Borderline Dysplasia with Acetabular Retroversion: Findings from a Large Hip Arthroscopy Study Group

D. MATSUDA 1, B. KIVLAN 2, S. NHO 3, A. WOLFF 4, J. SALVO 5, J. CHRISTOFORETTI 6, T. ELLIS 7, D CARREIRA 8

1 DISC Sports and Spine Center, Marina del Rey, CA; 2 Duquesne University, Pittsburgh, PA; 3 Rush University Medical Center, Chicago, IL; 4 Washington Orthopaedics and Sports Medicine, Washington D.C.; 5 Rothman Orthopedic Institute, Marlton, NJ; 6 Texas Health Sports Medicine, Allen, TX; 7 Orthopedic One, Dublin, OH; 8 Peachtree Orthopedics, Atlanta, GA
Disclosure Information

- **DC**
  - Royalties, consultant, and paid speaker for CONMED Linvatec
  - Royalties, consultant, and paid speaker for Zimmer Biomet
  - Research grants from Arthrex

- **DM**
  - Royalties: Zimmer Biomet, ArthroCare, Smith and Nephew
  - Paid consultant: Zimmer Biomet
  - Editorial board: Orthopedics Today
  - Educational committees: ISHA Education Committee, AAOS Adult Hip program committee.

- **JS**
  - Paid consultant: Stryker
  - Stock options: Franklin Bioscience

- **SN**
  - Consultant: Stryker, Ossur
  - Research Grants: AANA

- **JC**
  - Research grants: Arthrex
  - Board membership: ISHA
  - Consultant: Arthrex, Breg
  - Paid speaker: Arthrex, Breg
  - Royalties: Arthrex, Breg
  - AANA committee member

- **AW**
  - Consultant: Stryker, Allosource

- **TE:**
  - Consultant for Stryker and Pivot Medical
Introduction

- The radiographic crossover sign (COS) is an indicator of acetabular retroversion, classically representing anterosuperior overcoverage often treated with acetabuloplasty which could exacerbate acetabular hypovolemia in dysplasia\(^1,2\).
- No prior study has investigated the prevalence of acetabular retroversion in patients with dysplasia undergoing hip arthroscopy, acetabuloplasty rates, and outcomes in this setting.

Aim:

To report the prevalence of acetabular retroversion in dysplasia, the influence of the COS on arthroscopic acetabuloplasty rates, and relative outcomes compared with control groups.
Method

• Retrospective cohort study, prospectively collected multi-center database

• Patients undergoing isolated hip arthroscopic surgery were assigned to dysplasia (lateral center-edge angle (LCEA) ≤ 25°) or one of two control groups: normal (LCEA 26-38°), or pincer femoroacetabular impingement (FAI)(LCEA ≥ 39°).

• The prevalence of COS and acetabuloplasty rates between and within study and control groups were compared (Chi square analysis). Minimum 2 year outcomes utilizing iHOT-12 were compared (analysis of variance).
Method

N = 401

Stratify by pre-operative LCEA

Borderline Dysplasia (≤25°)  Normal (26-38°)  Pincer FAI (≥39°)

Minimum 2 year i-HOT 12
<table>
<thead>
<tr>
<th></th>
<th>Dysplasia</th>
<th>Normal</th>
<th>Pincer</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>N (%)</strong></td>
<td>64 (16%)</td>
<td>273 (64%)</td>
<td>64 (16%)</td>
</tr>
<tr>
<td><strong>Mean LCEA</strong></td>
<td>22.3°</td>
<td>31.5°</td>
<td>42.4°</td>
</tr>
<tr>
<td><strong>COS Prevalence</strong></td>
<td>31%</td>
<td>26%</td>
<td>33%</td>
</tr>
<tr>
<td><strong>Acetabuloplasty Rate</strong></td>
<td>40%</td>
<td>52%</td>
<td>90%</td>
</tr>
</tbody>
</table>
• Significant differences in mean LCEAs across groups: 22.3°, 31.5°, and 42.4° (p<0.001).

• COS prevalence was similar between groups at 31%, 26%, and 33%, respectively (p=0.873).

• Acetabuloplasty rates were dependent on the amount of acetabular coverage with lowered rate in the dysplasia group (40%) and increasing rates in the normal (52%) and the pincer (90%) groups (p=0.013).

• Post-operative iHOT-12 scores improved in all groups (68, 74, and 77, respectively, p=0.222).

• Patients with a COS plus rendered acetabuloplasty reported similar scores that improved to 77, 74, and 79, respectively (p=0.949).

• Patients with dysplasia with COS averaged 73.1 (SD 23.3) iHOT-12 score compared to 67.1 (SD 28.7) for the patients with dysplasia without COS (p=0.466).

• Within the dysplasia with COS subgroup, there was no significant difference in iHOT-12 scores between the group with acetabuloplasty (77.0; SD: 17.1) and without acetabuloplasty (70.4; SD: 27.4, p=0.580).
Results

No significant differences observed between COS + crossover sign and all patients across the spectrum of acetabular coverage
Results

In patients with radiographic evidence of dysplasia, no significant differences in outcomes were observed between presence or absence of acetabular retroversion.
• Acetabular retroversion occurs with similar prevalence in borderline dysplasia compared with non-dysplastic hips undergoing hip arthroscopy but with lower acetabuloplasty rates not influenced by the COS.

• Arthroscopic outcomes of dysplasia with retroversion are similarly successful and comparable with those of dysplasia and non-dysplastic hips. Although infrequently performed, acetabuloplasty did not compromise outcomes in dysplasia with retroversion.

Conclusion