

was significantly associated with a greater likelihood of thickness loss (right column Table 1), and with a reduced likelihood (OR <1.0) for thickness gain in almost all subregions, although these did not achieve significance (right column Table 2).

Conclusions: Cartilage thickness increase occurred in a subset of knees within each subregion. In most medial surfaces and subregions, worse baseline medial osteoarthritic disease severity was associated with a significantly greater likelihood of cartilage thickness loss and a consistent although not statistically significant trend towards a reduced likelihood of cartilage thickness increase.

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SUBREGIONAL EFFECTS OF MENISCAL TEARS AND SUBLUXATION IN KNEE OSTEOARTHRITIS

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Purpose: Meniscal damage has been linked to knee OA progression, presumably via a mechanism of impaired load attenuation. How meniscal damage affects OA pathogenesis is unclear, and examination of cartilage loss at the subregional level may help to elucidate whether the impact is local. We tested the hypotheses: 1) medial meniscal tear and subluxation at baseline are associated with baseline-to-two year cartilage thickness loss in subregions that the meniscus overlies (the external or medial-most, anterior, and posterior medial tibial subregions and the external medial weightbearing femoral subregion; and 2) meniscal tear presence is associated with cartilage thickness loss within the same subregion as the tear.

Methods: Participants with knee OA, defined by K/L ≥ 2 in at least one knee, underwent 1.5T MRI of both knees at baseline and two years later using double oblique coronal FLASHwe sequences, coronal T1-weighted spin-echo (SE), and sagittal fat-suppressed dual-echo turbo SE. Mean cartilage thickness within each subregion (5 tibial and 3 weightbearing femoral) was determined using proprietary software (Chondrometrics GmbH, Ainring, Germany). We used logistic regression with GEE to analyze the relationship between baseline presence of displaced meniscal tear (WORMS score >2) and any meniscal subluxation (WORMS score > 0) with baseline-to-2 year cartilage thickness loss (defined as ≥5%) in each subregion, adjusting for age, gender, and BMI.

Results: Our sample consisted of 261 knees from 159 persons [mean age 66 (±11, SD), BMI 30 (±6), 75% women]. In the medial tibial and weightbearing femoral surfaces, 23% and 31% of knees lost cartilage thickness, respectively. The percent of knees losing thickness in the medial tibial subregions was 33% (central), 36% (external), 20% (internal), 33% (anterior), and 28% (posterior), and in the femoral subregions was 36% (central), 33% (external), and 31% (internal). 25% and 35% of knees had a displaced medial meniscal tear and subluxation respectively. As shown in Table 1,

medial meniscal tear at baseline was significantly associated with cartilage thickness loss in the external, anterior, posterior, and central medial tibial subregions, as well as the external and central weightbearing femoral subregions. Medial meniscal subluxation was associated with thickness loss in the external, anterior, and central tibial subregions and the external femoral subregion (Table 1). Results for the same subregion analyses included: baseline anterior horn medial meniscal tear with anterior medial tibia subregion cartilage thickness loss, adjusted OR 4.09 (95% CI 0.96, 17.37); body medial meniscal tear with external medial tibial subregion thickness loss, adjusted OR 6.06 (95% CI 3.22, 11.38) and external medial femoral subregion thickness loss, adjusted OR 3.34 (95% CI 1.87, 5.99); posterior horn medial meniscal tear with posterior medial tibial subregion thickness loss, adjusted OR 2.24 (95% CI 1.12, 4.48).

Conclusions: Medial meniscal tear at baseline was significantly associated with subsequent cartilage thickness loss in the medial tibial and weightbearing femoral plates, and within each subregion except the internal subregions, with similar findings for medial meniscal subluxation. These results suggest the pattern of regions most stressed by medial meniscal damage, and are in keeping with the coverage provided by this tissue. Findings within the same subregion suggest that at least some of the meniscal damage effect may be experienced locally.

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GENDER-RELATED DIFFERENCES IN PATIENT-REPORTED OUTCOMES AFTER ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION - DATA FROM THE SWEDISH NATIONAL REGISTER ON ACL RECONSTRUCTION

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Purpose: Knee joint injury, such as anterior cruciate ligament (ACL) injuries, is the major risk factor for osteoarthritis (OA) development in the young and middle-aged. It is suggested that middle-aged women with or at high risk of OA report worse self-reported outcomes and are at greater risk of worsening over time in patient-reported outcomes than men. It is unclear whether gender-related differences in patient-reported outcomes are present also in people with ACL injury, at high risk of OA. The aim was to study gender-related differences in patient-reported outcomes before and after ACL reconstruction.

