Hip Morphology and Clinical Outcomes of Hip Arthroscopy in High-Level Soccer Athletes: A Case-Control Study with Comparison to Non-Kicking Athletes

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Disclosures

• The following relationships exist:
  – Asheesh Bedi is a Consultant for Smith and Nephew and is a Stockholder in A3 Surgical
  – Bryan T. Kelly is a Consultant for Smith and Nephew A3 Surgical

• None of these financial relationships relate to this presentation
Introduction

• Soccer requires repetitive forceful kicking and hip rotation.

• It has been associated with acute avulsion injuries of the anterior inferior iliac spine (AIIS)\textsuperscript{1}.

• Most of these injuries are treated with non-operative measures\textsuperscript{2}.

• A subset of patients with AIIS avulsions develop symptomatic subspine impingement secondary to malunion or traction apophysitis of the AIIS\textsuperscript{3}. 
Purpose

1. To describe the AllS morphology in a cohort of high-level soccer-athletes being treated with hip arthroscopy for symptomatic FAI.

2. To report the clinical outcomes of hip arthroscopy for FAI in high-level soccer athletes and compare to a cohort of non-kicking athletes.
Materials and Methods

• Between Jan 2009 and June 2012, 1079 patients (1275 hips) undergoing hip arthroscopy by the senior author for symptomatic FAI were enrolled into a hip preservation registry. From this cohort we identified our 2 study groups:

<table>
<thead>
<tr>
<th></th>
<th>Soccer Players</th>
<th>Non-Kicking Athletes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>24</td>
<td>61</td>
</tr>
<tr>
<td>Hips</td>
<td>32</td>
<td>81</td>
</tr>
<tr>
<td>Age (years)</td>
<td>19.5 ± 4.1</td>
<td>20 ± 3.3</td>
</tr>
<tr>
<td>M:F</td>
<td>11:13</td>
<td>26:35</td>
</tr>
</tbody>
</table>
Materials and Methods

- AllS morphology was evaluated on pre-operative CT scans and classified according to a recently described grading system:

<table>
<thead>
<tr>
<th>Type</th>
<th>Sub-type</th>
<th>Image</th>
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<tbody>
<tr>
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<td>A</td>
<td><img src="https://example.com/image1.png" alt="Image" /></td>
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<tr>
<td>II</td>
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<td><img src="https://example.com/image2.png" alt="Image" /></td>
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<tr>
<td>III</td>
<td>B</td>
<td><img src="https://example.com/image3.png" alt="Image" /></td>
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Materials and Methods

• Patient reported outcomes obtained pre-operatively and at 6 months, 1, 2, and 3 years post-operatively:
  – Modified Harris Hip Score (mHHS)
  – Hip Outcome Score-Activity of Daily Living (HOS-ADL)
  – Hip Outcome Score-Sport-Specific Subscale (HOS-SSS)
  – International Hip Outcome Tool (iHOT-33)

• Continuous and categorical variables compared with independent sample t-tests and chi-square tests respectively.

• Changes in outcome scores within groups were assessed via paired t-tests.

• Significance was set at p< 0.05.
Results: ALLS Morphology Comparison

- High-level soccer players had a significantly ($p< 0.001$) higher prevalence of Type II or Type III ALLS morphology
  - 18 of 24 soccer players with Type II or III abnormality (74.9%)
  - 16 of 46 non-kicking athletes with Type II or III abnormality (34.8%)
Results: Clinical Outcomes

- Mean follow-up of 34.8 months (range 24-76 months)
- Significant ($p < 0.001$) improvements observed in all outcomes scores
Results: Clinical Outcomes

**Hip Outcome Score: Activities of Daily Living Subscale**

- PreOp: 73.7
- PostOp: 91.4
- Change: 17.0

**Hip Outcome Score: Sports Subscale**

- PreOp: 52.7
- PostOp: 79.4
- Change: 26.5
Results

• After adjustment for age, sex, alpha angle, and pre-operative scores (mHHS, HOS, and iHOT-33) using multiple regression analysis, there was no statistically significant difference between the soccer and non-kicking groups.

• COMPLICATIONS
  – Patients in both soccer and non-kicking groups underwent revision surgery
  – 3 patients (13%) in soccer group revised for heterotopic ossification, capsule tear and residual cam deformity
  – 7 patients (12%) in non-kicking group required a revision arthroscopy at a mean 29 months postoperatively
Discussion & Conclusion

• High-level soccer players have a significantly higher prevalence of AlIS morphology that extends to or below the acetabular margin compared to non-kicking athletes.

• This pathomorphology may reflect the sequelae of the forceful repetitive kicking involved in the soccer and forces on the developing AlIS apophysis.

• The clinical outcomes between the soccer and non-kicking groups were similar with significant improvements in scores at a mean of 35 months follow-up.

• Based on these findings there should be a high index of suspicion for subspine impingement in soccer players with symptomatic FAI, with an expectation of excellent clinical outcomes if recognized and treated appropriately.
References


