Proximal Hamstring Ruptures

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Anatomy

- Semimembranosus
  - Anterolateral facet
- Semitendinosus & Biceps Femoris
  (Conjoint tendon)
  - Posteromedial facet
History

- Sudden pop
- Pain
- Eccentric injury
  - Hip flexion
  - Knee extension
Exam

- Swelling
- Ecchymosis
- TTP over ischium or musculotendinous junction
- Occasional palpable gap
Imaging

- AP pelvis XR - typically normal
- MRI
MRI Acute
MRI Chronic
MRI Chronic
Treatment

- Non operative
  - Partial tears
  - Musculotendinous injuries
  - Sedentary
  - Chronic tears
  - Unwilling or unable to do comply with postoperative rehab
  - Must warn of possibility of chronic pain
  - Late sciatic n involvement
  - Difficult to correct down line
Non operative treatment

- Protected WB until pain and swelling resolve
  - D/c crutches when ambulatory without pain or limp
- Ice/anti-inflammatory medications
- PT-gentle ROM exercises
- Edema control
- Strengthening begins with resolution of pain, swelling and limping
- Patient with return to sport
Nonsurgical Treatment

- Complete Avulsion of the Proximal Hamstring Insertion: Functional Outcomes After Nonsurgical Treatment

  - 19 patients
  - 44-73 y (mean 59y)
  - Complete avulsions prox hamstring
  - Lower Ext Functional Scale (LEFS) & Short Form-12 version 2 questionnaires
  - Functional and isometric testing
  - 10 patients functional testing
  - 8-156 m f/u (ave f/u 31 m)

- **Results**
  - Mean LEFS 70.2/80 (max)
  - SF-12v2
    - Physical 52.5
    - Mental 54.1
  - Hamstring strength
    - 45° flexion ave 62% uninvolved (p=.09)
    - 90° flexion ave 66% uninvolved (p=.07)
  - Single leg hop no sig difference
  - 12/17 patients returned to pre injury sporting activity

- **Conclusions**
  - Non op treatment yields noticeable subjective and strength deficits
Treatment

- **Surgery**
  - Teno-osseous injury
  - Significant retraction
  - More *predictable* in many regards
  - Postoperative bracing
Surgery

- Functional results and outcomes after repair of proximal hamstring avulsions
- Cohen SB, et al. AJSM 2012

**Methods**

- 52 patients (26 males) Ave 47.7 y
- LEFS, custom LEFS, Marx, custom Marx, prox hamstring score, prox ham questionnaire(subjective)
- 40 acute repairs
- 12 chronic repairs
- 5 ischial tub suture anchors
- Transverse incision
- Rehab protocol-hip orthosis 6-8 weeks with progressive ROM and WB
Results

- Mean f/u 33m (range 12-76m)
- Overall 51/52 patients satisfied
- No statistically significant difference in scores acute vs. chronic with the exception of the custom Marx score (P.001)
- 35 patients (67%) could participate in strenuous activities at latest follow up
- All patients estimated strength greater or equal to 75%
- Five patients (9.6%) had burning or numbness in foot or posterior thigh, and 25 (48%) had at least some discomfort sitting
Cohen SB, et al. AJSM 2012

Conclusions

- Successful repairs of both acute and chronic repairs

- Acute repairs did have higher functional and hamstring scores, and estimated hamstring strength
Timing of Surgery

- Timing of surgery for complete proximal hamstring avulsion injuries: successful clinical outcomes at 6 weeks, 6 months, and after 6 months of injury


- 112 athletes (63 patients were high level)

- Subgroups based on timing of surgery
  - Early-within 6 weeks
  - Delayed-6 w-6m
  - Late-after 6 m
Subbu et al

- Resulted
  - 108 patients (96.4%) returned to sport
  - Ave time to return to play was 16 weeks in early group, 9 weeks faster than in delayed group, and 13 weeks faster than in the late group
  - 2 partial reruptures in delayed group ➔ retired from competitive sport but remained recreationally active
  - 2 other athletes recovered but retired from all sports
  - 12 athletes delayed by local nerve symptoms
    - 2 early group, 5 in delayed and 5 in late
  - Only 2 cases required further exploration
Subbu et al

Conclusions

- Early sx $\rightarrow$ good clinical outcomes and quicker return to sport
- Delayed diagnosis can lead to prolonged morbidity and an increased likelihood of complications
Operative versus Non OP

