Sports Hernias: Caveats and Caution
Injuries to the Spleen

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No financial conflicts to disclose

Sports Hernia

No, it is not a hernia.
But that is what it is called.
Google 2,930,000 hits

Overview

• Definition
• Diagnosis
• Review this and other series/results
• Discuss repair and findings
• Conclusion & Caveats
Sports Hernia: Definition

Acute and chronic painful abdominal wall musculotendinous injury caused by sports related activity, resulting in pain and instability with vigorous activity, of the medial inguinal floor, conjoint tendon, or lower lateral rectus abdominis muscle. It may be associated with varying degrees of osteitis pubis and/or adductor tendinitis/tears.

PRESKITT
- Professional, collegiate, recreational athletes, the occasional “weekend warrior”
- Original reports, soccer, rugby
- Subsequent, most all sports

Four Groin Pain Zones

ANATOMY:
MUSCULOTENDINOUS

- Lateral rectus abdominis
- Conjoint tendon or fasc inguinalis
- Absence of muscular floor
DIAGNOSIS

• History, Exam, Imaging (MRI/xrays)
• Eliminate other pathology
• Evaluate adductors, pubis, lower abdominal wall
• Rocker test: forced adduction with abdominal crunch: focal tenderness over conjoint tendon, lateral rectus abd., or medial inguinal floor
• Relative grading of adductors, pubis, and abdominals (1-5/5 x 5)
Rocker test scoring
(Out of 5)

• 0 is scored when there is no tenderness,
• 1 is scored with very slight tenderness,
• 2 with mild but definite and reproducible tenderness,
• 3 with moderate tenderness ("Yes that hurts."),
• 4 with severe tenderness ("Hey, doc, that REALLY hurts."), and
• 5 when the pain is so severe that they cannot tolerate palpation.

Rocker test

Right abdominal: 0/5
Left abdominal: 2/5
Pubic symphysis: 0/5
Left adductor: 1/5

If exam consistent, right inguinal floor repair; excellent degree of success.
Rocker test

- Right abdominal: 2/5
- Left abdominal: 0/5
- Right adductor: 4/5
- Left adductor: 2/5
- Pubic symphysis: 2/5

Predominance of adductor symptoms, minimal abdominal symptoms, no surgery, continue rest/rehab adductor.

**IMAGING:**

MRI with an acute rectus injury/Sports Hernia

Imaging usually negative for Sports Hernia. Useful for other hip pathology, osteitis pubis, adductor injuries, other pathology.

**Aponeurotic cleft sign MRI**

FIGURE 5. Continuous bilateral rectus abdominis aponeurotic plate disruption.
Aponeurotic cleft sign MRI

Baylor Experience

- Retrospective personal series review, not scientific
- Baylor experience (approx.): hockey 20%, baseball 15%, U.S. football 20%, soccer 20%, remainder are track/cricket/lacrosse/gymnastics/power lifting
- 103 patients
- Open mesh repair
- 100 patients return to sport within 8 weeks

