observed and scored in order to analyze their distributions and investigate their biological and clinical significance, as well as to better characterize OA.

Methods: The six major joints, the shoulder, elbow, wrist, hip, knee, and ankle, were observed macroscopically in 180 skeletons (males: 122 and females: 58) (mean age was 59.7 years old for males and 66.2 years old for females). The osteophytes were categorized as Grade 0, 1, 2, 3, or 4 according to our original criteria based on their size and degree of proliferation to calculate the osteophyte scores (OS) (OARSI 2008 and 2009). The scores for the upper extremities (UOS) were calculated by averaging the shoulder, elbow, and wrist joints, and the scores for the lower extremities (LOS) were obtained from the mean of the hip, knee, and ankle joints. The mean of all six joint scores, the general OS (GOS) was calculated by averaging the UOS and LOS of every skeleton.

Results: The correlation coefficients between GOS and age were determined to calculate the “expected values”, and then the “variation value (VV)” in GOS was determined in each skeleton (Figure 1). There were many skeletons whose scores were larger than the expected values. The distributions of these cases formed a determinate biphasic pattern. In males, this biphasic distribution was more distinct; in the first group VV of the largest number was -3, and that in the second group was +4. The proportion of UOS to LOS (UOS/LOS) was calculated in every skeleton. The mean ratio in males (1.13) was significantly larger than that in females (0.94). UOS/LOS ratio was calculated separately in both the high score group (HSG) and low score groups (LSG). HSG was defined as the skeletons whose VV was more than 0 (males 81, females 21), and LSG group was defined as the skeletons whose VV was less than 0 (males 85, females 29). In males, the UOS/LOS ratio of HSG was 1.13, which was significantly larger than that of LSG, 1.03, and in females the ratio of HSG, 1.03, was significantly larger than that of LSG, 0.88 (Figure 2). This means that the UOS of the skeletons in HSG were higher than those in LSG.

Conclusion: The development of peri-articular osteophyte formations is deemed to be affected by various factors: systemic conditions and the local environment, mechanical stresses such as weight bearing and local loading by exertion. This study reassessed the potential influence of the unequal distribution of mechanical stress on joint surfaces in the facilitation of osteophyte formation and osteoarthritis pathogenesis. Although it was quite difficult to distinguish the generalized OA (GOA) skeletons based on the degree of osteophyte formation alone, it was shown that the osteophytes of some skeletons were larger than expected. In this study, the characteristics of the severe-osteoophyte-formed-group were shown by epidemiological analysis of major joints in a skeletal population. Furthermore, compared with the other skeletons, it was indicated that in these skeletons the osteophyte formation of the upper extremities joints was dominant. As the conclusion, there were skeleton groups in which systemic peri-articular osteophytes were formed severely; in these skeletons, osteophyte formation not only in the lower extremities but also in the upper extremities was significant.

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INCIDENTAL FINDINGS ON KNEE MRI IN ELDERLY KOREAN COMMUNITY RESIDENTS

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Purpose: Evaluation of the menisci and cruciate ligaments has been one of the major uses of magnetic resonance imaging (MRI) in the evaluation of painful knee with or without osteoarthritis (OA) over many years. However, previous reports suggest that incidental findings are common among middle-aged and elderly persons, especially among those with knee OA, and these findings do not correlate with the presence and or severity of knee pain. The objective of this study was to investigate the prevalence of meniscal damage and cruciate ligament tear, and the association of these findings with knee pain in a community residents in Korea.

Methods: The study subjects were from Hallym Aging Study (HAS), a prospective cohort investigating the health of elderly community residents in Chunchun, a city about 120 km east of Seoul, Korea. Subjects were 55 to 87 years of age and ambulatory; selection was not made on the basis of knee or other joint problems. We assessed the integrity of the menisci and anterior cruciate ligament in the dominant knee among subjects without knee pain or in the more symptomatic knee among subjects with knee pain on 1.5-tesla MRI scans obtained from 354 subjects (49% of whom were men). Symptoms involving the knee were evaluated by screening questionnaire and WOMAC.

