Adolescent Femoroacetabular Impingement (FAI): Gender Differences in Hip Morphology

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International Society for Hip Arthroscopy - Annual Scientific Meeting
San Francisco, CA
September 15-17, 2016
Disclosures

Perry Hooper, DO – None
Sameer Oak, MD – None
Gehan Ibrahim, MD – None
T. Sean Lynch, MD – None
Ryan Goodwin, MD – Paid consultant for Stryker
James Rosneck, MD – Paid consultant for Smith and Nephew
Background

- Femoroacetabular impingement (FAI) has become an increasingly recognized cause of hip pain\textsuperscript{8,9}
- FAI - abnormal bony offset or overgrowth creates irregular mechanical motion between the acetabulum and femoral head-neck junction\textsuperscript{9}
- Repetitive contact from hip motion can damage the acetabular labrum and articular cartilage
- These morphological irregularities in adults can contribute to degenerative joint disease of the hip\textsuperscript{1,3,6,12,13,17}
Purpose

• Morphological differences between male and female adolescents with FAI have not been well published, nor is there a good understanding of the degree of potential intra-articular pathology linked to their condition.

• We compared male and female adolescents who underwent hip arthroscopy for FAI to ascertain radiographic and intraoperative differences.

• The purpose of our study is to determine if adolescent males have more preoperative bony hip abnormalities and more severe acetabular cartilage pathologies than adolescent females.
Methods

• Retrospective review of 177 adolescents, 13 to 18 years of age, who were treated for FAI with hip arthroscopy

• Inclusion criteria - patients who presented with hip pain along with signs/symptoms of chondrolabral hip damage, which led to primary hip arthroscopy surgery

• Exclusion criteria - previous hip surgery, history of hip dysplasia, history of SCFE, history of Legg-Calve-Perthes disease and patients where both MRI and plain radiographs were unavailable

• Only the first operated hip was included for patients who had staged bilateral hip arthroscopies
Methods

• MRI and plain radiographs – lateral center edge angle, Tonnis angle, and alpha angle were measured and then compared with intraoperative findings

• Outerbridge system to document chondromalacia – Grades 0-IV

• Labral pathology
  • Normal
  • Intact but with degenerative changes
  • Chondrolabral wave sign/debonding evidence
  • Full thickness tear with or without detachment

• Intraoperative procedures were documented
Imaging Measurement Agreement

- All measurements indicated moderate to strong agreement between the three readers
Imaging Results

<table>
<thead>
<tr>
<th>Alpha angle on MRI</th>
<th>Female</th>
<th>Male</th>
</tr>
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<tbody>
<tr>
<td>≤44.9°</td>
<td>74.5% (n=73)</td>
<td>19.4% (n=7)</td>
</tr>
<tr>
<td>45-54.9°</td>
<td>24.5% (n=24)</td>
<td>41.7% (n=15)</td>
</tr>
<tr>
<td>55-64.9°</td>
<td>1.0% (n=1)</td>
<td>22.2% (n=8)</td>
</tr>
<tr>
<td>≥65°</td>
<td>0% (n=0)</td>
<td>16.7% (n=6)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100% (n=98)</td>
<td>100% (n=36)</td>
</tr>
</tbody>
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- 38.9% of males and 1% of females had an alpha angle > 55° on axial oblique MRI (p<0.0001)
- Average Alpha Angle (p<0.0001)
  - Males – 55.9°
  - Females – 45.2°
- 11% of males and 6% of females with lateral CEA >40° (p=.32) No statistically significant difference
Intraoperative Findings

• Males - more likely to display chondral injury intraoperatively
  • (56.3% versus 32.5%; p<0.0001)
  • Males with cam deformity – 64.3%

• Debonding evidence or full thickness tear to the labrum was seen 69.8% in females and 72.9% in males

• Males underwent femoroplasty and acetabuloplasty (75% and 62.5%) more often than females (56.6% and 48.8%) [p=0.025 and p=0.11]
Intraoperative Findings
Conclusions

• In adolescents, distinct differences between sexes were seen on both preoperative imaging and at the time of hip arthroscopy
• We found that males with FAI displayed a larger mean alpha angle, and therefore a more severe cam-type deformity, than females
• Males were 20% more likely to have chondral injury than females
• Longitudinal studies are needed to ascertain if surgical intervention at a young age will prevent early onset degenerative hip disease
Limitations

• Retrospective study

• Disproportionate number of females - 73%
  • Recent study with Dr Philippon - 69%; Microinstability/ligamentous laxity increases hip ROM?

• Our alpha angle measurements may be an underestimation
  • Recent data suggests radial imaging may better capture anterosuperior portion of the femoral head-neck junction where cam lesions typically occur

• No gonadol shields were used so the imaging reader could identify the patient’s gender

• The crossing sign was not documented
References


