

Conclusions: In this explorative study most patients awaiting TKR experienced significant levels of pain and limitations in activities, but surprisingly the majority did not take NSAIDs daily. Patients with inadequate medication, who started using NSAIDs daily, improved clinically significantly. Further, properly designed RCTs are warranted to study the potential effect of adequate pain medication to delay the need for total knee replacement surgery in case of severe OA, an area where rheumatologists can support orthopaedics.

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ASSOCIATIONS BETWEEN CLINICAL FINDINGS AND MRI OSTEOARTHRITIS FEATURES OF THE PATELLOFEMORAL JOINT

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Purpose: The patellofemoral joint is important in osteoarthritis (OA) of the knee, and in early detection of knee OA. Little is known about the relationship of specific patellofemoral clinical findings and patellofemoral MRI OA features. Therefore the purpose of this study is to examine the relationship between clinical findings and MRI OA features of patellofemoral joint in females aged 45 to 60 years without radiological tibiofemoral OA.

Methods: In an open population of the Rotterdam Study (RS-I-1) all women were invited for a sub-study of identification of early knee OA. Radiographs of the knees were made, as well as an MRI of both knees. Radiographs were scored with Kellgren and Lawrence classification criteria. Cartilage defects, osteophytes, cysts, bone marrow lesions and joint effusion were scored on the MRI's. Furthermore a physical examination of the knee was performed with specific patellar tests and specific questions about pain in the knee and patellar knee pain were reported in a questionnaire. Binomial logistic generalized estimated equations were used to determine the association between the clinical findings and MRI OA features of the patellofemoral joint (odds ratio (OR), 95% confidence interval (CI)). All associations were adjusted for age, BMI and MRI OA features of the tibiofemoral joint.

Results: In 776 women (1429 knees, mean age = 54.7 years and mean BMI = 26.7) we found significant associations between crepitus and all patellar MRI OA features (diffuse cartilage defects OR = 5.26 (CI = 3.52–7.85); focal cartilage defects OR = 3.60 (CI = 2.28–5.69); osteophytes OR = 3.21 (CI = 2.45–4.22); cysts OR = 2.73 (CI = 1.96–3.82); bone marrow lesions OR = 3.58 (CI = 2.65–4.83); joint effusion OR = 1.51 (CI = 1.18–1.94). And also between a history of patellar pain and the MRI OA features (diffuse cartilage defects OR = 2.44 (CI = 1.72–3.47); focal cartilage defects OR = 1.77 (CI = 1.15–2.71); osteophytes OR = 1.68 (CI = 1.26–2.22); cysts OR = 2.06 (CI = 1.48–2.86); bone marrow lesions OR = 2.18 (CI = 1.60–2.97); joint effusion OR = 1.48 (CI = 1.13–1.93). Current knee pain was significantly associated with diffuse cartilage defects (OR = 2.22, CI = 1.38–3.59), cysts (OR = 1.78, CI = 1.13–2.80), bone marrow lesions (OR = 2.11, CI = 1.39–3.19), and joint effusion (OR = 1.75, CI = 1.23–2.51) at PFJ. Furthermore patellar compression test was significantly associated with diffuse cartilage defects (OR = 1.55, CI = 1.03–2.32), and pain at tuberositas tibia was significantly associated with focal cartilage defects (OR = 4.98, CI = 1.50–16.49).

Conclusions: Crepitus and a history of patellar pain are clinical findings that indicate OA features at the patellofemoral joint in women without radiographic tibiofemoral OA. These tests could help to indicate signs of patellofemoral OA and follow-up data needs to confirm whether these tests have an additional diagnostic value on early stage knee OA.

