

# The Effect Of Pelvic Rotation On The Anterior Center Edge Angle On The False Profile Radiograph: A Cadaveric Study



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# Disclosures

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# Background

- The false profile radiograph, obtained by rotating the pelvis 65 degrees toward the affected hip, is commonly used to evaluate patients with suspected acetabular dysplasia.
- The anterior center edge angle (ACEA) is measured from this radiograph and is considered indicative of anterior or anterolateral acetabular coverage of the femoral head.
- The precise degree of rotation is difficult to obtain in clinical practice, and the clinician is often required to interpret radiographs with non-standard pelvic rotation, despite no current evidence of how this may affect the ACEA.

# Purpose

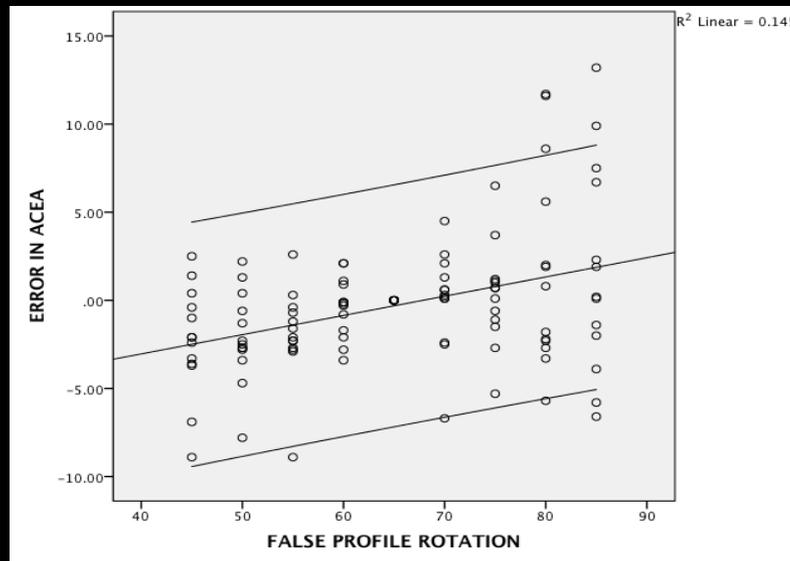
- Purposes of this study were (1) to determine the effect of pelvic rotation and tilt on measurement of the ACEA, and (2) to correlate the ACEA with position on computed tomography (CT) scans

# Methods

- Thirteen cadaveric hips (7 pelvis specimens) without evidence of osteoarthritis or prior surgery were identified.
- CT scans were obtained of each pelvis for three-dimensional characterization of acetabular anatomy.
- Pelvises were fixed to a custom jig in neutral pelvic tilt and rotation. Sequential radiographs were taken of the pelvis at 5 degree intervals from 45 through 85 degrees of rotation, and from 10 degrees of anterior pelvic tilt through 10 degrees of posterior pelvic tilt.
- The ACEA was measured for each image, and variation was calculated by ANOVA analysis.

# Results

- The error in ACEA was significantly associated with the variability in pelvic rotation ( $p=0.017$ ).
- Multivariate linear regression identified false profile rotation ( $p=0.001$ ), sex ( $p=0.001$ ), and age ( $p=0.010$ ) as independently correlated with ACEA.



# Results

- A 10 degree increase in false profile rotation results in a mean increase in ACEA of 1.1 degrees, but significant variability exists.
- Radiographs with pelvic rotation of within 10 degrees of a true false profile radiograph were significantly less likely to demonstrate greater than 5 degrees of difference in ACEA (6.2%), compared to greater than 10 degrees of under-rotation (42.3%) or over-rotation (11.5%) ( $p < 0.001$ ).

# Summary

- The ACEA on false profile radiographs is affected by changes in pelvic rotation, with pelvic over-rotation resulting in increases in ACEA and under-rotation resulting in decreases in ACEA.
- False profile radiographs within 10 degrees of the 65 degree standard are significantly less likely to demonstrate 5 or more degrees of error in ACEA measurement.