4.4 ± 0.79 mm, 5.3 ± 1.3 mm to 3.7 ± 1.2 mm, respectively; $p < 0.05$). Also, a decrease was observed in the mead PPD in the control group for the latter (6.0 ± 1.4 mm to 4.5 ± 0.49 mm; $p < 0.05$). Although not significant, a positive trend was observed for VBL after one year in the test group compared to the control (0.2 ± 0.4 mm vs. -0.3 ± 0.11 mm).
Conclusions: Focused PEMF therapy could offer a nonsurgical solution for peri-implantitis that can achieve clinical goals. Nevertheless, larger samples and longer follow-ups are needed to understand its long-term benefits and limitations.

PD029 | Flapless Surgical Treatment of Peri-Implantitis Combined With Electrolytic Cleaning: A Pilot Case Series Study

F.N. Pickert[1], A. Carillo de Albornoz[1], E. Montero[1], I. Sanz-Sanchez[1], M. Sanz[1]
[1]University Complutense Madrid, Madrid, Spain

Background & Aim: This pilot study aims to assess the clinical performance and patient experience of adjuvant electrolytic implant surface decontamination with flapless surgical access.
Methods: Patients with dental implants diagnosed with peri-implantitis were treated in consecutive order through a minimally invasive flapless surgical approach with mechanical debridement, electrolytic cleaning, systemic antimicrobials, and, when needed, prostheses modification. Clinical, radiographic and patient reported outcomes were assessed with a follow-up of 12 months. The primary outcome was disease resolution (probing depth [PD] ≤ 5 mm, ≤ 1 bleeding sites, no further bone loss > 0.5 mm).
Results: A total of 25 patients with 48 dental implants with peri-implantitis were treated. 18 (37.8%) implants achieved disease resolution at 12 months. A statistically significant reduction in mean pocket depth (−2.72 mm CI 95% −1.90; −3.54), plaque scores (−0.45 CI 95% −0.26; −0.63) and bleeding scores (−0.47 CI 95% −0.31; −0.63) was observed between baseline and at 12 months. Radiographic changes were not statistically significant. The satisfaction with the electrolytic cleaning process was judged negatively unpleasant or very unpleasant in 10 (20.8%) and 7 (14.6%) of the implants, respectively.
Conclusions: The adjuvant electrolytic implant surface decontamination with flapless surgical access offers moderate disease resolution rates and might be associated with negative patient experience.

PD030 | Effect of Adjunctive Electrochemical Implant Surface Decontamination in the Treatment of Peri-Implantitis: Preliminary Results From an Ongoing Randomized Controlled Trial

P. Staehler[1], T. Robl[1], L. Heimerl[1], N. Berthel[1], F. Ortner[1], S. Otto[1]
[1]University Hospital LMU Munich, Department of Oral and Maxillofacial Surgery, Munich, Germany

Background & Aim: Despite advances in technology, implant surface decontamination in the surgical treatment of periimplantitis remains a challenge, with no evidence of superiority of one single method. A novel electrochemical implant surface decontamination method (GalvoSurge, Straumann, Switzerland) has been developed to remove the biofilm from the implant surface. The aim of this study is to investigate the effect of the adjunctive use of this novel electrochemical implant surface decontamination approach in surgical peri-implantitis therapy.
Methods: Patients with peri-implantitis and attached, keratinized peri-implant mucosa wider than 2 mm were included. 12 weeks after non-surgical periimplantitis treatment (ultrasonic curettes, erythritol air-powder spray) the remaining unresolved periimplantitis sites were randomized. The control group received surgical peri-implantitis treatment using ultrasonic curettes, NiTi brushes and erythritol air-powder spray. The test group received the same treatment, but with additional application of GalvoSurge. Primary objective was disease resolution according to the EFP treatment guidelines.
Results: 15 patients contributing 22 independent sites showed 61.1% (11 sites) disease resolution after non-surgical treatment. At 3 months follow-up, the control group showed 3 of 4 sites with disease resolution compared to 3 of 3 sites in the test group, mean probing depths were 4.0 mm in the control group and 3.17 mm in the test group. No significant differences were found between groups regarding disease resolution, probing depths and radiographic bone fill.
Conclusions: Within the constraints of this pilot study, no significant intergroup differences were found, indicating, that

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

standard of care implant surface decontamination methods can achieve sufficient clinical biofilm removal for disease resolution. Further studies with larger patient groups are needed to detect possible beneficial aspects of electrochemical surface decontamination.

PD031 | Surgical Management of Peri-Implantitis: Comparing Implantoplasty and Mechanical Debridement—A Randomized Clinical Study

B.C. Vasconcelos Gurgel[1], R.K.S. Cruz[1], G.C. Freire[1], J.C. Monteiro Viana[1], L.E. Juliasse[1], P. Calderon[1], A.G. Oliveira[1]
[1]*Federal University of Rio Grande do Norte, Dentistry, Natal, Brazil*

Background & Aim: Surgical therapy has been identified as the most appropriate strategy for the treatment of peri-implantitis. Implantoplasty can improve the implant surface by removing exposed threads, making it less susceptible to biofilm adhesion. This study aimed to compare the efficacy of implantoplasty and mechanical therapy in the treatment of peri-implantitis.
Methods: For this prospective, controlled, randomized, and blind clinical trial, 13 participants with 33 implants were randomly allocated into two groups: surgical access + mechanical debridement (control group, $n = 17$) and surgical access + mechanical debridement + implantoplasty (test group, $n = 16$). The primary outcomes were assessed at baseline, 3, 6, 12, and 24 months: Plaque Index (PI), Gingival Bleeding Index (GBI), Probing Depth (PD), Bleeding on Probing (BoP), and Keratinized Mucosal Width (KM). Quality of life was assessed using the Oral Health Impact Profile (OHIP-14).
Results: The average age of participants was 60.6 years, and 69.2% were women. Of the 33 implants, 17 received control therapy, and 16 received test therapy. Of all rehabilitations, 53.8% were total, and 30.8% were partial, with the remainder being unitary. Split-Plot ANOVA revealed a significant effect of time on all clinical variables, indicating a decrease in values over the follow-up periods ($p < 0.05$). However, no significant interactions between time and treatment were observed. The OHIP-14 showed that, at baseline, there was a predominance of 'Physical pain', 'Psychological discomfort', and 'Physical disability', while at 12 months, there was an improvement in the assessed items.
Conclusions: Evidence is insufficient to suggest that incorporation of implantoplasty improves clinical parameters during the surgical treatment of peri-implantitis, compared to mechanical debridement alone.

PD032 | A 1–9 Years Follow-Up Report on Surgical Peri-Implantitis Treatment

A. Stavropoulos[1,2,3,4], L. Bayyigit[5], H. Hallström[1], K. Bertl[3,6]
[1]*University of Malmö, Periodontology, Faculty of Odontology, Malmö, Sweden,* [2]*University Clinic of Dentistry, Medical University of Vienna, Division of Conservative Dentistry and Periodontology, Vienna, Austria,* [3]*Blekinge Hospital, Department of Periodontology, Karlskrona, Sweden,* [4]*University of Bern, Department of Periodontology, School of Dental Medicine, Bern, Switzerland,* [5]*University Clinic of Dentistry, Medical University of Vienna, Division of Oral Surgery, Vienna, Austria,* [6]*Sigmund Freud University Vienna, Department of Periodontology, Dental Clinic, Faculty of Medicine, Vienna, Austria*

Background & Aim: Surgical therapy is regularly indicated in the management of peri-implantitis, as it provides better access for implant surface decontamination. Depending on patient-, implant-, and defect characteristics, surgery can be non-reconstructive, reconstructive, or combined. Nevertheless, there is relatively limited amount of information on the long-term outcomes of surgical peri-implantitis treatment.
Methods: All patients, who had been surgically treated for peri-implantitis at ≥ 1 implant and had ≥ 1 year follow-up, were prospectively examined by a single examiner. Surgical treatment was: (1) OFD, (2) resective (including implantoplasty for modified surfaced implants), (3) reconstructive, or (4) combined treatment. Clinical and radiographic parameters were recorded. Different treatment outcome levels were defined: (I) probing depth (PD) ≤ 4 mm, bleeding on probing (BoP)/suppuration (SUP) negative; (II) PD ≤ 4 mm, BoP positive, SUP negative; (III) PD = 5 mm, BoP/SUP negative; (IV) PD = 5 mm, BoP and/or SUP positive; (V) PD ≥ 6 mm; and (VI) explantation; the categories I–III were defined as 'successful' treatment outcome.
Results: Eighty-five patients contributed with 190 implants; 22 implants were extracted during the surgical intervention. The remaining 168 implants received OFD ($n = 20$), resective ($n = 81$), reconstructive ($n = 17$), or combined treatment ($n = 50$) and were followed up on average for 3.4 years (range 1–8.7 years). Eleven implants were explanted during the follow-up, while a 'successful' outcome was achieved in 78% of all implants and was well maintained over time, that is, implants with > 3 and > 5 years of follow-up were successful in 83.3% and 76.2%, respectively. OFD appeared to be less effective with only 60% of all implants having an 'successful' outcome, while reconstructive and combined treatment approaches were successful in 88.6% and 90% of the cases, respectively. Bone levels remained stable in 96.3% of the implants.
Conclusions: A successful outcome was achieved and maintained for > 5 years in 3 out of 4 cases. Reconstructive and combined treatment approaches were most effective.

PD033 | Peri-Implant Conditions During Supportive Periodontal Care: A Prospective Study

M. Sforza[1], P. Santamaria[2], A. Akcali[3], L. Nibali[2]
[1]*University of Bologna, Bologna, Italy,* [2]*King's College London, Department of Periodontology, London, United Kingdom,* [3]*Dokuz Eylul University, Department of Periodontology, Izmir, Turkey*

Background & Aim: To assess peri-implant conditions in a cohort of patients with history of periodontitis undergoing supportive periodontal care (SPC).
Methods: A prospective cohort study was carried out on previously-treated periodontitis patients followed for 5 years in SPC. The diagnosis of peri-implant disease at baseline and at the end of the 5-year period was assessed.

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Results: Two hundred patients were included in the study. A total of 88 implants were present at baseline in 31 of those patients. A total of 55 (62.5%) implants were diagnosed as having healthy peri-implant tissues, while 22 (25%) were diagnosed with peri-implant mucositis and 11 (12.5%) with peri-implantitis. Five-year data are available for 68 implants in 23 patients. None of these implants were lost during the 5 years follow-up. An additional 20 implants were placed during the study period, resulting in a total of 88 implants reassessed at the final follow-up session, with peri-implant diagnosis almost unchanged compared with baseline. None of the studied patient and implant factors were associated with peri-implant disease diagnosis at multilevel model with logistic regression target distribution.
Conclusions: A small percentage of implants in a population undergoing SPC were diagnosed with peri-implantitis, and peri-implant conditions were maintained almost unchanged during 5 years of SPC.

PD034 | Assessment of Periodontitis as a Predictive Sign of Occurrence of Type-II Diabetes Mellitus: A Case-Control Study

A. Alkharusi[1], L. Alharthi[2]
[1]Sultan Qaboos University Hospital, Dental and Maxillofacial Surgery, Muscat, Oman, [2]Military Dental Centre, Armed Forces Hospital, Muscat, Oman

Background & Aim: Considering the bidirectional relationship between periodontitis and Diabetes Mellitus, this study aimed to affirm that periodontitis is a possible early sign of Diabetes Mellitus (DM), and to determine the incidence of undiagnosed Pre-Diabetes Mellitus (Pre-DM) and DMin patients with stage III or IV periodontitis.
Methods: This is a case-control study. Patients with stage III/IV periodontitis with no previous history of DM were included. The exclusion criteria were age < 30 years, with a history of DM, current pregnancy, anemia, thalassemia, kidney disease, or chronic liver disease. Controls were those with no periodontal clinical attachment loss. Information about known risk factors of DM was collected from all participants. Controls were matched with cases in terms of age and sex. Once all clinical periodontal parameters were collected clinically, all self-reported data was obtained and blood samples were collected and analyzed for HPLC HbA1c. There were 200 participants recruited (100 periodontitis: 100 non-periodontitis) with a 1:1 ratio.
Results: In total, 101 individuals with abnormal HbA_{1C} (≥ 5.7) were identified: 11 (11%) and 4 (4%) were potentially DM, and 41 (41%) and 45 (45%) were potentially pre-DM in cases and controls, respectively. The prevalence of suspected diabetics in the periodontitis group (12.9%) was statistically significant compared to controls (2.4%) ($p = 0.034$). Patients with periodontitis stage III/IV with at least one PPD of ≥ 6 mm had OR of 4.96 (95% CI 1.01-24.2; $p = 0.048$) of having suspected DM.
Conclusions: Analysis of the study data indicates the clinical significance of periodontitis as a potential sign of DM. In addition, the data suggest that oral health professionals have the opportunity to identify pre-DM and DM in dental patients and refer them to their physicians for further assessment and management.

PD035 | The Influence of Periodontal Treatment on Circulating Markers of Endotoxin and Neutrophilic Activity

H. Ibrahim[1], T. Tervahartiala[1], M. Orlandi[2], F. D'Aiuto[2], P. J. Pussinen[1], T. Sorsa[1]
[1]University of Helsinki, Institute of Dentistry, Dental Research at Biomedicum 1, Helsinki, Finland, [2]UCL Eastman Dental Institute, Department of Clinical Research, London, United Kingdom

Background & Aim: Periodontal treatment triggers acute and chronic inflammatory changes associated with endothelial function. It is not known whether these changes are reflected by endotoxin or biomarkers of neutrophilic activity.
The aim of the present study was to assess the impact of periodontal treatment on circulating biomarkers of neutrophil activity.
Methods: 120 participants suffering from severe generalized periodontitis were randomized to receive either intensive periodontal therapy (IPT, $n = 61$) or control treatment (CPT, $n = 59$). Endothelial function was assessed by flow-mediated dilatation (FMD) of the brachial artery. Serum sample concentrations were collected at baseline, and at 1, 7, 30, 60 and 180 days. Neutrophil matrix metalloproteinase (MMP)-8 was determined by a time-resolved immunofluorometric assay (IFMA), and tissue inhibitor of MMP-1 (TIMP-1), myeloperoxidase (MPO) interleukin-6 (IL-6) levels were measured by ELISA. C-reactive protein (CRP) was quantified by immunoturbidimetry and endotoxin activity (LPS) by limulus amebocyte lysate (LAL) assay.
Results: Acute vascular dysfunction observed at 24 hrs following IPT was associated with elevated neutrophil activity (increased MMP-8 and MPO levels, $p < 0.01$ and decreased TIMP-1, $p < 0.01$) as well as with elevated endotoxin activity ($p < 0.01$) when compared to CPT. Most of these markers returned to baseline values within one month following IPT. Improvement of FMD at 6 months was associated with a reduction in neutrophilic enzyme activity ratio (MMP-8/TIMP-1 ratio, $p < 0.05$) and with an elevation in MMP-8 inhibitor (TIMP-1, $p < 0.05$).
Conclusions: After acute impairment biomarkers of neutrophilic activity display 6 months delayed improvement in subjects with severe periodontitis following IPT compared with CPT.

PD036 | A Histological and Radiographic Study of Pulpal Dystrophic Calcification in Periodontal Involved Teeth

I.-O. Chan[1,2], L.-G. Huang[1], G. Chen[3], Y.-C. Chang[2,4]
[1]Taichung Veterans General Hospital, Section of Periodontics, Department of Stomatology, Taichung, Taiwan, [2]Chung Shan Medical University, School of Dentistry, Taichung, Taiwan, [3]Taichung Veterans General Hospital, Section of Endodontics, Department of Stomatology, Taichung, Taiwan, [4]Chung Shan Medical University Hospital, Department of Dentistry, Taichung, Taiwan

Background & Aim: The prevalence of pulpal dystrophic calcifications was widely studied in the past but the relation with

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

periodontal patient was still uncertain. The purposes of this study were to investigate the incidence of pulpal calcifications of periodontally involved teeth in a Taiwan Chinese population using histological and radiographic examinations, and to find out any association of pulpal calcification with systemic disease and dental conditions.

Methods: A total of 197 teeth freshly extracted because of severe periodontal destruction were collected and prepared for histological and radiographic studies for the incidence of pulpal tissue calcifications. The occurrences of calcifications were recorded based on the different types of classifications proposed by Seltzer (1972). The number of examined teeth with pulpal calcifications was calculated, and they were statistically analyzed with the Chi-square test and one way ANOVA.

Results: The patient population ranged in age from 16 to 85 years. Of them, 165 (84%) were male and 32 (17%) were female. The results show that the incidence of pulpal calcifications of periodontally involved teeth was 62% in histological and 30% in radiographic examinations. The occurrences were slightly higher than that reported in some previous studies and significantly different between the two examined methods. No significant association of pulpal calcification with age and systemic disease was found. Moreover, molars were observed to have more pulpal calcifications than bicuspids and incisors statistically ($p < 0.001$).

Conclusions: The true incidence of pulpal dystrophic calcifications of periodontally involved teeth is likely to be higher in histological examination because pulpal calcifications with a small diameter may not be seen on radiographs. The prevalence of pulpal calcifications was found to increase significantly in molar teeth, and the results indicated that localized calcifications occur mostly in the radicular area of the pulp tissue.

PD037 | TGF1b and IL-17a as Predictors of the Transition of Gingivitis to Periodontitis

N. Bagdasaryan[1], T. Aksenova[1], V. Erichev[1], F. Mafagel[1], L. Maryanenko[1], E. Vinichenko[1], E. Ovcharenko[1]
[1]*Kuban State Medical University, Department of Dentistry, Krasnodar, Russian Federation*

Background & Aim: Determining predictors of the transition of gingivitis to periodontitis is an important problem. To study the significance of determining the level of TGF1b and IL-17a cytokines in oral fluid to evaluate the risk of periodontitis.

Methods: A 3-year observation of 120 patients with gingivitis was conducted. Treatment was carried out in accordance with the FDI ADA algorithm (2019). To evaluate the dynamics of the inflammatory process in the periodontium after performed treatment, the level of TGF1b, IL-17a and digital densitometry of the alveolar bone were studied every 12 months.

Results: The initial values of TGF1b and IL-17a in all subjects were 301.99 ± 0.01 and 64.46 ± 0.05. In 55 patients, 12 months after treatment the level of cytokines TGF1b (311.01 ± 0.03) and IL-17a (66.56 ± 0.04) remained unchanged, a decrease in the optical density of bone tissue was noted (after 12 months: 1528 ± 142, after 24 months: 1352 ± 161, and after 36 months: 1458 ± 128). After 1–2 years, this group showed the clinical picture of initial periodontitis. In 65 patients with normalization of TGF1b (476.48 ± 0.03) and IL-17a (94.46 ± 0.04), stable optical density of the alveolar bone was observed, corresponding to the control values at all observation periods (1980 ± 103).

Conclusions: The elevated levels of TGF1b and IL-17a that persisted 12 months after treatment are associated with a sufficiently rapid negative dynamics of changes in the optical density of the alveolar bone and the development of periodontitis clinical features. Normalization of the levels of TGF1b and IL-17a 1 year after gingivitis therapy was noted in patients with persistent clinical remission and preservation of the optical density of the alveolar bone.

The preservation of the elevated levels of TGF1b and IL-17a in patients with gingivitis 1 year after therapy can be considered as predictor of the transition of gingivitis to periodontitis.

PD038 | Cytokine Profile in Relation to Periodontal Grade

C. Modin[1,2], L. Jansson[1], A. Gustafsson[2], T. Yucel-Lindberg[3]
[1]*Folktandvården Eastmaninstitutet, Department of Periodontology, Stockholm, Sweden,* [2]*Karolinska Institutet, Division of Periodontology, Department of Dental Medicine, Huddinge, Sweden,* [3]*Karolinska Institutet, Division of Pediatric Dentistry, Department of Dental Medicine, Huddinge, Sweden*

Background & Aim: Identification of biomarkers that can differentiate between different grades of periodontitis is still a goal that hopefully will make it possible to identify individuals with a high risk for disease progression at an early stage. The aim for this research was to describe the cytokine profile in saliva from individuals with periodontitis and relate the profile to the grade of the disease.

Methods: 215 individuals (mean age 38 years) with an earlier periodontitis diagnosis underwent a clinical examination at least 10 years after treatment at a specialist clinic. Saliva specimens were obtained by collecting stimulated saliva for two minutes. The levels of cytokines were analysed using the Luminex technology on a Bioplex Suspension Array System. The analysed cytokines were IL-1β, IL-4, IL-6, IL-7, IL-8, IL-17, IL-18, IFN-γ, IP-10, MIP-1a, MIP-1b, MCP-1, MIF, MIG, TNF-α. The diagnostic accuracy was evaluated by calculation of Youden's index to estimate the highest sensitivity and specificity by comparing saliva samples from subjects with periodontitis grade A with grade C. Moreover, area under curve (AUC) were calculated.

Results: The cytokine levels were higher for 11 of the cytokines in subjects diagnosed with grade C compared to those classified as healthy/gingivitis or grade A and B. These differences were significant for IL-1β, IL-6 and IL-18, also when adjusted for age and smoking. The highest diagnostic potential was found for IL-18 (AUC = 0.88, 95% CI 0.81–0.94). In model including IL-1β, IL-6 and IL-18, the sensitivity was 0.89 and the specificity 0.74, while the AUC was 0.88 (95% CI 0.82–0.94).

Conclusions: The saliva levels of IL-1β, IL-6 and IL-18 were significantly higher for individuals with periodontitis grade C compared to those with grade A. The diagnostic power for a model including these biomarkers may have a good ability to discriminate between grade A and C.

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

PD039 | Periodontal Precision: Diagnostic Skills and Confidence of Dentists in Asian Countries in Applying the 2017 EFP/AAP Periodontal Disease Classification

P.A. Charde[1], K. Ali[1], N. Hamdan[2], T. Al Hadeethi[1], E. McColl[3], D. Zahra[4]
[1]College of Dental Medicine, Qatar University, Department of Clinical Sciences, Doha, Qatar, [2]Faculty of Medicine & Dentistry, University of Alberta, Department of Clinical Sciences, Edmonton, Canada, [3]Peninsula Dental School, Faculty of Health, University of Plymouth, Clinical Dentistry, Plymouth, United Kingdom, [4]Plymouth University, School of Psychology, Plymouth, United Kingdom

Background & Aim: The most recent classification of periodontal disease published in 2017 by the EFP and AAP, provides a framework to aid clinicians in the diagnosis of, and treatment planning for, patients. The aim of this study was to evaluate the diagnostic skills and self-perceived confidence of dentists and dental students based in Asian countries in the use of the 2017 periodontal disease classification.
Methods: A cross-sectional analytic study was conducted using an online questionnaire encompassing four periodontitis cases. The target population included general dentists, dental specialists, post graduate and undergraduate students in Dentistry. 312 participants were invited to provide a diagnosis for each case as per the 2017 classification, and also indicate the level of confidence in their diagnosis on a 10-point scale.
Results: The results of the 4 Case x 4 Professional Role ANOVA showed a statistically significant difference in accuracy across cases by Professional Role (F (9, 924) = 2.304, p = 0.005), and an overall difference on accuracy by Professional Role (F (1, 308) = 2.304, p = 0.012). Among different Professional Roles, diagnostic accuracy mean for periodontics specialists was 57.81 (±49.78); general dental practitioners 50.00 (±50.31); other dental specialists 45.00 (±50.06); and finally 25.00 (±43.55) for undergraduate dental students. The results of the 4 Case ×4 Age Group, Gender and Roles ANOVA showed a statistically significant difference in confidence across Age Groups, Gender, and Roles ($F_{(1,291)}$ = 6.356, p < 0.001; $F_{(1,293)}$ = 13.747, p < 0.001; $F_{(1,291)}$ = 8.731, p < 0.001 respectively), but no interaction between Age Group, Gender, Roles and Case.
Conclusions: The study shows the diagnostic accuracy and confidence was highest amongst periodontology specialists followed by general dentists and undergraduate students. Overall the participants showed suboptimal diagnostic accuracy and confidence which underscores a need for additional education and training on the use of periodontal disease classification in participating countries.

PD040 | Cognitive Performance and Its Associations With Periodontal Status: Results From the Dental, Oral, Medical Epidemiological (DOME) Records-Based Nationwide Study

A. Schwartz[1], Y. Horev[1], A. Wilensky[1], G. Mizraji[1], G. Almoznino[2]
[1]Hebrew University, Department of Periodontology, Jerusalem, Israel, [2]Hebrew University, Jerusalem, Israel

Background & Aim: The association between periodontal disease and cognitive performance has been investigated in the past years. Recent studies suggest that periodontitis is associated with cognitive decline and low cognitive performance in elderly patients. This study aims to analyze the association between periodontitis and cognitive performance in middle age Israeli population.
Methods: Data from 45.898 adults between 18 and 50 years old, was retrieved from the dental, oral, medical epidemiological (DOME) study; a cross-sectional records-based research, which integrated large socio-demographic, medical, and dental databases of a Israel nationally representative sample of military personnel who arrived at a military dental clinic for routine dental examination during 2015 (n = 45,898, mean age: 21.8 ± 5.9 years, age range: 18–50). Cognitive function was assessed at the age of 17 years using psychometric tests termed General Intelligence Score (GIS). According to GIS scores, population was divided into quartiles. Patients underwent full clinical, periodontal and radiographic examination. Periodontitis was defined according to the American Academy of Periodontology guidelines. Radiographic bone loss defined as distance greater than 2 mm between the crestal margin and the cementoenamel junction, in more than one tooth with no visible cause. Univariable and multivariable logistic regression analyses were performed.
Results: 5581 patients were diagnosed with periodontitis (12.2%) and 40,317 healthy patients served as control. The prevalence of periodontitis was 17%, 37%, 34% and 12% among the GIS quartiles (very low, low, high, very high), respectively. Univariable analysis show that very low GIS patients have OR = 1.4 (1.251–1.545), p < 0.001 for periodontitis compared with very high GIS. The associations between GIS and periodontal disease persisted even after adjusting for socio-demographic parameters.
Conclusions: The present study suggests an independent association between cognitive performance and periodontal disease among middle-aged Israelis, regardless of socio-demographic variables.

PD041 | Point-of-Care aMMP-8 Test for Discriminating Periodontal Health Status: Diagnostic Accuracy and Clinical Correlations

M. Bi[1], X. Wu[1], X. Zhang[1], Y. Li[1], M. Tonetti[1]
[1]Institute of Integrated Oral, Craniofacial and Sensory Research and Department of Oral and Maxillofacial Implantology, Shanghai Ninth People's Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai, China

Background & Aim: Active-matrix metalloproteinase-8 (aMMP-8) is a promising biomarker for assessing periodontal health. This study aims to evaluate the diagnostic accuracy of an aMMP-8 point-of-care oral rinse test (POC-ORT) for predicting periodontitis in treatment-naïve individuals and to explore the relationship between aMMP-8 levels and the prevalence of pocketing and inflammation.
Methods: The aMMP-8 POC-ORT index test was conducted on a consecutive convenience sample in Shanghai, China. The reference standard was the 2017 World Workshop classification of periodontal diseases. Sensitivity, specificity, and the area under

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

the receiver operating characteristic curve (AUROC) were assessed. The Spearman test was used to explore the correlation between aMMP-8 value and clinical parameters, including the number of sites/teeth with bleeding on probing (BOP), probing pocket depth (PPD), and clinical attachment loss (CAL).

Results: 390 subjects were enrolled, and 67.2% had periodontitis. The aMMP-8 positive test (threshold 20 ng/mL) demonstrated an AUROC of 0.669 for predicting periodontitis, with a sensitivity of 50.4%, and specificity of 83.6%. The true positive rate was notably higher among subjects with more advanced periodontitis stages or grades. Significant positive correlations were observed between aMMP-8 levels and the number of sites with BOP ($r_s = 0.331$, $p < 0.001$), PPD ≥ 5 mm ($r_s = 0.436$, $p < 0.001$), and interdental CAL ($r_s = 0.379$, $p < 0.001$). We also found a significant positive correlation between aMMP-8 levels and the number of sites exhibiting PPD ≥ 5 mm and BOP ($r_s = 0.439$, $p < 0.001$).

Conclusions: In this study, the aMMP-8 POC-ORT demonstrates low sensitivity, high specificity, and low accuracy in predicting periodontitis. Oral rinse aMMP-8 levels are moderately positively correlated with a proxy assessment of active sites of periodontal inflammation. Further research is still to explain the diagnostic performance of aMMP-8.

PD042 | Accuracy of a SegResNet-Based Deep Learning Model in the Segmentation of Intrabony Periodontal Defects on Cone-Beam Computed Tomography Scans

D. Palkovics[1], B. Molnar[1], C. Pinter[2], D. García-Mato[2], A. Diaz-Pinto[3], P. Windisch[1], C.A. Ramseier[4]
[1]Semmelweis University, Department of Periodontology, Budapest, Hungary, [2]Empresa de Base Tecnológica Internacional de Canarias, S.L. (EBATINCA), Las Palmas de Gran Canaria, Spain, [3]King's College London, School of Biomedical Engineering & Imaging Sciences, London, United Kingdom, [4]University of Bern, Department of Periodontology, Bern, Switzerland

Background & Aim: Deep learning (DL) methods are increasingly used in cone-beam computed tomography (CBCT) segmentation to produce detailed 3D models of anatomical structures. Automatic segmentation of periodontal intrabony defects (PIDs) remains unexplored due to challenges posed by their high morphological variation. The aim of this examination was to evaluate the efficacy of a DL model in the segmentation of PID on CBCT images.

Methods: The proposed SegResNet-based DL model was trained on 70 CBCT scans of patients undergoing periodontal treatment. Testing of the model was performed on 10 CBCT scans which were not included in the original training dataset. The DL model's performance was evaluated by comparing the results of semi-automatic (SA) segmentation based on the dice similarity coefficient (DSC), intersection over union (IoU) and Hausdorff distance (HD95). Linear measurements at 17 PIDs were used to assess the model's trueness in segmenting periodontal defects. Measurements of width, depth, and angle of the intrabony component were taken on both 3D models generated by DL and SA segmentation.

Results: Mean intrabony component depths were 3.90 ± 1.24 mm (DL) and 4.05 ± 1.37 mm (SA) while mean widths were 2.78 ± 0.93 mm (DL) and the 2.97 ± 0.93 mm (SA) on average. Mean defect angles were 35.02° ± 8.23° (DL) and 35.49° ± 8.13° (SA). Spearman's correlation coefficients for depth and width measurements were 0.92 ($p < 0.0001$) and 0.95 ($p < 0.0001$), while Pearson's correlation for the intrabony defect angle was 0.94 ($p < 0.0001$), indicating a strong correlation between linear measurements on the DL and SA models.

Conclusions: Within the limitation of this study, it can be concluded that the proposed SegResNet DL-model provided accurate segmentations of CBCT images from periodontally involved patients. The model could sufficiently visualize the 3D PID morphology and thus aid treatment planning for periodontal surgical procedures.

PD043 | Impact of Different Periodontal Conditions on Self-Reported Illness Perception and Oral Health-Related Quality of Life

İ.N. Akpinar[1,2], H. Oktopcu[1], S. Aksoydan[1], O. Büyükgün[1], M.A. Serdar[3], Ş. Kurgan[1]
[1]Ankara University, Department of Periodontology, Ankara, Turkey, [2]Ankara University, Institute of Health Sciences, Ankara, Turkey, [3]Acıbadem University, Department of Medical Biochemistry, İstanbul, Turkey

Background & Aim: This prospective cohort study aimed to evaluate the impact of various periodontal conditions and risk factors on individuals' illness perception and oral health-related quality of life.

Methods: The study comprised 252 participants with differing periodontal conditions: 16 with a healthy periodontium, 160 with gingivitis, 22 with gingivitis in a reduced periodontium, and 54 with periodontitis. Clinical periodontal parameters were assessed, and participants completed the Brief Illness Perception Questionnaire (BIPQ) and the Oral Health Impact Profile (OHIP-14) to measure their illness perception and the influence of oral health on quality of life. Additionally, the Fagerstrom Questionnaire was administered to evaluate smoking dependency. The relationships between smoking addiction, clinical periodontal parameters, BIPQ scores, and OHIP-14 results were analyzed.

Results: The periodontitis group had significantly higher scores on item 1 ('Consequences') compared to all other groups ($p < 0.001$). While no significant differences were observed between the gingivitis groups, both were higher than the healthy group ($p < 0.05$). For items 2 (Timeline), 5 (Identity), 6 (Concern), and 8 (Emotional response), the periodontitis group also scored significantly higher than the gingivitis and healthy groups ($p < 0.05$). Although the Fagerstrom scores did not show significant intergroup differences, the periodontitis group demonstrated the highest prevalence of nicotine dependency. Furthermore, OHIP-14 scores indicated that the domains of 'Functional Limitation,' 'Psychological Discomfort,' 'Psychological Disability,' and 'Handicap' were significantly higher in the periodontitis group compared to the others ($p < 0.05$).

Conclusions: The BIPQ serves as an effective tool for rapidly assessing illness perception, revealing notable differences based

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

on periodontal status. Further research is warranted to explore how illness perception influences treatment adherence and overall disease outcomes.

PD044 | Prevalence and Severity of Periodontitis in a Large German City—A Supplementary Analysis of the MERIBEL Study

R. Matthaei[1], S. Jepsen[1], K. Jepsen[1], A. Strömer[2], N. West[3], R. Cosgarea[1,4,5]
[1]University of Bonn, Department of Periodontology, Operative and Preventive Dentistry, Bonn, Germany, [2]University of Bonn, Department of Medical Biometrics, Informatics and Epidemiology, Bonn, Germany, [3]University of Bristol, Department of Restorative Dentistry, Bristol, United Kingdom, [4]Philipps University Marburg, Department of Periodontology and Peri-Implant Diseases, Marburg, Germany, [5]Faculty of Dentistry, University Iuliu-Hatieganu, Cluj-Napoca, Romania

Background & Aim: The aim of the study was to determine the prevalence of periodontitis and its severity in a large German city using the ACES (Application of 2018 Classification to Epidemiological Surveys) framework.
Methods: 432 patients (237 women) who had participated in a recent European epidemiological study (Meribel) were examined: probing depths (PD), clinical attachment level (CAL), furcation involvement, mobility and bleeding on probing (BOP) were recorded. Staging and grading of periodontitis was determined using the ACES framework. Descriptive statistics and chi-square tests were used for statistical analysis.
Results: Of the 432 patients, 430 (99.3%, 43.18 years old, 54.22% women) were diagnosed with periodontitis. The mean clinical attachment level (CAL) was 1.73 ± 1.2 mm, with a continuous increase from younger (18–35 years, 2.03 mm) to older patients (81–95 years, 3.24 ± 0.65 mm). On average, 22.74 ± 5.55 teeth showed interproximally a CAL ≥ 1 mm (1.64 ± 1.3 mm). In young patients (aged 18–29 years), the majority (65.8%) showed stage I, 26.8% stage II and 7.4% stage III periodontitis. Older patients (> 60 years) showed the highest percentage of advanced periodontitis (stage III: 75.6%, stage IV: 4.1%). More men (43.5%) were diagnosed with stage III periodontitis, whereas most women were stage I (35.7%). Most patients showed grade B progression ($n = 308$, 71.62%) and 27.9% were diagnosed with grade C (mostly in stage III, 13.25%). Grade A was seen only in stage I periodontitis forms, whereas most patients in stages I, II and III showed a grade B progression.
Conclusions: Based on the current analysis we can conclude: (1) The majority of patients suffered from periodontitis and showed a moderate progression, and (2) Increased age was associated with more advanced forms of periodontitis.

PD045 | The Awareness and Knowledge Levels of Individuals About Peri-Implant Health: A Questionnaire-Based Study

B. Topuz[1], I. Ozenci[1], B. Biyikoglu[1], M.S. Yildiz[1], G. Cakar[1], S. Dirikan Ipci[1]
[1]Altinbas University, Department of Periodontology, Istanbul, Turkey

Background & Aim: Peri-implant problems have become one of the major concerns of oral health professionals with increasing numbers of implant placements all around the world. Raising awareness for peri-implant disease can positively impact preventing and treating related conditions. This study aimed to investigate the relationship between peri-implant conditions, oral hygiene habits, and patient knowledge regarding peri-implant disease risk factors.
Methods: A total of 85 systemically healthy patients participated in this study. Peri-implant conditions were assessed by periodontal parameters and radiographic evaluation. A survey comprising 26 questions was used to gain insight into the knowledge, attitudes, and behaviors related to dental care habits among people with implants. The ANOVA test compared three independent groups according to the normality test results. The Pearson Chi-Square and Fisher Freeman-Halton tests compared categorical variables between groups. $p < 0.05$ was considered statistically significant.
Results: A significant difference was observed between the groups regarding oral hygiene habits and knowledge levels ($p < 0.05$). Individuals with peri-implant health were significantly more meticulous about the frequency and duration of tooth brushing, oral and dental health self-assessment, the variety of oral hygiene tools used, and attendance at follow-up appointments for dental implants ($p < 0.05$). In contrast, individuals with peri-implantitis showed significantly lower knowledge regarding the role of brushing in bacterial removal, the necessity of antibiotics and mouthwash in the treatment of peri-implant diseases, the impact of clenching habits, and systemic diseases ($p < 0.05$).
Conclusions: Within the limitations of this study, the findings suggest that as peri-implant status worsens, patients' oral hygiene practices and knowledge regarding factors influencing peri-implant health decline. Oral health care professionals must educate all patients undergoing implant therapy about oral health care regimens, and the importance of supportive peri-implant therapy to reduce the incidence of peri-implant diseases.

PD046 | Evaluating the Efficacy of Antimicrobial Photodynamic Therapy in Managing Peri-Implantitis: Insights From a Swine Model

U. Demoner Ramos[1], B. Furtado Masalskas Martins[2], A. Finger Stadler[3], M. Bianchini Lemos Reis[4], A. Belem Novaes Jr[4]
[1]Federal University of Espirito Santo, Clinical Dentistry, Vitoria, Brazil, [2]University of São Paulo, Ribeirao Preto, Brazil, [3]Adams School of Dentistry, Chappel Hill, United States, [4]University of São Paulo, Oral Surgery and Periodontics, Ribeirao Preto, Brazil

Background & Aim: Peri-implantitis, an inflammatory condition leading to bone loss around dental implants, poses a significant challenge in dental care. This study aimed to assess the efficacy of antimicrobial photodynamic therapy (aPDT), with or without leukocyte- and platelet-rich fibrin (L-PRF), in decontaminating and promoting bone regeneration in peri-implant defects using a swine model.

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Methods: Five minipigs were used, each receiving eight dental implants. Silk ligatures were used to induce peri-implantitis, which was removed after 14 weeks. The study evaluated four treatment groups: no treatment (C—), mechanical decontamination (C+), mechanical decontamination with aPDT (Group 1), and mechanical decontamination with aPDT and L-PRF (Group 2). Submucosal biofilm and peri-implant crevicular fluid (PICF) were analyzed for bacterial load and cytokine levels. Histomorphometric and microtomographic analyses were conducted to assess bone regeneration and inflammation.
Results: The induction of peri-implantitis resulted in significant inflammation and bone loss. While no statistical differences were observed between treatment groups, aPDT showed potential in reducing bacterial load and pro-inflammatory cytokines. Specifically, aPDT-treated groups exhibited a trend towards decreased levels of IL-1β, a key marker of inflammation. Histological analysis revealed inflammation without new bone formation in a significant portion of sites, particularly in the untreated group. Microtomographic analysis showed no significant differences in bone mineralization or bone-implant contact among the groups.
Conclusions: The swine model effectively simulated peri-implantitis, providing a viable preclinical model for studying the condition. Although statistical differences were not observed, aPDT demonstrated potential in reducing bacterial presence and inflammation, suggesting its utility as an adjunctive therapy in managing peri-implantitis. Further research is needed to optimize treatment protocols and explore the role of defect type in treatment success.

PD047 | Long Versus Short Concave Neck Implants: A Histological Study About the Effect on Peri-Implant Soft and Hard Tissues

M. Petrini[1], G. Iezzi[1], E. D'Amico[1], T.V. Pierfelice[1], H. Antoun[2], F. Bonnet[3], F.M. Muñoz Guzón[4,5], D. Botticelli[6]
[1]University of Chieti, Chieti, Italy, [2]Institut de Formation en Chirurgie Implantaire Avancée, Paris, France, [3]L'Institut de Formation FIDE, Cannes, France, [4]University of Santiago de Compostela, Lugo, Spain, Lugo, Spain, [5]Ibonelab, Lugo, Spain, [6]ARDEC Academy, Rimini, Italy

Background & Aim: The abutment micro- and microgeometry can influence hard and soft peri-implant tissue quality and quantity. Concave abutments were significantly associated with higher percentages of collagen bundles, greater bundle size, and fewer longitudinally oriented bundles than the divergent neck. This study investigated the influence of the abutment's neck height on peri-implant tissues.
Methods: The sample size calculation was performed, and the study protocol was approved. Eight dogs were subjected to the extraction of mandibular posterior teeth. Sixteen one-piece implants with concave abutments of two different heights were inserted 1 mm sub-crystally three months later. Healing caps were attached to the implants and left to heal for three months, not submerged. Then, the dogs were sacrificed, and specimens were subjected to histological analysis by another examiner, blinded to the study protocol, and statistical analysis was performed.
Results: All implants were osseointegrated. Regardless of the groups, a modest inflammatory infiltrate was observed in several specimens, mainly localized at the junctional epithelium level, but no gaps at the implant-bone interfaces were found. In all specimens, peri-implant mucosa showed well-represented tissue maturation, collagen fiber organization, junctional epithelium, and connective tissue formation. In the longitudinal sections of the group 'long', collagen fibers perpendicular to the implant's longitudinal axis were intertwined with the transverse fibers. The perpendicular fibers were detected in the same area of short neck implants, but the longitudinal ones were less numerous and further away from the surface. Bone remodeling, partial crestal, and marginal bone loss were found around all implants, particularly in those with short necks. Although no statistically significant differences were found among the two groups, the soft tissue and bone crest height was higher in the group long.
Conclusions: Concave long necks seem to be associated with higher-quality peri-implant tissues than short ones.

PD048 | A Prospective Evaluation of Subgingival Irrigation With i-PRF Following Non-Surgical Treatment of Periimplantitis

L. Deterville[1], C. Birgy[1], S. Toma[1], J.F. Lasserre[1]
[1]Université catholique de Louvain/Cliniques universitaires Saint Luc, Orthodontics and Periodontology, Brussels, Belgium

Background & Aim: Peri-implantitis, an inflammatory condition around dental implants, is challenging to manage with conventional non-surgical treatments alone. Emerging adjunctive therapies like glycine air-polishing and injectable platelet-rich fibrin (i-PRF) show potential to enhance decontamination, promote healing, and improve treatment outcomes. Aim: To assess the clinical and radiographic effectiveness of non-surgical treatment for mild peri-implant lesions using glycine air-polishing in combination with i-PRF.
Methods: For this prospective case series, nine patients ($n = 14$ implants) with at least one implant exhibiting signs of mild peri-implantitis (Radiographic bone loss visible and up to 4 mm, < 25% of the implant length) were selected. All implants received identical treatment, consisting of non-surgical mechanical debridement with an air abrasive device (PERIOFLOW) followed by subgingival irrigation with injectable platelet-rich fibrin (i-PRF). Clinical parameters such as plaque index (PI), bleeding on probing (BOP), suppuration on probing (SOP), probing pocket depth (PPD), relative attachment level (RAL), marginal bone loss (MBL), and recession were evaluated at baseline (M0) and at 3 and 6 months (M3 and M6) ($p > 0.05$, ANOVA, Bonferroni).
Results: Results indicated that PI significantly decreased over 6 months to a mean value of < 0.5. Both BOP ($p < 0.05$) and SOP ($p < 0.05$) were substantially reduced at 3 months, although a slight increase was noted at 6 months. Mean PPD was 3.61 ± 0.917 mm ($p < 0.05$) at M6, and RAL gain was significantly improved at 6 months (7.76 ± 1.29 mm, $p < 0.05$). MBL showed a significant improvement (1.12 ± 1.29 mm, $p < 0.05$). Most mucosal recession occurred within the first 3 months, with no significant change at 6 months.

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Conclusions: i-PRF following glycine air-polishing significantly seems to enhances clinical outcomes and maintains bone levels for at least six months; however, successful management of bleeding on probing is essential for optimal implant health. Further randomized clinical trials are recommended to validate i-PRF's efficacy as an adjunctive treatment for peri-implantitis.

PD049 | Less Postoperative Pain After Peri-Implantitis Treatment With Cold Atmospheric Plasma

C. Pink[1], R. Matthes[1], B. Holtfreter[1], K. Jepsen[2], J. Wiltfang[3], F. Schwarz[4], C. Eberhard[5], T. Kocher[1], L. Jablonowski[1], PeriPLas Study Group
[1]University Medicine Greifswald, Department of Restorative Dentistry, Periodontology and Endodontology, Greifswald, Germany, [2]University of Bonn, Department of Periodontology, Operative and Preventive Dentistry, Bonn, Germany, [3]University Hospital of Schleswig-Holstein, Department of Oral and Maxillofacial Surgery, Kiel, Germany, [4]Johann Wolfgang Goethe-University, Department of Oral Surgery and Implantology, Frankfurt, Germany, [5]Dentsply Sirona, Bensheim, Germany

Background & Aim: Bacterial colonisation of dental implant surfaces can trigger inflammation and subsequent bone loss. Pilot_PeriPLas (DRKS-ID: DRKS00026673) therefore evaluates the efficacy of cold atmospheric plasma cleaning in controlling inflammation and promoting bone regeneration in a multi-centre, randomised clinical pilot trial. This analysis focuses on postoperative pain perception and analgesic medication.
Methods: Since January 2022, 61 potential participants were recruited across four study centres (Bonn, Kiel, Frankfurt am Main, Greifswald). Of these, 50 were enrolled and randomised into two groups: water jet and cold plasma treatment (test group; 26 patients/45 implants) or gauze pellet treatment (control group; 24 patients/40 implants). Postoperative pain perception using a visual analogue scale and the number of analgesics taken were recorded on a daily basis. Periodontal measurements at 6, 12, 24 and 36 months post-treatment are ongoing. Multilevel linear and logistic regression models were used to compare the treatment groups, adjusting for study centre, age, sex, smoking, education, and number of implants treated.
Results: The participants were 45.9% male and had between 1 and 6 implants treated. At baseline, they were 66.1 ± 10.9 years old and there were no significant differences between treatment groups. The average pre-treatment mean probing depth per implant was 5.5 ± 1.4 mm for the control group and 5.4 ± 1.4 mm for the test group. During the first 5 days post-treatment, the mean pain score was 23.4 ± 23.8 among controls, notably higher than 16.4 ± 15.8 among tests patients. Adjusted models showed a difference of $B = -8.65$ (95% CI: −17.26; −0.04) in mean pain scores and 0.36 fewer analgesics per day in the test group compared to the controls (95% CI: −0.63; −0.08).
Conclusions: Treatment with water jet and cold plasma was associated with significantly less postoperative pain and less need for analgesics. This may represent an additional benefit of the test treatment if confirmed by long-term clinical outcomes.

PD050 | The Effect of Different Decontamination Methods on Surface Contamination of Implant Healing Abutments

E. Cetinsoy[1], B. Gokce[2], A. Gurkan[1]
[1]Ege University Faculty of Dentistry, Department of Periodontology, Izmir, Turkey, [2]Ege University Faculty of Dentistry, Prosthodontics, Izmir, Turkey

Background & Aim: Successful dental implant treatments depend heavily on maintaining sterile conditions, including healing abutments. These components should ideally be single-use. However, they are often reused due to practical and economic factors. Various decontamination methods exist, including mechanical cleaning and chemical disinfection, yet no standardized protocol is established. This study aims to identify the most effective decontamination techniques for clinical use. We hypothesize that combined decontamination procedures, specifically ultrasonic cleaning with chemical disinfectants followed by autoclaving, will significantly reduce surface contamination compared to single-method approaches.
Methods: The study utilized 100 healing abutments removed from patients, divided into five groups, each undergoing different decontamination protocols. Pre-cleaning involved a 15-minute enzymatic treatment followed by staining and photographing to assess contamination. Decontamination groups included:
Group 1: Autoclaving only.
Group 2: Ultrasonic cleaning with enzymatic disinfectant + autoclaving.
Group 3: Ultrasonic cleaning with a citric/maleic/lactic acid mixture + autoclaving.
Group 4: Ultrasonic cleaning with sodium hypochlorite + autoclaving.
Group 5: Ultrasonic cleaning with tap water + autoclaving.
Post-treatment, abutments were re-photographed, and surface contamination was analyzed using ImageJ software. Statistical significance was determined using ANOVA with Bonferroni-Dunn correction.
Results: Results showed significant differences among groups. Group 1 had the least effectiveness, while Groups 2, 3, and 4 exhibited substantial contamination reduction, with Group 2 being particularly effective. Group 5 showed moderate results, outperforming Group 1 but not reaching the efficacy of the others.
Conclusions: The study confirms that multi-step decontamination methods are superior in reducing surface contamination on healing abutments compared to autoclaving alone. Further research, including SEM/EDX analysis, is warranted to explore these findings and their implications for implant success and patient outcomes.

PD051 | The Evaluation of the Recurrence of Peri-Implantitis After Different Surgical Treatment Approaches. A Systematic Review

K. Budreikaitė[1], D. Skripkauskas[1], S. Demirjian[1], E. Ramanauskaitė[1], N. Basevičienė[1]
[1]Lithuanian University of Health Sciences, Faculty of Odontology, Kaunas, Lithuania

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Background & Aim: Peri-implantitis is an inflammatory condition characterized by soft tissue inflammation and bone loss around dental implants, with prevalence rates between 28% and 51%. Various factors, such as bacterial biofilm, patient habits (e.g., smoking, poor dental care), environmental factors, and dentist expertise, may influence the onset and progression of the disease. As the number of dental implants increases, so will the incidence of peri-implantitis, highlighting the need for effective management strategies to prevent disease recurrence. To evaluate the recurrence rate of peri-implantitis (RecPI) following surgical treatment, considering different treatment approaches, including open flap, resective, and regenerative techniques.
Methods: Clinical trials with a minimum follow-up period of 2 years that assessed surgical treatment of peri-implantitis and its recurrence rate were included in the review. Other inclusion criteria were: English language, ability to access a full text.
Results: The systematic review included 10 studies with 934 implants in total. In studies using open flap debridement, 525 implants affected by peri-implantitis of which 261 (50.67%) exhibited the recurrence of the disease. Furthermore, research on surgical resective treatment approach revealed that out of 288 implants treated, 65 (22.57%) experienced the recurrence. Meanwhile, studies evaluating regenerative treatment reported 121 treated implants, with recurrence observed in 36 (29.75%) implants.
Conclusions: The extensive review analyzing the recurrence rates of peri-implantitis after different surgical treatment approaches indicates that the recurrence of a disease is dependent on the surgical intervention. In particular, open flap debridement demonstrated the highest recurrence, regenerative treatment presented a moderate, and resective method was associated with the lowest recurrence of peri-implantitis.

PD052 | Influence of Abutment Height and Supportive Peri-Implant Therapy Compliance on Marginal Bone Levels

N. Padros Creus[1], F. Al Hajeb[1], M. Muñoz Carcavilla[1], J. Vilarrasa[1], G. Pardo[1], Á. Babiano[1], V. Ruíz-Magaz[1], J. Nart[1]
[1]International University of Catalonia, Department of Periodontology, Barcelona, Spain

Background & Aim: This 7-year randomized clinical trial aimed to evaluate the long-term impact of abutment height (1-mm vs. 3-mm) on marginal bone loss and the prevalence of peri-implant diseases. The study explored whether 3-mm abutments would provide better bone level stability and lower rates of peri-implantitis compared to 1-mm abutments.
Methods: Sixty-three implants were placed in 37 patients, with either 1-mm (control group) or 3-mm (test group) definitive abutments. Marginal bone level changes from baseline to 7 years were measured using radiographs. Peri-implant clinical variables such as probing depth, bleeding on probing, keratinized mucosa width, and peri-implant health status (mucositis, peri-implantitis) were also evaluated. Patient-related factors (smoking, oral hygiene, and peri-implant maintenance compliance) were also assessed.
Results: At the 7-year follow-up, 3-mm abutments demonstrated significantly lower marginal bone loss compared to 1-mm abutments ($p = 0.016$), particularly at mesial sites. Implants with 3-mm abutments showed only 3.2% peri-implantitis, compared to 18.2% in the 1-mm group. However, peri-implant mucositis was more prevalent in the 3-mm group (74.2%) compared to the 1-mm group (54.6%), but without statistical significance ($p = 0.158$). Additionally, compliance with peri-implant maintenance therapy was suboptimal, with only 16.2% of patients fully compliant, potentially influencing the prevalence of peri-implant diseases.
Conclusions: Over the long term, implants with 3-mm abutments exhibited less marginal bone loss and a lower risk of peri-implantitis compared to 1-mm abutments. These findings suggest that using higher abutments may offer a protective effect against bone loss and peri-implantitis, contributing to the long-term stability of subcrestally placed implants.

PD053 | Impact of Bone Substitute Materials and Metal Artefact Reduction on the Assessment of Buccal Bone Level at Implants With CBCT—A Laboratory Study

F. Beck[1], L. Schropp[2], K. Bertl[3], K. Hellén-Halme[4], C. Ulm[1], P. Heimel[5], S. Lettner[5], A. Stavropoulos[6]
[1]University Clinic of Dentistry, Medical University of Vienna, Division of Oral Surgery, Vienna, Austria, [2]Aarhus University, Department of Dentistry and Oral Health, Aarhus, Denmark, [3]Sigmund Freud University Vienna, Department of Periodontology, Vienna, Austria, [4]University of Malmö, Department of Oral and Maxillofacial Radiology, Malmö, Sweden, [5]University Clinic of Dentistry, Medical University of Vienna, Karl Donath Laboratory for Hard Tissue and Biomaterial Research, Division of Oral Surgery, Vienna, Austria, [6]Malmö University, Periodontology, Faculty of Odontology, Malmö, Sweden

Background & Aim: The accuracy of cone-beam computed tomography (CBCT) to correctly display the buccal bone at implants is questioned. This study aimed to evaluate the impact of the presence of bone substitutes and application of metal artifact reduction (MAR) on assessing the buccal bone at implants.
Methods: One implant bed was prepared in 36 porcine bone blocks with a buccal bone thickness (BBT) of 0.5–1, >1–1.5, or >1.5–2 mm. In two-thirds of the bone blocks, a buccal dehiscence of random vertical extent (1–9 mm) was created. CBCT scans were performed with the following set-ups: bone block (1) without an implant (reference), (2) with the implant (±MAR), (3) as (2) mounted with a zirconia crown (±MAR), (4) and (5) as (3) with demineralized bovine bone mineral (DBBM) or hydroxyapatite/beta-tricalcium phosphate (HA/TCP), respectively, covering the buccal aspect and without MAR. Two observers assessed the absence/presence and vertical extent of the dehiscence. Reference values (1) were verified by intraclass correlation and compared to those in the various set-ups.
Results: Both observers assessed the absence/presence of a dehiscence with a high sensitivity (0.977) and specificity (≥0.931). However, the thinner the buccal bone, the more incorrect was the assessment. The highest mean error in linear measurements was observed for HA/TCP in the thinnest BBT group (average overestimation: 2.38 mm); DBBM demonstrated a smaller average overestimation than HA/TCP (1.48 mm). MAR (average

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

under-/overestimation: −0.18 to 0.54 mm) was closest to the reference value, however, MAR underestimated in ca. 30% of the cases the extent of the dehiscence.
Conclusions: The presence of bone substitute materials as well as a thin BBT impeded the correct assessment of the buccal bone level at implants with CBCT. MAR improved visualisation of the buccal bone, especially in cases with BBT ≤1 mm, but defect extent is then often underestimated.

PD054 | Narrow Versus Standard Diameter Implants: Clinical Outcomes and Prosthetic Complications in Different Arch Configurations

O. Kantzuker[1], P. Raz[1], G. Slutzkey[1], A. Sebaoun[1], I. Beitlitum[1]
[1]*The Maurice and Gabriela Goldschleger School of Dental Medicine, Faculty of Medicine, Tel Aviv University, Department of Periodontology and Oral Implantology, Tel Aviv, Israel*

Background & Aim: Narrow diameter implants (NDIs) have emerged as an alternative to standard diameter implants (SDIs) in cases of limited bone width or restricted interdental space, potentially eliminating the need for bone augmentation procedures. To evaluate and compare the clinical performance of NDIs versus SDIs. Assessing implant survival rates, peri-implant bone level changes, and mechanical complications across three configurations: parallel positions in the same arch, different arches, and splinted/non-splinted restorations within the same arch.
Methods: This retrospective study analyzed records of 43 partially edentulous patients treated at Tel-Aviv University (2012–2022). Patients received minimum one NDI (3.3 mm) and one SDI (3.75–4.2 mm), with 3-years minimum follow-up. Patients were stratified into three categories based on implant configuration and location.
Results: Study included 43 patients (25 females, 18 males, mean age 52.7 ± 8.3 years) with 100 implants (50 NDIs, 50 SDIs) evaluated at final follow-up (mean 4.2 ± 0.8 years). Implant distribution showed 58% posterior, 42% anterior placement; 62% maxilla, 38% mandible. Prosthetically, 54% received single crowns, 46% splinted prostheses. Both implant types showed 100% survival rate, with comparable mean marginal bone loss MBL values (NDIs: 0.836 mm, SDIs: 0.877 mm), showing no significant difference. Technical complications occurred only in NDIs: one abutment screw fracture (2%) and two cases of screw loosening (4%), while SDIs showed no complications.
Conclusions: NDIs demonstrated comparable clinical outcomes to SDIs in both anterior and posterior regions, with minimal technical complications over the three-year follow-up period. These findings support the use of NDIs as a viable treatment option for single or splinted restorations in cases of limited bone width or restricted interdental space.

PD055 | Biofabrication of an In Vitro Human Oral Mucosa Model

M. Gavriiloglou[1], M.F. Teres[2], M. Hammad[2], N. Bostanci[3], P. Layrolle[2], D. Apatzidou[1]
[1]*Aristotle University of Thessaloniki, Preventive Dentistry, Periodontology & Implant Biology, Thessaloniki, Greece,* [2]*INSERM-CHU Purpan, UMR 1214, ToNIC, Toulouse, France,* [3]*Karolinska Institute, Dental Medicine, Stockholm, Sweden*

Background & Aim: 3-dimensional human oral mucosa equivalents have become a powerful tool in studying the aetiopathogenesis and treatment of periodontal and peri-implant diseases and an ethical alternative to animal experiments. The aim of this study is to reconstruct oral mucosa equivalents by defining the optimal cell culture conditions of the self-assembly of gingival fibroblasts and keratinocytes.
Methods: Human gingival fibroblasts (GFB-16) and gingival epithelial keratinocytes (HGEK-16) immortalized by the expression of human papillomavirus E6/E7 viral oncogenes were cultured by self-assembling in different culture conditions and media. GFB-16 were cultured with DMEM medium supplemented with 10% SVF, 1% P/S, G-418 and 50 µg/mL ascorbic acid for 28 days. Then, HGEK-16 keratinocytes were seeded on the cell sheets and cultured in D-KSFM medium. Two days later, the constructs were placed at the air-medium interface and cultivated for 12 days in a mixture of 1/3 F12: DMEM medium supplemented with Green's medium, to allow the differentiation of epithelial cells. Characterisation of the engineered mucosa was performed by immunofluorescence and confocal microscopy.
Results: 8×10^4 GFB-16 cells per cm^2 in 24-well plates and 50 µg/ml of ascorbic acid were found to be the optimal conditions to form 3D fibroblast cell sheets and to promote the production of a collagenous extracellular matrix. 1×10^5 HGEK-16 were seeded and formed an upper keratinocyte layer that was cultured at the air medium interface. Microstructures of the 3D human oral mucosa constructs formed after 42 days were evidenced by CK14 and Vimentin antibodies for keratinocytes and fibroblasts.
Conclusions: This self-assembly 3D model was established with the presence of both cell types and an initial characterisation by immunofluorescence. However, the engineered tissue appeared to be very thin compared to native tissue. Further histological sections need to be performed to provide a detailed characterisation of the reconstructed tissue.

