

Results: All subjects completed the sensory measures and the five first functional tasks resembling conditions of daily life (ADL). 20 subjects (39%) were not able to perform all hop tests, mainly due to hesitation or for safety reasons (close to surgery). No difference was observed in knee position score between men and women for any of the functional tasks. When men and women were pooled, no correlation was found between TDPM and knee position for the ADL tasks. Poorer TDPM was associated with a knee medial to foot position during the drop jump ($r_s = 0.409$, $P = 0.013$). No relation was found between VPT at MTP1, MM or MF and medio-lateral knee position in the pooled group. When women were analyzed separately, no relation was found between TDPM and knee position for the ADL tasks. For the hop tests, poorer TDPM was associated with a knee medial to foot position during drop jump ($r_s = 0.469$, $P = 0.106$) and cross over hop ($r_s = 0.697$, $P = 0.012$). Worse vibration sense was associated with a knee medial to foot position for stair descending, stair ascending and forward lunge, ($r_s = 0.467$ – 0.606 , $P = <0.025$). No association was found between VPT and knee position for the hop tests. In men, there were no relations between TDPM and knee position for the ADL tasks. Poorer TDPM was associated with a knee medial to foot position during drop jump ($r_s = 0.423$, $P = <0.044$). No relation was found between VPT at MTP1, MM or MF and medio-lateral knee position in men (Table 1).

Conclusions: Worse kinesthetic acuity seems to be low to moderately associated with worse movement quality, determined as a knee medial to foot position, during hop tests. Poor vibration sense at the foot, seems to be related to a knee medial to foot position during several different functional tasks in women, whereas no such association seems to be present in men.

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PATELLAR BONE MARROW LESIONS PREDICT PATELLAR CARTILAGE DEFECT PROGRESSION, CARTILAGE VOLUME LOSS AND KNEE PAIN IN OLDER ADULTS: A COHORT STUDY

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Purpose: Recent evidence suggests that bone marrow lesions (BMLs) of the tibia and femur predict local cartilage loss and play an important role in knee pain; but it remains unclear whether patellar BMLs have similar roles. Aim of this study was to examine whether patellar BMLs are associated with cartilage loss (defects and/or volume loss) and knee pain in older adults.

Methods: A total of 904 randomly selected subjects (mean 62.4 years, 49.9% female) were studied. OARSI atlas was used to assess radiographic knee osteophytes and joint space narrowing (JSN). T1- or T2-weighted fat suppressed magnetic resonance imaging (MRI) was used to assess bone marrow lesions (BMLs), cartilage volume and cartilage defects. Knee pain was assessed by self-administered Western Ontario McMaster Osteoarthritis Index (WOMAC) questionnaire.

Results: The prevalence of any patellar BMLs was 18.8%. Cross-sectionally, patellar BMLs were positively associated with any BMLs at tibiofemoral compartments (OR: 2.52, 95% CI: 1.78, 3.56), medial and lateral femoral cartilage defects, patellar cartilage defects (OR: 12.99, 95% CI: 8.28, 20.39), and any knee pain when going up/down stairs (OR: 1.67, 95% CI: 1.18, 2.35), but negatively associated with patellar cartilage volume (β : -345.7 mm^3 , 95% CI: -470.9 , -220.4) after adjustments of age, sex, BMI, and rheumatoid arthritis. Longitudinally, baseline patellar BMLs was associated with increases in any BMLs in tibiofemoral compartment (OR: 2.21, 95% CI: 1.27, 3.85), increases in patellar cartilage defects (OR: 1.75, 95% CI: 1.01, 3.05) and an increase in knee pain when go up/down stairs (OR: 1.67, 95% CI: 1.08, 2.59) over 2.6 years in multivariable analyses. Baseline patellar BMLs were negatively associated with changes in cartilage volume at patellar (β : -2.10% , 95% CI: -3.39% , -0.80%), medial tibial (β : -1.36% , CI: -2.70% , -0.02%) and lateral tibial (-1.21% , -3.39% , -0.80%) sites. The associations with changes in tibial

cartilage volume became non-significant after further adjustment for baseline tibial BMLs.

Conclusions: Patellar BMLs were consistently associated with increases in patellar cartilage defects, loss of patellar cartilage volume and knee pain when going up/down stairs, suggesting a local effect of patellar BMLs in the development and progression of patellofemoral OA.

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COMORBIDITY IN OSTEOARHRITIS PATIENTS FOLLOWING HIP AND KNEE JOINT REPLACEMENT SURGERY

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Purpose: In the large majority of patients with severe hip and knee osteoarthritis (OA) pain, physical functioning and quality of life improve significantly after total hip arthroplasty (THA) or total knee arthroplasty (TKA). In a subgroup of patients the outcomes are however less favorable, with comorbidity, amongst others, being identified as one of the contributing factors. Therefore the aim of this study was to describe the presence of comorbidities and the associations of the number of comorbidities, and specific comorbidities with pain, physical functioning and quality of life in osteoarthritis patients with who underwent THA or TKA.

