Groin Pain and No Hernia

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Disclosures

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Groin Pain and No Hernia

- Differential diagnosis
- Diagnostic evaluation
- Groin pain in the athlete (Sports hernia or not)
  - Clinical presentation/diagnosis
  - Mechanisms
  - Surgical indications and surgical options
Groin Pain and No Hernia: Differential Diagnosis

- Occult inguinal hernia
  - Prior inguinal hernia repair
- Sports hernia/athletic pubalgia
- Pelvis
  - Stress related fractures
  - Osteitis pubis
- Muscular strains
  - Rectus, iliopsoas, hip flexor, adductor, oblique strains
- Hip Injuries (labral tears, FAI, arthritis)
- Non-athletic causes
Chronic Injuries: Stress Fractures

- **Mechanism:** Subtotal or total fracture due to imbalance between submaximal repetitive loads and bone remodeling

- **Causes:**
  - Overuse
  - Osteoporosis (female triad)

- **Due to changes in:**
  - Training duration or intensity
  - Foot gear
  - Training surface

- **Locations:** Inferior pubic ramus, femoral neck
Chronic Injuries: Osteitis Pubis

- Probably due to overuse, abnormal biomechanics of pubis
- Incidence - accounted for up to 6.3% of overuse injuries in one series
- Clinical presentation:
  - pubic symphysis pain
  - may be referred to adjacent areas (adductor)
Adductor Muscle Group Injury

- Adductor strains common in sports
  - Renstrom: 62% of sports groin injuries involved adductor longus (Br J Sports Med 1980;14:30-6.)

- Often Hx of sudden injury; may be difficult to distinguish from “sports hernia”

- Adductor muscle groups injured: Adductor longus, brevis, pectineus, gracilis, add. magnus, obturator externus
Non-Hernia Causes of Groin Pain: Hip Joint Disorders

- Osteoarthritis
- Acetabular labral tear
- Stress fracture
- Avascular necrosis of femoral head
- Legg-Perthes disease
- Slipped capital femoral epiphysis
- Synovitis
Groin Pain in Non-athlete: ? Inguinal Hernia

- Beware the patient with groin pain and no definitive hernia bulge.
- Patients with pain preoperatively more likely to have continued pain postop.
# Non-Athletic Causes of Groin Pain

<table>
<thead>
<tr>
<th>Cause</th>
<th>26 patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inflammatory bowel disease</td>
<td>16</td>
</tr>
<tr>
<td>Endometriosis</td>
<td>6</td>
</tr>
<tr>
<td>Urologic problems</td>
<td>4</td>
</tr>
<tr>
<td>Aseptic hip necrosis</td>
<td>2</td>
</tr>
<tr>
<td>Other hip problems</td>
<td>2</td>
</tr>
<tr>
<td>Ovarian cyst disease</td>
<td>2</td>
</tr>
<tr>
<td>Genital herpes</td>
<td>1</td>
</tr>
<tr>
<td>PID</td>
<td>1</td>
</tr>
<tr>
<td>High rectus abdominus tear</td>
<td>1</td>
</tr>
<tr>
<td>Spigelian hernia</td>
<td>1</td>
</tr>
<tr>
<td>Testicular seminoma</td>
<td>1</td>
</tr>
<tr>
<td>Rectal cancer</td>
<td>1</td>
</tr>
</tbody>
</table>

Groin Pain in Athletes

- Groin injuries in athletes are a common problem in sport
- Regional anatomy is complex
- Can be difficult to diagnose and treat accurately (numerous causes)
- Most resolve with conservative management
Regional Anatomy of the Groin

- External oblique muscle (cut)
- Internal oblique muscle (cut)
- Transversus abdominis muscle
- Iliopsoas muscle
- Sartorius muscle
- Ilioinguinal nerve
- Pectineus muscle
- Adductor longus muscle
- Rectus femoris muscle
- Gracilis muscle
“Sport’s Hernia” Terminology