Methods: Patients undergoing surgical reconstruction of the ACL in Sweden are registered in the Swedish National Register on ACL reconstruction. During 2005 - 2008, 10163 patients (mean age 27 years, SD 9.8, 42% women) with primary reconstruction were registered. 4438 (44%) of these patients (mean age 26 years, SD 9.6, 42% women) had completed the Knee injury and Osteoarthritis Outcome Score (KOOS) before surgery and were

Abstract 357 – Table 1. Adjusted Odds Ratio (95% CI) for Medial Tibiofemoral Subregional Cartilage Thickness Loss

Medial meniscal damage (independent variable)	Medial tibia	Medial tibia, central subregion	Medial tibia, external subregion	Medial tibia, internal subregion	Medial tibia, anterior subregion	Medial tibia, posterior subregion
Displaced medial meniscal tear (yes vs. no)	4.97 (2.53,9.79)	3.21(1.71, 6.03)	5.77(3.19, 10.45)	1.21(0.64, 2.28)	1.99 (1.14, 3.47)	1.87(1.06, 3.33)
Medial meniscal subluxation (yes vs. no)	3.47 (1.94, 6.23)	2.29(1.34, 3.92)	1.78(1.06, 2.98)	1.29 (0.68, 2.47)	1.77 (1.04, 3.00)	1.41(0.81, 2.47)

Medial meniscal damage (independent variable)	Medial weightbearing (WB) femoral	Medial WB femoral, central subregion	Medial WB femoral, external subregion	Medial WB femoral, internal subregion
Displaced medial meniscal tear (yes vs. no)	1.91(1.03, 3.51)	1.98 (1.13, 3.46)	3.10 (1.80, 5.33)	0.78 (0.41, 1.49)
Medial meniscal subluxation (yes vs. no)	2.12(1.24, 3.65)	1.65 (0.96, 2.84)	2.72 (1.65, 4.48)	1.07 (0.61, 1.89)

Abstract 358 – Table 1. Mean difference (95% CI) between men and women in self-reported KOOS data

KOOS subscales	Pre-op (n=4432 to 4438) Mean diff (95% CI)	1 yr post-op (n=3851 to 3857) Mean diff (95% CI)	2 yrs post-op (n=2178 to 2184) Mean diff (95% CI)	Change pre-op vs. 1 yr post-op (n=1823 to 1831) Mean diff (95% CI)	Change 1 yr post-op vs. 2 yrs post-op (n=1319 to 1325) Mean diff (95% CI)
Pain	1.9 (0.8 to 2.9)	1.4 (0.4 to 2.4)	1.2 (-0.1 to 2.5)	-0.1 (-1.8 to 1.6)	0.3 (-1.3 to 1.9)
Symptoms	1.4 (0.3 to 2.4)	1.0 (-0.2 to 2.1)	1.1 (-0.4 to 2.5)	-0.3 (-2.1 to 1.6)	0.0 (-1.4 to 1.5)
ADL	0.6 (-0.4 to 1.6)	-0.1 (-1.0 to 0.7)	-0.1 (-1.1 to 1.0)	-0.7 (-2.2 to 0.9)	0.4 (-0.9 to 1.7)
Sport/rec	4.7 (3.0 to 6.3)	2.7 (0.9 to 4.4)	4.4 (2.1 to 6.7)	-1.7 (-4.6 to 1.2)	3.2 (0.3 to 6.1)
QoL	2.1 (1.1 to 3.2)	0.3 (-1.2 to 1.9)	2.4 (0.4 to 4.4)	-3.2 (-5.6 to 0.8)	2.2 (-0.4 to 4.8)

included in this study. The KOOS is a patient-relevant questionnaire comprising five subscales; pain, other symptoms, activities in daily living (ADL), function in sport and recreation (sport/rec), and knee-related quality of life (QoL). Each subscale is scored on a 0 (worst) to 100 (best) scale. Possible confounding factors, such as age, associated injuries, activity at injury, and graft type did not influence the results (ANCOVA) and were, therefore, not adjusted for. Independent t-tests were used to study gender-related differences in KOOS before (pre-op), at 1 and 2 years after surgery (post-op), and over time (pre-op vs. 1 year post-op and 1 year vs. 2 years post-op).