PD056 | Association Between Mouth Breathing and Gingival Inflammation in Adults: A Multicenter Cross-Sectional Study

R. Fernández-Durán[1], I. Zabalegui[1,2], M. Martínez[1], M. López-Durán[1], F. Noguerol-Sicilia[1,3], L. Novoa[4], A. Marcos-Teran[2], C. Galleti[5], P. Batalla-Vázquez[4], A. Carbó-Cortés[5], M. Sanz[1]
[1]*Universidad Complutense de Madrid, Madrid, Spain,* [2]*Zabalegui Periodoncia, Bilbao, Spain,* [3]*Universidad de Granada, Granada, Spain,* [4]*Universidad de Santiago de Compostela, Santiago, Spain,* [5]*Universidad Internacional de Cataluña, Barcelona, Spain*

Background & Aim: Studies have shown that mouth-breathing children exhibit a higher prevalence of gingival inflammation than nasal breathers, although no significant differences in plaque index were observed. These findings suggest that other pathogenic mechanisms related to breathing patterns may contribute to the development of gingival inflammation, beyond the mere increase in dental biofilm. Currently, there are no previous studies analyzing the influence of mouth breathing on gingival

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

inflammation in adults. Therefore, the aim of this study was to investigate the association between mouth breathing and gingival inflammation in adults.

Methods: Systemically healthy adults, aged 30–65 years, were recruited at four universities and one private practice in Spain. Participants completed an objective exhalation permeability test and a questionnaire regarding their breathing habits to determine their breathing pattern (nasal, mixed or mouth breathing). Additionally, a periodontal examination of anterior sextants was performed. The primary outcome variable was the gingival index. Age, sex, dental crowding, smoking, and the patient's periodontal diagnosis were registered as potential confounders. Student's *t*-test and ANOVA were used to evaluate intergroup differences.

Results: In total, 62 patients were included for a preliminary analysis of the results and are presented based on the two diagnostic methods used to determine the patient's breathing pattern. A relationship between mouth breathing and gingival inflammation was determined based on the gingival index and bleeding on probing across all groups. In the questionnaire, the nasal group had a mean gingival index of 0.68 ± 0.51, whereas in the mouth breathing group was 1.00 ± 0.65 ($p = 0.045$). In the exhalation permeability test, mouth breathers exhibited greater bleeding on probing (0.50 ± 0.39) compared to nasal breathers (0.19 ± 0.13) ($p = 0.011$). Plaque index for nasal, mixed and mouth breathers were 0.37 ± 0.29, 0.53 ± 0.35 and 0.82 ± 0.50 respectively ($p = 0.004$).

Conclusions: Mouth breathing was associated with gingival inflammation in a systemically healthy adult population.

PD057 | Evaluation of the Changes in LRP5 and TPH1 Levels due to Periodontal Inflammation

Z.D. Guner[1], M. Atak[1], S. Mirzaliyeva[2], H. Ranjbar[2], B.S. Gazioğlu[2], U. Yildiz[2], M.A. Serdar[3], S. Kurgan[1]
[1]Ankara University Faculty of Dentistry, Periodontology, Ankara, Turkey, [2]Ankara University Faculty of Dentistry, Ankara, Turkey, [3]Acibadem University School of Medicine, Department of Medical Biochemistry, Istanbul, Turkey

Background & Aim: Low-density lipoprotein receptor-associated protein 5 (LRP5) is a known regulator of bone mineral density. LRP5 activation is thought to have an inhibitory effect on tryptophan hydroxylase 1 (TPH1), the regulatory enzyme in serotonin synthesis, and consequently causes a decrease in the level of serotonin, which has an inhibitory effect on osteoblasts. The aim of this study was to determine the changes in LRP5 and TPH1 levels in serum and saliva samples due to periodontal inflammation and to evaluate the relationship between these values and clinical periodontal parameters.

Methods: Saliva and serum samples were collected from 20 systemically healthy stage III periodontitis patients and 20 periodontally healthy control individuals. Salivary and serum LRP5 and TPH1 levels were analyzed by enzyme-linked immunosorbent assay (ELISA). Clinical periodontal parameters (plaque index [PI], probing pocket depth [PD], bleeding on probing [BOP], clinical attachment level [CAL]) were recorded.

Results: Salivary LRP5 and TPH1 levels were significantly higher in the periodontitis group than in the control group ($p = 0.007$ and $p = 0.037$, respectively). Serum TPH1 levels were significantly lower in the periodontitis group ($p < 0.05$). A positive correlation was found between salivary LRP5 and TPH1 and serum LRP5 and TPH1 levels ($p < 0.001$, $\rho = 0.738$, $\rho = 0.680$, respectively). There was a significant positive correlation between salivary LRP5 levels and clinical periodontal parameters (PI, PD and BOP) ($p < 0.05$, $\rho = 0.335$, $\rho = 0.365$, $\rho = 0.327$, respectively). There was a negative correlation between serum TPH1 level and clinical periodontal parameters (PI, PD and CAL) ($p < 0.05$, $\rho = -0.333$, $\rho = -0.328$, $\rho = -0.458$, respectively).

Conclusions: Our results suggest that LRP5 and TPH1, which are associated with bone metabolism, may play a role in periodontitis, an inflammatory disease associated with bone loss.

PD058 | Metabolomics Analysis of Saliva and Serum Samples in Young Patients With Grade C Molar Incisor Pattern Periodontitis

M.M. Alamri[1,2], G. Proctor[3], A.L. Guennec[4,5], L. Nibali[1]
[1]King's College London, Periodontology Unit, Centre for Host-Microbiome Interactions, Faculty of Dentistry, Oral & Craniofacial Sciences, London, United Kingdom, [2]King Saud University, Dental Health Department, Riyadh, Saudi Arabia, [3]King's College London, Centre for Host-Microbiome Interactions, Faculty of Dentistry, Oral & Craniofacial Sciences, London, United Kingdom, [4]King's College London, Centre for Biomolecular Spectroscopy, London, United Kingdom, [5]King's College London, Randall Centre for Cell and Molecular Biophysics, London, United Kingdom

Background & Aim: Metabolomics is one of the omics technologies focusing on detecting metabolites in biological samples, which aid in recognizing the alteration between healthy and diseased conditions, leading to discovering biomarkers for diagnosis, treatment and recovery. This cross-sectional study aimed to investigate metabolomic profile differences in saliva and serum from young patients with grade C molar incisor pattern periodontitis (C/MIP) and age-matched controls.

Methods: Saliva and serum samples were collected from 62 patients, divided into 31 cases and 31 periodontally healthy age-matched controls. Two analytical techniques were used to detect metabolites: nuclear magnetic resonance (NMR) for saliva and mass spectrometry (MS) for serum. Differences between C/MIP and controls were tested using multivariate regression analysis with Bonferroni corrections at ($p < 0.001$) for saliva samples and ($p < 0.0001$) for serum samples.

Results: After adjusting for covariates, C/MIP had lower salivary dimethylamine, proline and glycine ($p < 0.001$), lower serum 2,2-Bis(hydroxymethyl) propionic acid, 1-[(9Z)-octadec enoyl]-2-tetradecanoyl-sn-glycero-3-phosphocholine, decanoylcarnitine, 4-picoline, tranexamic acid, 2-hydroxy-5-vinylphenyl hydrogen sulfate, and L-serine ($p < 0.0001$), and higher serum methyl indole-3-acetate, N-(3-Acetamidopropyl) pyrrolidin-2-one, 4-ethyl-2-methoxyphenyl hydrogen sulfate, and sulfosalicylic acid ($p < 0.0001$) than controls. Correlations between saliva

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

and serum metabolites were assessed but were not statistically significant.

Conclusions: This study shows the initial efforts in identifying metabolic profile differences in serum and saliva from young patients (≤25) with C/MIP. Three saliva and 11 serum metabolites were significantly associated with C/MIP; however, their role in C/MIP pathogenesis is unclear due to not being previously studied in periodontics. Further research on a larger sample size is needed to understand their role in host immunity and inflammation and confirm their potential as diagnostic biomarkers.

PD059 | The Genetic Basis of Periodontitis: Insights From a Western Cape Population

S. Kabbashi[1], M. Chetty[1], H. Holmes[2], Y. Prince[3], E. Ndonwi[3]
[1]University of the Western Cape, Craniofacial Biology, Pathology, and Radiology, Cape Town, South Africa, [2]University of the Western Cape, Oral Medicine and Periodontology, Cape Town, South Africa, [3]Cape Peninsula University of Technology, Biomedical Sciences, Cape Town, South Africa

Background & Aim: Periodontitis has seen a steady global rise over the past three decades, especially in Africa, where socio-economic barriers limit access to dental care. The disease often remains undiagnosed until irreversible damage occurs, with the host's immune-inflammatory response playing a significant role. Research indicates that genetic factors contribute to susceptibility, which varies across populations. Identifying these genetic variations, alongside the microbial profile, can aid in early diagnosis and prevention, key to managing this costly and time-intensive condition. This study aimed to identify genetic polymorphisms influencing periodontitis susceptibility and characterize the sub-gingival bacterial communities in a Western Cape population. It sought to compare genetic profiles of periodontitis patients with healthy individuals and investigate the relationship between genetic and bacterial profiles.

Methods: A case-control study was conducted with 150 South-African participants, comprising 75 periodontitis cases and 75 healthy controls. An initial bacterial pilot study was performed on a subset of 10 participants (5 cases and 5 controls), while the core investigation focused on SNP genotyping for all 150 participants using saliva samples. Bacterial samples underwent 16S metagenomics analysis, while genetic data were assessed using the OpenArray system. Statistical tests, including Chi-square, *t*-tests, and logistic regression, were used to analyze associations between SNPs and clinical variables.

Results: The bacterial study revealed differences in microbiome structure, with periodontitis patients showing enrichment of Fusobacterium. Genetically, SNPs in OPG+1181, RANKL-RL2, and IL-17A+197 were linked to higher plaque scores, while TNF-α-238 and IL-1B-511 variants were associated with lower risk of periodontitis. No significant association between bacterial and genetic profiles was found.

Conclusions: The study underscores the importance of genetic diversity in periodontitis susceptibility, highlighting the need for larger sample sizes and standardized research approaches. These findings support the development of precision diagnostic tools, especially for underserved populations.

PD060 | Microbial Complexes in Subgingival Plaque: A Bacterial and Eukaryotic Metataxonomic Study

J. Santi-Rocca[1], D.F. Martín-García[1], I. Lorca Alonso[2], S. González-de la Fuente[2], B. Aguado[2], M. Bonner[3], V. Amard[4], P. Amiot[4], C. Bar[4], V. Berbon[4], N. Berkani[4], A. Burke[4], I. Cartagena[4], J.-M. Chatard[4], C. Coutayar[4], G. Depraz[4], I. Morales[4], N. Popa[4], S. Regniers[4], T. Rissoan[4], C. Robert[4], A. Tremoureux[4], M. Verdy[4], M. Fresno Escudero[5,6,7], N. Gironès Pujol[5,6,7]
[1]Science and Healthcare for Oral Welfare, Toulouse, France, [2]Biocomputational Analysis Core Facility (SABio), Centro de Biología Molecular Severo Ochoa, Consejo Superior de Investigaciones Científicas, Universidad Autónoma de Madrid, Madrid, Spain, [3]International Institute of Periodontology, Victoriaville, Canada, [4]Association Médicale contre les Infections Buccales (AMIB), Saint-Maur-des-Fossés, France, [5]Centro de Biología Molecular Severo Ochoa, Consejo Superior de Investigaciones Científicas, Universidad Autónoma de Madrid, Madrid, Spain, [6]Instituto de Investigación Sanitaria del Hospital Universitario de La Princesa, Madrid, Spain, [7]Universidad Autónoma de Madrid, Departamento de Biología Molecular, Madrid, Spain

Background & Aim: To celebrate the 25 years of the contribution of Socransky and his colleagues, we proposed to provide an actualized representation of subgingival microbiota diversity and dynamics across health and disease.

Methods: Subgingival plaque from 135 patients (41 healthy, 47 gingivitis, 47 periodontitis) was analysed by sequencing the V3-V4 16S (bacteria) and V5-V5 18S rRNA (eukaryotes) rRNAs. Sequences were assigned to unambiguous taxon groups (UTGs) using a genuine probabilistic, non-exclusive bioinformatic procedure. Beyond univariate analyses across health groups, samples were reclassified into microbial patterns using unsupervised clustering. Microbial community ordination was performed via correlation analyses.

Results: In total, 756 bacterial UTGs were detected: 240 per sample, with 120 representing more than 96.92% of the bacteriome, of which around a quarter remain uncultured or not fully characterized. Among the 10 UTG hierarchical clusters, 2 were associated with health, and 2 with disease. Samples were grouped into 6 microbial patterns by k-clustering, correlating with disease progression and bacterial clusters.

Among the 375 eukaryotic UTGs, *Homo sapiens* initially accounted for 60.5% of the reads and *Saccharomyces cerevisiae*, 27.6%. After molecular interference with their sequencing, we determined that *Entamoeba gingivalis* was ubiquitous, with variable proportions of the ST1 and ST2 subtypes. *Trichomonas tenax* reads were less abundant than *E. gingivalis* in general, and more prevalent in disease. Parasites were less frequently observed by microscopy: their quantification relative to bacteria is currently performed.

Conclusions: Shifts in dominant microbial clusters mark the transition from health to disease. The variability within clusters and 'boundary taxa' linking them highlight the complexity of microbial dynamics. Eukaryotes can help refine our understanding of the oral microbiota in health and disease, as well as archaea, viruses, and viroids. These new data, thanks to advances in molecular biology and bioinformatics, helped refine

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Socransky's model, providing new targets for research, diagnosis, prophylaxis, and therapy.

PD061 | Serum Antibody Levels to Periodontal Species Associate With Decreased Risk of Periodontitis Progression

P. Pussinen[1], E. Salasuo[2], A. Salminen[2], K. Buhlin[3], J. Sinisalo[4], P. Mäntylä[1], S. Paju[2]
[1]University of Eastern Finland, Kuopio, Finland, [2]University of Helsinki, Helsinki, Finland, [3]Karolinska Institutet, Huddinge, Sweden, [4]Helsinki University Hospital, Helsinki, Finland

Background & Aim: The presence and amount of periodontal bacterial species in the oral cavity is the main determinant of their antibody levels and the extent of periodontitis has a modifying effect. We analysed whether serum antibodies associate with periodontitis stage and grade as well as periodontitis progression.
Methods: The Parogene cohort including patients undergone coronary angiography had a mean (SD) age of 63.3. (9.1) years and 64.8% were males. Serum IgG antibody levels against five species were determined and summed up. Periodontal stage and grade were evaluated using panoramic tomography at baseline and in the 12-year follow-up appointment.
Results: From a total of 489 patients available, 31 (6.3%) did not have periodontitis, while 40 (8.2%) had initial, 215 (43.9%) moderate and 203 (41.5%) severe periodontitis. Among the periodontitis patients, 44 (9.6%) were classified to grade A, 368 (80.5%) B, and 45 (9.8%) C. Among the 99 participants of the follow-up, 24 (24.2%) presented periodontitis progression, while 25 (25.3%) suffered from advanced tooth loss. At baseline, periodontitis stage explained of 11.1% ($p=0.014$) of the serum IgG variance but periodontitis grade did not ($p=0.05$). Serum IgG against periodontal species associated with decreased risk of periodontitis progression with an OR (95% CI) 0.51 (0.28–0.93) independently of age, sex, smoking, and diabetes. The antibody levels did not associate significantly with tooth loss ($p=0.4$).
Conclusions: Periodontitis stage is associated with systemic IgG antibodies to multiple periodontal species. The antibodies may protect against progression of periodontitis.

PD062 | Knockout of *Slc7a11* Impairs Osteogenic Differentiation and Bone Formation in Experimental Periodontitis Mice

J. Bao[1], L. Chen[1]
[1]The Second Affiliated Hospital, College of Medicine, Zhejiang University, Department of Periodontology, Hangzhou, China

Background & Aim: Periodontitis, a chronic inflammatory disease, is characterised by progressive alveolar bone destruction due to immune responses that release pro-inflammatory cytokines, such as IL-1β, disrupting bone homeostasis. As key regulators of bone homeostasis, osteoblasts exhibit reduced survival and function in periodontitis-affected tissues. Metabolic cell death, driven by cellular metabolism imbalances, is increasingly recognised in disease progression. The cystine transporter SLC7A11 is critical for metabolic cell death, regulating cystine-glutamate exchange essential for glutathione synthesis, thus maintaining antioxidant defences and cellular function. Recently, reduced SLC7A11 expression has been noted in periodontitis, but its precise role in bone destruction remains unclear. This study investigates the role of SLC7A11 in osteogenic differentiation and bone formation within an experimental periodontitis model.
Methods: A murine periodontitis model was induced *via* ligation, with samples collected on Day 7. IL-1β and SLC7A11 expression in healthy and periodontitis-affected tissues were analysed by immunohistochemistry and qPCR. Osteoblasts isolated from the murine mandible were treated with IL-1β and *Slc7a11*-targeting siRNA to assess SLC7A11 expression, cell viability, and osteogenesis. A cKO mouse of *Slc7a11* in osteoblasts was established using the *Col1a1* Cre-LoxP system. Alveolar bone destruction, inflammatory infiltration, and osteogenic markers expression were analysed by micro-CT, H&E staining, and immunohistochemistry.
Results: In the periodontitis model, IL-1β levels were elevated, while SLC7A11 expression decreased, correlating with pronounced alveolar bone destruction. IL-1β suppressed SLC7A11 expression, osteoblast viability and differentiation. *Slc7a11* knockdown inhibited osteogenesis, and combined IL-1β with *Slc7a11*-targeting siRNA exacerbated this effect. Micro-CT analysis revealed that *Slc7a11* cKO mice exhibited reduced vertical alveolar bone height and bone volume fraction, resulting in more severe bone destruction compared to controls. H&E and immunohistochemical staining confirmed a reduction in osteoblast numbers and osteogenic markers expression in *Slc7a11* cKO mice.
Conclusions: *Slc7a11* knockout exacerbated alveolar bone destruction by impairing osteoblast viability and differentiation, highlighting its potential as a therapeutic target for periodontitis.

PD063 | The Role of HIF-1α/HO-1 Signaling Pathway in Periodontal Ligament Stem Cells Ferroptosis Under Hypoxia

X. Chang[1], Y. Han[1], C. Lin[1], J. Hou[1]
[1]Peking University School and Hospital of Stomatology, Department of Periodontology, Beijing, China

Background & Aim: As a critical transcription factor responsive to hypoxia, HIF-1α plays a pivotal role in regulating cell fate under hypoxic microenvironment associated with periodontitis. Ferroptosis of periodontal ligament stem cells (PDLSCs) is a novel pathological mechanism of periodontitis, yet this process remains elusive. Here, the study aimed to investigate the underlying mechanisms of the HIF-1α and downstream signals in PDLSCs ferroptosis.
Methods: Established mouse periodontitis model and used cobalt chloride ($CoCl_2$) to mimic hypoxia-stimulated cells in vitro. Periodontitis pathogenicity was analyzed by micro-CT and histology. Immunohistochemistry and immunofluorescence were used to assay the expression of HIF-1α and its downstream HO-1, as well as to evaluate the ferroptosis-related genes

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

expression. In vitro, typical characteristics of ferroptosis were detected under $CoCl_2$ stimulation, with or without the ferroptosis inhibitors Fer-1 and DFO. By knocking down the expression of HIF-1α and HO-1 respectively, revealed its essential effects in ferroptosis. In addition, the direct relationship between HIF-1α and HO-1 was detected by immunofluorescence co-localization, dual luciferase reporter gene assay and ChIP-qPCR.

Results: The expression of HIF-1α and HO-1 significantly are increased in periodontitis model, accompanied by reduction of SLC7A11 and GPX4 proteins. However, these changes were ameliorated after Fer-1 treatment. In vitro, the activity of PDLSCs was reduced under hypoxia. The mitochondria showed the typical morphology of ferroptosis. The Fe^{2+} levels and cellular antioxidant capacity were decreased. The mRNA and protein expression of HIF-1α, HO-1 and NCOA4 were significantly upregulated, while the SLC7A11, GPX4 and FTH expression were decreased. It suggested that autophagy-mediated ferritin degradation could be involved in PDLSCs ferroptosis. In addition, HIF-1α targets the HO-1 promoter and in turn activates downstream ferroptosis signaling pathway.

Conclusions: Hypoxia induces PDLSCs ferroptosis and the periodontal tissue of periodontitis undergoes ferroptosis. Mechanically, hypoxia stability upregulates HIF-1α expression, which targeted HO-1 transcription and regulated downstream ferroptosis.

PD064 | Long-Term Splinting of Teeth With Severe Periodontal Compromise: Case Series

B. Matos[1,2], S. Matos[1,2,3], O. Martins[1,2,3], J.C. Ramos[1,2]
[1]Portuguese Institute of Dental Medicine, Aveiro, Portugal, [2]University of Coimbra, Dentistry Department, Coimbra, Portugal, [3]University of Coimbra, Institute of Periodontology and Institute of Medicine and Oral Surgery, Coimbra, Portugal

Background & Aim: Severe periodontitis can lead to major clinical sequelae, such as severe loss of periodontal support, tooth mobility, pathological migration, chewing discomfort and impaired masticatory function, which negatively impacts in patients' quality of life. Temporary/definitive splinting with occlusal adjustment is a viable approach to improve patient's chewing and phonetic comfort and facilitate oral hygiene procedures. The aim of this case series is to evaluate retrospectively questionable and hopeless teeth with severe periodontal compromise in the lower-anterior sextant, treated with a reinforced composite resin splint, during long-term supportive periodontal therapy (SPT).

Methods: 10 clinical cases were selected (6 male and 4 female, age between 50 and 85 years), with a mean periodontal bone loss of 72.20% ± 9.41% and tooth mobility grade 2 or 3 in the lower-anterior sextant. Patients were monitored from a periodontal and occlusal point of view and teeth were splinted with composite resin and reinforcement means ($n = 50$) for active periodontal treatment (steps 2 and 3). Patients were enrolled in a SPT with a mean follow-up of 16.50 ± 2.99 years (ranging from 12 to 23 years follow-up).

Results: The primary outcome was the determination of survival rate of splinted teeth (tooth loss). Secondary outcomes were the evaluation of radiographic bone level, clinical performance of splints in a long term basis and centered patient satisfaction. The survival rate was 92%, with only one case experiencing the loss of 4 teeth, due to root fracture, at 23 years of age. There was an improvement in radiographic bone level of 1.80% ± 13.58% and all splints required at least 1 repair (2.4 ± 1.65). Overall, patients expressed satisfaction with this treatment option.

Conclusions: Splinting of teeth with a reduced periodontal support can be maintained in a healthy and comfortable state through long-term SPT. Despite the need for regular splint repairs, patient acceptance levels are high.

PD065 | The Effect of Periodontally Accelerated Osteogenic Orthodontics on Periodontal Phenotypes in Adult Patients With Skeletal Class II Malocclusion: A Retrospective Cohort Study

F. Yin[1], M. Li[1], Q. Chen[1], X. Chen[1], X. Feng[1], X. Chen[1], G. Qi[1]
[1]Stomatology Hospital, School of Stomatology, Zhejiang University School of Medicine, Zhejiang Provincial Clinical Research Center for Oral Diseases, Key Laboratory of Oral Biomedical Research of Zhejiang Province, Cancer Center of Zhejiang University, Hangzhou, China

Background & Aim: In adult patients with skeletal class II malocclusion, insufficient labial alveolar bone in the lower anterior region often leads to higher periodontal complications. Periodontally accelerated osteogenic orthodontics (PAOO), building on corticotomy, effectively reshapes the alveolar bone through bone augmentation. This retrospective cohort study aims to evaluate the effect of PAOO on periodontal phenotypes of the lower anterior teeth in these patients.

Methods: This study included 30 patients with skeletal Class II malocclusion who were recommended for PAOO surgery due to insufficient labial alveolar bone in the lower anterior region from 2021 to 2022. They were divided into the PAOO group (15 patients, orthodontic treatment +PAOO) and the control group (15 patients, orthodontic treatment only). Basic characteristics of patients, periodontal phenotypes, and teeth were collected from the medical record system and cone-beam CT images.

Results: At 1-year post-treatment, there were statistical differences in the increment of keratinized gingival width (KGW) and thickness (KGT) and gingival recession (GR) between the PAOO group (0.76 ± 1.03 mm, 0.38 ± 0.82 mm, and −0.06 ± 0.80 mm respectively) and the control group (−0.53 ± 0.97 mm, −0.08 ± 0.60 mm, and 0.18 ± 0.41 mm, $p < 0.01$). The increment in labial bone height in the PAOO group (2.90 ± 3.77 mm) was prominently higher than that in the control group (−3.56 ± 4.48 mm, $p < 0.001$). In addition, the PAOO group achieved a substantial increase in labial bone thickness at 4, 6, and 8 mm from the cemento-enamel junction, and apex level (0.59 ± 0.90 mm, 1.09 ± 0.97 mm, 1.08 ± 0.97 mm, 3.28 ± 1.18 mm respectively) compared to the control group (−0.39 ± 0.51 mm, −0.11 ± 0.51 mm, 0.11 ± 1.01 mm, 0.05 ± 1.55 mm, $p < 0.01$). Interestingly, the PAOO group had less reduction in root length, although there was no statistical difference compared to the control group.

Conclusions: PAOO surgery can improve the periodontal phenotypes of patients with skeletal Class II malocclusion, manifesting as increased KGW, KGT, alveolar bone thickness and height, and decreased GR.

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

PD066 | Success Rate of Crown Lengthening Procedures—A Systematic Review and Meta-Analysis

R. Ang[1], G.P. López[2], G.P. Zamora[3], N. Mardas[4], R. Garcia[1]
[1]Kings College London, Periodontology, London, United Kingdom, [2]Hospital Universitario Morales Meseguer Clínica Odontológica Universitaria, Departamento de Dermatología, Estomatología, Radiología y Medicina Física Facultad de Medicina (Sección Odontología), Murcia, Spain, [3]Universidad de Murcia, Departamento de Dermatología, Estomatología, Radiología y Medicina Física Facultad de Medicina (Sección Odontología), Murcia, Spain, [4]QMUL, Barts & The London School of Dentistry, Periodontology, London, United Kingdom

Background & Aim: The success rate of crown lengthening procedures is based on various clinical, aesthetic and patient reported outcomes. Focused question: What is the success rate of crown lengthening procedures based on a set of well and clear predefined clinical aesthetic and patient reported outcomes.
Methods: The search strategy incorporated both electronic search and hand search. The following electronic databases were utilised:

i. MEDLINE via Ovid interface;
ii. EMBASE via Ovid interface; and
iii. The Cochrane Central Register of Controlled Trials (CENTRAL).

In addition hand search was conducted to all relevant journals up to May 2024. Only prospective randomised clinical trials were included in the analysis. ROB2 tool was used for quality assessment.
Results: The initial search yielded 9924 papers, excluding the 34 papers that were selected through hand search. A total of 102 articles were selected for full-text analyses and 16 RCT were included for final analyses. Of the 16 studies included, 10 presented a high risk of bias, 2 were having some concerns and 4 were of a low risk of bias. Most of the papers reported a significant increase in clinical crown length. In regards to aesthetic outcomes, different and no comparable assessment methods were used. None of the selected studies reported on the overall success rate based on criteria set a priori.
Conclusions: Composite success indicators for crown-lengthening procedures should be reported more consistently in future research based on a predefined set of clinical, aesthetic and patient reported outcomes similar to those investigated in this study.

PD067 | Risk Factors for Non-Carious Cervical Lesions: Evaluation the Role of Gingival Recession, Anxiety, Stress, Bruxism and Eating Disorders

V. Gandillot[1,2], K. Hadjisavva[1], D. Chekroun[1], C. Mocquot[3,4], M.C. Carra[5,6]
[1]Université Paris Cité, Service of Odontology, Rothschild Hospital (AP-HP) and Department of Periodontology, Paris, France, [2]Institution Nationale des Invalides, Paris, France, [3]Université de Rennes, CHU de Rennes (Pôle Odontologie), Rennes, France, [4]Laboratoire des Multimatériaux et Interfaces (LMI), UMR CNRS 5615, Lyon, France, [5]Université Paris Cité, INSERM-CRESS Methods Team, Epidemiology and Statistics Research Centre, Paris, France, [6]University of Ferrara, Department of Translational Medicine, Ferrara, Italy

Background & Aim: Non-carious cervical lesions (NCCLs) are a common condition characterized by the loss of dental hard tissue at the cervical region of the tooth not caused by caries.
This cross-sectional study aimed to investigate the association between the presence and severity of NCCLs and risk factors, such as: periodontal diseases, stress, anxiety and depression.
Methods: Consecutive adult patients attending the Department of Odontology were asked to fill validated questionnaires assessing the level of stress, anxiety, and depression (DASS21). A clinical examination was performed to identify the presence and severity of NCCLs (based on the DSW system), and the periodontal status. Descriptive statistics and multivariable regression analysis were performed.
Results: The study comprised 180 patients (mean age: 46.15 ± 19.3 years); 33.9% was diagnosed with periodontitis. At least one NCCL was observed in 108 patients (patient-level prevalence of NCCL: 60%). Patients were divided into 3 groups: no NCCL ($n=72$), severe NCCLs (≥1 NCCL with a width and/or depth >2 mm) ($n=70$), and non-severe NCCLs ($n=38$). The number of NCCL per patient positively correlated with the severity of the lesions ($r=0.690$, $p<0.001$). Moreover, patients with severe NCCLs were older ($p<0.001$), more frequently smokers ($p<0.023$), asthmatic ($p=0.045$), taking medications ($p=0.006$), and diagnosed with periodontitis ($p<0.001$). Patients with severe NCCL reported severe stress levels more frequently than the other two groups ($p=0.009$).
At the tooth level, 682 teeth (15.3%) presented with a NCCL. A significant correlation was found between the presence of gingival recession and the depth ($r=0.463$, $p<0.001$), shape ($r=0.479$, $p<0.001$), and width ($r=0.532$, $p<0.001$) of the NCCL. In the multivariable regression, age, smoking, periodontitis, and severe stress level were found to be significantly associated with severe NCCL.
Conclusions: These results shed light on NCCLs risk factors, including psychological aspects that should be considered in the diagnostic and therapeutic approaches for patients with NCCLs.

PD068 | The Role of the Periodontology in Acute Facial Fractures: Part One—Reducing Surgical Site Infections in Mandibular Fractures

D. Leigh van As[1], N.H. Binti Shamsul Bahrin[1], S. Holmes[2], D. Chatzopoulou[1]
[1]Queen Mary University of London (QMUL), Barts and The London School of Medicine and Dentistry, London, United Kingdom, [2]Barts Health NHS Trust, Oral-Maxillofacial, London, United Kingdom

Background & Aim: This study investigates whether integrating periodontal support into the maxillofacial trauma clinic correlates with a reduction in surgical site infection (SSI) rates following transoral mandibular fracture repairs. By comparing outcomes with the pre-integration cohort, this research aims to

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

determine if periodontal involvement can play a significant role in reducing SSIs in mandibular trauma patients.
Methods: A retrospective analysis was conducted on patients with mandibular fractures treated at the Royal London Hospital from January 2021 to January 2023, following the introduction of a periodontal team to the Multidisciplinary trauma team. Using an identical methodology in a control group (pre-integration) prior to this innovation, we then analysed SSI rates among patients treated with and without periodontal involvement against the control group. Descriptive statistics and statistical associations were evaluated using SPSS.
Results: The study shows a notable reduction in SSI rates, decreasing from 22.95% in the control group to 12.5% in the current cohort, indicating a statistically significant improvement associated with periodontal team involvement. Additionally, the positive predictive value of advanced periodontal disease (Stages 3 and 4) as a risk factor for SSIs dropped from 53.85% to 16.13%, highlighting the benefit of periodontal management even among higher-risk patients. These results suggest that periodontal support may be pivotal in reducing SSI rates in maxillofacial trauma cases.
Conclusions: This study demonstrated statistical significance in reducing SSI rates in mandibular fracture patients treated in conjunction with periodontal support in acute trauma situations. These differences have real-time phenotypically relevant clinical values in terms of patient mobility and outpatient and in-patient costings. Given the increased level of dental disease in this patient cohort, the benefits are striking. The impact of this multidisciplinary approach suggests that periodontal support could become a fundamental part of maxillofacial trauma protocols, with the potential to enhance patient outcomes and set new benchmarks in trauma care.

PD069 | Features of Local Immune Response in Patients With Endo-Periodontal Lesions

N. Bagdasaryan[1], T. Aksenova[1], N. Taranova[1], S. Triandafilov[2], S. Triandafilova[2], F. Mafagel[1], L. Maryanenko[1]
[1]Kuban State Medical University, Department of Dentistry, Krasnodar, Russian Federation, [2]Kuban State Medical University, Krasnodar, Russian Federation

Background & Aim: Features of the course of combined endo-periodontal lesions are determined by the state of both the general and local immune response. The activity indexes of neutrophil bactericidal systems in the focus of endo-periodontal inflammation has not been sufficiently studied. To study features of local immune response taking into account the bactericidal activity of neutrophils in patients with endo-periodontal lesions.
Methods: Forty-three patients with clinical endodontic pathology against the background of initial and moderate periodontitis and 30 patients with periodontitis without pulp damage and apical periodontium were examined. In all patients, the level of interleukin and IL-1Ra receptor antagonist in oral fluid, as well as myeloperoxidase and non-enzymatic cationic proteins in regional pool neutrophils (zone of the affected tooth) were determined.
Results: All patients with periodontitis showed an increase of IL-1b levels, more pronounced with exacerbation of inflammation, as well as a significant decrease of the level of non-enzymatic cationic proteins in neutrophils from the inflammation zone. IL-1Ra level was increased relative to the control values in patients with periodontal lesions without endodontic pathology, the myeloperoxidase activity in local pool neutrophils herewith corresponded to the control values or was slightly reduced. In the presence of endo-periodontal pathology, IL-1Ra remained within the control values, in addition, a significant decrease in myeloperoxidase activity in neutrophils from the affected tooth zone was noted.
Conclusions: The revealed changes in the local immune response are characteristic of an acute inflammatory process in the periodontium. At the same time, it is noteworthy that endo-periodontal lesions are associated with rigidity of IL-1Ra level and a significant violation of the activity of bactericidal systems of local pool neutrophils. This fact requires further investigations. The study of the local immune response features, taking into account the functional activity of neutrophils as first-line defense cells is of interest for developing a rational therapy plan.

PD070 | Knowledge and Need of Education Toward Oral Diseases by Students in Midwifery in France

A. Vasileiou[1], L. Brillaux[1], C. Petit[1], P.-Y. Gegout[1], O. Huck[1]
[1]Université de Strasbourg, Faculté de Chirurgie Dentaire, Department of Periodontology, Strasbourg, France

Background & Aim: Pregnancy is associated with hormonal, immunological, and behavioral changes that can affect oral health. Increased gingival inflammation due to fluctuating estrogen and progesterone levels often leads to gingival bleeding, as seen in various studies. Maternal periodontal diseases are linked to adverse pregnancy outcomes, such as preterm birth and preeclampsia. Despite safe and effective oral interventions, there is a lack of awareness about the importance of dental care during pregnancy. This is partly due to misconceptions and misleading information, particularly from social networks. This study aims to evaluate midwifery students' knowledge and awareness of oral health during pregnancy and to assess the extent to which oral health is included in their training.
Methods: A cross-sectional study was conducted among French midwifery students (2nd to 5th year) in November 2023. A self-administered questionnaire was distributed via email, consisting of 31 questions covering four domains: demographics, knowledge of oral health and pregnancy, the inclusion of oral health in their education, and clinical experience. Responses were collected anonymously. Statistical analyses were performed using XL Stat (Lumivero, France), with data expressed in frequencies and proportions.
Results: Among 420 participants, 96.4% agreed that dental consultations can occur during pregnancy, and 95.0% acknowledged the importance of oral health care. However, only 66.9% were aware of the connection between oral health and adverse pregnancy outcomes, and 50.9% knew what periodontitis is. Notably, 62.4% reported that oral health is not covered in their courses. Only 16.0% frequently recommend dental check-ups to pregnant women.
Conclusions: The study revealed significant gaps in knowledge among midwifery students regarding oral health during

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

pregnancy, particularly its role in adverse outcomes. Improved education and training are essential to promote better oral health practices and patient referrals.

PD071 | Correlation Between Smile Characteristics and Facial Patterns in Patients With Dentofacial Deformities

R. Cimões[1], C. Fontan[1], C. Andrade Lima[1], V. Silva[1], R. Siqueira[2], J. Silva Neto[3]
[1]Universidade Federal de Pernambuco, Recife, Brazil, [2]Virginia Commonwealth University, Richmond, Virginia, United States, [3]Universidade de Pernambuco, Recife, Brazil

Background & Aim: This study aimed to evaluate the correlation between smile characteristics and facial patterns in patients with dentofacial deformities.
Methods: A retrospective analysis was conducted using records of patients with dentofacial deformities from a public hospital and a private oral and maxillofacial surgery clinic in Recife, Brazil. Electronic health records and photographs were reviewed to categorize gender (male or female), skeletal facial pattern (Pattern II, Pattern III, Long Face, Short Face, dolichocephalic, brachycephalic, and mesocephalic), and smile characteristics (smile line, smile arc, smile design, curvature of the upper lip, lip/tooth ratio, and number of teeth shown).
Results: Data from 187 individuals were included in the analysis. Pattern III (48.1%) was the most prevalent skeletal pattern, with a majority being female (62.6%). Most Pattern II (94.9%) and Pattern III (82.2%) patients were classified as mesocephalic. The smile line was found to correlate with the vertical dimension of the face. Smile arc and smile design were similar in facial patterns with a comparable occlusal plane inclination. Only the Short Face group showed no significant differences in any of the evaluated smile aspects.
Conclusions: Smile characteristics were correlated with the morphology of facial patterns.

PD072 | Safety and Accuracy Assessment of Dynamic Computer Assisted Localized Piezoelectric Alveolar Decortication: An In Vitro Study

J. Calvo-Zuluaga[1], A. Jorba-Garcia[1], J. Bara-Casaus[1], C. Subirà-Pifarré[1], O. Camps-Font[1]
[1]Universitat de Barcelona, Department of Odontostomatology, L'Hospitalet de Llobregat, Spain

Background & Aim: Currently, there is only a case report evaluating dynamic CACS in Piezocision. Although its promising results, further research is needed to corroborate these findings and fully establish the benefits and limitations of this technology in this specific application. Accordingly, the aim of this randomized in vitro study was to assess the safety and accuracy of dynamic computer assisted corticotomy surgery (dCACS) in comparison with freehand piezocision.
Methods: A randomized in vitro study was conducted. A total of 260 interradicular corticotomies were performed in 20 identical printed models. dCACS was performed in half of the models, while the rest underwent freehand localized decortication. Accuracy was measured in the three spatial axes by overlapping the digital planning with a previous cone-beam computed tomography (CBCT) scan of the patient and a postoperative CBCT of the models. Safety was determined as the number of damaged root surfaces. Descriptive and bivariate analyses were performed.
Results: Freehand corticotomies were associated with a significantly higher risk of iatrogenic root damage ($p < 0.001$). Both techniques exhibited some deviation from the digital planning; however, the accuracy of dynamic computer-assisted implant surgery (dCACS) was markedly superior in terms of sagittal ($p < 0.001$), axial ($p < 0.001$), and angular deviation ($p < 0.001$) when compared to freehand surgery, with depth being the only parameter where no significant difference was observed. Despite its advantages, dCACS required an additional 18 minutes to complete (95% CI: 10.43–26.24; $p < 0.001$).
Conclusions: dCACS demonstrates significantly greater precision and safety compared to the freehand technique, as evidenced by reduced deviations in corticotomy positioning and lower risk of iatrogenic complications. However, this approach is associated with a statistically significant increase in surgical duration, which should be factored into clinical workflow and planning.

PD073 | Impact of Autoclaving on the Dimensional Stability of 3D-Printed Surgical Guides for Crown Lengthening: An In Vitro Study

A. González-Barnadas[1], J. Baulenas-Alsina[1], A. Jorba-Garcia[1], V. Ruiz-Romero[1], A. Ribas-García[1], B. Añoveros-Puig[1], J. Miranda-Rius[1], O. Camps-Font[1]
[1]Universitat de Barcelona, Department of Odontostomatology, L'Hospitalet de Llobregat, Spain

Background & Aim: Surgical guides are widely used in aesthetic crown lengthening procedures. This study aimed to assess the impact of the 3D printing process and subsequent steam autoclaving on the dimensional stability of surgical guides manufactured with four different 3D printers.
Methods: Forty surgical guides were designed using Exocad DentalCAD software and fabricated with four different 3D printers, following each manufacturer's specifications. The printers included two digital light processing models (NextDent 5100 and SprintRay Pro55S), one stereolithography printer (Formlabs 3B+), and one liquid crystal display stereolithography printer (Phrozen Sonic Mini 4K). All guides underwent steam autoclaving at 134°C, 2 bar for 5 min. Each guide was scanned using a desktop scanner (3Shape E4) both before and after autoclaving. The study evaluated the trueness and precision of the overall surface and the regions of interest (RoIs). The repeatability of the accuracy was assessed across its dimensions in the *x*, *y* and *z* axes. Digitized guides were compared with the original CAD control design using Control X (Geomagic) software. Statistical analysis involved descriptive statistics, a repeated measures mixed model, and post-hoc pairwise comparisons. The level of significance was set at $p < 0.05$, using Bonferroni's correction for multiplicity of contrasts.

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jope.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Results: Three-dimensional printing resulted in significant dimensional alterations across all groups. Steam autoclaving led to substantial shrinkage in the *x*-axis ($p < 0.001$), y-axis ($p < 0.001$), and *z*-axis ($p < 0.001$). Significant differences in trueness and precision were observed between groups in both the overall surface and the regions of interest (RoIs) ($p < 0.001$). Among the groups, the NextDent printer demonstrated the highest repeatability. Notable statistical differences in the three spatial axes were identified in the Phrozen group.
Conclusions: Most guides exhibited minor but statistically significant shrinkage, attributed to the 3D printing process and subsequent steam autoclaving cycles. The degree of shrinkage varied notably among the different printers.

PD074 | *Porphyromonas gingivalis* Lipopolysaccharide Impairs Endothelial Barrier Integrity by Down-Regulating Intercellular Junctions Expression

N. An[1], H. Chen[1], Y. Liu[1]
[1]*Peking University School and Hospital of Stomatology, Beijing, China*

Background & Aim: To investigate the effect of *Porphyromonas gingivalis* lipopolysaccharide (*P. g*-LPS) on vascular endothelial barrier integrity.
Methods: Human umbilical vein endothelial cells (HUVECs) were cultured until they reached confluence, the cells were stimulated with 10 μg/mL *P. g*-LPS, FITC-Dextran trans-endothelial permeability assay was performed to assess the endothelial barrier permeability. After stimulation with different concentrations of *P. g*-LPS, real-time quantitative polymerase chain reaction (real-time PCR) was taken to detect the expression of the intercellular junctions vascular endothelial-cadherin (VE-cadherin) and zonula occludens-1 (ZO-1), as well as occludin and claudin-5.
Results: Changes in the concentration of FITC-Dextran in the lower chamber of the Transwell occurred as soon as the endothelial cells were stimulated with *P. g*-LPS for 4 h, endothelial barrier permeability further increased with time, and endothelial barrier dysfunction became more significant. After 24 h of *P. g*-LPS stimulation in 1, 10 and 100 μg/mL groups, the decrease of tight junction ZO-1 gene expression was 38.68% ± 3.73%, 39. 89% ± 3.73% and 43.18% ± 3.73% respectively ($p < 0.0001$), and the decrease of claudin-5 gene expression was 64.32% ± 20.54%, 70.02% ± 20.54% and 69.46% ± 20.54% respectively ($p < 0.05$). The gene expression of occludin was significantly decreased (37.32% ± 5.17%, 35.52% ± 5.17% and 42.01% ± 5.17%, $p < 0.001$) as well. Moreover, after stimulating HUVECs with different concentrations of *P. g*-LPS for 24 h, adherens junction VE-cadherin gene expression in the 1 μg/ml, 10 μg/ml and 100 μg/ml groups was significantly lower than that in the control group (52.19% ± 16.88%, 56.09% ± 16.88% and 53.30% ± 16.88%, $p < 0.05$).
Conclusions: *P. g*-LPS can disrupt the endothelial barrier by down-regulating the expressions of intercellular junctions VE-cadherin, ZO-1, occludin and claudin-5, as well as increase the endothelial barrier permeability and disrupt endothelial barrier integrity, which may prompt endothelial barrier dysfunction.

PD075 | Study on the Role of Interleukin-22 in Regulating the Expression of Gingival Epithelial Barrier Proteins E-Cadherin in Periodontitis

C. Zhang[1], L. Tan[1], L. Gao[1], C. Zhao[1]
[1]*Hospital of Stomatology, Sun Yat-sen University, Department of Periodontology, Guangzhou, China*

Background & Aim: Gingival epithelial cells (GECs) are the main cellular component of the gingival epithelial barrier and the first line of defense against pathogenic bacteria. E-cadherin is a key protein of the gingival epithelial barrier. Studies have shown that IL-22 maintains the homeostasis of the epithelial barrier and plays a protective role in the epithelium. However, whether IL-22 is involved in regulating E-cadherin expression in periodontitis remains to be studied. Therefore, we sought to explore the effect of IL-22 on the E-cadherin expression and its possible mechanisms in periodontal inflammatory environment.
Methods: GECs were stimulated with IL-22 and/or *Porphyromonas gingivalis* (*P. gingivalis*). Western blot and immunofluorescence were used to detect the change of E-cadherin expression. Meanwhile, the levels of the antioxidant factor heme oxygenase-1 (HO-1) were detected by Western blot. In vivo, experimental mouse periodontitis model was established by oral gavage with *P. gingivalis* and *Fusobacterium nucleatum* (*F. nucleatum*), and the local administration of IL-22 was used to confirm the role of IL-22 on the expression of E-cadherin and HO-1 in the gingival epithelium.
Results: Western blot results showed that the expression of E-cadherin was decreased after *P. gingivalis* infection of GECs, and IL-22 increased the level of E-cadherin. Immunofluorescence results showed that the fluorescence intensity of E-cadherin at the junction of GECs was reduced after *P. gingivalis* infection, while the fluorescence intensity of E-cadherin in the *P. gingivalis*+IL-22-treated group was enhanced compared to *P. gingivalis* group. Meanwhile, the expression of HO-1 was downregulated after *P. gingivalis* stimulation, and IL-22 restored the expression of HO-1. In vivo, the downregulation of E-cadherin and HO-1 expression were observed in periodontitis gingival tissue, and the levels of E-cadherin and HO-1 were increased after IL-22 treatment.
Conclusions: IL-22 inhibited the down-regulation of E-cadherin expression in periodontal inflammatory environment, and its regulation of E-cadherin may be related to antioxidant HO-1.

PD076 | Sphingolipid Synthesis by *Porphyromonas gingivalis* Regulates Neutrophil Response

F. Oner[1,2], M. Yu[1], C. Alvarez Rivas[1], J. Greatorex[3], P. Zimmerman[1], D. Irimia[3,4], M.E. Davey[1], A. Kantarci[1,5]
[1]*ADA Forsyth Institute, Cambridge, Massachusetts, United States,* [2]*Istinye University, Periodontology, Istanbul, Turkey,* [3]*Massachusetts General Hospital, Center for Engineering in Medicine and Surgery, Boston, Massachusetts, United States,* [4]*Harvard Medical School, Boston, Massachusetts, United States,* [5]*Harvard School of Dental Medicine, Oral Microbiology and Infection, Boston, Massachusetts, United States*

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Background & Aim: *P. gingivalis* sphingolipids (SLs) have been detected in periodontitis lesions. Their impact on neutrophils, which drive the progression of periodontal disease, is unknown. In this study, we tested the hypothesis that SL-synthesis by *P. gingivalis* regulates neutrophil response.
Methods: We pulsed primary neutrophils with *P. gingivalis* W83 and its SL-null mutant partner. We analyzed the phagocytosis of *P. gingivalis*, and the expression of toll-like receptor (TLR) 2, TLR4, and sphingosine 1 phosphate receptor 1 (S1PR1) on neutrophils by flow cytometry. We measured neutrophil chemotaxis in transwell and microfluidic systems. We measured IL-8, TNFα, IL-1β, MIP-1α, G-CSF, GM-CSF, IFNγ, IL-13, IL-10, IL-7, IL-9, IL-15, TGFα and GRO release by Luminex. We used GraphPad to analyze all data sets.
Results: Phagocytosis of *P. gingivalis* W83 was significantly lower at 15- and 30-min compared to phagocytosis of the SL-null mutant ($p < 0.0001$). SL synthesis improved the survival of *P. gingivalis* in neutrophils, and significantly decreased the neutrophil recruitment at 1, 2 and 4 h ($p = 0.0074$ for 1 h, $p < 0.05$ for 2 and 4 h). SLs suppressed the inflammatory mediator release; IL-8, TNFα, IL-1β, MIP-1α, G-CSF, GM-CSF, IFNγ, IL-13, IL-10, IL-7, IL-9, IL-15, TGFα and GRO levels were significantly lower ($p < 0.05$) in cultures with the parent strain than those with the SL-null mutant. SL synthesis stimulated TLR2 expression ($p = 0.0002$) while preventing S1PR1 expression ($p < 0.05$).
Conclusions: SL synthesis by *P. gingivalis* decreases neutrophil chemotaxis, phagocytosis, and inflammatory mediator release.

PD077 | Macrophage-Derived IL-23 Orchestrates Periodontal Disease Pathogenesis via Pathogenic Th17 Cell Activation

R.-Y. Huang[1,2], P.-Y. Hsiao[1], W.-C. Cheng[1,2], C.-E. Sung[1,2]
[1]National Defense Medical Center and Tri-Service General Hospital, Department of Periodontology, Taipei, Taiwan, [2]Taiwan Academy of Periodontology, Department of Periodontology, Taipei City, Taiwan

Background & Aim: Periodontal disease is characterized by inflammatory bone loss, but the specific mechanisms governing disease progression remain incompletely understood. Interleukin-23 (IL-23) has emerged as a critical cytokine in inflammatory diseases, though its precise role in periodontal disease pathogenesis has not been fully elucidated.
Methods: This study employed wild-type (WT) and IL-23 knockout (KO) mouse models with ligature-induced periodontal disease. Disease progression was evaluated through multiple approaches, including bone loss measurements, immunohistochemistry, Western blot analysis, flow cytometry, microbiome analysis, and gene expression profiling. The investigation particularly focused on immune cell infiltration, bone remodeling, and T cell responses.
Results: IL-23 expression significantly increased with disease severity ($p < 0.001$) and strongly correlated with inflammatory cell infiltration ($R^2 = 0.5416$, $p < 0.0001$), with macrophages identified as the primary source (approximately 80% of IL-23+ cells were CD68+). IL-23 deficiency significantly protected against bone loss, as evidenced by ~50% reduction in CEJ-ABC distances ($p < 0.001$) and preserved bone volume in KO mice compared to WT controls. The absence of IL-23 substantially modified the inflammatory response, demonstrated by decreased expression of pro-inflammatory mediators TNF-α (~3-fold, $p < 0.001$), IL-1β (~4-fold, $p < 0.01$), and IL-6 (~5-fold, $p < 0.01$). Notably, IL-23 KO mice showed a significant reduction in pathogenic Th17 cells (> 60% decrease, $p < 0.001$) compared to WT mice, accompanied by distinct changes in the periodontal microbiome composition, particularly in the relative abundance of key bacterial species.
Conclusions: This study demonstrates that IL-23 serves as a key mediator in periodontal disease progression by orchestrating inflammatory responses, particularly through the modulation of pathogenic Th17 cell development and subsequent bone loss. The protective effects observed in IL-23 deficient mice suggest that targeting the IL-23 pathway may represent a promising therapeutic strategy for periodontal disease management.

PD078 | Inhibition of MAP Kinase Signaling Pathways and IL-17 Production in *Porphyromonas gingivalis* Infection: In Silico and Vitro Study

S. Castro Trindade[1,2], R. Bulhosa Santos[2], G. Pedral Sampaio[2], A. Hintz[1], A.P. Fróes de Farias[2], J.T. Raynal Filho[2], Y. Andrade de Oliveira[3], P.C. Carvalho Filho[1], S. Seixas da Cruz[4], J. Passos-Soares[5], L. Coimbra[1], G. Florentino[1], M. Mascarenhas[1], R. Meyer[2], M. Tosta Xavier[2], I. Suzart Gomes-Filho[1]
[1]Feira de Santana State University, Health, Feira de Santana, Brazil, [2]Federal University of Bahia, Laboratory of Immunology and Molecular Biology, Salvador, Brazil, [3]Feira de Santana State University, Postgraduate Program in Biotechnology, Feira de Santana, Brazil, [4]Federal University of Recôncavo da Bahia, Health Sciences Center, Santo Antônio de Jesus, Brazil, [5]Federal University of Bahia, Preventive Dentistry, Faculty of Dentistry, Salvador, Brazil

Background & Aim: *Porphyromonas gingivalis* is a microorganism considered a keystone pathogen in periodontal dysbiosis. It has virulence factors that are essential for its survival. Among them, lys-gingipains (Kgp) and the outer membrane lipoprotein HmuY stand out for their immunogenic potential, eliciting both innate and adaptive immune responses. This study aimed to evaluate the role of the three Mitogen Activated Protein Kinases (MAP kinases) pathways—MAPK p38, Jun N—Terminal Kinase (JNK) and Extracellular Signal-Regulated Kinase 1/2 (ERK1/2) - in the production of interleukin 17 (IL-17) induced by *P. gingivalis* antigens.
Methods: The gingipain Kgp12 was synthesized after prediction by bioinformatics tools for in silico analysis (IEDB reference ID 1032999) and the recombinant protein was produced by cloning. Somatic antigens were obtained by sonication. The monocytic cell line THP-1, with and without inhibition of MAPK signaling pathways, were cultured with the antigens. The concentration of IL-17 in culture supernatants was measured by flow cytometry and were compared using the ANOVA and the Dunnet post-hoc tests.
Results: The production of IL-17 by THP-1 significantly decreased ($P < 0.001$) in the supernatant of cells cultured with *P. gingivalis* somatic antigens, which the signaling pathways MAPKp38 (16.21 ± 0.20), JNK (10.26 ± 0.38) and ERK1/2 were inhibited, in comparison with the cells without inhibition (34.53

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

± 1.29). Cells cultured with rHmuY had their IL-17 production increased ($P < 0.001$) when the MAPKp38 (23.95 ± 0.51), JNK (17.41 ± 0.89) and ERK1/2 (12.26 ± 0.26) pathways were inhibited, compared to cells without inhibition (6.83 ± 0.15). In cells cultured with Kgp12, IL-17 production decreased when the ERK1/2 pathway (6.723 ± 0.350) was inhibited ($P < 0.001$), when compared with cells without pathway inhibition (8.20 ± 0.19).
Conclusions: *P. gingivalis* antigens induce IL-17 production through different MAP kinase pathways, which are a possible target for blocking the pathogenesis of periodontitis.

PD079 | NRF2 Nuclear Translocation and Interaction With DUSP1 May Regulate Osteogenic Differentiation of Murine Mandibular Osteoblasts Stimulated by *Pg*-LPS

Y. Wei[1], Z. Wang[1]
[1]*The Second Affiliated Hospital, College of Medicine, Zhejiang University, Department of Periodontology, Hangzhou, China*

Background & Aim: Periodontitis is characterized by alveolar bone resorption, aggravated by osteoblast dysfunction, and associated with intracellular oxidative stress linked to nuclear factor erythroid-2-related factor 2 (NRF2) levels. We evaluated the molecular mechanism of periodontitis onset and development and the role of NRF2 in osteogenic differentiation.
Methods: Primary murine mandibular osteoblasts were extracted and exposed to *Pg*-lipopolysaccharide (LPS) or other stimuli. Reactive oxygen species and JC-1 staining were used to detect intracellular oxidative stress. Alkaline phosphatase and alizarin red S staining were used to detect the osteogenic differentiation of osteoblasts. Immunofluorescence and western blotting determined changes in the mitogen-activated protein kinase (MAPK) pathway and related molecule activities. Immunofluorescence colocalization and co-immunoprecipitation were performed to examine the nuclear translocation of NRF2 and its interaction with dual-specific phosphatase 1 (DUSP1) in cells.
Results: Ligated tissue samples showed higher alveolar bone resorption rate and lower NRF2 levels than did healthy periodontal tissue samples. *Pg*-LPS increased intracellular oxidative stress levels and inhibited osteogenic differentiation, whereas NRF2 expression changes correlated with oxidative stress and osteogenesis rate changes. NRF2 promoted dephosphorylation of the MAPK pathway by nuclear translocation and upregulation of DUSP1 expression, thus enhancing the osteogenic differentiation capacity of mandibular osteoblasts. Interaction between NRF2 and DUSP1 was observed.
Conclusions: NRF2 and its nuclear translocation may regulate the osteogenic differentiation of mandibular osteoblasts under *Pg*-LPS conditions by interacting with DUSP1 in a process linked to the MAPK pathway. These findings may form the basis of periodontitis treatment.

PD080 | Cathepsin D Inhibition Attenuates Periodontal Inflammation and Alveolar Bone Loss in Experimental Periodontitis

W.-C. Cheng[1], T.-Y. Kou[1], S.-M. Chih[1], R.-Y. Huang[1], C.-E. Sung[1]
[1]*National Defense Medical Center and Tri-Service General Hospital, Department of Periodontology, Taipei, Taiwan*

Background & Aim: Cathepsin D (CTSD) is a lysosomal protease implicated in various inflammatory diseases; however, its role in periodontitis remains unclear. This study investigated the contribution of CTSD to periodontal inflammation and evaluated the therapeutic potential of its inhibitor, Pepstatin A (Pep A).
Methods: Using a ligature-induced periodontitis mouse model, we examined the effects of local Pep A administration (5 and 10 mg/mL) on periodontal inflammation, bone loss, and tissue degradation. CTSD expression and activity, immune cell infiltration, and inflammatory markers were analyzed through histology, micro-CT, flow cytometry, and molecular approaches. In vitro studies using human gingival fibroblasts, neutrophils, and macrophages were conducted to elucidate cellular mechanisms.
Results: Ligature-induced periodontitis significantly increased CTSD expression and activity, accompanied by enhanced inflammatory cell infiltration and alveolar bone loss. Pep A treatment dose-dependently reduced these effects, with the 10 mg/mL dose showing superior efficacy ($p < 0.001$). Flow cytometry revealed that CTSD was predominantly expressed in infiltrating immune cells, particularly macrophages (96.4%) and neutrophils (69.6%). Pep A significantly preserved collagen content and reduced inflammatory cytokine expression, including TNF-α, IL-1β, and IL-6 ($p < 0.001$). In vitro studies demonstrated that macrophages were the primary source of CTSD in response to periodontal pathogens, and Pep A effectively inhibited both inflammatory cytokine production and collagen degradation ($p < 0.001$).
Conclusions: Our findings identify CTSD as a key mediator of periodontal inflammation and tissue destruction, primarily through its effects on macrophage function. The therapeutic efficacy of Pep A in reducing inflammation, preserving tissue integrity, and preventing bone loss suggests that CTSD inhibition represents a promising treatment strategy for periodontitis.