Results: The prevalence of a meniscal tear or of meniscal destruction in the knee as detected on MRI ranged from 35.1% among men <69 years of age to 86% among women >75 years of age. The prevalence of cruciate ligament tear ranged from 2.7% among men <69 years of age to 31.4% among women 70-74 years of age. The presence of meniscal tear was significantly associated with the presence of knee pain among subjects without radiographic evidence of osteoarthritis (Kellgren-Lawrence grade 2 or higher). Adjusted OR 3.02, 95% CI 1.84-5.00) after adjustment of confounders. However, the presence of meniscal tear did not affect knee pain among subjects with radiographic osteoarthritis (Adjusted OR 2.12, 95% CI 0.54-8.23). The presence of cruciate ligament tear did not affect knee pain in either the subjects with or without radiographic knee OA (Adjusted OR 1.78, 1.96, 95% CI 0.55-5.72, 0.8-4.8, respectively).

Conclusions: Incidental meniscal or cruciate ligament findings on MRI of the knee are common in the general population and unrelated with knee pain, especially among persons with knee OA.

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SHORT STATURE ASSOCIATED TO SEVERE KNEE OA IN WOMEN

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Purpose: To describe the role of short body stature as a risk factor for the development of severe knee osteoarthritis (OA).

Methods: Cross-sectional study. Inclusion Criteria: knee OA according to ACR criteria. Radiographic findings were scored according to Kellgren-Lawrence (K-L), and further categorized as follows: low/moderate for K-L grades 0 to 2, severe/very severe for K-L grades 3 and 4; additionally, ultrasonographic images from both knees were obtained in orthogonal planes to evaluate soft tissue abnormalities. WOMAC functional scale was applied. Clinical evaluation included anthropometric variables such as body weight in kilograms, height in meters, and body mass index. Short stature was considered for height below 1.53 m (mean national value for adult women). Statistical analysis was performed with SPSS 16 software.

Figure 1. Variation value and case numbers.

Figure 2. The proportion of UOS to LOS (*p < 0.05).
Descriptive analysis was done, bivariable and multivariable analysis using appropriated test were performed. 

Results: 80 women with knee OA were studied, mean height 1.52 m (1.41-1.7 m). Mean disease duration from diagnosis was 3 years (0.1-12). 13 patients (16.3%) had severe OA. Performing ROC curves, patients with height below 1.52 m and over 61 years of age had an increased risk to present severe OA versus low/moderate grade patients. Mean height for severe knee OA patients was 1.48±0.04 m vs 1.53±0.06 m for those in low/moderate knee OA (p = 0.01). By means of a binary logistic regression, only height <1.52 m had an OR 6.7 (IC 95% 1.3-32.9, p = 0.008) for severe OA, age (p = 0.18), body mass index (p=0.87), and mean disease duration from diagnosis (p = 0.67). Ultrasonographic evaluation showed that patients with severe OA had a greater proportion of synovial hypertrophy, joint swelling and the presence of positive power Doppler signal (p < 0.05).

Conclusions: Female patients with short stature (1.52 m or less) are at high risk for the development of severe knee OA. Short stature should be weighted as factor contributing to the development of severe knee OA in patients from different ethnic backgrounds. Us evaluation represents a useful tool for the evaluation of soft tissues abnormalities associated with advanced knee OA.

359 PAIN, PHYSICAL FUNCTION, AND STIFFNESS IN KNEE OSTEARTHRITIS: ASSOCIATIONS WITH INDIVIDUAL AND COMMUNITY SOCIOECONOMIC STATUS FACTORS

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Purpose: Several studies have evaluated individual socioeconomic (SES) factors associated with pain and disability in knee osteoarthritis (OA), but no studies have examined community SES factors associated with these outcomes. Our study examines associations between education, occupation, and community poverty with pain, physical function, and stiffness in people with knee OA, while controlling for pain in another lower extremity, the hip.

Methods: A cross-sectional analysis was conducted on 2933 individuals (65% White and 35% African American [AA]) residing in 67 of the 67 Census block groups of Johnston County, NC. Education (<high school [HS] degree or < HS), occupation (physically demanding or not) and Census block group poverty rate (≤12%, 12-25%, >25%) were SES measures. Covariates included age, gender, race, body mass index (BMI), hip pain, and an occupational activity scale (reporting frequency of squatting, standing, lifting, and walking). Three outcomes were investigated: pain, physical function, and stiffness measured by the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). Analyses were run separately for people with right knee osteoarthritis (ROA) (defined as Kellgren-Lawrence grade ≥2 in one or both knees), and symptomatic OA (symptOA) (ROA and pain, aching or stiffness on most days in the same knee joint). Multiple regression models were used to determine associations of each outcome and the three main SES variables, adjusting for covariates.

