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Association of change in WOMAC knee pain over 24 months with change in cartilage volume loss over 24 months			
	Model	Model + BML	Model + BML + synovitis
	Mean change (95% CI)	Mean change (95% CI)	Mean change (95% CI)
Cartilage Volume Loss over 24 months	0.10(0.02,0.18)* p=0.0158	0.10(0.01,0.18) p=0.0242	0.10(0.02,0.18) p=0.0207
BML at baseline (size summary score across <i>n</i> areas)		0.02(-0.06,0.11) p=0.6016	0.04(-0.05,0.13) p=0.4161
Synovitis at baseline (summary score)			-0.04(-0.13,0.05) p=0.3520
All models adjusted for age, sex, BMI, race, depressive symptoms (CESD). Continuous variables have been mean-centered and standardized. 1 SD mean cartilage volume change over 24 months =0.185mm ³ *Beta coefficients are in standard deviations of change in WOMAC knee pain (SD=3.4). Positive(+) beta coefficient indicates an increase in the outcome WOMAC pain.			

baseline ($n = 367$) showed no effect of cartilage thickness or volume loss with pain. However, there was an association of cartilage loss with pain in those ($n = 233$) with no pain at baseline.

Conclusions: Cartilage thickness and volume loss are weakly associated with knee pain, and this association with pain appears to be partially mediated by change in synovitis and may be greater in those with no knee pain than in those with pre-existing pain.

200 DEMOGRAPHIC, PSYCHOSOCIAL FACTORS, MUSCULOSKELETAL PAIN AND PRESCRIPTION OPIOID USE IN COMMUNITY-BASED MIDDLE-AGED WOMEN - A PROSPECTIVE COHORT STUDY

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Purpose: Although the effectiveness of long-term opioid use in pain management has never been convincingly established, its use has increased in tandem with more liberal prescribing practices. Little is known about the characteristics of women who take prescribed opioids. Thus the aim of our study was to examine factors (demographic, psychosocial factors, and musculoskeletal pain) associated with prescription opioid use in community-based middle-aged women.

Methods: 11,221 women (born 1946–1951, aged 52.0 ± 1.5 years in 2001) from the Australian Longitudinal Study of Women's Health (ALSWH) who consented to linkage of their survey data with Pharmaceutical Benefit Scheme (PBS, a universal insurance scheme entitling Australian residents to subsidized prescription medicines) were included in the current study. Women in the ALSWH were surveyed every 3 years from 2001 to 2016. The current study examined use of opioid prescriptions from 2003 to 2015, derived from the PBS. Opioid use was examined in relation to sociodemographic factors, physical and mental health, depression and musculoskeletal pain collected between 2001 and 2016. Demographic, psychosocial factors, and musculoskeletal pain were compared among women with different numbers of opioid prescriptions in one year (no prescriptions in any calendar year, 1 prescription in at least one year, and ≥ 2 prescriptions in at least one year) and for the entire study period (12 years) using ANOVA and chi square test. Ordinal logistic regression was used to examine the factors associated with use of opioid prescriptions, including demographic, psychosocial factors, and musculoskeletal pain in the same regression model. All analyses were performed using Stata SE version 14.0 (StataCorp).

Results: 45.7% women were using prescribed opioids during the study period. Almost a quarter of these women (24.2%) were prescribed strong opioids (tramadol and oxycodone). In the multivariable model adjusted for demographic, psychosocial factors, and musculoskeletal pain, increasing age (OR 1.07, 95% CI 1.04–1.11), greater BMI (OR 1.05, 95% CI 1.04–1.06), current/former smoking (OR 1.32, 95% CI 1.16–1.51), low level of education (OR 1.25, 95% CI 1.14–1.38), no paid employment (OR 1.27, 95% CI 1.14–1.40), depression (OR 1.59, 95% CI 1.36–1.86), back pain at baseline (OR 1.15, 95% CI 1.04–1.28), frequent back pain over the entire study period (OR 1.40, 95% CI 1.25–1.56), other joint pain at baseline (OR 1.23, 95% CI 1.11–1.37), and frequent other joint pain over the entire study period (OR 1.52, 95% CI 1.34–1.72) were associated with increased risk of yearly opioid use. These factors were also associated with increasing number of opioid prescriptions over the entire study period in multivariable analyses.

