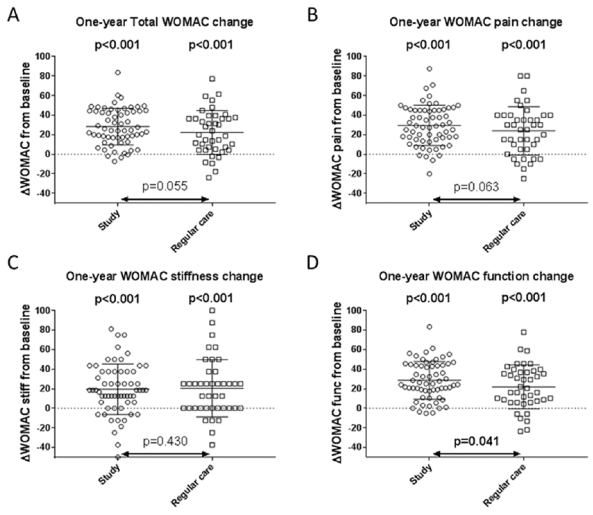


Figure 1: One-year change in total WOMAC score (A) and the WOMAC subscales pain (B), stiffness (C) and function (D) for patients treated with knee joint distraction in clinical studies and in regular care. In all graphs, the p-values above patient groups indicate significant one-year changes while the p-values between patient groups indicate the differences between the groups, corrected for baseline values.

Abstract THU0434 – Figure 1

Conclusion: KJD results in a statistically and clinically significant 1-year improvement in total WOMAC and subscales for most patients. There were no clinically relevant differences between study and regular care patients. Longer follow-up will show whether this is maintained. As such, KJD not only shows good efficacy in study conditions, but also in regular care and can be a joint-preserving treatment of choice for young knee OA patients.

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THU0435 ASSESING THE EFFECTS OF PULSED ULTRASOUND TREATMENT ON PAIN, FUNCTIONALITY, SYNOVIAL FLUID AND CARTILAGE THICKNESS, IN KNEE OSTEOARTHRITIS

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Background: Osteoarthritis (OA) is a progressive rheumatic disease which is the most common cause of musculoskeletal pain and functional impairment, particularly in the elderly group. Ultrasound therapy is one of the most commonly used physical modalities in the OA treatment. It has deep heating effect and increases tissue regeneration, blood flow and metabolic effects while reducing the inflammation. In addition, it increases the cartilage regeneration according to certain in vivo and in vitro studies (1).
Objectives: To research the effect of pulsed ultrasound treatment on pain, functionality, synovial fluid and cartilage thickness in knee osteoarthritis.
Methods: This study was a randomised-controlled and parallel group study. 96 patients (79 females and 17 males) were included to study who had knee pain, aged between 45-75 years. They also have diagnosed as knee osteoarthritis according to ACR diagnostic criteria and their Kellgren-Lawrence grades were ≤3. These patients were divided in two groups randomly: Treatment group (exercise + US), (9 male, 39 female), control group (exercise + Sham US), (8 male, 40 female). The patients in the treatment group were treated with a 1 MHz probe and a density of 1w/cm², 1: 4 for 10 minutes, and 3 sessions a week for 8 weeks. Sham US treatment was applied to each group at the same time. Both groups received a home exercise program including knee range of motion and isometric strengthening exercises. All patients were evaluated by ultrasonographic measurements and quality of life tests; VAS (Visuel Analog Scale) rest, VAS walking, Timed Up and Go Test, WOMAC Questionnaire scores (before treatment, after treatment, 3 months after treatment).
Results: 9 out of 48 patients in the treatment group and 12 out of 48 patients in the control group were excluded from the study because they did not continue treatment or come to the control. The distribution of groups was similar (Table-1). VAS rest, VAS walking, Timed up and go test, WOMAC questionnaire scores, were improved statistically significant in both groups (P<0.05), but group effect could not be demonstrated (P>0.05) There were no statistically significant results in terms of both synovial fluid and femoral cartilage thickness measurements (P>0.05) (Table 2).

Abstract THU0435 –Table 1.

Table-1	Treatment group (exercise + US) n=48	Control group (exercise +Sham US) n=48	P
Age	58.52 ±7.28	60.02 ± 7.43	0,320
Gender	39 female 9 male	40 female 8 male	0.789
BMI (kg/m²)	28.59±4.97	29.29±9.23	0,700
VAS Rest	4.75 ± 2.23	4.37 ± 1.90	0,507
VAS Walking	7.10 ± 2.15	6.75± 2.03	0,360
Timed up and go test (sec)	12.52 ± 3.00	12.53 ± 2.20	0,990
WOMAC questionnaire scores	42.98 ± 18.32	39.85 ± 15.59	0,370
Synovial Fluid Amount (Right Knee)	0.39 ± 0.18	0.32 ± 0.15	0.081
Synovial Fluid Amount (Left Knee)	0.35 ± 0.16	0.39 ± 0.19	0.422
Femoral Cartilage Thickness (cm) (Right Knee)	0.17 ± 0,03	0.17 ± 0.02	0,722
Femoral Cartilage Thickness (cm) (Left Knee)	0.17 ± 0.02	0.17 ± 0.03	0,730

