and survival analysis, were used to investigate associations between hip shape modes and change in cartilage volume, incident BMLs, worsening knee pain and left KR respectively. All models were adjusted for baseline age, sex, BMI, knee injury or surgery and hip radiographic osteoarthritis (ROA), while the KR model was additionally adjusted for WOMAC pain and knee ROA.

Results: Ten hip shape modes were identified, describing 78% of the total shape variance in descending order from mode 01 (31% variance) to mode 10 (1.82% variance). Hip shapes with a larger greater trochanter (mode 07) were associated with lower knee cartilage volume loss (Beta:2.14, 95% CI:0.07,4.21), while a shorter and narrower femoral neck shape (mode 09) was related to increased volume loss (Beta:-3.86, 95% CI:-6.16,-1.56). Increasingly non-spherical femoral head (mode 04) was associated with an increased risk of incident BMLs (RR:1.19, 95% CI:1.07,1.34). Those with a longer, wider femoral neck and a larger femoral head (mode 01) had an increased risk of worsening knee pain (RR:1.33, 95% CI:1.09,1.61), whereas those with a smooth curving upper femoral neck (mode 09) had a lower risk of worsening knee pain (RR:0.78, 95% CI:0.67,0.90). A larger greater trochanter and wider femoral neck shape (mode 08) was associated with an increased risk of KR (RR:1.73, 95% CI:1.18,2.52), while increasing acetabular coverage (mode 10) was associated with a lower risk of KR (RR:0.54, 95% CI:0.36,0.8).

Conclusions: Hip shape variations were associated with significant MRI-based and clinical outcomes in knee over 10.7 years, possibly due to biomechanical, lifestyle or other factors related to both joints. These results suggest that hip shape may play an important role in the onset and progression of knee osteoarthritis over time.

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SAT0563

IDENTIFICATION AND VALIDATION OF PHYSICAL ACTIVITY PHENOTYPES FOR KNEE OSTEOARTHRITIS: A POPULATION-BASED COHORT STUDY

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Background: The identification of phenotypes to reduce heterogeneity of characteristics is important in understanding the development and progression of knee osteoarthritis.

Objectives: This study aimed to identify physical activity (PA) phenotypes and to investigate the association of these phenotypes with tibial cartilage volume, bone marrow lesions (BMLs) and knee replacements (KR) over 10.7 years.

Methods: 1046 community-dwelling older adults aged 50–80 years were studied. At baseline, PA was measured by pedometers (steps/day), knee pain was assessed using Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) and body mass index (BMI) was determined utilising objective weight and height measures. MRI scans were conducted at baseline and 10.7 years to assess tibial cartilage volume and BMLs. The incidence of KR was determined by data linkage to the Australian Orthopaedic Association National Joint Replacement Registry. Latent class analysis was used to determine 'PA phenotypes' based on PA, BMI and WOMAC pain at baseline. Linear mixed-effects models and log-binomial models were used to estimate the associations between the identified PA phenotypes with change in cartilage volume, incident BMLs, and KR surgery over 10.7 years. All models were adjusted for age, sex, and history of knee injury or surgery, while the KR model was additionally adjusted for the prevalence of knee radiographic osteoarthritis.

Results: Three PA phenotypes were identified: Class 1: Normal/overweight participants with low levels of PA and low pain (42%); Class 2: Obese participants with low levels of PA and high pain (26%); Class 3: Normal/overweight participants with high levels of PA and low pain (32%). Mean cartilage volume loss over 10.7 years was 465±231 mm³. 221 participants had an incident BML while 74 had an incident KR. Class 2 participants had greater cartilage volume loss over 10.7 years (Beta: -79.9, 95% CI -135.8,-23.9) and, had a higher risk of KR (RR 2.36, 95% CI 1.20, 4.67) compared to Class 1 participants. Class 3 was not associated with cartilage volume loss (Beta: -36.2, 95% CI -86.6, 14.1) or risk of KR (RR 0.86, 95% CI 0.40, 1.84) compared to Class 1. Similarly, PA phenotypes were not associated with incident BMLs (Class 2: RR 1.15, 95% CI 0.88, 1.50; Class 3: RR 1.19, 95% CI 0.93, 1.54; compared to Class 1).

Conclusions: Our findings support the existence of homogeneous PA profiles, and suggest that PA interacts with body weight and knee pain and has long-term impacts on osteoarthritis outcomes.