- Athletic pubalgia
- Abdominal core injury
- Inguinal disruption
- Inguina-related groin pain
- Gilmore’s groin
- Posterior abdominal wall deficiency
Sports Hernias/Athletic Pubalgia

- Chronic inguinal/lower abdominal pain
- Minimal/subtle exam findings
- Pain occurs during extremes of exertion
  - sudden starts/turns/cutting movements
  - propulsive skating movements, slapshot
  - kicking (soccer/football)
- Pain limits sudden accelerating movements
Athletic Pubalgia: Clinical Presentation

- May also have pain with coughing, sneezing, getting out of a car
- Associated adductor symptoms are often present (40-60%)
- Onset is usually insidious; only c. 30% assoc. with a specific precipitating event
General Approach: History

- Acute vs. chronic
- Pain localized, diffuse, radiates?
- Activating, alleviating factors (rest, activity)
- Predisposing factors (prior injury, change in training regimen)
- Mechanism of injury
Diagnosis and Exam

- Tender medial inguinal canal/lower rectus abdominus
- Dilated external ring
- Palpable gap over inguinal floor
- Pain with resisted trunk rotation, resisted sit-ups
- Absence of inguinal hernia
Athletic Pubalgia: Abdominal Muscle Testing

Pelvic Floor Integrity ± Situp
# Athletic Pubalgia: Abdominal Muscle Testing

<table>
<thead>
<tr>
<th>Test</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tender inguinal floor/rectus</td>
<td>80.3%</td>
</tr>
<tr>
<td>Weak inguinal floor</td>
<td>90.2%</td>
</tr>
<tr>
<td>Pain resisted sit-up</td>
<td>63.8%</td>
</tr>
<tr>
<td>Pain resisted trunk rotation</td>
<td>73.3%</td>
</tr>
<tr>
<td>Pain resisted adduction</td>
<td>57.6%</td>
</tr>
<tr>
<td>Inguinal hernia (clinically suspected)</td>
<td>1.0%</td>
</tr>
</tbody>
</table>
Athletic Pubalgia: Imaging

• Plain X Rays
• Dynamic ultrasound
• Pelvic MRI

From Minnich Amer J Sports Med 2011
Pathophysiologic Mechanisms

- Rectus tendon injury, rectus/adductor complex
- Posterior abdominal wall/inguinal floor defect
- Inguinal/genital neuropathy
MRI Rectus Abdominus Tear: Transverse T2-weighted image

White line = separation between pubis & rectus

Intact attachment on the left
MRI: Rectus Adductor Imaging: Sagittal View

From Brunt LM. Master Techniques Hernia Surgery 2012
MRI: Rectus Tendon Injury
Posterior Abdominal Wall/ Inguinal Floor Defect-Disruption

Minnich Amer J Sports Med 2011
Ilioinguinal/Genital Nerve Entrapment or Neuropathy

Ilioinguinal nerve entrapment in external oblique tear (Brown/Mulder Montreal)

Genital nerve compression by bulging posterior inguinal floor (Muschawek – Munich)
Clinical Entities of Athletic Pubalgia

Experience With “Sports Hernia” Spanning Two Decades

William C. Meyers, MD,* Alex McKechnie, PT,† Marc J. Philippon, MD,‡ Marcia A. Horner,* Adam C. Zoga, MD,§ and Octavia N. Devon, MD*

- Pure rectus abdominus (unilateral or bilateral) – 31%
- Rectus abdominus/unilateral adductor – 39%
- Pure adductor syndromes – 21%
- Severe osteitis variant – 8%
- Iliopsoas variant – 4%
- Baseball pitcher/hockey goalie syndrome – 4%
- Rectus femoris variant – 3%
- High rectus abdominus variant – 2%
- Female variant – 2%
- Dancer’s variants - <1%
- Etc, etc....