Conclusions: These findings highlight the high rate of prescribed opioid use in women, particularly those of low socioeconomic status and with depression and musculoskeletal pain. The findings will inform strategies to help women who are at risk of chronic opioid use.

201 DIFFERENTIAL ASSOCIATIONS OF PATTERNS OF CO-EXISTING MRI LESIONS WITH KNEE PAIN AT REST AND ON JOINT LOADING: DATA FROM THE OSTEOARTHRITIS INITIATIVE

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Purpose: Pain at rest and pain on joint loading are two different manifestations of knee pain in osteoarthritis (OA) that may have different underlying mechanisms and corresponding risk factors. Knee OA is a disease of the whole joint featured by structural changes in a number of tissues including cartilage, meniscus, synovium and subchondral bone. Studying the relation of multiple MRI lesions to knee pain in OA may provide insights into pathogenesis of knee pain in OA. We conducted a within-person knee-matched case-control study to determine if distinct patterns of co-existing MRI lesions have differential associations with knee pain at rest and on joint loading using data collected from the Osteoarthritis Initiative (OAI).

Methods: We included participants from Osteoarthritis Initiative whose pain score, measured by WOMAC sub-scales, differed by ≥ 1 point at rest (in bed and with sitting/lying down) or on joint loading (with walking and on stairs) between two knees. MRI readings of structural lesions of knee OA, including cartilage morphology (CartM), bone marrow lesion (BML), synovitis-effusion, Hoffa's synovitis (HFS), meniscus morphology (MM) and meniscus extrusion (MExt), were performed using the compartment-specific semi-quantitative MRI Osteoarthritis Knee Score (MOAKS) in the OAI. Scores for BML and CartM were applied in subregions for each lesion in both the tibiofemoral joint (TFJ) and patellofemoral joint (PFJ), denoted by TFJ-BML, PFJ-BML, TFJ-CartM and PFJ-CartM, respectively. We used the worst CartM, MM and MExt score to represent the severity of corresponding lesions. BML score for size was used to represent the severity of BML. We only pooled data from the knee MRI scans that were read by Boston Imaging Core Laboratory group. We restricted our analyses to those who had MRI readings for both knees in one visit. We identified a matched pair of case and control knees within one participant if his/her two knees differed by ≥ 1 point in at least one WOMAC subscale of knee pain at rest or on joint loading (Figure 1). Participants were included when their knees formed a matched pair in the earliest visit between baseline and the 48-month visit. Each participant was included only once. We performed latent class analyses to identify subgroups of co-existing MRI lesions and fitted a conditional logistic regression model to examine their associations with knee pain.

Results: Among 130 eligible participants, we identified five subgroups of knees according to patterns of co-existing MRI lesions (Figure 2): I. minimal lesions; II. mild lesions; III. moderate morphological lesions; IV. moderate multiple reactive lesions; and V. severe lesions. In knees of subgroup I, there was no TFJ cartilage damage, whereas all knees of subgroup II had mild TFJ-CartM. All knees of subgroup III and IV had moderate TFJ-CartM, while the prevalence of severe TFJ-CartM was 100% in subgroup V. The prevalence and severity of MM and MExt also increased from subgroup I to subgroup V. Compared with subgroup III, subgroup IV was featured by a higher prevalence and greater severity of EFF, HFS and TFJ-BML. EFF, HFS and TFJ-BML often coexisted and their prevalence and severity were highly correlated. The prevalence and severity of PFJ-CartM and PFJ-BML was not correlated with that of TFJ-CartM. For example, although knees of subgroup V had greater TFJ-CartM than knees of subgroup IV, the prevalence and severity of PFJ-CartM and PFJ-BML was lower in subgroup V.

