

Sex-Based Differences in Patients with Femoroacetabular Impingement Syndrome Demonstrate Reduced Anterior Coverage and Greater Anteversion in Females: A Three-Dimensional Computed Tomography Analysis

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INTRODUCTION:

Differences have been noted in the prevalence of type of femoroacetabular impingement syndrome (FAIS) between males and females. Three-dimensional (3D) coverage and morphological differences of the acetabulum may explain the differences between sexes. The purpose of this study is to use 3D computer tomography (CT) analysis of to determine if there are sex-based differences in acetabular coverage and 3D morphology in patients with FAIS.

METHODS: 3D anatomic models were generated using preoperative CT imaging data on a consecutive cohort of patients indicated for surgical treatment of FAIS. Acetabular coverage was measured projecting the surface area of the acetabulum onto the femoral head and defined by a quadrant system (AM=anteromedial, AL=anterolateral, PM=posteromedial, PL=posterolateral). Morphological measurements utilizing the 3D models included neck-shaft angle (NSA), femoral torsion, cranial and anterior acetabular version, combined version, alpha angle, and lateral center edge angle (LCEA). Patients were dichotomized into male and female cohorts and measurements were compared using independent t-tests. A multivariate regression analysis was performed to evaluate the impact of age, sex, and body mass index (BMI) on coverage and 3D morphological parameters.

RESULTS: Sixty-eight females (age: 30.8±12.1years) and 30 males (37.1±12.3 years, p=0.022) were evaluated. Ninety-five patients at mean±SD age of 34.6±11.7 years were included. Males had significantly greater (p<0.001 for all) total acetabular and femoral head surface area (mm²) globally and in all quadrants. Females demonstrated significantly greater percent PM coverage (Females: 99.7 ± 0.8%, Males: 98.8 ± 1.8%, p=0.002), higher NSA (Females: 130.3 ± 4.7°, Males: 128.1±4.5°, p=0.033), higher anterior acetabular version (Females: 21.4 ± 5.8°, Males: 18.2 ± 6.7°, p=0.019), and higher combined version (Females: 27.9±10.7°, Males: 21.8±10.1°, p=0.010). Multivariable regression demonstrated sex to have significant association with acetabular version (p=0.010), posterior coverage (p=0.007), and combined version (p=0.021).

DISCUSSION AND CONCLUSION: Female patients indicated for hip arthroscopy secondary to FAIS demonstrated reduced acetabular anteversion and greater posterior coverage compared to males as demonstrated on 3D CT analysis. The results of this study may implicate that pincer-type morphology may not be affecting the overall prevalence of FAIS between males and females, but rather a contribution form a higher prevalence of hip dysplasia, acetabular anteversion, and other dynamic factors.