Surgical Indications

• Symptoms that limit athletic performance

• Failure of 6-8 weeks of conservative therapy

• Exclusion of other diagnoses/pathology
‘Treatment of the Sportsman’s groin’: British Hernia Society’s 2014 position statement based on the Manchester Consensus Conference

Aali J Sheen,¹ B M Stephenson,² D M Lloyd,³ P Robinson,⁴ D Fevre,⁵ H Paajanen,⁶ A de Beaux,⁷ A Kingsnorth,⁸ O J Gilmore,⁹ D Bennett,¹⁰ I Maclellan,¹¹ P O’Dwyer,¹¹ D Sanders,⁸ M Kurzer¹²

Table 2  Suggested algorithm for the management of inguinal disruption (ID)

<table>
<thead>
<tr>
<th>Time</th>
<th>Discomfort</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1–2 months</td>
<td>ID</td>
<td>Prehabilitation, rest and analgesia (see box 1)</td>
</tr>
<tr>
<td></td>
<td>VAS 0–2 at rest; 6–7 on exercise; cannot undertake any sporting activity</td>
<td></td>
</tr>
<tr>
<td>&gt;2 months</td>
<td>On going ID — chronic groin pain — failure of rehabilitation</td>
<td>Surgical repair either open or laparoscopic with postoperation rehabilitation (see table 1)</td>
</tr>
</tbody>
</table>

VAS, visual analogue scale.

Athletic Hernia/Pubalgia Case

- 26 y/o NHL defenseman
- Hit while opened up and felt a pop in right lower abdomen and groin
- MRI showed minimal lateral rectus separation
- Managed conservatively, returned to play at 7 weeks, reinjury in 2nd game back
- Pain with skating, sudden starts, sneezing
Athletic Hernia/Pubalgia Case

- Exam focal tenderness in right inguinal floor/distal rectus
- Minimal right adductor discomfort with resisted movements
Athletic Hernia/Pubalgia Case

• Exam focal tenderness in right inguinal floor/distal rectus; minimal right adductor discomfort with resisted movements

• Underwent surgical repair (open TF mesh)

• Return to play at 32 days
PRT: Surgery vs Nonoperative Management

- 60 pts with chronic groin pain and suspected sports hernia and 3-6 months of groin symptoms

- Randomized into operative or physiotherapy groups
  - Surgery: Lap extraperitoneal (TEP) mesh repair
  - Conservative: 2 mos PT, oral anti-inflamm’s, corticosteroid injections

- Outcomes measures:
  - VAS pain at 1,3,6,12 months
  - Partial or full recovery to sports activity
Laparoscopic surgery for chronic groin pain in athletes is more effective than nonoperative treatment: A randomized clinical trial with magnetic resonance imaging of 60 patients with sportsman’s hernia (athletic pubalgia).

<table>
<thead>
<tr>
<th>Return to Sport</th>
<th>Operative (N=30)</th>
<th>Conservative* (N=30)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 month</td>
<td>20 (67%)</td>
<td>6 (20%)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>3 months</td>
<td>27 (90%)</td>
<td>8 (27%)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>12 months</td>
<td>29 (97%)</td>
<td>15 (50%)</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

*After 6 mos, 7 of 30 athletes in conservative group underwent surgery.
Surgical Approaches

1. Primary pelvic floor repair (Meyers: modified Bassini) ± adductor release

2. Minimal repair technique (primary repair) ± genital n. neurectomy

3. Open anterior mesh repair ± ilioinguinal neurectomy

4. Laparoscopic (posterior) mesh repair

5. Inguinal ligament release (laparoscopic) (Lloyd)
Sports Hernia

Diagnosis and Treatment Highlighting a Minimal Repair Surgical Technique

John M. Minnich,* MD, John B. Hanks,† MD, Ulrike Muschaweck,‡ MD, L. Michael Brunt,§ MD, and David R. Diduch,‖ MD

