medially and 2 knees showed worsening BMLs laterally. 10 (7%) knees showed incident BMLs medially and 8 (6%) knees in the lateral FT compartment. Deep layer T2 showed prolongation in the LT in knees with incident LT cartilage lesions (n=8, 34.5 vs. 32.7 ms, p=0.02) and for MF in knees with MF cartilage lesion worsening (n=9, 47.6 vs. 41.4 ms, p=0.01) and MF BML incidence (n=6, 45.4 vs. 41.6 ms, p=0.000). Superficial T2 showed prolongation in the MT only in those knees with MT cartilage lesion worsening (n=2, 47.3 vs. 43.4 ms, p=0.03). No additional associations were seen for the superficial layer.

Conclusion: For knees without ROA, BL deep layer T2 prolongation was seen for those who developed incident cartilage damage in the LT, and those with worsening cartilage damage and incident BMLs in the MF, respectively. Superficial T2 showed prolongation only in the MT for those with MT cartilage lesion worsening. In summary and contrary to our hypothesis the deep cartilage layer seems to be more relevant for cartilage damage development or worsening in the same FT plate than the superficial layer.

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Osteoarthritis: clinical

OP0184

RISK OF COMORBIDITIES FOLLOWING INCIDENT CLINICIAN-DIAGNOSED KNEE OR HIP OSTEOARTHRITIS: A REGISTRY-BASED COHORT STUDY

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Background: Osteoarthritis (OA) is associated with increased comorbidity, but knowledge of the temporal relationships between OA and comorbidities is limited.

Objectives: To estimate the risk of consulting for comorbidities in people with incident clinician-diagnosed knee or hip OA.

Methods: Using the Swedish Population Register, we identified all residents aged 35 years or above in the Skåne region, Sweden (total pop. 1.23 million) in the year 2009. We used the Skåne Health Care Register (SHR), a comprehensive register based on physicians' International Classification of Disease (ICD) 10, to identify persons who had at least one diagnosis of knee or hip OA – the exposures of interest – and 18 other diagnoses (Figure 1) – the outcomes of interest – between 1 January 2010 and 31 December 2017. To minimize potential confounding due to propensity to seek care, persons had to have at least one health-care visit with any diagnosis registered between 1 January 1998 and 31 December 2009 to be included. We excluded persons with a knee or hip OA diagnosis before 1 January 2010, and for each analysis, persons with a previous diagnosis of the outcome diagnosis of interest. People were followed from 1 January 2010 until relocation outside of the region, death, outcome diagnosis, or 31 December 2017, whichever came first. We calculated hazard ratios (HR) of each outcome diagnosis using Cox proportional hazard models with incident knee and hip OA as time-varying exposure. Time from start of follow-up to the date of an OA diagnosis was treated as unexposed, while time from an OA diagnosis to the outcome diagnosis was treated as exposed. Models were adjusted for residential area, if born in Sweden, annual income, years of education, marital status, sex, and age (all retrieved from Statistics Sweden), and baseline conditions (i.e. the other outcome diseases of interest, and alcohol-related disorders) as registered in SHR before 1 January 2010.

Results: We included 548,681 persons in the Skåne population having at least one health-care visit during 1998 to 2009 and no doctor-diagnosed knee or hip OA. Of these, 36,465 persons consulted for knee OA and 14,477 for hip OA during the follow-up period (Table 1). Persons with clinician-diagnosed incident knee or hip OA have 8-61% higher hazard of depression, cardiovascular diseases, back pain, and osteoporosis than persons without an OA diagnosis (Fig. 1). Both knee and hip OA persons have increased risk of diabetes, however the 95% confidence interval excluded 1 only for knee OA (Fig. 1). Also, only knee OA patients have an increased risk of fracture to the forearm. For the rest of the diagnoses, we found either no increased risk for knee or hip OA persons, or estimates with

wide confidence intervals, excluding any clear interpretations of the direction or size of the effects.

Table 1. Demographics of the study cohort at start of follow-up (Jan. 1, 2010).