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NSAIDS VERSUS ACETAMINOPHEN IN KNEE AND HIP OSTEOARTHRITIS: A SYSTEMATIC REVIEW REGARDING HETEROGENEITY INFLUENCING THE OUTCOMES

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Purpose: Recent reviews reported only small improvements in pain in favor of non-steroidal anti-inflammatory drugs (NSAIDs) compared to acetaminophen in treating patients with osteoarthritis (OA), but NSAIDs are consistently associated with substantially more side effects. Systematic reviews integrate the results of original studies but if studies are heterogeneous, there is no added value of pooling the results and subgroup analyses may be needed. Statistical heterogeneity was reported

absent in systematic reviews that compared the effectiveness of NSAIDs versus acetaminophen in treating patients with OA. Yet, clinical and methodological heterogeneity are unknown.

The aim of our review was to identify sources of heterogeneity (statistical, methodological, and clinical) in trials evaluating NSAIDs vs. acetaminophen in patients with knee and hip OA to elucidate variations in outcomes.

Methods: A search in relevant databases (1966–Jan 2010) was made for (randomized) controlled trials ((R)CTs) comparing NSAIDs vs. acetaminophen in knee and hip OA. Extracted data included baseline demographic/clinical characteristics, outcomes at follow-up, and characteristics of study design. Heterogeneity was examined with subgroup-analyses by exploring changes in effect size and with I² of Higgins. Pain measures were expressed as standardized mean differences.

Results: 15 RCTs met the in- and exclusion criteria which included 21 comparisons of NSAIDs and acetaminophen. Statistical heterogeneity was absent (Cochran's Q-test = 14.11; I² = 0; p = 0.78). Moderate clinical heterogeneity was found for comparisons which included both patients with hip and knee OA vs. patients with knee OA only (I² = 51; p = 0.09). NSAIDs seemed slightly more effective than acetaminophen if more patients with hip OA were included. However, the pooled effect sizes of comparisons with knee OA vs. both knee and hip OA are equal. Low clinical heterogeneity was found for comparisons with low dosage of acetaminophen, normal dosage of NSAIDs, and moderate pain intensity at baseline. Low methodological heterogeneity was found for comparisons with a short duration of follow-up.

Conclusions: Future trials should present the results of patients with hip and knee OA separately, as moderate clinical heterogeneity was found. There might be differences in effectiveness of NSAIDs vs. acetaminophen in patients with hip vs. knee OA. No significant methodological and statistical heterogeneity was found in studies evaluating NSAIDs vs. acetaminophen.

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PATIENT-ORIENTED OUTCOME MEASURE AND RISK OF KNEE REPLACEMENT SURGERY FOR THE JAPANESE KNEE OSTEOARTHRITIS PATIENTS WITH KELLEGREN-LAURENCE GRADE 4

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Purpose: Total knee arthroplasty (TKA) is an effective therapy to control pain and improve function in subjects with severe knee osteoarthritis (OA). However, as the decision whether to have a joint replacement or not is more ambiguous, it is a judgment that has to be made by the physician and patient working together, and it has to take account of a disability of the patient, in addition to X-ray changes. It is also revealed that there are regional differences for the indication of TKA. For physicians, objective indicators which represent the past results of patients already received TKA are helpful to discuss with patients who are considering their decision to TKA.

The use of clinical outcomes in clinical medicine is important. The Japanese Knee Osteoarthritis Measure (JKOM) was created as a patient-oriented outcome measure for Japanese patients with knee OA. This measure has proven to have sufficient reliability and validity by means of statistical evaluation and comparison with the WOMAC and SF-36.

The aim of this study was to examine whether the JKOM score can predict the risk for receiving TKA, and, if so, the cut-off of JKOM score can be set for receiving TKA.

Methods: This study protocol was approved by the institutional review board of our university. 227 painful medial knee OA patients with K/L 4 were enrolled in this study. JKOM score was obtained from all subjects on the day that radiographs taken. The significant differences of the data were evaluated using the Mann Whitney-U test. The AUC, which is analogous to the area under the ROC curve, was estimated for the discriminative value of prediction models. Odds ratios (ORs) were calculated to evaluate the JKOM cut-off score for receiving TKA.