Disclosure of Interest: None declared

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SAT0564

EFFECTS OF EDUCATION AND INCOME ON PREVALENCE, INCIDENCE, AND PROGRESSION OF RADIOGRAPHIC KNEE OSTEOARTHRITIS: AN ANALYSIS OF THE OSTEOARTHRITIS INITIATIVE DATA

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Background: Low socioeconomic status (SES) is one of the strongest predictors of morbidity and mortality from many chronic diseases including cardiovascular diseases, obesity, and diabetes.¹ There is insufficient data regarding impact of SES on knee osteoarthritis (OA).

Objectives: To evaluate the associations between education, income levels and prevalence, incidence, and progression of radiographic knee OA

Methods: For the current analysis we used data from the publicly available Osteoarthritis Initiative (OAI) database. The education status of the participants was dichotomized into either low/moderate or high educational attainment. The income status was dichotomized using 50 K US threshold. A baseline sample was used to analyse the impact of SES on knee OA prevalence (prevalence sample). To evaluate the effects of SES on knee OA incidence and progression we analysed the samples of OAI participants with KL <2 at baseline (incidence sample) and OAI participants with JSN <3 at baseline (progression sample), respectively. We used logistic regression models to assess the association between SES and prevalence and incidence of radiographic knee OA (defined as KL2 and JSN or joint replacement), and disease progression (defined as increase in semiquantitative JSN or a new knee replacement). Generalised estimating equations (GEE) were used to adjust for the correlation between knees. The models were adjusted for multiple covariates including age, race, and body mass index.

Results: Prevalence, incidence, and progression samples consisted of 4371 participants (8741 knees), 2268 participants (4535 knees), and 3950 participants (4013 knees), respectively.

Higher education attainment and higher income were associated with decreased prevalence of the knee OA in the crude analyses. After adjustment for confounders these associations became insignificant (Table). There was no effect of SES on incidence and progression of the knee OA.

Table

	Prevalence			
	Unadjusted OR (95% CI)	P value	Adjusted OR (95% CI)	P value
Education	0.8 (0.7–0.9)	<0.001	1.05 (0.9–1.18)	0.48
Income	0.71 (0.64–0.8)	<0.001	1 (0.87–1.4)	0.97

OR – odds ratio, CI – confidence interval

Conclusions: Higher levels of education and income are linked with decreased prevalence of radiographic knee OA. Lack of this association after adjustment suggests confounding or mediating effects of other risk factors. Future studies are needed to delineate the precise mechanisms of how SES impact knee OA.

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SAT0565

ADJUSTING FOR THE INTRA-ARTICULAR PLACEBO EFFECT IN KNEE OSTEOARTHRITIS THERAPIES

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Background: Currently, there is a large debate regarding the appropriateness of intra-articular (IA)-saline injection as a "placebo" comparator in knee osteoarthritis (OA) trials and meta-analyses. There is substantial evidence to suggest that the injection of saline into the joint is not without treatment effect.

Objectives: This study aimed to assess the current literature's estimates of the IA-saline treatment effect against a range of appropriate minimal clinically important difference (MCID) values to identify if IA-saline provides a therapeutic effect that is not indicative of a null-effect.

Methods: The treatment effect estimates of IA-saline and topical placebo for knee OA pain, relative to oral placebo, were derived from a published network meta-analysis Bannuru et al, 2015 and compared across a range of plausible

MCID values. Effect estimates of pharmacologic knee OA treatments were also extracted from recent high-quality meta-analyses, and the effect of IA-saline or topical placebo was used as an adjustment for meta-analyses that used IA-saline or topical placebo as a comparator, respectively. This was done to estimate the therapeutic effect of these treatment options when compared to a truly null treatment option, as IA-saline has been shown to not be a null-effect intervention. The unadjusted and adjusted treatment effect values were compared across an MCID value range of 0.2 to 0.5 standard deviation units representing an effect size range. This range was used to determine if the adjustment for the effect of IA-saline would affect the potential clinical interpretation of the previously published meta-analysis results.

Results: IA-saline provides a therapeutic benefit that is potentially clinically meaningful to patients based on a range of MCID values (figure 1). Across the same range of MCID values, the effects of high molecular weight IA-hyaluronic acid products and IA-corticosteroid treatments were not conclusively clinically significant. However, when reassessing these treatments while accounting for the treatment effect of IA saline, they were found to have a clinically significant effect at the strictest MCID value (figure 2).