Methods: In this cross-sectional study 521 patients with hip or knee OA who underwent THA or TKA in the previous 5–22 months were recruited from 4 hospitals (281 THA and 240 TKA). Sociodemographic characteristics, information on comorbidities (19-item questionnaire), pain and physical functioning (subscores of the Hip disability Osteoarthritis Outcome Score (HOOS), and the Knee injury Osteoarthritis Outcome Score (KOOS)), and quality of life (SF 36 physical and mental component scores) were collected by means of a paper questionnaire. Statistical analysis included descriptive statistics and multivariate regression analysis.

Results: Characteristics of participating OA patients in this survey were: female 65.2%, mean age 70.0 (SD 9.3) years, mean BMI 27.8 (SD 4.7), mean pain score 81.7 (SD 19.1), mean physical functioning score 78.9 (SD 20.9), and a mean quality of life physical and mental component score of respectively 45.4 (SD 8.6) and 47.7 (SD 7.7). BMI was significantly higher, and pain and physical functioning scores were significantly worse for TKA patients compared to THA. Overall 86% of the patients had one or more comorbidities. The proportion of patients with 5 or more comorbidities was higher in patients with TKA as compared to THA (47 (19.6%) and 37 (13.2%) respectively ($p = 0.047$)). Concerning the presence of individual comorbidities, hypertension and hearing impairments in a group conversation were the most frequently reported comorbidities (>25% for the total group). Severe back pain, severe neck/shoulder pain, severe elbow, wrist or hand pain, cancer and malignant diseases, incontinence of urine, and vision impairment in short distances were reported by 15–25% of the patients in the total group. In both THA and TKA severe back pain (reported in 19%) and dizziness in combination with falling (reported in 6%) were most commonly associated with all four outcomes. Reported comorbidities were more associated with worse outcome in physical functioning and quality of life than with worse pain. Poor outcome increases with number of comorbidities, and in patients with 5 or more comorbidities associations were seen with all outcomes. Factors in the best fit association model for the total group of patients with THA and TKA for the different outcomes are: Dizziness in combination with falling, severe back pain, cancer and malignant diseases, and BMI for HOOS/KOOS subscale pain; Dizziness in combination with falling, vision impairments in long distances, severe back pain, severe neck/shoulder pain, and BMI for HOOS/KOOS subscale physical functioning; incontinence of urine, severe back pain, sex, severe neck/shoulder pain, BMI, and age for the SF36 physical component scale; dizziness in combination with falling, (consequences) of stroke, migraine, and incontinence of urine for the SF36 mental component scale.

Conclusions: Various comorbidities, different in THA and TKA were associated with outcome, especially with physical functioning and the

physical component of quality of life. Particularly severe back pain and dizziness in combination with falling, and 5 or more comorbidities should be taken into account in OA patients undergoing joint replacement surgery, in order to tune to expectations, satisfaction and outcome after surgery.

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THE NEED FOR CAUTION IN THE SELECTION AND INTERPRETATION OF MEASURES OF FUNCTION FOR PATIENTS WITH SEVERE HIP AND KNEE PROBLEMS

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Purpose: Joint replacement is a common operation, predominantly provided to older adults with osteoarthritis. Reduced function is one of the main indications for joint replacement, and recovery of function one of its main objectives. Adequate assessment of function is critical to help both health care professionals and patients decide upon treatment options and to enable evaluation of the effectiveness of joint replacement.

Physical function is commonly assessed in three ways: patient-reported outcome measures (PROMs), performance tests, and clinician-administered measures. It is recommended that several types of these measures should be used concurrently to capture an extended picture of function but patient burden, resources and logistical constraints mean that such an approach is seldom feasible. Moreover, most of the tools in use do not clearly differentiate between impairments, activity limitations and participation restrictions, and it is unclear to what extent each measure describes them, which in turn has implications as to their substitutability and comparability. The picture is further complicated by the effects of multi-morbidity and patient characteristics on functional measures.

The aims of this research were twofold: 1) to describe the correlations between a variety of commonly used functional measures collected on the same group of older patients listed for hip or knee replacement, and 2) explore associations between these measures and patient characteristics.

Methods: 1,451 patients listed for primary or revision hip or knee replacement at a single high-volume orthopaedic centre were invited to take part in a study of function before joint replacement. 264 agreed to do so and provided their informed consent.

Participants were asked to complete a postal questionnaire about their age, gender, BMI, living arrangements, education level and working status. They completed the Functional Co-morbidity Index and the Hospital Anxiety and Depression Scale. The severity of arthritis was derived as a count of affected joints other than the joint listed for surgery. Two PROMs were also completed, the Western Ontario McMaster Arthritis Index pain and function scales and the Aberdeen Impairment, Activity Limitation and Participation measure.