As shown in Table 1, compared with subgroup I, the odds ratios (ORs) and 95% confidence intervals (CI) of greater pain in bed were 1.6 (0.3, 7.2), 2.2 (0.5, 9.5), 6.2 (1.3, 29.6) and 11.2 (2.1, 59.2) for subgroups II–V, respectively. A similar association was observed between aforementioned subgroups and pain with sitting/lying down. The ORs (95% CI) of greater pain with walking were 1.0 (reference), 1.7 (0.5, 6.1), 0.7 (0.2, 2.3), 5.0 (1.4, 18.6) and 7.9 (2.0, 31.5) for subgroup I–V, respectively (Table 2). The corresponding analysis for pain on stairs showed similar results.

Conclusions: Co-existing patterns of MRI lesions were identified and differentially associated with knee pain at rest and on joint loading in OA. Morphological lesions were not statistically significantly associated with pain. Synovitis-effusion and TJF-BML were highly correlated and appeared to be the major sources of pain. PFJ lesions had a limited role in the pathogenesis of osteoarthritic knee pain. These findings are informative for optimizing a treatment strategy targeting the pathogenic sources of osteoarthritic knee pain.

Table 1. Subgroups of co-existing MRI lesions and knee pain at rest. Figures are numbers unless stated otherwise.

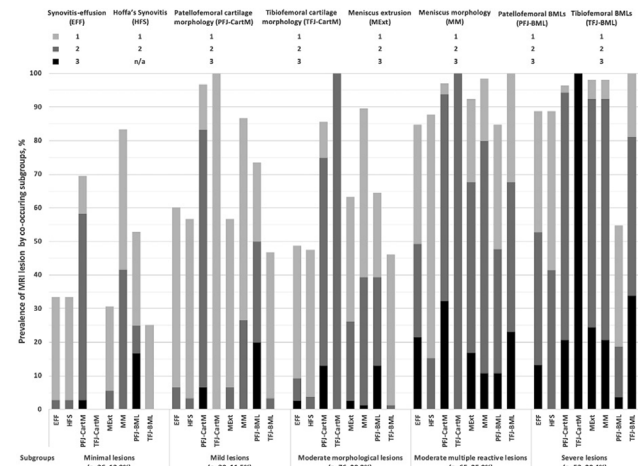
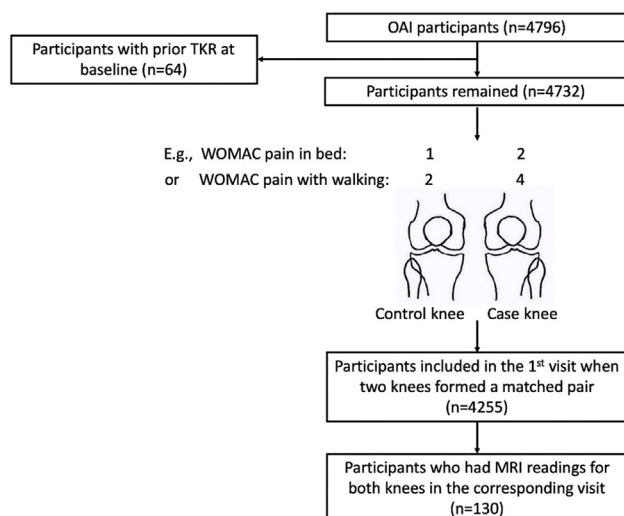
Subgroups	Knee pain at rest					
	Pain in bed			Pain with sitting/lying down		
	Control knee	Case knee	OR (95% CI)	Control knee	Case knee	OR (95% CI)
I. Minimal lesions	13	7	1.0 (Reference)	16	8	1.0 (Reference)
II. Mild lesions	14	8	1.6 (0.3, 7.3)	14	4	1.1 (0.2, 5.6)
III. Moderate morphological lesions	29	22	2.2 (0.5, 9.5)	31	20	3.1 (0.7, 14.4)
IV. Moderate multiple reactive lesions	22	28	6.2 (1.3, 29.6)	20	31	14.4 (2.5, 81.7)
V. Severe lesions	14	27	11.2 (2.1, 59.2)	13	31	28.9 (4.5, 184.0)
			P for test of homogeneity = 0.056			P for test of homogeneity < 0.001

OR = Odds ratio. CI = Confidence interval.

