Variations of Acetabular Morphology between Supine and Standing: Diagnostic Thresholds of Dysplasia

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INTRODUCTION:

Diagnosis of hip dysplasia relies on acetabular measurements from anteroposterior (AP) pelvic X-rays. The Ottawa classification offers a comprehensive approach by identifying patterns of dysplasia that traditional methods overlook. However, since radiological acetabular appearance differs between the supine and standing positions, it is crucial to establish new diagnostic values when standing. This study aims to 1. Determine dysplasia prevalence amongst asymptomatic volunteers and patients with hip pain; (2) compare prevalence between the supine and standing positions using described thresholds; and (3) establish diagnostic threshold values when standing. METHODS:

This is a prospective study from an academic referral center. Patients presenting at with hip pain without arthrosis (n=288) (age: 36 ±9 years, 170 (58%) females) between 2020-24 were enrolled. Additionally, one hundred volunteers with well-functioning hips (Oxford hip score >45) (45 (45%) females, mean age 37 ±14 years) were included. Supine and standing AP pelvic radiographs were analyzed to determine lateral center-edge angle (LCEA), acetabular index (AI), anterior wall index (AWI), the posterior wall index (PWI), cross-over-sign (COS), cross-over-ratio (COR), posterior wall sign (PWS), ischial spine sign (ISS). Dysplasia was defined according to the Ottawa classification. RESULTS:

In the asymptomatic volunteer group, prevalence of anterior-/posterior-/global dysplasia was 7/100 (7%), 6/100 (6%), and 6/100 (6%) respectively when supine, and 16/100 (16%), 2/100 (2%), and 7/100 (7%) when standing. In the symptomatic group, prevalence of anterior-/posterior-/global- dysplasia was 27/424 (6%), 24/424 (6%), and 77/424 (18%) respectively when supine, and 47/424 (11%), 4/424 (1%), and 98/424 (23%) when standing. Normative AWI should reduce to 0.25 from 0.3 when standing and PWI increase from 1.00 to 1.05 (AUC: 0.82, sensitivity/specificity: 85%/75%) DISCUSSION AND CONCLUSION:

Parameters traditionally considered abnormal are often observed in asymptomatic individuals. Radiographic parameters differ between supine and standing positions. Thresholds needs to change for standing pelvic evaluations.