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COMPARISON OF RADIOGRAPHIC HIP JOINT SPACE IN WEIGHT BEARING AND SUPINE X-RAYS IN PATIENTS WITH HIP PATHOLOGY

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Purpose: Hip arthroscopy is often used to treat many pathologies about the hip. Diagnosis is based on history, physical examination and radiographic findings. Studies have shown that decreased joint space (2mm or less) in the hip is a negative prognostic factor for a favorable outcome following arthroscopic treatment. The purpose of this study is to investigate the potential influence of a patient's weight bearing status (supine vs. standing) on radiographic joint space findings of the hip.

Methods: Weight bearing and supine pelvic radiographs of 44 hip joints were evaluated. All radiographs were evaluated twice by three reviewers in order to determine intra and inter-observer reliability. The average patient age was 36 (range 18 to 69), with 11 males and 11 females. The average BMI was 23. Joint space was measured at the lateral edge, middle sourcil, and above the fovea of the hip. The first readings of a single reviewer were used in order to most closely mirror the practices of a clinical setting. The measurements of the reviewer with the highest intra-observer reliability were utilized.

Results: Intra-rater reliability for joint space measurements at the lateral sourcil, middle sourcil, and fovea the weightbearing films were 0.483, 0.679, 0.683 and for the supine films were 0.718, 0.750, 0.697 respectively. Inter-rater reliability at the lateral sourcil, middle sourcil and fovea for the weightbearing films were 0.531, 0.627, and 0.410 respectively and for the supine films were 0.475, 0.462, and 0.528 respectively. There was a significant difference between joint space as measured on weight bearing and supine radiographs at all three measurement locations (lateral edge measurement $P<0.001$, middle sourcil measurement $P<0.001$, and fovea measurement $P<0.001$). On average, there was an increase of 0.50 mm[95%CI:0.28 to 0.71] at the lateral sourcil, 0.46 mm[95%CI: 0.46 to 0.56] at the middle sourcil, and 0.92 mm [95%CI: 0.65 to 1.2] at the fovea from supine to weightbearing measurements.

Conclusions: Supine radiographs had excellent intra-observer reliability and all other measurements had moderate reliability. This study demonstrated that an increased joint space was seen on weight bearing pelvic radiographs compared to supine pelvic radiographs. Although a statistically significant difference was noted, the confidence intervals of the mean differences were less than 2mm and unlikely to alter clinical decision making in the majority of cases. As there is an increase in joint space on weightbearing films, it is possible that a joint space of 2 mm or less could go undetected and supine radiographs allowed for improved intra-observer reliability, this study supports the use of supine films for measurement of hip joint space so that t joint space narrowing can be appreciated.
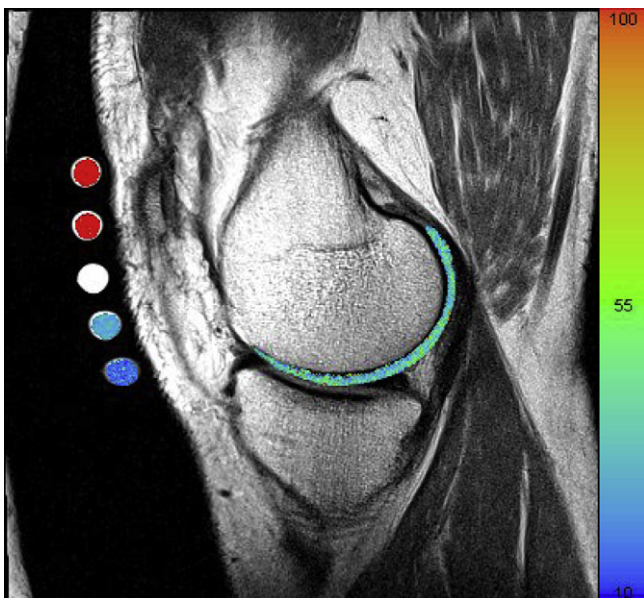
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COMPARING T2 CALCULATION TECHNIQUES

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Purpose: T2 relaxation time in cartilage provides useful measurements as it relates to hydration, macromolecular density and collagen fiber orientation. The three major manufacturers of MRI scanners all provide sequences and software that can be used to generate T2 maps. In addition, there are many techniques presented in the literature for calculating T2 relaxation times. This study compares the results from various methods with those generated by the manufacturers and draws conclusions about the preferred methods to use.

Methods: Four volunteer subjects were scanned on two different MR scanners (Siemens Trio 3T and GE Signa HDxt 1.5T). On each scanner, a T2 mapping sequence was used to scan the medial condyle of the left knee. All subjects were scanned twice on each scanner with repositioning of the patient between scans. Each scan contained five vials with nominal T2 relaxation times of 15, 30, 60, 120 and 240 ms in addition to the medial condyle. T2 values were calculated with and without the first echo, and with and without a signal bias.

Results: Results are currently being compiled. The different techniques have widely varying T2 relaxation times, especially at the higher T2 relaxation times. Altering the signal bias has minimal effect if the proton density is high (phantoms), but has a substantial effect in areas of lower signal intensity (cartilage).

Conclusions: Regardless of the method employed to calculate T2 relaxation time, if longitudinal measurements are begin made, then the same technique needs to be used across all visits. In addition, in a multi-center study, the same technique should be used to minimize variability. Based upon the known T2 relaxation times within the phantoms, central calculation dropping the first echo and accounting for some signal bias provides the most accurate results

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THE PREVALENCE AND PROGRESSION OF RADIOGRAPHIC KNEE OSTEOARTHRITIS OVER 9 YEARS IN A POPULATION-BASED COHORT OF MIDDLE-AGED SUBJECTS

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Purpose: To investigate the prevalence and progression of radiographic knee osteoarthritis (KOA) over 9 years in middle-aged subjects with chronic knee pain.

Methods: In longitudinal population-based study, tibio-and patellofemoral (TF/PF) radiographs were graded for OA in 113 subjects (mean age 45 ± 6.2 years) at four different time points over 2002-2011. Radiographic progression was defined as: (i) the presence of osteophytes and/or joint space narrowing (JSN) in subjects with no previous radiographic OA or (ii) an increase in the grade or number of osteophytes and/or JSN grade.

Results: At baseline, 55% (62/113) of subjects had KOA, the majority of them with OA grade 1. Out of the subjects with KOA, 36 had only osteophytes (58 %), 8 had only JSN (13%) and in 18 cases (29%) the OA grade based on osteophytes and JSN in combination. More than 1/3 of subjects had only PF joint involvement. The progression rate of radiographic KOA over 9 years was 69% (78/113). Among them 26 had only TFOA progression, 23 only PFOA progression and 29 had TFOA and PFOA progression in combination. In 57% of subjects KOA progression was based on osteophytes alone, in 17% on isolated JSN, and in 26% on both. Individual assessment revealed distinct subgroups of radiographic progression.

Conclusions: More than half of the middle-aged subjects with chronic knee pain had radiographic KOA. The radiographic course of early KOA over 9 years turned out to be non-consistent with intermittent periods of progression and stabilization.

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IMPACT OF CHONDROITIN SULFATE TREATMENT ON IMMUNOREGULATORY NEUROPEPTIDES LEVELS IN OA PATIENTS SYNOVITIS

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Purpose: Osteoarthritis (OA) is the most prevalent joint disease, characterized by synovial inflammation, cartilage destruction and subchondral bone sclerosis. Synovitis has been described to be an