<table>
<thead>
<tr>
<th>Author</th>
<th>Repair</th>
<th>Mesh Type</th>
<th>No. pts</th>
<th>Follow-up</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polglase</td>
<td>Bassini &amp; Tanner slide</td>
<td>None</td>
<td>64</td>
<td>8 mo</td>
<td>62.5% full activity; 4.7% dissatisfied</td>
</tr>
<tr>
<td>Bassini &amp;</td>
<td>Bassini &amp; Tanner slide</td>
<td>None</td>
<td>9</td>
<td>8 mo</td>
<td>100% to full activity in 8 mo</td>
</tr>
<tr>
<td>Tanner</td>
<td>Bassini &amp; Tanner slide</td>
<td>None</td>
<td>18</td>
<td>8 mo</td>
<td>98% to full activity</td>
</tr>
<tr>
<td>McHenry</td>
<td>Bassini &amp; Tanner slide</td>
<td>None</td>
<td>15</td>
<td>8 mo</td>
<td>98% to full activity</td>
</tr>
<tr>
<td>Williams</td>
<td>Approx. mid lat aponeurosis</td>
<td>None</td>
<td>8</td>
<td>3–6 mo</td>
<td>100% to full activity</td>
</tr>
<tr>
<td>Olbricht</td>
<td>Bassini &amp; Tanner slide</td>
<td>None</td>
<td>600</td>
<td>8 yrs</td>
<td>97% to full activity in 8 mos</td>
</tr>
<tr>
<td>Brannigan</td>
<td>Bassini &amp; Tanner slide</td>
<td>None</td>
<td>45</td>
<td>3–21 mo</td>
<td>98% to full activity in 21 mos</td>
</tr>
<tr>
<td>Meyers</td>
<td>Polytetrafluoroethylene (+)</td>
<td>None</td>
<td>157</td>
<td>3–9 yrs</td>
<td>98% to full activity in 9 mos</td>
</tr>
<tr>
<td>Inbal</td>
<td>Approx. mid lat aponeurosis</td>
<td>Gore-tex</td>
<td>1.5</td>
<td>30 mos</td>
<td>100% to full activity</td>
</tr>
<tr>
<td>Neumann</td>
<td>Modified Shouldice</td>
<td>Gore-tex</td>
<td>45</td>
<td>30 mos</td>
<td>99% to full activity</td>
</tr>
<tr>
<td>Meyers</td>
<td>Modified Shouldice</td>
<td>Gore-tex</td>
<td>600</td>
<td>3–60 mo</td>
<td>97% to full activity in 60 mos</td>
</tr>
<tr>
<td>Preskitt</td>
<td>Modified Shouldice/Open Mesh repair</td>
<td>Polypropylene</td>
<td>100+</td>
<td>6–12 mo</td>
<td>98% to full activity</td>
</tr>
</tbody>
</table>

SURGERY for Sports Hernia

- Open mesh repair
- Modified Bassini
- Shouldice repair
- Laparoscopic repair
- “Pelvic floor repair” with or without adductor release

SURGERY: Considerations

- Rocker test 3 or greater in medial inguinal floor with a dominance of inguinal/abdominal tenderness over adductor tenderness AND
- Compelling need for repair: high probability that resolution of the abdominal wall pain will return the athlete to competition
- Failure of conservative therapy: rest & rehab
- Persistent exam – repeated after additional PT
- Importance of collaboration
- Prior hernia surgery with mesh – NO

SURGERY: Open Mesh Repair
Attenuated or weakened inguinal floor

Tear/defect in External Oblique with entrapped ilioinguinal n.

Injuries we find at surgery:

Common pathologic findings at surgery are:
- Torn external oblique aponeurosis
- Tear in the conjoint tendon
- Conjoint tendon torn from pubic tubercle
- Dehiscence between conjoined tendon and inguinal ligament
- Tear in the fascia transversalis
- Abnormal insertion of the rectus abdominis muscle
- Entrapment of the ilioinguinal nerve or the femoral branch of the genitofemoral nerve
SPORTS HERNIAS:
SUMMARY

• Sports Hernia Defined
• Reviewed a personal (one surgeon) series of 130 patients, 118 with successful return to sport in 3 months
• Clinical diagnosis
• Surgical Repair findings

Cautionary notes....

• Principle of reasonable expectations
• The very young (mid-teens), caution
• Bilateral complaints, beware
• Predominance of adductor symptoms, NO
• Previous hernia repairs, NO, rarely
• “Rip or tear” and timing best sign

Injuries to the Spleen

The spleen is a delicate, fist-sized organ under your left rib cage near your stomach. It contains special white blood cells that destroy bacteria and help your body fight infections. The spleen also makes red blood cells and helps remove, or filter, old ones from the body’s circulation.

A layer of tissue entirely covers the spleen in a capsule-like fashion except where the arteries and veins enter the organ. This tissue, called the splenic capsule, helps protect the spleen from direct injury.
Injuries to the Spleen

Carl Pavano remains hospitalized

Jason Witten has spleen injury, might miss preseason

Injuries to the Spleen

- Spleen most common organ injured in blunt trauma
- Adults – pediatrics
  - Adults: spleen more protected by rib cage, spleen capsule is thinner, easier to rupture, less susceptible to OPSI (0.2%)
  - Children: spleen less protected by rib cage, spleen capsule is much thicker, less likely to rupture, more susceptible to OPSI (0.6%)

“Delayed” splenic rupture, 90% occur within the first 10-14 days.