Results: 31.8% of the sample had knee ROA and 21.3% symptOA, all of whom had roa. There was no evidence of effect modification for race with the SES variables. In unadjusted models, lower education level, physically demanding occupation, and higher block group poverty rate were all significantly (p<0.05) associated with WOMAC pain, physical function, and stiffness in individuals with ROA. In symptOA, occupation and poverty were significantly (p<0.05) associated with pain; education, occupation and poverty with function; and occupation with stiffness. In individuals with ROA, when the three SES variables were analyzed individually for associations with WOMAC outcomes adjusted for covariates, education, occupation and poverty were significantly (p<0.01) associated with pain, [βs 95% CIs respectively, 0.89 (0.21,1.74), 1.06 (0.34,1.78), -1.17 (-2.12,-0.22)]. Education and poverty were associated independently (p<0.05) with function [βs=3.44, 95% CIs (0.82, 6.05), -3.15 (-5.72,-0.58)] in individuals with roa. No SES variables were associated with stiffness. Throughout the analyses, hip pain and obesity (BMI ≥ 30) were the dominant significant covariates contributing to WOMAC scores.

Conclusions: Our study confirms that the individual level SES measures are associated with pain, function and stiffness in individuals with knee OA after adjusting for known predictors such as BMI, gender and hip pain. Community poverty was also shown to be independently associated with pain and function after adjusting for individual SES and other covariates in knee OA.

360 DETERMINANTS OF CLINICAL PROGRESSION OF LOWER EXTREMITY OSTEARTHRITIS

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Purpose: Sometime Osteoarthritis (OA) can affect knees and hips at the same time. The OA of the lower limbs accounts for problems in performing lower extremities tasks such as walking and stair climbing. Since OA is a progressive disease with a heterogeneous disease outcome, identifying determinants which are associated with worse outcome is important for patient information concerning their disease and on prognosis. Moreover, possible treatment can be aimed at modifying these determinants. We investigated here the determinants of OA progression of lower extremity.

Methods: This study was part of the Genetic Arthritis and Progression cohort. From this cohort, patients with osteoarthritis in either knee or hip or both knee and hip were followed for 6 years. The following clinical determinants were investigated: age, sex, body mass index (BMI), self-reported pain and function experienced at knees and hips together at baseline using Western Ontario and MacMaster (WOMAC) scores, WOMAC pain and function worsening after 1 year, presence of pain on physical examination, total range of motion (tROM, the sum of flexion and extension of the knee and endorotation of the hip). Also investigated were the radiological determinants: osteophytes and joint space narrowing (JSN) scores, which are determined using Osteoarthritis Research Society International- atlas. Clinical progression was defined as 1) total joint replacement performed during the follow-up, 2) change in self-reported pain or function (WOMAC scores) above the minimum perceptible clinical improvement, which were 9.7 and 9.3, respectively. Relative risks (RR) for clinical and radiological determinants of progression were calculated together with 95% confidence interval (95% CI) and adjusted for age, sex and BMI.

Results: Of 168 patients investigated, 135 (80.3%, mean age: 61 years, 82% female) completed the follow-up. Clinical progression was present in 48% of patients; 36% received joint replacement and 22% reported worsening in self-reported pain or function. Pain on physical examination (RR 2.0, 95%CI 1.2 to 3.0) and limited total range of motion (tROM) at baseline (RR 2.3, 95%CI 1.4 to 3.2) as well as worsening of self-reported pain (RR 2.7, 95%CI 1.2 to 4.5) and function (RR 3.5, 95%CI 1.6 to 5.5) over 1 year were associated with clinical progression. Other clinical determinants were not significantly associated. Osteophytes scores (RR 2.3, 95%CI 1.2 to 3.6) and JSN scores (RR 3.9, 95%CI 2.0 to 5.1) at baseline were also associated with clinical progression.

Conclusions: We find that objective measures of pain and function at baseline are associated with clinical progression of lower limbs OA. These results can be used for patient information concerning the progression of OA at the long-term. Additional information on detrimental prognosis can be given when self-reported (WOMAC) pain and function were deteriorated after 1 year. Whether improvement of pain or function in one year would lead to better prognosis should be tested in trials on pain medication or physical therapy.