Table-2		Treatment group (exercise + US) n=39	Control group (exercise +Sham US) n=36	P**
VAS Rest	Before treatment	4.79±2.22	4.11±1.86	
	After treatment	2.49±1.87	2.89±2.21	
	3 months later	2.41±2.61	2.44±2.14	
	P*	P*<0,001	P*<0,001	0.140
VAS Walking	Before treatment	7.26±2.17	6.75±2.04	
	After treatment	4.08±2.45	4.39±2.49	
	3 months later	3.62±2.99	4.31±2.44	
	P*	P*<0,001	P*<0,001	0.144
WOMAC questionnaire scores	Before treatment	43.84± 19.01	41.05±13.73	
	After treatment	27.61±18.81	29.61±15.98	
	3 months later	25.56±18.72	28.67±13.42	
	P*	P*<0,001	P*<0,001	0.281
Timed up and go test (sec)	Before treatment	12.85±3.10	12.56±2.25	
	After treatment	11.44±1.92	11.97±2.10	
	3 months later	11.60±2.49	12.08±2.87	
	P*	P*<0,001	P*<0,001	0.166
Synovial Fluid Amount (Right Knee)	Before treatment	0.39±0.19	0.32±0.15	
	After treatment	0.37±0.16	0.34±0.15	
	3 months later	0.35±0.17	0.32±0.16	
	P*	P*=0.648	P*=0.670	0.370
Synovial Fluid Amount (Left Knee)	Before treatment	0.36±0.16	0.37±0.18	
	After treatment	0.37±0.14	0.39±0.13	
	3 months later	0.35±0.14	0.35±0.14	
	P*	P*=0.263	P*=0.864	0.888
Femoral Cartilage Thickness (cm) (Right Knee)	Before treatment	0.17±0.03	0.17±0.02	
	After treatment	0.17±0.02	0.17±0.02	
	3 months later	0.17±0.03	0.17±0.03	
	P*	P*=0.868	P*=0.879	0.864
Femoral Cartilage Thickness (cm) (Left Knee)	Before treatment	0.17±0.02	0.16±0.02	
	After treatment	0.17±0.02	0.16±0.02	
	3 months later	0.17±0.02	0.16±0.02	
	P*	P*=0.486	P*=0.599	0.611

P *: In-group evaluation **P **:** Intergroup evaluation (In-group comparison and group effect comparison was performed by ANOVA variance analysis)

Conclusion: Therapeutic ultrasound treatment in addition to home exercise program has not been shown to be effective rest and walking pain, functionality, synovial fluid and femoral cartilage thickness in the treatment of knee osteoarthritis. This is the first study to evaluate the effect of therapeutic intermittent ultrasound on synovial fluid and cartilage thickness by

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ultrasonography. International collaborative studies and randomized clinical trials will help in clarifying these areas of uncertainty.

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THU0436 THE RELATIONSHIP OF BONE MINERAL DENSITYOF THE AXIAL SKELETON ON THE RISK OF PROGRESSION OF OSTEOARTHRITIS OF THE KNEE

Natalia Kashevarova, Elena Taskina, Ludmila Alekseeva, Nikolay Demin, Aleksandr Lila. *VA Nasonova Research Institute of Rheumatology, Moscow, Russian Federation* **Objectives:** To find the relationship between bone mineral density (BMD) and risk of knee OA progression in a 5-year prospective study.

Methods: 110 females with knee OA were examined twice with 5-year interval. Examination included filling questionnaires, VAS pain assessment, plain knee radiography and axial skeleton densitometry. I stage knee OA was established in 33 (30%) patients, II stage - in 46 (41,8%, III stage – in 26 (23,6%), and IV - in 5 (4,5%). Normal lumbar vertebrae densitometry BMD values were found in 45 patients (40,9%), osteopenia-corresponding BMD values – in 33 (30,0%), and osteoporosis – in 32 (29,1%). Normal femoral neck BMD values were identified in 60 (54,5%) patients, osteopenia-level BMD – in 48 (43,7%), osteoporosis – in 2 (1,8%). In all premenopausal patients (n = 15) axial skeleton BMD values were normal.

Results: In 5-year interval radiographic progression was established in 40 patients (Group 2), while in 70 (Group 1) patients no progression occurred. Both groups were comparable in terms of age and disease duration, although, more patients from Group 2 tended to have normal baseline densitometry BMD values - both in lumbar vertebrae and femoral neck: 47,5% vs 37,1%, and 62,5% vs 44,3% as compared to Group 1 patients. Patients from Group 1 more often had BMD values corresponding to osteoporosis and osteopenia: 32,9 vs 22,5%, and 55,7 vs 37,5%, respectively, as compared to Group 2 patients, although not achieving statistical significance. These differences were still identifiable after 5-year interval. Absolute BMD values at the second examination in 5 years were indicative of statistically significant increase in femoral neck and total hip BMD in Group 2 patients with knee OA progression: 0,79 ± 0,11 vs 0,73 ± 0,16, p<0,01, and 0,93 ± 0,14 vs 0,84 ± 0,25, p<0,05; respectively.

