## Paper #45

## Impingement-Free Hip Range of Motion in Asymptomatic Young Adult Females

**Notes** 

Charles C. Yu, MD, **Michael C. Mahan, MD**, Rachel Shields, MD, Marnix Van Holsbeeck, MD, Ira Zaltz, MD

Introduction: Femoroacetabular impingement is a recognized cause of early hip osteoarthritis. This is attributed to either a cam impingement caused by a non-spherical head or a pincer impingement caused by excessive acetabular coverage. Although many surgical techniques aim to improve hip range of motion, little normative data exist on dynamic impingement-free hip range of motion (ROM) in asymptomatic individuals. Hip ultrasound can effectively measure ROM by dynamically identifying labral anatomy and femoral morphology. The purpose was to measure impingement-free hip ROM until labral deflection is observed and the maximum degree of sagittal plane hip flexion when further flexion is limited by structural femoroacetabular abutment.

**Methods:** Fifty-five asymptomatic adult female volunteers between the ages of 21 and 34 years underwent bilateral dynamic hip ultrasound examination. Femoral morphology was characterized and midsagittal flexion passive ROM was measured at two points: (1) at the initiation of labral deformation; and (2) at maximum flexion when the femur impinged on the acetabular rim. Additionally, AP pelvis x-ray was taken to correlate any pathological morphology. The mean age of the subjects was  $26 \pm 3$  years and the mean body mass index was  $23 \pm 3$  kg/m2.

**Results:** In asymptomatic females, mean impingement-free hip passive flexion measured from full extension to initial labral deflection was  $72^{\circ} \pm 8^{\circ}$  (95% confidence interval [CI], 70–74). Mean maximum midsagittal passive flexion, measured at the time of bony impingement, was  $101^{\circ} \pm 11^{\circ}$  (95% CI, 99–103). There was a statistically significant correlation between impingement-free hip flexion and maximum midsagittal flexion (R = 0.665, p < 0.001).

**Conclusions:** Using dynamic ultrasound, we found that passive ROM in the young asymptomatic female hip was approximately 100°, much less than the motion reported in the literature. Surgical procedures that treat femoroacetabular impingement should be evaluated based on these precise normative data.