PD081 | Tanshinone-IIA Attenuates Periodontitis Progression in Mice Through Anti-Inflammatory and Anti-Resorptive Mechanisms

G.E. Oliveira[1], E. Ervolino[2], R.M. Scarel-Caminaga[3], L.H. Theodoro[1], S. Tetradis[4], P.P. Chaves de Souza[5], J.A. Cirelli[6], R.S. de Molon[1]
[1]*Sao Paulo State University – UNESP, Diagnosis and Surgery, Aracatuba, Brazil,* [2]*Sao Paulo State University – UNESP, Basic Sciences, Aracatuba, Brazil,* [3]*São Paulo State University – UNESP, Morphology, Genetics, Orthodontics and Pediatric Dentistry, Araraquara, Brazil,* [4]*University of California Los Angeles – School of Dentistry, Division of Diagnostic and Surgical Sciences, Los Angeles, California, United States,* [5]*Federal University of Goias, Periodontics, Goiania, Brazil,* [6]*São Paulo State University – UNESP, Diagnosis and Surgery, Araraquara, Brazil*

Background & Aim: Periodontitis is a chronic inflammatory condition that leads to progressive destruction of the alveolar bone. Currently, there is a lack of effective adjuvant treatments to

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

non-surgical periodontal therapy offering strong antiresorptive-properties. Tanshinone II-A, a lipophilic compound derived from Salvia-miltiorrhiza, exhibits various biological properties. This study investigates the antiresorptive activity of tanshinone as an adjuvant therapy for periodontitis.

Methods: Forty 8-week-old male C57BL6/J mice were randomly assigned to four experimental groups: control (C), periodontitis (P), tanshinone IIA (T-IIA), and sodium tanshinone II-A sulfonate (STS). The C group did not undergo experimental periodontitis, while the P, T-IIA and STS groups were induced with periodontitis by placing ligatures around the first maxillary molars bilaterally. Tanshinones (40 mg/kg) were administered daily via oral gavage immediately following ligature placement for 10 days. The P group received only the vehicle solution. Microcomputed tomography (micro-CT), histological, immunohistochemical and RT-qPCR analyses were performed.

Results: T-IIA and STS significantly reduced the infiltration of inflammatory cells in the connective tissue and increased the percentage of fibroblasts. This treatment also mitigated alveolar bone loss caused by ligature placement compared to the P group, enhancing bone mineral density and improving bone architectural parameters. T-IIA and STS groups effectively lowered the number of osteoclasts, significantly downregulated the production of IL-1β, IL-17, and MMP-13 and decreased the mRNA levels of IL-1β, TNF-α, RANKL and cathepsin K.

Conclusions: Conclusion: Our findings demonstrate that T-IIA and STS prevent periodontitis-induced bone loss by controlling inflammation and inhibiting osteoclastogenesis. This suggests that these compounds possess dual antiresorptive and anti-inflammatory properties, making them promising novel therapeutic agents for treating periodontitis.

PD082 | Spatial Characterization of Innate Lymphoid Cells in Periodontitis

A. Adam[1], H. Germar[2], S. Kroh[3], P. Bilobrk[1], R. Uecker[3], H. Dommisch[1], A. Hauser[3]
[1]Charité-Universitätsmedizin Berlin, Periodontology, Oral Medicine and Oral Surgery, Berlin, Germany, [2]Charité–Universitätsmedizin Berlin, Department of Rheumatology and Clinical Immunology, Corporate Member of Freie Universität Berlin and Humboldt-Universität zu Berlin. Immune Dynamics, Deutsches Rheuma-Forschungszentrum (DRFZ), a Leibniz Institute, Berlin, Germany, [3]Charité-Universitätsmedizin Berlin, Department of Rheumatology and Clinical Immunology, Corporate Member of Freie Universität Berlin and Humboldt-Universität zu Berlin. Immune Dynamics, Deutsches Rheuma-Forschungszentrum (DRFZ), a Leibniz Institute, Berlin, Germany

Background & Aim: The oral mucosal barrier is under constant exposure to a variety of pathogens and commensals. Thus, the resolution of inflammation and immune surveillance at mucosal sites is highly dependent on tissue-resident lymphocytes and their ability to respond to signals of the tissue microenvironment. In the recent years, innate lymphoid cells (ILCs) emerged as sentinels of mucosal barriers, maintaining barrier integrity by orchestrating tissue healing and remodeling, features that are disturbed in patients suffering from periodontitis. The mechanisms by which ILCs contribute to the etiopathology of periodontitis and how crosstalk between tissue-resident lymphocytes and ILCs influences immune function and defense mechanisms in periodontitis remains widely unclear. The aim of this study was to investigate the unique phenotypic features of ILCs and tissue-resident lymphocytes and their spatial localization within the human oral mucosa.

Methods: Fluorescence Immunophenotyping (FACS) and multiplex immunofluorescence imaging (multi-epitope-ligand-cartography, MELC) and a computational, open-source analysis pipeline was applied to analyze distribution patterns of ILC subpopulations and their putative hematopoietic and non-hematopoietic interactions partners within periodontal tissue of patients with periodontitis and periodontally healthy individuals.

Results: The FACS data indicated an expansion of ILCs, and a shift in ILC subpopulations to TNF-α and IL-17A producing subtypes in periodontitis compared to periodontally healthy individuals. The majority of ILCs in periodontitis co-express HLA-DR and ICOS, implying ILC-T/B cell crosstalk as previously shown for chronic-inflammatory gut diseases. In periodontitis samples, a tertiary lymphoid structure formation (adaptive immunity) as well as features of innate immune activation such as neutrophil extracellular traps (NETs) were identified at those sites for the first time.

Conclusions: Combining the proteomic approach with spatial transcriptomics, future research will allow for a distinct definition of immune dynamics and cell-to-cell interaction within the gingiva in the context of periodontitis.

PD083 | High Mobility Group Box Protein 1 Levels in Periodontal Disease

Y. Ozkan Karasu[1], F. Oner[2], F.C. Onat[1], G. Ozgenc[1], H. Aslan[3]
[1]Ataturk University, Department of Periodontology, Erzurum, Turkey, [2]Istinye University, Periodontology, Istanbul, Turkey, [3]Ataturk University, Department of Biochemistry, Erzurum, Turkey

Background & Aim: High mobility group box protein 1 (HMGB1) is a member of alarmin family and considered as a subset of damage-associated molecular patterns (DAMPs). HMGB1 may play a role in the periodontal disease pathogenesis. In this study, we tested the hypothesis that HMGB1 release increases with the progression of periodontitis.

Methods: 60 patients applied to Department of Periodontology were enrolled in the study. Study was approved by the Ethics Committee of the Ataturk University, School of Medicine (B.30.2.ATA.0.01.00/682). Saliva and serum samples were obtained from the patients; then periodontal examination was performed. Plaque index (PI), bleeding on probing (BOP), probing depth (PD) and interdental clinical attachment levels (iCAL) were measured; and panoramic radiographs were used to evaluate the alveolar bone loss. Patients were generated into three groups; (1) Periodontally healthy, (2) Stages I–II Periodontitis and (3) Stages III–IV Periodontitis. HMGB1, receptor for advanced glycation end products (RAGE), TNFα, IL-1β, and TGFβ concentrations were measured by the enzyme-linked immunosorbent assay (ELISA); and all data were analyzed with SPSS program.

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Results: HMGB1 concentration was significantly elevated in serum of periodontitis stage III-IV patients than periodontally healthy ($p = 0.022$) and stage I-II periodontitis patients ($p < 0.05$). HMGB1 concentration was significantly increased in saliva of stage III-IV periodontitis patients than periodontally healthy patients ($p < 0.001$). RAGE release in saliva of stage III-IV periodontitis patients was significantly more than periodontally healthy patients ($p < 0.001$). Serum-IL-1β levels were significantly increased in stage III-IV periodontitis patients than periodontally healthy and stage I-II periodontitis patients ($p < 0.001$). Stage I-II and III-IV periodontitis patients had significantly more serum-TGFβ levels than periodontally healthy patients ($p < 0.001$). HMGB1 and IL-1β concentrations in serum; RAGE and IL-1β concentrations in saliva were found positively correlated in the stage III-IV periodontitis patients.
Conclusions: Our results indicate that HMGB1 increases in parallel with the severity of periodontitis and may play a role in disease progress.

PD084 | Characterization of Neutrophil Subsets in the Development of Periodontitis

S. Lu[1], B. Cheat[1], C. Torrens[1], L. Slimani[1], V. Witko-Sarsat[2], M. Gosset[1,3], J. Bouchet[1]
[1]Université Paris Cité, URP 2496 Orofacial Pathologies, Imaging and Biotherapies, Montrouge, France, [2]Université Paris Cité – INSERM – CNRS, Institut Cochin, U 1016 Team Neutrophils and Vasculitis, Paris, France, [3]Hospital Charles Foix APHP, Periodontal Department, Ivry sur Seine, France

Background & Aim: Periodontitis is a highly prevalent chronic inflammatory disease, characterized by an irreversible destruction of the tooth-supporting tissues. It is triggered by the oral dysbiosis with *Porphyromonas gingivalis* as a keystone pathogen. Neutrophils, the most abundant immune cells in periodontal lesions, play a crucial role in disease progression and may exhibit distinct phenotypes across different stages of periodontitis by their differential expression of pro-inflammatory markers. This study aims to identify and characterize neutrophil phenotypes based on their location within the periodontal tissue to better understand their functions in periodontitis onset and progression.
Methods: Experimental periodontitis was induced on 2 groups of C57BL/6 mice using ligatures soaked with or without *P. gingivalis*. The ligatures were placed into the palatal sulcus of the first maxillary right molar, while the left molars served as negative control. Alveolar bone resorption was monitored by micro-CT before, during, and at the end of the experiment. Mice were sacrificed at different time points for histological and immunostaining analysis.
Results: In ligature-induced periodontitis, the presence of *P. gingivalis* modulates the recruitment of neutrophils and the expression of different neutrophil markers in connective tissue and along the alveolar bone. We noted that neutrophils expressing neutrophil serine proteases (neutrophil elastase, cathepin G and proteinase 3), PD-L1 and NLRP3 were heterogeneously distributed within the tissue: at the level of the sulcus or alveolar bone. A pool of neutrophils expressing the osteoclast activation factor RANKL was observed with or without the presence of *P. gingivalis*, suggesting an important role for neutrophils in bone resorption during periodontitis.
Conclusions: The data from this study suggests the presence of distinct neutrophil subtypes with different functions involved in periodontitis development.

PD085 | Effectiveness of Non-Surgical Periodontal Treatment and Adjunctive Use of 3 Versus 7 Days of Systemic Antibiotics on the Parameters of Periodontitis. A Retrospective Analysis

J.V. Lemain[1], C. Valkenburg[1], L.J. Grundemann[2], M.G. Vroom[2], F. Van der Weijden[1], D.E. Slot[1]
[1]ACTA, Department of Periodontology, Amsterdam, Netherlands, [2]Periodontology Practice Friesland, Goutum, Netherlands

Background & Aim: Systemic antibiotics of amoxicillin/metronidazole as adjunctive therapy to non-surgical periodontal treatment (NSPT) can provide positive additional clinical effect. With increased focus on antimicrobial stewardship, the dose and duration of antibiotic treatment is of interest. Shorter duration is associated with decreased adverse effects and a lower risk for antibiotic resistance. Traditionally 7-day is used and recently 3-days is suggested. This retrospective study aimed to evaluate and compare the performance in daily practice of both durations adjunctive to NSPT on clinical parameters.
Methods: Patients were referred by their general dentist to the specialized clinics. 122 periodontitis patients who were treated in Goutum with a 3-day protocol were matched by gender, age, smoking and diabetes mellitus status with a patient treated in Utrecht with the 7-day protocol. Data were extracted at intake and evaluation for the following clinical parameters; number of teeth, probing pocket depth (PPD) > 5 mm on site and tooth level, and the consequent full mouth bleeding score (FMBS). Differences within and between groups were calculated and statistical tests were performed.
Results: Both treatment protocols showed statistically significant improvement in all parameters of interest ($p < 0.001$). The number of sites with PPD > 5 mm in the 3-day group reduced from 28.85 (19.43) to 1.03 (2.00) and from 30.95 (23.71) to 5.11 (6.54) in the 7-day group. At intake and for the change there was no statistical difference, at evaluation, there was a statistical difference between groups ($p < 0.001$). FMBS at evaluation and the change scores showed statistical significance in favour of the 3-day protocol ($p < 0.001$). The data showed that using both protocols the endpoint of < 20% BOP and ≤ 5 sites with > 5 mm PPD were reached.
Conclusions: There is no clinical difference by referred patients after NSPT combined with 3 or 7-days of adjunctive use of amoxicillin/metronidazole. Both reach periodontal endpoint values. Antimicrobial stewardship can guide individual evidence-based decisions.

PD086 | 5-Year Outcomes of Comprehensive Treatment of Severe Periodontitis: Impact of Adjunctive Systemic Antibiotics

R. Cosgarea[1], A. Rosu[2], C. Heumann[3], R. Bora[2], N.B. Arweiler[4], S. Jepsen[1], A. Sculean[5]

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

[1]University of Bonn, Department of Periodontology, Operative and Preventive Dentistry, Bonn, Germany, [2]Periodontal Private Practice CosMedica, Cluj-Napoca, Romania, [3]Philipps University Marburg, Department of Periodontology & Peri-implant Diseases, Marburg, Germany, [4]Ludwig-Maximilians University, Department for Statistics, Munich, Germany, [5]University of Bern, Department of Periodontology, Bern, Switzerland

Background & Aim: To evaluate the long-term clinical effects of 3 or 7 days adjunctive systemic administration of amoxicillin (AMX) and metronidazole (MET) during step 2 therapy as part of comprehensive treatment of severe periodontitis.
Methods: 102 patients with severe chronic periodontitis were randomly treated with either subgingival instrumentation (SI) within 24 h + placebo (Group A), or SI+AMX+MET (both 500 mg × 3 t.i.d) for 3 days (Group B), or SI + AMX + MET (both 500 mg × 3 t.i.d.) for 7 days (Group C). At 12 months in step 3 of therapy, teeth with residual PD ≥ 6 mm were treated surgically (resective/regenerative) and teeth with poor prognosis for prosthetic rehabilitation were extracted. Probing pocket depths (PD), clinical attachment level (CAL), bleeding on probing (BOP) and full-mouth plaque scores (FMPS) were assessed at baseline (before treatment), and after 5 years. During this period patients received supportive care every 3–4 months.
Results: 45 patients (n = 12/18/15 group A/B/C) showed up at the 5-year follow-up (mean follow-up 68.4 ± 8.24 months). A statistically significant mean CAL gain was recorded in all three groups (group A/B/C: 1.69 ± 0.54 mm/1.80 ± 0.74 mm/2.14 ± 0.68 mm, $p < 0.05$), without any statistically significant differences between the groups. BOP and FMPS remained statistically significantly reduced in all treatment groups without intergroup differences. However, a higher number of extracted (group A/B/C: n = 16/12/10 teeth) and surgically treated teeth (group A/B/C: n = 23/14/4 teeth) were recorded in the placebo group as opposed to the two antibiotic groups.
Conclusions: In patients with severe periodontitis that had received comprehensive periodontal therapy (steps 1–3) followed by SPT, the addition of adjunctive systemic antibiotics (AMX + MET for 3 or 7 days) during step 2 therapy, resulted in a lower number of extracted and surgically treated teeth compared to placebo after 5 years.

PD087 | Efficacy of a Low-Cost Antimicrobial Protocol in Step 2 of Periodontal Therapy for Patients With Stages III–IV Periodontitis: A Microbiological Analysis

S.-I. Stratul[1], S. Boia[1], H. Calniceanu[1], A. Belova[1], M. Boariu[2], V. Radulescu[1], V.-I. Siciliano[3], E. Catana[1], M. Machoy[4], S. Chinnici[1], M. Eliezer[1], I. Veja[1], S.M. Solomon[5], I. Luchian[5], A. Sculean[6], D. Rusu[1]
[1]University of Medicine and Pharmacy Victor Babes Timisoara, University Clinic of Periodontology, Faculty of Dental Medicine, Anton Sculean Research Center for Periodontal and Peri-Implant Diseases, Timisoara, Romania, [2]University of Medicine and Pharmacy Victor Babes Timisoara, University Clinic of Endodontics, Faculty of Dental Medicine, TADERP Research Center, Timisoara, Romania, [3]University of Naples Federico II, Department of Periodontology, Naples, Italy, [4]Pomeranian Medical University, Department of Periodontology, Szczecin, Poland, [5]Grigore. T. Popa University of Medicine and Pharmacy, Department of Periodontology, Faculty of Dental Medicine, Iasi, Romania, [6]University of Bern, Switzerland, Department of Periodontology, School of Dental Medicine, Bern, Switzerland

Background & Aim: Considering the viral and bacterial etiology of periodontal disease, the mechanical approach alone as part of its treatment is insufficient, thus it should be completed by highly effective and affordable antimicrobials. Aim of this single-blind randomized clinical trial with 6-months follow-up was to evaluate the microbiological changes following a therapeutic protocol including 10% solution povidone–iodine irrigations and the administration of antiviral medication during step 1 of periodontal therapy, 0.2% solution of sodium hypochlorite home-care rinsing, and systemic antibiotics (amoxicillin + metronidazole) after step 2, in patients with severe periodontitis, when compared with the golden-standard therapeutic approach–0.2% chlorhexidine solution for subgingival irrigation and home-care rinsing, respectively.
Methods: Forty-five patients, out of which 3 dropped out at the 6-month reevaluation, were randomly divided into controls (n = 21, subgingival instrumentation, chlorhexidine-assisted) and test (N = 21, antiviral medication, subgingival instrumentation with povidone–iodine, sodium hypochlorite rinsing solution, and antibiotics). Microbiological analysis for *Aggregatibacter actinomycetemcomitans* (*Aa*), *Porphyromonas gingivalis* (*Pg*), *Prevotella intermedia* (*Pi*), *Tannerella forsythia* (*Tf*), and *Treponema denticola* (*Td*), was performed at baseline, after 3 and 6 months using the PCR method.
Results: When compared with the 3-months evaluation, at 6-months recall, statistically significant differences in detection frequency were found in the bacterial detection scores for *Pg* (test compared to control, p = 0.044), and a statistically significant reduction for *Pi* at the 6-month reevaluation when compared to baseline (p = 0.021), in favor of test group, as well.
Conclusions: Regardless its complexity, the applied cause-related strong low-cost adjunctive antimicrobial protocol for the treatment of severe and advanced periodontal disease in step 2, resulted in substantial statistically significant improvements in the microbiological parameters at 6 months, when compared to the current antimicrobial recommendations.

PD088 | Local Delivery of Virgin Coconut Oil as an Adjunct to Root Surface Debridement: A Randomize Controlled Clinical Trial

F.H. Al-Bayaty[1], N.S. Azmi[2], F. Hidayat[2]
[1]MAHSA University, Faculty of Dentistry Department of Periodontology, Jenjarom, Malaysia, [2]Universiti Teknlogi MARA, Centre for Periodontology Studies, Faculty of Dentistry, Sungai Buloh, Malaysia

Background & Aim: Eliminating dental biofilm in periodontal pockets of 5 mm or more is challenging. Subgingival instrumentation with antimicrobial delivery may help eradicate microbes at the pocket base.

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

This study aims to assess the effectiveness of local virgin coconut oil (VCO) delivery in periodontitis patients as an adjunct to subgingival instrumentation.

Methods: 32 periodontitis subjects, stages II–IV with grade B and C, were randomized into test and control groups 16 for each, with 226 and 222 periodontal pockets respectively (ISRCTN10241517). Acrylic stents were fabricated, Probing Pocket Depth (PPD), Clinical Attachment Level (CAL), Bleeding on Probing (BOP), Gingival Index (GI), and Plaque Index (PI) were measured before full-mouth subgingival instrumentation. VCO or placebo applications were applied 24 h after instrumentation and repeated weekly for three weeks. Clinical parameters were reassessed at 3, 6, and 9 months. Results statistically analysed using independent *t*-test and repeated measure ANOVA.

Results: There are statistically significant differences in PPD at 3 months (3.11 ± 1.10 vs. 3.96 ± 1.44), at 6 months (2.80 ± 1.04 vs. 3.76 ± 1.41) and 9 months (2.90 ± 0.08 vs. 3.74 ± 0.08), CAL at 3 months (3.81 ± 1.42 vs. 4.99 ± 1.74), 6 months (3.61 ± 1.45 vs. 4.72 ± 1.71) and 9 months (3.67 ± 1.44 vs. 4.84 ± 1.72) and BOP at 3 months (0.43 ± 0.70 vs. 0.77 ± 0.93), 6 months (0.31 ± 0.56 vs. 0.60 ± 0.78) and 9 months (0.30 ± 0.54 vs. 0.55 ± 0.71) between the test and control group ($p < 0.05$), more reductions in the test group. Statistically significant differences for the GI (0.23 ± 0.47 vs. 0.39 ± 0.62) ($p = 0.002$) were noted at 3-month intervals, more reductions in the test than the control group. PI reported no statistically significant difference between the groups at each interval.

Conclusions: Adjunctive use of VCO resulted in significant reductions in PPD and BOP, with more significant gain in CAL at 3, 6 and 9 months follow up.

PD089 | Treatment of Advanced Periodontitis Using an Oscillating Chitosan Device With or Without a Chitosan Gel: A Randomized Parallel Arm Clinical Trial—12-Months Follow-Up

O. Klein[1], M.G. Balta[1], J.C. Wohlfahrt[1,2]
[1]University of Oslo, Faculty of Odontology, Institute of Clinical Dentistry, Department of Periodontology, Oslo, Norway, [2]Bjerke Tannmedisin, Oslo, Norway

Background & Aim: To reduce the indication for step 3 periodontal treatment, including antibiotics and surgical interventions, various non-surgical protocols using adjunctive chemicals have been suggested. The efficacy of a novel chitosan brush in non-surgical treatment of periodontal disease has previously been documented. The aim of this investigation was to evaluate a chitosan brush with an adjunctive chitosan-lactic acid gel on residual periodontal pockets in patients with advanced periodontitis up to 12 months after baseline.

Methods: 44 patients with Stages III and IV Grade B periodontitis, with 3–8 teeth with residual Probing Pocket Depth (PPD) of 5–8 mm and a modified Bleeding on Probing score (mBoP) grade 2 or 3, after previous step 2 and 3 periodontal treatments, were randomly assigned into two groups. The control-group received treatment with a chitosan brush (LBC) alone, while the test-group received LBC treatment with adjunctive chitosan-lactic acid gel (LGX). Pain perception was recorded with a visual analogue scale (VAS). Treatments were performed at baseline and repeated every three months.

Results: Both treatments led to significant improvements in both PPD and mBoP at all follow-up visits ($p < 0.001$). The results improved further over time. At the 3-, 6- and 9-months examinations PPD reductions were significantly greater in the sites treated with adjunctive LGX. Percentage of sites categorized as requiring further active intervention (PPD ≥ 5 mm and mBoP ≥ 2) was constantly lower with adjunctive LGX compared to LBC alone at all follow-up visits. After 12 months only 4% of the test-group sites remained in the category needing further active treatment. Reported discomfort was low and no adverse effects were reported.

Conclusions: Within the limitations of this study both treatments resulted in significant clinical improvements. Adjunctive LGX enhanced the clinical outcome and appeared to accelerate pocket closure. LGX seems to be a promising candidate as an adjunct to non-surgical periodontal therapy.

PD090 | Adjunctive Sodium-Hypochlorite and Hyaluronic Acid in Subgingival Reinstrumentation

G. Jungbauer[1], S. Eick[1], H. Jentsch[2]
[1]University of Bern, School of Dental Medicine, Department of Periodontology, Bern, Switzerland, [2]University of Leipzig, Medical Faculty, Leipzig, Germany

Background & Aim: The aim was to investigate the adjunctive application of an amino-acid sodium-hypochlorite gel (AA-NaOCl) and a crosslinked hyaluronic acid gel (xHA) during subgingival reinstrumentation.

Methods: Fourty-two patients with need for retreatment in at least two periodontal pockets were included. All patients were treated with subgingival instrumentation, in the test group adjunctively AA-NaOCl and xHA was applied. The treatment was performed at baseline (T0), and if needed again after three months (T1). Periodontal clinical indices were recorded at T0, T1 and T2 (after six months), the primary outcome was the reduction of open pockets at T2. Levels of interleukin (IL)-1beta and matrix metalloproteinase (MMP)-8 were quantified in gingival crevicular fluid. Biofilm samples were analyzed for major periopathobionts. Friedman's two-way analysis of variance and Wilcoxon test with Bonferroni correction were used for intragroup changes and Mann–Whitney *U* tests for intergroup comparison.

Results: All periodontal clinical indices and the number of open pockets significantly improved at T1 and T2 vs baseline in both groups. The test group demonstrated a more pronounced reduction of open pockets (−88% vs. −38%; $p < 0.001$ at T2), which was reflected by an increased probing depth reduction (−1.38 vs. −0.88 mm; $p < 0.001$ at T2), a greater clinical attachment level gain (−1.07 vs. −0.50 mm; $p < 0.001$ at T2), and a reduced number of sites positive for bleeding on probing (−78.6% vs. −19.0%; $p < 0.001$ at T2). For IL-1beta and MMP-8 no significant differences between the groups and timepoints could be seen. At T2, the abundance of *Porphyromonas gingivalis* in the test group declined by 1.86 log10 counts/site ($p = 0.004$), and *Campylobacter rectus* by 2.19 log10 counts/site ($p = 0.003$), *Filifactor alocis* by

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

2.77 log10 counts/site ($p = 0.006$), and *Fusobacterium nucleatum* 0.76 by log10 counts/site ($p < 0.001$), respectively.
Conclusions: AA-NaOCl and xHA may present a promising adjunct to mechanical subgingival reinstrumentation in non-responding periodontal pockets.

PD091 | Injectable Platelets Rich Fibrin With Ascorbic Acid as an Adjunct to Non-Surgical Periodontal Therapy in the Treatment of Stage-II Periodontitis: A Randomized Controlled Clinical Trial

K. Fawzy El-Sayed[1,2], M. Sherif[1], E. Abdel Ghafar[1], C. Graetz[2]
[1]Cairo University, Faculty of Dentistry, Cairo, Egypt, [2]Christian Albrechts University of Kiel, Clinic of Conservative Dentistry and Periodontology, Kiel, Germany

Background & Aim: Ascorbic acid (AA) is a pleotropic biomolecule with a variety of positive attributes on periodontal healing and regeneration. The aim of the current randomized controlled trial was to compare the effect of ascorbic acid (AA) with injectable PRF (I-PRF) as a locally delivered adjunct to professional mechanical plaque removal (PMPR) versus PMPR with local delivery of I-PRF or PMPR on non-surgical treatment outcomes of stage-II periodontitis.
Methods: Forty-five patients ($n = 45$) diagnosed with stage-II grade A periodontitis were randomly assigned into test (PMPR+I-PRF+AA; $n = 15$) or control groups (PMPR+I-PRF; $n = 15$ and PMPR; $n = 15$). Bleeding on probing (BOP; primary outcome), probing depth (PD), clinical attachment level (CAL), gingival margin (GM) and radiographic bone measurements were assessed at baseline, three- and six-months post-treatment. Post-operative pain was further assessed at second- and third-day post-treatment (secondary outcomes).
Results: Although BOP scores were lower in the PMPR+I-PRF+AA group, the regression analysis revealed that gender was the only significant predictor for BOP, with females showing a reduced propensity ($p < 0.05$). Clinical and radiographic parameters significantly improved in all groups independently ($p < 0.05$). No intergroup differences were notable regarding BOP or changes in PD, CAL, GM, PI and radiographic bone measurements at three or six months relative to baseline ($p > 0.05$). Significantly lower pain scores at two and three days were notable in the PMPR+I-PRF+AA and PMPR+I-PRF groups compared to the PMPR group ($p < 0.05$).
Conclusions: Apart from a positive effect on the patients' post operative pain perception, I-PRF with or without the addition of ascorbic acid does not additionally improve the clinical outcomes of PMPR in stage-II periodontitis.

PD092 | Flapless Application of Emdogain FL in Periodontal Therapy: Results From a Randomized Controlled Multicenter Study

S. Sayardoust[1,2], O. Notderyd[3], C. Starkhammar Johansson[2]
[1]Linköping University, Department of Biomedical and Clinical Sciences, Linköping, Sweden, [2]Centrum för Oral Rehabilitering, Linköping, Sweden, [3]Jönköping University, COO, Jönköping, Sweden

Background & Aim: Periodontitis is a chronic inflammatory condition affecting a large portion of the adult population. Non-surgical periodontal therapy, including scaling and root planing (SRP), is the first-line treatment for periodontitis. The addition of Emdogain FL, an enamel matrix derivative, has shown promise in enhancing periodontal tissue regeneration. This study aims to assess the safety and clinical performance of adjunctive Emdogain FL in a multicenter setting.
Methods: This prospective, single-blinded, randomized, split-mouth, multicenter clinical trial plans to include a total of 150 patients with Stage 3 or 4 periodontitis. Each patient receives SRP in all quadrants, with two randomly assigned quadrants treated with Emdogain FL and two serving as controls. Clinical outcomes, including changes in probing pocket depth (PPD), bleeding on probing (BoP), and radiographic attachment level (rAL), will be assessed at 6 and 12 months. So far, 25 patients have been included in the study, with 18 having completed the 6-month follow-up.
Results: Preliminary data from 30 patients who have completed the 6-month follow-up will be presented. However, these results will not yet be conclusive, and further data collection and analysis are required to determine the full effect of the adjunctive treatment. A total of 25 patients have been enrolled in the study to date.
Conclusions: The clinical relevance of this study lies in its potential to provide new insights into the benefits of Emdogain FL as an adjunct to non-surgical periodontal therapy. The ongoing study will help establish whether the addition of Emdogain FL can lead to better clinical outcomes, potentially reducing the need for surgical intervention in patients with advanced periodontitis. The final results of this trial will be critical in shaping future treatment protocols for periodontitis.

PD093 | Comparative Outcomes of Subgingival Instrumentation in Association With/Without Subgingival Erythritol Powder Polishing in Treatment of Stages I–III Periodontitis

D.N. Gheorghe[1], F. Nicolae[1], D.M. Popescu[1], A. Pitru[2], P. Surlin[1]
[1]University of Medicine and Pharmacy of Craiova, Department of Periodontology, Research Center Periodontal – Systemic Interactions, Craiova, Romania, [2]University of Medicine and Pharmacy of Craiova, Department of Oral Pathology, Research Center Periodontal – Systemic Interactions, Craiova, Romania

Background & Aim: Efficient removal of subgingival biofilm deposits is the key element of Step 2 peridontal therapy. This study aimed to evaluate the effectiveness of erythritol-based subgingival powder polishing techniques in the treatment of patients diagnosed with Stages I–III periodontitis, compared to standard ultrasonic and manual methods of subgingival instrumentation.
Methods: Conducted at the University of Medicine and Pharmacy of Craiova, Romania, the study involved patients diagnosed with generalized Stages I–III periodontitis. Following baseline periodontal examination (plaque and gingival bleeding levels, pocket depth and clinical attachment), diagnosis and informed consent, participants were randomly assigned to the Test

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Group (T) and the Control Group (C). Both groups received Steps 1 and 2 periodontal therapy. Different subgingival instrumentation protocols were applied—Group T underwent ultrasonic scaling, root surface scaling-planing (SRP) with additional subgingival powder jet polishing with erythritol powder. Group C received only ultrasonic scaling and SRP. Patients of both groups were refrained from the use of local and systemic antiseptic/antibiotic during the study. At the one-month follow-up visit, the periodontal parameters were reassessed and submitted for intra- and intergroup comparison to the baseline status.

Results: Post-treatment intragroup periodontal evaluations showed a significantly improvement of the periodontal parameters for both groups of patients compared to the baseline status. The intergroup comparison of the evolution of the periodontal status revealed that only plaque and bleeding on probing levels expressed a significantly better improvement for Group T as compared to Group C. The intrergroup difference in pocket depth reduction and clinical attachment gain between the two groups was not statistically significant.

Conclusions: Including erythritol powder jet devices as adjunctive subgingival therapy could contribute to the additional removal of biofilm deposits and consequent reduction of periodontal inflammation, in terms of decreased gingival bleeding on probing. Longer follow-up studies would be required to assess the stability of the results.

PD094 | Clinical Effects of a Modified Paleo Diet During Step 2 of Periodontal Therapy—An Explorative Pilot Study

C. Leipnitz[1], C. Kracht[2], D. Schweikert[3], M. Adolph[3], M.M. Herz[2], J.P. Woelber[4], D. Wolff[5], V. Bartha[5]
[1]Private Practice, Gersheim, Germany, [2]University Tuebingen, Conservative Dentistry, Tuebingen, Germany, [3]University Tuebingen, Nutrition Support Team, Tuebingen, Germany, [4]University Dresden, Periodontology, Dresden, Germany, [5]University Heidelberg, Conservative Dentistry, Heidelberg, Germany

Background & Aim: An emerging body of evidence indicates that diet and lifestyle factors influence periodontal health. This exploratory pilot study aimed to investigate the outcomes of a three-months modified paleolithic diet (MPD) intervention as an adjunct to step 2 of periodontal therapy.

Methods: A total of 32 patients (66% female) underwent Step 2 of periodontal therapy. In the test group (MPDG, $n=16$), a dietary intervention involving a modified Paleo diet was implemented by dietitians over the course of six dietary counseling sessions. Clinical parameters, including bleeding on probing (BOP) and probing pocket depth (PPD), and anthropometric data, were recorded baseline (BL) and post-therapy (3M). The control group (CG, $n=16$) consisted of retrospectively collected data from a cohort treated by the same clinician as the test group. Statistical analyses were conducted using nonparametric tests, and correlation analyses. Nutrient intake in the test group was assessed before and after the intervention using a dietary questionnaire to evaluate macro- and micronutrient levels.

Results: Both groups showed significant improvements in several clinical parameters after three months. Inter-group comparisons revealed a statistically significant more pronounced reduction in BOP (inter group difference −7.32% ± 5.00%, $p=0.028$) and in mean PPD (inter group difference −0.30 ± 0.13 mm, $p=0.038$) favoring the MPDG. Analysis of nutrient intake demonstrated significant changes between the timepoints in the MPDG group. Additionally, substantial correlations were observed between the change in certain dietary parameters and anthropometric parameters (e.g., BL-3M energy intake vs. BL-3M BMI (kg/m^2), Spearman-$\rho=0.64$), potentially underlining the adherence of the MPDG to the investigated diet.

Conclusions: The results suggest that an adjunctive modified Paleolithic diet during step 2 of periodontal therapy may beneficially affect clinical outcomes, particularly in reducing BOP and PPD. These preliminary results need further investigation in larger, controlled trials.

PD095 | Ozonized Gels Versus Chlorhexidine in Non-Surgical Periodontal Treatment: A Randomized Clinical Trial

A. Butera[1], M. Frani[1], M. Pascadopoli[2], A. Scribante[1]
[1]University of Pavia, Unit of Dental Hygiene, Section of Dentistry, Department of Clinical, Surgical, Diagnostic and Pediatric Sciences, Pavia, Italy, [2]University of Pavia, Unit of Orthodontics and Pediatric Dentistry, Section of Dentistry, Department of Clinical, Surgical, Diagnostic and Pediatric Sciences, Pavia, Italy

Background & Aim: To evaluate the efficacy of newly introduced ozonated gels compared with conventional chlorhexidine gel in the home management of periodontal patients.

Methods: 30 patients with bilateral periodontal disease (severity I, complexity II) were enrolled (split-mouth study design). After nonsurgical mechanical periodontal debridement, the teeth were randomly divided into two groups: teeth in the Control group were treated with a chlorhexidine-based gel to aid oral hygiene maneuvers for 2 weeks after the first visit, while teeth in the Test group were treated in the same way with ozone-based gels. After the baseline assessment, the follow-up included assessments at 1, 2, and 6 months. The variables evaluated were clinical attachment loss (CAL), probing pocket depth (PPD), bleeding on probing (BoP), plaque control record (PCR), recession (R), and tooth mobility (TM).

Results: For CAL, PPD, BoP, and PCR, significant intragroup differences were found for both groups ($p<0.05$), in contrast to intergroup differences ($p>0.05$). No significant differences were found for R and TM.

Conclusions: Non surgical mechanical periodontal debridement with adjunctive use of ozone and chlorhexidine was found to be effective in periodontal treatment. Ozone could be suggested as an alternative to chlorhexidine.

PD096 | AirFloss Combined With Essential Oils Compared to Dental Floss—A Randomized Controlled Clinical Trial

T.M.J.A. Thomassen[1], D.E. Slot[1], T.A. Elkerbout[1], E. van der Sluijs[1], F.A. van der Weijden[1]

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

[1]ACTA Amsterdam, Department of Periodontology, Amsterdam, Netherlands

Background & Aim: This study aims to determine the effectiveness of AirFloss Ultra with essential oils (AFeo) compared to waxed dental floss (DF) as an adjunct to regular manual toothbrushing. The effectiveness is measured via gingival bleeding, dental plaque, and gingival abrasion scores. Soft and hard tissue safety outcomes are also evaluated.
Methods: This study employed a randomly assigned, parallel, examiner-blind design. Eighty-two systemically healthy, right-handed volunteers with ≥25% gingival bleeding in the lower jaw but without periodontitis were enrolled. After 3 weeks of experimentally induced gingivitis, gingivitis reversal was assessed over the following 4 weeks. Subjects were divided into two groups: one used AFeo in addition to twice-daily manual toothbrushing with fluoride toothpaste, while the other used DF with the same brushing regimen. Bleeding On Marginal Probing (BOMP), Modified Silness & Löe Plaque Index (MPI), and approximal gingival abrasion scores (GAS) were recorded. The total mean and standard deviation for these clinical parameters were analyzed across all subjects at baseline, intermediate time points, and at the end of the study.
Results: The AFeo and DF groups showed a reduction in mean BOMP, MPI, and GAS scores. There were no significant differences in these parameters between the AFeo and DF groups at any time point ($p > 0.05$). Furthermore, no serious adverse events were reported.
Conclusions: There was no significant difference in effectiveness between the AirFloss Ultra filled with an essential oil solution and waxed dental floss when used adjunctively with manual toothbrushing. This conclusion was based on gingival bleeding, dental plaque, and gingival abrasions in the lower jaw after experimentally induced gingivitis. Both products were found to be safe for use.

PD097 | Volumetric Assessment of Volume Stable Collagen Matrix in Soft Tissue Ridge Augmentation at Maxillary Single Implant Site: A Randomized Controlled Clinical Trial

A. Hamdy[1], D. Ghalwash[1], D. Adel-Khattab[2], S. Seif Allah Ibrahim[2]
[1]The British University in Egypt, Oral Medicine and Periodontology, Al Shorouk City, Egypt, [2]Ain Shams University, Oral Medicine and Periodontology, Cairo, Egypt

Background & Aim: The soft tissue volume and its stability around dental implants are important for the final esthetic outcome. The main objective of this study was to compare connective tissue graft (CTG) or volume stable collagen matrix (VCMX) in a randomized controlled trial with respect to buccal soft tissue profiles when applied to individual implant sites exhibiting mild horizontal mucosal defects.
Methods: Twenty patients (14 females, 6 males) that required implant placement and augmenting the buccal concavity by VCMX or CTG, post-operative evaluation of the volumetric changes at the augmented implant site were carried out 3, 6 and 9 months postoperative as primary outcome, clinical and radiographic soft tissue thickness were carried out at baseline and 9 months intervals, Visual analogue scale (VAS) was recorded 2 weeks after the surgery.
Results: Regarding the soft tissue volume in groups VCMX and CTG had a statistically significant difference between baseline and 3, 6, 9 months postoperative with highest value at 9 months (136.33 ± 86.80) (mm^3) in VCMX and (186.38 ± 57.52) (mm^3) in CTG. The soft tissue thickness had a statistically significant increase in both groups at 9 months in comparison to baseline. However, there was a statistically higher increase in soft tissue thickness at 9 months in CTG 3.87 ± 0.91 than VCMX 2.94 ± 0.31 ($p = 0.007$). Regarding the radiographic soft tissue thickness there was a statistically significant increase in both groups at 9 months in comparison to baseline.VAS showed a statistically lower value in VCMX 0.4 ± 0.7 than CTG 2.8 ± 1.48 ($p < 0.001$).
Conclusions: Both CTG and VCMX were both effective in soft tissue augmentation at implant sites in esthetic zone. However, CTG were better than VCMX in increasing peri-implant soft tissue volume and mucosal thickness around single implants at 9 months follow up period. VCMX was associated with less amount of pain or discomfort and reduced patient morbidity.

PD098 | A Randomized Controlled Trial Assessing the Long-Term Effect of the Implant-Abutment Connection Type and Microthreads in Maxillary Overdenture Patients: 6-Year Clinical Outcomes

S. Matthijs[1], V. Christiaens[1], C. Matthys[2], H. De Bruyn[1,3], M. Glibert[1]
[1]Ghent University, Faculty of Medicine and Health Science, Department of Periodontology and Oral Implantology, Ghent, Belgium, [2]Ghent University, Faculty of Medicine and Health Science, Department of Oral Health Sciences, Clinic for Removable Prosthodontics, Ghent, Belgium, [3]Academic Center for Dentistry Amsterdam, Universiteit van Amsterdam & Vrije Universiteit, Department of Reconstructive Oral Care, Amsterdam, Netherlands

Background & Aim: Different implant macrodesigns have been developed to reduce crestal bone remodelling around implants. Microthreads as well as platform-shifting and conical abutment connection are suggested to limit bone remodelling. This randomized controlled trial assessed the effect of the implant neck design as well as the type of abutment connection on long-term crestal bone remodelling and peri-implant health around 4 different experimental implants used for a bar-retained maxillary overdenture, over a 6-year period.
Methods: Twenty-five patients received 4 different implants with respectively: internal connection and microthreads on the implant neck (I MT); internal connection, without microthreads (I NMT); external connection, with microthreads (E MT); and external connection, without microthreads (E NMT). Other design features as well as the surgical and prosthetic treatment protocol were identical. Radiographic crestal bone loss, plaque score, bleeding on probing and probing pocket depth were determined at 1 and 6 years after implant placement.
Results: Two implants in 2 patients were excluded from further analysis because a wider diameter implant needed to be placed. Four out of 98 implants (4.1%) failed during provisionalisation

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

and were replaced. Twenty patients were re-evaluated after 1- and 6 years, resulting in 78 examined implants. These showed a mean CBL of 0.39 mm (SD: 0.68; range: 0–3.42) after 1 year and 0.37 mm (SD: 0.60; range 0–3.03) after 6 years. Between the 4 different study implants, no statistically significant difference in CBL was identified over time. Microthreads nor connection type had a statistically significant effect on CBL over time, nor on PPD, Bop, and PS at the 6-year re-evaluation.
Conclusions: Six years after implant placement, a four-implant, bar-retained maxillary overdenture shows a high implant survival rate and limited crestal bone loss. Presence or absence of microthreads and type of implant-abutment connection has limited effect on peri-implant crestal bone loss. The peri-implant health parameters indicate absence of peri-implantitis.

PD099 | Therapy for Deeply Destroyed Teeth: A Multicenter, Prospective, Randomized Pilot Trial

R. Luthardt[1], H. Rudolph[1], M. Naumann[2]
[1]University Hospital Ulm/Ulm University, Department of Prosthetic Dentistry, Ulm, Germany, [2]Zahnärzte an der Kleinmachnower Schleuse, Prof. Dr. Naumann, Dr. Kiessling & Kollegen, Stahnsdorf, Germany

Background & Aim: The aspect whether or not to preserve deeply destroyed teeth is fundamentally in prosthetic dentistry. Two treatment approaches for deeply destroyed teeth with neighboring teeth without treatment need shall be compared. Tooth maintenance (TM) will be compared to implant therapy (IT).
Methods: In this bi-center, prospective randomized trial, the kind of treatment was assigned according to the randomization list. The primary outcome was success, secondary outcome measure is survival (restoration/ tooth/implant still in function). The present evaluation covers the findings of the study centers Ulm and Stahnsdorf (Germany). Fourty-one subjects (25 male, 16 female) with treatment need for one deeply destroyed front tooth or premolar with a mesial-distal extension ≥ 7 mm were included. Decoronated teeth with a supra-gingival amount of hard tissue after crown preparation of less than 2 mm in height received a surgical crown lengthening. Implants were placed 6–8 weeks after tooth removal. In both groups, single all-ceramic crowns were placed and followed for 5 years.
Results: TM or IT treatment were randomly assigned (22 TM, 19 IT). Four front-teeth, four canines and eleven premolars were replaced (IT-group). Seven front-teeth, two canines and thirteen premolars were restored (TM-group), mostly in the upper jaw (17, thereof seven implants). Patients were 28–78 years old (mean 55 year, SD 13). For 41 patients, the mean observation period is 0.2–9.2 years (mean 5 years, SD 2, 2 drop-outs [Years 1 and 2]). Two tooth fractures occurred in the TM-group (Years 3 and 4) and one early implant loss occurred in the IT-group. Eleven patients are still regularly contacting the clinic after the end of the study. One implant crown fractured shortly after cementation and had to be replaced.
Conclusions: Survival was 0.894 in the IT-group and 0.90 in the TM-group. This risk and the associated follow-up costs have to be discussed with patients in shared decision making.

PD100 | Immediate Implant Loading of Two Adjacent Implants With Single Definitive Restorations in the Posterior Region: A Multicenter Randomized Controlled Trial

F. Strauss[1], J.-Y. Park[2], J.-K. Cha[1], L. Schiavon[1], A. Patrizi[1], J.-S. Lee[2], H. Lee[3], R. Jung[1], U.-W. Jung[2], D. Thoma[1]
[1]University of Zurich, Clinic of Reconstructive Dentistry, Zurich, Switzerland, [2]Yonsei University, Department of Periodontology, Seoul, Republic of Korea, [3]Yonsei University, Department of Prosthodontics, Seoul, Republic of Korea

Background & Aim: Immediate loading (IL) with final restorations has the potential to reduce treatment time and costs, potentially enhancing patient satisfaction. However, evidence from randomized controlled trials supporting these benefits is lacking. This study aimed to compare IL with immediate definitive crowns to delayed loading (DL) in terms of clinician- and patient-reported outcomes up to one year after loading.
Methods: Sixty-four patients requiring at least two adjacent posterior implants were included in the study. All implants were placed prosthetically driven position applying a digital workflow. After implant placement, patients were randomly assigned to either (i) immediate loading (IL) with restoration or (ii) delayed loading (DL) with restoration after 3–4 months. All implants were restored with screw-retained monolithic zirconia crowns. Clinician- and patient-reported outcomes were assessed at baseline (4 weeks post-crown delivery) up to 1-year post-loading. The log-rank test and linear mixed-effects models were used to compare outcomes between the two groups.
Results: At one year follow-up, implant survival amounted to 94% in group IL (2 implant failures) and 100% in the DL group, with no significant differences between the groups ($p = 0.154$). Patient satisfaction at crown delivery was significantly higher in the DL group (9.7 ± 0.4) compared to the IL group (9.1 ± 1.5, $p = 0.038$). Nevertheless, at 12 months, patient satisfaction was comparable between the groups (IL: 9.6 ± 0.7; DL 9.5 ± 0; $p = 0.835$). Other clinical parameters including probing depth and bleeding on probing, remained stable and showed no significant differences ($p > 0.05$) between the groups at 12 months follow-up.
Conclusions: Immediate implant loading with definitive restorations in the posterior region is an effective treatment option that reduces overall treatment time. However, this faster approach does not appear to enhance patient satisfaction compared to delayed implant loading, highlighting the need for further research into factors influencing patient preferences and experiences.

PD101 | Acellular Dermal Matrix Versus Connective Tissue Grafts With Immediate Implant Placement in Compromised Extraction Sockets Using Vestibular Tunneling Incision: A Randomized Controlled Trial

A.A. Ellithy[1], M.M. El-Tonsy[1], S.F. Ghouraba[1], B.N. El-Fahl[1], A. Elaskary[2], A. Elfana[3,4]
[1]Faculty of Dentistry, Tanta University, Tanta, Egypt, [2]Private Practice, Alexandria, Egypt, [3]Indiana University School of Dentistry, Indianapolis, United States, [4]Faculty of Dentistry

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Cairo University, Cairo, Egypt

Background & Aim: Immediate implant placement (IIP) in compromised extraction sockets poses significant challenges in maintaining the contour and level of mucosal tissues. This study aims to compare the efficacy of vestibular socket therapy (VST) combined with acellular dermal matrix (ADM) versus connective tissue grafts (CTG) in IIP within the esthetic zone.
Methods: Twenty participants requiring extraction in the maxillary esthetic zone were randomized into two groups: ADM and CTG ($n=10$ each). Both groups underwent VST with immediate implant placement and peri-implant bone grafting. Clinical outcomes were evaluated at baseline, 6 months, and 12 months, measuring soft-tissue level and thicknesses on 3D intra-oral scans, and the radiographic facial alveolar bone thicknesses and height measured on cone beam computed tomography (CBCT) scans.
Results: After 12 month, all implants were successfully maintained (100% survival). Both interventions resulted in statistically significant increase in coronal mucosal thickness, facial bone height and thickness at apical, middle and coronal levels over time. Only CTG showed statistically significant increase at apical mucosal thickness over time (1.40 ± 0.30 mm baseline, 3.05 ± 1.17 follow-up, $p=0.001$) whereas the ADM group had a significantly higher facial bone height than CTG (13.86 ± 1.56mm vs 12.14 ± 1.58 mm respectively, $p=0.028$).
Conclusions: ADM and CTG are both effective for soft tissue augmentation and hard-tissue maintenance in IIP within compromised extraction sockets after 12 months. CTG may offer advantages in apical mucosal thickness, while ADM was associated with greater bone height. These insights help clinicians to customize treatment plans based on individual goals and patient needs, thereby improving the predictability and success of IIP.

PD102 | Biological and Mechanical Outcomes of 3 Different Implant-Abutment Connection Designs in Posterior Single-Tooth Implant Supported Restorations. A Randomized Clinical Trial

O. Camps-Font[1], L. Rubianes-Porta[1], V. Traver-Méndez[1], R. Figueiredo[1], C. Subirà-Pifarré[1], J. Piera-Auguet[1], E. Valmaseda-Castellón[1]
[1]*Universitat de Barcelona, Department of Odontostomatology, L'Hospitalet de Llobregat, Spain*

Background & Aim: To evaluate the influence of 3 implant-abutment connection designs (external hexagonal connection [EC], internal hexagonal connection [IC] and conical connection [CC]) on the vertical marginal bone loss (MBL) of posterior single-unit implant-supported crowns. Additionally, this study aimed at determining which connection design had a reduced risk of suffering mechanical and/or biological complications.
Methods: An open-label randomized controlled trial (RCT) of parallel groups with three treatment arms was made. Three different implant-abutment connection designs with the same macro- and microdesign were used (EC, IC, CC). The main outcome variable was the distance from the implant shoulder to the first visible bone to implant contact (DIB) at the mesial and distal aspect of each implant. Radiographic measurements were made by a blinded investigator. Additionally, several clinical outcome variables (probing depth, bleeding/suppuration on probing, plaque index, mechanical or biological complications) were also registered. Patients were assessed at implant placement, prosthesis installation and one-year post-prosthetic loading. The statistical analysis was carried out on an intention-to-treat basis.
Results: Seventy-five patients (105 implants) were consecutively enrolled in the trial and randomized to the EC, IC and to the CC groups (35 implants each). The 3 groups had similar baseline features. DIB varied significantly over time ($p<0.001$) but was similar for all groups ($p=0.152$) and followed the same pattern of evolution over time ($p=0.995$). All groups exhibited a progressive and comparable peri-implant MBL, without statistically significant differences ($p>0.05$). Eleven minor mechanical complications were reported in 10 patients (4 EC, 5 IC and 2 CC; $p=0.425$).
Conclusions: The implant-abutment connection design does not seem to significantly affect the changes in the interproximal bone levels of posterior single-unit implant-supported crowns after 12 months of loading. Furthermore, the risk of developing biological or mechanical complications was similar for all tested connection designs.

PD103 | Effect of Socket Sealing Abutment in Immediate Implant Placement in the Posterior Region. A Randomized Controlled Clinical Trial

A. Hurtgen[1], B. de Carvalho[1], G. Lecloux[1], F. Lambert[1]
[1]*Université de Liège, Liège, Belgium*

Background & Aim: Immediate implant placement (IIP) following tooth extraction causes soft and hard tissue alterations. The Socket Sealing Abutment (SSA) was designed to reduce peri-implant soft tissue shrinkage and enable primary wound closure following IPP. This randomized controlled trial (RCT) aims to compare SSA and conventional healing abutments in IIP for molar sites.
Methods: 30 patients requiring molar extraction and implant placement were included and followed for one year to assess soft tissue remodeling as well as implant survival, peri-implant health parameters and hard tissue alterations. Patient Related Outcome Measures (PROM's) as well as Pink Esthetic Score (PES) were also assessed.
Results: Both groups demonstrated a 100% implant survival rate at 12 months. Early soft tissue remodeling and inflammatory indices favored the SSA group, particularly at 6 months post-operatively, though these advantages diminished by the one-year follow-up. Bone remodeling, assessed via CBCT and 2D radiographs, was comparable between the groups, with both showing expected buccal and palatal/lingual bone height reductions. However, the SSA group exhibited slightly more pronounced buccal bone height loss, although the differences were not statistically significant. Patient-reported outcomes, including comfort, general appearance, masticatory function, and overall satisfaction, were high in both groups with no significant differences.
Conclusions: While the SSA showed short-term benefits in soft tissue preservation and reduced inflammation, long-term outcomes were similar to conventional healing abutments. This

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

study suggests that SSA may offer some early advantages in soft tissue maintenance but does not prevent inevitable bone remodeling following IIP in molar sites.

PD104 | Improving Novice Operator Accuracy in Dental Implant Placement by Integrating Dynamic Navigation in the Education of Pre-Doctoral Dental Students: A Pre-Clinical Study and Clinical Applications

P. Pani[1], A.-G. Benghiac[2], N. Fleisher[2]
[1]Boston University, General Dentistry – Periodontics, Boston, Massachusetts, United States, [2]Boston University, Boston, Massachusetts, United States

Background & Aim: Contemporary dental implantology has been continually evolving. There has been a shift from free hand placement and static guided surgery towards dynamic navigation and haptic guided procedures. The aims of this study were to evaluate factors that influence dental implant placement and assess the relative clinical accuracy as well as to evaluate the learning curve required for the dental students while using the dynamic navigation system for implant placement.
Methods: 54 dental students at Boston University School of Dental Medicine were voluntarily recruited. Participants attended a 3-h session which included a presentation on the methods of implant placement, a demonstration of the X-Guide (X-NAV Technologies, LLC, Lansdale, Pennsylvania), dynamic navigation system calibration and implant placement. Students were randomly assigned and placed two Nobel Replace Select 4.3 × 13 mm implants in the anterior (#31, #32) or posterior (#46, #47) mandible. Prior to implant placement, CBCT images of bony typodont samples were taken and virtual implant placement was planned using the dynamic navigation system's software. Post implant placement, a new CBCT was taken to assess accuracy. The following deviations from the virtual plan were calculated: Angular deviation (degrees), Global deviation (mm), Depth deviation (mm), Lateral deviation (mm). After placing the implant in the typodont model, the participants filled out a REDCap electronic questionnaire collecting data on perception towards use of dynamic navigation system. Assessment of clinical accuracy and precision in implant placement was achieved via utilizing the X-Guide in clinical cases.
Results: Students performed similarly in terms of accuracy of implant placement using the X-Guide dynamic navigation system, regardless of their previous clinical experience in general, or experience with implant placement in live patients. Implant placement accuracy increased when using the X-Guide clinically.
Conclusions: All students precisely placed a dental implant and would recommend the system to other clinicians and would use it in the future.

PD106 | Long-Term Outcomes of Dental Implants Placed Using Leukocyte- and Platelet-Rich Fibrin Bone Block for Horizontal Bone Augmentation: A Retrospective Analysis

B. Dupont[1], S. Cortellini[1], K. Van Caesbroeck[1], J. Van der Veken[1], Y. Breugelmans[1], I. Bollens[1], A. Temmerman[1], M. Quirynen[1], A.B. Castro[1]
[1]Catholic University of Leuven, Department of Periodontology, Leuven, Belgium

Background & Aim: Horizontal bone deficiencies in the maxilla and mandible pose significant challenges in implantology. Leukocyte- and platelet-rich fibrin bone blocks have been proposed as an effective method for horizontal bone augmentation. This study aimed to assess the long-term outcomes of implants placed using these bone blocks, either in a simultaneous or staged approach.
Methods: This retrospective analysis included 39 patients presenting a total of 59 implants treated with the leukocyte- and platelet-rich fibrin bone block technique at the Periodontology Department of UZ Leuven between 2016 and 2018, with a follow-up period of 5–8 years. Follow-up metrics comprised implant survival, probing pocket depth, bleeding on probing, levels of oral hygiene and keratinized tissue width.
Results: The overall implant survival rate was 92.9%, with four failures occurring in two patients. The level of oral hygiene was indicated by an average full-mouth plaque score of 45.3% and a full-mouth bleeding score of 20.9%. The mean probing depth around the implants was 3.5 mm, while the mean keratinized tissue width was 3.8 mm. Additionally, 73.5% of the implants exhibited bleeding on probing, and 1.9% showed signs of purulence.
Conclusions: The leukocyte- and platelet-rich fibrin bone block technique for horizontal bone augmentation demonstrates a promising long-term implant survival rate and stable clinical parameters over a follow-up period of 5–8 years. However, the significant incidence of bleeding on probing underscores the necessity for consistent monitoring to effectively manage peri-implant inflammation and ensure long-term peri-implant health.

PD107 | Relationship Between Dietary Habits and Periodontal Inflammation in a UK Population

G. Mainas[1], G. Grosso[2], J. Hurley[1], G. Isola[3], M. Ide[1], L. Nibali[1]
[1]King's College London, Periodontology Unit, Centre for Host-Microbiome Interactions, Faculty of Dentistry, Oral & Craniofacial Sciences, London, United Kingdom, [2]University of Catania, Department of Biomedical and Biotechnological Sciences, Catania, Italy, [3]University of Catania, Unit of Periodontology, Department of General Surgery and Surgical-Medical Specialties, School of Dentistry, Catania, Italy

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Background & Aim: The effects of balanced nutrition in maintaining health and in the predisposition to periodontal disease have been gradually emerging in several studies that reported reduction in gingival bleeding/inflammation and tooth loss. The aim of this project is to assess how dietary habits may affect the local and systemic inflammation associated with periodontal disease.
Methods: 200 consecutive patients attending the visit at the periodontal department at Guy's Hospital/King's College London (United Kingdom) were recruited. Each participant underwent a full periodontal assessment, and had blood and gingival crevicular fluid (GCF) samples taken. Dietary data was collected through a food frequency questionnaire (FFQ) and adherence to a Mediterranean-type diet was assessed. High-sensitivity C-Reactive Protein (hs-CRP) serum levels and GCF levels of metalloproteinases-8 (MMP-8), interleukins-1a, -1b, -6, -10, and -17 were analysed. Correlation and multivariate logistic regression analyses were performed to test the relation between dietary factors, inflammatory biomarkers, and clinical data.
Results: 170 patients had periodontitis, 16 gingivitis and 14 were periodontally healthy. A total of 195 patients had complete data, with 112 participants categorised as highly adherent to the Mediterranean diet (upper median). Multivariate analysis showed that low adherence to Mediterranean diet was associated to periodontitis Stage III-IV (OR 0.35, 95% CI: 0.12–0.89); among individual food groups, only more frequent red meat consumption was independently associated with more severe periodontitis stage (OR 2.75, 95% CI: 1.03–7.41). The consumption of several plant-derived food groups was inversely related to increased levels of hs-CRP and other inflammatory biomarkers, but no clear association was detected among the latter with periodontitis severity, aside for a non-significant trend.
Conclusions: This study shows that low adherence to Mediterranean diet and higher red meat consumption may be associated with periodontal disease. Studies with a larger sample size and other samples analyses are needed in order to further clarify the current findings.

