

Is Three-Dimensional Imaging Better than Plain Radiographs for Defining Pincer Femoroacetabular Impingement Subtypes?



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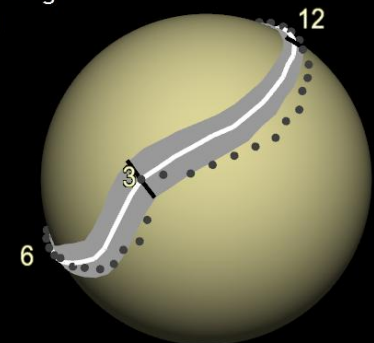
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● 3D Coverage
● Radial



Coverage %

Disclosures

- Smith and Nephew – Consultant, Research
- Zimmer – Research
- Arthroscopy – Editorial Board

Background

- Pincer-type Femoroacetabular Impingement (FAI)
 - Less evidence for pincer FAI, than for cam
 - Understanding continues to evolve
 - Pincer subtypes
 - Global/lateral overcoverage
 - Acetabular retroversion
 - Focal anterosuperior overcoverage



Purpose

- Determine the correlation of plain radiographs with CT characterization of acetabular morphology in a cohort of patients with FAI
- Are radiographs adequate to define acetabular morphology to guide treatment decisions?

Methods

- 28 consecutive FAI patients
 - Age 14+ yo
 - Low dose CT
 - 0.75-1.0 mSv
 - Equivalent 3-4 AP pelvis radiographs
 - Virtual AP pelvis radiograph
 - Perfect pelvic tilt and rotation
 - Identical to supine CT
 - Comparability to actual plain radiograph confirmed

Age	26.4 yrs (14 to 58 yrs)
Gender	Male: 12 (43%) Female: 16 (57%)
Side	Right: 14 (50%) Left: 14 (50%)

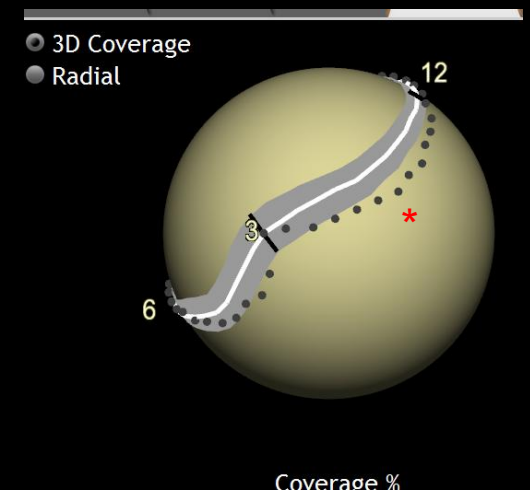


Methods

- Pincer subtypes
 - Global or lateral overcoverage
 - $LCEA > 40^\circ$ or $AI < 0^\circ$
 - Acetabular retroversion
 - +COS, +PWS
 - Anterosuperior overcoverage
 - +COS, - PWS

CT

- Three-dimensional characterization
 - Dyonics Plan Software
 - 3:00 anterior, 9:00 posterior
 - ≥ 2 consecutive 15 min clockface locations
 - Radial coverage > 2 SD above average
 - Larson et al. CORR. 2015
 - Normative data



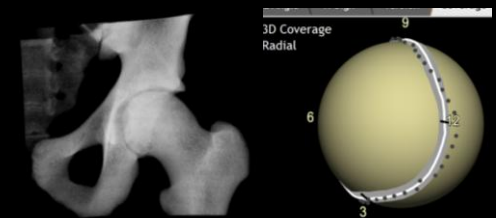
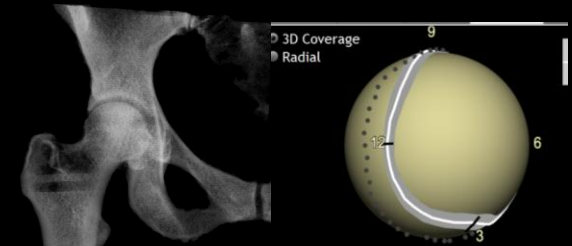
Results

- Plain radiographs
 - Pincer morphology 60.7% (17/28)
 - 5 Global/lateral overcoverage
 - 5 Acetabular retroversion
 - 7 Anterosuperior overcoverage
- Pincer morphology present
 - Plain radiographs n=17 (60.7%)
 - **76.5% confirmed on CT (13/17)**
 - CT n=14 (50%)
 - 1 not identified by plain radiographs



Results

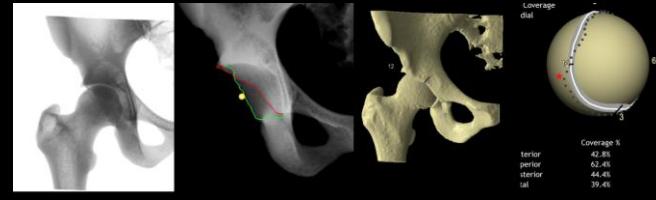
- Plain radiographs
 - Global or lateral overcoverage (n=5)
- CT
 - 100% confirmed on CT
 - Variable extent
 - Global overcoverage
 - Lateral/Posterolateral/Anterolateral



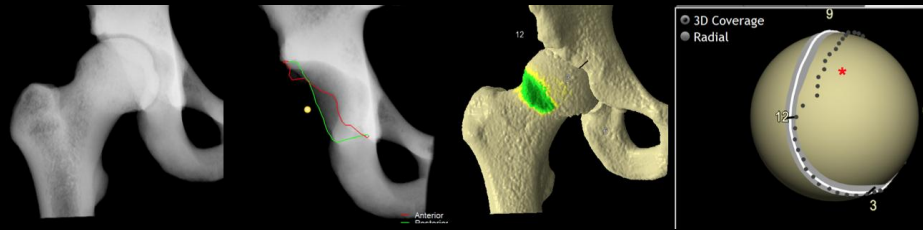
Results

- Plain radiographs
 - Acetabular retroversion (n=5)
- CT

- 3/5 confirmed on CT
- Discrepancies



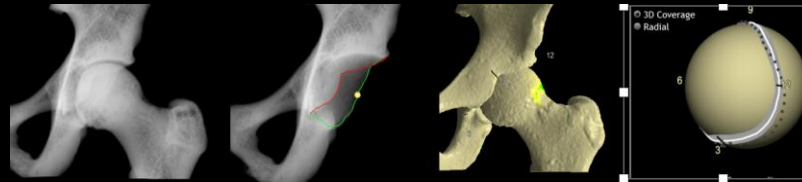
- Normal anterior lateral coverage with posterior undercoverage (n=1)



- Normal coverage with AIIS prominence (n=1)

Results

- Plain radiographs
 - Anterosuperior overcoverage (n=5)



- CT
 - Confirmed 3/5 (60%)
 - Discrepancies
 - Normal anterior lateral coverage with posterior undercoverage (n=1)
 - Normal coverage with AHS prominence (n=1)

Summary

- Limited correlation between plain radiographs and CT findings of pincer FAI
 - Radiographs sensitive 93%
 - Radiographs PPV 77%
- Normal radiographs – Overcoverage unlikely
- Pincer radiographs –
 - Global overcoverage – Overcoverage likely
 - Retroversion/AS overcoverage - Possible overcoverage

Conclusion

- Three-dimensional characterization of acetabular morphology remains the gold standard
 - Subtle acetabular overcoverage
- Traditional radiographs parameters on AP pelvis radiograph alone sometimes inadequate
- Further research into the role of pincer subtype morphologies in the pathophysiology of FAI is needed