

313 POST-TRAUMATIC ABNORMALITIES AND OA AFTER A LATERAL ANKLE SPRAIN ARE NOT ASSOCIATED WITH PERSISTENT SYMPTOMS

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Purpose: Persistent symptoms after a lateral ankle sprain are very common. It is unknown whether these persistent complaints are associated with structural changes or abnormalities in the ankle. Therefore, the purpose of this study was to determine the prevalence of structural abnormalities after a lateral ankle sprain and to investigate the association between structural abnormalities seen on radiography and MRI and persistent symptoms after a lateral ankle sprain.

Methods: Patients who visited their general practitioner 6 to 12 months ago with a lateral ankle sprain were selected for this study. All patients received a standardized questionnaire and underwent a physical examination, radiography and MRI (bi-lateral, 1.5 Tesla) of the ankle. Two musculoskeletal radiologists performed standardized scoring of radiography and MRIs. The presence of persistent symptoms was assessed using a 7-point Likert scale (1 = completely recovered, 7 = worse than ever). Based on this score, patients with (score 3–7) and without (score 1–2) persistent symptoms were compared regarding post-traumatic and degenerative abnormalities found on radiography and MRI. All analyses were adjusted for potential confounders including age, gender and BMI.

Results: A total of 206 patients (mean age 37.5(14.7), 43.1% male) were included, 98 of which reported persistent symptoms. Abnormalities were significantly more prevalent in the injured ankle compared to the contralateral ankle and most frequently reported in the talocrural and talonavicular joint: bone marrow edema (33.8% and 13.3%), osteochondral lesions (5.6% and 0%), osteophytes (39.5% and 54.4%), sclerosis (2.1% and 47.2%) cartilage loss (10.3% and 20%) and mild to severe osteoarthritis (KL grade >1, 41.5% and 55.4%). No significant differences in structural abnormalities were found between patients with and without persistent symptoms, when adjusted for age, gender and BMI.

Conclusions: The prevalence of structural MRI abnormalities on radiography and MRI in patients with a previous ankle sprain is high. However, there is no difference in structural abnormalities between patients with and without persistent clinical symptoms. These findings are important for clinical practice as ankle sprains appear to be

associated with a larger chance of structural abnormalities and early signs of osteoarthritis in the ankle.

314 ASSOCIATION BETWEEN SENSORY FUNCTION AND MEDIO-LATERAL KNEE POSITION DURING DYNAMIC TASKS IN PATIENTS WITH ANTERIOR CRUCIATE LIGAMENT INJURY

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Purpose: To investigate the influence of sensory function on the medio-lateral knee position during dynamic tasks in patients with anterior cruciate ligament injury (ACL). Possible gender differences were also explored. We hypothesized that worse sensory function would be related to a knee medial to foot position during dynamic tasks and that this relation would be more evident in women than in men. ACL injury leads to impaired proprioceptive acuity, reduced muscle strength, worse functional performance and an increased risk of early-onset knee osteoarthritis. These patients also often exhibit worse movement quality during dynamic tasks, observed as the appearance of the knee with a medial position relative to the foot. This movement pattern is suggested to be more common in women than in men. Possible contributing sensorimotor factors for this altered knee position are poorly studied in these patients.

Methods: Fifty-one patients (23 women), range 18–40 years, with ACL injury were included in this cross-sectional study. Measures of sensory function were assessed by the threshold to detection of passive motion (TDPM) for knee kinesthesia and by vibration perception threshold (VPT) at the metatarsophalangeal joint 1 (MTP1), the medial malleolus (MM) and the medial femoral condyle (MF) for vibration sense. Movement quality was assessed by visual observation and scoring of the position of the knee in relation to the foot during eight functional tasks with increasing difficulty; mini squat, single-limb mini squat, stair ascending, stair descending, forward lunge, drop-jump, one-leg hop for distance and crossover hop for distance. The mid-point of patella in line with the talocrural joint indicates good movement quality and was scored as “0”. The mid-point of patella medial to the talocrural joint indicates poor movement quality and was given scores from 1 to 3, where 1 = “fair”, 2 = “poor”, and 3 represents when the execution of the test does not have any similarity to the intended task. Spearman’s rank correlation coefficient was used to determine the relationship between the sensory measures and the knee score during the functional tasks. Because this study had an exploratory design we did not apply the Bonferroni correction for multiple comparisons.

Table 1
Correlations between sensory measures and medio-lateral knee position during functional task

Measures of sensory function	Functional tasks resembling daily and more demanding activities							
	Mini-squat	Single-limb mini squat	Stair ascending	Stair descending	Forward lunge	Drop-jump	Single-limb hop	Cross-over hop
Women	(n = 23)	(n = 23)	(n = 23)	(n = 23)	(n = 20)	(n = 13)	(n = 13)	(n = 12)
TDPM	rs = 0.317 p = 0.140	rs = 0.344 p = 0.108	rs = 0.253 p = 0.243	rs = -0.195 p = 0.371	rs = 0.056 p = 0.814	rs = 0.469 p = 0.106	rs = 0.085 p = 0.783	rs = 0.697 p = 0.012
VPT MTP1	rs = 0.012 p = 0.956	rs = 0.114 p = 0.603	rs = 0.359 p = 0.092	rs = 0.467 p = 0.025	rs = 0.346 p = 0.136	rs = -0.343 p = 0.251	rs = 0.360 p = 0.226	rs = -0.324 p = 0.304
VPT MM	rs = 0.141 p = 0.521	rs = 0.069 p = 0.756	rs = 0.486 p = 0.019	rs = 0.606 p = 0.002	rs = 0.556 p = 0.011	rs = -0.088 p = 0.776	rs = -0.246 p = 0.417	rs = 0.162 p = 0.615
VPT MF	rs = 0.079 p = 0.719	rs = -0.092 p = 0.675	rs = 0.067 p = 0.762	rs = 0.197 p = 0.397	rs = 0.269 p = 0.251	rs = 0.408 p = 0.167	rs = 0.128 p = 0.678	rs = 0.128 p = 0.678
Men	(n = 28)	(n = 28)	(n = 28)	(n = 28)	(n = 28)	(n = 23)	(n = 22)	(n = 20)
TDPM	rs = 0.084 p = 0.671	rs = 0.008 p = 0.969	rs = 0.276 p = 0.155	rs = 0.338 p = 0.079	rs = -0.030 p = 0.878	rs = 0.423 p = 0.044	rs = 0.205 p = 0.360	rs = -0.146 p = 0.539
VPT MTP1	rs = 0.222 p = 0.256	rs = -0.170 p = 0.388	rs = -0.157 p = 0.424	rs = -0.143 p = 0.468	rs = -0.052 p = 0.794	rs = -0.069 p = 0.755	rs = 0.042 p = 0.844	rs = 0.149 p = 0.532
VPT MM	rs = 0.057 p = 0.773	rs = -0.115 p = 0.560	rs = -0.083 p = 0.869	rs = 0.021 p = 0.917	rs = 0.232 p = 0.235	rs = -0.162 p = 0.461	rs = -0.195 p = 0.385	rs = -0.007 p = 0.977
VPT MF	rs = 0.196 p = 0.317	rs = -0.039 p = 0.844	rs = 0.070 p = 0.724	rs = 0.121 p = 0.540	rs = -0.237 p = 0.224	rs = 0.338 p = 0.079	rs = 0.046 p = 0.836	rs = 0.091 p = 0.704

TDPM = threshold to detection of passive motion, VPT = vibration perception threshold, MTP1 = metatarsophalangeal joint 1, MM = medial malleolus, MF = medial femoral condyle.

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