PD108 | The Impact of Patients Shaping Research Into Links Between Periodontal Health and Systemic Health

S. Culshaw[1], P. Sahrmann[2], S. Kohlmaier[3]
[1]University of Glasgow, Dental School, Glasgow, United Kingdom, [2]University Centre for Dental Medicine Basel, Periodontology, Basel, Switzerland, [3]University of Basel, Department for Clinical Research, Basel, Switzerland

Background & Aim: Understanding whether optimising periodontal health impacts on other systemic diseases is essential to shape health care policy and health care funder decisions. Clinical trials investigating the relationship between periodontal disease and comorbidities are complex and expensive. Patient and Public Involvement (PPI) improves research relevance and quality. This study aimed to identify whether PPI from an early stage made a difference to a study investigating the relationship between periodontitis and rheumatoid arthritis (RA).
Methods: A program of PPI was designed so researchers could work with patients to investigate the research question 'does treating periodontal disease improve RA symptoms?' RA patients attending University Hospital of Basel were invited to participate in semi-structured interviews and focus groups.
Results: The input from the patients resulted in several notable changes to the research. Examples included: title/terminology changed: Avoid use of 'periodontitis/periodontal disease' because of negative connotations; instead use 'gum health'. The PPI group agreed they would all decline a study about 'gum disease' as all would assume they do not have this disease. All believed gum disease carried a stigma. Emphasis of benefits: Achieving/maintaining gum health will reduce future dental care costs, future dental problems AND may benefit some RA patients. Important new outcomes: pain-free, mobile and less fatigue. A true control group should NOT receive dental 'information' or assessment in any form as this may change behaviour (exemplified by one member of the group who visited the dentist for the first time in 8 years, received treatment and purchased a new and upgraded toothbrush).
Conclusions: Early engagement with patients can significantly shape and change research delivery towards truly patient relevant research. Investigating comorbidities of periodontitis requires careful consideration of the patient lived experience with the comorbidity.

PD109 | Neutrophil Extracellular Traps Mediate Neuroinflammation and Affect Learning and Memory Impairment via TLR4 Axis in Periodontitis

Z. Song[1,2], L. Xu[1,2], W. Zhou[3,2]
[1]Shanghai Ninth People's Hospital, Shanghai Jiao Tong University School of Medicine, Department of Periodontology, Shanghai, China, [2]College of Stomatology, Shanghai Jiao Tong University; National Center for Stomatology; National Clinical Research Center for Oral Diseases; Shanghai Key Laboratory of Stomatology, Shanghai Research Institute of Stomatology, Shanghai, China, [3]Shanghai Ninth People's Hospital, Shanghai Jiao Tong University School of Medicine, Laboratory of Oral Microbiota and Systemic Diseases, Shanghai, China

Background & Aim: Periodontitis is one of the most common oral diseases and is a potential risk factor for systemic diseases. This study aimed to investigate the function of neutrophil extracellular traps (NETs) between periodontitis and learning and memory impairment.
Methods: A murine periodontitis model was established by oral infection with *Porphyromonas gingivalis* (*P. gingivalis*). Micro–computed tomography (Micro-CT) was assessed to observe the destruction of the alveolar bone. Y maze and Morris water maze was used to analysis learning and memory ability. The activation of microglia and astrocytes in the hippocampus and cortex was investigated by immunohistochemistry. The proportions of neutrophils in the spleen and brain samples were assessed by flow cytometry. NETs formation-associated components, including cell-free DNA (cf-DNA), neutrophil elastase (NE), and myeloperoxidase (MPO) in the peripheral blood plasma and cortex were analyzed. We determined the levels of cytokines and

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

NETs formation in the peripheral blood and cortex, as well as toll-like receptor 4 (TLR4)/NF-kB signaling pathway activation, using reverse transcription-polymerase chain reaction and western blot.

Results: *P. gingivalis* oral infection was found to cause alveolar bone resorption and impair learning and memory ability. Activated microglia and astrocytes with enlarged cell bodies and irregular protrusions were shown. There was an increase in the levels of neutrophils and NETs formation in the periphery and brain. Upregulated mRNA levels and protein levels of inflammatory cytokines and NETs formation were observed. Moreover, we confirmed TLR4/NF-kB signaling pathway activation.

Conclusions: These results suggested that periodontitis was associated with learning and memory impairment, which was probably induced by NETs formation via activating the TLR4/NF-kB signaling pathway.

PD110 | Metabolomic Profiling of Oral Bacteria in Patients With Rheumatoid Arthritis and Periodontitis

S.W. Foong[1], A.R. Al-Maleki[2], C.W. Cheah[1]
[1]Universiti Malaya, Restorative Dentistry (Periodontology), Kuala Lumpur, Malaysia, [2]Universiti Malaya, Medical Microbiology, Kuala Lumpur, Malaysia

Background & Aim: Dental plaque contains diverse bacterial species and the intricate host-microbiome interactions are pivotal in the onset of PD and exacerbation of RA. However, the underlying mechanism requires further investigation. Metabolites, as end products in the biological system, may alter expression patterns when influence by RA and PD. Therefore, the identification of the expressed metabolites may present the opportunity for more efficient management of both diseases, possibly through pro-microbial method. The aim of the present study is to profile bacterial metabolites in dental plaque in relation to RA and PD and correlate the differentially expressed metabolites with clinical parameters.

Methods: This pilot study consisted of 27 participants who were categorised into different groups based on their diagnosis. The groups included early RA with periodontitis (ERAPD) $n=3$, early RA without periodontitis (ERANPD) $n=4$, chronic RA with periodontitis (CRAPD) $n=5$, chronic RA without periodontitis (CRANPD) $n=5$, non-RA with periodontitis (NRAPD) $n=5$ and non-RA without periodontitis (NRANPD) $n=5$. Periodontal assessment, PPD, CAL, VPI and GBI were evaluated while DAS-28 and ESR were extracted from the electronic medical records. Dental plaque samples were collected, and metabolite analysis was performed using liquid chromatography quadruple time-of-flight mass spectrometry (LC-Q-ToF-MS) to profile the metabolites.

Results: A total 1065 different metabolites were detected in ERANPD compared to NRANPD. Bivariate correlation analysis revealed strong correlation with statistically significant difference ($p<0.05$) between nine metabolites and clinical parameters. The metabolites observed in ERA displayed significant diversity, with predominant upregulation. This finding indicates a potential involvement of nine metabolites, His-his, 5-Aminopentanoic acid, 12-hydroxy-10-octadecynoic acid, N-Acetyl-b-glucosaminylamine, 4-Isopropylbenzoic acid, Stigmatellin Y, Saccharopines, N-Cyclohexanecarbonylpentadecylamine, and Anandamide (20:l, $n-9$) which are involved in fuelling inflammation in the progression of RA.

Conclusions: Differently expressed metabolites in dental plaque could reveal links between RA and PD, highlighting oral health's role in systemic inflammation.

PD111 | Association of Advanced Glycation End Products With Its Soluble Receptor and Interleukin-17 in Type 2 Diabetic Periodontitis Patients

Y.D. Yildirim[1], A. Aydogdu[1], B. Erturk[2], B. Cicek[3], D. Çağdaş Ayvaz[3], U. Unluturk[2], E. Berker[1,4]
[1]Hacettepe University, Department of Periodontology, Ankara, Turkey, [2]Hacettepe University, Division of Endocrinology and Metabolism, Department of Internal Medicine, Ankara, Turkey, [3]Hacettepe University, Division of Pediatric Immunology, Institute of Child Health, Ankara, Turkey, [4]Istanbul Medipol University, Department of Periodontology, Istanbul, Turkey

Background & Aim: Periodontitis negatively affects glycemic control in individuals with diabetes and increases the risk of complications. Diabetes, if uncontrolled, increases the risk of periodontal disease and associated tooth loss. Assessment of Advanced glycation end products (AGEs) and its soluble receptor (sRAGE) together may give a better understanding of these molecules in inflammatory process. Gingival crevicular fluid and saliva AGE/sRAGE ratio has not been adressed in diabetic periodontitis pathogenesis yet. The aim of this study was to evaluate IL-17 levels and AGE/sRAGE ratio in saliva and gingival crevicular fluid in the presence of periodontitis in diabetic patients.

Methods: This case control study included 64 patients, divided into 4 groups as healthy (H), periodontitis without diabetes (P), periodontitis patients with controlled diabetes (DP), periodontitis patients with uncontrolled diabetes (PDP). Periodontal clinical parameters were recorded. AGE, sRAGE, IL-17 levels in GCF and saliva samples were measured with ELISA and AGE/sRAGE ratio was determined.

Results: GCF AGE/sRAGE ratio and IL-17 levels of periodontitis groups were significantly higher than H group, while sRAGE levels were significantly lower ($p<0.05$). In addition, AGE/sRAGE ratio of PDP group were significantly higher than DP group in GCF and saliva ($p<0.05$). Both GCF and saliva AGE/sRAGE ratio, GCF IL-17 and GCF AGE values were positively correlated ($p<0.05$) and GCF sRAGE values were negatively correlated with periodontal parameters ($p=0.001$). HbA1c levels were positively correlated with AGE/sRAGE ratio in GCF and saliva ($p<0.05$).

Conclusions: Findings point the AGE/sRAGE ratio as a promising indicator for disease risk and severity. Increased levels of AGEs in both GCF and saliva in poorly controlled diabetic patients highlight their role in periodontal inflammation and suggest that saliva might serve as a non-invasive monitoring tool for AGEs in hyperglycemic states. The AGE/sRAGE ratio emerged as a potential biomarker for periodontal disease in diabetes, with a positive correlation to clinical parameters and HbA1c levels.

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

PD112 | Targeting NLRP3 Inflammasome in Macrophages Restores Periodontal Tissue Homeostasis and Improves Cognitive Function in Mice via the 'Oral-Brain' Axis

Z. Shen[1], B. Cheng[1], C. Zhao[1]
[1]*Hospital of Stomatology, Guanghua School of Stomatology, Sun-Yat-sen University, Guangzhou, China*

Background & Aim: Periodontitis not only causes tooth loosening and loss but is also closely linked to cognitive impairment. In the elderly, the severity of periodontitis increases significantly, raising the risk of cognitive decline. Age-related damage-associated molecular patterns (DAMPs) activate the NLRP3 inflammasome in periodontal macrophages, weakening their defense and inflammatory regulation. This leads to a microbial imbalance and persistent inflammation, worsening periodontitis. It is unclear whether inhibiting the NLRP3 inflammasome can restore macrophage function, treat age-related periodontitis, and reduce its impact on cognition. This study aims to use nanomaterials to target and inhibit NLRP3 inflammasome activation in gingival macrophages, thereby improving their function. The research will explore whether modulating these macrophages can not only treat age-related periodontitis but also reduce its negative effects on cognitive function. This could provide new strategies for managing periodontitis and cognitive decline in the elderly.
Methods: We generated NLRP3 knockout aged mice to explore the role of the NLRP3 inflammasome in age-related periodontitis. Macrophages from periodontal tissue were isolated via flow cytometry and analyzed for polarization markers (CD86, CD206). Phagocytic ability was assessed through bacterial engulfment assays. Alveolar bone loss and gingival inflammation were measured to evaluate the impact of NLRP3 activation. NLRP3-siRNA-loaded nanoparticles were synthesized to inhibit excessive NLRP3 activation in macrophages. We assessed their effects on macrophage polarization, phagocytosis, periodontal microbiota, and cognitive function. Finally, Stereo-seq spatial transcriptomics was used to investigate hippocampal changes, identifying molecular mechanisms underlying cognitive improvement in treated mice.
Results: The impact of periodontal tissue disruption on cognitive function and astrocyte proliferation in the hippocampus. Injecting NPsiNLRP3 into the gingiva prevents periodontal tissue damage and associated cognitive decline. The number of Serpina3nhigh astrocytes significantly decreased in the hippocampus after periodontal treatment.
Conclusions: The use of NPsiNLRP3 to restore macrophage function can be beneficial for the treatment or prevention of aging-related periodontitis and cognitive decline.

PD113 | Prevalence and Clinical Characteristics of periodontitis in Men 65 Years or Older, With or Without Abdominal Aortic Aneurysm

L. Patomella[1], A. Bjällmark[2], M. Stensson[1], O. Norderyd[1,3]
[1]*Jönköping University, Department of Odontology and Oral Health Science, Jönköping, Sweden,* [2]*Jönköping University, Department of Clinical Diagnostics, Jönköping, Sweden,* [3]*The Institute for Postgraduate Dental Education, Region Jönköping County, Jönköping, Sweden*

Background & Aim: Abdominal aortic aneurysm (AAA) has been suggested to be associated with periodontitis. Research has identified increased levels of periodontitis-associated bacteria in the bloodstream and the vessel walls in individuals with AAA. Studies in the area are few, thus, we initiated 'The Oral and Vascular Health study (OVH)' to investigate if there is an association between AAA and periodontitis. The aim is to investigate prevalence and clinical characteristics for periodontitis in men ≥65 years of age, with or without AAA.
Methods: The study design is a case-control study with an age-matched control group without AAA. All participants were recruited in connection with a national screening program for AAA. The first third of the consecutively examined subjects in the OVH study were included in these preliminary analyses. These results are based on 10 individuals with AAA and 36 without AAA. Clinical and radiographic data were collected together with a medical examination. Gingival index (GI), plaque score, bleeding on probing (BoP), pocket depth, mobility, furcation involvement and periodontal diagnostics were registered. Chi square, Fishers exact test, Independent *t*-test and Mann–Whitney *U* test were used in the statistical analysis.
Results: The results show that 6 of 10 participants with AAA had severe periodontitis compared to 3 of 36 in the control group ($p=0.002$). There were no differences in plaque score, GI, BoP, mobility or furcation involvement between AAA and non-AAA. Individuals with AAA had a higher total of increased pocket depth ($p=0.030$) compared to non-AAA. The result was also statistically significant in pocket depth specific at 4 mm ($p=0.025$) and 5 mm ($p=0.036$), where the AAA had higher prevalence than the control group.
Conclusions: There is a difference in the prevalence of periodontitis and the increased pocket depth in individuals with AAA and without AAA. This needs further investigation.

PD114 | Effects of *Porphyromonas gingivalis* LPS on Sympathetic Nervous System in Mice

I. Matsuo[1], S. Okumura[2], T. Nagano[3], A. Matsuo[4]
[1]*Tokyo Medical University Ibaraki Medical Centre, Dentistry, Ibaraki, Japan,* [2]*Tsurumi University, Department of Physiology, Yokohama, Japan,* [3]*Tsurumi University, Department of Periodontology, Yokohama, Japan,* [4]*Tokyo Medical University Ibaraki Medical Centre, Oral and Maxillofacial Surgery, Ibaraki, Japan*

Background & Aim: Epidemiological studies have reported a higher rate of abnormal heart rate variability (HRV) in patients affected by periodontitis. Chronic activation of sympathetic nervous system (SNS) has previously been shown to induce the development of heart failure. These reports suggest that SNS signalling may be involved in the mechanism of periodontal disease-induced chronic heart failure. However, it is unclear whether sympathetic nervous system is involved in the mechanism of periodontal disease-induced heart failure. We therefore administered PG-LPS (lipopolysaccharide from *Porphyromonas gingivalis*) to telemetrically ECG-implanted mice at the same

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

dose as circulating levels in periodontitis patients, and analysed 24-h ECGs to investigate sympathetic nervous system activation.
Methods: Mice (C57BL6/J) were implanted with a telemetry ECG machine under isoflurane anaesthesia (2%), with a 14-day recovery period followed by 24-h baseline measurements before PG-LPS administration (0.8 mg/kg/day i.p.). Measurements were taken 24 h after 1, 3 and 7 days after administration, respectively. The measured ECG waveforms were analysed for heart rate (HR) and frequency analysis (LF/HF ratio) using analysis software (SRV2).
Results: HR and LF/HF ratio were significantly increased compared to baseline at 1 day, 3 days and 7 days after PG-LPS treatment. HR: Base line versus PG-LPS (1 day), PG-LPS (3 day), PG-LPS (7 day): 505.8 ± 19.06 versus 544.8 ± 18.67. 541.8 ± 35.16. 542.2 ± 17.46 (bpm), $p < 0.05$ versus Base line ($n = 5$): LF/HF ratio: Base line versus PG-LPS (1 day), PG-LPS (3 day), PG-LPS (7 day): 0.98 ± 0.08 versus 1.90 ± 0.32. 2.01 ± 0.25. 2.25 ± 0.39, $p < 0.05$ versus Base line ($n = 5$): one-way ANOVA Bonferroni post hoc test.
Conclusions: Our results indicated that periodontal disease may be involved in the development of heart failure through activation of the sympathetic nervous system.

PD115 | Plasma Cell Periodontitis: A Rare Disease Entity with Unique Clinical and Histopathological Features. Case Report

Y. Hanine[1], A. Cherkaoui[2]
[1]International Faculty of Dental Medicine of Rabat, Department of Periodontology, Rabat, Morocco, [2]Faculty of Dental Medicine Rabat, Department of Periodontology, Rabat, Morocco

Background & Aim: Plasmacytoid mucositis is a non-cancerous inflammatory disorder characterized by a concentrated infiltration of plasma cells into the orifice mucosa. It can affect various parts of the body, such as the lips, oral mucosa, palate, gums, tongue, epiglottis, larynx, and genital mucosa. Other terms used include orifical plasmacytosis, idiopathic plasmacytosis, oral papillary plasmacytosis, and plasmocytic gingivitis. It tends to occur slightly more frequently in men, with a male-to-female ratio of 1.2:1, according to epidemiological data. It typically appears around the age of 56.6 years.
Methods: A 32-year-old breastfeeding patient in good general health presented with gingival inflammation, irritation, and burning sensations, along with cheilitis. Periodontal examination showed gingival hyperplasia and periodontal pockets, suggesting periodontal disease. Following a detailed interview, the patient was referred to a pulmonologist. Comprehensive diagnostic tests—including radiographs, bloodwork, and biopsies—were performed, revealing a plasma cell-dominated inflammatory infiltrate, leading to a provisional diagnosis of plasma cell mucositis. The final diagnosis of plasmacytosis with periodontal involvement was confirmed. Treatment included scaling and root planing to remove plaque and calculus, along with antibiotic therapy to reduce infection and inflammation.
Results: The patient was reviewed after 2 weeks, then one month, and then six months, and improvement in clinical parameters was observed. The response to the etiological treatment was slower compared to plaque-related periodontal diseases.
Conclusions: In conclusion, plasmocytic periodontitis is a rare disease entity that presents unique clinical and histopathological characteristics. This case report highlights the importance of considering this condition in the differential diagnosis of chronic periodontitis, particularly when there is no response to conventional periodontal therapy. Early recognition and prompt treatment of this condition are essential for successful disease management and prevention of further complications. Further research is needed to better understand the pathogenesis and optimal treatment strategies for this rare condition.

PD116 | Granulomatosis With Polyangiitis Diagnosed From Oral Symptoms Only: A Case Report With 27 Months Follow-Up

B. Ozen[1], M. Soluk Tekkesin[2], L. Kuru[1]
[1]Marmara University, Faculty of Dentistry, Periodontology, Istanbul, Turkey, [2]Istanbul University, Oral Pathology, Istanbul, Turkey

Background & Aim: Granulomatosis with polyangiitis (GPA) is a multisystemic, idiopathic, necrotizing autoimmune granulomatous vasculitis. Approximately one-third of patients experience no symptoms at the onset of the disease, and 75% experience primarily non-specific symptoms related to the upper respiratory tract. Although rare, oral involvement is found in 6%–62% of patients (1.5). This rare case report describes the process starting with the diagnosis of the disease up to the 27-months follow-up.
Methods: A 31-year-old female patient with Hashimoto's thyroid disease contacted us via e-mail with diffuse swelling, tenderness and pain in the gums for 4 months. While most of the recent blood test results were within the normal reference range. Clinical examination revealed severe pain, tenderness and strawberry gingivitis appearance. She was consulted to the Rheumatology Department for cytoplasmic-Antineutrophil cytoplasmic antibodies (c-ANCA), sedimentation and complete blood count. The c-ANCA was found to be positive. No significant pathology was observed on thorax CT and paranasal sinus CT imaging. A biopsy of the gingival tissue was requested to confirm the diagnosis. Incisional biopsies were taken at the sites of severe lesions. Based on the histopathological and clinical findings, the diagnosis was compatible with GPA. Since the patient did not accept periodontal treatment, only oral hygiene instruction was given and she was followed up for 26 months. On 27th month, initial periodontal treatment was performed. In this process, the patient's treatment was started with systemic cortisone and methotrexate for the first 6 months followed by IV chemotherapy every 6 months.
Results: Periodontal tissues responded favorably to treatment at the 3, 12, 18, and 27-months control visits.
Conclusions: It is vital for dentists to be aware of GPA, which severely restricts blood flow to organs and severely shortens life expectancy when left untreated, to recognize oral symptoms and refer patients to Rheumatology Clinics.

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

PD117 | Presence of Bacterial Lipopolysaccharide and Amyloid-β at Explanted Implants With Peri-Implantitis

M. Toledano-Osorio[1], C. Cifuentes[2], R. Osorio[2], M. Toledano[2], M. Sanz[3]
[1]University Complutense of Madrid, Postgraduate Program of Specialization in Periodontology, Faculty of Dentistry, Madrid, Spain, [2]University of Granada, Granada, Spain, [3]University Complutense of Madrid, ETEP (Etiology and Therapy of Periodontal and Peri-Implant Diseases) Research Group, Madrid, Spain

Background & Aim: The most relevant long-term complication of dental implants restoring missing teeth is periimplantitis (PI). It is characterized by peri-implant tissue chronic inflammation leading to bone destruction and if untreated to implant loss. However, the mechanisms directly implicated in the pathobiology of this disease are not fully elucidated. The aim of this ex vivo investigation was to study the presence of amyloid-β and bacterial LPS in freshly extracted titanium implants, affected by PI or explanted by other causes. Additionally, a method for removal LPS bacterial endotoxin and amyloid-β from contaminated titanium surfaces was tested.
Methods: Twenty-four explanted implants were harvested from patients with ($n=12$) or without ($n=12$) PI, and their surfaces were analyzed by attenuated total reflectance (ATR) and Fourier transform infrared spectroscopy (FTIR) to co-localize amyloid-β and bacterial lipopolysaccharide. Presence of amyloid-β on the implants surfaces was further analyzed by light microscopy after specific staining with Congo red amyloid. In parallel, 6 titanium discs were contaminated with LPS and amyloid-β. A cleaning protocol using 0.25% NaOCl was tested on the implants and the contamined titanium discs.
Results: LPS and amyloid-β were observed at implant with PI, mainly located at the apical and cervical areas. On the contrary, none of these molecules were observed at the implants extracted without PI. 0.25% NaOCl application was an efficient method for removing LPS and amyloid-β, not being able to detect after the proposed disinfection protocol.
Conclusions: It was demonstrated the combined and closely related presence of LPS and amyloid-β at the surface of implants with PI. An easy treatment to effectively clean these organic contaminants from the titanium surface is proposed. Additional in vitro and in vivo research is necessary to evaluate other decontamination methods, such as ultrasonics, which also seem efficient in decontaminating LPS deposits.

PD118 | Saliva Microbiome Profiles in Patients With Implant-Retained Overdentures

A. Gillone[1], A.A. Martinez Luna[1], D.W. Paquette[1], M. Sheba[2], M. Abdelaal[2], X. Cui[3]
[1]East Carolina University, Surgical Sciences, Periodontology, Greenville, United States, [2]East Carolina University, General Dentistry, Prosthodontics, Greenville, United States, [3]East Carolina University, General Dentistry, Greenville, United States

Background & Aim: Limited clinical data exist regarding the saliva microbiome in edentulous patients with implant-retained overdentures (IRO). This study aimed to evaluate the saliva microbiome profiles in IRO patients, compare these profiles with peri-implant plaque microbiomes, and examine their correlation with pre-treatment periodontal diagnoses.
Methods: The study included 25 patients with a total of 50 implants. Demographic data and pre-treatment periodontal diagnoses were recorded. Clinical measurements, peri-implant plaque, and saliva samples were collected, followed by 16S rRNA gene-targeted sequencing.
Results: Participants had an average age of 71 years. Pre-extraction diagnoses included:

- Group 1: 4 patients with clinically healthy gingiva on a reduced periodontium
- Group 2: 4 patients with localized Stage II to IV periodontitis, Grades B or C
- Group 3: 7 patients with generalized Stage I to III periodontitis, Grades A or B
- Group 4: 10 patients with generalized Stage IV periodontitis, Grade C

Nineteen implants exhibited signs of peri-implant mucositis, while 31 were healthy. Salivary microbiome results showed statistically significant differences in alpha diversity between male and female patients ($p<0.05$) and between group 4 and group 2 ($p<0.05$). Beta diversity also showed significant differences when comparing group 3 with groups 4 ($p<0.05$) and 2 ($p=0.05$). Patients with fewer than 10 residual teeth before implant placement had a higher prevalence of health-associated species. No significant differences in the salivary microbiome were noted based on the duration of IRO wear (less than or more than 1 year).
Saliva samples exhibited significantly higher alpha and beta diversity compared to plaque samples ($p=0.01$ and $p<0.01$, respectively). Significant differences between saliva and plaque microbiomes were identified based on pre-treatment diagnoses.
Conclusions: This study confirmed notable differences in salivary microbial profiles among IRO patients, as well as between saliva and plaque microbiomes across all patient groups. However, assessing the biological significance of these differences remains complex.

PD119 | Dynamics of Mucosal Integration of Machined Versus Anodized Titanium Implants

J.S. Dworan[1], F. Aellos[1], J.A. Grauer[1,2], G. Fabbri[3], K.G. Harder[1,4], S. Boccardo[5], P.L. Cuevas[1], I. Dawid[1], M. Vicini[1], J.A. Helms[1]
[1]Stanford School of Medicine, Surgery, Palo Alto, United States, [2]University of Manitoba, Dr. Gerald Niznick College of Dentistry, Winnipeg, Canada, [3]Private Practice, Ban Mancini Fabbri Dental Clinic, Cattolica, Italy, [4]University of Manitoba, Max Rady College of Medicine, Winnipeg, Canada, [5]Nobel Biocare Services AG, Kloten, Switzerland

Background & Aim: The long-term success of dental implants depends on the ability of soft tissues to form a protective barrier, limiting pathogen infiltration into peri-implant tissues. Here, we

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

investigated the impact of an anodized surface modification on mucosal integration.
Methods: Scanning electron microscopy and surface chemistry characterization were carried out on miniaturized implants. Following placement in fresh extraction sockets of mice, peri-implant tissues were examined at four timepoints. Histology along with quantitative immunohistochemistry (qIHC) for Keratin 14, Vimentin, Laminin 5, and CD68 were carried out on post-implant day (PID) 3 to assess early events in soft tissue repair; on PID7, when peri-implant epithelialization was complete; at PID14 when osseointegration was complete; and at PID28 when soft tissue maturation was nearing completion. In all cases, an intact junctional epithelium (JE) served as a reference.
Results: Our analyses supported three conclusions: first, maturation of the peri-implant epithelium (PIE) is a protracted process consistent with clinical observations. Second, maturation of the soft tissue-implant interface is slower than maturation of the bone-implant interface. Third, there is a benefit, albeit transient, to soft tissue maturation around an anodized implant surface.
Conclusions: The nature of the soft tissue-implant interface changes dramatically over time, although mucosal integration is a slow process relative to osseointegration. The prolonged timeframe of maturation and remodeling may explain why, at earlier stages, the PIE is a sub-optimal barrier compared to a JE. Given its prolonged time course, strategies to improve and/or accelerate PIE maturation are likely to have significant clinical benefits.

PD120 | How Are Imaging Techniques Selected for Anterior Mandibular Dental Implant Planning? A Survey

N. Garcia-Madueño[1], Y. Kiwaki Arauco[1], M.E. Guerrero[2]
[1]San Martin de Porres, Periodontology, Lima, Peru, [2]Nacional Mayor de San Marcos, Periodontology, Lima, Peru

Background & Aim: Implant-supported overdentures in the edentulous anterior mandible are considered the treatment choice in many cases of severe or moderate alveolar resorption r Pre-surgical evaluation for dental implant placement is based in two-dimensional radiographic methods such as panoramic (PAN) and periapical radiographs and three-dimensional imaging such as cone beam computed tomography (CBCT) are possible options. The aim of this study was to determine the most often used imaging in the preoperative assessment for dental implant placement in mandibular edentulous patients.
Methods: A web-based questionnaire was developed and was presented with two clinical scenarios of two edentulous cases. Implant-retained mandibular complete dentures were planned using different imaging techniques with additional imaging guides. A mixed mode methodology was used. The population were defined as dental surgeons with or without post-graduate qualifications and dental implantology training.
Results: 112 dentists were surveyed. Dental surgeons with a two-year specialization course were associated with the selected imaging study used for the preoperative evaluation for ($p=0.000$) for case 1 and ($p=0.023$) for case 2, since these dental surgeons preferred CBCT with a guide, while the surgeons who did not take this course preferred PAN with a guide. Also, postgraduate studies and the selected imaging study for the pre-operative evaluation were associated ($p=0.040$), since dental surgeons with a master's or doctorate degree preferred to use CBCT with a guide, while graduated dental surgeons preferred panoramic with guide.
Conclusions: The most widely imaging technique used for pre-operative evaluation of dental implants placement was CBCT with a guide as the first option.It was also observed that the type of training in implantology had no association with the imaging study used. Evidence-based selection criteria are necessary for dentistry school instruction because dental implantology can also be learned through manufacturer courses or peer mentorship.

PD121 | Deep Learning-based Segmentation of Dental Implants and Quantification of Marginal Bone Loss Using Periapical Radiographs

F. Umer[1], N. Adnan[2], S.MF. Ahmed[2], A. Sadiq[2]
[1]Aga Khan University Hospital, Surgeey, Karachi, Pakistan, [2]Aga Khan University, Surgery, Karachi, Pakistan

Background & Aim: Dental implants have been the long-term restoration of choice for missing teeth. Follow-up of implants is crucial to ensure optimum health of the implant to ensure longevity. Periapical (PA) radiographs are the modality of choice for assessing bone around the implant as well as clinical examination to assess soft tissues. To segment dental implants on PA radiographs using a Deep Learning (DL) algorithm. To compare the performance of the algorithm relative to the ground truth determined by the human annotator. To detect and quantify Marginal Bone Loss (MBL) around dental implants on sequential PA radiographs.
Methods: Three hundred PA radiographs (150 taken at placement and 150 at follow-up appointments) were retrieved from the radiographic database and annotated to label implants as well as teeth using polygons on the LabelMe annotation software. The dataset was augmented to increase the number of images in the training data and a total of 1294 images were used to train, validate and test the DL algorithm. An untrained U-net was downloaded and trained on the annotated dataset to allow detection of implants on PA radiographs. Thereafter, a YOLO model was used to detect and quantify MBL around dental implants at follow-up radiographs.
Results: A total of one hundred and thirty unseen images were ran through the trained U-net to determine its ability to segment implants on PA radiographs. The performance metrics are as follows: accuracy of 97.88%, precision of 90%, recall of 83%, F-1 score of 86% and Intersection over Union of 86%. MBL was calculated as a percentage of pixels within a bounded region of interest.
Conclusions: The trained DL algorithm segmented implants on PA radiographs with high performance similar to that of the humans who labelled the images forming the ground truth. The YOLO model adequately detects marginal bone loss at follow-up PA radiographs.

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

PD122 | Automated Surgical Planning for Implant Placement in the Posterior Maxilla Using Deep Learning

I.-K. Hwang[1,2], W.-J. Yi[3], T. Kim[2]
[1]*Gangneung-Wonju National University, Department of Periodontology and Research Institute of Oral Sciences, Gangneung, Republic of Korea,* [2]*Seoul National University, School of Dentistry and Dental Research Institute, Department of Periodontology, Seoul, Republic of Korea,* [3]*Seoul National University, School of Dentistry and Dental Research Institute, Department of Oral and Maxillofacial Radiology, Seoul, Republic of Korea*

Background & Aim: When planning implant surgeries, clinicians usually analyze patients' CBCT images to assess residual bone width and height and to identify critical anatomic structures. In the posterior maxilla, available bone width and height and proximity to the maxillary sinus influence the determination of surgical approaches for implant placement. Techniques such as sinus floor elevation via lateral window or crestal approach and guided bone regeneration are accompanied to resolve the bone deficiency. Deep learning, a subset of artificial intelligence, enables computers to learn from large datasets, and these advances aid humans in improving task efficiency and accuracy. In dentistry as well, digital data such as CBCT scans can be utilized in deep learning to accomplish task automation, which has needed dentist or dentistry-related workers. This study aims to develop and validate a deep learning model employing a 3D distance-guided network to automatically suggest optimal treatment plans for implant surgery in the posterior maxilla.
Methods: The overall framework incorporates a two-stage approach: anatomical landmark detection and classification. The detection network (D-Net) utilizes a cascaded volumetric regression network with a coarse-to-fine learning strategy, predicting the locations of five key anatomical landmarks. Subsequently, the classification network (C-Net) integrates these 3D landmarks with distance priors to categorize CBCT images into appropriate surgical approaches based on the ABC classification, the well-known criteria proposed by Hom-Lay Wang.
Results: D-Net achieved high accuracy in landmark detection, with a mean radial error of 0.87 mm and a 95.47% success rate for detections within 2 mm. C-Net demonstrated an overall accuracy of 0.97, with sensitivity and specificity values of 0.92 and 0.98, respectively. The area under the curve reached 0.95, indicating the robust performance of the framework.
Conclusions: The framework offers a reliable method for automatically determining approaches for implant surgery on the posterior maxilla, potentially enhancing treatment planning efficiency in digital dentistry.

PD123 | Evaluation of Dental Implant Survival and Success in Patients With Oligodontia: A Retrospective Clinical Study

P. Monneyron[1], A. Svestonof[1], R. Felizardo[2,3], M.C. Carra[4,5], B. Pj Fournier[3,6,7], S. Kerner[3,8]
[1]*Université Paris Cité, Resident in the Post Graduate Program in Periodontology and Implant Dentistry-EFP, Paris, France,* [2]*Université Paris Cité, Faculty of Odontology, Department of Imaging, Paris, France,* [3]*Reference Center for Oral and Dental Rare Diseases, ORARES, Rothschild Hospital, AP-HP, Paris, France,* [4]*Université Paris Cité, Faculty of Odontology, Department of Periodontology, Paris, France,* [5]*University of Ferrara, Translation Medicine, Ferrara, Italy,* [6]*Université Paris Cité, Faculty of Odontology, Department Oral Biology, Paris, France,* [7]*Centre de Recherche des Cordeliers, Université Paris Cité, Sorbonne Université, INSERM U 1138, Laboratory of Molecular Oral Pathophysiology, Paris, France,* [8]*Loma Linda, Periodontics, School of Dentistry, Loma Linda, California, United States*

Background & Aim: Patients with oligodontia are candidate to dental implant treatment to replace the congenital missing teeth. However, due to the rare disease prevalence of oligodontia, little is known about the survival and success rates of dental implants in these patients. Objective: The aim of this retrospective clinical study was: (1) to evaluate the dental implant survival and success rates in patients with oligodontia up to 5 years; and (2) to assess their Oral Health-related Quality of Life (OHRQoL) after implant therapy.
Methods: Medical records of oligodontia patients who underwent dental implant treatment between February 2013 and December 2023 in the department of Rare Oral and Dental Diseases were reviewed. During their annual follow-up consultations, variables such as plaque level, bleeding on probing, probing depth, implant mobility/stability, implant loss, and peri-implant bone level changes via orthogonal X-rays were assessed. The OHIP-14 questionnaire was used to assess OHRQoL and was given to each patient during the consultation. Implant survival and success rates were analyzed by the Kaplan-Meier curves.
Results: The survival analysis was conducted on a total of 267 dental implants placed in 58 oligodontia patients by the same experienced surgeon. The 5-year cumulative survival rate was 96.67%. Twenty-seven patients came for their annual follow-up appointments and were used for the success rate analysis. Based on 146 implants, the success rate at 5 years was 82.4% according to Misch et al. criteria. Peri-implant mucositis and peri-implantitis rates were 37.67% and 5.47%, respectively. Patients demonstrated favorable OHIP-14 scores with a median score of 4 (IQR [2; 6]) indicating a high OHRQoL after dental implant therapy.
Conclusions: Dental implants in oligodontia patients display a high survival and success rates, which are similar to those reported for the general population. Dental implants could be considered a predictable treatment option to replace missing teeth also in patients with oligodontia.

PD124 | The Modified Coronally Advanced Tunnel Technique for Treatment of Mucosal Recessions at Implants

G. Nikou[1], A. Sculean[1], H. Deppe[2], E. Allen[3], R. Cosgarea[4,5,6]
[1]*School of Dental Medicine, University of Bern, Department of Periodontology, Bern, Switzerland,* [2]*University of München, Germany, Department of Oral Surgery, München, Germany,* [3]*Center for Advanced Dental Education, Dallas, Texas,*

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

United States, [4]University of Bonn, Germany, Department of Periodontology, Operative and Preventive Dentistry, Bonn, Germany, [5]Philipps University, Department of Periodontology and Peri-implant Diseases, Marburg, Germany, [6]University Iuliu Hatieganu Cluj-Napoca, Faculty of Dentistry, Cluj-Napoca, Romania

Background & Aim: To clinically evaluate the outcomes following surgical coverage of single peri-implant mucosal recessions in the aesthetic maxillary area by means of the modified coronally advanced tunnel (MCAT).
Methods: Eleven systemically healthy non-smoking patients (8 females) each presenting a single peri-implant mucosal recession in the anterior maxillary region were consecutively treated with MCAT in conjunction with a subepithelial connective tissue graft (SCTG). In all cases, the facial recession was associated with an impaired aesthetic appearance. Before reconstructive surgery and at 12 months postoperatively, clinical and aesthetic parameters were assessed. The primary outcome variable was the mean mucosal coverage recession (MRC).
Results: Healing was uneventful in all cases. At 12 months, statistically significant ($p < 0.05$) recession coverage (MRC 94.71%) and improvement of aesthetics (pink esthetic score) was obtained at all implants. Complete RC was obtained in 10 out of the 11 patients (90.9%). The treatment was associated with a significant gain of keratinized and attached mucosa ($p < 0.05$).
Conclusions: The present findings indicate that the MCAT and SCTG is a valuable option for treating single peri-implant mucosal recessions in the maxillary aesthetic area.

PD125 | Aesthetics Assessment in Maxillary Lateral Incisor Agenesis Treated by Distalisation and Adhesive Bridge or Implant Reconstruction Compared With Substitution Therapy

I. Marek[1], A. Homolova[1], M. Novosad[2], J. Stibal[2], M. Starosta[2]
[1]Palacky University, Olomouc, Olomouc, Czech Republic, [2]STOMMA Clinic, Breclav, Czech Republic

Background & Aim: Space opening followed by reconstruction with dental implant or an adhesive bridge, or space closure by substitution therapy are three basic options when treating maxillary lateral incisor agenesis. The aim of this study was to compare the aesthetics of the results the methods using the Pink Esthetic Score (PES) and White esthetic score (WES) indices and to compare the differences in aesthetic perceptions by dental specialists and patients.
Methods: The study included 60 patients with 103 missing maxillary lateral incisors treated between 2001 and 2015. Patients were divided into groups according to the treatment method (substitution: $n = 21$ patients; adhesive bridge: $n = 16$; and implant reconstruction: $n = 23$). PES and WES indices were used to evaluate the final result by a questionnaire including randomly ordered, post-treatment photographs. Assessment was performed by laypeople ($n = 5$), dental specialists ($n = 15$, represented equally by orthodontists, prosthodontists and implantologists). Patients investigated their subjective perception of the treatment outcome.
Results: The differences in PES index assessment were found to be significant between all three treatment groups ($p = 0.0001$); in the combined PES/WEX index, significantly higher values were found for substitution when compared to other groups ($p = 0.0001$). The prosthodontists were most critical in assessment according to the WES index, while implantologists were most critical according to the PES index. Respondents from all groups did not find any difference between adhesive bridge or implant reconstructions. Patients were significantly more satisfied with adhesive bridge replacement or implant compared to canine substitution ($p = 0.012$ and $p = 0.033$).
Conclusions: In correcting lateral incisor agenesis, all groups assessed canine substitution as aesthetically more acceptable than replacement by implant or adhesive bridge, and no difference was found between these two treatments. Opposite results were found in the assessment performed by the patients themselves.

PD126 | Volumetric Changes in Post-Extraction Sockets Following Alveolar Ridge Preservation or Spontaneous Healing

S. Seni[1], P. Salgado[2], A. Castro Escalante[3], D. Anastasio[4], S. Puia[1], B. Orman[3]
[1]University of Buenos Aires, Oral and Maxillofacial Surgery I, Buenos Aires, Argentina, [2]University of Buenos Aires, Microbiology, Buenos Aires, Argentina, [3]University of Buenos Aires, Pharmacology, Buenos Aires, Argentina, [4]University of Buenos Aires, Rehabilitation of medium and high complexity, Buenos Aires, Argentina

Background & Aim: Alveolar preservation is a well-known and studied technique. The interaction of soft and hard tissue received less attention. The aim is to evaluate the dimensional changes of the soft and hard tissue in post-extraction sockets and the interaction of them after spontaneous healing (SH) or alveolar preservation (AP).
Methods: Twelve patients requiring extraction of one tooth (not molar) were randomly assigned to SH or AP. A volumetric/tomographic model was designed for measurements. STL files obtained at baseline and six months after treatment were superimposed with DICOM files at a time (*t*) 0 (before extraction) and 180. Soft tissue thickness was measured at *t*0 and 180. STL files at *t*0 and 180 were superimposed to assess linear and volumetric contour changes. The buccal and palatal bone plate and bone ridge width were measured in the DICOM files at t0 and 180. SPSS29 Software was applied for statistical analysis and comparison of differences between groups. $p < 0.05$ was considered significant.
Results: Soft tissue thickness post/pre showed significant differences between groups (SD) $p = 0.025$ (95% CI: 0.252–3.098) and $p = 0.014$ (95% CI: 0.353–2.417) for two buccal points. The post/pre differences didn't show SD for the buccal linear contour. Total contour also showed no SD ($p = 0.62$). The post/pre-bone tissue analysis showed SD for the buccal plate ($p = 0.03$) and palatal plate ($p = 0.02$). The bone ridge width showed a reduction for the AP of 0.95 ± 0.48 mm and for SH of 2.61 ± 2.56 mm, with no SD ($p = 0.15$). The bone area was reduced at t180 ($p = 0.017$).

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Conclusions: At t180, both linear and volumetric dimensional changes were observed in both groups. In AP, soft tissue thickness decreased at t180, while in the SH, it increased. Bone remodeling was more pronounced in SH. However, both groups managed to maintain their linear and volumetric contours, suggesting a compensatory mechanism in ridge remodeling with soft tissue in SH.

PD127 | Edentulous Alveolar Ridge Changes Over Time: Maxillary Versus Mandibular Sites

V. Kofina[1], T. Phuatrakoon[1], S. Mehta[2], S. Han[3], D. Tatakis[4,5]
[1]Marquette University, Surgical Sciences, Milwaukee, Wisconsin, United States, [2]Texas A&M University, Department of Orthodontics, Dallas, Texas, United States, [3]Marquette University, General Dental Sciences, Milwaukee, Wisconsin, United States, [4]Case Western Reserve, Periodontics, Cleveland, Ohio, United States, [5]University of Jordan, Oral and Maxillofacial Surgery, Oral Medicine, and Periodontology, Amman, Jordan

Background & Aim: A delay in implant treatment plan may often be necessary due to finances or a complex multi-step global treatment plan. This, in turn, leads to bone availability uncertainty for future implant placement. The aim of this study is to measure long-term alveolar ridge height and width changes in established edentulous sites and compare maxillary and mandibular sites.
Methods: Patients with maxillary and mandibular edentulous sites, visualized in two Cone-Beam Computed Tomography scans (CBCTs) obtained at least one year apart, were included. Dolphin software was used for analysis. The ANS-PNS and the line connecting the two mental foramina were used as references for maxillary and mandibular sites, respectively, to measure changes in alveolar bone height and width (3 and 5 mm from crest).
Results: Eighty-three patients (age at first CBCT: 62.5 ± 0.7 years; 44 females) contributed to the study with 253 sites (148 molar, 55 premolar, 14 canine, 36 anterior) in CBCTs recorded 26.3 ± 1 months apart. Alveolar bone height changes in coronal and sagittal views were 0.42 ± 0.05 mm in mandible and 0.14 ± 0.03 mm in maxilla ($p < 0.0001$) and 0.35 ± 0.05 mm in mandible and 0.13 ± 0.03 in maxilla ($p < 0.001$), respectively. The bone width changes were 0.39 ± 0.08 mm in mandible and 0.22 ± 0.03 mm in maxilla ($p = 0.053$) and 0.25 ± 0.05 mm in mandible and 0.12 ± 0.03 mm in the maxilla ($p = 0.84$) at 3 and 5 mm from the crest, respectively.
Conclusions: Alveolar bone height and width of established edentulous sites undergo minimal changes for at least a 2-year period. Although mandibular site height changes are statistically significantly greater than in maxillary sites, the differences are clinically insignificant.

PD128 | Association Between Diabetes and Peri-Implantitis. A Register-Based Cohort Study

A. Trullenque-Eriksson[1], F. Valentim Bitencourt[2], C. Tomasi[1], T. Berglundh[1], J. Derks[1]
[1]University of Gothenburg, Department of Periodontology, Gothenburg, Sweden, [2]Aarhus University, Department of Dentistry and Oral Health, Aarhus, Denmark

Background & Aim: Previous data on implant outcomes in patients with diabetes are somewhat conflicting. There is some evidence suggesting a higher risk for peri-implantitis, typically originating from studies with small sample size not differentiating by diabetes type. The aim of this register-based retrospective cohort study was to evaluate the association between type 1/type 2 diabetes and peri-implantitis.
Methods: Using multiple nationwide registers in Sweden, we identified four cohorts of individuals with dental implants—two groups with diabetes (type 1, T1D; type 2, T2D) and two groups of matched individuals without (non-T1D; non-T2D). All subjects had a follow-up of at least 5 years. Data on the occurrence of peri-implantitis, defined as any registered treatment of peri-implantitis (non-surgical/surgical or implant removal due to peri-implantitis), were obtained (time period: 2010-2020). Adjusted regression analyses were used to evaluate the association between diabetes and peri-implantitis.
Results: The study included 273 individuals with T1D (51.6% female, mean age 50.3 ± 15.7 years, 2.7 ± 2.6 implants), 635 non-T1D (49.0% female, mean age 53.4 ± 17.0 years, 2.7 ± 2.2 implants), 3 205 T2D (47.3% female, mean age 67.1 ± 9.4 years, 3.3 ± 2.6 implants) and 10 068 non-T2D (48.3% female, mean age 65.6 ± 10.9 years, 3.8 ± 2.9 implants). Peri-implantitis was a frequent finding in all cohorts (T1D: 24.9%; non-T1D: 16.7%; T2D: 24.3%; non-T2D: 20.8%). T1D significantly increased the risk for peri-implantitis (adjusted OR 1.8; 95% CI 1.2, 2.6; reference: non-T1D), whereas T2D did not (adjusted OR 1.1; 95% CI 1.0, 1.2; reference: non-T2D). Periodontitis was a strong risk factor for peri-implantitis.
Conclusions: Type 1 diabetes was associated with a higher risk for peri-implantitis, whereas type 2 diabetes was not.

PD129 | Compositional and Functional Microbiome Profiles Associated With Peri-implantitis Severity

A. Joshi[1,2], S.P. Szafrański[1,2], M. Steglich[1,2,3], I. Yang[1,2], W. Behrens[1,2], P. Schaefer-Dreyer[1], J. Grischke[1], S. Häussler[4,5,6], M. Stiesch[1,2]
[1]Hannover Medical School, Department of Prosthetic Dentistry and Biomedical Materials Science, Hannover, Germany, [2]Lower Saxony Centre for Biomedical Engineering, Implant Research and Development (NIFE), Hannover, Germany, [3]Hannover Medical School, Research Core Unit Genomics, Hannover, Germany, [4]Helmholtz Centre for Infection Research, Department of Molecular Bacteriology, Braunschweig, Germany, [5]Twincore, Centre for Clinical and Experimental Infection Research, Institute for Molecular Bacteriology, Hannover, Germany, [6]Copenhagen University Hospital – Rigshospitalet, Department of Clinical Microbiology, Copenhagen, Denmark

Background & Aim: Peri-implantitis is a biofilm-associated inflammatory condition affecting the tissues surrounding dental implants. Microbial dysbiosis is an important factor that may drive clinical severity and accelerated disease progression. The present study aims to investigate the compositional and functional changes in the microbiome in relation to changes in probing depth (PD) as a measure of peri-implantitis severity.

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Methods: Submucosal biofilm samples were collected from 49 implants diagnosed with peri-implantitis, and full-length 16S rRNA gene amplicon sequencing (Full-16S) and metatranscriptomics were employed to examine microbial diversity, taxonomic composition, and activities within biofilms. Differential expression and multivariate linear regression analyses were used to identify associations between microbiome features and PD.
Results: Significant microbial community shifts were observed with increase in PD (PERMANOVA $p = 0.01$; Pseudo-$F_{max} = 2.46$ for PD threshold of 8 mm). A multivariate regression (MaAsLin2) model adjusted for patient variability revealed that the classes Gammaproteobacteria, Flavobacteria and Actinobacteria were negatively correlated with peri-implantitis severity (FDR-$p < 0.05$). At the species level, *Gemella morbillorum*, *Olsenella* sp. HMT-807, *Gemella* sp. OTU-9, *Capnocytophaga leadbetteri* and *Prevotella* sp. HMT-317 were negatively correlated with PD (FDR-$p < 0.05$) while *Pseudoramibacter alactolyticus* (FDR-$p < 0.05$) was positively correlated with higher PD. PICRUSt2 in-silico analysis predicted the functional potential of microbial taxa, while metatranscriptomics identified their expressed activities within biofilms. Enzymes (ECs) related to KEGG metabolic pathways such as galactose and purine metabolism, arginine biosynthesis, glycolysis, pyruvate metabolism, and amino sugar and nucleotide metabolism were negatively associated with higher PD, whereas those related to pathways for cobalamine, folate and polyamine biosynthesis showed positive associations with higher PD.
Conclusions: Our results suggest that increased peri-implantitis severity is associated with significant changes in submucosal microbial composition and both predicted and active microbial functions. This high-resolution microbiome characterization reveals severity-specific microbiome signatures, which support the development of targeted clinical interventions for peri-implantitis.

PD130 | Influence of Implant-Supported Prosthesis Design on Peri-Implant Health: A Cross-Sectional Study

A. Alahmari[1,2], R. Figueiredo[1,3], M. García García[1,3], A. Sánchez Torres[1,3], X. Mir-Marí[1,1], E. Valmaseda Castellón[1,3]
[1]University of Barcelona, Odontostomatology, Master of Oral Surgery and Implantology, Faculty of Medicine and Health Sciences, Dental Hospital, Bellvitge Campus, Barcelona, Spain, [2]King Kahalid University, Periodontics and Community Dental Sciences, Division of Periodontics, College of Dentistry, Abha, Saudi Arabia, [3]IDIBELL Institute, Odontostomatology, Master of Oral Surgery and Implantology, Faculty of Medicine and Health Sciences, University of Barcelona, Dental Hospital, Bellvitge Campus, Barcelona, Spain

Background & Aim: Dental implants are widely accepted solution for oral rehabilitation for their long-term survival rates. However, mucositis and peri-implantitis, are increasingly prevalent and pose risks to implant longevity. This study aims to investigate how submucosal extension (SE) and emergence angle (EA) affect peri-implant health and how correlate with aesthetics in patients fitted with implant-supported single crowns.
Methods: A cross-sectional study evaluated patients with single implants at the University of Barcelona Implant Maintenance Unit. Patients were divided into two groups: no bleeding on probing (BOP0) and bleeding on probing (BOP1). Eligible implants were placed at the crestal level with screw-retained restorations and followed for at least one year. Probing depth, BOP, plaque index, keratinized mucosa, and aesthetic scores were recorded. Photographic measurements of SE and EA were analysed for correlations with bleeding on probing.
Results: Sixty-nine patients with 90 implants were included. The diagnosis of peri-implant health resulted in 38 (42.2%) healthy implants, 43 (47.8%) peri-implant mucositis and 9 (10%) peri-implantitis. Group BOP1 included 52 (57.8%) implants while BOP0 included 38 (42.2%). Probing depths were deeper in BOP1 group (mean PD = 3.1 mm vs. 2.1 mm; $p < 0.001$). Palatal SE was larger for BOP1 (mean SE = 1.6 mm; $p = 0.028$) compared with BOP0 (mean SE = 1.3 mm). Mesial SE was greater for BOP1 (mean SE = 1.9 mm) than BOP0 (mean SE = 1.5 mm; $p = 0.027$). There were no significant differences in EA between the BOP0 and BOP1 but higher palatal (EA) correlated with peri-implantitis ($p = 0.014$). Larger buccal EA negatively impacted Pink and White Esthetic Score ($r = -0.227$; $p = 0.032$).
Conclusions: Larger palatal and mesial SE are linked to higher presence of bleeding. Higher palatal EA was correlated with peri-implantitis while larger buccal EA resulted in worse aesthetics. Results emphasize the importance of careful prosthetic design in promoting peri-implant health and achieving optimal aesthetic outcomes.

PD131 | A Modified Ligature-Induced Peri-Implantitis Murine Model and RNA Sequencing Analysis Compared With Human Subjects

Z. Tong[1], L. Chen[1], L. Shen[1], Y. Lu[1], J. Zhang[1], Y. Qi[1], Y. Qian[1], S. Bao[1], W. Chen[1], M. Si[1]
[1]Zhejiang University, Hangzhou, China

Background & Aim: Murine models have emerged as viable alternatives to traditional larger animal models for peri-implantitis research. However, standardized procedures for constructing peri-implantitis murine models are lacking; the similarity between this mouse model and the human disease is unclear. This study aims to propose a modified method for establishing a peri-implantitis murine model, assess the gene expression profile and immune cell infiltration of the gingiva and alveolar bone, and evaluate the transcriptomic similarity between patients with peri-implantitis and the corresponding murine model.
Methods: A ligature-induced peri-implantitis murine model was established using an immediate implant placement approach. RNA sequencing was performed to determine the transcriptomic profiles of peri-implant tissues from mice, patients with peri-implantitis, and healthy individuals. Histopathological and bioinformatics analyses were performed to measure immune cell infiltration, bone remodeling, and inflammatory reactions.
Results: Mouse gingival tissue showed strong immune and inflammatory responses, especially macrophage functions; these responses were weaker in the alveolar bone. Humans and mice showed similar gene expression patterns in the gingiva, with greater infiltration of macrophages and neutrophils.
Conclusions: During peri-implantitis progression, mouse gingival tissue exhibited increased immune-related functions and

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

inflammation compared to the alveolar bone. Patients with peri-implantitis and the murine model displayed transcriptomic similarities within the gingiva. We propose that the modified ligature-induced peri-implantitis murine model is suitable for investigating peri-implantitis pathogenesis, with macrophages and neutrophils potentially being critical in its development.

PD132 | Preliminary Study on the Effect of Oral Microbiota on Soft and Hard Tissues after Flapless Immediate Implant Placement and Provisionalization

Z. Guo[1], X. Wang[2], D. Meng[3]
[1]Beijing Stomatological Hospital, Capital Medical University, Beijing, China, [2]Beijing Stomatological Hospital, Capital Medical University, Department of Multi-Disciplinary Treatment Center, Beijing, China, [3]Capital Medical University, Department of Prosthodontics, Beijing, China

Background & Aim: Bone substitutes and connective tissue grafts are conventionally used in immediate implant placement and provisionalization (IIPP) in anterior region. These, along with implant surfaces, could be contaminated by oral microbiota, potentially leading to complications. This study aims to investigate oral bacteria's impact on soft/hard tissue changes post-IIPP.
Methods: The study included 10 patients undergoing IIPP in anterior region (10 implants) and 10 periodontally healthy volunteers as controls. Saliva samples were collected preoperatively for composition and diversity microbial analysis utilizing high-throughput sequencing. Bone and gingival changes were assessed using CT and intra-oral scan at preoperatively, post-surgery and 1 year. Three-dimensional superimposition analysis was performed to assess the changes in horizontal buccal bone thickness (HBBT) at 0, −1, −2, −3, −5, −7, −10, −11.5, −13 mm to the implant platform and vertical buccal bone height (VBBH) at cervical section of implants. Vertical changes of gingival margin (VCGM) and papillae height (VCPH) and horizontal changes of soft tissue (HCST) from −3 to 3 mm to the implant platform around implants were also investigated. Furthermore, the correlation between oral microbial composition and hard/soft tissue changes was statistically analyzed using multiple linear regression equations.
Results: All 10 patients completed the study without failure. 1 year post-surgery, notable variation was observed in HBBT at different levels ranged from −1.58 to −0.02 mm, HCST at different levels ranged from −1.48 to 0.81 mm, VBBH changes was −0.77 mm, VCGM was −0.67 mm, VCPH (mesial) was −0.64 mm, VCPH (distal) was −0.55 mm in average. Salivary microbiota composition and diversity varied among patients in the result. Those with more significant peri-implant changes exhibited higher bacterial abundance and diversity. Furthermore, *Lautropia dentalism* was significantly correlated with VBBH changes.
Conclusions: Oral microbiota might influence peri-implant soft/hard tissue changes. Greater microbial diversity and higher bacterial abundance in saliva correlate with more pronounced changes in soft/hard tissue over 1 year.