	No OA (n=497,739)	Incident knee OA (n=36,465)	Incident hip OA (n=14,477)
Age, yrs (SD)	57.3 (14.6)	62.2 (12.2)	65.3 (11.7)
Women, n (%)	254,593 (51)	21,553 (59)	8,306 (57)
Married ^a , n (%)	350,172 (70)	27,955 (77)	10,937 (76)
Born in Sweden ^b , n (%)	422,713 (85)	31,292 (86)	12,949 (89)
Education ^c , n (%)			
<10 yrs	128,738 (26)	11,364 (31)	4,745 (33)
10-12 yrs	222,147 (45)	16,390 (45)	6,050 (42)
13-14 yrs	59,950 (12)	3,908 (11)	1,556 (11)
≥15 yrs	83,620 (17)	4,590 (13)	2,065 (14)
Income in 100,000 SEK ^d , mean (SD)	2.3 (3.0)	2.1 (2.4)	2.1 (2.6)

Missings: ^a29 ^b44, ^c3,558, ^d2

Conclusion: Incident clinician-diagnosed knee and hip OA are associated with increased risk of consultation for depression, cardiovascular disease, back pain, osteoporosis, and diabetes. Results support previous findings for cardiovascular diseases and diabetes, however suggesting that the risk of diabetes is mainly associated with knee OA.

Figure 1. Adjusted hazard ratios of consultation for diseases occurring in persons with incident doctor-diagnosed knee or hip OA compared to non-OA persons. *Only women included in analysis. **Only men included in analysis.

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OP0185

KNEE JOINT DISTRACTION IS MORE EFFICIENT IN RESTORING CARTILAGE THICKNESS THAN HIGH TIBIAL OSTEOTOMY IN PATIENTS WITH SEVERE KNEE OSTEOARTHRITIS

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Background: Both high tibial osteotomy (HTO) and knee joint distraction (KJD) are joint preserving surgical techniques unloading the affected femorotibial

compartment in patients with knee osteoarthritis (OA). While HTO permanently unloads the more affected compartment (MAC) by overcorrecting the leg axis, KJD temporarily unloads the whole joint by separating the tibia and femur for 5 mm for 6 weeks. In a previous randomized controlled trial (RCT), comparable clinical benefit and radiographic joint space width (JSW) increase over 2 years follow-up were demonstrated for both treatments¹. Yet, comparison of JSW before and after HTO may be unreliable, as pseudo-widening of the unloaded compartment may occur due to the induced leg axis change. Therefore, direct cartilage thickness measurements need to be compared between KJD and HTO, to accurately evaluate the efficacy of both treatment options on cartilage structure.

Objectives: To compare two-year cartilage thickness changes after treatment with KJD vs HTO and identify factors predicting cartilage thickness restoration.

Methods: Patients indicated for HTO were randomized to KJD (KJD_{HTO}) or HTO treatment. Patients indicated for total knee arthroplasty received KJD (KJD_{TKA}). Standardized semi-flexed weight-bearing radiographs and 3T MRIs with 3D spoiled gradient recalled imaging sequence with fat suppression (SPGR-fs) were acquired before and two years after surgical treatment. Cartilage thickness in the knee was measured using Chondrometrics Works 3.0 software. On the radiographs the mean JSW in the MAC were measured with KIDA software. Readers were blinded to the type of intervention and acquisition order. The primary and secondary outcomes were the mean MAC cartilage thickness (ThCiAB) and percentage of denuded bone area (dABp) change before and two years after treatment (MRI), with radiographic joint space width (JSW) used as a reference.

Results: No statistically significant differences in the baseline characteristics were seen between KJD_{HTO} (n=18) and HTO (n=33). The KJD_{TKA} group (n=18) had a higher age and Kellgren-Lawrence grade (KLG) than the HTO and KJD_{HTO} groups.

KJD_{HTO} patients did not show significant changes in MAC cartilage thickness, dABp, or JSW over time (all $p > 0.10$; figure 1). HTO patients displayed a decrease in MAC cartilage thickness and an increase in dABp (both $p < 0.03$), but an increase in JSW ($p = 0.006$). KJD_{TKA} showed a significant increase in MAC cartilage thickness and JSW and decrease in dABp (all $p < 0.01$). Baseline OA severity was the strongest predictor of cartilage restoration. KJD patients with severe OA (KJD_{severe}; KLG ≥ 3) showed significant restoration (all $p < 0.01$; figure 2); mild OA patients (KJD_{mild}; KLG ≤ 2) showed a slight deterioration. KJD_{severe} showed a significantly greater cartilage restoration response in the MAC than HTO_{severe} for cartilage thickness ($p = 0.005$) and dABp ($p = 0.003$), but not JSW change ($p = 0.521$). The changes in all three parameters did not differ significantly between KJD_{mild} and HTO_{mild} (all $p > 0.08$).