- Bodendorfer, et al
- Outcomes after Operative and Non Operative Treatment of Proximal Hamstring Avulsions
- Systematic Review and Meta Analysis
- AJSM 2017
- 24 studies
- 795 Hamstrings
- Studies low Methodological Studies
- Small non op group
### TABLE 2
Outcomes for Operatively and Nonoperatively Treated Proximal Hamstring Avulsions

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Operative</th>
<th>Nonoperative</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient satisfaction, %</td>
<td>90.81 ± 9.72</td>
<td>52.94</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Return to sport or preinjury activity level, %</td>
<td>79.75</td>
<td>70.59</td>
<td>.363</td>
</tr>
<tr>
<td>Strength testing, %</td>
<td>85.01 ± 6.3</td>
<td>63.95</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Single-legged hop test, cm</td>
<td>119.1 ± 14.12</td>
<td>56.62 ± 15.92</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>LEFS score</td>
<td>72.77 ± 6.55</td>
<td>69.53 ± 4.04</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>SF-12 score</td>
<td>53.15</td>
<td>53.3</td>
<td>NC</td>
</tr>
</tbody>
</table>

*Data are presented as mean ± SD unless otherwise indicated. No. indicates the sample size of patients reported for the specific outcome analyzed. LEFS, Lower Extremity Functional Scale; NC, not calculable; SF-12, 12-Item Short Form Survey.

### TABLE 3
Complications for Operatively Treated Proximal Hamstring Avulsions

<table>
<thead>
<tr>
<th>Complication</th>
<th>Incidence, %</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rerupture</td>
<td>2.17</td>
<td>16</td>
</tr>
<tr>
<td>Reoperation</td>
<td>2.57</td>
<td>19</td>
</tr>
<tr>
<td>Infection/wound complications</td>
<td>3.25</td>
<td>24</td>
</tr>
<tr>
<td>Neurologic complications</td>
<td>7.99</td>
<td>59</td>
</tr>
<tr>
<td>Peri-incisional numbness</td>
<td>5.42</td>
<td>40</td>
</tr>
<tr>
<td>DVT/PE</td>
<td>0.68</td>
<td>5</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>1.08</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>23.17</td>
<td>171</td>
</tr>
</tbody>
</table>
Bodendorfer

- **Conclusions**
  - Surgery had superior outcomes but a high complication rate
  - Acute repairs do better than chronic
  - Complete avulsion repairs higher satisfaction, less pain, higher complication rates than partial avulsion repairs
  - Partial avulsion repairs had better strength and endurance
# How I approach it

## Non op
- Physical Therapy
- WBAT
- May have buttock pain, difficulty with sitting, weakness
- Late sciatic n symptoms
- More difficult to address down the line

## Operative
- More predictable in the active patient
- Compliance with rehab is critical
- Discuss potential complications
- Chronic cases are technically difficult and require meticulous attention to detail
Surgery

- Prone
- Meticulous prepping and draping
- Incision in gluteal crease or longitudinal
- Medial
- Beware cluneal and post cutaneous in thigh
- Fascia
- Hematoma
Surgery

- Dissection
  - Acute is straightforward
  - Subacute to chronic requires meticulous attention to detail
  - Identify the ischium
    - C-arm
  - Tendon
    - Muscle in chronic cases
  - Sciatic Nerve
    - Lateral
    - May require dissection in chronic cases
Surgery

- Can often fix anatomically acutely
- Chronic is a challenge
- Insertion is broad
- C-arm chronic cases
- May need to flex hip and knee
- Rasp or curettes
- Caution with burr
Surgery

- Fixation
  - Variable
  - Bioanchors
  - TAP

- Closure
  - Repair the fascia
  - Subcuticular and dermabond on the skin for hygiene purposes
Postoperative Rehab

- Hip/knee orthosis which is fitted Pre-operatively
- Apply in OR
- Avoid hip flexion
- PT initially focuses on isometrics and brace gait training
- Brace eliminated at 1 month
- Goal nearly full ROM at 2 mo
Postoperative Rehab

- 3m light jogging
- 4-6 mo heavy lifting, explosive movements
Summary

- Good results with both non-surgical and surgical treatments
- Patients may be more likely to recover strength with surgical treatment
- Acute appears better than chronic
- Warn patients of possibility of residual buttock pain with or without surgery
- Surgical dissection warrants attention to detail and meticulous dissection
- Post-operative bracing is cumbersome
Thank you