PD133 | A Comparative Analysis of The Roles of EBV, IL-1β, RANKL, and OPG in Peri-Implant Diseases

M. Vuckovic[1], A. Djinic Krasavcevic[1], N. Nikolic[2], T. Zivanovic[1], I. Milinkovic[2]
[1]School of Dental Medicine, University of Belgrade, Department of Periodontology and Oral Medicine, Belgrade, Serbia, [2]School of Dental Medicine, University of Belgrade, Implant Center, Belgrade, Serbia

Background & Aim: The role of human herpes viruses is well studied in periodontitis, but their influence on peri-implant diseases remains unclear. Peri-implantitis and peri-implant mucositis are biological complications initiated by oral biofilm microbiota that trigger proinflammatory and osteoimmunological mediators within the host immune response, leading to the destruction of peri-implant supporting tissues. This study aimed to assess the prevalence of *Epstein-Barr virus* (EBV) and the relative expression levels (RELs) of IL-1β, RANKL, and OPG genes, as well as to evaluate the correlation between the virus and gene RELs in patients with diseased and healthy implants.
Methods: One hundred and two patients were enrolled and divided into peri-implantitis (PI), peri-implant mucositis (PM), and healthy implant (HI) groups. Each patient's peri-implant crevicular fluid was sampled using sterile paper points. The prevalence of EBV and RELs of IL-1β, RANKL, and OPG genes were determined using a quantitative real-time polymerase chain reaction. Correlations were done using Spearman's correlation statistical test.
Results: The IL-1β gene RELs across all groups revealed a statistically significant difference ($p < 0.05$), with the highest levels in peri-implantitis and lowest in healthy implant samples. Furthermore, elevated RELs of the RANKL in the PI group significantly differed compared to the PM ($p = 0.006$) and HI ($p = 0.024$) groups. In contrast, the prevalence of EBV and the RELs of the OPG gene showed no statistical significance. No correlations were observed between the investigated virus and genes.
Conclusions: Upregulation of IL-1β and RANKL RELs in the PI group underscores their involvement in the inflammatory and bone resorption processes associated with peri-implant disease. The significantly elevated RELs of IL-1β in peri-implantitis, contrasted with reduced levels in healthy implants, highlights its role in mediating inflammation. Similarly, the increased expression of RANKL, a key regulator of osteoclast differentiation and activity, emphasizes its contribution to the bone resorption observed in peri-implantitis progression.

PD134 | Beneficial Effects of *Rheum ribes* Methanol Extract on Periodontal Wound Healing: Enhancement of Key Biochemical Markers and Antioxidant Properties

A. Yakut[1], U.U. Tosun[1], T. Taşkın[2], S.T. Aydın[3], D. Baykara[4], A. Tiryaki[4], C. Ekinci Doğan[4], O. Gündüz[4], Ö.B. Ağralı[1]
[1]Marmara University Faculty of Dentistry, Department of Periodontology, Istanbul, Turkey, [2]Marmara University Faculty of Pharmacy, Professional Pharmaceutical Sciences, Department of Pharmacognosy, Istanbul, Turkey, [3]Marmara University

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

School of Medicine, Department of Medical Biochemistry, Istanbul, Turkey, [4]Marmara University Faculty of Technology, Metallurgical and Materials Engineering, Department of Materials, Istanbul, Turkey

Background & Aim: *Rheum ribes*, a perennial wild plant native to the Middle East and Asia, can offer potential benefits for wound healing. This study aimed to evaluate the effects of *Rheum ribes* methanol extract on key biochemical markers—collagen type-1, BMP-2, AXIN-2, and FGF-2—in human periodontal ligament fibroblasts (hPDLF) and human osteoblasts (hOB), as well as its antioxidant properties.
Methods: Methanol extract were derived from fresh young shoots of *Rheum ribes* using the maceration technique. Based on previous MTT analysis (unpublished data), a 2.5 μg/ml dose was chosen for cell treatment. Four replicates were conducted for both hPDLF and hOB. Collagen type-1, BMP-2, AXIN-2, and FGF-2 levels were measured using ELISA kits. Antioxidant activities were assessed using CUPRAC, FRAP, DPPH, and FCR assays. JASP was used for data analysis, with statistical significance set to $p < 0.05$.
Results: In hPDLF cells, *Rheum ribes* extract significantly increased expressions of collagen type-1, BMP-2, and AXIN-2 compared to controls ($p < 0.001$). In hOB cells, *Rheum ribes* extract significantly increased expressions of collagen type-1, BMP-2, AXIN-2 compared to controls ($p < 0.001$) while it significantly decreased FGF-2 levels ($p < 0.001$). The extract also demonstrated higher copper (II) reducing activity compared to BHA (2.497 ± 0.517 vs. 1.83 ± 0.0002), lower iron (III) reducing activity compared to BHT (0.067 ± 0.02 vs. 1.10 ± 0.001), and lower radical scavenging activity compared to ascorbic acid (0.041 ± 0.009 vs. 0.004 ± 0.001). The total phenolic component content of the extract was 1,171 ± 0,084 mg GAE/mg extract.
Conclusions: *Rheum ribes* methanol extract at a dose of 2.5 μg/mL looks as an optimal candidate as additional therapy for improving periodontal wound healing, showing significant differences on important biochemical markers. These findings advocate for additional in vivo studies to validate its clinical applicability.

PD135 | Impact of Continuous and Non-Continuous Parathyroid Hormone Administration on Periodontal Ligament Fibroblast-Mediated Osteoclastogenesis and Osteogenesis

W.M.I. Talbi[1], E. Steemers[1], J. Hogervorst[1], T. Schoenmaker[1], T.J. de Vries[1]
[1]*Academic Centre for Dentistry Amsterdam (ACTA), University of Amsterdam and Vrije University Amsterdam, Department of Periodontology, Amsterdam, Netherlands*

Background & Aim: Parathyroid hormone (PTH) is essential for bone remodeling through its regulation of osteoclast and osteoblast activity. While its role on these cell types is well-known, the impact of different timing and durations of PTH exposure on bone-related cellular markers remains unclear. This study aims to determine how the timing and duration of PTH exposure affect osteoclastogenesis and osteogenesis.
Methods: PDLFs were analyzed for their contribution to osteogenesis using osteogenic medium, or for osteoclastogenesis by co-culturing them with peripheral blood mononuclear cells. Both types of cultures were exposed to PTH at varying concentrations (10^{-12} M to 10^{-9} M) during the first titration experiment. Based on the titeration experiment, the highest PTH concentration (10^{-9} M) was further applied under six application conditions: continuous exposure, single-week applications, and cyclic patterns. Markers for osteoclastogenesis (DC-STAMP, TRAcP, and RANKL/OPG ratio) and osteogenesis (alkaline phosphatase [ALP] activity and OPG expression) were measured on Days 0, 14, and 21. Alizarin Red staining was used to assess mineral deposition as an indicator of osteogenesis (TV2).
Results: Increased PTH concentrations caused a concentration-dependent increase in osteoclastogenesis. Alizarin Red staining demonstrated enhanced mineral deposition with PTH treatment, with variability across donors and application schedules. In contrast, ALP activity showed minimal responses across PTH conditions.
Conclusions: This study demonstrates that PTH dose-dependently increases osteoclast formation. In timing experiments, PTH increased Alizarin Red staining, though optimal responses varied between donors. Our in vitro findings suggest heterogeneous outcomes when applying PTH in a therapeutic setting.

PD136 | A Mixed-Methods Analysis of Coolant Liquids for Improved Thermal and Droplet Control in Ultrasonic Periodontal Instrumentation: An In Vitro Study

C. McCarthy[1], M. Fenlon[1], L. Nibali[1]
[1]*King's College London, Department of Periodontology, London, United Kingdom*

Background & Aim: Continuous coolant flow, typically water, is needed to prevent thermal injury during ultrasonic instrumentation. This coolant quickly becomes contaminated on contact with oral tissues, producing aerosols with particles < 5 μm that can remain airborne, travel long distances, and penetrate deep into the respiratory tract. The aim of this in vitro, mixed-methods study is to evaluate the effectiveness of 75% and 80% glycerol compared to water in reducing aerosol size particles, managing intra-pulpal and device temperatures, and optimising droplet cohesion.
Methods: Aerosol particles were measured continuously during a 5-min activation and 15-min post-activation period using high-sensitivity laser particle sensors ($n = 6$). Intra-pulpal and scaler tip temperatures were recorded in real-time. Complementary high-speed imaging captured droplet formation at medium (50%) and high (75%) power settings, allowing for detailed observation of the interaction between coolant viscosity, droplet cohesion, and device power. Data were analysed using one-way ANOVA and Tukey's HSD tests ($p < 0.05$).
Results: Both 75% and 80% glycerol coolants significantly reduced aerosol particle counts compared to water ($p < 0.001$). Water produced a sustained aerosol peak, while the 75% glycerol coolant reduced particle counts by up to 92.86%, and the 80%

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

glycerol solution achieved up to 96.23% reduction, with particle counts near baseline ($p > 0.9999$). Thermal results showed that water reduced intra-pulpal temperature by 12°C, while 80% glycerol achieved an 8°C decrease, with no significant difference in scaler tip temperatures between coolants ($p > 0.05$). High-speed imaging confirmed that glycerol-based coolants produced larger, cohesive droplets that were less prone to fragmentation, particularly at high power, enhancing droplet control compared to water.

Conclusions: This study suggests 80% glycerol may serve as an alternative coolant to water in ultrasonic periodontal instrumentation, achieving aerosol reduction (< 5 µm) comparable to baseline without compromising intra-pulpal or device cooling. Further research with varied tip designs, power settings, and clinical conditions is needed to further validate these findings.

PD137 | Mitochondrial Transplantation Promotes Periodontal Bone Regeneration by Regulating Inflammation and Metabolic Homeostasis

Y. Ma[1], X. Wang[1]
[1]*The Affiliated Stomatological Hospital of Nanjing Medical University, Department of Periodontology, Nanjing, China*

Background & Aim: Mitochondria are essential for the metabolism and differentiation of eukaryotic cells. Recent research highlights that mitochondrial transfer can affect recipient cell fate, particularly in stem cells. Studies show that macrophages can deliver mitochondria to mesenchymal stem cells (MSCs), enhancing their osteogenic differentiation. M1 macrophages have reduced mitochondrial function compared to M2 macrophages, which exhibit superior capabilities. Therefore, the purpose of this study is to investigate the effect of M2-type macrophage-derived mitochondrial transplantation on the treatment of periodontitis, explore whether it can enhance the mitochondrial function and metabolic level of human periodontal ligament stem cells (hPDLSCs), enhance their osteogenic differentiation ability and the exact molecular mechanism.

Methods: Transplanting M2-type macrophage-derived mitochondria into inflammation-damaged periodontal stem cells and studying the effect of this process on dental bone regeneration in vivo and in vitro.

Results: This study extracted mitochondria from M2 macrophages using a kit, and the mitochondria obtained had complete mitochondrial structure and function. In vitro experiments showed that the mitochondria could be captured by inflammation-damaged periodontal stem cells and enhance the ability of human periodontal stem cells to undergo osteogenic differentiation. This process may involve the p38-MAPK signaling pathway. Meanwhile, the transplantation of mitochondria can regulate the mitochondrial function of periodontal stem cells in the inflammatory microenvironment and enhance their metabolic ability. Animal model studies of periodontitis showed that mitochondrial transplantation could alleviate inflammation-induced damage to periodontal tissues and promote bone formation in periodontal tissues.

Conclusions: M2 macrophage-derived mitochondria can significantly enhance the mitochondrial function of hPDLSCs, improve its metabolic level, and regulate glycolysis to control inflammation, enhance hPDLSCs osteogenic differentiation ability, and promote periodontal bone tissue regeneration.

PD138 | Personalized Periodontal Therapy: The Future of Tailored Treatments Based on Genetic Profiling and Risk Assessment

S. Abidi[1], Y. Azzouz[1], R. Chraibi[2], S. Chbicheb[3]
[1]*International University of Rabat, Department of Oral Surgery, Rabat, Morocco,* [2]*International University of Rabat, Department of Prosthodontics, Rabat, Morocco,* [3]*Faculty of Dental Medicine, University Mohamed, Department of Oral Surgery, Rabat, Morocco*

Background & Aim: Periodontal disease is a prevalent oral health issue characterized by chronic inflammation, leading to gum and bone degradation. Standard treatment approaches often lack specificity, with varying effectiveness across individuals due to genetic and environmental differences. Emerging evidence suggests that genetic profiling and personalized risk assessment may enhance treatment outcomes by allowing for tailored therapeutic interventions. Personalized Periodontal Therapy (PPT) aims to incorporate genetic information and individual risk factors into treatment planning, paving the way for more targeted and effective management of periodontal disease.

Methods: This study employed a comprehensive review of current research on genetic markers associated with periodontal disease and advanced risk assessment models. We analyzed data from studies conducted on patients with varying genetic predispositions and lifestyle factors, utilizing genetic profiling and machine learning algorithms to create a predictive risk model. Patients were categorized into risk groups, and treatment regimens were customized based on individual genetic markers, inflammatory response profiles, and lifestyle-related risks. Clinical outcomes of personalized therapy were compared to conventional treatment approaches to evaluate the efficacy of PPT.

Results: Patients receiving personalized therapy demonstrated significant improvements in clinical outcomes, including reduced probing depths and improved attachment levels, compared to those receiving standard treatment protocols. Genetic profiling identified specific markers associated with higher disease susceptibility, allowing for more targeted interventions.

Conclusions: Personalized periodontal therapy, guided by genetic profiling and comprehensive risk assessment, shows potential to enhance treatment efficacy and patient outcomes. This approach represents a significant shift toward tailored healthcare in dentistry, paving the way for future advancements in periodontal disease management and prevention. Further research is needed to validate these findings and refine personalized treatment strategies.

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

PD139 | Trends in the Prescription of Antibiotics for the Treatment of Periodontal Diseases in Croatia during a Five-Year Period

K. Bašić[1], M. Radić Vuleta[2], K. Peroš[1], I. Šutej[1]
[1]*School of Dental Medicine University of Zagreb, Department of Pharmacology, Zagreb, Croatia,* [2]*Croatian Institute of Public Health, Zagreb, Croatia*

Background & Aim: Given the rise of antimicrobial resistance (AMR), cautious judgment should be used while administering antibiotics in dentistry. The aim of this study is to monitor changes in the amount of antibiotics administered for the treatment of periodontal diseases over a five-year period and compare those changes to the overall amount of antibiotics prescribed in dentistry in Croatia.
Methods: The number of antibiotic prescriptions prescribed under ICD-10 code K05 (Gingivitis and Periodontal Diseases) was obtained from the Croatian Institute of Public Health. Patients were categorized into four age groups: 0–6 years, 7–18, 19–64, and 65+. The Croatian Health Insurance Institute, a national insurance provider, provided the total number of antibiotic prescriptions in dentistry that were utilized as a comparison in this study. All of the data covered the 2019–2023 timeframe.
Results: Over the five-year period, Croatian dentists prescribed an annual average of 36,883 antibiotic prescriptions under code K05, which represented approximately 10.3% of all antibiotic prescriptions in dentistry. The most commonly prescribed antibiotic was the combination of amoxicillin with clavulanic acid (19,162 prescriptions), accounting for 8.82% of all amoxicillin and clavulanic acid prescriptions in dentistry. This was followed by amoxicillin (6240), clindamycin (4655), and metronidazole (4118). Doxycycline, sulfamethoxazole + trimethoprim, and ciprofloxacin exhibited highest rates of prescription under diagnosis code K05 compared to overall antibiotic prescriptions in dentistry (28.17%, 24.79%, and 22.29%, respectively). The most of prescribed antibiotics under code K05 was in 19-64 age group.
Conclusions: Although there are clear guidelines for the supportive antibiotic therapy of periodontal disease that recommend amoxicilin and metronidazole together, this was not the case in this investigation. To promote safe utilization of antibiotics in dental care, more education is needed. It is important to carefully consider non-pharmacological therapy options and specific clinical conditions prior to administering antibiotics in order to minimize medication overuse.

PD140 | Comparison of Additive and Subtractive Digital Workflow for Splints in Patients With Stage IV Periodontitis—An In-Vitro Study

A.-L. Bruns[1], J. Schroeder[1], S. Jepsen[1], P.-M. Jervøe-Storm[1]
[1]*University Hospital Bonn, Department of Periodontology, Operative and Preventive Dentistry, Bonn, Germany*

Background & Aim: Patients with stage IV periodontitis often needs splinting of mobile teeth as well as occlusal adjustment. In some cases removable splints might be an option. In this study the accuracy of two removable stabilization splints, manufactured either with a 3D-print or a milled technique were compared.
Methods: A standard-tessellation-language (STL)-file was created from a scanned model and used as master for the production of forty removable identical stabilization splints (SS). Twenty SS were milled (subtractive technique) and twenty were 3D printed (additive technique) and rescanned. For each rescanned splint, a new STL-file resulted, this was compared with a master STL-file. Deviations were measured at predefined points at three sites (vestibular, palatal and occlusal/incisal). Additionally, differences between vestibular respectively palatinal measure points between first and second quadrants in the molar region were measured. The fitting accuracy of the twenty splints in each group was compared. The Kruskal–Wallis test was used for statistical analysis ($p < 0.05$).
Results: In all splints the accuracy was clinically sufficient (subtractive: mean difference [MD] 23 µm [±19]; additive: MD 44 µm [±31]) with no significant difference between groups ($p = 0.4202$). In molar regions differences between both methods were determined, however not significant ($p = 0.999$). In this region, on the vestibular aspect the additive splints showed a higher contraction (vestibular MD 13 µm [±91 µm]) than the subtractive splints (MD 4 µm [±53]). On the palatinal side, additive splints also showed a contraction (MD 9 µm [±121]), whereas the opposite was measured for subtractive splints (MD −39 µm [±53]).
Conclusions: Both types of splints showed a clinically sufficient precision. Less deviations were found in posterior areas of the dental arch with the subtractive process. The CAD/CAM-workflow of periodontal stabilization-splints may be a precise and comfortable alternative in the treatment of combined mobile teeth and occlusal disbalance in the periodontally compromised dentition.

PD141 | Uptake of BSP Implementation of 2018 World Workshop Classification and 2020 S3 Level Clinical Practice Guideline Stages I–III Periodontitis in UK Primary Care

S. Iram[1], R. Jacques[2]
[1]*University of Sheffield, School of Clinical Dentistry, Sheffield, United Kingdom,* [2]*University of Sheffield, School of Medicine and Population Health, Sheffield, United Kingdom*

Background & Aim: Research indicates evidence-based diagnostic frameworks and guidelines improve patient outcomes, for Periodontal Disease translating into life-long stability and tooth survival. The 2018 EFP Worldwide Periodontal Classification and 2020 S3-Level Clinical Practice Guideline for Stage I-III Periodontitis were adapted by the British Society of Periodontology for UK use with dissemination in 2019 and 2021. Currently, no published literature exists assessing uptake and impact of this guidance in the UK.
Methods: An online questionnaire-based survey was conducted with General Dental Practitioners (GDP's), Dental Therapists

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

and Hygienists in UK Primary Care. Current practice, awareness, perceptions and adherence to guidance was examined using Case Scenarios for moderate (BPE3) and severe disease (BPE4). Statistical analysis tested the association of adherence to guidance with mode of remuneration and Clinician type.

Results: A total 224 responses were received. Adherence to recommendations ranged 26%–75% for moderate and 21%–93% for severe disease. NHS Clinicians showed greater adherence in Initial Therapy, recall and Subgingival instrumentation for moderate cases and in Step 1, Step 2, Periodontal charting, Reassessment and Supportive Care for severe cases ($p < 0.001$), compared to Private Clinicians. Correct Diagnosis using 2018 WWC was formulated by 49% of respondents. Uptake of guidance varied with 72% 'Always' using the Classification and 47% 'Always' using the S3 Guideline, Therapists showed greatest uptake ($p < 0.01$). Barriers include difficulty in achieving patient engagement, lack of time, training and NHS remuneration. BSP webinars proved useful facilitators, but accessed mostly by Private Clinicians.

Conclusions: BSP-implemented guidance has impacted patient management but confusion in managing moderate disease requires clarification to prevent progression of manageable disease, use of diagnostic periodontal charting and investment in preventive strategies may aid patient engagement. Uptake of S3 Guideline needs improvement by targeting barriers identified, raising awareness of clinical recommendations to assist effective incorporation into UK Primary Care practice, utilising skills of the entire dental team.

PD142 | Genetic Markers of Teeth Erosion in People With Thyroid Function Disorder

M. Beznosiuk[1], E. Pavlenko[1], I. Palyvoda[2], M. Savchenko[1]
[1]Shupyk National Healthcare University of Ukraine, Department of Therapeutic Dentistry, Kyiv, Ukraine, [2]Shupyk National Healthcare University of Ukraine, Department of Prosthetic Dentistry, Digital Technologies and Implantology, Kyiv, Ukraine

Background & Aim: With tooth erosion becoming more common, it is crucial for dentists to have the tools for early diagnosis, particularly among patients with thyroid function disorders. In this regard, new methods for diagnosing tooth erosion in the context of endocrine disorders using genetic markers, with the KLK4 gene being the most promising, are of great interest. To determine the predictive value of KLK4 gene polymorphisms in the development of tooth erosion in patients with thyroid diseases.

Methods: Ninety-five individuals aged 17-59 were observed, including 35 (group 1) with tooth erosion associated with hypo- or hyperthyroidism, and 60 (group 2) with tooth erosion without thyroid disorders. A molecular-genetic study of the buccal epithelium from the inner cheek was conducted on all participants to identify the KLK4 gene using allele-specific PCR and PCRP-PCR. All participants signed informed consent forms. Statistical analysis was performed using Statistica 6.0 software.

Results: In both groups, features of the rs2664152 T > G polymorphism of the KLK4 gene were detected, revealing differences in the TT genotype and KLK4 gene alleles (rs2664152 T > G) between groups. The study showed that patients with the T allele had a reduced risk of tooth erosion ($\chi^2 = 6.47$, $p = 0.011$, OR = 0.32 95% CI: 0.14–0.73), indicating its protective effect. In the presence of the G allele, the risk of developing tooth erosion increased three times ($\chi^2 = 6.47$, $p = 0.011$, OR = 3.11 95% CI: 1.36–7.10).

Conclusions: The presence of the T genotype of the KLK4 gene in the buccal epithelium prevents the development of tooth erosion, and the TT genotype of the KLK4 gene (rs2664152 T > G) can be useful in predicting the risk of early tooth erosion in patients with thyroid disorders.

PD143 | Study on Self-Perceived Versus Clinical Halitosis and Their Associating Factors in Patients With Different Level of Periodontitis

B. Baharin[1], N. Sze Min[2], A.J.H. Chau[2], N.M. Nik Azis[1], H. Rani[3]
[1]Universiti Kebangsaan Malaysia, Department of Restorative Dentistry, Faculty of Dentistry, Kuala Lumpur, Malaysia, [2]Universiti Kebangsaan Malaysia, Faculty of Dentistry, Kuala Lumpur, Malaysia, [3]Universiti Kebangsaan Malaysia, Department of Family Oral Health, Faculty of Dentistry, Kuala Lumpur, Malaysia

Background & Aim: Halitosis is a common complaint of periodontal patients. The perception of one's own halitosis often differs from the clinical diagnosis. The aim of this study is to determine the accuracy of self-perceived halitosis with clinical halitosis between mild to moderate and severe periodontal patient groups and to evaluate their associating factors.

Methods: A validated questionnaire that included medical history, dietary habits, oral hygiene practices, and halitosis perception was administered to 32 patients with severe periodontal disease and 32 patients with mild to moderate periodontal disease. Clinical halitosis was diagnosed using the Tanita Breath Alert, while tongue coating was assessed using the Wickel Tongue Coating Index. Plaque index, gingival bleeding index, probing pocket depth and clinical attachment loss were also recorded. Cohen's kappa was used to determine diagnostic accuracy.

Results: The diagnostic agreement between self-perceived halitosis and clinical halitosis was lower in the mild to moderate group ($k = -0.187$) than in the severe group ($k = 0.097$). The group with mild to moderate periodontitis had higher self-perceived halitosis ($n = 23$, 71.9%) than the group with severe halitosis ($n = 20$, 62.5%). The distribution of those diagnosed with halitosis was higher in the group with severe periodontal disease ($n = 18$, 56.3%) than in the group with mild to moderate periodontal disease ($n = 16$, 50%). Tongue coating was significantly higher in the mild to moderate periodontitis group ($p = 0.039$). Of the clinical parameters, only tongue coating correlated significantly with clinical halitosis ($r = 0.275$, $p = 0.028$).

Conclusions: The diagnostic agreement between self-perceived halitosis and clinical halitosis was low in both groups of periodontal patients. The only clinical parameter that correlated with clinical halitosis was tongue coating.

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

PD144 | Oral Health Awareness Among University Academic Staff

E. Yenidoğan[1], A. Efe[2], M.E. Arayici[3], A. Akcali[1,4,5]
[1]Dokuz Eylul University, Faculty of Dentistry, Department of Periodontology, Izmir, Turkey, [2]Dokuz Eylul University, Faculty of Dentistry, Izmir, Turkey, [3]Dokuz Eylul University, Faculty of Medicine, Department of Basic Medical Sciences, Division of Biostatistics and Medical Informatics, Izmir, Turkey, [4]Dokuz Eylul University, Institute of Health Sciences, Department of Dental Biomaterials, Izmir, Turkey, [5]Queen Mary University of London, Barts and The London School of Medicine & Dentistry, Institute of Dentistry, Centre for Oral Clinical Research, London, United Kingdom

Background & Aim: The present cross-sectional study aimed to evaluate oral health awareness among academic staff in a public university.
Methods: A total of 2838 academic staff members at Dokuz Eylul University were invited to participate through official emails and the document management system. Dental Faculty members were excluded. Demographic variables, smoking status, academic qualifications, years of experience, field of study, and information on oral hygiene routines were recorded. Oral and periodontal health were assessed using self-reported questionnaires (Oral Health Impact Profile-14 [OHIP-14] and Periodontal Screening Score [PESS]). Normal distribution was evaluated using the Kolmogorov-Smirnov test and symmetry by Skewness and Kurtosis. The Chi-square test was used to analyze categorical variables and the Mann–Whitney *U* test was applied to continuous variables.
Results: A total of 124 individuals responded to the questionnaire. The majority of participants were female ($n = 82$, 65.6%), with a mean age of 46.5 ± 9.8 years. Participants with periodontitis (PESS ≥ 5) accounted for 27.4% of the sample, with a median OHIP-14 score of 4 (IQR: 1–10). The OHIP-14 score was significantly lower among those who brushed their teeth more than once daily (3 [IQR: 1–9]) compared to those who brushed only a few times per week (8 [IQR: 6–17]) ($p = 0.001$). Among individuals with systemic diseases, the OHIP-14 score (7 [IQR: 2–13]) was significantly higher compared to systemically healthy participants (3.5 [IQR: 1–8.25]) ($p = 0.45$). No remarkable difference was observed between the periodontitis and OHIP-14 scores of academicians working in the field of health compared to other fields ($p > 0.05$).
Conclusions: The study indicated that oral health awareness levels were not associated with academic ranks (Professor versus other ranks). Increased PESS values in more than one-quarter of the population demonstrated that oral health awareness still needs to be raised even in highly educated niches.

PD145 | Prevalence of COVID-19 Infections Among Dental Healthcare Workers: A Systematic Review

M.C. van Capelleveen[1], T.A. Elkerbout[1], E. van der Sluijs[1], D. de Roo[1], D.E. Slot[1]
[1]Academic Centre for Dentistry Amsterdam (ACTA), Department of Periodontology, Amsterdam, Netherlands

Background & Aim: COVID-19 is a respiratory illness caused by SARS-CoV-2, a virus belonging to the coronavirus family, and was declared a global pandemic in March 2020. Transmission is suggested via aerosols. Dental healthcare workers (DHCWs) include professionals such as dentists, periodontists, dental assistants, dental hygienists, and others involved in oral healthcare. DHCWs are regularly exposed to infectious biological fluids, including saliva, blood, and respiratory secretions. This occupational exposure places DHCWs at an increased risk of contracting COVID-19 and potentially transmitting it to patients and colleagues. Within periodontology aerosol generating procedures can increase this exposure. This study aimed to systematically review scientific literature on the prevalence of COVID-19 infections among DHCWs.
Methods: A comprehensive search of MEDLINE-PubMed and the Cochrane Library databases was conducted from 2020 up to 2023. Studies reporting on the prevalence or incidence of COVID-19 among DHCWs were included. Two independent reviewers extracted data from the eligible studies and evaluated their methodological quality. The overall weighted prevalence was calculated, with sub-analysis on DHCW-professions and geographical regions. The strength of evidence was graded.
Results: Independent screening of 700 unique titles and abstracts resulted in 41 studies which met the eligibility criteria involving 126,194 DHCWs. The weighted mean prevalence of COVID-19 among the DHCWs in studied population was 12.70% (95% CI: [8.94; 16.46%]). Based on sub analyses, dental assistants had the highest weighted prevalence (18.52%), followed by dentists (13.38%) and the dental hygienists (2.37%). No sub-analsyis for periodontists could be performed. Based on geographical regions, South America had the highest prevalence (20.71%) and North America the lowest prevalence (3.51%) of COVID-19.
Conclusions: The overall prevalence of COVID-19 among DHCWs during the pandemic was 13%. Distinct differences in prevalence were noted across different professional roles and geographical regions. However, no specific data on periodontists and DHCW in periodontal settings were identified.

PD146 | Implication of Topical Drug-delivery Systems in the Treatment of Chronic Pain—An In Vitro Study in Oral Keratinocytes and Gingival Fibroblast

A. Vega[1], K. Kostakidis[1], J. Nayak[2], S. Moré[2], K. Zierau[3], D. Höhne[3], K. Danker[4], H. Dommisch[1]
[1]Charité – Universitätsmedizin Berlin, Department of Periodontology, Oral Medicine and Oral Surgery, Berlin, Germany, [2]DendroPharm GmbH, Berlin, Germany, [3]HM HerbaMedica GmbH, Berlin, Germany, [4]Charité – Universitätsmedizin Berlin, Institute of Biochemistry, Berlin, Germany

Background & Aim: Tetrahydrocannabinol (THC), the psychoactive component of cannabis, provides analgesic effects and may influence inflammation and cellular responses. In addressing chronic pain, the oral mucosa's absorption capability is utilized for THC administration. Innovative drug delivery systems (DDS) are used to improve bioavailability and reduce side effects. This study developed a targeted mucosal THC delivery

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

system and examined the impact of THC-encapsulated in an ester-based core-multishell (CMS) DDS on oral keratinocytes and gingival fibroblasts, focusing on inflammation, metabolism, and barrier integrity.

Methods: Human gingival keratinocytes (hTERT-immortalized OKG4) and immortalized human gingival fibroblast (ihGF) cells were exposed to CMS, THC, and THC encapsulated in CMS (CMS+THC) and compared to a non-treated control. Pro-inflammatory responses were measured using qPCR technology. RT-Glo MT-assay and CellTiter-Glo assessed cellular metabolism and vitality. Barrier integrity was evaluated by measuring the transepithelial electrical resistance (TEER).

Results: CMS+THC down-regulated IL-1β and CXCL8 gene expression. In the RT-Glo MT-assay, OKG4 cells exposed to THC and CMS+THC showed reduced cell metabolism compared to CMS and the control after a 24-h recovery. CMS+THC-treated ihGF cells recovered cellular metabolism after 24 h compared to only THC-treated cells. In the CellTiter-Glo assay, treatment with THC and THC+CMS decreased ATP production by over 61% in OKG4 cells and over 49% in ihGF cells; treatment with only CMS enhanced ATP production compared to the previous treatments in both cell lines. TEER results indicated reduced barrier integrity by 13.95%, 18.6%, and 32.56% for CMS+THC, CMS, and THC, respectively.

Conclusions: THC delivery via the CMS-DDS altered inflammatory responses without affecting the cellular physical barrier in OKG4 cells and enhanced cellular vitality in ihGF cells, compared to pure THC exposure. These results indicate the potential of DDS-based cannabinoid delivery based on dendritic nanomaterials in oral tissues, necessitating further research into clinical applications.

PD147 | A Cone Beam Computed Tomographic Analysis of the Greater Palatine Foramen in a United Arab Emirates Population

O. Murad[1], M. Atieh[1], A. Hakam[1], M. Shah[1]
[1]Mohammed Bin Rashid University of Medicine and Health Sciences, Department of Periodontology, Dubai, United Arab Emirates

Background & Aim: The greater palatine foramen (GPF) is a critical anatomical landmark situated medial to the third molars and near the lateral margin of the hard palate. Accurate localization of the GPF is vital for effective local anesthesia administration and surgical interventions. While several studies have examined the GPF's position across various populations, research specifically targeting the UAE population remains lacking.

This study aims to evaluate the relative position and dimensions of the GPF in a UAE population using cone beam computed tomography (CBCT) imaging.

Methods: This retrospective cross-sectional study analyzed 100 randomly selected CBCT images from patients at Hamdan Bin Mohammed College of Dental Medicine (HBMCDM) in Dubai. Relevant demographic data were recorded, focusing on distances from the GPF to anatomical landmarks and its relationship to upper molars.

Results: The study analyzed 100 CBCT scans (57 females, 43 males) with a mean patient age of 46.14 ± 15.41 years (range: 21–86 years). The average distance from the GPF to the anterior nasal spine was 45.49 ± 3.70 mm (right) and 45.44 ± 3.71 mm (left). The distance to the mid-maxillary suture was measured at 14.59 ± 1.46 mm (right) and 14.50 ± 1.42 mm (left). The GPF was most commonly located distal to the third molar (66% right, 61% left). Males exhibited significantly greater distances to the anterior nasal spine and medial maxillary suture, as well as larger GPF diameters compared to females ($p < 0.05$).

Conclusions: It was concluded that the GPF in the UAE population is predominantly located distal to the third molar, supporting its use as a landmark for effective GPN block anesthesia. Furthermore, the significant differences in GPF dimensions between genders highlighted to be considered and the importance of precise localization of the GPF to enhance surgical outcomes and minimize complications related to local anesthesia administration and periodontal plastic surgery.

PD148 | Clinical and Molecular Effects of Minimally Invasive Piezosurgically Assisted Complex Exodontia in Type 2 Diabetes Mellitus: A Randomized Controlled Clinical Study

M. Vucetic[1], J. Roganovic[2], M. Rakic[3], Z. Vucetic[4], M. Milic[5], V. Todorovic[6], L. Djukic[7], N. Petrovic[8], B. Brkovic[1]
[1]School of Dental Medicine, University of Belgrade, Department for Oral Surgery, Belgrade, Serbia, [2]School of Dental Medicine, University of Belgrade, Department for Pharmacology in Dentistry, Belgrade, Serbia, [3]School of Dental Medicine, University of Bern, Robert K. Schenk Laboratory of Oral Histology, Department of Periodontology, Bern, Switzerland, [4]Private Practice, Kotor, Montenegro, [5]School of Dental Medicine, University of Belgrade, Department for General and Oral Physiology, Dr Subotica 1, Serbia, [6]School of Dental Medicine, University of Belgrade, Department for Oral Surgery, Dr Subotica 4, Serbia, [7]School of Dental Medicine, University of Belgrade, Pharmacology in Dentistry, Belgrade, Serbia, [8]Institute for Oncology and Radiology of Serbia, Belgrade, Serbia

Background & Aim: Socket healing is complex process involving soft and hard tissue regeneration, regulated by cytokines like Vascular Endothelial Growth factor (VEGF), along with oxidative stress, influenced by epigenetic regulation involving microRNAs. Factors such as extractive surgical trauma and systemic conditions like diabetes mellitus type 2 (DMT2) can impair healing and complicate implant rehabilitation. Piezosurgery, known for its precision and controlled cutting, aims to address the limitations of traditional exodontia methods, but evidence for its use in DMT2 patients remains limited. This study aims to investigate the effects of piezosurgery on cellular and molecular aspects of socket healing and patient recovery in healthy and DMT2 patients.

Methods: In this split-mouth study, 32 patients (16 healthy, 16 DMT2) undergoing complex upper multi-rooted teeth extractions were compared using piezosurgical and conventional techniques. Pain intensity and gingival tissue appearance were monitored clinically. Bone samples were analyzed for miR-21

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

expression, VEGF levels, and superoxide-dismutase enzyme (SOD) activity.

Results: Significantly more DMT2 patients reported pain with both techniques, but piezosurgery significantly reduced analgesic use in DMT2 patients compared to conventional methods. Pain intensity was lower after piezosurgery in both groups. Gingival appearance was improved immediately after piezosurgery and on Day 7, but only in DMT2 patients. miR-21 expression was higher in DMT2 patients regardless of the method, with piezosurgery increasing it in healthy patients. VEGF levels were significantly lower in DMT2 patients, and piezosurgery reduced them further in healthy patients. SOD activity showed no significant differences.

Conclusions: Patients with DMT2 experienced more post-extraction pain than healthy individuals. Piezosurgery reduced pain intensity and analgesic use in these patients due to its less traumatic nature, leading to improved gingival healing in the first 7 days. Changes in signaling pathways suggest that piezosurgery promoted a more controlled early inflammatory response, making it a valuable option for complex extractions in patients suffering from DMT2.

PD149 | Physical and Biological Characterizations of 3D-Bioprinted Hydroxyapatite-Based PDLSC-Laden Hydrogels for Future Use in Periodontal Regeneration

N. Mohd[1], M. Razali[1], N.H. Abu Kasim[2], M.B. Fauzi[3,4]
[1]Universiti Kebangsaan Malaysia, Department of Restorative Dentistry, Faculty of Dentistry, Kuala Lumpur, Malaysia, [2]Universiti Malaya, Department of Restorative Dentistry, Faculty of Dentistry, Kuala Lumpur, Malaysia, [3]Universiti Kebangsaan Malaysia, Department of Tissue Engineering and Regenerative Medicine, Faculty of Medicine, Kuala Lumpur, Malaysia, [4]Universiti Kebangsaan Malaysia, Advance Bioactive Materials-Cells UKM Research Group, Bangi, Malaysia

Background & Aim: Current periodontal regenerative approaches have limitations in restoring the function and structural integrity of periodontium. Three-dimensional (3D) bioprinting is a promising technologically-assisted strategy to address clinical challenges in the field of periodontal regeneration. By enabling the fabrication of customized, complex tissue constructs with patient-specific architectures and ideal biomaterial-cell combinations, 3D bioprinting offers a potential breakthrough. This study aims to evaluate the physical and biological properties of 3D-bioprinted hydroxyapatite (HA)-based cell-laden scaffolds for periodontal applications.

Methods: 3D-bioprinted gelatin/HA scaffolds, prepared with various concentrations and crosslinked with genipin, were fabricated using an extrusion-based bioprinting technique. Scaffolds without cells were printed for physical characterization, assessing biodegradation, rheology, porosity, and pore size. For biological characterization, human periodontal ligament stem cells (hPDLSCs) were incorporated into the gelatin/HA bioink to create cell-laden scaffolds. The biological properties of these 3D-bioprinted hydrogels were analyzed using Live/Dead cell viability and MTT assays, cell proliferation via Ki67 protein expression, and hPDLSCs morphology observed by scanning electron microscopy.

Results: The addition of HA to gelatin significantly reduced the biodegradation rate ($p < 0.05$) and increased the pore size ($p < 0.05$) of 3D-bioprinted scaffolds as well as demonstrating porous microstructures with interconnected pores. All groups exhibited shear-thinning behaviour. The in vitro assessments showed high cell survival with more than 90% hPDLSCs viability in all groups. The metabolic activity of hPDLSCs showed an increased trend with increasing time point and with the increased addition of HA concentration. There was no significant difference of cell proliferative marker expression between groups ($p > 0.05$). The morphological observation showed hPDLSCs were able to adhere and proliferate in the 3D-bioprinted gelatin/HA hydrogels.

Conclusions: 3D-bioprinted gelatin/HA crosslinked with genipin has excellent physical and biocompatibility properties that are able to maintain the hPDLSCs viability and function post printing thus making it a promising bioink for future application in periodontal regeneration.

PD150 | Successful Outcomes of Regenerative Periodontal Therapy at Nova Southeastern University: A Retrospective Study

A. Danesh[1], A. Rivera[1], S. Vardar[1], O. Chocron[1], T. Koutouzis[1]
[1]Nova Southeastern University, Davie, Florida, United States

Background & Aim: A modality in treating infrabony defects is periodontal regeneration. The primary aim of this study was to evaluate outcomes of regenerative procedures using PPD, CAL and radiographic defect resolution. The secondary aim was to evaluate if these parameters differ when growth factors are employed.

Methods: This retrospective study utilized electronic patient records from the NSU department of Periodontics. Patients having received periodontal regenerative procedures on teeth were considered. Independent variables include smoking status, growth factor use, age, gender. Dependent variables include PPD, CAL and radiographic defect resolution. The primary outcome variable is achievement of pocket closure (PD less than 5 mm). Parametric tests were used to evaluate differences in PPD, CAL before and after treatment and differences between 2 groups receiving different biologic materials, EMD and rh-PDGF. Binary logistic regression analysis was formulated to analyse possible interactions of treatment type, tooth location, use of membrane, radiographic defect resolution, smoking and ASA status to pocket closure.

Results: A total of 103 defects were included in the study. There was a statistically significant decrease in PD and increase in CAL for both EMD and rh-PDGF groups. 70%–76.2% of defects had pocket closure (PD less than 5 mm). No statistically significant differences observed between groups for pocket closure. 60%–62.9% of defects had radiographic resolution of defects with no differences between groups. Achieving defect resolution radiographically and treatment of maxillary premolar teeth were associated with pocket closure.

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Conclusions: Regenerative procedures at NSU were found to have success rates as defined by pocket closure of 70%–76.2%. No differences found when comparing the use of 2 different biologic growth factors (EMD and rh-PDGF).

PD151 | Effectiveness of Regenerative Treatment of Intrabony Defects Using Hyaluronic Acid in Periodontitis Stages III and IV Patients

M. Trost[1], B. Gaspirc[1]
[1]*Faculty of Medicine, University of Ljubljana, Department of Oral Medicine and Periodontology, Ljubljana, Slovenia*

Background & Aim: This study evaluated the effects of hyaluronic acid on bone defect regeneration in periodontal disease, both alone and with different bone substitute grafting materials.
Methods: Thirty patients with Stages III and IV periodontitis and intrabony defects were randomly included into six treatment groups. Clinical parameters were measured after and an oral hygiene phase was performed 30–60 days before surgery. The control group received bovine bone substitute material and collagen membranes, while three test groups used hyaluronic acid alone or with various bone grafts. Two additional test groups included a resorbable collagen membrane with the hyaluronic acid-containing bone grafts. Clinical outcomes were assessed after six months.
Results: In medium-depth pockets (4–6 mm), probing depths decreased on average by 1 mm. Guided tissue regeneration led to significantly smaller recessions and greater clinical attachment level (CAL) gain in the hyaluronic acid-only group compared to the control. In deep pockets (7+ mm), the mean probing depths decreased by 2.5 mm, with the HA-only group showing the greatest reduction (2.75 ± 0.37 mm) and the HA + bone graft group at 2.86 ± 0.28 mm. The HA-only group also had significantly lower recession and higher CAL gain compared to the control. Radiological assessment showed less than 100% filling of vertical bone defects in all groups, with the HA-only group exhibiting the lowest filling rate.
Conclusions: Based on the results of the present clinical study, we conclude that hyaluronic acid, alone or in combination with bone grafts, can improve the clinical and radiographic outcomes of surgical treatment of periodontal disease in deep intrabony defects.

PD152 | Proteomics Related to Quality of Wound Healing After Regenerative Periodontal Surgery

L. Pitzurra[1], S. Bizzarro[1], E. Stamatelou[1], D. Vasdravellis[1], A. Angelakis[2], B. Loos[1]
[1]*ACTA, Periodontology, Amsterdam, Netherlands,* [2]*Amsterdam UMC, Epidemiology and Data Science, Amsterdam, Netherlands*

Background & Aim: To gain insights in the early wound healing after regenerative periodontal surgery applying proteomics.
Methods: 18 patients were equally randomized in three groups: Emdogain (EMD), Advanced Platelet Rich Fibrin (A-PRF+) and control (Open Flap Debridement [OFD]). Strips were inserted in the designated site of the experimental tooth for GCF samples at baseline (A), and Day 3 (B), Week 1 (C), Week 2 (D) and Week 6 (E) postoperatively. Healing was scored via Early Wound Healing Index. An Olink TargetT96 Immuno-Oncology kit was used for proteomics. Data were cleaned (quality control) and imputed where appropriate (MissForest). Healing was dichotomized into 'above' and 'below' the overall median score per time point. Spearman correlation coefficients (rho) were calculated to explore potential proteins associated with the healing per treatment at different time points.
Results: In total, 45 proteins could be analyzed and the following top-ranked proteins correlated with 'above median' healing. Positive correlations: For EMD, CD4 at time point C (rho 0.85, $p = 0.044$), for A-PRF+, IL6 at time points D and E (both rho 0.85, $p = 0.042$), and for OFD, CCL4 at time points B and C (both rho 0.85; p-values 0.042, 0.036 resp.). Negative correlations: For EMD, CD5, TNFRSF, TWEAK at time point C (all rho −0.85, p-values 0.057), for A-PRF+, CXCL5, IL6 at time points B and C (all rho −0.85, p-values 0.042), while TNFSF14, PGF, IL8 only at time point B (all rho −0.85, p-values 0.042), and CCL4, PGF, MCP1 at time point E (all rho −0.85, p-values 0.042), for OFD, CD27, EGF, IL1A, MMP12, TRAILB at time point B (all rho −0.85 with p-values 0.042).
Conclusions: Certain proteins emerged which form the beginning of better understanding the biology of the early wound healing after regenerative periodontal surgery. Further studies are needed to propose characteristic protein signatures for the regenerative procedures.

PD153 | Evaluating the Morphological and Cellular Interactions of Calcium Sulfate and Chitosan-Enhanced Biomaterials

F. Ariffin[1], I.H. Mohamad[2], N.Z. Nik Mahmood[3]
[1]*Universiti Teknologi MARA, Centre of Periodontology Studies, Sungai Buloh, Malaysia,* [2]*Universiti Sains Malaysia, Periodontics Unit, Kota Bharu, Malaysia,* [3]*SEGI University, Faculty of Dentistry, Petaling Jaya, Malaysia*

Background & Aim: Calcium sulfate ($CaSO_4$) is widely used in medicine as a bone substitute, showing promise for bone repair. However, its limited porosity restricts cell ingrowth. This study investigates the structure of calcium sulfate and a calcium sulfate-chitosan ($CaSO_4$-CHT) composite, focusing on their interactions with periodontal ligament fibroblasts (PDLFs).The objective of this study is to examine the structural characteristics of $CaSO_4$ and $CaSO_4$-CHT and their interaction with PDLFs using scanning electron microscopy (SEM).
Methods: $CaSO_4$ and $CaSO_4$-CHT biomaterials were prepared in an 8.0 × 2.0 mm mold and cultured with PDLFs for structural analysis. The materials underwent several preparation steps: soaking in saline to reduce hydrophobicity, sterilization, and incubation in growth media. Following cell seeding, the samples were analyzed after 2–3 days for cell proliferation. SEM analysis was performed after fixation and dehydration, focusing on cell

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

attachment and material structure at magnifications of 1.5 and 5.0 kx.

Results: SEM images revealed a diverse range of structures for both $CaSO_4$ and $CaSO_4$-CHT, characterized by varying pore sizes (6.0–89.5 mm) and textured surfaces. Observations indicated successful adhesion of PDLFs, with visible cytoplasmic extensions extending onto the biomaterials, suggesting favorable conditions for cellular integration.

Conclusions: The study underscores the unique morphological properties of $CaSO_4$ and $CaSO_4$-CHT, which exhibit surface roughness and diverse pore sizes conducive to periodontal regeneration. The successful attachment of PDLFs to these materials supports the potential of $CaSO_4$-CHT as an effective scaffold for further research in bone regeneration applications, warranting continued exploration in clinical settings.

PD154 | Comparative Evaluation of Antimicrobial Properties of L-PRF and A-PRF+: An In Vitro Study

A. Ganeshkumar[1], V. Balaji[2]
[1]Sri Ramachandra Institute of Higher Education and Research, Periodontics and Implant Dentistry, Chennai, India, [2]CSI College of Dental Sciences and Research, Periodontics and Implant Dentistry, Madurai, India

Background & Aim: Platelet-rich fibrin (PRF) is widely used in regenerative therapy, but its antimicrobial properties are not well understood. Notably, there is no published research comparing the antimicrobial effects of L-PRF (Leukocyte-Platelet Rich Fibrin) and A-PRF+ (Advanced Platelet Rich Fibrin). To compare and evaluate the antimicrobial properties of L-PRF and A-PRF+ alone and with antibiotics (amoxicillin, ofloxacin and gentamycin) against *Streptococcus aureus* and *Escherichia coli* (aerobic and anaerobic organism) among three groups of patients.

Methods: Blood was collected from 42 subjects and 0.5 mL of antibiotics were added to respective tubes and centrifuged as per protocol to obtain L-PRF and A-PRF+ following which they were made into respective membranes. Antimicrobial property was assessed by measuring the zone of inhibition (cup plate method). Statistical analysis was done using independent sample *t*-test, Kruska–Wallis test and one way ANOVA.

Results: On intragroup comparison against *S. aureus* and *E. coli*, all the sub-groups (L-PRF, L-PRF& AMOXICILLIN, L-PRF & OFLOXACIN, L-PRF & GENTAMYCIN, A-PRF+, A-PRF+ & AMOXICILLIN, A-PRF+ & OFLOXACIN, A-PRF+ & GENTAMYCIN) showed antibacterial activity. With addition of antibiotics, there was greater zone of inhibition which signifies greater antibacterial activity. On intergroup comparison among *S. aureus*, L-PRF with addition of amoxicillin alone had statistical significance. On intergroup comparison among *E. coli*, L-PRF & AMOXICILLIN, L-PRF & OFLOXACIN, A-PRF+ & AMOXICILLIN, A-PRF+ & OFLOXACIN showed statistical significance. Group III patients showed more antibacterial activity than other two groups.

Conclusions: Both L-PRF and A-PRF+ alone and with antibiotics has shown significance in antimicrobial properties among three groups. However, studies involving larger sample sizes and in-vivo studies are required to understand the antimicrobial efficacy of PRF for use in clinical situations.

PD155 | Comparative Evaluation of Periodontal Pathogenic Bacterial Penetration and Absorption on Collagen Membrane Loaded With and Without Antibiotics—An In Vitro Study

S. Shetty[1], A. Patil[1]
[1]MGM Dental College and Hospital, Department of Periodontics, Navi Mumbai, India

Background & Aim: This study compared the periodontal pathogenic bacterial penetration and absorption on collagen membrane loaded with and without antibiotics.

Methods: The collagen membrane was loaded with antibiotics and divided into four groups: Group A—Collagen membrane with bacteria and without antibiotics, Group B—Augmentin loaded collagen membrane, Group C—Metronidazole loaded collagen membrane, Group D—Augmentin plus Metronidazole loaded collagen membrane. After incubation period of 24 h, 48 h, 72 h, 7 days and 14 days the penetration of Porphyromonas Gingivalis, Tannerella Forsythia, Prevotella Intermedia through collagen membrane was achieved using a device consisting of inner tube and outer tube filled with culture media and the assessment was done by colony forming unit. After incubation period of 14 days the bacterial absorption on the outer surface of collagen membrane was assess using scanning electron microscope.

Results: The penetration of periodontal pathogenic bacteria was significantly increased in collagen membrane without antibiotics at incubation period of 72 h, 7 days in the inner tube and at incubation period of 14 days in the outer tube as compared to collagen membrane with antibiotics. When reviewed under SEM analysis there were no changes seen on the outer surface of collagen membrane after incubation period of 14 days except that few clusters of bacteria were noted on collagen membrane loaded with antibiotics.

Conclusions: The results showed that loading the collagen membrane with antibiotics delayed and/or reduced the penetration of periodontal pathogenic bacteria as compared to collagen membrane without antibiotics wherein increase penetration of periodontal pathogenic bacteria was seen and after incubation period of 14 days no changes were noted on the outer surface of collagen membrane except that few clusters of bacteria were present. This finding indicates the effectiveness of using antibiotics loaded collagen membrane for periodontal regenerative therapy.

PD156 | The Periodontal Benefits of Alveolar Ridge Augmentation With Xenograft Following Third Molar Extraction: A Randomised Controlled Trial

S.S. Quach[1], N. Johnson[1,2], R. Dudhia[1], A. Puljich[1], S. Ivanovski[1], R.S. Lee[1]
[1]The University of Queensland, Herston, Australia, [2]Princess Alexandra Hospital, Oral and Maxillofacial Department, Woolloongabba, Australia

Background & Aim: Retained third molars rarely remain healthy, with deep periodontal pockets often detected around both the third and adjacent second molar. In some cases,

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

periodontal defects associated with the distal aspect of the second molar (D2M) persisted even after extraction. This study aimed to evaluate the effect of deproteinised bovine bone mineral with collagen (DBBM-C) grafting on periodontal healing at the D2M during adjacent third molar extraction.

Methods: 28 patients were initially recruited, and the eligible sites were randomly allocated into two groups ($n = 42$). The test group ($n = 18$) received DBBM-C grafting during extraction, whereas the control group ($n = 24$) received extraction alone. The patients were reviewed 6 months postoperatively, and the D2M and extraction sites were evaluated by both linear and volumetric CBCT measurements. The bone height adjacent to the mandibular second molar (CEJ-C) was examined. This was performed at the distobuccal, distal, distolingual positions around the second molar, as well as at the slice with the most amount of bone loss at baseline (worst slice). Two volumes of interest were defined, one to represent socket healing (SHV) and the other to represent periodontal healing (PHV) around the D2M.

Results: After 6 months of healing, 9 patients dropped out ($n = 14$), 2 patients were excluded ($n = 4$) and 17 patients ($n = 24$) were reviewed and assessed. There were no significant differences between the groups in the linear or volumetric outcome analyses. Volumetric measurements demonstrated excellent intra-rater agreement (ICC = 0.94).

Conclusions: Within the limitations of the study, the use of DBBM-C during third molar extraction did not result in additional periodontal healing at the D2M. The volumetric outcome analysis described in the study may represent a comprehensive way to report radiographic healing at the D2M. This trial was registered April 2020, in the Australian New Zealand Clinical Trials Registry (ACTRN12620000497909).

PD157 | Osseodensification Versus Conventional Drilling for Implant Site Preparation: A Randomized Controlled Trial

M.S. Shah[1], T. Somas Kandhan[1], M. Ameen[1], A. Hakam[1], M. Atieh[1,2]

[1]Mohammed Bin Rashid University of Medicine and Health Sciences, Department of Periodontology, Dubai, United Arab Emirates, [2]University of Otago, Sir John Walsh Research Institute, Faculty of Dentistry, Dunedin, New Zealand

Background & Aim: Osteotomy site preparation, a critical step in implant placement, directly influences implant stability and osseointegration. Conventional drilling (CD) remove bone, potentially reducing primary stability. In contrast, osseodensification (OD) is a novel technique that compacts bone, enhancing implant stability and bone density around the osteotomy site. This randomized controlled trial aimed to compare clinical outcomes of implants placed using OD versus CD protocol, focusing on measures of implant stability.

Methods: Participants receiving single implant were randomly assigned to OD or CD treatment groups. Osteotomies were prepared using either OD technique where tapered multifluted burs (Densah Burs) were used versus CD protocol. Implant insertion torque (IT) and implant stability quotient (ISQ) using resonance frequency analysis (RFA) at time of implant placement and at the time of second stage surgery (three months) were measured. Patient postoperative experience was assessed using VAS, 1 week following implant placement.

Results: 31 participants receiving 44 implants were evaluated for second-stage implant surgery; of which three implants failed (2-OD group and 1-CD group). Overall, implants placed in the mandible had significantly higher ISQ values at implant placement than those placed in the maxilla (p-value = 0.002), regardless of the drilling protocol; however, the difference between the two groups was not statistically significant. At implant placement, the recorded ISQ values in OD and CD groups were 74.95 ± 5.86 and 75.93 ± 5.24, respectively (p-value = 0.56), while at the second stage surgery, the recorded ISQ values in OD and CD groups were 74.95 ± 5.86 and 75.93 ± 5.24, respectively (p-value = 0.83). Participant postoperative experience and IT values did not demonstrate any significant differences between the two drilling protocols.

Conclusions: Implants placed using OD or CD protocols showed comparable ISQ and IT values at implant placement, which stayed similar at second stage exposure surgery. Both drilling protocols were well tolerated by the participants.

PD158 | Effects of Different Materials on the Changes of the Labial Soft and Hard Tissues After Immediate Implantation and Immediate Restoration in the Aesthetic Area

X. Qi[1], X. Wang[1]

[1]Capital Medical University, Beijing, China

Background & Aim: To explore the effects of different materials on the changes of the labial soft and hard tissues within 6 months after immediate implantation and restoration at antierior region.

Methods: Twenty implants from 20 patients undergoing immediate implantation and restoration were chosen and then randomly divided into test group and control group. For the test group, CAD-CAM zirconia abutments in conjunction with temporary crowns were adopted for immediate restoration guaranteeing. For the control group, temporary abutments and resin temporary crowns were utilized for immediate restoration. CBCT scans and intra-oral scans were taken pre-surgery (T0) and 1 year after (T1). Vertical facial bone height (VBH) and Horizontal facial bone thickness (HBT) at 0, −1, −2, −3, −5, −7, −10 mm to the implant platform was measured respectively. For facial soft tissue measurements. CBCT scan data and intra-oral scan data were registered with same time point. Gingival height (GH) and Horizontal Facial Contour Thickness (HCT) at 3, 2, 1, 0, −1, −2, −3 mm to the implant platform were measured as well. Finally, analyze the changes in the two groups within one year.

Results: In the experimental group, the average change in the height of the mid-labial soft tissue within 6 months was 0.58 ± 0.29 mm. In the control group, it was −1.00 ± 0.50 mm. The value of the experimental group was smaller than that of the control group, and the difference was statistically significant ($p < 0.05$). In gingival papilla height and the horizontal direction, the changes of hard and soft tissues in the experimental group also showed better performance than those in the control group.

Conclusions: In immediate implantation and immediate restoration in the aesthetic area, the use of personalized zirconia

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

abutments, with the gingival margin area located on the zirconia material, can achieve a better gingival papilla morphology and reduce labial gingival recession to a certain extent.

PD159 | Resective Surgical Therapy in the Treatment of Peri-Implantitis: A Retrospective Study

M. Sarsri[1], A. Varela[1], J. Nart[1], N. Carrió[1], I. Doria[1], C. Mor[1], C. Vallès[1]
[1]*Universitat Internacional de Catalunya, Periodoncia, Sant Cugat del Vallès, Spain*

Background & Aim: The effect of peri-implantitis surgical treatment has been reported in previous studies. However, no single procedure seems to provide predictable outcomes resulting in a consistent disease resolution. Moreover, such studies presented small samples, variability in the treatment protocols, inconsistencies in disease definitions and differing success criteria. Thus, this retrospective study aimed to assess clinical and radiological outcomes after 3 years of resective surgical treatment of peri-implantitis.
Methods: Data for patients diagnosed with peri-implantitis who had received resective surgical therapy from 2012 to 2017 were analysed by one investigator. Treatment included non-surgical debridement, surgical intervention, and supportive periodontal/peri-implant therapy (SPT). Patients were classified as compliant or non-compliant. Implant characteristics, type of prosthesis and its cleansability and type of retention were evaluated. Clinical parameters—including plaque index (PI), bleeding on probing (BoP), suppuration (SoP), probing depth (PD), marginal recession (MR) and keratinized mucosa (KM)—were evaluated. Treatment success was defined according to Heitz-Mayfield et al. (2018) criteria.
Results: The final analysis included 22 patients (15 males [68.2%] and 7 females [31.8%] with a mean age of 63.7 [SD 5.7] years) and 55 implants, predominantly in the maxillary posterior region. Significant improvements were observed in PD, with a mean reduction of approximately 2.5 mm at both patient and implant levels after 12 months ($p < 0.05$), which remained stable over the follow-up period. BoP was also significantly reduced from baseline to 1-year follow-up, although a minor rebound was noted thereafter. Radiographic analysis showed minor changes in peri-implant bone levels, with no significant bone loss progression from the 1-year to the end of the study period. Treatment success was obtained in 10 patients (45.5%) and 26 implants (46.4%).
Conclusions: Resective surgical treatment of peri-implantitis demonstrated sustained clinical and radiological benefits at a 3-year follow-up.

