

(95% CI 1.03–1.71), percent fat OR 1.45 (95% CI 1.19–1.77), fat mass OR 1.23 (95% CI 1.05–1.44). For women the ORs were - BMI OR 1.39 (95% CI 1.22–1.59), waist OR 1.36 (95% CI 1.22–1.52), waist-to-hip ratio OR 1.49 (95% CI 1.21–1.84), percent fat (10%) OR 1.39 (95% CI 1.22–1.57), fat mass OR 1.27 (95% CI 1.15–1.40). Similarly all obesity measures and fat mass measures were associated with LBP disability. The risk of LBP intensity and disability increased in a linear manner in sex-specific quartiles of all obesity measures and fat mass measures such that the individuals in the highest quartile had the highest risk of developing LBP.

Conclusions: This study is the first large-scale prospective population-based cohort study that addresses the association between fat mass with symptomatic LBP. The association was more noticeable among those who had the severest form of disease and there was a tendency of increasing the odds of association in the highest quartiles of fat mass measures. Our study can therefore be viewed as one of the first steps to unravel the link that, apart from loading; chronic inflammatory and atherosclerotic processes play an important role in the pathogenesis of the disease. Understanding this mechanism is important as this will shed light into therapeutic strategies for the prevention of the devastating burden of LBP.

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ASSOCIATION BETWEEN RADIOGRAPHIC SEVERITY AND PAIN IN KNEE OSTEOARTHRITIS

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Purpose: Concordance between radiographic severity and pain in knee osteoarthritis (KOA) is thought to be low. We aimed to evaluate the association between radiographic severity and pain in KOA.

Methods: We used the baseline data from a randomized controlled trial of colchicine for symptomatic KOA, where radiographic and pain information of both knees were collected separately. Radiographic severity of OA in both knees was assessed for Kellgren and Lawrence (KL) grade (0–4) of the tibiofemoral (TF) and patellofemoral (PF) joints. A determination of OA in a particular compartment (TF or PF) was based on KL grade was ≥ 2 in the respective compartment. Each knee was classified as no OA, patellofemoral only (PFOA), tibiofemoral only (TFOA) or combined PFOA and TFOA. Severity of knee pain on movement was assessed by self-report with a 0–10 numeric rating scale. We summarized and evaluated, respectively, the association of radiographic and pain information of individual knees with odd ratios and confident intervals using generalized linear model with generalized estimating equations that control for within-subject correlation. Analyses were also adjusted for age, sex and body mass index (BMI).

Results: Information for 109 subjects and 218 knees were included. KL grades in TF were strongly associated with severity of knee pain in a dose-response manner (Table 1). Similar results were seen for the relation of compartmental involvement and severity of knee pain (Table 2).

Conclusions: Using a knee based analysis, we found strong association between radiographic OA and knee pain on movement. PFOA coexisting with TFOA was associated with more knee pain on movement than PFOA or TFOA alone.

Table 1. Association of tibiofemoral Kellgren and Lawrence (KL) grades and pain in knee osteoarthritis

	Pain on movement OR (95% CI)	Pain on movement OR (95% CI)*
KL = 4	10.02 (1.87, 53.73)	13.06 (2.49, 68.59)
KL = 3	7.76 (1.88, 31.99)	8.51 (2.12, 34.16)
KL = 2	4.41 (1.11, 17.48)	4.81 (1.24, 18.60)
KL = 1	1.51 (0.36, 6.29)	1.47 (0.37, 5.83)
KL = 0	1.00	1.00

KL 0 was set as reference.

* Model adjusted for age, sex and body mass index.

Table 2. Association of compartmental structural abnormalities and pain in knee osteoarthritis.

	Pain on movement OR (95% CI)	Pain on movement OR (95% CI)*
Combined PFOA and TFOA	11.67 (4.73, 28.84)	12.97 (5.33, 31.55)
TFOA only	6.09 (2.49, 14.91)	6.74 (2.82, 16.12)
PFOA only	6.89 (2.41, 19.72)	6.36 (2.45, 16.51)
No OA in TF/ PF	1.00	1.00

PF = patellofemoral; TF = tibiofemoral.

No OA in PF/ TF was set as reference.

* Model adjusted for age, sex and body mass index.

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VALIDITY OF THE DUTCH MODIFIED PAINDETECT QUESTIONNAIRE (mPDQ-NL) FOR PATIENTS WITH HIP OR KNEE OSTEOARTHRITIS

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Purpose: The etiology of pain in osteoarthritis (OA) is complex and multifactorial. A growing number of studies suggest that modification of pain-transmission in the peripheral and central nervous system, leading to sensitization, plays a role in OA pain. Sensitization seems to be associated with neuropathic pain-like symptoms and assessment of these symptoms can help to identify patients who could benefit from additional treatment options. Several questionnaires are available to distinguish neuropathic from nociceptive pain symptoms. The modified painDETECT questionnaire (mPDQ) is a self-reported questionnaire developed to discriminate between nociceptive- and possible/likely neuropathic pain in knee OA patients. Recently the mPDQ was translated into Dutch and adjusted to also fit hip OA patients. The aim of this study was to assess the validity of the mPDQ-NL in patients with hip or knee OA.