Participants were also invited to an appointment during which clinician-administered measures and performance tests were performed. These comprised the Harris Hip Score (HHS) or the American Knee Society Score (AKSS), which were completed by a research nurse. The performance tests were a timed 20 metre walk, the get-up-and-go test, step tests (20 and 30 cm high blocks), and a single stance balance test. The relationships between the functional measures were assessed with Spearman Rank coefficient, point-biserial coefficient or Cramér's V statistic. The association between participants' characteristics and functional measures were investigated with linear regression or modified Poisson regression with robust error variance. Individual patient characteristics were first considered in univariate models and then in multivariate analyses to determine if their effects were confounded by other factors. The analyses were conducted separately for hip and knee patients.

Results: Strong to moderate correlations were found within PROMs ($\rho = 0.63$ to 0.88) and within performance tests, but correlations were weaker between these two assessment approaches ($\rho = 0.17$ to 0.65). The HHS correlated better with PROMs ($\rho \sim 0.70$) than performance tests ($\rho = 0.38$ to 0.67); poor correlations were found with the AKSS and other functional measures ($\rho = 0.18$ to 0.28).

Patients' psychological well-being was associated with PROMs (p -value < 0.0001) but not with performance tests. Age was associated with performance tests (p -values ranging from < 0.05 to < 0.0001) but not with PROMs. Pain was strongly associated with function irrespectively of the measurement method. Other patient characteristics had weak or no association with function.

Conclusions: We found that PROMs, performance tests and clinician-administered measures provide information on different aspects of function. This study also shows that associations between function and patient characteristics differed according to the measurement approach used. The functional limitations caused by joint pathology are entangled with the limitations resulting from ageing when measured with performance tests; while psychological status seems to play an important role in patients' self-reported perception of functional ability. Both objective and subjective measures need to be adjusted for pain to enable appropriate interpretation.

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CLINIMETRICS OF THE STAIR CLIMB TEST IN THE AMSTERDAM COHORT

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Purpose: OARS recently published recommendations for physical performance tests in hip or knee osteoarthritis (OA). A test of stair climbing was recommended, but the authors could not recommend a specific stair climbing test or report clinimetric properties due to a lack of data in the literature. The purpose of this study was to describe clinimetric properties of the stair climb test (SCT) in people with knee OA. SCT-up and SCT-down were reported separately, to reveal potentially differing clinimetric properties.

Methods: Baseline and 2-year follow-up data from the Amsterdam Cohort ($n = 200$) were analyzed. Construct validity (convergent) was estimated using Pearson's correlation coefficients between the SCTs and the Western Ontario and McMaster Osteoarthritis index (WOMAC). Smallest detectable change (SDC) at the 90% confidence level was calculated from the standard error of measurement (SEM). We report the difference in SCT means between responders and non-responders at different cut-points of WOMAC Total scale score (WOMAC-T); WOMAC physical function subscale score (WOMAC-PF); and knee extensor strength change reported in the literature. Minimum important change (MIC) was calculated using receiver operating characteristics (ROC) curve methodology, from baseline and follow-up data. The change data was dichotomised into responders and non-responders using cut-off criteria for each of the following external references: WOMAC-T; WOMAC-PF; and knee extensor strength change. MIC estimates for small, medium and large change are reported for each of the cut-points sourced from the literature. Construct validity (discriminant) was estimated using the area under the ROC curve (AUC), with an a priori significance level of .80.

Results: Construct validity (convergent) was moderate (.39) against WOMAC-T and WOMAC-PF (.41). SDC (90%) was larger for SCT-down (3.75 sec) than for SCT-up (1.63 sec). The proportion of patients achieving MCID on the WOMAC-T was 44.5% and for small change and 33.5% for moderate change. For WOMAC-T, the difference in mean SCT time for those who achieved small change in SCT-up was .82 sec (95%CI .27, 1.4) and .93 sec (.35, 1.5) for moderate change. The difference in SCT-up means between responders and non-responders on the WOMAC-PF were .87 (.27, 1.50), .89 (.08, 1.38) and .74 (.09, 1.38) for small, moderate and large changes, respectively. For knee extensor strength, the differences in SCT-up means were: .46 (-.08, .99), .43 (-.15, 1.01), .36 (-.31, 1.03), and .09 (-.66, .84) for small, moderate, medium and large changes respectively. MIC for the SCT-up was -.40 for small change and -.70 for moderate change in WOMAC-T. MIC for the SCT-up based on small, moderate and large changes in WOMAC-PF were -.40, -.40 and -.30, respectively. MIC for the SCT-up based on small, moderate, medium and large changes in knee extensor strength was -.70 at all levels. MDC and MIC values for the SCT-down were larger or equal in 7 of 9 analyses. AUC values did not exceed .75 for any ROC analysis.