PD160 | Accuracy of Dental Implant Placement Using Dynamic Navigation Versus Freehand Technique in Novice Surgeons: A Randomized Clinical Trial

V. Ruiz-Romero[1], O. Camps-Font[1], A. Jorba-Garcia[1], R. Figueiredo[1], E. Valmaseda-Castellón[1]
[1]*University of Barcelona, Oral Surgery and Implantology, Barcelona, Spain*

Background & Aim: Accurate implant placement is essential for achieving functional and aesthetic restorative goals while minimizing complications. Although dynamic computer-assisted implant surgery (dCAIS) systems improve implant accuracy, no clinical study has evaluated their impact on novice surgeons. This study evaluated the performance of novice surgeons using dCAIS versus freehand (FH) techniques, and patient perceptions through patient-reported outcome measures (PROMs).
Methods: An open-label, double-arm, randomized clinical trial was conducted in the Master's Degree Program in Oral Surgery and Implantology (University of Barcelona). Partially edentulous patients were randomly assigned to dCAIS (X-Guide system) or FH placement of Nobel Replace TiUltra implants. Accuracy outcomes included apex and platform linear deviation (mm), and angular deviation (°) measured with X-Nav software. Self-reported satisfaction, quality of life, surgical time, analgesic consumption, and pain were also recorded.
Results: Sixty-two patients (74 implants) were included. Thirty patients received 36 implants using dCAIS, while 30 patients (36 implants) were treated with FH. One patient per group was lost to follow-up. Implant placement with dCAIS significantly reduced angular deviation (MD: −5.51; 95% CI: −7.10 to −3.91; $p < 0.001$), lateral platform deviation (MD: −0.79; 95% CI: −1.53 to −0.05; $p = 0.037$), global platform deviation (MD: −0.89; 95% CI: −1.66 to −0.12; $p = 0.024$), and global apex deviation (MD: −1.23; 95% CI: −1.98 to −0.48; $p = 0.001$) compared to FH. Intervention time was similar between FH (61.99 ± 19.40 minutes) and dCAIS (55.81 ± 16.66 minutes) ($p = 0.190$). Postoperative pain and analgesic consumption were similar, with high self-reported satisfaction (3.96 dCAIS vs. 3.77 FH). The surgical procedure did not result in significant changes in participants' quality of life ($p = 0.236$).
Conclusions: The dCAIS approach significantly improves implant placement accuracy in novice surgeons without extending surgical time. However, it does not have a significant effect on patient satisfaction or postoperative pain levels.

PD161 | Long-Term Clinical, Radiographic and Soft-Tissue Profilometric Outcomes of Two Narrow-Diameter Implants to Replace Missing Maxillary Lateral Incisors

A. Roccuzzo[1,2,3], J.-C. Imber[4], J. Lampert[3], L. Mancini[5], S. Storgård Jensen[3,6]
[1]*University of Bern, Department of Periodontology, School of Dental Medicine, Bern, Switzerland,* [2]*University of Bern, Unit for Practice-based Research, School of Dental Medicine, Bern, Switzerland,* [3]*University of Copenhagen, Department of Oral and Maxillofacial Surgery, Copenhagen University Hospital, Copenhagen, Denmark,* [4]*University of Bern, Periodontology, Bern, Switzerland,* [5]*University of Zurich, Clinic of Reconstructive Dentistry, Zurich, Switzerland,* [6]*University of Copenhagen, Research Area Oral Surgery, Section for Oral Biology and Immunopathology, Institute of Odontology, Copenhagen, Switzerland*

Background & Aim: To report the 5-year clinical, radiographic, aesthetic and soft-tissue profilometric outcomes in patients with

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

congenitally missing lateral incisors (MLIs) rehabilitated with two narrow-diameter implants (NDIs).

Methods: A cohort of 100 patients rehabilitated with a cement-retained bi-layered zirconia single-unit crown on either a Ø2.9 mm (Test) ($n = 50$) or a Ø3.3 mm (Control) NDI ($n = 50$), was prospectively assessed at 1, 3, and 5-year follow-up (T2, T3, T4). Clinical (PPD, PI) and radiographic (crestal bone level [CBL] changes) outcomes, as well as biological and technical complications were recorded. Aesthetics was assessed applying the Copenhagen Index Score. Finally, after the acquisition of intraoral optical scans, three different soft-tissue profilometric profiles (linear, concave, and convex) were described.

Results: At T4, 66 patients ($n = 33$ per group Ø2.9/3.3 mm; drop-outs $n = 33$; implant survival rate: 99%; early implant loss $n = 1$) could be evaluated. Throughout the observation period, CBL changes at Ø 3.3 mm implants remained higher than at Ø2.9 (difference: 0.5 mm; $p = 0.059$). Despite the positive aesthetic scores recorded (i.e., 1–2), at T4 18.2% of Ø3.3 mm patients vs. 9.1% of patients Ø2.9 mm displayed an alveolar process deficiency (Score 3). The frequency of soft-tissue profilometric profiles were: linear in 21.2% versus 28.2%, concave 72.7% versus 41.2% and convex in 6.1% versus 20.6 within the Ø2.9 mm versus Ø3.3 mm groups, respectively ($p = 0.01$). PPDs and PI remained low in both groups ($p > 0.05$). Between T1 and T4, the documented technical complications included loss of retention (3×), ceramic chipping of the incisal edge (3×), and loosening of the abutment (1×), while a buccal fistula was noticed 3×. PROMs statistically significant improved after delivery of the definitive restoration and remained stable without difference between groups up to T4 ($p > 0.05$).

Conclusions: The use of Ø2.9 or Ø3.3 implants showed comparable positive long-term results in terms of survival rate, CBL, aesthetic and profilometric outcomes.

PD162 | Bone Drilling in Implantology Without Irrigation: A Retrospective Clinical Study Over a 20 Year Time Period

Y. Reingewirtz[1], P.-Y. Gegout[1], O. Huck[1]
[1]Dental Faculty of Strasbourg, Université de Strasbourg, Department of Periodontology, Strasbourg, France

Background & Aim: In a previous in vitro study, low heat elevation was observed after cortical bone drilling using a low drilling speed without irrigation. The aim of this retrospective study is to evaluate this protocol in dental implantology through a 20-year clinical analysis.

Methods: The surgical procedure involved low-speed drilling (≤400 rpm) followed by irrigating the socket with refrigerated saline solution (5°C). A total of 334 Straumann implants were fixed in 119 patients between January 2003 and March 2023. Among them, 71 patients are still undergoing periodontal care with a mean follow-up of 102.2 months. This group was reevaluated using peri-implant soft tissue assessment and standard retroalveolar radiography.

Results: 71 patients (35 male, 36 female; mean age 55.4 years [57.6 for males, 53.3 for females]) received 202 implants. Five implants failed to achieve primary stability and were not fixed. Among the 197 fixed implants, five were removed from four patients after a mean of 114.8 months due to localized or generalized severe periodontitis. Mucositis and periodontitis were found in 27.8% and 14.4% of cases, respectively ($M > 33.3\%$; 16.2%; $M < 20.4\%$; 12.3% respectively). Bone resorption was observed in 31 patients, with average bone loss (BL) months of 0.206 mm (mesial BL: 0.194 mm; distal BL: 0.219 mm). Prosthodontics include single crowns (74), bridge on implants (26) or tooth-implant associated bridge (35).

Conclusions: This is the first study to demonstrate long-term survival of implants with a 98.47% success rate using low-speed bone drilling without irrigation. This protocol facilitates easier visual access in posterior areas and supports bone autologous harvesting.

Reference: Reingewirtz Y, Reingewirtz N. New protocol for implant surgery: low speed bone drilling without irrigation. In vivo study concerning 40 implants. Journal of Clinical Periodontology 2006: suppl 7: 120.

PD163 | Satisfaction With Perioperative Care in Patients Subjected to Regional (Local) Anesthesia or Analgo-Sedation in All-on-Four Procedures

D. Gabrić[1], M. Vuletić[1], D. Gerbl[2], I. Smojver[3], L. Marković[4]
[1]School of Dental Medicine, Department of Oral Surgery, Zagreb, Croatia, [2]University Hospital Centre Zagreb, Department of Anesthesiology and ICU, Zagreb, Croatia, [3]St. Catherine Specialty Hospital, Dental Center, Zagreb, Croatia, [4]Private Practice, Pula, Croatia

Background & Aim: To establish the attitude of the respondents towards local anaesthesia (LA) and analgo-sedation (AS), satisfaction after undergoing LA or AS, difference in satisfaction level after LA in contrast to AS and to determine the factors which affect the assessment of the overall anaesthetic management.

Methods: The participants are patients treated at the St. Catherine Specalty Hospital in the period from 1 January to 1 December 2023. The inclusion criterion for participation in the study is a scheduled dental implant procedure in the upper and lower jaw which can be performed under LS or AS. Emergency patients were not included, neither were parturients and persons with cognitive impairments. Relevant data was acquired by means of an anonymous questionnaire.

Results: Out of 30 questionnaires, 30 have been completed. The majority (62.5%) of the respondents was in favour of AS. The respondents rated anaesthetic management satisfaction with assessment marks 4 (24.2%) and 5 (69.2%). After having experienced anaesthesia, 61.7% of the respondents would opt for AS again.

Conclusions: More than 60% of the participants supports AS. Experience and surroundings affect their attitude towards AS and LA. The patients who had prior experience with LA would opt for LA again. More than 90% of the participants expressed a high level of satisfaction regarding anaesthetic management. Access to information about anaesthesia, possibility to participate in the selection of anaesthesia type, psychological support and the occurrence of unwanted events associated with the use of anaesthesia affected the total assessment mark of the overall anaesthetic management.

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

PD164 | Effects of Implant Penetration Inside the Maxillary Sinus

M.H. Azrak[1], Y. Hanine[2], A. Cherkaoui[3], S.M. Song[4]
[1]International University of Rabat, Periodontology, Rabat, Morocco, [2]International University of Rabat, Periodontology, Rabat, Morocco, [3]Mohammed V University, Periodontology, Rabat, Morocco, [4]International University of Rabat, Oral Surgery, Rabat, Morocco

Background & Aim: Implant protrusion into the maxillary sinuses presents a challenge in cases of moderately resorbed maxillae. The aim of this study was to investigate whether dental implant exposure to the maxillary sinus cavity increased the risk of maxillary sinus complications and affect implant survival and success rate.
Methods: 101 implants were inserted into the maxilla of 73 patients who presented with moderately resorbed ridges but no history of sinusitis. We classified the implant penetration depths into two groups (>3 mm and ≤3 mm). Patients were scheduled for follow-up clinical and radiographic examinations after implant placement from 1 month to 9 years.
Results: *Sinus health*: During follow-up, no patients exhibited signs of sinusitis. *Radiographic evaluation*: 2 patients (13%) showed radiographic signs of mucosal thickening of the Schneiderian membrane and they were both in the group who presented a penetration depth >3 mm (3.5 and 4 mm, respectively).
In the group with an implant penetration depth of less than 3 mm, no evidence of mucosal thickening was detected. *Implant health*: The implant success rate was assessed using the modified James–Misch implant quality of health scale:

I. success [optimum health];
II. survival [satisfactory health];
III. survival [compromised health];
IV. failure [clinical or absolute failure].

All implants were classified in Group I, indicating they were in good health, exhibiting no mobility or pain and with less than 2 mm of crestal bone loss. *Patient satisfaction*: All patients were satisfied with their treatment, reported an improvement in their quality of life.
Conclusions: Based on the clinical and radiographic evaluation of the patients in this study we can conclude that protrusion of implants into the maxillary sinuses does not compromise the success or survival rate of the implant nor the health of the sinuses.
However, if the penetration depth is >3mm, the risk of mucus thickening is higher.

PD165 | Biologically-Oriented Alveolar Ridge Preservationat Intact and Compromised Extraction Sites: A Prospective Case Series

M. Pramstraller[1,2], R. Farina[1,2], A. Simonelli[1,2], A. Sclip[1], M. Fracasso[1], R.E. Jung[3], A.N. Zuercher[3], L. Trombelli[1,2]
[1]Research Centre for the Study of Periodontal and Peri-Implant Diseases, University of Ferrara, Ferrara, Italy, [2]Dental Clinic, University Hospital, AUSL Ferrara, Ferrara, Italy, [3]Clinic of Reconstructive Dentistry, Center of Dental Medicine, University of Zurich, Zurich, Switzerland

Background & Aim: The most recent systematic reviews failed to identify a superior approach for alveolar ridge preservation. Also, extraction sockets with compromised buccal bone showed greater dimensional reduction compared to intact sockets. The present study was performed to evaluate the dimensional changes of intact and compromised alveolar sockets undergoing Biologically-oriented Alveolar Ridge Preservation (BARP).
Methods: At extraction sites with intact buccal and lingual walls (I group), BARP consists of socket filling with a collagen sponge up to 4–5 mm from the most coronal extension of the alveolar crest (apical collagen layer) and xenograft particles up to the bone crest (graft layer), followed by socket sealing with a collagen sponge (coronal collagen layer). At extraction sites with compromised buccal and/or lingual alveolar bone walls (C group), BARP was modified by placing an additional collagen sponge between mucoperiosteal flap and the compromised bone wall.
Results: Thirty sockets ($I=15$; $C=15$) were consecutively included in a prospective case series. At 4–5 months following BARP, I and C groups showed a mean reduction in bone width (as clinically assessed with a probe) of 0.7 ± 1.0 mm and 1.0 ± 0.8 mm, respectively, and a mean apical shift in vertical ridge position (as assessed on periapical radiographs) of 0.3 ± 0.7 mm and 0.3 ± 1.4 mm, respectively. Also, a lingual displacement of the buccal soft tissue surface of 0.7 ± 0.3 mm (I group) and 0.9 ± 0.4 mm (C group) was observed by superimposition of digital impressions.
Conclusions: The results of the present study (i) confirm that BARP is an effective option for alveolar ridge preservation, and (ii) suggest that the clinical outcomes observed at intact extraction sites can be maintained even at sites with compromised buccal and/or lingual walls.

PD166 | The Effect of Reusable Drills Debris on Osteoblast's Osteogenic Differentiation—In Vitro Study

Y. Friedlander[1], A. Younes[1], O. Genesin[1], O. Doppelt Flikshtain[1], T. Asbi[1], Y. Mayer[1], E. Gabay[1], H. Zigdon Giladi[1]
[1]Ramabam Health Care Campus, Department of Periodontology, Haifa, Israel

Background & Aim: Previous studies showed residual biologic debris on the surface of reused implant drills following conventional cleaning methods. We assume that residual debris on reusable implant drills decreases osteogenic differentiation of cells.
Methods: There were 2 study groups: Multi-use drills group consisted of 9 drills which were used for 15 operative and cleaning cycles (S7). Single-use drills group consisted of 9 unused drills (XD). SEM-EDS was obtained to evaluate the amount and composition of residual contamination on the drills. Osteogenic differentiation was evaluated by incubating S7 and XD7 drills in osteogenic differentiation medium for two different time points: 10 min and 24 h. Medium without osteogenic

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

supplement served as negative control (NC) and medium with osteogenic supplement without exposure to drills as positive control (PC). Osteosarcoma cells (U2-OS) were cultured with the supernatant from the test and control groups for 21 days. The effect on osteoblastic differentiation was determined after 21 days by Alizarin Red staining which was measured by using Image J software.

Results: SEM-EDS examination revealed that the XD7 drills presented minor carbon contamination, but without biological residues. To the contrary, all S7 specimens were contaminated with organic and unorganic residues despite having undergone 15 consecutive cleanings. The PC group produced statistically higher Alizarin Red staining intensity than the NC group (72.6 ± 38.49 and 1.07 ± 2.145 respectively, $p = 0.0006$). In the XD7 10 min and 24 h staining intensities were 63 ± 55.55 and 97 ± 40.58 respectively, while in the S7 10 min and 24 h staining intensities were 90 ± 41.97 and 97 ± 41.03 respectively, which were all statistically similar to the PC group readings ($p > 0.05$). All XD7 and S7 groups had significantly higher readings when compared to the NC group ($p < 0.01$).

Conclusions: This study shows that mechanical cleaning does not eliminate debris on drills. However, debris presence does not affect the osteogenic differentiation of osteoblasts.

PD167 | Morphological Characterization and Protein Expression of Macrophage Interaction to Polydioxanone Mesh—In Vitro Preliminary Study

A.L. Zonta[1,2], B. Matera[2], I. Gonsales[1], C.E. Melo[1], F. Rossi[3], P. Tambasco[1], D. Palioto[1], B. Ghezzi[2,3]

[1]University of São Paulo – Ribeirão Preto School of Dentistry, Department of OMS and Periodontology, Ribeirão Preto, Brazil, [2]University of Parma, Center of Dental Medicine, Dept. of Medicine and Surgery, Parma, Italy, [3]IMEM, National Council for Research, Parma, Italy

Background & Aim: The use of absorbable and synthetic biomaterials, such as polydioxanone, has shown promising results when evaluating the regenerative process. Biomaterials that allow personalization of physical and mechanical properties are ideal for regulating cell populations during and post-coagulation, consequently favoring regeneration. Macrophages play a critical role as modulator of tissue remodeling. Their polarization into pro-inflammatory (M1) and/or anti-inflammatory (M2) phenotypes is directly influenced by microenvironmental stimuli and implanted biomaterial characteristics. An orchestrated and efficient polarization is essential to achieve functional remodeling. The aim of this study is to characterize the morphology and protein expression of macrophages cultured on 3D polydioxanone mesh in vitro.

Methods: Polydioxanone meshes samples (0.5 mm thick) were prepared and divided into three groups: M0, M1 and M2. THP-1 human monocytic cells were seeded onto the samples and differentiated into macrophages. M1 and M2 groups received cytokine treatments post-differentiation to induce pro-inflammatory and anti-inflammatory polarization, respectively, and were maintained for 72 and 96 h. No stimuli were added to group M0. SEM analysis assessed cell morphology and adhesion to the substrate, while qRT-PCR measured the expression of pro-inflammatory (TNF-a and IL-8) and anti-inflammatory (IL-10 and AGR-2) cytokines/enzymes.

Results: SEM images revealed cells adhering to the mesh surface, penetrating through its interlacing filaments and forming monolayers of juxtaposed cells. The cells exhibit varying degrees of elongation, potentially associated with macrophage phenotypes. qRT-PCR analysis showed that TNF-a, IL-8 and IL-10 expression in M1 is lower than in M0 and M2 at both time points. ARG-2 expression is reduced in M1 at 96 h but higher at 72 h.

Conclusions: This study demonstrates that the polydioxanone mesh is suitable for supporting cell adhesion, penetration and differentiation with controlled expression of pro-inflammatory genes. Therefore, this mesh may be promising for innovative application as a biomaterial able to control the inflammatory process during tissue regeneration.

PD168 | Comparison of Periodontal Ligament–Derived Cell Sheets With Dental Pulp–Derived Cell Sheets for Periodontal Bone Regeneration Utilising Commercial Collagen Membranes: An In Vitro Study

S. Gupta[1], T. Sharma[2], V. Kumar[2], D. Kaur[2], S. Singh Jolly[1], S. Sareen[1]

[1]Post Graduate Institute of Medical Education and Research, Oral Health Sciences Center, Chandigarh, India, [2]Post Graduate Institute of Medical Education and Research, Department of Dermatology, Chandigarh, India

Background & Aim: Stem cell therapy represents a promising new approach that could facilitate the regeneration of lost alveolar bone, positioning regenerative dentistry at the forefront of translating basic scientific research into clinical practice. Guided tissue regeneration (GTR) employs different membranes to create a three-dimensional space between the defect and the root or bone surface, allowing for the repopulation of cells and the regeneration of periodontal ligament and bone tissue. As stem cells have the ability to develop a complete periodontal attachment apparatus, seeding periodontal ligament stem cells (PDLSCs) or Dental pulp stem cells (DPSCs) onto commercially available GTR membranes could enhance the predictability of regenerative therapy by merging the cell-exclusivity of GTR membranes with the osteogenic potential of stem cells. Aim: Fabrication, characterization and comparison of PDLSC sheets and DPSC sheets for periodontal bone regeneration utilising various commercially available membranes.

Methods: PDLSCs and DPSCs from healthy teeth were isolated, characterised (nanog, OCT4, Runx2, Osteocalcin, PPARy and C/EBPα) and seeded as cell sheets onto various commercially available GTR membranes (Bio-Gide, Rapi-Gide, Collprotect, Healiguide). So formed cell sheets were tested for their osteogenic differentiation and potential (RUNX2, OCN, ALP, COL1 and alizarin Red staining).

Results: Applying PDLSCs and DPSCs cell sheets to GTR membranes significantly enhanced the regenerative potential of periodontal therapy. Osteogenic potential of PDLSCs and DPSCs differed significantly, with DPSCs exhibiting greater potency. Additionally, significant differences were observed in the regenerative capacities of commercially available GTR membranes,

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

with Rapi-Gide and Collprotect membranes being more effective at supplying a scaffold for osteogenesis than the other two.
Conclusions: Integrating PDLSCs and DPSCs onto GTR membranes significantly enhances periodontal bone regeneration. Additionally, we found important differences in osteogenic potential between cell types, particularly between pulp and ligament cells, suggesting that the choice of cell source and scaffold can significantly impact regenerative strategies.

PD169 | Radiographical Changes and Wound Healing Evaluation of Dentine Particles With PRF and Collagen Plug in Human Alveolar Ridge Preservation: A Randomised Controlled Trial

F. Kamaruddin[1], F.A. Adam[1], E. Noor[1]
[1]*Universiti Teknologi MARA, Centres of Studies For Periodontology, Sungai Buloh, Malaysia*

Background & Aim: Alveolar ridge preservation (ARP) procedures are crucial for minimizing physiological bone resorption and enhancing bone regeneration, ultimately leading to improved prosthetic and aesthetic results. Various grafting materials, such as autogenous bone, xenografts, and allografts, have been used; however, they present significant drawbacks. Autogenous bone harvesting can increase patient morbidity, while xenografts and alloplasts carry risks of contamination, rejection, infection, and high costs. Dentin particles (DP) obtained from extracted teeth, rich in type I collagen and growth factors like bone morphogenic proteins, offer a promising alternative by stimulating osteogenic cell response and enhancing bone regeneration. Platelet-rich fibrin (PRF) is a natural biomaterial that promotes micro-vascularization and wound healing, while collagen plug (CP) aids in osteogenesis and stabilizes grafting materials. This study aims to evaluate the efficacy of the combined use of DP, PRF, and CP in ARP to improve treatment outcomes.
Methods: Thirty-three mandibular extraction sockets were randomized into three groups. Group A (test group) received a combination of DP, PRF, and CP, while Group B (positive control) was treated with PRF and CP, and Group C (negative control) was left empty. Healing sockets were assessed through clinical by using early healing score after 10 ± 4 days of ARP and three-dimensional radiograph to measure the changes in bone width, bone height and buccal bone thickness after 6 months of ARP.
Results: Group A exhibits the lowest means of bony changes, reflecting notable reduction in bone resorption. Group C demonstrates higher means across most metrics, while Group B stands out in ΔRW3 the coronal bone width changes and ΔBH1 the buccal bone height.
Conclusions: The use of autogenous dentin, along with PRF and CP, represents a promising and safe alternative grafting material, offering potential benefits for clinical and radiological outcomes in alveolar ridge preservation.

PD170 | The Influence of Flap Design on the Relevance of Biomaterials in Regenerative Periodontal Surgery

P. Menhadji[1], N. Kansagra[1], L. Nibali[1]
[1]*Kings College London, Department of Periodontology, London, United Kingdom*

Background & Aim: The aim of this systematic review was to assess whether the benefits of biomaterials in periodontal regenerative surgery are influenced by the type of flap used. This study fills a gap in evidence supporting the advantages of minimally invasive periodontal surgery over conventional access flap surgery for treating intrabony defects.
Methods: Electronic searches on Embase, Medline, and Cochrane were conducted to identify suitable RCTs on periodontal regenerative surgery. The Cochrane Collaboration tool assessed the risk of bias. Papers were categorized by flap design into Access Flap (AF), Papilla Preservation Flaps (PPF), and Single-Flap Variants (SFV). Meta-analyses evaluated the effect of added biomaterials versus controls on probing pocket depths (PPD) and clinical attachment level (CAL), subdivided by flap design.
Results: Of the 1311 papers identified, 522 underwent full-text screening, and 29 were included. In Group 1 (Access Flaps, $n = 6$), the meta-analysis revealed a statistically significant additional effect of biomaterials on improving CAL outcomes at 12 months, with an additional 2.46 mm CAL gain compared to control (95% CI: 0.37–4.56, $p = 0.02$). In Group 2 (Papilla Preservation Flaps, $n = 18$), biomaterials provided a statistically significant benefit compared to PPF alone, with an additional 1.86 mm PPD reduction (95% CI: 0.29–3.42, $p = 0.02$) and 2.15 mm CAL gain (95% CI = 0.59-3.70, $p = 0.01$) at 12 months. In Group 3 (Single Flap Variants, $n = 3$), there was no statistically significant difference between the minimally invasive flap alone and its combination with biomaterials in terms of PPD reduction or CAL gain at 12 months.
Conclusions: This systematic review suggests that SFVs may reduce the need for biomaterials due to their minimally invasive nature. However, the limited number of studies in the SFV group and high heterogeneity are limitations. It is unclear whether flap design alone or adding biomaterials has a greater impact on outcomes like PPD reduction and CAL gain.

PD171 | A Novel Approach of Periodontal Regenerative Procedure for Two Deep Intrabony Defects Between Adjacent Teeth: A Case Report of Modified Entire Papilla Preservation Technique: (MEPPT)

T. Kishimoto[1,2]
[1]*Oita Perio Dental Office, Oita, Japan,* [2]*Nagasaki University School of Dentistry, Nagasaki City, Japan*

Background & Aim: Periodontal regenerative therapy (PRT) has been developed in a few decades due to the flap design and minimally invasive techniques. For instance, Aslan S et al. indicated that the entire papilla preservation technique (EPPT) in the PRT showed clinically significant results for one isolated deep intrabony defect. The EPPT has achieved the outcomes because of not incising interdental areas and minimally invasive techniques. On the other hand, there is no report regarding minimally invasive non-incised papilla technique in RPT for two deep intrabony defects between two neighboring teeth. Therefore, this case report aims to introduce a new technique

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

for treating two areas of deep intrabony defects between adjacent teeth.

Methods: A 46-year-old healthy Asian male was presented to our office. The initial examination revealed 4–14 mm probing depth (PD), 4–15 mm CAL, bleeding on probing (BoP) with severe radiographic bone loss indicating 1–2 wall defect to or beyond the apex of tooth #25/26. The oral hygiene instruction, non-surgical periodontal treatment, and root canal therapy on #25 were performed before the RPT. The MEPPT with a single vertical incision and tunneling from an interdental area to the distal of the adjacent tooth for two deep intrabony defects between teeth was carried out on #25/26 utilized bone graft, enamel matrix derivatives, and resorbable collagen membrane. The tooth was splinted immediately after the surgery.

Results: At the 12-month follow-up, radiographic bone fill was also observed. The prognosis of #25/26 improved from Hopeless to Poor.

	Residual PD (mm)	CAL (mm)
Baseline	7.0	8.08
1-year	2.17	3.92
1-year change	4.83	4.16

Conclusions: The MEPPT may achieve significant PD reduction and CAL gain for two deep intrabony defects between two neighboring teeth in a short-term period.

PD172 | Effective Management of in Trabony Defects in a Young Patient With Molar-Incisor Pattern (MIP) Periodontitis

A. Danesh[1], J. Jaar[1], S. Vardar[1], T. Koutouzis[1]
[1]*Nova Southeastern University, Davie, Florida, United States*

Background & Aim: MIP periodontitis poses many challenges in the field of periodontics. Its pattern of bone loss, while affecting an age-specific population, makes it necessary for early diagnosis and management to prevent further destruction. Emerging evidence has shown promising results in regenerative therapy. The aim of this report is to present a case with MIP periodontitis treated with regenerative therapy.

Methods: A 17-year-old African-American male patient presented to the Periodontics Department at NSU. Initially, the patient underwent scaling and root planning with adjunctive systemic antibiotic therapy. 8 weeks following non-surgical therapy and improvement in motivation and oral hygiene, surgical therapy was initiated, consisting of regenerative procedures including a combination of allograft, rh-PDGF, and collagen membrane on teeth #16, 11, 21, 26, 36, 41, 46. For the lower anterior teeth, a CTG was performed in conjunction with regenerative therapy. Occlusal adjustment and splinting were done to ensure wound stability. The patient was seen for regular follow-ups and periodontal maintenance during healing. Clinical parameters such as PD, CAL, and radiographic evidence of bone regeneration were recorded at baseline and follow-up.

Results: The defects were followed up for an average span of 8.1 months. Overall, the combination of allograft BRG, rh-PDGF and collagen membrane resulted in improvement in all periodontal parameters including pocket depth reduction, clinical attachment level gain, radiographic bone fill, and clinical and radiographic furcation closure. All teeth showed 3–4 mm pockets with presence of no BOP, and complete furcation closure was observed for #26 and #46. Single localized areas on interproximal of #16 showed a residual 5 mm pocket and an interproximal furcation of 1 which will be managed with non-surgical therapy and re-evaluation.

Conclusions: The successful periodontal outcomes indicate the effectiveness of regenerative therapy in treating intrabony defects associated with Molar-Incisor Pattern Periodontitis. Multi-disciplinary collaboration, regular follow-up, and patient compliance are crucial for maintaining longterm results.

PD173 | Periodontal Infrabony Defect Treatment With Platelet-Rich Fibrin Enriched Porcine-Derived Xenograft

D. Lyu[1]
[1]*U-Dental Shenzhen China, Department of Periodontology, Shenzhen, China*

Background & Aim: A 24 year-old female, systemically healthy and non-smoker, complained about tooth migration and loosening. Although non-surgical periodontal debridement 1 year ago, gingival swelling still presented.

Full mouth probing depth (PD) was 7–10 mm and infrabony defects prevailed, migration and moderate mobility detected. Diagnosis was periodontitis (Stage IV, Grade C). Although second time non-surgical debridement reduced bleeding on probing (BOP) from 100% to 42%, in 2 months follow up, deep pockets in molar sites with infrabony defects exhibited limited improvement.

Methods: Three sessions of regenerative surgery were scheduled. After local anesthesia, buccal papilla base and sulcular incisions were made, and mucoperiosteal flaps were reflected. Care was taken to preserve interproximal soft tissue. Meticulous defect (mostly one-wall or two-wall) debridement and root planing were carried out using piezon slim tips and curets, without osseous recontouring.

In each surgery, venous blood was drawn from patient's vein. Twenty-mL was collected in plastic-coating vacutainers to produce liquid fibrinogen, while 10 mL was collected in a glass-coating vacutainer for aggregated PRF. After centrifugation in PRF mode, liquid fibrinogen was aspirated and mixed to 0.25 g porcine-derived xenograft (THE Graft, Purgo). Exudate taken after compression of PRF layer was added, then sticky-bone was formed. Sticky-bone was cut to fit in the infrabony defects. PRF layers were trimmed and placed over the graft. Sutures (6-0 nylon) were applied to close wounds.

Results: Eight month follow-up showed evident bone filled on peri-apical X-ray films. On 3 year reevaluation, PD mainly remained at 2–3 mm. Previous interdental gaps due to migration were closed. BOP was reduced to 4%, with good oral hygiene.

Conclusions: PRF enriched porcine-derived graft for surgical treatment of periodontal infrabony defect could be one of the effective and feasible clinical options.

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

PD174 | Modified Tunnel Technique With and Without EMD for Deep and Narrow Gingival Recession in the Mandibular Anterior Region: A 3-Year Longitudinal Cohort Population-Based Study

C.-M. An[1], J.-H. Lee[1]
[1]*Jeonbuk National University Dental Hospital, Department of Periodontology, Jeonju-si, Republic of Korea*

Background & Aim: This study aimed to evaluate the 3-year predictability and validity of the modified tunnel technique in combination with and without enamel matrix derivative (EMD) for deep and narrow gingival recession defects (GRD) in the mandibular anterior region.
Methods: Thirty-one GRDs were treated with modified tunnel technique in combination with subepithelial connective tissue graft, with ($n=16$) and without ($n=15$) the adjunctive use of EMD. Changes in clinical outcomes, including recession depth (RD), keratinized tissue width (KTW), mean root coverage (MRC), and complete root coverage (CRC), were measured at baseline and at 6 months, 1 year, and 3 years postoperatively. Patient discomfort was assessed using a self-reporting questionnaire, 2 weeks after surgery.
Results: Between both treatment modalities, there were no statistically significant differences observed in clinical parameters, including RD (EMD: −6.47 ± 2.23 mm and non-EMD: −5.10 ± 3.23 mm), KTW (EMD: 1.03 ± 0.96 mm and non-EMD: 1.00 ± 1.02 mm), MRC (EMD: 86.62 ± 21.18% and non-EMD: 80.24 ± 38.73%), and CRC (EMD: 62.5% and non-EMD: 73.3%) at a follow-up of 3 years. In addition, no statistically significant differences were found between the two groups in terms of early and subjective postoperative discomfort, including pain and swelling.
Conclusions: Within the limitations of this study, the modified tunnel technique with or without the adjunctive use of EMD is beneficial for the treatment and maintenance of deep and narrow GRDs.

PD175 | Clinical Evaluation of Periodontal Regenerative Therapy Using Recombinant Human Fibroblast Growth Factor-2 in Combination With Carbonate Apatite Granules: A 1.5-Year Follow-Up Case Series

T. Murakami[1,2], S. Nakane-Koyachi[1,2], E. Suzuki[1,3], K. Imamura[1,4], A. Katayama[1,2], A. Saito[1,4]
[1]*Tokyo Dental College, Department of Periodontology, Tokyo, Japan,* [2]*Yurakucho Dental Office, Private Practice, Tokyo, Japan,* [3]*Suzuki Dental Clinic, Private Practice, Tokyo, Japan,* [4]*Tokyo Dental College, Oral Health Science Center, Tokyo, Japan*

Background & Aim: Combination therapy with signaling molecules and scaffolds is an effective treatment option for periodontal intrabony defect. In Japan, a commercial formulation of 0.3% recombinant human FGF-2 (rhFGF-2) has been clinically used for periodontal regenerative therapy, and carbonate apatite (CO_3Ap) is approved for implant and periodontal treatment as a scaffold. Although the outcomes of various combination therapies on periodontal regeneration have been reported, there are still few reports using rhFGF-2 in combination with CO_3Ap granules. This case series aimed to evaluate the clinical outcomes of periodontal regenerative therapy using rhFGF-2 in combination with CO_3Ap granules for the treatment of intrabony defects.
Methods: Following initial periodontal therapy, six intrabony defects in six patients (Stage III Grade B or C) were treated by combination therapy using rhFGF-2 and CO_3Ap granules. Following the removal of granulation tissue and root planning, 0.3% rhFGF-2 with CO_3Ap granules was applied to the defect. Prior to the application, the rhFGF-2 solution was thoroughly mixed with CO_3Ap granules in a sterile dish. The flap was immediately closed with sutures. Probing pocket depth (PPD), clinical attachment level (CAL), and gingival recession (GR) were assessed at baseline, 6 months, 1 year, and 1.5 years postoperatively. Additionally, radiographic bone fill (RBF) was calculated.
Results: Significant improvements in PPD and CAL from baseline were exhibited at 1 and 1.5 years following surgery. At 1 and 1.5 years postoperatively, these values showed no significant change from 6 months. No postoperative gingival recession was observed at all sites. There was an increase in the radiopacity of the defect after surgery, but RBF values at 1 and 1.5 years showed no significant difference from 6 months.
Conclusions: This case series showed that periodontal regenerative therapy using rhFGF-2 in combination with CO_3Ap granules yielded favorable clinical and radiographic outcomes in the treatment of intrabony defects.

PD176 | Biological Papilla Preservation Technique: Tunnelling Approach for Periodontal Regeneration Surgery

S. Batia[1], P. Vadagnini[1], T. Frieri[1], M. Ghizzoni[1], S. Pieriboni[1], R. Zunino[1]
[1]*Università degli Studi di Milano 'La Statale', Biomedical, Surgical and Dental Sciences, Milan, Italy*

Background & Aim: This study presents an alternative approach to enhance the safe application of the incision-free technique in periodontal tissue regeneration surgery. Maintaining an adequate blood supply is crucial for flap survival, while the stability of the clot is a critical element in wound healing and regeneration. A flap created without incisions, followed by gentle elevation, can improve aesthetic outcomes and minimize scar tissue formation.
Methods: A minimum waiting period of 6 months post-nonsurgical periodontal treatment was ensured before procedure. We employed magnification tools and microsurgical instruments, including mini micro-blades, PTFE 6/0 sutures, mini-five curettes, tunneling tools, and micro alveolar spoons. The gingival biotype is assessed using the Colorvue Probe; this technique is suitable for medium or thick gingiva with interproximal spaces exceeding 2 mm. An incision around the buccal aspect of the tooth adjacent to the defect allows for the elevation of a full-thickness flap of 4 mm and a partial-thickness flap of 3 mm, achieving a tension-free passive flap near the intrabony defect. After removing inflammatory tissue, biomaterials such as dental

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

matrix proteins and bone chips are used for periodontal regeneration. A collagen membrane may be applied for Class I furcation defects. For suturing, a cross-suspended suture is used for thick biotype, while a double-cross suspended suture is preferred for medium biotypes. In furcation cases, two concentric suspended sutures at different peripheral distances may be applied.

Results: The incision-free papillary technique effectively ensures the preservation of blood vessels and the formation of a stable cloth, resulting in finer healing, and immediate postoperative comfort for patients. Enhanced healing of the surgical area was observed 15 days post-operation.

Conclusions: This technique is an effective approach to improve healing in periodontal regeneration, preserving blood supply and magnifying aesthetic outcomes through primary wound closure.

PD177 | Management of Intrabony Defects With the Entire Papilla Preservation Flap (EPP) With a Combination of Porcine Bone Substitute and Hyaluronic Acid

D. Božić[1], E. Marušić[2], A. Labetić[2], A. Badovinac[3], B. Mrak[1], A. Šekelja[3], D. Lipkovac[4]

[1]University of Zagreb, School of Dental Medicine, Department of Periodontology, Clinic for Periodontology, University Clinical Hospital, Zagreb, Croatia, [2]University of Zagreb, School of Dental Medicine, Department of Periodontology, Clinic for Periodontology, University Clinical Hopital, Zagreb, Croatia, [3]University of Zagreb, School of Dental Medicine, Department of Periodontology, Zagreb, Croatia, [4]University of Zagreb, School of Dental Medicine, University Clinical Hospital, Department of Periodontology, Zagreb, Croatia

Background & Aim: Recently, it has been shown that hyaluronic acid (HA) promotes periodontal regeneration and has positive effects on cementoblasts inducing proliferation and differentiation. Nothing is know about the clinical outcomes when HA is combined with porcine derived xenograft utilizing the EEP approach in intrabony defects.

Methods: 20 patients with 23 IBDs were treated with a combination of HA and deproteinized porcine bone mineral (DPBM). Clinical attachment level (CAL), pocket probing depth (PPD), gingival recession (REC) were recorded at baseline and 1 year after the surgery. All surgical procedures were performed at the Department of Periodontology, School of Dental Medicine, University of Zagreb, between April 2022 and June 2023. Each patient provided written informed consent. The inclusion criteria were: no systemic diseases, non-smoking patients, patients who underwent initial periodontal therapy. Patients had to have at least one IBDs with PPD, CAL ≥6 mm and IBDs ≥4 mm measured on digital periapical radiographs. Following local anesthesia, the defect-associated papillary area was accessed with the EPP flap. Following granulation tissue removal a mixture of HA and DPBS was packed into the IBDs. The flap was repositioned and primary wound closure was achieved with single interrupted suture.

Results: At 1 year, there was a significant CAL gain of 5.04 ± 1.30 mm ($p < 0.001$), PPD reduction of 5.17 ± 1.30 mm ($p < 0.001$), and very little increase in gingival recession (0.22 ± 0.52 mm, $p = 0.059$). The percentage of pocket resolution based on a PPD ≤4 mm was 82.6%. CAL gains were 3mm in 13%, 4 mm in 17.4%, 5 mm in 39.1% and ≥6mm in 30.4% of the cases.

Conclusions: The EPP flap with a combined approach of HA and DPBM resulted in significant CAL gains and PPD reductions after 1 year.

PD178 | Optimising the Microarchitecture and Cytocompatibility of Lyophilised Platelet-Rich Fibrin Biocomposite Scaffold for Alveolar Bone Regeneration

N.A. Ngah[1,2], S.N.F. Mohd Noor[3], G.J. Dias[4], D.C. Tong[5], J. Ratnayake[5], P.R. Cooper[5], H. Mohd Hussaini[5]

[1]Universiti Teknologi MARA, Sg Buloh Campus, Faculty of Dentistry, Sungai Buloh, Malaysia, [2]University of Otago, Sir John Walsh Research Institute, Faculty of Dentistry, Dunedin, New Zealand, [3]Universiti Sains Malaysia, Craniofacial and Biomaterial Group, Advanced Medical and Dental Institute, Kepala Batas, Malaysia, [4]University of Otago, Department of Anatomy, School of Biomedical Sciences, Dunedin, New Zealand, [5]University of Otago, Faculty of Dentistry, Dunedin, New Zealand

Background & Aim: The latest generation of tissue engineering bone scaffolds seeks to improve tissue regeneration by administering bioactive molecules critical for bone growth at the injured areas. Growth factors (GFs) are crucial for alveolar bone regeneration, leading to the formulation of novel GF-based approaches to enhance bone repair. Platelet rich fibrin (PRF) possesses the capability to concurrently distribute a diverse array of bioactive molecules including transforming growth factor beta-1 and platelet-derived growth factors which are essential for bone regeneration as they promote cell adhesion, proliferation, and differentiation.

This study aims to develop novel lyophilised platelet-rich fibrin (LyPRF) biocomposite scaffolds for potential applications in alveolar bone regeneration.

Methods: Collagen (C), bioactive glass (BG), and LyPRF were used to fabricate a C-BG-LyPRF biocomposite scaffold using freeze drying method. The morphological, chemical, mechanical, and cytocompatibility properties of different concentrations of C-BG-LyPRF scaffolds were evaluated using Field Emission Scanning Electron Microscopy (FESEM), Micro-computed tomography (Micro-CT), Fourier transform infrared (FTIR), X-ray diffraction (XRD), compression test and Live/Dead assay.

Results: The combined C-BG-LyPRF at 5 mg is the most optimised scaffold as determined by the physicochemical and mechanical analyses of numerous concentrations of LyPRF in a C-BG scaffold. The lower quantity of LyPRF needed to attain similar physical and mechanical qualities compared to C-BG-LyPRF 10 mg, which necessitates a greater concentration of the material. C-BG-LyPRF 5 mg had the highest mean pore diameter of 146 μm and a compressive strength of 0.0266 MPa. The C-BG-LyPRF scaffold showed cytocompatibility with MC3T3-E1 cells in the Live/Dead assays ranging from 93.2% to 98.9%.

Conclusions: The affirmation results demonstrated that C-BG-LyPRF is a porous material with comparable pore sizes, porosity,

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

chemical composition, and it was shown to be cytocompatible with MC3T3-E1 cells, establishing it as a promising biomaterial for alveolar bone regeneration.

PD179 | Silk Proteins: A Potential New Gen Biomaterial in Guided Bone Regeneration—An In Silico Analysis

L. Ashokkumar[1], R. Sabarish[1], T. Nandhinee[1], S. Balaji[1]
[1]*Sri Ramachandra Dental College and Hospital, SRIHER, Department of Periodontology, Chennai, India*

Background & Aim: Delayed tooth replacement commonly attributes to alveolar ridge defects. Natural biomaterial with enhanced regenerative potential is always sought after as a primary choice for ridge reconstruction. Silk, biopolymers with its constituent proteins (fibroin and sericin) have recently shown promising outcome in vitro. However, the molecular mechanism through which it works is yet to be elucidated. Hence the aim of our study is to assess the molecular interaction and stability between silk proteins with BMP-2 Type IA and Type II receptors using molecular docking and molecular dynamic simulation.
Methods: N-Terminal Domain of Silk Proteins and Structural complex of BMP-2 Type IA and Type II receptors were considered for Protein—Protein Docking. The binding affinity between the proteins were assessed using HADDOCK server and the stability of the interactions were assessed through molecular dynamic simulation using GROMACS. HADDOCK scores are a measure of the predicted stability of the protein-protein complex and lower score indicates more stable complex and a higher affinity for binding.
Results: The HADDOCK scores and Root mean square deviation (RMSD) value for interaction between silk proteins with BMP-2 Type IA and Type II receptor were (−114.2 ± 25.0 and −143.1 ± 11.3) and (2.9 ± 0.4 and 1.9 ± 0.5) respectively for fibroin and (−1.8 ± 15.6 and −9.7 ± 25.2) and (3.5 ± 0.3 and 0.9 ± 0.6) respectively for sericin.
Conclusions: Sericin and fibroin have significant binding affinity with both receptors of BMP-2. In comparison, the interaction between fibroin and BMP-2 receptors were found to be more stable with higher affinity, hence it can be considered as a potential biomaterial in guided bone regeneration.

PD180 | Physicochemical Characterisation and Biocompatibility of Bioactive Glass/Polycaprolactone Membrane for Guided Bone Regeneration

A.N. Arupudin[1], A.H. Norafizal[1], F. Ariffin[2], S.N.F. Mohd Noor[3], N.A. Ngah[4]
[1]*Faculty of Dentistry, Universiti Teknologi MARA, Sungai Buloh Campus, Sungai Buloh, Malaysia,* [2]*Centre of Studies for Periodontology, Faculty of Dentistry, Universiti Teknologi MARA, Sungai Buloh Campus, Sungai Buloh, Malaysia,* [3]*Craniofacial and Biomaterials Group, Advanced Medical and Dental Institute, Universiti Sains Malaysia, Kepala Batas, Malaysia,* [4]*Centre of Studies for Oral & Maxillofacial Surgery, Faculty of Dentistry, Universiti Teknologi MARA, Sungai Buloh Campus, Sungai Buloh, Malaysia*

Background & Aim: Guided bone regeneration (GBR) is crucial for implant therapy, facilitating the development of new bone surrounding dental implants. Composite membranes, which combine the beneficial properties of multiple materials, are beneficial for GBR due to their enhanced mechanical properties, controlled tissue regeneration and ability to provide a stable barrier to non-osteogenic cells. In our study, combining the biocompatibility and osteoconductivity of bioactive glass (BG) with the mechanical qualities and degradability of poly-ε-caprolactone (PCL) provides tailored properties and membrane architecture conducive for GBR. This study aims to develop bioactive BG/PCL composite membrane compatible with periodontal ligament (PDL) fibroblast cells for potential use in GBR applications.
Methods: BG/PCL membranes were fabricated using a solvent-casting method at three different weight percentages (wt.%) ratios (10:90, 20:80, and 30:70). The membrane were characterized using scanning electron microscopy (SEM), Fourier transform infrared (FTIR) spectroscopy, and MTT (3-(4,5-Dimethylthiazol -2-yl)-2,5-Diphenyltetrazolium Bromide) Assay to evaluate their physical, chemical, and biocompatibility properties.
Results: SEM imaging showed surface characteristics that support GBR by enabling effective barrier functionality, cellular occlusion and tissue integration. FTIR spectra exhibited characteristic absorption bands corresponding to the functional groups of BG and PCL components. Furthermore, the biocompatibility test confirmed the viability and proliferation of PDL fibroblast cells cultured with the membrane.
Conclusions: The BG/PCL composite membrane demonstrates strong potential as a GBR membrane for clinical applications in implant therapy. Its optimized bioactivity, stability, and compatibility with PDL fibroblast cells suggest it could improve regeneration outcomes.

PD181 | Impact of Rifampin Pre-Treatment on Bone Graft Resorption in Maxillary Sinus Augmentation

M.S. Yildiz[1]
[1]*Altinbas University, Department of Periodontology, Istanbul, Turkey*

Background & Aim: Rifampin is an antibiotic with highly bactericidal on staphylococcus. This retrospective pilot study aimed to evaluate the impact of xenograft pre-treatment with rifampin versus sterile saline on graft resorption in patients undergoing external sinus lifting.
Methods: Data were collected from 20 patients (7 females, 13 males), with mean ages 49.10 ± 8.70, 43.00 ± 10.93 for the test ($n = 10$) and control ($n = 10$) groups, respectively. Xenograft materials were pre-treated by soaking in rifampin for 5 minutes in test group, while soaked in sterile saline for control group. Panoramic radiographs were used to compare graft surface area immediately post-grafting and after 6-month follow-up period. The actual lengths of the constant landmarks on the panoramic radiograph were input into the computer program, and graft surface area was then calculated.
Results: There was no significant difference between the groups regarding the age ($p > 0.05$). Test group demonstrated an average graft resorption percentage of 5.33 ± 11.74, with a

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

median value of 8.32 (−24.90 to 15.41). In comparison, the control group had an average resorption percentage of 17.60 ± 24.47, with a median of 16.55 (−32.80 to 64.64). A statistically significant difference was found in the percentage changes of graft surface area between the study groups ($p < 0.05$), indicating that pre-treatment with rifampin was linked to reduced graft resorption. Importantly, no signs of infection were noted in any of the patients throughout the follow-up period.

Conclusions: This study suggests that pre-treating xenografts with rifampin for 5 min may enhance graft stability and reduce resorption over a 6-month period compared to sterile saline pre-treatment. Panoramic radiographic analysis confirmed these findings, and the absence of infection symptoms further supports the clinical safety of rifampin use. Larger-scale studies incorporating 'Cone Beam Computed Tomography' imaging for more detailed and accurate assessments of graft resorption are essential to confirm these outcomes and further investigate the underlying mechanisms.

PD182 | Enhancing Bone Healing in Rabbit Premaxillary Defects With 3D-Printed Grafts Stimulating Proteoglycan Activity

E. Dallazen[1], G.d.G. Dias[1], G. Ferreira[1], E. Ervolino[1], A.R. Naqvi[1], J. Shibli[2], L.P. Faverani[1]
[1]FOA-UNESP, Araçatuba, Brazil, [2]Guarulhos University (UnG), Guarulhos, Brazil

Background & Aim: Critical bone defects pose a challenge in oral and maxillofacial surgery. Advancing additive manufacturing is crucial for personalized grafts and fixation materials, customizing treatments to individual needs, and enhancing bone healing. This study investigated the effectiveness of additive manufacturing (AM) for fixation plates and 3D-printed bone grafts in a rabbit model.

Methods: Male rabbits underwent premaxillary osteotomies, then were divided into four groups: conventional plates and screws (PLATES), 3D-printed plates (3D-PRINTED PLATES), custom AM-fabricated bone grafts (GRAFTS), and a combination of both (PLATES+GRAFTS). Pain behavior assessment, mass spectrometry, western blotting, and micro-computed tomography (micro-CT) were performed.

Results: Pain scores decreased over time with no inter-group differences ($p > 0.05$). Mass spectrometry identified 120 proteins and 63 of them were higher expressed in test groups ($p < 0.05$). Bone-related proteins were higher in test groups, validated by western blotting ($p < 0.05$). Proteoglycans such as decorin and biglycan showed significant expression variations, indicating their role in bone repair and extracellular matrix restructuring. Micro-CT analysis revealed higher bone volume (BV/TV) and improved trabecular bone (Tb) parameters (number and thickness) in groups with AM-produced materials (3D-PRINTED PLATES and PLATES+GRAFTS) compared to the control group ($p < 0.05$).

Conclusions: Overall, this study demonstrates the potential of additive manufacturing techniques in enhancing bone healing outcomes and elucidates the functions of proteoglycans in bone repair. These findings provide valuable insights for developing innovative strategies in regenerative medicine for bone defects.

PD183 | Surgical Therapy for Peri-Implantitis Using Deproteinized Bovine Bone Mineral With 10% Collagen, Enamel Matrix Derivative and Doxycycline—A Prospective 10-Year Implant Survival Cohort Study

T. Mercado[1], S. Ivanovski[2]
[1]University of Otago School of Dentistry, Department of Oral Sciences, Dunedin, New Zealand, [2]University of Queensland, School of Dentistry, Brisbane, Australia

Background & Aim: To evaluate the 10-year implant survival outcome of surgical management of peri-implantitis with crater-like bone defect by combination of deproteinized bovine bone mineral with 10% collagen (DBBMC), enamel matrix derivative (EMD) and Doxycycline powder (BED).

Methods: The original population consisted of 30 patients with peri-implantitis (BoP/suppuration), probing depth > 4 mm, minimum radiographic bone loss of 20%, at least 2 years in function (Mercado et al., Clin Oral Implant Res, 2018; 29:583–591). Following surgical access and debridement, the implant surfaces were decontaminated with 24% EDTA for 2 min, the bone defects were filled with BED cocktail. The defects were covered with connective tissue grafts where necessary. All the patients were enrolled in an individualised supportive periodontal and implant therapy (SPIT) program.

Results: 29 patients reached the 10-year review period (96.6 % survival rate). During SPIT, 12 implants needed further antibiotic therapy, and one implant had to be removed. PD was reduced from 8.90 ± 1.9 to 3.06 ± 0.98 mm and the percentage bone loss reduced from 57 ± 16.5 to 13 ± 2.5 after 10 years. There were no statistically significant differences in the clinical parameters measured at the 5th and 10th year. 60% of the implants were considered successful (Successful Treatment Outcome Criterion: PD < 5mm, no further bone loss > 10%, no BoP/suppuration, no recession greater than 0.5 mm for anterior implants) after 10 years.

Conclusions: The surgical management of peri-implantitis using the BED cocktail followed by personalised SPIT, resulted in high survival rate of peri-implantitis affected implants. The benefits of this protocol incorporating EMD and xenograft should be tested in multi-centre randomized clinical trials.

PD184 | Elastin-Like-Recombinamer Membranes (ELRs) Lead the Formation of New Bone in Critical Size Calvarial Defects in a Rabbit Model

V.P. Koidou[1], S. Elsharkawy[2], A. Mata[3], S. Shahdad[1]
[1]Queen Mary University of London, ITI Scholarship Centre, London, United Kingdom, [2]King's College London, Centre for Oral, Clinical, and Translational Sciences Faculty of Dentistry, Oral & Craniofacial Sciences, London, United Kingdom, [3]University of Nottingham, School of Pharmacy, Division of Regenerative Medicine and Cellular Therapies Department of Chemical and Environmental Engineering, Nottingham, United Kingdom

Background & Aim: Elastin-like-recombinamer membranes (ELRs) have been developed with the aim to control the apatite nucleation and hierarchical growth and mimic the structural

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

hierarchical features of hard tissues, such as bone. The aim of this in-vivo study was to assess the effectiveness of ELR in bone fill of critical size calvarial defects.

Methods: Thirteen New Zealand rabbits were used and four circular cranial defects of critical size (7 mm) were created on each calvarium where test membranes (non-mineralized ELR [D0], mineralized ELR for 1 day [D1], mineralized ELR for 2 days [D2], mineralized ELR for 8 days [D8]) and two controls (C− empty defect, C+ collagen membrane) were implanted using the Latin Square design. The rabbits were sacrificed at 4 weeks and analysis was performed using histology and micro CT to determine bone mineral density and bone volume.

Results: MicroCT results suggested similar bone mineral density for all test and control groups, whereas a trend for superior bone volume gain was observed for D2 ELR membranes. Histologically, new bone grew by intramembranous ossification from both defect sides and was mostly trabecular woven bone. In control defects, minor bone regeneration was observed, growing discontinuously from the peripheral cranial bone admixed with soft tissue proliferation. In the ELR membrane sites, there was additional bone re-growth consisting of a thin woven bone layer at the top of the cranial defect arranged beneath and parallel to the membrane.

Conclusions: In a rabbit model 4 weeks after implantation ELR membranes promote bone fill of critical-sized calvarial defects, forming a bone bridge connecting the defect margins and running in parallel to the ERL membrane.

PD185 | A Novel Bilayer Polycaprolactone/Silk Fibroin/Strontium Carbonate Nanofibrous Membrane for Guided Bone Regeneration: Histological Evaluation of Subcutaneous Tissue Reactions in Rabbits

L. Kheiri[1], A. Golestaneh[2], M. Mehdikhani[3], S.M. Razavi[4], N. Etemadi[5]

[1]Dental Research Center, Dental Research Institute, School of Dentistry, Isfahan University of Medical Sciences, Isfahan, Iran, Republic of Islamic, [2]Department of Oral and Maxillofacial Surgery, School of Dentistry, Islamic Azad University, Isfahan (Khorasgan) Branch, Isfahan, Iran, Republic of Islamic, [3]Department of Biomedical Engineering, Faculty of Engineering, University of Isfahan, Isfahan, Iran, Republic of Islamic, [4]Department of Oral and Maxillofacial Pathology, Dental Implants Research Center, School of Dentistry, Isfahan University of Medical Sciences, Isfahan, Iran, Republic of Islamic, [5]Department of Materials Engineering, Najafabad Branch, Islamic Azad University, Isfahan, Iran, Republic of Islamic

Background & Aim: The selection of appropriate biomaterial for guided bone regeneration is challenging. The blending of polymers is a simple method to retain their characteristics and to compensate for the drawbacks of each component. The release of Sr^{+2} (Strontium) ions from the Polycaprolactone/Strontium carbonate (PCL/SrC) nanocomposite is the main reason of enhanced osteogenesis. The most important reasons of clinical failure after using biomaterials include infections and lack of tissue-integration. Modifications of Silk fibroin (SF) based membranes improved new bone formation in animal studies without inflammatory reaction. The aim of the present study was to compare biological response of the subcutaneous connective tissue to a novel bilayer PCL (60 wt%)/SF (20 wt%)/SrC (20 wt%) membrane to a commercially available collagenous membrane.

Methods: Eighteen male New Zealand rabbits were randomly divided into three groups and all received subcutaneously the following materials: novel bilayer membrane, commercial membrane and empty defect as control group which were tested after 7, 14, and 28 days. The type and severity of inflammation, granulation tissue, and fibrous tissue were assessed.

Results: The connective tissue surrounding the implanted samples of each group exhibited the presence of similar cells close to the control groups. Statistical analyses showed no significant differences between the specimens in each time period.

Conclusions: In general, the novel bilayer nanocomposite membrane was a biocompatible material and produces a similar subcutaneous response compared to commercially available membrane. Besides, it demonstrated promise for guided bone regeneration technique for treating the osseous defects of oral and maxillofacial region.

PD186 | The Effects of Dentin Matrix Derivatives on Gingival Fibroblast

A. Dalesis[1], T. Schoenmaker[1]

[1]Academic Centre for Dentistry Amsterdam, ACTA, Department of Periodontology, Amsterdam, Netherlands

Background & Aim: Demineralized dentin grafts, derived from extracted teeth, have shown promise as bone graft materials that facilitate bone regeneration. This study explores the impact of dentin grafts on the osteogenic differentiation of gingival fibroblasts (GFs), which possess the ability to differentiate into osteoblast-like cells. This study hypothesizes that proteins present in dentin grafts will promote the differentiation of GFs into osteoblast-like cells.

Methods: Gingival fibroblasts were isolated from four donors. Dentin was pooled from intact teeth and ground to powder in the form of powdered dentin derivatives of demineralized dentin matrix (DDM) or ground dentin without demineralization (GD). DDM and GD were incubated in medium for 1 week to generate conditioned medium. Subsequently, GFs were cultured for 3 weeks with conditioned medium or in direct contact with powdered dentin derivatives, DDM or GD. Normal culture medium served as controls, and all conditions were cultured without or with osteogenic medium. Osteogenesis was evaluated through morphological assessment via light microscopy, Alizarin Red staining, and quantitative PCR on osteogenic and inflammatory genes.