Results: The mean (SD) for the five KOOS subscales at pre-op (n=4432 to 4438), 1 year (n=3851 to 3861), and 2 years (n=2178 to 2184) post-op, respectively, were: KOOS pain 74 (17), 85 (16), 86 (16); KOOS symptoms 68 (18), 79 (18), 79 (17); KOOS ADL 84 (17), 92 (13), 92 (13); KOOS sport/rec 41 (27), 65 (28), 66 (27); KOOS QoL 33 (18), 61 (25), 62 (24). The mean difference (95% CI) between men and women in KOOS scores ranged between 0.6 (-0.4 to 1.6) for KOOS ADL and 4.7 (3.0 to 6.3) for KOOS sport/rec at pre-op, between -0.1 (-1.0 to 0.7) for KOOS ADL and 2.7 (0.9 to 4.4) for KOOS sport/rec at 1 year post-op, and between -0.1 (-1.1 to 1.0) for KOOS ADL and 4.4 (2.1 to 6.7) for KOOS sport/rec at 2 years post-op, with generally lower scores for the women (Table 1). For changes in KOOS scores over time, the mean difference (95% CI) between men and women ranged between -0.1 (-1.8 to 1.6) for KOOS pain and -3.2 (-5.6 to 0.8) for KOOS QoL at pre-op vs. 1 year post-op, and between 0.0 (-1.4 to 1.5) for KOOS symptoms and 3.2 (0.3 to 6.1) for KOOS sport/rec at 1 year vs. 2 years post-op (Table 1).

Conclusions: Women reported statistically significantly worse scores in all KOOS subscales, except for KOOS ADL, than men. However, these gender-related differences were too small to be considered clinically relevant. There were no gender-related differences in improvements in KOOS over time.

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NATURAL COURSE OF THE MEDIAL KNEE OSTEOARTHRITIS

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Purpose: Knee osteoarthritis (Knee OA) is one of the most common form of aging of the joints, and knee OA is a major source of chronic disability and is becoming a serious public health problem. Therefore, it is very important to clarify the pathomechanics of this disease. The purpose of this study is to evaluate the results of long-term epidemiological study of medial knee OA and clarify the natural course of this disease.

Methods: This study was a population-based historical cohort study, and a baseline study was performed in 1979 at Niigata prefecture, Japan (Matsudai Knee Osteoarthritis Survey). Totally 1327 people (1075 women and 252 men), aged between 40 and 65,

were evaluated, and the same cohort was longitudinally followed at every 7 years from 1979 to 2007, resulting in 5 surveys with 28 years of follow-up. Data were collected by questionnaire, physical examination, and anteroposterior standing X-ray. The questionnaire included age, gender, work history, knee injury or trauma of the lower extremity, walking ability, and medical history of other disease. The physical examination included body weight, height, range of motion of joints, stability of the knee joint, and evaluation of the gait. BMI was calculated as a parameter of obesity. A weight-bearing knee radiograph was obtained and graded according to a Kellgren-Lawrence scale, and knee OA was defined if radiographic grade of II or higher was detected.

Results: A total of 6629 subjects, 4363 women and 2266 men, were involved in this survey and mean follow-up rate was 80.3% (73-87%). Of the 6629 subjects, 258 people, 251 women and 7 men, participated in all five surveys. The age-specific prevalence of radiographic knee OA in women was 10% in the 40-50 year range, 20% in the 50-60 year range, 35% in the 60-70 year range, 58% in the 70-80 year range, and 80% in subjects more than 80 years. In the case of men, the result was 5%, 7%, 15%, 35%, and 55%, for respective age group. Of the 258 subjects who have participated all five surveys, 227 women subjects had no knee OA (grade-0, I) at the baseline study, and the change of knee X-ray of these subjects in 28 years were longitudinally evaluated in order to clarify the natural course of the medial knee OA. At the time of fifth survey in 2007, 59 knees (26%) showed grade-0, I (no knee OA), 107 knees (47%) showed grade-II, 44 knees (20%) showed grade-III, and 17 knees (7%) showed grade-IV, respectively. Furthermore, several risk factors were clarified from cross-sectional and longitudinal evaluation. These include age, female, obesity (BMI), varus deformity (FTA), and medial thrust during gait.

Conclusions: At this point, there are few epidemiological studies of knee OA with longer follow up periods than the current study (Matsudai Knee Osteoarthritis Survey) in the world. The result of this study indicate that medial knee OA may slowly progress with time but still 73% of the subjects had no knee OA or mild OA in 28 years. This suggests that the preventive strategy and conservative treatment is more important for medial knee OA than surgical procedure.

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THE RISK OF SUBREGIONAL CARTILAGE THICKNESS LOSS ASSOCIATED WITH VARUS AND VALGUS MALALIGNMENT

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Purpose: Varus and valgus malalignment stress the medial and lateral tibiofemoral compartments, respectively, and are associated with OA disease progression in the expected (stressed) compartment. Recent studies have suggested that tibiofemoral cartilage loss is not homogeneous but is more pronounced in certain anatomical subregions, depending in part upon varus-valgus