Methods: Primary hip and knee OA patients were recruited from three Dutch hospitals. Based on previous research, confirmatory factor analysis for two principal components was performed to assess structural validity. Construct validity (both convergent and divergent) was assessed using hypothesis testing. Predefined hypotheses were formulated concerning the correlation between the mPDQ-NL and the Self-reported Leeds Assessment of Neuropathic Symptoms and Signs (S-LANSS), subscales of the Knee injury and Osteoarthritis Outcome score/ Hip disability and Osteoarthritis Outcome Score (KOOS/HOOS), Visual Analogue Scale for pain (VAS pain), and subscales of the RAND-36 health survey (RAND-36). According to the COSMIN criteria, construct validity of a questionnaire is sufficient if 75% of predefined hypotheses are met. Additionally, convergent validity was assessed with blunt Pain Pressure Thresholds (PPTs) in a subsample of participants. A reduced PPT is a somatosensory abnormality that is considered an indication of sensitization in OA. Therefore it was expected that reduction of PPTs was associated with higher mPDQ scores.

Results: 168 participants were included. PPT measurements were performed in a sample of 46 participants. Factor analysis confirmed two principal components. The items that loaded on the first component could be described as “evoked neuropathic sensations”, the items that loaded on the second component as “spontaneous neuropathic sensations”. However there were two items that substantially loaded on both components. The item regarding pain pattern did not load on any component. Considering construct analysis, 80% of the predefined hypotheses concerning the correlation between mPDQ and self-reported questionnaires were met. Considering the correlation with PPT measurements, 50% of the predefined hypotheses were met.

Conclusions: The mPDQ-NL seems to adequately reflect neuropathic pain-like symptoms experienced by hip and knee OA patients. Concerning structural validity, two determinative components seem to be present, in line with previous research. However, one particular item regarding pain pattern might not reflect the construct of neuropathic pain-like symptoms in hip or knee OA. Therefore, when using the mPDQ in hip or knee OA patients, it might be considered to skip this particular item. Construct validity can be considered sufficient, with over 75% of the predefined hypotheses regarding correlation between the mPDQ-NL and other questionnaires were met. However, only 50% of the

hypotheses concerning PPT measurements were met, probably due to heterogeneity and limited sample size of this subgroup. To our knowledge, this study is the first to assess the structural validity of the mPDQ knee and hip by using factor analysis and to assess construct validity using elaborate hypothesis testing as proposed by the COSMIN guidelines.

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CO-EXISTING HIP SYMPTOMS ARE ASSOCIATED WITH SELF-EFFICACY AND PAIN-RELATED FEAR IN OLDER ADULTS WITH A PRIMARY COMPLAINT OF LOW BACK PAIN: THE DELAWARE SPINE STUDIES

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Purpose: Low back pain (LBP) is the most common musculoskeletal complaint among the geriatric population. Musculoskeletal clinicians have often proposed a link between the hip and lumbar spine in older adults. Offierski and McNab originally described hip-spine syndrome as the presence of lumbar symptoms due to an abnormal biomechanical relationship between the hip joint and spine likely related to degenerative pathology in one or both joints; but, little work has been done to understand whether the additional burden of co-existing hip symptoms might impact pain-related psychologic factors in an individual with LBP. The purpose of this study was to determine whether the presence of hip symptoms, which are indicative of hip osteoarthritis (OA), are associated with self-efficacy, kinesiophobia and fear-avoidance beliefs among older adults with a primary complaint of low back pain.

Methods: We have conducted an analysis of baseline data from the Delaware Spine Studies cohort study of 228 older adults with a primary complaint of LBP that is greater than any other musculoskeletal pain complaint (mean age: 69.75+/-6.85 years). We examined clinical hip symptoms that were proposed predictors of radiographic hip OA according to American College of Rheumatology (ACR) guidelines by Altman et al, including hip joint pain, morning stiffness in the hip that lasts less than 60 minutes and pain with hip internal rotation (IR). The following subscales of the Low Back Activity Confidence Scale were used to assess self-efficacy: self-efficacy for functional activities, self-efficacy for self-regulation of back health and self-efficacy for regular exercise. The Tampa Scale for Kinesiophobia (TSK-11) was used to capture kinesiophobia. And, the Physical Activity subscale of the Fear Avoidance Beliefs Questionnaire (FABQ-PA) was used to capture fear avoidance beliefs about LBP. Analysis of covariance (ANCOVA) was used to determine the association between presence of any hip symptoms (1 or more hip symptoms) and our psychologic outcomes of interest, self-efficacy, kinesiophobia and fear avoidance. ANCOVA models were adjusted for age, sex and education.