Results: DDM presence resulted in cell death for cultures due to unknown reasons. Osteogenic medium and dentin derivatives showed signs of osteogenic differentiation and no signs of inflammatory response, as indicated through absence of inflammatory gene expression. Alizarin Red staining was evident in the presence of osteogenic inducers and to a lesser extent, in cultures with GD. qPCR results indicate that expression of osteogenic genes, collagen type 1, and alkaline phosphatase, increased in the presence of osteogenic medium and occurred in

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

cultures with only the dentin derivatives, although to a lesser extent in cultures with osteogenic medium.
Conclusions: Dentin graft proteins seem to induce or potentially accelerate this process, without creating an inflammatory response. These preliminary results are promising for using dentin grafts and gingival fibroblasts as a safe and effective material in bone regeneration procedures.

PD187 | Molar-Incisor Hypomineralization and Periodontitis in Adolescents: A Population-Based Study

C.M. Coelho Alves[1], M.M. Pereira Franco[2], L.L. Costa Ladeira[3], M.A. Brondani[4], E.B. Abreu Fonseca Thomaz[2], C.C. Costa Ribeiro[2]
[1]Federal University of Maranhao, Dentistry II, Sao Luis, Brazil, [2]Federal University of Maranhao, Graduate Program in Dentistry, Sao Luis, Brazil, [3]Ceuma University, Post-Graduate Program in Dentistry, Sao Luis, Brazil, [4]University of British Columbia, Division of Dental Public Health, Vancouver, Canada

Background & Aim: Individuals with MIH exhibit altered immune responses, leading to increased tooth sensitivity, challenges in oral hygiene maintenance, and dysbiosis in oral biofilm, all indicative of periodontitis. We investigate the association between MIH and Periodontitis in adolescents.
Methods: A population-based study of Brazilians aged 18 and 19 ($n = 2515$). MIH was assessed according to Ghanim's criteria. The outcomes were *Periodontitis Indicators*, a continuous latent variable estimated through the common variance shared by indicators Bleeding on Probing (BoP), Probing Pocket Depth (PPD ≥4 mm), and Clinical Attachment Level (CAL ≥3 mm) and periodontitis cases (CDC-AAP). The adjustment was made for lower socioeconomic status, sex, tabagism, triglycerides/high-density lipoprotein (TG/HDL) (mg/dL), and visible plaque index (VPI). The model was analyzed using Structural Equation Modeling. As sensitivity analyses, at the individual level, regression models analyzed MIH and periodontitis (CDC/AAP), and at the tooth level, the mean CAL and PPD in molars affected or not by MIH were compared. A multilevel analysis was also developed to test the association between MIH and *Periodontitis Indicators* (CAL and PPD) at the tooth level, adjusted for other tooth-level and individual-level variables.
Results: The prevalence of MIH was 16.86% ($n = 423$). The prevalence of periodontitis, according to CDC-AAP, was 34% ($n = 828$). Individuals with MIH had higher values of *Periodontitis Indicators through* a direct pathway (Standardized Coefficient [SC] = 0.193, $p < 0.001$) and indirectly mediated by biofilm (SC = 0.263, $p < 0.001$). MIH was also associated with periodontitis (according to CDC-AAP [SC] = 0.071, $p < 0.001$) and indirectly mediated by biofilm (SC = 0.344, $p < 0.001$). Consistently, lower socioeconomic status, sex, TG/HDL, and biofilm were associated with both periodontal outcomes. The tooth-level sensitivity regression analyses confirmed the association observed in individual-level principal analyses.
Conclusions: Our findings suggest MIH-affected adolescents are prone to periodontitis. It is essential to monitor their periodontal health.

PD188 | Gingival Thickness Estimation by Artificial Intelligence on Clinical Photographs: A Diagnostic Accuracy Study

A. Gürkan[1], B.F. Uysal[1], B. Yılmaz[1], M. Akçay[2], E. Sezer[2]
[1]Ege University Faculty of Dentistry, Department of Periodontology, Izmir, Turkey, [2]Ege University Faculty of Engineering, Department of Computer Engineering, Izmir, Turkey

Background & Aim: This study introduces an innovative, non-invasive approach for assessing gingival thickness (GT) and gingival phenotype (GP) using deep learning techniques. The research hypothesizes that AI can accurately estimate GT and GP from clinical photographs through a machine learning process, achieving a high level of concordance between virtual predictions and clinical measurements.
Methods: The data set were established on 180 photographs captured from maxillary centrals, laterals and canines using a digital camera. Photographs were transferred to an editing software and each image was cropped to include both the papillary and keratinized gingiva. GT was measured by transgingival probing using an endodontic file. Leveraging the DinoV2-Small backbone, the model predicted GT and GP from clinical photographs processed with a series of targeted augmentations-randomized adjustments in image sharpness and rotations across both horizontal and vertical axes-intended to enhance the model's robustness and generalizability. Following this preprocessing stage, the images were fed into the DinoV2 backbone, where they passed through a two-layered regression module specifically designed for this task. Model performance was rigorously evaluated using Mean Squared Error (MSE), Mean Absolute Error (MAE) and Mean Absolute Percentage Error (MAPE) metrics, providing a comprehensive assessment of the model's predictive accuracy and reliability in a clinical setting.
Results: The model estimated the GT with a deviation of 0.185 mm (MAE = 0.185, MSE = 0.059, MAPE = 0.147). The GP estimation resulted in a 90% accuracy and F1 score of 0.98.
Conclusions: The findings of this study demonstrate that the estimation of GT and GP from clinical photographs using AI presents a reliable, efficient, and precise approach. Future research leveraging larger, more diverse datasets could significantly improve the robustness and generalizability of the AI models. The proposed AI-driven method holds substantial promise as a scalable and objective tool for gingival phenotype assessment, with potential implications for its integration into predictive diagnostics and personalized oral medicine.

PD189 | A Cross-Sectional Retrospective Study on Age-Related Periodontal Bone Loss Using Electronic Health Record: Is the Association Linear?

F. Fahimipour[1], L. Nguyen[2], N.C. Geurs[3], M.L. Geisinger[1]
[1]University of Alabama School of Dentistry, Department of Periodontology, Birmingham, Alabama, United States, [2]Private Practice, Redding, California, United States, [3]University of Alabama School of Dentistry, Dean, Birmingham, Alabama, United States

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Background & Aim: While aging is often associated with a higher incidence of oral and systemic diseases, such findings may be associated with an increased in cumulative risk factors or age-related conditions on the body. Periodontitis prevalence is known to rise with age. This study investigates age-related periodontal bone loss and its associations with self-reported medical conditions. While age is a recognized risk factor, the study explores whether bone loss progresses linearly with age or intensifies as age increases.
Methods: Electronic health records (EHR) of 2000 patients who received a comprehensive oral exam and bitewing radiographs at the University of Alabama at Birmingham (2014–2022) were reviewed. After excluding patients with incomplete charts or lack of posterior support, 815 patients aged 15–64 remained. Radiographic bone loss, self-reported height, weight, and medical history were assessed in ten five-year age cohorts. Bone loss >2.5 mm from the cemento-enamel junction was analyzed for associations with systemic conditions, including diabetes, hypertension, and tobacco. Measurements were validated using MiPACS Image Analysis.
Results: Results indicated that individuals aged 45–49 were 2.5 times more likely to exhibit radiographic bone loss than those aged 30–34, and those aged 50–54 showed a 4.6-fold increase in risk compared to younger cohorts. Patients with a history of vaping had an odds ratio (OR) of 1.8 (95% CI: 0.7–5.1) for bone loss, while those with depression and penicillin allergy had OR of 2.1 and 2.0, respectively. Notably, 31.6% of patients with bone loss reported smoking, and 34.6% reported hypertension, compared to 20.1% and 15.5% of patients without bone loss ($p<0.05$).
Conclusions: This study provides essential baseline data on bone loss within Alabama's population. By identifying age-specific risk factors and the influence of comorbidities on alveolar bone loss, this research aligns with personalized and predictive (P4) medicine principles, supporting more targeted approaches to patient care and improved outcomes.

PD190 | Multi-Center Validation of a Clinical Knowledge-Guided and AI-Based Hybrid Classification Network for Periodontitis Stages II–IV Screening in Panoramic Radiographs

Y. Li[1], X. Wu[1], L. Marini[2], G. Pelekos[3], A. Pilloni[2], K. Deng[3], L. Mei[4], Z. Cui[4], H. Lai[1], D. Shen[4], M. Tonetti[1]
[1]Shanghai Ninth People's Hospital, Shanghai Jiao Tong University School of Medicine, Institute of Integrated Oral, Craniofacial and Sensory Research and Department of Oral and Maxillofacial Implantology, Shanghai, China, [2]Sapienza University of Rome, Department of Oral and Maxillofacial Sciences, Roma, Italy, [3]The University of Hong Kong, Periodontology and Implant Dentistry, Hong Kong, Hong Kong, SAR of China, [4]Shanghai Tech University, School of Biomedical Engineering & State Key Laboratory of Advanced Medical Materials and Devices, Shanghai, China

Background & Aim: The development of artificial intelligence-driven approaches for periodontitis detection is of considerable importance. We have developed an AI-based system—Hybrid Classification Network (HC-Net) for stage II–IV periodontitis screening in orthopantomogram (OPG). While promising, further pre-training and external test of the network are needed to fully optimize and evaluate its performance.
Methods: The HC-Net was initially pre-trained and fine-tuned to obtain HC-Net Plus. Both HC-Net and HC-Net Plus were then externally validated using OPG images verified by periodontal clinical examinations from consecutive patients at Shanghai Ninth People's Hospital Pudong Clinic. Their performance was compared with that of six dentists of different experience levels, who reviewed each OPG image twice with a 2-week washout period. Tooth-level predictions were assessed, and heat maps were generated to visualize HC-Net Plus's areas of focus for interpretability. Additionally, OPG images from real-world datasets without periodontal clinical examinations were used to further evaluate HC-Net Plus against an expert panel. Performance was measured by AUROC, sensitivity, and specificity.
Results: 10,400 unlabeled OPG images were used for pre-training. The external and real-world datasets consisted of 382 and 760 cases, respectively. The HC-Net plus achieved a higher patient-level diagnostic AUROC of 0.942 (95% CI 0.914–0.968) than the HC-Net in the external dataset. HC-Net plus also showed better sensitivity and specificity than dentists of different experience. HC-Net plus achieved a AUROC of 0.91 (95% CI 0.898–0.921) for tooth-level diagnostic accuracy and high consistency was observed between the periodontitis stages II–IV tooth identified in the classification activation heat maps and clinical examination (external test: 92.7%). In the real-world datasets, HC-Net plus achieved acceptable accuracy with an overall AUROC of 0.902 (95% CI 0.875–0.926).
Conclusions: This HC-Net plus demonstrated strong clinical potential for stage II-IV periodontitis detection in OPG image. Further validation is required to establish this approach as a screening tool for diverse populations globally.

PD191 | The Impact of E-Cigarette use on Periodontal Health: A Systematic Review and Meta-Analysis

R. Tattar[1], J. Jackson[2], R. Holliday[2]
[1]The University of Sheffield, The School of Clinical Dentistry, Sheffield, United Kingdom, [2]Newcastle University, School of Dental Sciences, Newcastle, United Kingdom

Background & Aim: Electronic Nicotine Delivery Systems (ENDS) are a popular alternative to traditional tobacco smoking. Aim: To evaluate the effect of ENDS use on periodontal health.
Methods: A protocol was published in accordance with PRISMA guidelines (PROSPERO ID: CRD42024496560). Subjects with periodontal health, gingivitis, and periodontitis were included. Reviews, case reports, letters, abstracts, narratives, and expert opinions were excluded. Databases searched included PubMed, Embase, Web of Science, CINAHL Plus, and Dentistry & Oral Sciences Source up until February 2024. Primary outcomes included changes in periodontal clinical parameters, while secondary outcomes were PROMs, microbiological changes, and biological markers. Risk of bias (RoB) was evaluated using the Newcastle-Ottawa Scale, ROBINS-I, and RoB 2 tools. Meta-analysis was performed using RevMan with subgroup analysis for confounding from tobacco smoking.

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Results: Forty eligible studies were included. Smokers had poorer clinical outcomes than ENDS users and non-smokers/former smokers, apart from bleeding on probing (BOP) and gingival indices (GI). BOP and GI were significantly lower in ENDS users compared to non-smokers/former smokers (BOP: Mean Difference [MD] −11.03, 95% CI −15.37 to −6.69; GI: Standardized Mean Difference [SMD] −6.56, 95% CI −9.26 to −3.86). There was no evidence of a difference between ENDS users and non-smokers/former smokers in markers of periodontal destruction including periodontal probing depths (MD 0.32, 95% CI −0.27 to 0.92) and marginal bone loss (Distal: SMD 0.80, 95% CI −0.50 to 2.11; Mesial: SMD 1.10, 95% CI 0.01–2.19). ENDS users had significantly higher plaque scores than non-smokers/former smokers (SMD 1.57, 95% CI 0.74–2.41). ENDS use leads to unique microbial changes compared to tobacco smokers and higher pro-inflammatory markers compared to non-smokers/former smokers.
Conclusions: Within the limitations of high-bias studies, we found evidence that ENDS use had some impact on periodontal parameters compared to non-smokers/former smokers, with tobacco smokers having the worst outcomes.

PD192 | Identifying Proteomic Salivary Biomarkers of Periodontitis Using Label-Free Quantification Acquisition Modes: Carbonic Anhydrase 1 as a Potential Biomarker

M. Vignon[1], S. Coppens[2], L. Fichter[3], J. Kindermans[3], N. Pradeilles[3], P. Bousquet[4], V. Orti[4], J. Vialaret[3], S. Lehmann[5], D. Deville De Periere[5], C. Hirtz[5]
[1]University of Montpellier/Hospital Center of Montpellier/Montpellier Institute of Neuroscience, Periodontology, Montpellier, France, [2]University of Montpellier/Clinical Proteomic Platform, Montpellier, France, [3]Clinical Proteomic Platform, Hospital Center of Montpellier, Montpellier, France, [4]University of Montpellier/Hospital Center of Montpellier, Periodontology, Montpellier, France, [5]University of Montpellier/Hospital Center of Montpellier/Montpellier Institute of Neuroscience, Montpellier, France

Background & Aim: Periodontitis biomarkers are essential for early diagnosis and prognosis, enabling a 'personalized periodontology' approach to be adopted. Nowadays, no biomarker is sufficiently sensitive and specific for universal clinical use, which is why biomarker research is still ongoing. Thanks to the use of new high-throughput mass spectrometry methods using label-free quantification (LFQ), we aimed to identify new biomarkers for the diagnosis of periodontitis in saliva in order to improve patient management.
Methods: To contribute to the discovery of new biomarkers of periodontitis, we compared the salivary protein profiles of 16 periodontitis patients (PG) and 7 healthy subjects (HG), using label free quantification mass spectrometry with different acquisition modes. Clinical measurements, proteomic data and bioinformatics tools were combined to identify protein profiles specific to periodontitis and to explore their links with its etiopathogenesis. Orthogonal validation by ultrasensitive immunoassay was also applied to the main results.
Results: Among the acquisition modes tested, results obtained in DDIA were the most robust, with a lower proportion of missing values and a homogenous protein expression distribution after normalization and imputation steps. All acquisition methods tested showed a significant increase in carbonic anhydrase 1 (CA1) levels in PG group ($Q = 0.000307$), which was validated by an ultrasensitive immunoassay ($p = 0.0325$). Other proteins showed significantly different levels, particularly hemoglobins, all of which were significantly increased in PG group. Overall, the data identified altered molecular functions, such as oxygen uptake and endopeptidase inhibitory activity, and promoted biological processes such as stress response, catabolic process, immune system process and stimulus response regulation.
Conclusions: Our novel approach allowed us to identify CA1 as a potential periodontitis biomarker in saliva. This latter could be added to the currently available panel of biomarkers in order to improve the diagnostic performance of a future salivary test. Additionally, the identified molecular mechanisms suggest future directions for periodontal treatment strategies.

PD193 | Translation and Validation of the Adapted Self-Reported Oral Health Questionnaire (SROH) for Periodontitis Screening Among Malaysian Adults

J. Lawrence[1], A.H. Kherul Anuwar[2], N.A. Baharuddin[1]
[1]University of Malaya, Department of Restorative Dentistry, Faculty of Dentistry, Kuala Lumpur, Malaysia, [2]University of Malaya, Department of Community Oral Health & Clinical Prevention, Faculty of Dentistry, Kuala Lumpur, Malaysia

Background & Aim: Periodontitis is a globally prevalent disease, yet an instrument for population-wide screening remains elusive. Self-reported questionnaires hold promise as rapid, accessible, and non-invasive screening tools for the disease surveillance. To translate the adapted Self-reported Oral Health Questionnaire (SROH) and to evaluate its validity and reliability as a screening tool for periodontitis among Malaysian adults.
Methods: The study was conducted in two parts. First, the adapted SROH was translated into Malay by independent experts using a forward-backward translation process. Then, the validity and reliability of the translated adapted SROH (M-SROH) were evaluated. Content validity was established through review by six experts, while face validity was assessed by self-administering the questionnaire to 10 participants from the target population. The internal consistency and construct validity of the questionnaire were tested in a pilot study of 90 participants from the Primary Care Unit at the Faculty of Dentistry, Universiti Malaya. The concurrent validity of the M-SROH, including sensitivity, specificity and the area under curve (AUC), was determined against a full mouth periodontal examination of 18 patients.
Results: Both content and face validation were deemed acceptable, with item-level and scale-level indices exceeding the cut-off of 0.83. The M-SROH demonstrated excellent concurrent validity, with a sensitivity of 100%, specificity of 85.7% and an AUC of 0.994. A weighted screening score for periodontitis based on the self-reported oral health items was developed. The internal consistency was moderate with Cronbach's alpha value

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

of 0.64. Exploratory factor analysis revealed two items that had low factor loadings below 0.3, suggesting removal from the questionnaire.
Conclusions: The M-SROH shows promise as a non-invasive and cost-effective community screening tool for periodontitis among Malaysian adults. To strengthen the validity and generalisability of the M-SROH, a validation study involving a representative sample of the general Malaysian population is warranted.

PD194 | Sexual Dimorphism in Periodontal Inflammation: A Cross-Sectional Study

A. Simonelli[1,2], L. Trombelli[1,2], C. Tomasi[3], E. Ioannidou[4], R. Farina[1,2]
[1]Research Centre for the Study of Periodontal and Peri-Implant Diseases, University of Ferrara, Ferrara, Italy, [2]Operative Unit of Dentistry, University-Hospital of Ferrara, Ferrara, Italy, [3]Institute of Odontology, Sahlgrenska Academy at the University of Gothenburg, Periodontology, Gothenburg, Sweden, [4]School of Dentistry, University of California, Orofacial Sciences, San Francisco, California, United States

Background & Aim: The purpose of the present study was to evaluate the role of sexual dimorphism (SD) in the clinical manifestation of plaque-induced periodontal inflammation by analyzing the association between patient-related factors and the full-mouth prevalence of bleeding on probing (BOP%) within two cohorts of male and female individuals.
Methods: Data on BOP (dichotomously recorded as present/absent after the assessment of probing depth, PD) were retrospectively obtained from the files of adult patients undergoing a first periodontal visit at a University center. Two multiple regression models (one for males, one for females) were built with BOP% as the dependent variable and patient-related factors (i.e., age; smoking status; daily cigarette consumption; history of diabetes diagnosis; number of teeth present; proportion of sites with PD ≥ 5 mm around teeth) as independent variables.
Results: In males ($n = 212$), BOP% was 5.9% lower in smokers compared to non-smokers ($p = 0.021$). In females ($n = 389$), BOP% increased by 1.6% for each 10-year increase in age ($p = 0.046$). The proportion of sites with PD ≥ 5 mm showed a strongly significant, positive association with BOP% irrespective of biological sex ($p < 0.001$).
Conclusions: SD manifested as a sex-dependent diversity in the association between patient-related factors and periodontal inflammation expressed as BOP%. While smoking determined a lower BOP% only in males, aging was associated with increased BOP% only in females.

PD195 | Evaluation of Prognostic Tools on Dental Survival

A. Sarbacher[1], S. Sbalchiero[1], P.-Y. Gegout[1], C. Petit[1], O. Huck[1]
[1]Université de Strasbourg, Faculty of Dentistry, Department of Periodontology, Strasbourg, France

Background & Aim: Periodontitis is a chronic, multifactorial inflammatory disease associated with dysbiotic biofilm and characterized by the progressive destruction of periodontal tissue support, resulting in tooth loss. Predicting whether periodontally involved teeth can be retained over the long term is crucial for treatment planning in periodontitis patients. This retrospective study aims to evaluate the prognostic performance of 4 dental prognostic tools on the ability to predict periodontal-related tooth loss.
Methods: Data were retrieved retrospectively from patients who were treated for periodontitis (Department of Periodontology, Dental Faculty, Strasbourg). Medical history and smoking status, periodontal status, radiographic examination were retrieved from T0 (initial consultation) and from the last maintenance visit (T1). 4 tooth-level prognostic systems were compared. Areas under the curve (AUC) were used to assess the predictive ability of the different tool prognosis systems. The ROC curves were calculated using the XLSTAT statistical software.
Results: Data from 203 patients with 5055 teeth, followed for an average period of 5.48 years ± 0.61 years (5–7 years), were evaluated according to the 4 different tooth-level prognosis systems. Initially, 2462 maxillary teeth and 2593 mandibular teeth were present. A total of 320 teeth (6.3%) were lost during the follow-up period; 172 (53.75%) were for periodontal reasons. All prognostic systems used were able to stratify the risk of periodontitis-related tooth loss and had excellent predictive ability for the risk of periodontitis-related tooth loss at long-term (Nunn OR = 65.11; McGowan OR = 30.73; PRS OR = 56.03; Faggion OR = 43.77).
Conclusions: Patient (smoking, diabetes) and tooth-related factors (furcation involvement, increased probing depth, mobility) influence the prognosis of tooth retention at long-term. All prognostic systems at the dental level showed excellent predictive capacity for the risk of tooth loss linked to periodontitis. Overall, Nunn's system was the most discriminating.

PD196 | Evaluation of the Diagnostic Accuracy of ChatGPT 4o According to the 2017 Classification of Periodontal Diseases

A. Muhterem[1], A. Dikilitaş[1], F. Akkoca[2], M.E. Arayici[3], A. Akcali[1,4,5]
[1]Dokuz Eylul University, Faculty of Dentistry, Department of Periodontology, Izmir, Turkey, [2]Dokuz Eylul University, Faculty of Dentistry, Department of Clinical Sciences, Division of Oral, Dental, and Maxillofacial Radiology, Izmir, Turkey, [3]Dokuz Eylul University, Faculty of Medicine, Department of Basic Medical Sciences, Division of Biostatics and Medical Informatics, Izmir, Turkey, [4]Dokuz Eylul University, Institute of Health Sciences, Department of Dental Biomaterials, Izmir, Turkey, [5]Queen Mary University of London, Barts and The London School of Medicine & Dentistry, Institute of Dentistry, Centre for Oral Clinical Research, London, United Kingdom

Background & Aim: To evaluate the ability of ChatGPT 4o to stage and grade periodontitis according to the 2017 classification of periodontal diseases.
Methods: From the university hospital database, sagittal sections of the tooth with the greatest bone loss obtained from cone-beam computed tomography (CBCT) images were analyzed by ChatGPT 4o. Reference points on the cementoenamel junction, tooth apex, and bone levels were introduced to the

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

AI. Parameters considered for stage and grade assessment, including several teeth lost due to periodontal disease, furcation involvement, vertical and horizontal bone destruction patterns, and masticatory dysfunction, were uploaded to the ChatGPT 4o. Measurement concordance was analyzed using intraclass correlation coefficient (ICC) and kappa tests.

Results: 37 participants with a mean age of 54.2 ± 9.6 years were included in the study. Researchers calculated bone loss as 48.8% ± 17.9%, while bone loss percentage was recorded as 50.8% ± 5.3% by ChatGPT. Regarding bone loss-to-age ratios, researchers found 0.92 ± 0.38, and ChatGPT was calculated as 0.96 ± 0.22. Inter-rater reliability analysis showed a non-significant correlation ($r = 0.173$, $p = 0.306$) and low level of agreement (ICC = 0.175, 95% CI: −0.619 to 0.577, $p = 0.286$) between the researchers and ChatGPT regarding bone loss percentages. However, a significant moderate correlation ($r = 0.477$, $p = 0.003$) and agreement (ICC = 0.586, 95% CI: 0.194 to 0.787, $p = 0.005$) were noted for the bone loss-to-age ratio. A fair level of agreement was observed between the researchers and ChatGPT 4o regarding grading ($\kappa = 0.385$, $p = 0.018$). A moderate level of agreement was observed between researchers and ChatGPT regarding staging ($\kappa = 0.579$, $p < 0.001$).

Conclusions: ChatGPT 4o demonstrated moderate success in radiographic analyses and may serve as guidance in radiographic evaluations required to establish initial staging and grading of periodontitis patients.

PD197 | Validation of Four Oral Microbiome Sampling Methods for Periodontal Patients: Saliva, Oral Rinse, Subgingival Dental Plaque and Gingival Crevicular Fluid

R. Lee[1], J.-Y. Park[1], Y. Park[1], J.-S. Lee[1]
[1]*Yonsei University College of Dentistry, Department of Periodontology, Seoul, Republic of Korea*

Background & Aim: The composition of the oral microbiome varies significantly depending on the type of sample collected from the oral cavity. Understanding the microbial characteristics of each sample type is essential for effective study design. This study aims to compare the microbial composition of four sample types—saliva, oral rinse, subgingival plaque, and gingival crevicular fluid (GCF)—and evaluate the abundance of periodontal pathogens in each type.

Methods: A total of 150 participants from various prospective cohorts at Yonsei University Dental Hospital provided all four types of oral samples: saliva, oral rinse, subgingival plaque, and GCF. Full-mouth periodontal and radiographic assessments were conducted. Participants were categorized as periodontally healthy ($n = 41$) or stage III/IV periodontitis ($n = 43$). Samples were collected under standardized conditions, and microbial DNA was extracted and analyzed using 16S rRNA gene (V3-V4 regions) sequencing on an Illumina MiSeq platform. Bioinformatic analyses included quality filtering, sequence merging, taxonomic assignment, and diversity calculations using VSEARCH.

Results: At the phylum level, *Firmicutes* were predominant in saliva and oral rinse, while *Bacteroidetes* were most abundant in subgingival plaque and GCF. Saliva and oral rinse, showed similar microbial distributions, as did subgingival plaque and GCF. Principal coordinate analysis (PCoA) using the Bray-Curtis beta diversity matrix demonstrated significant differences in microbial composition across all four sample types, confirmed by PERMANOVA ($p = 0.001$). Among the sample type, GCF exhibited the greatest compositional difference between periodontal health and stage III/IV periodontitis, with Red Complex bacteria significantly more abundant in periodontitis patients' GCF samples.

Conclusions: Distinct microbial composition patterns are evident for each type of oral sample. GCF stands out as a primary candidate for bacterial sampling in periodontal evaluations due to its marked differentiation between periodontal health and disease.

PD198 | Evaluation of miR-98, miR-145, miR-146a and Let-7e as Potential Diagnostic Biomarkers for Early Detection of Peri-Implant Diseases

N.L. Zainal Abidin[1], F.H. Al-Bayaty[2], M.F.H. Hidayat[1]
[1]*University Technology MARA Sungai Buloh Campus, Sungai Buloh, Malaysia,* [2]*Malaysia MAHSA University, Jenjarom, Malaysia*

Background & Aim: Peri-implant diseases (PID), including peri-implant mucositis and peri-implantitis, significantly jeopardize dental implant success. Traditional diagnostic methods, such as periodontal probing and radiographs, have limitations. Recent research suggests that microRNA (miRNA) profiling could enhance early detection of PID. This study aimed to evaluate the expression levels of specific miRNAs—miR-98, miR-145, miR-146a, and let-7e—in individuals with peri-implant mucositis and peri-implantitis with a healthy control, compare their expression levels, and determine their association with clinical parameters.

Methods: From January 2022 to October 2023, 19 participants with 38 dental implants were recruited according to established criteria. After clinical and radiographic evaluations, dental implants were grouped as peri-implant health ($n = 12$), peri-implant mucositis ($n = 16$), and peri-implantitis ($n = 10$). Subsequently, peri-implant crevicular fluid (PICF) samples were collected and analysed through real-time quantitative polymerase chain reaction (qPCR).

Results: Our findings revealed that miR-98, miR-145, and miR-146a were not detected in any of the samples. Interestingly, let-7e was consistently detected, with their expression increased 6.2-fold in peri-implant mucositis and 62.8-fold in peri-implantitis cases. The Kruskal–Wallis test showed a significant difference in let-7e expression between groups ($H(2) = 30.62$, $p < 0.001$). Additionally, Let-7e levels were significantly associated with all clinical parameters ($p < 0.001$), particularly impacting the modified sulcus bleeding index (msBI) with an R^2 value of 0.328.

Conclusions: In conclusion, while these findings are promising, the cross-sectional nature of this study warrants cautious interpretation. Further longitudinal studies are needed to validate miRNAs' potential as biomarkers in implant dentistry. Additionally, PICF offers a practical, non-invasive sampling method for the early detection of PID.

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

PD199 | Artificial Neural Network as a Predictive Model for Dental Implants Classification

M.S. Milic[1], M. Vucetic[2], V.S. Todorovic[2], Z. Vucetic[3], N. Milosavljevic[4]
[1]University of Belgrade School of Dental Medicine, Basic Dental Sciences Department, Belgrade, Serbia, [2]University of Belgrade School of Dental Medicine, Belgrade, Serbia, [3]Private Dental Practice, Kotor, Montenegro, [4]University of Belgrade Faculty of Agriculture, Department of Mathematics and Physics, Belgrade, Serbia

Background & Aim: In the absence of clinical data it can be difficult to distinguish dental implants with similar shape and design on panoramic radiographs, due to distortion, noise and increased number of available dental implant systems. An artificial neural network (ANN) is a predictive model designed to analyse complex data using sophisticated algorithms that imitate human neurological activities, including data grouping and classifying.
We aimed to test the accuracy and optimise the ANN model for classification of the dental implants according to their design.
Methods: Panoramic radiographs with 102 dental implants, with two designs of a single dental implant brand (Straumann Bone Level and Straumann Tissue Level) were analysed. ANN was modelled as a tool for dental implants classification into two groups according to their design, using the characteristics such as width, length, and position on panoramic radiographs. ANN consisted of three layers: the input layer, the hidden layer with complex functions that create predictors, and the output layer where the predictions made in the hidden layer were collected to produce the model's prediction. A set of nodes in the hidden layer (neurons) represented math functions that modified the input data. The ANNs with hidden layers containing 5–10 neurons were tested.
Results: The accuracy of the predictive model varied with the number of neurons. The lowest accuracy was observed with 5 neurons in hidden level (90%), while the highest accuracy (96%) was observed with 8 neurons in the hidden level. Further increase of the number of neurons did not improve the accuracy of the model.
Conclusions: Based on this limited data set, ANN with 8 neurons in hidden level appears to be a stable predictive model for dental implants identifying from the panoramic radiographs. To improve the applicability of the model, further research on a larger and more diverse datasets is necessary.

PD200 | Alveolar Ridge Preservation Using Allograft, Alloplast and Autogenous Tooth Graft: A Randomized Clinical Trial

H. Almalahy[1], S. Sarhan[2], Y. Fouad[2], B. Ahmed[2]
[1]Ain Shams University, Oral Periodontology, Cairo, Egypt, [2]Ain Shams University, Cairo, Egypt

Background & Aim: Following tooth extraction, sequels of events that reduce alveolar crest width and height take place. Alveolar ridge preservation (ARP) after extraction of a tooth is crucial as it maintains ridge dimensions facilitating dental implant placement. Previous systematic reviews and clinical trials recommended allografts, alloplasts, and autogenous tooth bone graft (Auto-BT). However, the results were heterogeneous about the exact superiority of one material over the other. Thus, the herein work aimed to evaluate the efficiency of the different bone graft materials in ARP.
Methods: In this randomized clinical trial, thirty patients were divided into three groups. ARP was performed using allograft, alloplast, and Auto-BT. Changes in alveolar ridge dimensions were evaluated clinically, radiographically, and histomorphometrically after 3 months.
Results: Results of intergroup comparisons for clinical and radiographic measurements showed higher bone loss values in the alloplast group than in the tooth graft group. Histological measurements disclosed that the tooth graft group had the highest value of mature bone followed by alloplast with allograft having the lowest value.
Conclusions: In conclusion, tooth graft could be considered a viable alternative to other graft materials in ARP. Autogenous tooth graft is the new concept of graft material. They can be processed and used as an economical, natural, biocompatible, versatile, and predictable grafting material.

PD201 | Hyaluronic Acid Gel in Alveolar Ridge Preservation

S. Fawzy[1,2], H. Gamal[1], S. Seif Allah[1]
[1]Ain Shams University, Department of Periodontology, Cairo, Egypt, [2]Nahda University, Department of Periodontology, Beni Suef, Egypt

Background & Aim: This study aimed to evaluate the effect of Hyaluronic acid gel (HA) 1% alone in alveolar ridge preservation (ARP) after atraumatic tooth extraction clinically, radiographically, and histomorphometric analysis.
Methods: Twenty-four patients having hopeless teeth in the esthetic zone were recruited and randomly allocated to either Group I (HA 1%) ($n=12$) undergoing atraumatic tooth extraction followed by application of HA gel 1% and covering by collagen membrane and Group II (collagen membrane alone) ($n=12$) undergoing atraumatic tooth extraction and covered by collagen membrane alone. The assessments were done clinically, radiographically, and histomorphometric three months postoperatively.
Results: Firstly, all patients had no signs of infection. Secondly, the mean difference in bone width of group I (Hyaluronic Acid Gel 1%) and group II (control group) were (-1.62 ± 0.22 mm) and (-1.57 ± 0.31 mm), respectively, with no significant difference between the groups. Radiographically, cone-beam computed tomography demonstrated dimensional changes in bone width in groups I and II as (−1.03) and (−0.72), respectively, and bone height of the socket decreased in group I and group II by (−1.45 mm) and (−1.39 mm), respectively, with no significant difference in bone width and height. The bone density in groups I and II was (44.85 ± 61.87) and (124.17 ± 111.32), respectively, with a significant difference between the groups. After harvesting, core biopsy by trephine bur during implant placement was analyzed using Hematoxylin & Eosin stain and Masson Trichrome (MT). Histological examination showed trabeculae of matured bone with less dilated osteocytes lacunae in group II. Histomorphometric analysis, Group II showed more mature bone than group II (34.54) (8.59) respectively.

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Conclusions: Hyaluronic acid alone was not effective in alveolar ridge preservation and could not be an alternative to the other bone graft materials.

PD202 | Development of Injectable Composite Hydrogels Loaded With Montmorillonite and Hydroxyapatite for Enhanced Bone Regeneration

I. Eshkol-Yogev[1,2], M. Salman[1], O. Gariani[1], M. Zilberman[1]
[1]Tel Aviv University, Department of Biomedical Engineering, Tel Aviv, Israel, [2]University College London, Eastman Dental Institute, Unit of Periodontology, London, United Kingdom

Background & Aim: Bone regeneration around implants requires materials that support both the biological healing process and structural stability. A key aspect of early bone healing is the formation of a blood clot, which stabilizes the site and initiates tissue repair. Combining a hemostatic agent with bioactive ceramics in a biodegradable scaffold can promote this process. The hemostatic agent montmorillonite (MMT) provides initial stability, while hydroxyapatite (HA) particles offer mechanical reinforcement. This study aims to investigate novel injectable composite hydrogels made from gelatin-alginate, reinforced with either micro- or nano-sized hydroxyapatite and MMT, for potential use in bone regeneration around implants.
Methods: Hydrogels were formulated with gelatin-alginate and crosslinked with carbodiimide, loaded with either micro- or nano-hydroxyapatite (n-HA) and MMT. The HA particles mimic bone's mineral composition, supporting osteoconductive bone growth around implants, while MMT enhances clot formation and tissue adhesion. Physical properties (gelation time, swelling ratio, weight loss) and mechanical properties (tensile and burst strengths) were evaluated, with particular focus on ensuring suitable gelation times and mechanical properties for clinical handling and implant stability.
Results: The addition of n-HA particles significantly increased tensile strength, providing up to three times the strength of non-loaded formulations, and increasing the mechanical stability. MMT further enhanced tensile and burst strength through nano-structuring effects that increase matrix cohesion. Dual composite formulations with MMT showed controlled gelation times conducive to surgical application and reduced swelling, which may support nutrient transport and cell infiltration without compromising scaffold integrity.
Conclusions: These tunable hydrogels, with adjustable physical and mechanical properties, offer a versatile scaffold for specific applications in bone regeneration around implants. The combination of hemostatic and osteoconductive properties provides tailored support for early-stage healing and sustained implant stability, creating a robust scaffold environment that may enhance integration and biological functions.

PD203 | Validation of Liquid PRF Enhancement on New Vital Bone Formation in Sinus Graft Procedures—Clinical Trial

M. Infante da Câmara[1], R. Rodrigues[1], M. Nunes Vasques[1], A. Carvalho[1], R. Costa[1]
[1]University Institute of Health Sciences (IUCS – CESPU), Department of Medicine and Oral Surgery, Gandra, Portugal

Background & Aim: Several procedures have been documented for maxillary sinus graft augmentation, including the lateral window technique and crestal approach with osteotomes or osseodensification. Because platelet-rich fibrin can enhance both soft and hard tissue recovery, it has been employed in maxillary sinus lift procedures. Aim: This study sought to determine whether PRF and NanoBone, a synthetic hydroxyapatite, could improve bone regeneration in sinus floor elevation using the lateral window approach.
Methods: Six patients who fullfilled the study's inclusion criteria gave their agreement to participate, out of the fifty patients who were screened during a preoperative assessment appointment from the clinical unit CESPU—Famalicão and intervened upon between January 2023 and December 2023. Twelve sinus augmentation procedures were performed as part of a split-mouth clinical trial.
Results: According to our findings, there is a 27.5% ± 4.9% rise in new vital bone, a 23.0% ± 3.7% increase in inert bone particles, and a 49.4% ± 2.8% increase in connective tissue for the test group (NanoBone/PRF). In contrast, there is a 19.5% ± 3.0% rise in new vital bone, 23.4% ± 5.7% increase in inert bone particles, and a 57.0% ± 3.5% increase in connective tissue for the control group (NanoBone).
Conclusions: The results clearly show that, when comparing NanoBone alone, or mixing liquid PRF with NanoBone does not have a detrimental effect on the amount of viable bone formation. In fact, it may even slightly increase the amount of new bone formation and revascularization during sinus bone graft procedures using the lateral window technique.

PD204 | Evaluating the Efficacy of PRF Technique in Alveolar Ridge Preservation: A Case Series

I. Mitsika[1], E. Zampa[1], S. Silvestros[2]
[1]UoA, Faculty of Dentistry, Athens, Greece, [2]UoA, Faculty of Dentistry, Prosthodontics, Athens, Greece

Background & Aim: Proper implant orientation in a three-dimensional prosthetic position requires adequate soft and hard tissue support. Pioneer studies have shown that tooth extraction leads to an average bone loss of 1.67 mm vertically and 3.87 mm horizontally, which is more evident in sockets with thin buccal bone. Alveolar Ridge Preservation (ARP) techniques can minimize hard tissue loss, reducing the need for ridge augmentation by 55%–100%. The research hypothesis posits that the dimensional changes of the alveolar ridge one year after implant restoration in patients who underwent ARP with xenograft are comparable to those in patients who received ARP with xenograft and PRF.
Methods: This case series includes patients from a private periodontics clinic (2019–2023) who required single implant placement for edentulous area restoration. The series presents 10 cases of ARP using xenograft with A-PRF-derived growth factors and 10 cases using xenograft alone. Bone loss was measured with ImageJ using periapical radiographs one year post-restoration and analyzed with Stata 13.

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Results: The demographic data of the patients showed an average age of 66 years, 55% were female, 60% were non-smokers, 66.6% were in lower jaw, and 10% involved anterior teeth. One year after the final prosthetic restoration, average mesial and distal bone loss in total were 0.356 and 0.647 mm, respectively. Bone loss averaged 0.663 mm with ARP using xenograft along with growth factors, compared to 0.501 mm using only xenograft. Testing the null hypothesis, there is no statistically significant difference ($p = 0.078$, 95% CI: −0.324 to 0).
Conclusions: ARP techniques stabilize tissue volume in a post-extraction socket, often eliminating the need for additional bone augmentation to achieve a prosthetically acceptable implant position. These techniques offer a reliable, less invasive option for clinicians but require significant expertise in material handling and site management.

PD205 | Biologically-Oriented-Alveolar-Ridge-Preservation in Periodontally Affected Patients

M.O. Cojocaru[1], S.M. Popescu[1], R.I. Marinescu[1], M.R. Cojocaru[2], C.M. Cojocaru[2], C.A. Banica[3]
[1]UMF Craiova, Romania, Oral Rehabilitation, Craiova, Romania, [2]Private Practice, Dental Spectrum, Craiova, Romania, [3]UMF Craiova, Romania, Endodontics, Craiova, Romania

Background & Aim: The physiological healing process following tooth extraction results in hard and soft tissue losses and ridge contour deformation. The preservation of alveolar ridge volume in extraction sockets affected by severe periodontitis is a critical challenge that requires clinical attention. There is a significant decrease in bone dimension (width/height) observed in sockets with periodontal compromise. The present study aimed to evaluate the dimensional changes of sites undergoing alveolar ridge preservation and the justification for ARP to reduce subsequent surgical complexity in implants rehabilitation, reduce the vertical and horizontal ridge dimensional alteration, and shortening the time for finalizing complete rehabilitation treatment.
Methods: We study the bone changes in width and vertical ridge position on14 maxillary extraction sites, 7 first incisor and 7 first molar sites for 12 patient stages III and IV with advanced loss of periodontal tissue support. Treatment protocol after noninvasive extraction was Biologically-oriented-Alveolar-Ridge-Preservation (BARP), and diode laser assisted therapy for decontamination and biostimulation (with specific setting). We use collagen and xenograft in layering alternative technique.
Results: We evaluate all the sites after 5 months, and the changes in bone width and vertical on re-entry time for implant placement were 1.2 mm/0.6 mm (in frontal area) and 1.0 mm/0.7 mm in distal area. No infection, no unexpected healing. In recent years, alveolar ridge preservation (ARP) techniques with various biological materials have been proposed to minimise the post-extraction alterations and maintain the ridge dimensions, in prevention of volumetric change, profilometric change, keratinized mucosal width change, feasibility for implant placement.
Conclusions: The periodontally compromised sockets present a reduced number of socket walls and are topographically limited by fewer tissue resources from residual bone walls, and often ARP eliminate the need for additional augmentation during implant placement.
The magnitude and timing of changes will influence the complexity, costs, timing, associated morbidity of treatment, impacting on the functional and aesthetic outcomes of restorative treatment.

PD206 | The Effect of L-PRF on the Treatment of Single Recession-Type Defects

M.R. Fok[1], Y.H.D. Chan[1], M. Tonetti[2], G. Pelekos[1]
[1]University of Hong Kong, Division of Periodontology and Implant Dentistry, Faculty of Dentistry, Hong Kong, Hong Kong, SAR of China, [2]Shanghai Jiao Tong University, Shanghai PerioImplant Innovation Center, Department of Oral and Maxillofacial Implantology, Ninth People Hospital, School of Medicine, Shanghai, China

Background & Aim: The primary objective of this study was to investigate the adjunctive effects of leukocyte and platelet-rich fibrin (L-PRF) on the clinical efficacy of coronal advancement flap (CAF), in terms of (i) Complete root coverage, (ii) Recession reduction, and (iii) Clinical attachment level gained.
Methods: This was a single-centre, randomised, single-blind, split-mouth clinical trial. Two anterior sites in different quadrants per patient were followed by a standard coronal advancement flap procedure with are without the additional L-PRF placement at surgical site in 12 systemically healthy, non-smoking patients with matched RT1/2 recession-type defects. The intra-individual trial was powered to assess changes in complete root coverage. Percentage sites achieving complete root coverage and percentage root coverage within and between groups before and after treatment will be evaluated. Early healing was evaluated with an early wound healing index. Soft tissue volumetric and profilometric changes were assessed by serial digital scans from 6 h to 6 months.
Results: Root coverage was similarly observed in both test and control groups. No significant inter-group differences were observed in percentage complete root coverage, percentage mean root coverage, volumetric and profilometric soft tissue changes.
Conclusions: This intraindividual controlled, randomised trial indicated that CAF surgery alone or in combination with L-PRF are effective procedures to improve single recession-type defects. Our 6-month data comparing a combined CAF with L-PRF technique to CAF alone showed no additional benefit in terms of mean root coverage or short-term wound healing for the treatment of single RT1 and RT2 recessions in non-molars. A longer period of evaluation may be necessary to appreciate the clinical effects of this autogenous biologic material. The soft tissue thickness gained by L-PRF at 6 h to Day 3 could not be sustained for up to 6 months.

PD207 | The Effectiveness of Different Xenogenic Gingival Grafts as a Means to Avoid Gingival Recessions in Orthodontic Treatment

R. Miremadi[1]
[1]Private Practice, Antwerpen, Belgium

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Background & Aim: Gingival recessions are a common finding among patients undergoing orthodontic treatment. Among other factors, gingival biotype has been considered to play a defining role. The primary objective of the study was to evaluate whether a xenogenic gingival graft can avoid recessions. Second, it aimed at analyzing whether different graft thicknesses would affect the primary goal.
Methods: 24 class II patients (11—15 years) scheduled for non-surgical non-extraction orthodontic treatment were assigned to 2 equal groups and underwent a gingival graft of lower incisors, prior to the orthodontic treatment. The treatments were performed using Creos mucogain (Nobel Biocare, 5 mm thick) or Derma (Osteobiol, 0.9 mm thick). Orthodontic treatment was performed during the following 3 months. The gingival level of the lower incisors were measured at 3 points on the buccal side, prior to the graft procedure, at the end of the orthodontic treatment and 6-months afterwards to monitor the formation and the extent of new recessions.
Results: The orthodontic treatment took on average 2.1 years. There were no significant intra-group or inter-group difference between the gingival levels throughout the study, meaning there were no new recessions were observed in any of the groups.
Conclusions: Even though gingival recession has multifactorial etiology, xenogenic grafts might be a useful means to limit their occurrence during orthodontic treatment. Considering the young age of most orthodontic patients, such graft mean a more approachable treatment as they can be performed relatively fast and do not require a donor site. Due the relatively short follow-up period, the study failed to yield any clinical difference based on the thickness of used material. Further follow-up would clarify the effect of the resorption of the graft collagen matrix on the formation of recessions.

PD208 | Soft Tissue Augmentation Using CAF With Either SCTG and Vitamin C Versus SCTG Alone in Management of RT1 Gingival Recession: A Randomized Controlled Clinical Trial

A. Albert Anwar Zaki[1], O. Khaled Tawfik[1], K. Fawzy El-Sayed[1]
[1]*Faculty of Dentistry Cairo University, Department of Periodontology, Cairo, Egypt*

Background & Aim: The aim of this study was to clinically assess if using vitamin C with connective tissue graft could achieve superior soft tissue augmentation in terms of gingival thickness when compared to connective tissue alone in root coverage procedures for management of patients with Cairo RT1 gingival recession.
Methods: 22 patients diagnosed with RT1 gingival recession were recruited and randomly assigned into two groups. Eleven patients were assigned to CAF + SCTG group and treated using a split-full-split flap approach along with subepithelial connective tissue graft harvested by single incision technique. The other eleven patients were assigned to CAF + SCTG + Vit. C group in which the same procedure was executed but with the addition of vitamin C injection.
Results: Both groups demonstrated a statistically significant improvement in all clinical outcomes after 3 and 6 months compared to baseline. No statistically significant difference was detected in most clinical outcomes, including GT, RD, RW, KTW, and percentage of root coverage between both groups at 6 months. Patients treated with CAF + SCTG + Vit. C achieved 68.9% mean root coverage while patients treated with CAF + SCTG achieved 88.6%. Patients treated with CAF + SCTG + Vit. C reported significantly higher pain after 7 days than those treated with SCTG. The CAF+SCTG achieved better root coverage esthetic score of 8.7 versus 6.4 for CAF+SCTG+Vit. C with statistically significant difference between the 2 groups. There were no significant differences in patient satisfaction between both groups.
Conclusions: CAF + SCTG and CAF + SCTG + Vit. C were both effective and safe treatments for Cairo RT1. CAF +SCTG provided better esthetic outcomes.

PD209 | Coronally Advanced Flap With Xenogenic Collagen Matrix or Autogenous Connective Tissue Graft for the Treatment of Multiple Adjacent Gingival Recessions: A Randomized Controlled Trial

G. Dinota[1]
[1]*University of Turin, Department of Periodontology, Turin, Italy*

Background & Aim: In literature a difference was found between XCM + CAF and the CAF alone favouring XCM + CAF and also similar aesthetic outcomes at 6 months evaluation. The aim of this study was to assess whether using a new xenogeneic collagen matrix (XCM) with a multiple coronally advanced flap (mCAF or CAF) to treat multiple adjacent gingival recessions (MAGR) provides comparable results to a bilaminar technique using a connective tissue graft (CTG).
Methods: The primary outcome was recession reduction (RecRed) at 6 months. Complete root coverage (CRC), mean root coverage (MRC), changes in keratinized tissue width (KTW), gain in gingival thickness (GT), volumetric changes, and patient-reported outcomes (PROMs) were also assessed through clinical and digital examinations. Student *t*-test, Mann–Whitney *U* test and ANOVA tests with Bonferroni correction were used for statistical comparisons.
Results: At 6 months, the RecRed was 1.69 and 1.79 mm for the test and control groups, respectively ($p = 0.630$). CRC values were 52% and 36% ($p = 0.491$), while MRC was 67.85% and 62.73% for the test and control group, respectively ($p = 0.454$). A statistically significant gain in KTW was observed for patients in the CAF + CTG group (1.04 vs. −0.61 mm, $p = 0.003$). Moreover, the control group presented greater volume gain and GT gain, which were assessed through a digital analysis. CAF + XCM resulted in better PROMs regarding bleeding and swelling at 7 days compared to CAF + CTG, while no differences were found in pain perception.
Conclusions: Within the limitations of this study, both treatments yielded improvements in MAGRs. XCM showed results similar to CTG in terms of recession coverage, albeit improving patients' surgery acceptance, but CAF + CTG was superior relative to gingival phenotype modifications.

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

PD210 | Long Term Evaluation (5 Years) of Modified Coronally Advanced Flap (MCAF) With and Without Connective Tissue Graft (CTG) for the Treatment of Multiple Gingival Recessions

M. Gualtieri[1], D.A. Muresan[1], A. Signoriello[1], L. D'Alba[1], A. Zangani[1], A. Pardo[1], G. Lombardo[1]
[1]*University of Verona, Dentistry and Maxillo-Facial Surgery Section, Department of Surgery, Dentistry, Paediatrics and Gynaecology (DIPSCOMI), Verona, Italy*

Background & Aim: Gingival recession (GR) is defined as the apical displacement of the gingival margin compared to the Cemento-Enamel Junction. The prevalence of GRs ranges from 40% to 75% of the world population. Even if the etiology of GR is unclear, the predisposing factors for its formation are thin periodontal phenotype, absence of attached gingiva and reduced alveolar bone thickness.
The currently used classification for the diagnosis of GRs is the 'Recession Type' which considers the size of the recession correlated to the loss of interdental clinical attachment. The aim of this study is to evaluate the long-term stability of MCAF and MCAF + CTG root coverage procedures (RCPs).
Methods: Patients who underwent MCAF surgery between January 2018 and December 2022, with a follow-up of 1, 3 and 5 years were included. Measurements of clinical parameters (Recession Depth, Keratinized Tissue Width [KTW], Bleeding and Probing Depth) and aesthetic parameter (Root Esthetic Score, RES) were performed before the surgical procedure and at 1, 3 and 5 years.
Results: 20 patients completed the 1 and 3-year follow-up (55 GRs), while 16 (44 GRs) out of 20 completed the follow-up at 5 years. At long term (5 years) the Complete Root Coverage (CRC) was 85% for MCAF and 83.33% for MCAF + CTG, while the mean Root Coverage (RC) was 94.75% for MCAF and 92.37% for MCAF+CTG, without any significant difference. A statistically significant difference in KTW change between 5 years and baseline was found in favor of MCAF + CTG (p 0.0006). RES remained stable between 3 and 5 years (MCAF: 9.35 ± 1.35; CTG: 9.04 ± 1.40; p 0.38).
Conclusions: The MCAF and MCAF + CTG techniques have proven to be reliable RCPs, showing stable results in terms of periodontal health, RC and aesthetic evaluation in the short (1 year), medium (3 years) and long term (5 years).

PD211 | Enhanced Patient Comfort With Custom 3D-Printing Surgical Splints for Covering Palatal Donor Site in Soft Tissue Graft

D.-W. Lee[1,2], M.-S. Goh[3], S.-M. Kim[3]
[1]*Wonkwang University College of Dentistry, Department of Periodontology, Iksan, Republic of Korea,* [2]*Wonkwang Dental Research Institute, Iksan, Republic of Korea,* [3]*Wonkwang University Dental Hospital, Department of Periodontology, Iksan, Republic of Korea*

Background & Aim: Soft tissue grafting is often limited by postoperative discomfort at the donor site. This study compared the efficacy of conventional Omnivac splints and custom 3D-printed surgical splints in mitigating this discomfort. Patient-reported outcomes were assessed using the Oral Health Impact Profile-14 (OHIP-14) and Visual Analogue Scale (VAS).
Methods: This study was conducted on 26 patients who required soft tissue grafting. The control group ($n = 16$) had an Omnivac splint made using a conventional impression taking method, and the experimental group ($n = 10$) had a digital impression taken using an oral scanner (i500, Medit, Seoul, Korea) and manufactured the device (Clear splint, One Dental System, Incheon, Korea) by 3D-printing (Hunter DLP 3D printer, Flashforge, Zhejiang, China). The OHIP-14 questionnaire and VAS scores were measured on the day of surgery and 1, 7, and 14 days after surgery, and the differences between the two groups were analyzed using the Mann–Whitney U test.
Results: The group using the custom 3D surgical splint showed a statistically significant difference in OHIP-14 scores compared to the conventional Omnivac splint group ($p < 0.05$). This means that the group using the custom splint experienced less postoperative discomfort, especially in speech and mastication when the device was needed. On the other hand, the VAS scores for postoperative pain did not show a statistically significant difference between the two groups ($p > 0.05$).
Conclusions: This study aimed to introduce a novel approach to soft tissue grafting, utilizing a 3D-printing surgical splint. In some limitations, it could reduce postoperative discomfort for patients. While this study provides preliminary evidence for the feasibility of this approach, further research with a larger sample size and additional outcome measures is warranted to evaluate its clinical benefits.

PD212 | Evaluation of the Effect of N-Butyl Cyanoacrylate on Graft Contraction and Vascularization Using Digital Impression Method and Laser Doppler Flowmetry

S. Gürbüz[1], Z. Turgut Çankaya[1]
[1]*Gazi University Faculty of Dentistry, Department of Periodontology, Ankara, Turkey*

Background & Aim: Cyanoacrylate-based tissue adhesives used for stabilizing free gingival grafts (FGG) offer advantages over suturing methods, such as ease of application, reduction in surgical time, and decreased postoperative bleeding. This randomized controlled clinical trial aims to evaluate the effect of cyanoacrylate use in FGG procedures on graft shrinkage and the early healing period using digital measurement and laser Doppler methods, respectively.
Methods: Forty patients aged 18–45 years were included in the study. In the test group, cyanoacrylate was applied both in the recipient area for graft stabilization and in the donor area to control bleeding and enhance healing. In the control group, the graft was stabilized in the recipient area with sutures, and no application was performed in the donor area. The healing was evaluated based on perfusion values obtained through laser Doppler flowmetry (LDF). To assess the level of graft shrinkage, the change in area was calculated by comparing the digitally impressed surface area of the graft on Days 0 and 30. Post-operative pain levels were assessed using the Visual Analogue Scale (VAS). Mann–Whitney U test was used for non-parametric data.

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Results: The highest mean value of LDF donor site values was statistically obtained on Day 10 in both groups. In both groups, the lowest mean value was obtained preoperatively and on Day 30, while the highest mean value was obtained on Day 10. When the digital area scores of FGG were analyzed in both groups, the mean baseline score was higher than the 30th-day score ($p < 0.001$). In the test group, mean VAS scores were significantly lower than in the control group during the first 6 days ($p < 0.05$).
Conclusions: This study indicates that, compared to sutures, the application of cyanoacrylate in the recipient area reduces graft shrinkage, while its use in the donor area enhances healing by increasing blood perfusion with reducing postoperative pain levels.

PD213 | Ex Vivo Study of Elastic Properties in Coronally Advanced Flaps: The Role of Length in Tension, Young's Modulus and Poisson's Ratio

A. Jornet-Garcia[1], M.J. Moya-Villaescusa[1], A. Sanchez-Perez[1], M.d.C. Martinez-Valero[1], J.-M. Montoya-Carralero[1], E. Palomares-Espinosa[1]
[1]Murcia University, Department of Periodontology, Murcia, Spain

Background & Aim: Periodontal plastic surgery focuses on correcting defects in the gingival soft tissues. The coronally advanced flap is primarily used to cover gingival recessions, achieving optimal aesthetic and functional results. During surgery, a well-vascularized and tension-free flap is sought for proper healing, using various techniques depending on the specific situation. To evaluate how the length of coronally advanced flaps affects their elasticity and tension at the closure line.
Methods: Five short (10×10 mm) and five long (10×20 mm) coronally advanced flaps were compared measuring variables such as length, width, vertical force, tension, and deformation. A dynamometer was used to apply a force over the flaps up to 90 g. Statistical analysis was conducted using SPSS, considering means, standard errors, and normality tests. The main variables evaluated were tension, Young's Modulus, Poisson's Ratio, and deformations in the *X* and *Y* axes.
Results: During the application of 90 gf, the average tension was 13.966 g/mm^2. We did not find statistically significant differences between the short and long flap groups ($p = 0.285$). Regarding Young's Modulus, we obtained an average of 135.059 g/mm^2, without finding statistically significant differences between groups ($p = 0.499$). The average Poisson's ratio was 0.731, without finding statistically significant differences ($p = 0.795$). After the application of 90 gf, we found an elongation, that is, an average vertical deformation (*Y*-axis) in the flaps of 0.061. We did not find statistically significant differences between the two groups ($p = 0.41$). Similarly, we found a narrowing, that is, a negative average horizontal deformation (*X*-axis) in the flaps of −0.047 without finding statistically significant differences ($p = 0.235$).
Conclusions: Doubling the length of coronally advanced flaps and applying forces of 90 g did not affect vertical tension, Young's Modulus, or Poisson's Ratio, nor did it affect deformations in the *Y* and *X* axes or dimensional variations between short and long flaps.

