Radiographic and Clinical Risk Factors for the Extent of Labral Injury at the Time of Hip Arthroscopy

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Disclosures – Dr. Benjamin Domb

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- **AANA Learning Center Committee**
Background

- Femoroacetabular impingement and dysplasia are morphologic bony abnormalities that often lead to hip pain in young adults.
- Early chondrolabral damage precedes joint space narrowing, and multiple radiographic parameters have been proposed as possible predictors of chondrolabral injury.
The purpose of this study was to investigate the influence of multiple demographic and radiographic findings for the size of labral tears identified at the time of hip arthroscopy.
Methods

• Data was prospectively collected for patients treated with arthroscopic labral repair or debridement from February 2008 to August 2011.

• Preoperative radiographic and demographic data was collected for 392 patients during the study period. Exclusion criteria included revision surgery and previous hip conditions.
At the time of surgery, labral tear size and location was documented for all patients using traditional acetabular clock face nomenclature for sizing.

A multiple linear regression analysis was then performed to assess the correlation of radiographic and demographic findings with the size of the labral tear.
Results – Size of Labral Tears

Histogram for Size of Labral Tear

<table>
<thead>
<tr>
<th>Size of Labral Tear (Clock Face Sectors)</th>
<th>Number of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
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<tr>
<td>5</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>
## Results - Radiographic

### Statistics for Variables Associated with Size of Labral Tear

<table>
<thead>
<tr>
<th>Variable</th>
<th>Count</th>
<th>Average</th>
<th>Range</th>
<th>STD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Labral Tear Size</strong></td>
<td>2.9</td>
<td></td>
<td>(0.0 - 7.0)</td>
<td>1.3</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>392</td>
<td>37.7</td>
<td>(14.2 - 76.4)</td>
<td>14.3</td>
</tr>
<tr>
<td><strong>Tonnis Grade</strong></td>
<td>392</td>
<td>0.4</td>
<td>(0.0 - 3.0)</td>
<td>0.6</td>
</tr>
<tr>
<td><strong>Neck-Shaft Angle</strong></td>
<td>367</td>
<td>130.3</td>
<td>(122.0 - 141.0)</td>
<td>2.8</td>
</tr>
<tr>
<td><strong>Alpha Angle</strong></td>
<td>376</td>
<td>59.8</td>
<td>(32.0 - 105.0)</td>
<td>12.5</td>
</tr>
<tr>
<td><strong>Lateral CEA</strong></td>
<td>392</td>
<td>29.8</td>
<td>(11.0 - 49.0)</td>
<td>6.2</td>
</tr>
<tr>
<td><strong>Acetabular Inclination</strong></td>
<td>392</td>
<td>4.4</td>
<td>(-11.0 - 20.0)</td>
<td>4.9</td>
</tr>
<tr>
<td><strong>Anterior CEA</strong></td>
<td>206</td>
<td>30.4</td>
<td>(3.0 - 55.0)</td>
<td>8.5</td>
</tr>
<tr>
<td><strong>Crossover %</strong></td>
<td>389</td>
<td>14.9</td>
<td>(0.0 - 65.0)</td>
<td>16.1</td>
</tr>
</tbody>
</table>
Results - Regression

- Regression analysis displayed statistical significance:
  - gender (p < 0.0001)
  - age (P < 0.0001)
  - alpha angle (P = 0.005)
- For females, Tönnis grade(P = 0.0004), and neck-shaft angle (p = 0.004) correlated with labral tear size.
- This model accounted for only 26% of variation in labral tear size.
# Regression Analysis

## Multivariate Regression Model

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Effect of Labral Tear Size</th>
<th>Standard Error</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (per year)</td>
<td>0.0203</td>
<td>0.005</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Male / Female Difference</td>
<td>0.510</td>
<td>0.134</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Alpha Angle (per degree)</td>
<td>0.016</td>
<td>0.006</td>
<td>0.0050</td>
</tr>
<tr>
<td>Tonnis Grade - Female</td>
<td>0.656</td>
<td>0.182</td>
<td>0.0004</td>
</tr>
<tr>
<td>Tonnis Grade - Male</td>
<td>0.216</td>
<td>0.155</td>
<td>0.1648</td>
</tr>
<tr>
<td>Neck Shaft Angle - Female</td>
<td>-0.092</td>
<td>0.032</td>
<td>0.0044</td>
</tr>
<tr>
<td>Neck Shaft Angle - Male</td>
<td>0.019</td>
<td>0.034</td>
<td>0.5711</td>
</tr>
<tr>
<td>Ace Inclination</td>
<td></td>
<td></td>
<td>0.2802</td>
</tr>
<tr>
<td>Lateral CEA</td>
<td></td>
<td></td>
<td>0.3004</td>
</tr>
<tr>
<td>Anterior CEA</td>
<td></td>
<td></td>
<td>0.7723</td>
</tr>
<tr>
<td>Crossover</td>
<td></td>
<td></td>
<td>0.3073</td>
</tr>
</tbody>
</table>
Conclusion

• Preoperative risk factors for the extent labral tear size are male gender, increasing age, and increasing alpha angle.
• Labral tears were larger in females with higher Tönnis grades and lower neck-shaft angles.
• Measurements of acetabular coverage and version showed no correlation with labral tear size.
• The majority of labral tear size variation was not accounted for in this model.
References