Results: Of the 228 participants with LBP, 166 (72.8%) had one or more hip symptoms. Co-existence of 1 or more hip symptoms was associated with lower levels of self-efficacy for functional activities (-12.22 points, 95%CI: -19.43, -5.02, $p = .001$), greater levels of fear-avoidance beliefs (+3.48 points, 95%CI: 0.46, 6.50, $p = .024$) and greater levels of kinesiophobia (+4.55 points, 95%CI: 0.17, 8.93, $p = .042$) as compared to absence of hip symptoms. Presence of hip symptoms was not associated with self-efficacy for self-regulation of back health or self-efficacy for exercise ($p > .05$).

Conclusions: Hip symptoms are prevalent among older adults with a primary complaint of LBP; and, the additional burden of these hip symptoms is associated with reduced self-efficacy, as well as heightened kinesiophobia and fear avoidance beliefs. There has long been consensus that researchers should focus on classifying patients into clinically relevant subgroups that share similar clinical characteristics to improve treatment outcomes. It appears that one such subgroup among older adults with LBP consists of those with co-existing hip symptoms. Given that poor self-efficacy and elevated pain-related fears are related to poor outcomes in low back pain

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DOES PAIN AT OTHER SITES INFLUENCE THE ASSOCIATION BETWEEN KNEE PATHOLOGY AND KNEE PAIN?

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Purpose: The association between structural abnormalities and knee pain remains controversial. It may be that the association is weaker in

those with generalized pain compared to localized pain. The aim of this study therefore was to describe the effect of pain at other sites on the association between knee structural pathology and pain in knee OA.

Methods: 1099 participants (average age 63 years; range 51–81 years) from the population-based Tasmanian Older Adult Cohort study were studied. Presence of pain (yes/no) at the neck, back, hands, shoulders, hips, knees and feet was assessed by questionnaire. T1-weighted or T2-weighted fat saturated MRI of the right knee was performed to measure cartilage defects, bone marrow lesions (BMLs) and effusion. Osteophytes and joint space narrowing (JSN) were assessed by X-ray. Data were analysed using multi-nominal logistic regression with adjustment for potential confounders including age, sex, body mass index, physical activity, smoking history and pain medication.

Results: Knee pain only, knee plus any other site pain, and any other site pain were respectively present in 3%, 44% and 41% of the participants. In multivariable analyses, knee pain only was strongly associated with the presence of cartilage defects (OR 16.96, 95% CI 4.03–71.32), BMLs (OR 3.27, 95% CI 1.01–10.53), effusion (OR 3.52, 95% CI 1.06–11.68) and osteophytes (OR 8.22, 95% CI 2.10–32.27). Significant results were also found for knee pain plus any other site pain, but these associations were weaker (OR = 3.03–3.38, all $P < 0.05$). Any other site pain was not found to be associated with all knee structural pathologies. There was a dose-response relationship between number of knee structural pathologies, and knee pain only and knee plus any other site pain (both P for trend < 0.002).

Conclusions: Knee structural pathologies are more strongly associated with knee pain in those with localized pain suggesting that knee structural pathologies appear to be the origin of pain in knee OA, and a combination of peripheral and central mechanisms may be involved in the pain processing. The influence of pain at other sites needs to be considered while assessing the knee.

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CHANGES IN KNEE PAIN AND SENSITIZATION AFTER BARIATRIC SURGERY

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Purpose: Obesity is associated with knee pain and believed to be related to abnormal loading and/or systemic inflammatory effects. Mechanical stimuli, as may be due to excessive loading, and inflammation have also been shown to induce central and/or peripheral sensitization (altered pain processing of the nervous system) in animal models. Further, clinically, sensitization is associated with pain and its severity in knee osteoarthritis (OA). Whether knee pain improvements noted after massive weight loss may be partly related to resolution of sensitization is not clear. We sought first to corroborate that knee pain improves after massive weight loss, and second, to determine whether sensitization improves after massive weight loss in individuals undergoing bariatric surgery.

Methods: Individuals for the current study were part of the Osteoarthritis Before and After Bariatric Surgery (OABS) Study. Individuals aged 25–60 were included if they had BMI ≥ 35 , knee pain on most days of the month and were approved for bariatric surgery (laparoscopic gastric bypass surgery or laparoscopic sleeve gastrectomy); there was no requirement regarding knee OA itself. To determine what an expected change in pain and sensitization over one year may be in this patient population with obesity who do not undergo massive weight loss with bariatric surgery, we also assessed those who were deemed appropriate for bariatric surgery but did not undergo the surgery and underwent medical management. All subjects had knee pain assessed at baseline and one year follow-up in the knee that was more painful at baseline (index knee) using the WOMAC (activity-related knee pain; 0–20; 0 = no pain) and VAS (overall knee pain; 0–100; 0 = no pain). A pressure algometer applied at 0.5 kg/s was used to assess pressure pain threshold (PPT) at the index patella (indicator of peripheral and/or central sensitization) and the right wrist (indicator of central sensitization) as the point at which the pressure first changed to slight pain. Three PPT trials at each anatomical site were averaged. Lower PPTs represent more sensitization or pain sensitivity. To determine the mean change in measures of pain and pain sensitization at baseline and follow-up, we performed separate paired t-tests in the surgery and medical management groups.