PD214 | Effect of *Aronia melanocarpa* Extract on Oxidative Status and Secondary Wound Healing in the Palatal Mucosa in Rats

B. Goler[1], S. Demirci Delipinar[2], L. Kuru[1], H.S. Gungormek[1]
[1]Marmara University, Department of Periodontology, İstanbul, Turkey, [2]Biruni University, Department of Histology and Embryology, İstanbul, Turkey

Background & Aim: This study aimed to investigate effect of orally administration of two doses of Aronia melanocarpa (AM) extract on palatal mucosa secondary wound healing in rats.
Methods: A total of 35 male systemically healthy Wistar albino rats were used in this study. In all rats, diameter of 4 mm mucoperiosteal defect was created in center of palatal mucosa. Then rats were randomly divided into saline (5 mL/kg saline), AM5 (5 mL/kg AM), AM10 (10 mL/kg AM) groups. The rats were sacrificed 0, 7 and 21 days after defects were created, and serum samples were collected. Photographs of the wound area (WA) were taken for measuring WA using Image-J computer program. After routine histological tissue follow-up, on sections, hematoxylin-eosin staining was performed for histomorphometric measurement of the distance between epithelial margins (EM) and evaluation of vascularization and inflammatory cell infiltration. Picro Sirius Red staining was applied to evaluate collagen density. Total antioxidant status (TAS) and total oxidant satus (TOS) in serum samples were determined by ELISA.
Results: On Day 7, AM groups were found to have a smaller WA and EM than saline group ($p < 0.05$). Inflammatory cell infiltration was higher in saline group than AM groups on 7 and 21 days ($p < 0.05$). Collagen density of AM groups was higher than saline group on 7 and 21 days ($p < 0.05$). The vascularization of saline group was higher than AM groups at Day 7 ($p > 0.05$), whereas AM groups were higher than saline group at Day 21 ($p < 0.05$). TAS of AM groups were higher than saline group at Days 7 and 21 ($p < 0.05$). TOS of AM groups was higher than saline group at Day 21 ($p < 0.05$).
Conclusions: This study findings suggest that AM extract administration orally impact on palatal mucosa secondary wound healing with reducing inflammation by affecting TAS and TOS in rats.

PD215 | Stability of Soft Tissue Augmentation at Implant Site Using Volume-Stable Collagen Matrix: 2-Year Retrospective Study

Y. Mayer[1,2,3], L. Mancini[4], M. Zeltner[5], Y. Berg[2], H. Zigdon Giladi[2,1], E. Gabay[2,1,3]
[1]Technion – Israel Institute of Technology, Faculty of Medicine, Haifa, Israel, [2]Rambam Health Care Campus (RHCC), Department of Periodontology, Haifa, Israel, [3]Periocenter Ltd., Private Practice, Haifa, Israel, [4]University of Zurich, Clinic of Reconstructive Dentistry, Center of Dental Medicine, Zurich, Switzerland, [5]Private Practice, Horgen, Switzerland

Background & Aim: To evaluate the long-term dimensional stability of dental ridges two years after soft tissue augmentation using a porcine-derived volume-stable collagen matrix (VCMX) at healing abutment connections.

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Methods: A retrospective study was conducted at a private clinic from 2021 to 2023, involving 13 patients who underwent delayed single implant placement in the maxillae. Three months after implant placement, the buccal soft tissue adjacent to the abutment was augmented with VCMX. Intraoral scans were taken at three points: at implant placement (baseline), one month post-grafting, and 24 months after implant loading. Pre-implant cone-beam computed tomography (CBCT) scans were also obtained. Volumetric and profilometric changes were measured at 1, 2, and 3 mm below the mucosal margin by superimposing intraoral and CBCT scans. The Wilcoxon signed-rank test was used for statistical analysis.
Results: All 13 patients completed the two-year follow-up. Mean volumetric changes at the graft site were +18.15 ± 15.34 mm^3 initially, decreasing by 11.73 ± 21.91 mm^3 over two years. Profilometric analysis showed increases of 0.72 ± 0.88 mm, 0.54 ± 0.65 mm, and 0.32 ± 0.65 mm at 1, 2, and 3 mm, respectively, one-month post-grafting. At 24 months, reductions of −0.17 ± 0.77 mm, −0.45 ± 0.58 mm, and −0.48 ± 0.60 mm were recorded.
Conclusions: VCMX use for soft tissue augmentation shows minimal remodelling after 24 months, supporting its efficacy for soft tissue stability in dental implantology. Further long-term studies are recommended.

PD216 | The Effect of Chlorhexidine Mouthwash on Blood Pressure: A Systematic Review and Meta-Analysis

L.S.J. Toonen[1,2], B.W.M. Van Swaaij[1,2], M.L. Vagevuur[1], F. Van der Weijden[2], M.F. Timmerman[3], D.E. Slot[2]
[1]Hogeschool Arnhem Nijmegen (HAN), University of Applied Sciences, Department of Dental Hygiene, Nijmegen, Netherlands, [2]Academic Centre for Dentistry Amsterdam (ACTA), University of Amsterdam and Vrije Universiteit Amsterdam, Department of Periodontology, Amsterdam, Netherlands, [3]Radboud University Medical Center (Radboud UMC), Department of Dentistry, Section Implantology and Periodontology, Nijmegen, Netherlands

Background & Aim: Modifying the oral microbiome may potentially result in reduced bioavailability of nitric oxide and hypothetically pose a risk for complications. Insufficient production of nitric oxide can contribute to the development and progression of cardiovascular diseases, including hypertension. Consequently, modifying the oral microbiome with an antiseptic mouthwash may impact the regulation of blood pressure through the nitrite pathway. As a result, there is an ongoing debate as to whether the use of chlorhexidine mouthwash results in elevated blood pressure, as chlorhexidine mouthwash can possible interfere with nitric oxide-producing bacteria. This study evaluated the effect of rinsing with a chlorhexidine mouthwash on blood pressure, as compared to rinsing with a control mouthwash or no mouthwash, based on (randomized) controlled trials and observational studies in humans. PROSPERO CRD42020222495.
Methods: The PubMed-MEDLINE and COCHRANE-CENTRAL databases were searched to identify eligible studies that had been published as of September, 2024. Studies evaluating the effect of chlorhexidine mouthwash on human blood pressure were included. A descriptive analysis of the selected studies and a meta-analysis was performed.
Results: Searching identified 89 unique studies; four studies fulfilled all inclusion criteria and could be analyzed. The descriptive analysis demonstrated that both systolic blood pressure and diastolic blood pressure were significantly increased after the use of chlorhexidine mouthwash in two of the included studies. The meta-analysis showed no significant difference of means based on end scores between chlorhexidine mouthwashes and controls for systolic blood pressure (Diff $M = 2.13$, 95% CI [−0.38; 4.64]) and diastolic blood pressure (Diff $M = 0.47$, 95% CI [−1.66; 2.60]).
Conclusions: For patients to whom the use of chlorhexidine mouthwash has been recommended, there is a moderate level of confidence that any change in blood pressure is insignificant or very small. The clinical importance of this blood pressure elevation is estimated to be negligible.

PD217 | Professional Mechanical Plaque Removal in Supportive Periodontal Therapy—A Longitudinal Observational Study

M. Cyris[1], G. Hach[1], C.E. Dörfer[1], T. Hahn[1], K.F. El-Sayed[1,2], C. Graetz[1]
[1]University of Kiel, Clinic of Conservative Dentistry and Periodontology, Kiel, Germany, [2]Cairo University, Oral Medicine and Periodontology Department, Faculty of Dentistry, Giza, Egypt

Background & Aim: Supportive periodontal therapy (SPT) involves professional mechanical plaque removal (PMPR) using either powder-water jet devices with low-abrasive powders (LP) or rotating polishing cups/brushes with polishing paste (RP). This study aimed to compare the effectiveness of these PMPR-methods in a university setting.
Methods: Patients with periodontitis attending SPT at the Department of Conservative Dentistry and Periodontology at the UKSH, Kiel Campus at least once a year between January 2018 and December 2023 were included. Clinical parameters like number of teeth and pocket probing depths (PPD) were recorded at the first (T1) and last (T2) SPT session.
Results: 430 patients (LP/RP: $n = 152/n = 278$) with a mean (SD) age of 60.7 (11.5) years were implemented in the study. Most of them had a stage III (LP/RP: 56.6%/56.8%) and a grade B (LP/RP: 52%/64.4%) periodontitis. The number of sites with PPD ≤ 4 mm (median [IQR]) divided into anterior teeth, premolars and molars of the LP group versus RP group revealed no significant difference at T1 and T2 ($p > 0.05$). Sites with PPD ≥ 5 mm, showed significant differences between treatment groups at T1 (LP/RP: 8 [4–16]/6 [3–12]; $p = 0.002$), but not at T2 (LP/RP: 6 [3–13]/5.5 [3–11]; $p = 0.104$). No group-specific differences were found according to the treatment time (LP/RP: 79.1 [21.5] min/77.2 [20.7] min) as well as number of sites with PPD ≥ 5mm at T1 ($p = 0.805$), which remained stable (LP/RP: $n = 40$ [17.7%]/$n = 56$ [15.9%]), improved (LP/RP: $n = 102$ [45.1%]/$n = 167$ [47.7%]) or worsened (LP/RP: $n = 84$ [37.2%]/$n = 129$ [36.6%]). At T1 the LP group showed a higher number of multi-rooted teeth with grade III furcation involvement and BOP than the RP-group (LP/RP:

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

2 [1–5]/1 [1–3]; $p = 0.046$), but not at T2 (LP/RP: 2 [1–3]/1 [1–3]; $p = 0.374$). In favor of RP group, molars showed differences with regard to deteriorating PPD ≥ 5mm over time in LP group (LP/RP: $n = 48$ [45.3%]/$n = 62$ [33.3%]; $p = 0.027$).

Conclusions: Both PMPR methods are effective in enhancing or stabilizing PPD ≥ 5 mm. Nevertheless, on molars, the RP group showed superiority.

PD218 | Intermittent Fasting Regimes Reduce Gingival Inflammation. A Three-Arm Semi-Randomized Controlled Clinical Trial

C.L. Pappe[1], J. Maetschker[1], S. Dujardin[2], B. Peters[3,4], O. Pivovarova-Ramich[4,3,5], F. Kandil[6], A. Michalsen[6,7], C. Breinlinger[6], N. Steckhan[8,9], D. Koppelt[4,6,7,10,11]

[1]Charité Universitätsmedizin, CharitéCentrum für Zahn-, Mund- und Kieferheilkunde, Abteilung für Parodontologie, Oralmedizin und Oralchirurgie, Berlin, Germany, [2]Martin Luther University Halle-Wittenberg, University School of Dental Medicine, Department of Prosthetic Dentistry, Halle, Germany, [3]German Institute of Human Nutrition Potsdam-Rehbruecke, Department of Molecular Metabolism and Precision Nutrition, Potsdam, Germany, [4]German Center for Diabetes Research (DZD), München-Neuherberg, Germany, [5]Charité – Universitätsmedizin Berlin, Department of Endocrinology and Metabolism, Berlin, Germany, [6]Charité–Universitätsmedizin, Institute of Social Medicine, Epidemiology and Health Economics, Berlin, Germany, [7]Immanuel Hospital Berlin, Department of Internal and Integrative Medicine, Berlin, Germany, [8]Hasso Plattner Institute, Digital Health-Connected Healthcare, Potsdam, Germany, [9]Technical University of Dresden, Evidence-Based Digital Diabetology, Medical Faculty Carl Gustav Carus, Department of Medicine III, Prevention and Care of Type 2 Diabetes, Dresden, Germany, [10]Charité – Universitätsmedizin Berlin, Charité Competence Center for Traditional and Integrative Medicine (CCCTIM), Berlin, Germany, [11]Faculty of Medicine Carl Gustav Carus, Technische Universität Dresden, Department for Prevention and Care of Diabetes, Department of Medicine III, Dresden, Germany

Background & Aim: Intermittent fasting regimes have gained popularity recently for treating chronic inflammatory diseases. A reduction in bleeding on probing (BOP) and gingival crevicular fluid (GCF), has been demonstrated during prolonged fasting. However, it remains unclear whether intermittent fasting protocols, exhibit similar anti-inflammatory potential. The objective of this study was to investigate the effects of Bahá'í dray fasting (BF; avoiding food and drinks during the day) and time restricted eating (TRE; 16 h fasting, 8 h eating window) on periodontal parameters during locally induced experimental gingivitis when compared to a regular diet (CG).

Methods: Participants were asked to refrain from oral hygiene (3. sextant) for 9 days (T1-T2). After resuming oral hygiene, they were followed until 19 days (T3) while adhering to fasting or regular diet. Primary outcome was BOP in the test sextant (BOP_s), additionally rustogi plaque index (RPI), gingival crevicular fluid (GCF), blood pressure (BP), body weight (BW), HbA1c and C-reactive protein (CRP) were measured (T1-T3). T-tests for paired samples were applied.

Results: Sixty-six healthy participants were recruited. Forty-three were randomly assigned to TRE ($n = 22$) and CG ($n = 21$), while 23 followed BF. At T2, BOP_s increased significantly in the TRE by 14.61% (11.13), in the CG by 14.9% (15.26), and in the BF by 5.42% (7.4). In the BF, BOP_s was lower than in the TRE or CG ($p_{BF\text{-}TRE} = 0.003$, $p_{BF\text{-}CG} = 0.018$, respectively). GCF significantly increased in the CG compared to TRE and BF (inter-p-value$_{CG\text{-}TRE} = 0.049$, $p_{CG\text{-}BF} = 0.026$, respectively). At T3, significant intra-group reductions for BW and HbA1c were observed in both fasting groups, while BP and CRP were additionally reduced in the BF.

Conclusions: This study demonstrated an anti-inflammatory effect of two different intermittent fasting regimes on periodontal and metabolic parameters during an experimental gingivitis model in systemically and periodontally healthy participants. Results are limited by randomization issues and potential bias in the BF (DRKS00026701).

PD219 | Periodontal Status in Older Individuals Over a Period of 18 Years: A Longitudinal Comparative Study

S. Critén[1], P. Andersson[2], S. Renvert[2,3], B. Götrick[4], J. Sanmartin Berglund[3], V. Wallin Bengtsson[2]

[1]Kristianstad University, Faculty of Health Science, Dental Hygienist Program, Kristianstad, Sweden, [2]Kristianstad University, Kristianstad, Sweden, [3]Blekinge Institute of Technology, Karlskrona, Sweden, [4]Malmö University, Malmö, Sweden

Background & Aim: The prevalence of periodontitis increases with aging. Therefore, to maintain optimal oral and general health, it is important to prevent and treat periodontitis. In the present study, periodontal status in 60- and 66-year-old individuals was compared between different periods over 18 years.

Methods: This longitudinal study used quantitative methods based on data from the ongoing project 'The Swedish National Study on Aging and Care (SNAC)' in Karlskrona, Sweden. In total, 340 individuals 60- and 66-year underwent clinical and radiographical examinations at baseline (2001–2003) and follow-ups examinations at 12 year (2013–2015) and at 18 year (2019–2021). For statistical analyses, Paired t-test and McNemar's test were performed. Statistical significance was determined at $p < 0.05$.

Results: A significant reduction of 1.5 teeth lost, compared to baseline, was observed at the 12- and 18-year follow-ups ($p < 0.001$ for both). The prevalence of BOP ≥ 10% significantly increased at both the 12-year and 18-year follow-ups ($p < 0.001$ and $p < 0.002$ respectively). During the 18-year follow-up, the prevalence of PPD ≥ 5 mm was unchanged. Compared to baseline, no 30% bone loss ≥ 5 mm was observed at the 12-year follow-up ($p > 0.134$). However, a significant increase was observed at the 18-year follow-up, both overall and in men ($p < 0.003$ and $p < 0.021$, respectively).

Conclusions: The present study indicates that over a period of 18 years, periodontal status in 60- and 66-year-old individuals declines.

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

PD220 | The Effect of Different Commercially Available Mouthwashes With Active Ingredients in Healthy Subjects With Intra-Oral Halitosis. A Randomized Controlled Clinical Trial

M. Joosstens[1], E. Windhorst[1], E. Van der Sluijs[1], C. Valkenburg[1], M.L. Laine[1], D.E. Slot[1]
[1]*ACTA, Department of Periodontology, Amsterdam, Netherlands*

Background & Aim: This study aimed to assess the effects of three commercially available mouthwashes (MWs) with active ingredients, compared to water, on intra-oral halitosis in healthy individuals.
Methods: A 3-week, single-centre, single-blind, four-arm randomized controlled trial was conducted. Participants rinsed twice daily with an assigned MW while maintaining their usual dental routine. The following rinsing groups were evaluated, water, essential oils (EO) MW, chlorhexidine-digluconate + cetylpyridinium-chloride + zinc-lactate (CHX + CPC + Zn) and zinc-acetate+chlorhexidine (Zn + CHX). Measurements were taken at baseline, Day 7, and Day 21. The primary outcome was hydrogen sulphide (H_2S) levels, with secondary outcomes including methyl-mercaptan (MM), total volatile sulphur compounds (VSCs), and organoleptic-scores (ORG). Statistical tests were performed within groups, among groups and if indicated between groups.
Results: 57 participants (46 female, 11 male; mean age 29.3) completed the study. At baseline, no significant differences were found between groups for any parameter. Significant improvements after 3 weeks for all group on H2S and total VSCs and all but water for MM and ORG. At Days 7 and 21, H_2S scores were significantly lower for the groups with CHX+CPC+Zn and Zn+CHX compared to the water group ($p < 0.001$, except $p < 0.01$ for water vs. Zn+CHX at Day 7). For MM levels, a significant reduction was observed between the water group and the Zn+CHX-group at Day 7 ($p = 0.021$). Total VSC scores showed a significant reduction for the group with CHX+CPC+Zn compared to the water group at Day 21 ($p = 0.042$). Organoleptic scores were significantly lower for the groups with CHX+CPC+Zn and Zn+CHX compared to the water group at Day 7 ($p < 0.01$) and Day 21 ($p < 0.001$). At Day 21, ORG-scores showed a significant reduction for the groups with CHX+CPC+Zn and Zn+CHX ($p < 0.001$) versus the water group. There was also a significant reduction for the Zn+CHX-group compared to the group containing EO-MW ($p < 0.01$).
Conclusions: Mouthwashes containing CHX+CPC+Zn and Zn+CHX demonstrated significant benefits over water or EO-MW on reducing parameters for measuring intra-oral halitosis after 21 days.

PD221 | Periodontal Status of Elderly in Need of Home-Based Medical Care Evaluated in the InSEMaP-Study

P. Schmage[1], D. Yuldashev[1], E. Henken[2], L. von Palubitzki[1], M. Ramadan[3], S. Schellhammer[4], A. Behrens-Potratz[5], A. Konnopka[6], T. Zimmermann[7]
[1]*Hamburg, Department of Periodontology, Preventive Dentistry and Operative Dentistry, Hamburg, Germany,* [2]*Hamburg, Department of Health Economics and Health Services Research, Hamburg, Germany,* [3]*Private Office, Hamburg, Germany,* [4]*Deutsche Angestellten-Krankenkasse (DAK), Department of Health Care Research and Innovation, Hamburg, Germany,* [5]*Hamburg University of Applied Sciences, Faculty of Business and Social Sciences, Department of Nursing and Management, Hamburg, Germany,* [6]*University Medical Center Hamburg-Eppendorf Center for Psychosocial Medicine, Department of Health Economics and Health Services Research, Hamburg, Germany,* [7]*Hamburg, General Practice and Primary Care, Center for Psychosocial Medicine, Hamburg, Germany*

Background & Aim: Elderly who suffered from systemic diseases, often prefer to stay at their homes and receive daily medical care. Priorities might have changed, why they eventually interrupt their regular yearly appointments for check-up with the dentist. In the InSEMaP-study we liked to get to know more about the consequences when the routine oral check-up (CU) was stopped. The patients were offered to be visited at home by a dentist and a nurse, when their periodontal health status was recorded.
Methods: 406 persons (> 60 years, living in the greater area of Hamburg, having a documented level of care of 2–5, being insured in a statutory health insurance) participated in the study. The following periodontal indices were assessed: CAL, PISA (periodontal inflamed surface area), BOP, visual Plaque-Index (vPI). The results were calculated analyzing significant differences.
Results: The average CAL were found to be 4.6 ± 1.3 mm for those continuing CU and 5.1 ± 1.5 mm for those without CU. vPI of 53.2% ± 24% and BOP of 41.4% ± 23.2% were measured with CU and vPI of 75.5% ± 25.3% and BOP of 54.8% ± 27.3% without CU. Overall PISA showed similar values (494.7 ± 432.0 mm^2 with CU/547.4 ± 438.2 mm^2 without CU) with no statistically significant differences between the two groups ($p > 0.05$). Separating the groups by the amount of teeth, good oral health was proven for 70% of the group with < 10 teeth, but only 30% of the other groups. Opposingly, with > 19 teeth a poor oral health revealed more frequently (27%).
Conclusions: Plaque index and BOP regardless of CU turned out to be too high to maintain periodontal health and should be improved. With CU a better CAL and PISA could be maintained. For elderly in need of care, it is highly recommended to continue CU and get more support during the daily oral for plaque control.

PD222 | Dodecylpyridinium Chloride and Cetylpyridinium Chloride Effectiveness Against Individualized Oral Biofilms

T. Suzuki[1,2], J. Inubushi[1], S. Steimer[2], Y. Shimizu[1], P.I. Diaz[2,3]
[1]*Sunstar Inc., R&D, Takatsuki, Japan,* [2]*University at Buffalo, Department of Oral Biology, School of Dental Medicine, Buffalo, United States,* [3]*University at Buffalo, Microbiome Center, Buffalo, United States*

Background & Aim: There is a need for novel agents to prevent dental plaque dysbiosis. Previous research shows that the commonly used quaternary ammonium antimicrobial

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

cetylpyridinium chloride (CPC) is not effective against certain oral pathobionts, including the core subgingival species *Fusobacterium nucleatum* (Fn). Here we evaluate Dodecylpyridinium chloride (DPC), a quaternary ammonium compound with different N-alkyl chain length and lipophilicity than CPC. To test antimicrobials using clinically-relevant models we developed individualized biofilms using isolates or whole subgingival plaque derived from subjects with periodontal health or periodontitis.

Methods: Polymicrobial biofilms were developed on saliva-coated hydroxyapatite disks, anaerobically, under mucin-serum. Six common subgingival species were included in defined-inoculum biofilms constructed with type strains or subject-specific isolates obtained from subgingival plaque of 4 individuals. Models were also developed using whole subgingival plaque from 2 subjects. Biofilms were rinsed twice a day with potassium-phosphate buffer (PBS; negative control), 0.05% CPC, 0.03% DPC, 0.05% CPC+0.03% DPC or 0.12% chlorhexidine (CHX; positive control). Commercial formulation containing 0.05%CPC and developing formulation containing 0.05% CPC+0.03% DPC were also tested. Biomass was quantified by qPCR and LIVE/DEAD staining. The composition of whole plaque biofilms was evaluated via 16S rRNA gene sequencing.

Results: CPC had limited ability to decrease biofilm biomass and viability. DPC decreased biomass and viability more than CPC, but CPC+DPC was even more effective and comparable to CHX. Two formulations behaved in a similar manner to active compounds. In defined-inoculum models, species showed different susceptibilities and variability depending on the isolate. Fn biomass was not decreased by CPC, but in most models it was decreased by CPC+DPC. In whole plaque models, CPC+DPC reduced diversity in a manner comparable to CHX; however, Fn abundance was not reduced in biofilms of one subject.

Conclusions: CPC+DPC act synergistically and show promise as an effective antimicrobial with comparable activity to CHX. Further research is needed to elucidate Fn's variable susceptibility to CPC+DPC.

PD223 | Efficacy of Motivational Interviewing to Improve Oral Hygiene in Adults: A Randomized Controlled Clinical Trial

C. Moreira[1], K. Tatsch[1], J. Uliana[1], D. Slot[2], K. Kantorski[1], G. Ortigara[1]

[1]Federal University of Santa Maria, Stomatologiae, Santa Maria, Brazil, [2]Academic Centre for Dentistry Amsterdam, Amsterdam, Netherlands

Background & Aim: This randomized controlled clinical trial evaluated the efficacy of motivational interviewing (MI) as an approach to improving oral health in adults.

Methods: 72 participants, systemically healthy, non-smokers, with periodontitis (stage I to IV) and with at least 30% of sites presenting bleeding on probing (BoP), were randomized into two groups. During steps 1 and 2 of periodontal therapy, control group (CG) received conventional information and the test group (TG) received MI-based approach (MI) aiming behavior change. Participants in both groups received treatment once a week, were instructed to brush their teeth twice daily, and use an interdental device once daily. In the TG group, 3–5 MI interventions were conducted. Gingival Index (GI), Plaque Index (PlI) and BoP were evaluated at baseline, at 15 days after step 1, and at 30 and 60 days after step 2 of therapy. Linear mixed models were used to compare PlI, GI and BoP intra- and intergroup means. Delta and effect size were evaluated.

Results: After 60 days of follow-up, both groups showed increased tooth brushing and interdental device use, along with significant reductions in gingival inflammation and bleeding over time. No statistically significant differences were observed between groups for clinical outcomes. The effect size for BoP was large in both groups (CG: 1.68 and TG: 1.86), indicating substantial improvements.

Conclusions: In the short term (60 days), periodontal clinical inflammation was reduced for both groups. MI showed no additional effect on clinical outcomes of periodontal therapy compared to conventional approach.

PD224 | Biofilm-Inhibitory and Antimicrobial Effect of a Chlorine-Based Mouthwash: A 4-Day Non-Brushing Trial

K. Povšič[1,2], H. Munjaković[1,2], N. Zayed[3], W. Teughels[3], K. Seme[4], A. Fidler[5,6], R. Gašperšič[1,7]

[1]University of Ljubljana, Faculty of Medicine, Department of Oral Medicine and Periodontology, Ljubljana, Slovenia, [2]University Medical Centre Ljubljana, Department of Oral Medicine and Periodontology, Ljubljana, Slovenia, [3]University of Leuven (KU Leuven), Department of Oral Health Sciences, Leuven, Belgium, [4]University of Ljubljana, Faculty of Medicine, Institute of Microbiology and Immunology, Ljubljana, Slovenia, [5]University of Ljubljana, Faculty of Medicine, Department of Endodontics and Operative Dentistry, Ljubljana, Slovenia, [6]University Medical Centre Ljubljana, Department of Restorative Dentistry and Endodontics, Ljubljana, Slovenia, [7]University Medical Centre Ljubljana, Department of Oral Medicine and Periodontology, Ljubljanasloven, Slovenia

Background & Aim: The antimicrobial effect of chlorine-based mouthwashes (CBM) varies greatly due to differences in their pH and free chlorine concentrations. The aim of this study was to evaluate the effect of a CBM formulation compared to the gold standard, chlorhexidine gluconate (CHX), on de novo biofilm formation in terms of: a traditional plaque index, a 3D digital volumetric quantification method, and qPCR.

Methods: This was a randomized, double-blind, placebo-controlled, cross-over, 4-day non-brushing clinical trial with 3 arms. After professional tooth prophylaxis at baseline, periodontally healthy subjects refrained from mechanical tooth cleaning for 4 consecutive days and rinsed their oral cavities twice daily with either CBM (200 ppm free chlorine, pH 7), 0.12% chlorhexidine (CHX) or placebo according to a 3-arm randomization sequence. Biofilm formation was assessed at baseline and after 4-days using the Turesky Modification of the Quigley-Hein Plaque Index (TMQHPlI), a novel volumetric plaque index (VPI) based on superimposed intraoral 3D scans, and qPCR. Pearson's correlation coefficient and multilevel

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

models were used to examine the relationship between the VPI and the TMQHPlI.

Results: CHX was more effective than CBM in reducing biofilm formation as measured by both TMQHPlI and VPI, although both mouthrinses significantly ($p < 0.05$) reduced the presence of biofilms compared to placebo. The broad-spectrum antimicrobial effect of CHX led to a significant decrease in all tested commensal bacteria, but increased the load of *F. nucleatum* ($p < 0.05$). Conversely, CBM effectively ($p < 0.05$) reduced the bacterial load of *F. nucleatum* and *P. intermedia* without significantly affecting commensals associated with eubiosis. CBM consistently showed a stronger ($p < 0.05$) antimicrobial effect against all pathobiontic species tested, except *T. denticola*.

Conclusions: While CBM showed a significant but lower biofilm-inhibitory effect than CHX, it exhibited a more selective antimicrobial action and dysbiosis-controlling effect than CHX.

PD225 | Pocket Closure Following Non-Surgical Periodontal Treatment in Type 2 Diabetes Mellitus Patients: A Multilevel Analysis

N.G. Gorgulu[1], H.S. Gungormek[1], B. Dogan[1]
[1]*Marmara University, Department of Periodontology, Istanbul, Turkey*

Background & Aim: Diabetes mellitus (DM) is a significant risk factor for periodontitis, and studies have shown that DM patients with poor glycemic control experience an 86% higher incidence or risk of periodontitis progression compared to non-DM or well-controlled DM patients. Following periodontal treatment for periodontitis, achieving pocket closure (PC) has been associated with the highest likelihood of periodontal stability and the lowest risk of tooth loss. This study aims to evaluate the impact of type 2 DM and tooth-related factors on PC following non-surgical periodontal treatment (NSPT).

Methods: The analysis included 71 non-smoker periodontitis patients, comprising 25 systemically healthy patients, 23 well-controlled DM patients, and 23 poorly controlled DM patients, with a total of 1,671 teeth. All sites with baseline pocket depth (PD) ≥ 5 mm were considered diseased. At 3 months after NSPT, PD ≤4 mm without bleeding on probing was regarded as PC. Logistic multilevel regression was used to explore factors associated with diseased sites and the likelihood of PC, considering variables at the patient, tooth, and site levels.

Results: Poorly controlled DM, multirooted teeth, and interdental periodontal pockets (mesial and distal sites of the teeth) were associated with diseased sites. NSPT significantly reduced PD (1.05 ± 1.12 mm, $p < 0.001$). PC was achieved in 67% of the diseased sites following NSPT. However, poorly controlled DM, multirooted teeth, interdental periodontal pocket, and higher baseline PD were significant predictors of incomplete PC at diseased sites.

Conclusions: The control of DM, the number of roots, and the site of the periodontal pocket were found to significantly affect NSPT outcomes. Considering these factors beforehand could help identify sites that may require additional treatments to ultimately achieve the treatment endpoint.

PD226 | Impact of Self-Perceived Improvement in Oral Health-Related Quality of Life on Gingival Bleeding After Oral Hygiene Training: A Secondary Analysis

R. Tavares[1], G. Ortigara[1], K. Tatsch[1], A.P. Reiniger[1], J. Knorst[1], D. Slot[2], C.H. Moreira[1]
[1]*Federal University of Santa Maria, Santa Maria, Brazil,* [2]*Academic Center for Dentistry Amsterdam, Amsterdam, Netherlands*

Background & Aim: Gingivitis can negatively impact oral health-related quality of life (OHRQoL). Effective oral hygiene practices, including toothbrushing and dental flossing, have the potential to reduce gingival bleeding and improve OHRQoL. However, the extent to which individuals' perceived improvements in OHRQoL after oral hygiene training (OHT) correlate with actual reductions in gingival bleeding remains uncertain. This study aims to assess the impact of perceived OHRQoL improvement following OHT on gingival bleeding outcomes.

Methods: Sixty-five participants with at least 15% proximal gingival bleeding were included in this secondary analysis. They received weekly oral hygiene instructions and professional plaque control according to group allocation: adjunctive use of dental floss with toothbrushing (TB+DF) or toothbrushing alone (TB) over 60 days, followed by a six-month period without further hygiene instructions. Gingival index (GI) was evaluated at baseline and after 60, 120, and 240 days; OHRQoL was measured using the Oral Health Impact Profile (OHIP-14) at baseline and after 60 days. The Minimal Clinically Important Difference (MID) for OHRQoL was estimated and participants were classified as achieving (≥MID) or not achieving (<MID) this improvement. Mixed linear models were used to compare groups over time.

Results: The MID was established as a 6.4-point improvement on the OHIP scale. Participants in the <MID group had significantly higher gingival bleeding levels (20.7 [SE 2.05] vs. 14.6 [SE 2.2], $p < 0.05$) at 120 days, with no differences observed at 60 and 240 days. In the TB+DF group, participants who perceived an OHRQoL improvement exhibited lower gingival bleeding over time.

Conclusions: Individuals perceiving OHRQoL improvement after OHT demonstrated lower gingival bleeding levels, suggesting that perceived quality of life improvements may align with positive clinical outcomes in gingival health.

PD227 | Advanced Periodontal Treatment of a 16-Year Old Patient Diagnosed With Papillon Lefevre With Stage 4, Grade C Periodontitis

R. Bujaldón Rodríguez[1], E. Montero[1], D. Herrera[1], E. Figuero[1], M. Sanz[1]
[1]*Faculty of Odontology, University Complutense of Madrid, Madrid, Spain*

Background & Aim: Papillon-Lefèvre Syndrome (PLS) is a rare, autosomal recessive genetic disorder (two copies of an abnormal gene must be present) characterized by severe periodontitis and hyperkeratosis of the palms of the hands and soles of the feet (palmoplantar keratoderma). The syndrome typically presents in early childhood and is caused by mutations in the CTSC

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

gene, which encodes the enzyme cathepsin C. This enzyme is crucial for the proper functioning of immune cells, particularly neutrophils, leading to a compromised immune response and subsequent periodontal disease.

Methods: A complete periodontal treatment was performed following the clinical practice guideline of stage IV periodontitis. In step 3, 3 regenerative surgeries were performed (one of them on a tooth with a grade 2 endo-periodontal lesion) and application of non-surgical enamel-matrix derivative. After achieving the end-points, we advanced to the multidisciplinary phase where orthodontics was placed with the objectives of correcting the malpositions to facilitate the biofilm control by the patient. During maintenance, the tooth with the endo-perio lesion relapsed and regeneration surgery was performed again.

Results: We present the evolution of periodontal and orthodontic treatment in a patient with papillon lefrevre syndrome 3 years later, where the periodontal treatment objectives were achieved and the patient has not lost any teeth.

Conclusions: Periodontal treatment is an effective tool in providing periodontal stability and maintenance of masticatory function to our patients. After a periodontal therapy structured in 3 phases, we have been able to maintain teeth with questionable or even impossible prognoses.

In addition, under a strict protocol of supportive periodontal care, we have been able to provide periodontal stability to this periodontitis as a manifestation of systemic disease, which in comparison to the published cases lost teeth at a very early age.

PD228 | Assessment of Periodontal Status and Cardiometabolic Risk in the Dental Setting: The CardioRisk Study

B. González Gallego[1], C. Sola[1], A. Abuelo[1], A. Lorente[1], M. Carasol[1], D. Herrera[1], E. Montero[1], M. Sanz[1]
[1]University Complutense of Madrid, Madrid, Spain

Background & Aim: In Spain, periodontitis presents a prevalence of 38.4% and around 4 million subjects present a high risk of cardiovascular death. Taking into account the evidence of the association between both diseases, the development of a protocol for the identification of subjects at increased cardiovascular risk in the dental clinic could be useful in terms of public health. The objective of this investigation was to evaluate the association between periodontal status and cardiometabolic risk, assessing the 10-year risk of cardiovascular death, using the Systematic Coronary Risk Evaluation (SCORE) index for case definition and, secondarily, to evaluate the association between periodontal status and glycated hemoglobin (HbA1c) levels, as part of a protocol for the evaluation of cardiometabolic risk in the dental clinic.

Methods: Patients ≥40 years old attending a university clinic and a private dental clinic were recruited and the following data were taken: periodontal examination, Finnish Diabetes Risk Score (FINDRISC), HbA1c, total cholesterol, blood pressure and SCORE.

Results: 281 patients were included, with a mean age of 58.9 (±10.4) years. 2.5% of the patients obtained a SCORE ≥ 10% (very high) and 17.7% between 5 and 9% (high). Of the sample, 9.4% obtained HbA1c values ≥ 6.5% and 14.2% between 5.7% and 6.4% (values indicative of the potential presence of diabetes mellitus and prediabetes, respectively). A significant association was found between SCORE and basic periodontal examination ($p < 0.001$), but not with the rest of periodontal parameters ($p > 0.05$). An association was observed between HbA1c levels and bleeding on probing ($p = 0.046$) or the percentage of sites with PS ≥ 4 mm ($p = 0.023$).

Conclusions: This protocol constitutes an effective and simple method for the early detection of individuals with high cardiometabolic risk in the dental clinic and, therefore, could be beneficial in terms of public health for the early identification of patients with increased cardiovascular risk and/or of developing diabetes mellitus.

PD229 | Effect of Glycemic Control on Periodontal Parameters in People with Type 2 Diabetes—A Single-Arm Interventional Pilot Trial

L. Thiemann[1], M.-L. Gnadt[1], A.B. Kruse[1], K. Vach[2], K. Laubner[3], J. Seufert[3], F. Cieplik[1], P. Ratka-Krüger[1], J.P. Wölber[4]
[1]Center for Dental Medicine, Faculty of Medicine, University of Freiburg, Department of Operative Dentistry & Periodontology, Freiburg, Germany, [2]Institute of Medical Biometry and Statistics, University of Freiburg, Faculty of Medicine and Medical Center, Freiburg, Germany, [3]Division of Endocrinology and Diabetology, Faculty of Medicine, University of Freiburg, Department of Medicine II, Freiburg, Germany, [4]Policlinic of Operative Dentistry, Periodontology, and Pediatric Dentistry, Medical Faculty Carl Gustav Carus, Technische Universität Dresden, Dresden, Germany

Background & Aim: Periodontitis and type 2 diabetes (T2D) show a bidirectional relationship. This pilot study investigated how glycemic control affected periodontal status in people with T2D.

Methods: Patients with inadequately T2D (baseline HbA1c-value ≥8.0) and periodontitis were scheduled to receive both intensification of antihyperglycaemic therapy and periodontal examinations, without further prophylaxis or subgingival instrumentation during a 3-month study period. Clinical assessments at baseline and 3 months included metabolic assessment (HbA1c), pocket probing depth (PPD), bleeding on probing (BOP), periodontal inflamed surface area (PISA), plaque index (PI), and gingival index (GI). Primary outcome parameter was PISA.

Results: The successful reduction in HbA1c in 17 out of 20 patients (from in average 9.3% to 8.2%) after 3.8 ± 1.1 month resulted additionally in significant reductions of PISA, BOP and PI ($p = 0.0014$; $p = 0.0008$; $p = 0.048$). Furthermore, at T2 a significant association between HbA1c concentration and oral clinical parameters was found when adjusting for age, BMI and treatment time. For higher HbA1c values increased PISA values ($p = 0.006$), higher BOP values ($p = 0.026$) and increased tooth mobility ($p = 0.015$) were observed.

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Characteristics of the study population (absolute numbers or mean values ± standard deviation)

Variable	T1	T2	Δ (T2 − T1)
n		20	
Age		58	
Male/Female		17/3	
HbA1c (%)	9.3 ± 1.0	8.2 ± 1.5	−1.1 ± 1.5
BMI	33.6 ± 6.5	34 ± 6.9	−0.4 ± 0.75
BOP (%)	46.3 ± 19.3	37.7 ± 21.1	−8.6 ± 9.7
PISA (mm^2)	627.5 ± 306.7	502.2 ± 295.5	−125.2 ± 150.1

Conclusions: This study provides evidence that glycemic control can significantly improve periodontal inflammation over a short period of 3-months without extended periodontal therapy. These findings underline the importance of a good glycemic control for periodontal health in people with TD2.

PD230 | Associations Between Plasma Immunoglobulin G Levels Against *Porphyromonas gingivalis* and Complications in Type 2 Diabetes

A. Kolahi Azar[1,2], E.K. Frimodt-Møller[1], H. Sayed Zohori Bahrami[1], C.H. Nielsen[3], L. Massarenti[3], T. Kümler[1], P. Godsk-Jørgensen[4], M. Thorsten Jensen[1,5], T. Willum Hansen[1], C. Damgaard[2], P. Rossing[1,5]

[1]Steno Diabetes Center Copenhagen, Department of Clinical and Translational Research, Herlev, Denmark, [2]University of Copenhagen, Faculty of Health and Medical Sciences, Department of Odontology, Copenhagen, Denmark, [3]Institute for Inflammation Research, Center for Rheumatology and Spine Diseases, Copenhagen University Hospital, Copenhagen, Denmark, [4]Department of Cardiology, Copenhagen University Hospital Herlev-Gentofte, Hellerup, Denmark, [5]University of Copenhagen, Faculty of Health and Medical Sciences, Department of Clinical Medicine, Copenhagen, Denmark

Background & Aim: Adults with type 2 diabetes (T2D) have an increased risk of periodontitis compared to adults without diabetes. Immunoglobulin (Ig) G against *Porphyromonas gingivalis* is an established marker for periodontitis, but it is unclear whether high levels of these antibodies are associated with diabetes-related complications. We aimed to determine the associations between plasma IgG levels against *P. gingivalis* and complications in T2D.

Methods: In a cross-sectional study of adults with T2D attending an outpatient clinic in Copenhagen, Denmark, plasma samples were analyzed for IgG against *P. gingivalis*, using a bead-based Luminex assay. Differences in clinical characteristics across tertiles of IgG levels against *P. gingivalis* were assessed using one-way ANOVA and the chi-squared test. We used logistic regression analyses to investigate the associations between IgG levels against *P. gingivalis* and complications (cardiovascular disease, albuminuria, and retinopathy). We adjusted for age, sex, diabetes duration, smoking status, estimated glomerular filtration rate (eGFR), and interleukin-6 (IL-6) levels.

Results: A total of 898 participants were included, 34% were female, mean (±standard deviation) age was 65 ± 10 years, and median (interquartile range) diabetes duration was 12 (6–17) years. Participants in the highest tertile of IgG levels against *P. gingivalis* were older, had longer diabetes duration, lower eGFR, and higher IL-6 levels compared to participants in the lowest tertile. A one unit increase in log (IgG) levels against *P. gingivalis* was associated with 20% (95% confidence interval: 4%–40%) increased odds of being in a more severe albuminuria category, independent of clinical characteristics ($p = 0.016$). Statistically significant associations between plasma IgG levels against *P. gingivalis* and other complications were not observed.

Conclusions: Higher plasma IgG levels against *P. gingivalis* were associated with lower eGFR and increasing albuminuria, suggesting a possible link between periodontitis and kidney disease in adults with diabetes.

PD231 | Prevalence of Comorbidities in Individuals With Periodontitis in a Private Periodontal Referral Practice

N.G. Beukers[1], B.G. Loos[1], G.J. van der Heijden[2], E. Stamatelou[1], A. Angelakis[3], N. Su[2]

[1]Academic Centre for Dentistry Amsterdam, Department of Periodontology, Amsterdam, Netherlands, [2]Academic Centre for Dentistry Amsterdam, Oral Public Health, Amsterdam, Netherlands, [3]Amsterdam University Medical Centers, Epidemiology and Data Science, Amsterdam, Netherlands

Background & Aim: Periodontitis (PD) patients frequently suffer from comorbidities, necessitating increased attention to disease management and monitoring. The aim of the study is to investigate the prevalence and patterns of comorbidities among patients with PD in a private periodontal referral practice.

Methods: The study involved 3171 adults with PD. Data on demographics, lifestyle data, number of teeth, pockets ≥6 mm, bleeding on probing (BOP), periodontal inflammatory surface area (PISA), and comorbidities were extracted from the Electronic Health Records. Descriptive and statistical analyses, including *t*-tests, chi-square tests, cluster analysis, binary logistic regression analysis and hypergraph network analysis, were performed.

Results: Patients had on average 1.7 systemic diseases, with 47% having comorbidities and 20% having multimorbidity (≥2 diseases). Comorbid patients were more often female ($p < 0.001$) and had fewer teeth ($p < 0.001$), though PD severity was comparable. Two distinct clusters emerged based on disease patterns. Cluster 1, dominated by respiratory conditions, and Cluster 2, predominantly containing cardiometabolic diseases, differed significantly in age ($p = 0.049$), sex ($p < 0.001$), number of teeth ($p = 0.017$), and number of pockets ≥6 mm ($p < 0.001$), but showed no differences on smoking ($p = 0.16$), BOP ($p = 0.55$), or PISA ($p = 0.47$). Adjusted logistic regression highlighted significant distinctions between clusters. For multimorbidity, two primary groups appeared: (i) with pulmonary conditions (lung disease, asthma, allergic rhinitis, allergies); (ii) with cardiometabolic disorders (hypertension, myocardial infarction,

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

cerebrovascular disease, diabetes mellitus). Hypertension, allergy, and allergic rhinitis demonstrated high centrality (0.41, 0.54, 0.46, respectively), acting as central nodes and frequently co-occurring with other diseases, underscoring their key roles in patients' health profiles and their association with other diseases within this cohort.

Conclusions: The study highlights comorbidity patterns in PD-patients, suggesting dental professionals to consider systemic conditions in their care-strategies. Moreover, the current results could guide policymakers and practitioners in developing evidence-based strategies to address the comprehensive health needs of PD-patients.

PD232 | Supervised Machine Learning Analytics for Investigating Hyperlipidemia and Periodontitis: A Nationwide Study

D. Domb[1], G. Mizraji[1], C. Goldstein[2], A. Wilensky[1], G. Almoznino[3,2]

[1]Hebrew University of Jerusalem, Department of Periodontology, Hadassah Medical Center, Faculty of Dental Medicine, Jerusalem, Israel, [2]Hebrew University of Jerusalem, Big Biomedical Data Research Laboratory, Jerusalem, Israel, [3]Hebrew University of Jerusalem, Department of Oral Medicine, Sedation & Maxillofacial Imaging, Big Biomedical Data Research Laboratory Hadassah Medical Center, Faculty of Dental Medicine, Jerusalem, Israel

Background & Aim: The association between hyperlipidemia and periodontitis has been investigated in the past years, suggesting a connection and hypothesizing a bi-directional relationship between these two diseases. This nationwide study aims to investigate the association between hyperlipidemia and periodontitis, using big data machine learning techniques.

Methods: Data from patients aged 18–50 years was retrieved from the Dental, Oral, and Medical Epidemiological study; a record-based cross-sectional study, that integrates extensive sociodemographic, medical, and dental records. The study utilized a nationally representative sample of military personnel in Israel, collected in 2015. Hyperlipidemia was diagnosed as blood lipids > 200 mg/dL and all non-HDL-Cholesterol > 190 mg/dL. Periodontitis was defined according to the American Academy of Periodontology guidelines. Radiographic bone loss was defined as the interval exceeding 2 mm between the crestal margin and the cementoenamel junction.

While adjusting for dental status, sociodemographic factors, health behaviors, metabolic syndrome components and related conditions. Feature importance analysis was performed using the eXtreme Gradient Boosting machine learning algorithm with hyperlipidemia as the outcome variable.

Results: The research consisted of 132,529 records (mean age = 37.11 ± 7.08). The prevalence of hyperlipidemia was 5.8% (n = 7726). Among patients with hyperlipidemia, the prevalence of periodontitis was 11.6% (n = 655) compared to 4% in the whole sample (OR = 2.8. [2.5–3.0], p-value < 0.001). Feature importance model showed strong predictive performance, with an area under the curve = 0.948 (accuracy = 0.935, precision = 0.694, recall score = 0.652). The feature importance analysis using Gradient Boosting identified the following key factors: age, obesity, male sex, smoking, fatty liver, deep vein thrombosis, hypertension, and a high-sugar diet—well-known risk factors for hyperlipidemia. Periodontitis ranked ninth in terms of importance.

Conclusions: Patients with hyperlipidemia are 2.8 time more likely to develop periodontitis. Periodontitis emerged as the primary dental condition associated with hyperlipidemia, as identified through gradient boosting machine learning analysis.

PD233 | Neutrophil Isolation and Characterisation From Colonic Lavage Fluid to Provide Insights Into Periodontitis-Inflammatory Bowel Disease Links

E. Yay Kus[1,2], J.P. Steffens[1,3], J. Hirschfeld[1,2], P. Rimmer[4,5,2], V. Stoica[4,2], T. Iqbal[4,5,2], I.L.C. Chapple[1,2]

[1]University of Birmingham, Dentistry, School of Health Sciences, College of Medicine and Health, Birmingham, United Kingdom, [2]National Institute for Health and Care Research (NIHR) Birmingham Biomedical Research Centre, Birmingham, United Kingdom, [3]Universidade Federal do Paraná, Department of Stomatology, Curitiba, Brazil, [4]University of Birmingham, School of Health Sciences, College of Medicine and Health, Birmingham, United Kingdom, [5]Queen Elizabeth Hospital, Birmingham, United Kingdom

Background & Aim: Periodontitis and inflammatory bowel diseases (IBD) are associated and share common pathophysiological mechanisms. IBD, principally Crohn's disease and ulcerative colitis, is characterised by dysregulated immune-inflammatory responses. Neutrophils are critical effectors of innate and acquired immunity. Whilst neutrophil function has been extensively investigated in peripheral blood in periodontitis and IBD, no studies have reliably isolated and characterised neutrophils in gut lavage fluid, which may shed light on their role in IBD pathogenesis. We report a method to isolate, quantify, and characterise neutrophils from gut lavage fluid.

Methods: Lavage samples (n = 13) were collected into sterile saline (1:1 ratio water-to-saline) from IBD patients. Samples were strained via 70, 40 and 31.5 µm filters. After centrifugation, supernatant was aspirated, and the remaining pellet resuspended in glucose-supplemented phosphate-buffered saline. Viability was assessed by Trypan blue exclusion and cells counted using a Cellometer Auto T4 Cell Counter. Neutrophils were identified microscopically by cytospin preparation and Giemsa staining, and flow cytometry was employed to identify their stage of differentiation using CD10, CD11b, CD62L, and CD66b surface markers. Neutrophil reactive oxygen species (ROS) release following stimulation by PMA, opsonized *S. aureus*, and *F. nucleatum* (vs. no stimulation) was analysed using luminol.

Results: Neutrophils were consistently detected in gut lavage fluid in IBD patients. Giemsa staining showed the presence of neutrophils in a highly contaminated environment. Mean cell viability was 43.36% ± 12.67%. Flow cytometry demonstrated a high degree of specificity for neutrophil markers, especially related to advanced stages of differentiation. Neutrophil stimulation demonstrated compromised ROS production.

Conclusions: This is the first study to establish a method for detection and quantification of neutrophils in human gut lavage fluid. It represents a valuable tool for monitoring IBD disease activity and to explore the role of neutrophil-driven inflammation

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

in the context of the oral-gut axis, potentially informing new therapeutic strategies.

PD234 | Virulence Factors of *Porphyromonas gingivalis* in Periodontitis and Rheumatoid Arthritis: Clinical Implications

D. Santos Silva[1], M. Kaminska[2], D. Mizgalska[3], J. Potempa[4], C. de Vries[5], K. Lundberg[5], J.A. Pereira da Silva[6], I. Poiares Baptista[1]
[1]University of Coimbra, Department of Periodontology Institute, Coimbra, Portugal, [2]University of Bergen, Bergen, Norway, [3]Jagiellonian University, Krakow, Poland, [4]University of Louisville, Louisville, United States, [5]Karolinska Institutet, Stockholm, Sweden, [6]University of Coimbra, Coimbra, Portugal

Background & Aim: *Porphyromonas gingivalis* (*P.gingivalis*), has been implicated in exacerbating inflammatory arthritis through its virulence factors. Understanding the role of these factors could inform strategies to mitigate both periodontal and synovial inflammation. This study aimed to examine the pathogenic correlation between periodontitis and RA, focusing on various *P.gingivalis* virulence factor variants.
Methods: Patients with rheumatoid arthritis (RA) ($n=22$), RA plus periodontitis ($n=22$), periodontitis ($n=10$), and healthy controls ($n=35$), were compared for C-reactive protein levels, anticyclic citrullinated peptide IgG, peptidylarginine-deiminase (PAD) 2/4 activity and anti-*P. gingivalis* virulence-associated gingipain antibodies. All patients with periodontitis were compared for *P.gingivalis*, *Tannerella forsythia* and *Prevotella intermedia* colony-forming units, and gene variants of *P. gingivalis*, including PAD (*P*.PAD), major fimbriae (*fimA*), lysine-gingipain (*kgp*), and receptor antigen gene B (*ragB*).
Results: Higher mean clinical attachment loss was observed with *P*.PAD type 1. The *fimA* and *kgp* gene variants showed distinct distributions between groups. Anti-gingipain IgG levels showed positive correlations with RA disease activity.
Conclusions: Despite limitations, this study supports a role for *P.gingivalis* in exacerbating periodontitis and RA underscoring the importance of *P.gingivalis* virulence factors in disease modulation and highlighting potential therapeutic strategies. Further research is needed to elucidate mechanistic pathways and develop effective interventions.

PD235 | Effect of Periodontal Treatment in a Combined Model of Periodontitis and Depression in a Pre-Clinical In Vivo Study

N. Ambrosio[1], M. Martínez[1], C. Chamorro[1], J. Gamonal[1], J. Ríos-Barbero[1], J. Robledo-Montaña[2], L. Virto[1], E. Montero[1], J. Bueno[1], M.J. Marin[1], D. Herrera[1], M. Sanz[1], B. García-Bueno[2], D. Martín-Hernández[2], J.C. Leza[2], E. Figuero[1]
[1]University Complutense of Madrid, Faculty of Dentistry, Madrid, Spain, [2]University Complutense of Madrid, Faculty of Medicine, Madrid, Spain

Background & Aim: Linking mechanisms between periodontal diseases and depression have been previously described, however, there is a lack of evidence on the effect of periodontal treatment on both diseases. The aim of this study was to analyze the impact of non-surgical periodontal treatment on the microbiota (intestinal, feces and blood) and on the gingival junctional epithelium.
Methods: A preclinical in vivo study in Wistar rats. Periodontitis (P) was induced (ligatures and oral rinses with *Fusobacterium nucleatum* and *Porphyromonas gingivalis*) followed by a depression induction through a chronic mild stress (CMS) model. Periodontal treatment (TREAT) consisted of supra- and subgingival instrumentation with chlorhexidine rinses. Six groups were obtained: P+CMS+TREAT+; P+CMS+TREAT-; P+CMS-TREAT+; P+CMS-TREAT-; P-CMS+; and control (P-CMS-). Periodontal clinical variables and depressive and anxiety like behavior were made (splash, open field and elevated plus maze test). Intestinal mucosa, feces and blood samples after TREAT were processed using sequencing technologies (Illumina MiSeq) to assess taxa abundant, α- and β-diversity of microbiota. Gingival junctional epithelium barrier was assessed by transmission electron microscopy (TEM).
Results: After periodontal treatment, statistically significant improvement were observed in periodontal outcomes. No changes were observed between groups in the behavioral tests made. Significant differences in the microbial composition of intestinal and feces between groups were observed. Adonis test identifies CMS_as the factor that has the greatest impact on the intestinal mucosa microbiome ($R^2=0.271$; $p=0.001$), followed by periodontitis induction with a much smaller effect ($R^2=0.082$; $p=0.007$). Periodontal_treatment represent a non-significant marginal contribution ($R^2=0.0005$; $p=0.980$). Desmosomes of P+ and CMS+ groups were observed to be more radiolucent, indicating a lower density of the filaments, that increased after periodontal treatment.
Conclusions: Changes in microbial composition and in gingival junctional epithelium were observed after CMS and P induction, with a marginal contribution of periodontal treatment.

PD236 | Periodontal Inflammation and Preterm Birth (PTB) in Women at Increased Risk of PTB. A Cross-Sectional Study

S. Ker[1], F. D'Aiuto[1], M. Huang[1]
[1]UCL Eastman, London, United Kingdom

Background & Aim: Several lines of evidence support the association of periodontitis with adverse pregnancy outcomes (preterm birth [PTB] and low birth weight [LBW]), however inconclusive results from intervention studies do not support a causal association. The aim of this study was to ascertain whether periodontal inflammation was associated with PTB or LBW in a sample of women at increased risk of PTB.
Methods: Women at increased risk of PTB were consecutively recruited between 13 and 28 weeks of pregnancy at the Obstetric Unit of the University College London Hospital from February 11 2022 to July 12 2023. Medical, demographic data and a self-reported periodontal health questionnaire were completed and followed by a dental examination. Oral clinical data including decayed, missing, filled teeth (DMFT) and clinical periodontal parameters (dental plaque indices, number of sites with probing

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

pocket depths more than 4 mm (PPD > 4 mm) and bleeding on probing), were collected by three calibrated examiners around 6 sites per tooth. Outcomes of pregnancy including complications and general health data were retrieved from electronic health records from consenting participants.

Results: A total of 134 participants (aged 35.3 ± 4.5 years) mostly of Caucasian origin (57.9%) were recruited in this study. The most frequent (21.6%) reason for referral to the high-risk clinic was previous caesarean-section at full dilatation. All participants delivered between 20.6 and 41.3 weeks with a rate of PTB of 16% and of LBW of 15%. Less than 20% of participants presented with good oral health. A statistically significant negative association between PPD > 4 mm and delivery term was observed ($p = 0.02$) independent of other confounders including smoking. A borderline statistically significant association between PPD > 4 mm and delivery weight was also noted ($p = 0.07$).

Conclusions: Continuous measures of periodontal inflammation (PPD ≥ 4 mm) were associated with PTB and partially with LBW independent of common confounders. In a cohort of women at increased risk of PTB.

PD237 | Non-Surgical Instrumentation of Periimplantitis Defects Supported by Hypochlorite/Aminoacid Gel and xHyA Impacts Probing Depth and Bleeding Tendency—Preliminary 12-Months Results From Prospective Case Series

A. Friedmann[1], B. Ayoub[1], E. Ramanauskaite[2], D. Diehl[1]
[1]Witten/Herdecke University, Department of Periodontology, Witten, Germany, [2]Lithuanian University of Health Sciences, Department of Dental Diseases and Oral Pathology, Kaunas, Lithuania

Background & Aim: Non-surgical approach for treating intrabony periimplantitis defects is considered ineffective in resolving probing depth (PD) and bleeding tendency (BoP) over a period of 12 months post-treatment. The case series addresses the impact of adjunctive application of a hypochlorite/aminoacid gel and crosslinked hyaluronic acid (xHyA) to non-surgical mechanical instrumentation protocol on clinical parameters change and radiographic alterations (MBL) 12 months after non-surgical therapy.

Methods: Study enrolls 40 adult patients aged from 18 to 80 who present with severe periimplantitis condition at least at one implant site. Patients are generally at good health condition, while diabetes mellitus, hypertension and other systemic disorders are excluded.

The intervention bases on repeated subgingival application of hypochlorite/aminoacid gel to enhance mechanical debridement as well as to decontaminate exposed implant surface during one visit. Once operator considers instrumentation completed, crosslinked hyaluronic acid (xHyA) gel floats the subgingival defects. The primary parameter is the change in PD assessed at 6 points and resolution of BoP, secondary parameter is the MBL change on a 2D periapical x-ray obtained at 12-months visit.

Results: From 30 patients treated so far, eight patients accomplished the 12-months follow-up. These patients received treatment at 14 implants with a mean initial PD of 7.1 ± 1.6 mm. Initial BoP was positive for 100% of all sites involved. At 12 months evaluation the mean PD was 2.9 ± 1.1 mm and BoP was reduced down to 7% positive sites. PD reduction equalled 4.2 ± 2.0 mm. Radiographically observed changes corroborate this clinical outcome by displaying MBL gain after 12 months.

Conclusions: Within the limitations of this case series we conclude that the preliminary results indicate for proposed adjunctive protocol an effectively enhanced decontamination effect on implant surface and sufficiently supported healing response in deep intrabony periimplantitis defects within non-surgical subgingival treatment.

1600051x, 2025, S28, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/jcpe.14159 by Turkey Cochrane Evidence Aid, Wiley Online Library on [22/06/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License