Results: In this study, patients were followed for 6 months on average. While 63% of the patients were received TKA (OP group), remaining 37%

were not (NOOP group). No gender distribution (87.2% was female in total), age (73.1 y on average) and BMI (25.4 kg/m²) differences were observed between OP group and NOOP group, respectively. On the other hands, JSW of medial tibio-femoral knee joint of OP group (0.4 mm) was significantly reduced in comparison to that of NOOP group (0.9 mm) ($p < 0.001$). FTA of OP group (189.0°) was significantly increased in comparison to that of NOOP group (184.5°) ($p < 0.001$). Pain VAS and JKOM score of OP group (72.7 and 56.5) were significantly increased in comparison to those of NOOP group (60.5 and 38.5), respectively ($p < 0.001$). The AUC in ROC curve of JSW and FTA were 0.25 (95% CIs; 0.16, 0.35) and 0.67 (95% CIs; 0.55, 0.78), respectively. The AUC in ROC curve of pain VAS score and JKOM score were 0.66 (0.58, 0.74) and 0.74 (0.67, 0.81), respectively. The cut-off of FTA calculated by ROC curve was found at 189° and the ORs at 189° of FTA for receiving TKA was 5.90 (95% CIs; 2.54, 13.71). The cut-off of pain VAS score calculated by ROC curve was found at 78 point and the ORs at 78 point of VAS score for receiving TKA was 3.71 (95% CIs; 1.94, 7.07). The cut-off of JKOM score calculated by ROC curve was found at 42 point and the ORs at 42 point of JKOM score for receiving TKA was 5.18 (95% CIs; 2.86, 9.36).

Conclusions: The first conclusion of this study is that among severe knee OA Japanese patients with K/L grade 4, JKOM scores were predictive of future indication for TKA. The second conclusion is that we found a cut-off point of JKOM score that relatively accurately discriminated Japanese patients who did vs did not receive TKA, as the AUCs for ROC curves were higher than 0.65 (0.74). In addition, JKOM score was more predictive than VAS score and FTA, and the ORs of JKOM score for receiving TKA was 5.18. Therefore, JKOM score would be one of the novel indicators for Japanese patients with severe knee OA which are helpful for physicians to discuss with patients who are considering their decision to TKA.

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MODULATION OF RATE OF FORCE DEVELOPMENT INFLUENCES KNEE FUNCTION IN OA

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Purpose: Quadriceps strength has long been known to influence knee function in people with osteoarthritis (OA) and quadriceps strength is commonly measured as the maximum force produced during a voluntary isometric contraction (MVIC). The magnitude of muscle force necessary to accomplish daily activities is difficult to estimate, however, it is likely that maximum quadriceps force may be required during only very strenuous tasks. Recently, the maximum rate at which the quadriceps muscles generate force has been shown to influence daily function in people with hip OA, however, the maximum rate of force development may not be as influential as the manner in which the rate of force development is regulated during activities. The Rate of Force Development Scaling Factor (RFDsf) describes the change in rate of force development as a function of force production thus quadriceps muscles with a high RFDsf produce force more quickly per change in the force than those with a low RFDsf. A high RFDsf may indicate quadriceps muscles that are better equipped to stabilize the knee during daily activities thus protecting the joint from abnormal arthrokinematics that could be detrimental to articular cartilage. Moreover, exercise interventions aimed at increasing the RFDsf may prove more successful in improving knee function in people with knee OA. The purpose of this ongoing study is to examine both maximal and submaximal quadriceps muscle function assessments and their relationships with functional measures.

Methods: Quadriceps MVIC and RFD during rapid volitional and electrically elicited contractions were measured across a range of sub-maximal forces. Electrically elicited contractions were generated using a single square wave pulse, 1 msec in duration (Grass Technologies, S48, Warwick, RI) up to the highest amplitude tolerated. The RFDsf (the slope of the regression line calculated from scatter plots of force and RFD) were determined for each subject. Knee function was assessed with the Knee and Osteoarthritis Outcome Score (KOOS) self-reported questionnaire, a global rating of knee function and a timed stair climbing test. Due to the small number of subjects in this ongoing study, group differences were not assessed. Relationships between the RFDsf and functional variables were assessed using Pearson correlation coefficients across all subjects. Correlations were considered statistically significant when $p \leq 0.05$.