Conclusion: In patients with severe knee OA, KJD is more efficient in restoring cartilage thickness than HTO is. In these patients, KJD causes significant cartilage restoration while HTO, despite shifting the leg axis and demonstrating radiographic joint space widening, shows loss of cartilage as measured on MRI. In patients with mild knee OA, neither HTO nor KJD treatment results in significant cartilage restoration and both treatments show a slight deterioration that is likely the result of natural OA progression. As such, this research promotes the choice KJD as joint-preserving surgery in case of knee OA patients with more severe structural damage.

References:

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Figure 1: Two-year change in radiographic and MRI cartilage parameters. (A) Change in MRI mean cartilage thickness over the total subchondral bone area (ThCiAB) of the most affected compartment (MAC), for the three groups: KJD_{HTO} = KJD patients with indication high tibial osteotomy (HTO); KJD_{TKA} = knee joint distraction (KJD) patients with indication total knee arthroplasty. (B) Change in MRI percentage of denuded subchondral bone area (dABp) of the MAC for the three groups. (C) Change in mean radiographic joint space width (JSW) of the MAC for the three groups. Markers represent individual patients, dashes represent the group mean and 95% confidence interval. P-values above groups indicate statistical significance of two-year changes while p-values between groups indicate the differences between each two groups, corrected for baseline patient characteristics statistically significantly different between each two groups.

Figure 2: Two-year change in radiographic and MRI cartilage thickness parameters for knee joint distraction (KJD) patients with mild (KJD_{mild}) and severe (KJD_{severe}) osteoarthritis. (A) Change in MRI mean cartilage thickness over the total subchondral bone area (ThCiAB) of the most affected compartment (MAC). (B) Change in MRI percentage of denuded subchondral bone area (dABp) of the MAC for both groups. (C) Change in mean radiographic joint space width (JSW) of the MAC for both groups. Markers represent individual patients, dashes represent the group mean and 95% confidence interval. P-values above groups indicate statistical significance of two-year changes while p-values between groups indicate the differences between each two groups, corrected for statistically significantly different baseline characteristics.

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OP0186

HYDROXYCHLOROQUINE IN PATIENTS WITH INFLAMMATORY AND EROSION OSTEOARTHRITIS OF THE HANDS: RESULTS OF A RANDOMIZED, DOUBLE-BLIND, PLACEBO CONTROLLED, MULTI-CENTRE, INVESTIGATOR-INITIATED TRIAL (OA TREAT)

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Background: Hand osteoarthritis (OA) is a very common condition with cartilage degradation and frequently erosive bone changes. It may be very painful and can greatly affect everyday activities. Common analgesics and NSAIDs are used for symptomatic relief but are often poorly tolerated or contraindicated especially in elderly patients. There is no effective and proven disease modifying therapy available. Previous publications and anecdotal reports suggest hydroxychloroquine (HCQ) as a possible treatment, and some physicians use HCQ off-label for the treatment of OA

Objectives: To investigate the efficacy and safety of HCQ in patients with inflammatory and erosive hand OA in a randomized, double-blind, placebo controlled, multi-centre, investigator-initiated trial

Methods: Patients with inflammatory and erosive hand OA, according to the ACR criteria, with radiographically proven erosive disease were randomized 1:1 to HCQ 200-400mg per day or matching placebo (PBO) for 52 weeks. Both groups received standard therapy (stable NSAIDs). The primary endpoint was AUSCAN for pain and hand disability at week 52 (W52). A secondary endpoint was radiographic progression from baseline (BL) to W52. A multiple endpoint test and analysis of covariance was used to compare changes between groups. All analyses were conducted on an intention-to-treat base

Results: Of 156 patients 3 were excluded and 75 were randomized to HCQ and 78 to PBO. Mean age was 52.4 (SD 8.1) in the HCQ and 50.2 (SD 6.6) years in the PBO group. 68 (90.7%) of the patients were female in the HCQ and 60 (76.9%) in the PBO group. Disease duration was 9.5 (SD 7.5) in HCQ and 10.8 (SD 8.8) years in PBO group. CRP and ESR were normal in both groups. BL pain (AUSCAN) was 31.1 (SD 8.2) and 30.7 (SD 8.9), BL function (AUSCAN) was 58.5 (SD 15.5) in HCQ and 57.8 (SD 17.1) in PBO patients. Table 1 shows clinical and functional parameters at W52. Only morning stiffness was significantly reduced in the HCQ group ($p = 0.001$). Changes in radiographic scores did not