WUMC St. Louis: Anterior Mesh Approach

- Inguinal floor repair using a tension free mesh approach (lightweight polypropylene mesh)
- Anesthesia: local with sedation (93%)
- Selective ilioinguinal neurectomy
WUMC St. Louis: Partial Adductor Release

- Adductor release in highly selected athletes with predominately adductor symptoms and findings
- Division of anterior epimysial fibers of adductor longus
Laparoscopic Repair in Athletic Groin Injuries

- Used in selected athletes by our group
- Prior open inguinal surgery
- Demonstrable rectus tendon injury on MRI
WUMC St. Louis Results: Demographics

- N = 257 athletes from 2000-2015
- Mean age: 27.8 ± 9.8 yrs (14-70 yrs)
- Gender: Male: 236 (93%)  Female: 15 (7%)
- Mean duration of symptoms prior to referral: 9.0 mos (range 0.5-72 mos)
- Timing of repair: Off-season in 62.4%
WUMC St. Louis Results: Type of Sport

- Hockey: 11%
- Football: 11%
- Soccer: 25%
- Basketball: 25%
- Track: 19%
- Baseball: 5%
- Other: 11%
WUMC St. Louis Results: Surgical Approach (N=257)

- **Method of repair:**
  - Open primary repair: 12 (4.7%)
  - Open w mesh 227 (87.6%)
  - Laparoscopic 32 (12.4%)

- **Adductor release in 94 (37%)**

- **Nerve abnormality/resection in 40%**
WUMC St. Louis Symptomatic Outcomes

- Mean follow-up interval: 13.1 months

- Playing sport at 1 year follow-up (N=97): (92%) (at 96% of pre-injury level)

- 12 have undergone reoperation (4.5%)
  - 7 required subsequent adductor procedures
  - 1 adductor re-release
  - 5 (2.5%) required abdominal reoperation
    - One recurrent injury 55 months after bilateral repair
  - 6 subsequent hip problems/hip surgery
Athletic Pubalgia: Post Surgical Rehab

- 4-5 days: structured walking
- 1-2 weeks: incline walking, pool exercises, start biking 7-10 days, start ART 4 wks
- 2-3 weeks: hip stretching, progressive resistive exercises, begin sports specific activities

From Ray Barile, ATC
St. Louis Blues
Athletic Pubalgia: Post Surgical Rehab

• 3-4 weeks: increase speed, function, volume and intensity to maximum, progress to full sprinting, cutting drills

• 4-5 weeks: advanced exercises, progress to game play

• Should be based on symptomatic progression

Modified from Ray Barile, ATC
St. Louis Blues
Sports Hernia and Athletic Pubalgia

Summary

- Multi-disciplinary team approach to evaluation and management of chronic athletic groin pain (athletic trainer, orthopedist, physical therapist, general surgeon)

- Surgery indicated for sports hernia/athletic pubalgia after failure of conservative treatment

- Postop rehab important in facilitating return to sport

Ray Barile, Head ATC
St. Louis Blues
Thank You!
Inguinal Ligament Release – (Lloyd Procedure)

- Laparoscopic approach
- Inguinal ligament divided at its attachment to the pubis
- Floor reinforced with mesh

Primary Pelvic Floor Repair (Meyers)

Minimal Repair Technique 1

- Only the defect is opened (sound tissue remains intact)
- Contains only preperitoneal fat, no hernia sack
- If necessary resection of the genital branch of the genitofemoral nerve
Minimal Repair Technique 2

From U Muschawek w permission
Minimal Repair Technique 3

- Stabilizing the posterior wall
- Reducing the tension of the rectus abdominis muscle
- Suture line over the pubic bone
WUMC St. Louis Results: Clinical Presentation (N=259)

- Side of injury (N=259):
  - Right: 44%  Left: 39%
  - Bilateral: 17%

- Associated adductor symptoms: 66%

- 20 (10.3%) had previous pubalgia surgery

- 13 (6.7%) had delayed presentation of contralateral side at 2-34 months after original repair