Results: See the tables.

Group Means (\pm stdev)

	OA	Control
RFDsf-vol	7.577 \pm 0.777	7.505 \pm 1.104
RFDsf-Twitch	14.8550 \pm 0.472	15.6010 \pm 0.652
MVIC/BMI	11.219 \pm 2.277	17.013 \pm 4.508
KOOS-ADL	63 \pm 16.47	100 \pm 0
Global Rating Scale \pm GRS	64.3 \pm 15.5	100 \pm 0
Stair Climbing time \pm SCT	14.12 \pm 3.33	10.42 \pm 3.37

Correlations across all subjects

KOOS-ADL vs RFDsf-Tw	$r = 0.771$	$p = 0.042$
KOOS-ADL vs MVIC/BMI	$r = 0.575$	$p = 0.177$
GRS vs RFDsf-Tw	$r = 0.740$	$p = 0.057$
GRS vs MVIC/BMI	$r = 0.577$	$p = 0.175$
SCT vs RFDsf-Tw	$r = -0.699$	$p = 0.080$
SCT vs MVIC/BMI	$r = -0.800$	$p = 0.031$

Conclusions: As expected, higher RFDsf were observed in the electrically elicited vs. the volitional contractions, likely due to different motor recruitment patterns. Functional measures related strongly to MVIC, as reported by others. However, these preliminary results demonstrate strong relationships between the twitch RFDsf and the self-reported functional measures which suggest that the regulation of the rate of force development may be important in influencing knee function. Interestingly, the volitional RFDsf did not relate to functional measures, which warrants further investigation.

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RELIABILITY OF RADIOGRAPHIC GRADES USED TO ASSESS 1ST METATARSOPHALANGEAL JOINT OSTEOARTHRITIS

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Purpose: First metatarsophalangeal joint osteoarthritis (MTP OA) is the most common form of degenerative joint disease in the foot, affecting 35–60% of adults over 65 years. Individuals with 1st MTP OA experience debilitating foot pain which limits their routine daily activities such as walking and stair climbing, as well as restricts participation in recreational activities. Current clinical assessment of severity of 1st MTP OA involves the use of radiographic grades. Two foot-specific scales have been proposed to evaluate 1st MTP OA, however no objective data are available assessing intra- or inter-rater reliability using the two scales. The purpose of this study is to assess intra- and inter-rater reliability of two of the most commonly used radiographic scales to grade 1st MTP OA in current clinical practice.

Methods: All procedures were approved by the IRB, and the study was conducted at NYU Hospital for Joint Diseases. Radiographs of 30 feet with 1st MTP joint OA (26 patients, 56% female) were evaluated, and included antero-posterior and lateral views on all feet and oblique views on 78% feet. All radiographs were de-identified, and graded by the following five raters: three fellowship-trained orthopaedic surgeons, one fellowship-trained radiologist, and one orthopaedic resident. Standard grading criteria and examples were provided to each rater. Radiographs were randomly re-ordered for re-evaluation. The Coughlin scale refers to radiographic criteria developed by Coughlin and Shurnas (2003). The Menz scale includes two subscales, one assessing joint space narrowing and the other assessing osteophytes. Rater reliability was assessed using quadratically weighed kappa for ordinal data.

Results: Intra-rater reliability for the Coughlin scale, and the Menz subscales is summarized in Table 1 and ranged from 0.54 to 0.88. Inter-rater reliability ranged from 0.43–0.72, 0.54–0.77, and 0.53–0.68, respectively for the Coughlin, and Menz joint space narrowing and osteophyte subscales.

Conclusions: The key findings of this study indicate that the two most frequently used radiographic scales used to evaluate 1st MTP joint osteoarthritis have good intra-rater reliability (65–90 percent agreement) and inter-rater reliability (52–71 percent agreement). Our results assessing the Coughlin and Menz scales are consistent with previous studies assessing the Menz scale and Kellegren Lawrence grades.