Figure 1. Effects of Topical Placebo and IA-Saline in Comparison to the MCID Threshold Range

Figure 2. Pain Effect Estimates Adjusted for Placebo Effect Estimate (from Bannuru et al [2015])

Conclusions: The use of IA-saline as a placebo treatment within RCTs of IA injectable therapies is inappropriately underestimating the true effect of these treatments. When the potential therapeutic effect that IA-saline demonstrates is accounted for, these IA therapies show a considerably larger therapeutic effect.

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SAT0566 ASSOCIATIONS OF OSTEOCLASTS AND MACROPHAGES IN SUBCHONDRAL BONE WITH SYMPTOMS IN PEOPLE WITH KNEE OA

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Background: Knee pain is a major source of disability and reason for hospital visits in patients with knee OA, but the pain pathophysiology is incompletely

understood. Recent accumulating clinical evidence indicates that subchondral bone plays a role in generating joint pain in OA¹. Subchondral bone marrow lesions (BMLs) detected on magnetic resonance imaging (MRI) in knee OA are strongly associated with pain¹. In human OA histology, bone turnover and osteoclast numbers in subchondral bone were increased². Inflammatory CD68-positive macrophages have been detected in bone marrow compartments of subchondral bone tissue from tibial plateaux of OA knees³. However, the relevance of osteoclasts and macrophage infiltration in subchondral bone to knee OA symptoms has not been clarified.

Objectives: To identify osteoclast and macrophage infiltration in subchondral bone associated with symptomatic knee OA, by comparing cases with similar macroscopic chondropathy, half of whom had sought help for knee pain and undergone total knee replacement (TKR) surgery (symptomatic chondropathy), the other half of whom had not sought help for knee pain but had died from unrelated illness (asymptomatic chondropathy).

Methods: Medial tibial plateaux were obtained from people undergoing TKR for OA (symptomatic chondropathy), and from post-mortem (PM) cases matched for similar macroscopic chondropathy scores (asymptomatic chondropathy). Samples were histologically graded for chondropathy, subchondral fibrovascular or macrophage infiltration, and TRAP-positive osteoclasts were quantified (figure 1).

Results: Patient demographics are shown in table 1. Total Mankin score showed similar values between the two groups (Table 2). The number of osteoclasts in symptomatic chondropathy cases was significantly higher than in asymptomatic chondropathy cases (table 2). This difference remained significant (p<0.05) after adjusting for age by logistic regression analysis. However, there was no significant difference in macrophage densities between symptomatic and asymptomatic chondropathy groups (Table 2).

Abstract SAT0566 – Figure 1. Representative photomicrographs of TRAP-positive osteoclasts and CD68-positive macrophages in subchondral bone.

Abstract SAT0566 – Table 1. Patient demographic data.

	PM Asymptomatic chondropathy	TKR Symptomatic chondropathy	p
Number	31	31	
Male/Female	19/12	16/15	0.442
Years (mean ± SD, median (IQR))	75 ± 11 74 (68, 84)	65 ± 10* 67 (56, 73)	0.001
Revised SFA score (mean ± SD, median (IQR))	69 ± 17 74 (68, 84)	69 ± 17 76 (57, 79)	0.955
Grade IV chondropathy score (mean ± SD, median (IQR))	30 ± 27 30 (0, 48)	30 ± 27 30 (0, 48)	0.943

SFA; Systeme Franc, also D'Arthroscopie * : p<0.05 by Mann-Whitney U test

SFA; Sytème Franc, also D'Arthroscopie
*: p<0.05 by Mann-Whitney U test

Abstract SAT0566 – Table 2. Histopathological characteristics.

	PM Asymptomatic chondropathy	TKR Symptomatic chondropathy	p
Total Mankin score (mean ± SD, median (IQR))	8.8 ± 2.7 8 (7, 11)	9.1 ± 2.4 9 (7, 11)	0.755
Fibrovascular tissue(n)	14	11	0.437
Osteoclasts (number / cm)	1.1 ± 3.2 0 (0, 0.8)	3.3 ± 5.7* 1.0 (0, 2.7)	0.019
CD68+ macrophages grading(0-2) (mean ± SD, median (IQR))	1.13 ± 0.76 1 (1, 2)	1.06 ± 0.51 1 (1, 1)	0.626

* : p<0.05 by Mann-Whitney U test

*: p<0.05 by Mann-Whitney U test