Table 2. Subgroups of co-existing MRI lesions and knee pain on joint loading. Figures are numbers unless stated otherwise.

Subgroups	Knee pain on joint loading					
	Pain with walking			Pain on stairs		
	Control knee	Case knee	OR (95% CI)	Control knee	Case knee	OR (95% CI)
I. Minimal lesions	16	11	1.0 (Reference)	19	15	1.0 (Reference)
II. Mild lesions	15	14	1.7 (0.5, 6.1)	16	10	0.9 (0.3, 3.3)
III. Moderate morphological lesions	45	21	0.7 (0.2, 2.3)	44	27	0.8 (0.3, 2.5)
IV. Moderate multiple reactive lesions	24	37	5.0 (1.4, 18.6)	30	34	2.4 (0.7, 7.4)
V. Severe lesions	16	33	7.8 (2.0, 31.5)	15	38	6.6 (1.8, 23.9)
			P for test of homogeneity = 0.001			P for test of homogeneity = 0.003

OR = Odds ratio. CI = Confidence interval.



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DEPENDENCE OF WOMAC PAIN ON RADIOGRAPHIC KNEE OA STATUS, AGE, SEX, BODY MASS INDEX (BMI), RACE, AND CONTRALATERAL KNEE PAIN STATUS

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Purpose: It has been proposed that structural (e.g. radiographic) change and symptoms are highly discordant in knee osteoarthritis, although work comparing radiographic alterations with symptoms between both knees in the same patient (between knee, within-person analysis) have revealed a stronger relationship. The purpose of the current work was to analyze the impact of age, sex, body mass index (BMI), race, and contra-lateral knee pain status on the level of knee pain perception, adjusting for radiographic status, using a probabilistic index model (PIM).

Methods: We used data from 4171 participants of the Osteoarthritis Initiative (OAI) cohort who had complete information on the above measures at the 12 month follow-up time point. This time point was used to reduce bias in knee pain reporting from participants who were eager to participate in the study. The PIM was used due to the ordinal scale of the outcome variable "Western Ontario Mac Master" (WOMAC) pain score (0-20, 0 representing no, and 20 the worst pain during 5 activities) and the study design. The target knee was defined as the knee with the more severe WOMAC pain score, with contralateral knee pain status being included in the model. When both knees had the same WOMAC pain score, the left knee was defined as the target knee. The PIM quantifies the impact of potential prognostic variables on the so-called probabilistic index. The corresponding effect measure is typically referred to as "nonparametric relative effect" and can be interpreted as the probability that a random subject with the covariate value of interest scores higher on the WOMAC pain score than a random subject without the characteristic of interest.

We defined 5 categorical groups with increasing radiographic severity (ROA groups 1-5); these were defined based on the Kellgren Lawrence Grade (KLG) and the maximum value of medial and lateral radiographic joint space narrowing (JSN_{max}), based on v1.8 of the central OAI radiographic readings performed by experts at Boston University. ROA group 1 (n=1857) considered OAI participants with KLG 0 or 1 and JSN_{max} 0 (non-ROA), ROA group 2 (n=427) participants with KLG 2 and JSN_{max} 0 (definite ROA without JSN), ROA group 3 (n=927) participants with KLG 1 or 2 and JSN_{max} 1 (definite ROA with mild JSN), ROA group 4 participants (n=679) with KLG 3 and JSN_{max} 2 (definite ROA with moderate JSN), and finally ROA group 5 participants (n=285) with KLG 4 and JSN_{max} 3 (definite ROA with severe JSN). Race included White or Caucasian (n=3393), Black or African American (n=679), Asian (n=35) and Other Non-White (n=60). In addition, we conducted a sensitivity analysis and applied backward variable elimination based on the Akaike Information Criterion (AIC) using a logistic regression model, with the outcome variable WOMAC pain score 'yes (>0) / no (=0)'. We started