Hip Capsule Insufflation Volume At The Time Of Arthroscopy Correlates With Hip Capsular Laxity: A Preliminary Study.

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• Disclosure

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Introduction

- Hip instability: more common than previously thought
- Potential source of pain in young active patients
- Traumatic instability: related to fracture-dislocations
- Atraumatic instability: related to dysplasia, repetitive micro-trauma, Ehlers-Danlos, Marfan syndrome
- Iatrogenic instability: extensive capsulotomy, prolonged traction
Introduction

- Hip instability is related to capsular laxity and/or redundancy
- Capsular laxity could be related to capsular volume
- Laxity can be estimated in physical exam: range of motion (ROM), Beighton tests, dial test, axial traction test
- Shoulder and knee literature have shown correlation between volume and hypermobility/instability
- Hypothesis:
  - Patients with capsular laxity (observed during hip arthroscopy) and patients with signs of laxity at preoperative physical examination would have a higher hip insufflation volume
Methods

• Data prospectively collected on all hip arthroscopies in a single center

• Exclusion criteria: age <18y, arthritis, history of capsular defect, volume above 120ml (probable extravasation)

• Preoperative exam: ROM, flexion-abduction-external rotation test (FABER), Beighton tests, hip dial test, center-edge angle, alpha angle
• Capsular volume measurement:
  – First needle inserted at the anterolateral portal
  – Up to 120ml of saline injected until resistance felt
  – Injected volume was recorded

• Intraoperative assessment of laxity:
  – Capsular inspection and palpation
    • Anterior and medial portions of the capsule
    • Zona orbicularis
    • Redundancy at the capsulolabral recess
  – Always done immediately after interportal capsulotomy

Results

- 355 consecutive hips
- 258 primary cases, 97 revisions
- Average age: 36y primaries, 31y revisions
- Average volume: 31ml primaries, 35ml revisions

<table>
<thead>
<tr>
<th></th>
<th>Primary</th>
<th>Revision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>36</td>
<td>31</td>
</tr>
<tr>
<td>Center-Edge angle</td>
<td>32.5</td>
<td>32</td>
</tr>
<tr>
<td>Alpha angle</td>
<td>73</td>
<td>63</td>
</tr>
<tr>
<td>Insufflation volume (ml)</td>
<td>31</td>
<td>35</td>
</tr>
<tr>
<td>Internal Rotation</td>
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<td>37</td>
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<tr>
<td>External Rotation</td>
<td>42</td>
<td>42</td>
</tr>
<tr>
<td>Weight (lb)</td>
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<td>161</td>
</tr>
<tr>
<td>Height (in)</td>
<td>69</td>
<td>69</td>
</tr>
</tbody>
</table>
Primary cases

• Patients with laxity had a larger volume (p=0.001)
  – With Laxity: 33ml
  – Without laxity: 29ml

• No differences based on gender (p=0.199) or hip dial test (p=0.172).

• Capsular volume was correlated with height (rho=0.15; p=0.016).

• Capsular volume was not associated with weight, BMI, range of motion, joint space, center edge angle or alpha angle
Revision cases

- Patients with hip laxity had a larger volume than those without (40ml vs 32ml; p=0.001)
- No differences in volume based on gender (p=0.782) or hip dial test (p=0.618)
- Capsular volume was not associated with height, weight, BMI, range of motion, joint space, center edge angle or alpha angle
Discussion

• First study to evaluate the relationship between hip capsular insufflation volume and signs of hip laxity on physical exam and intraoperative inspection.
• Capsular volume is associated to intraoperative signs of laxity, but not to classical physical exam tests for laxity.
• The hip dial test, FABER test and Beighton tests (elbow and knee hyperextension, thumb and finger hypermobility, etc) were expected to be associated to volume. However, we could not find such association.
Discussion

• Shoulder research has previously used volume as a benchmark for capsular shift procedures
• The best test for hip laxity is still unknown
• Patients with increased capsular volume could benefit from capsular closure/plication at the end of surgery
• **Limitations**
  
  – Volume measurement technique is not totally accurate and depends on subjective perception of resistance to injection
    
    • To control this bias, all surgeries were performed by a single surgeon
  
  – Revision cases were mostly referrals. Other surgeons perform different techniques for capsular closure.

• **Conclusions**
  
  – Increased insufflation volume was significantly associated with hip laxity observed at arthroscopy
  
  – Hip insufflation volume may be a useful measurement to perform prior to arthroscopy to help surgeons decide how to manage the capsule.
REFERENCES


