

Identifying Parameters for the Optimal Acetabular Reduction of the Periacetabular Osteotomy for Acetabular Dysplasia: Evaluation via Postoperative Low-Dose Ct

Jeffrey J. Nepple, M.D.

James R. Ross

Asheesh Bedi

John C. Clohisy

Washington University Orthopaedics

St. Louis, Missouri

ISHA

Sept 15-17th, 2016

Disclosures

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

Background

- The periacetabular osteotomy (PAO) has become a well-accepted treatment of acetabular dysplasia, yet the radiographic criteria for optimal acetabular reduction are not known.
- While lateral coverage is simply assessed by measurement of the lateral center edge angle and Tonnis angle on an AP pelvic radiograph, optimal versional reduction is commonly based on the presence/absence of a crossover sign and posterior wall sign.

Purpose

- The purpose of the current study was to (1) demonstrate whether PAO can normalize acetabular coverage and (2) determine if the crossover sign and posterior wall sign are predictive of the quality of acetabular reduction.

Methods

- Using our hip preservation database, we identified patients that underwent low dose pelvic CT scan as part of the preoperative planning for PAO who had previously undergone PAO of their contralateral hip.
- The study cohort was comprised of ten hips (7 females and 3 males).

Methods

- Preoperative plain radiographs were analyzed.
- Three-dimensional CT was analyzed including radiographic simulations and quantification of acetabular coverage relative to established normative data (+ 1 SD) from 9:00 (posterior) to 3:00 (anterior).

Results

- On preoperative radiographs, six patients had mild-moderate acetabular dysplasia (LCEA -5 to 20), while 4 had borderline acetabular dysplasia (LCEA 20-25).
- PAO was able to normalize acetabular coverage with perfect or excellent reduction in 70% of cases.
- The mean postoperative LCEA was 28.5 degrees

Results

- Acetabular reduction was graded as perfect (normal anterior, lateral, and superior coverage), excellent (normal coverage in 2 regions; near normal coverage in 3rd), good (normal lateral coverage; with version malreduction resulting in mild overcoverage in one region and compensatory undercoverage in another region), or poor (all other reductions).

Results

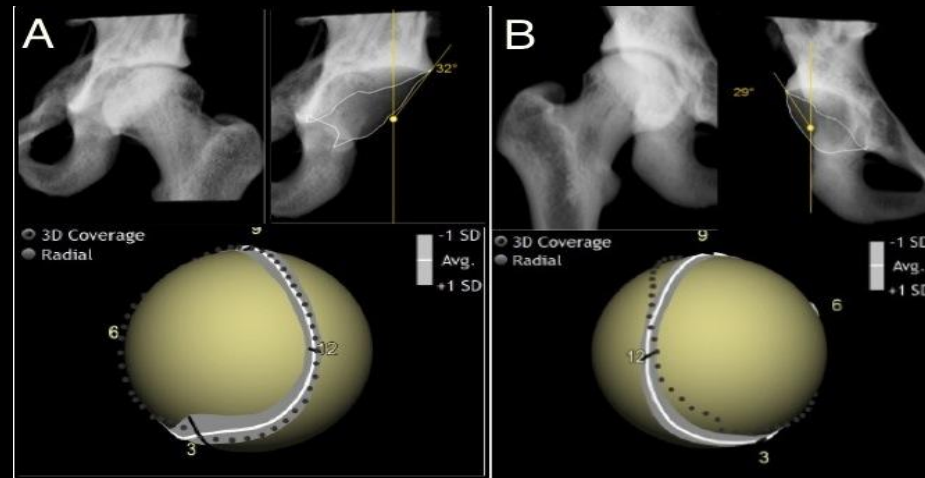


Figure 1. Case Examples. AP pelvis radiograph, radiographic analysis, and three-dimensional coverage analysis (A) Case 1 – Perfect acetabular reduction restoring lateral, anterior, and posterior coverage, in setting of mildly positive posterior wall sign (B) Case 2 - Good acetabular reduction restoring lateral coverage but with remaining anterior undercoverage and posterior overcoverage, in setting of negative posterior wall sign

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

- PAO successfully normalized acetabular coverage with perfect or excellent results in 70% of our study patients. The use of the crossover sign and posterior wall sign to guide version acetabular reduction appears inaccurate.