Dx:
  - Clinical: abd pain, left shoulder pain, assoc. injuries
  - FAST: blood around spleen
  - CT: Classic means
  - High index of suspicion
Injuries to the Spleen:
Treatment Options

• Observation, bedrest
  • Lower grade, younger patient, stable patient
  • Avoid unnecessary follow-up CT; doesn't predict recovery or healing well

• Embolization:
  • Mid-grade, older at risk stable patient, stable bleeding patient

• Splenectomy:
  • Higher grade, unstable patient, risky medical comorbidities, assoc. injuries requiring surgery, freely bleeding, delayed rupture.

Injuries to the Spleen:
After splenectomy

• Vaccinations
  • Haemophilus B conjugate, Pneumococcus, Meningococcus
  • Yearly flu shot
  • Re-vaccinate in 5 years.

• Return to sport no longer dependent upon the spleen but on recovery from surgical wounds
Grading of Spleen Injuries

<table>
<thead>
<tr>
<th>Grade</th>
<th>Injury Type</th>
<th>Description of Injury</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Hematoma</td>
<td>Subcapsular, &lt; 10% surface area</td>
</tr>
<tr>
<td></td>
<td>Laceration</td>
<td>Capsular tear, &lt; 1cm parenchymal depth</td>
</tr>
<tr>
<td>II</td>
<td>Hematoma</td>
<td>Subcapsular, 10-50% surface area intraparenchymal, &lt; 5cm in diameter</td>
</tr>
<tr>
<td></td>
<td>Laceration</td>
<td>Capsular tear, 1-3 cm parenchymal depth that does not involve a trabecular vessel</td>
</tr>
<tr>
<td>III</td>
<td>Hematoma</td>
<td>Subcapsular, &gt;50% surface area or expanding; ruptured subcapsular or parenchymal hematoma; intraparenchymal hematoma &gt; or = 5cm or expanding</td>
</tr>
<tr>
<td></td>
<td>Laceration</td>
<td>&gt;3 cm parenchymal depth or involving trabecular vessels</td>
</tr>
<tr>
<td>IV</td>
<td>Laceration</td>
<td>Laceration involving segmental or hilar vessels producing major devascularization (&gt;25% of spleen)</td>
</tr>
<tr>
<td>V</td>
<td>Shattered</td>
<td>Vascular</td>
</tr>
<tr>
<td></td>
<td>Vascular</td>
<td>Hilar injury which devascularizes spleen</td>
</tr>
</tbody>
</table>

Injuries to the Spleen

Grade II spleen injury

Grade III spleen injury

Grade IV spleen injury
## Injuries to the Spleen

### Spleen Injury Scale

<table>
<thead>
<tr>
<th>GRADE</th>
<th>INJURY</th>
<th>ACTIVITY RESTRICTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>&lt;1 cm in depth</td>
<td>3 WEEKS</td>
</tr>
<tr>
<td>II</td>
<td>1-3 cm in depth not involving trabecular vessels</td>
<td>4 WEEKS</td>
</tr>
<tr>
<td>III</td>
<td>&gt;3 cm depth or any depth involving trabecular vessels</td>
<td>5 WEEKS</td>
</tr>
<tr>
<td>IV</td>
<td>Segmental or hilar vessel injury</td>
<td>6 WEEKS*</td>
</tr>
<tr>
<td>V</td>
<td>Shirrered spleen or hilar vessel injury</td>
<td>7 WEEKS*</td>
</tr>
</tbody>
</table>

### Injuries to the Spleen:

- Return to play

- Time in hospital: injury grade plus one (days)
- Time for inactivity: injury grade plus two (weeks)
- Most splenic injuries are healed at 2.5 months.
- No hard scientific data.

## Summary

- Sports hernias are not life-threatening
- Sports hernia surgery is also not life-threatening
- Spleen injuries are potentially life-threatening
- Splenectomy is also potentially life-threatening
- Try to avoid surgery in both

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