Abstract THU0436 –Table 1.

Femoral BMD differences correlating with OA stage
(Scheffe's method, p < 0,05000)

	I stage	II stage	III stage	IV stage
I stage		0,651186	0,996946	**0,039177**
II stage	0,651186		0,747927	0,213481
III stage	0,996946	0,747927		**0,046981**
IV stage	**0,039177**	0,213481	**0,046981**	

Abstract THU0436 –Table 2.

Lumbar vertebrae BMD differences correlating with OA stage
(Scheffe's method, p ≤ 0,05000)

	I stage	II stage	III stage	IV stage
I stage		0,726047	0,998565	**0,004315**
II stage	0,726047		0,790777	**0,021175**
III stage	0,998565	0,790777		**0,004115**
IV stage	**0,004315**	**0,021175**	**0,004115**	

Thorough analysis of lumbar vertebrae BMD (g/cm^2) relationship with OA stages revealed that in patients with stage IV OA lumbar BMD values were significantly higher than in patients with stages I-III OA (stage I OA - BMD 0,87±0,12 g/cm^2; stage II OA - 0,92±0,21 g/cm^2; stage III OA - 0,88±0,13 g/cm^2, stage IV OA – BMD 1,07± 0,17 g/cm^2) (Table1). Femoral BMD values didn't show evident correlation with knee OA stage, although there was a trend towards higher BMD values in patients with stage IV OA compared to stage III OA (p = 0,06). Total hip BMD values were quite similar to lumbar BMD values (p = 0,01) (Table 2). BMD values were statistically significantly higher in patients with stage IV OA, than in patients with stages I and III (respectively, IV – 0,98 ± 0,13 g/cm^2, I - 0,85 ± 0,10 g/cm^2 and III - 0,86 ± 0,16 g/cm^2). Correlation analysis also confirmed direct correlation between knee OA stage and BMD values in all evaluated compartments (p<0,05).

Conclusion: Increasing during the 5-eyar follow up period femoral neck and total hip BMD values can be interpreted as the predictor of knee PA progression. More advanced OA stages are associated with higher BMD values. Future multicenter prospective studies are deemed to better establish the correlation between BMD and knee OA progression.

Disclosure of Interests:
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THU0437 INCIDENCE OF OSTEOPOROTIC FRACTURE IN PATIENTS WITH KNEE OSTEOARTHRITIS: CLINICAL IMPACT OF FRAX-BASED OSTEOPOROSIS TREATMENT

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Background: The relationship between osteoporosis and osteoarthritis is complex and controversial. Several previous studies have indicated inverse relationship between osteoporosis and osteoarthritis [1-2]. However, the increased bone mineral density in osteoarthritis does not confer a reduce risk for fractures in other studies [3-4]. From the Rotterdam study, although patients with knee osteoarthritis had a higher bone mineral density, their incident fracture risk was increased as compared with those without knee osteoarthritis [5]. Therefore, fracture risk assessment in patients with knee osteoarthritis should not be overlooked.

Objectives: We aimed to evaluate the incidence of high risk group of osteoporotic fracture in patients with knee osteoarthritis comparing the FRAX and WHO criteria. We also examined whether patients with knee OA differ from age, sex, and BMI matched community-based control group without knee OA in terms of the incidence of high risk group of osteoporotic fracture.

Methods: We retrospectively assessed 282 Korean patients with knee OA who visited 5 medical centers between November 2012 and November 2015. For control group, 991 subjects aged of ≥ 50 years-old were enrolled in database of health chekup centers. After matching for age, sex and body mass index, 552 subjects (276 subjects in knee OA group and 276 subjects in control group) included for this study.

Results: Osteoporosis according to WHO criteria was detected 110 (39.86%) subjects in OA group, and 101 (36.59%) subjects in control group; these difference were not significant. However, mean FRAX major osteoporotic fracture probabilities calculated with femur neck T-score were significant different between OA group and control group (7.72% vs 6.10%, p<0.001). Mean FRAX major osteoporotic fracture probabilities calculated without femur neck T-score were also significant different between OA group and control group (8.85% vs 6.86%, p<0.001). Mean FRAX hip fracture probabilities calculated with femur neck T-score were significant different between OA group and control group (2.48% vs 1.73%, p<0.001). Mean FRAX hip fracture probabilities calculated without femur neck T-score were also different significant between OA group and control group (3.50% vs 2.37%, p<0.001). When FRAX calculations without the use of femur neck BMD was adjusted for knee OA group rather than control group, 5.9% more patients would be recommend for osteoporosis treatment. Among the clinical risk factors of FRAX, previous fracture was significant different between knee OA group and control group (15.9% vs 0%, p<0.001).

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