HIP CAPSULAR REPAIR AFTER HIP ARTHROSCOPY - A CADAVERIC STUDY DEMONSTRATING ARTHROSCOPIC CAPSULOTOMY AND IT’S RELATION TO THE ANTERIOR CAPSULAR LIGAMENTS

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DISCLOSURES

• Felipe Duarte, MD:
  - Nothing to disclose

• Aleksey Lazarev, MD:
  - Nothing to disclose

• Brian Walters, MD:
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• Srino Bharam, MD:
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There has been a tremendous surge in popularity and utilization of hip arthroscopy in the last decade.

Capsulotomies required for evolving indications and improved access to the central and peripheral compartments.

Reports of instability/dislocations after hip arthroscopy:
- Catastrophic complications in dysplastic patients resulting in subluxation, cartilage wear and eventual arthroplasty at 1 year post-op
- Anterior hip dislocation in patient with increased joint laxity after capsulectomy for peripheral compartment access

These illustrate the need for better understanding of the hip capsule structures and how they relate to hip stability.
ILLIOFEMORAL LIGAMENT AND ARTHROSCOPY

ILFL
- Provides static restraint to full hip extension
- Allows for upright posture to be maintained without constant muscular contraction
- Provides stability in flexion and external rotation and extension in both internal and external rotation
- Thickest aspect of capsule in anterosuperior portion
- Branches
  - Lateral
  - Medial

Portals - Established to be outside of anterior capsular ligamentous structures
- Anterolateral / Posterolateral / Anterior / Mid Anterior

Capsulotomy
- Improve access to compartments of
  - Interportal & T-limb

Safran et al. - Arthroscopy 2011
Observe the relationship between the T-capsulotomy performed during hip arthroscopy and the capsular ligamentous structures.
METHODOLOGY

10 fresh human cadavers
• No known pathology

Arthroscopy
• Standard Anterolateral and Mid-anterior portals
• Capsulotomies:
  - Interportal capsulotomy to access central compartment
  - T-limb of capsulotomy to access peripheral compartment

Demographics

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<table>
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<tr>
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<tbody>
<tr>
<td>Avg. Age</td>
<td>71.8</td>
</tr>
<tr>
<td>Sex</td>
<td>6♂; 4♀</td>
</tr>
<tr>
<td>Weight</td>
<td>172.6 lbs</td>
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METHODOLOGY

Immediate anatomic dissection of anterior structures

- Dynamic and static stabilizers
- Identification of capsulotomy
Measurements (To nearest 0.1mm using digital caliper)

- Capsulotomy length
- ILFL mid capsular measurements of thickness & width
- Mid capsular measurements of thickness
- % of ILFL involvement during capsulotomy
- Measurements repeated by 2 senior residents (ICC >.85)
**RESULTS**

Mid capsular quadrant measurements

<table>
<thead>
<tr>
<th>Quadrant</th>
<th>Thickness</th>
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<tbody>
<tr>
<td>Posterosuperior</td>
<td>8.87 {±1.41}</td>
</tr>
<tr>
<td>Superior</td>
<td>7.969 {±1.47}</td>
</tr>
<tr>
<td>Anterosuperior</td>
<td>4.98 {±1.25}</td>
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Mid capsular IFL measurements

<table>
<thead>
<tr>
<th>ILFL Limb</th>
<th>Width</th>
<th>Thickness</th>
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<tbody>
<tr>
<td>Lateral Horizontal Limb</td>
<td>9.78 {±1.7}</td>
<td>8.72 {±1.58}</td>
</tr>
<tr>
<td>Medial Vertical Limb</td>
<td>8.81 {±1.96}</td>
<td>7.16 {±1.43}</td>
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Capsulotomy Parameters

<table>
<thead>
<tr>
<th>Interportal (mm)</th>
<th>Lateral Extension (mm)</th>
<th>ILFL Cut IP (%)</th>
<th>ILFL Cut LL (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20.1 (± 4.24)</td>
<td>10.87 (± 2.6)</td>
<td>63 (±29.1%)</td>
<td>10</td>
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Capsule anatomy
- Postero-superior capsule is thickest vs. superior ($p < 0.0001$) and anterosuperior ($p < 1.01 \times 10^{-12}$)
- Capsule measurements consistent with previous studies
- Postero-superior capsule corresponds to lateral limb of ILFL

Capsulotomy
- Lateral limb of IFL cut in all specimens
- On average 63% of the width of the lateral limb of ILFL was cut
- Only in 10% of cases was the lateral limb of ILFL cut
**DISCUSSION**

**Limitations:**
- Only effect of anterolateral and mid anterior portals studied, other portals may spare the ILFL

**Horizons:**
- Microinstability and possible repercussions
  - ILFL is main anterior restraint in ER+Extension
  - Alteration of hip motion and its relation to future joint health
- Biomechanical Study
  - Establish changes if any in hip kinematics through motion analysis
  - Determine if capsular repair restores original kinematics
CONCLUSIONS

• 63% of the lateral limb of ILFL is cut during routine arthroscopy with standard anterolateral and mid-anterior portals.

• Lateral limb of ILFL cut area corresponds to thickest part of capsule.

• These findings may support performing capsular repair after arthroscopic capsulotomy to restore ILFL integrity.
REFERENCES