

Groin Pain and No Hernia

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Disclosures

Gore – institutional research support
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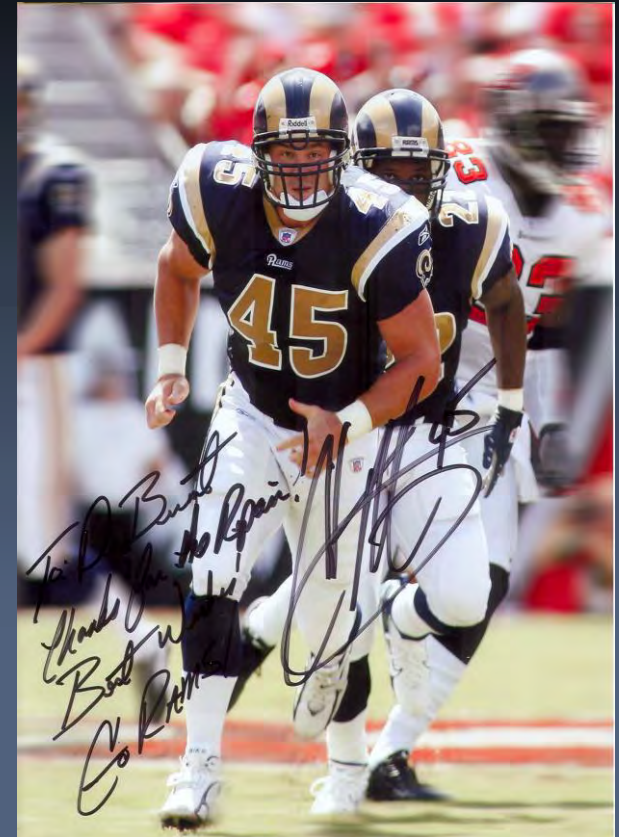
Groin Pain and No Hernia

- 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



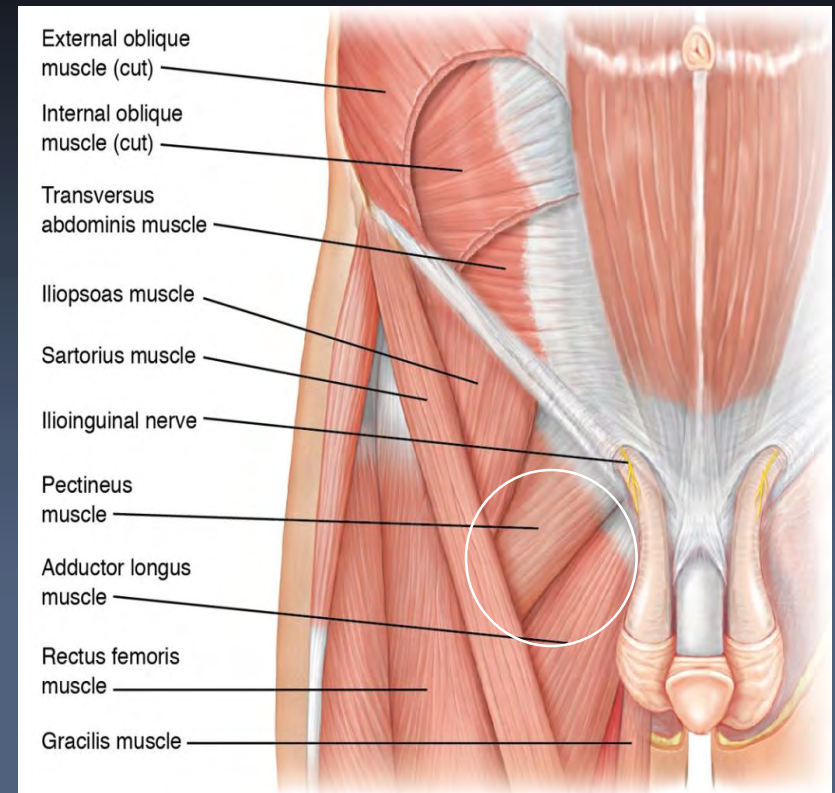
Chronic Injuries: Osteitis Pubis

- 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)



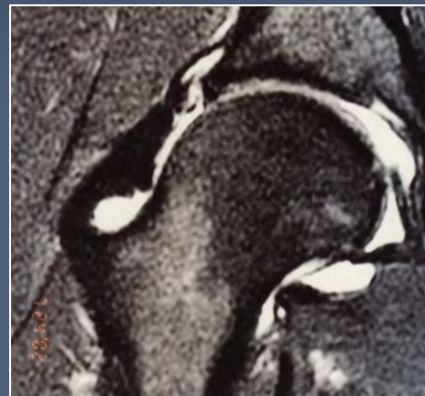
Adductor Muscle Group Injury

- 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 pre-operatively more likely to have continued pain postop



Non-Athletic Causes of Groin Pain

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



Crohn's Disease

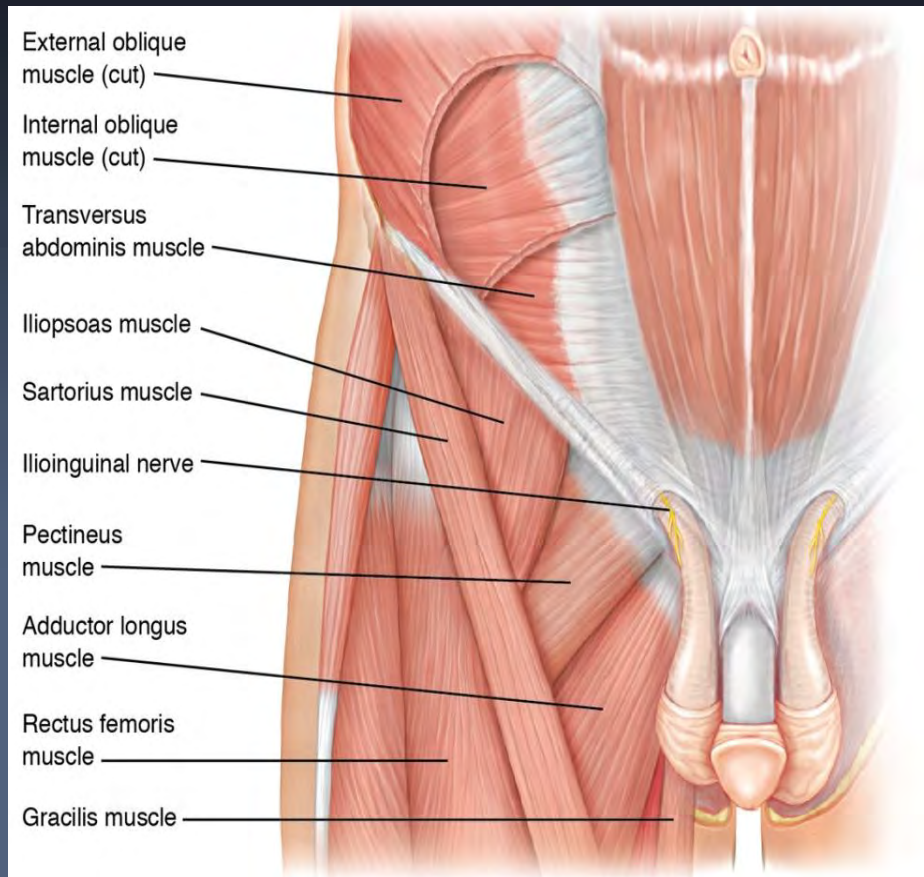
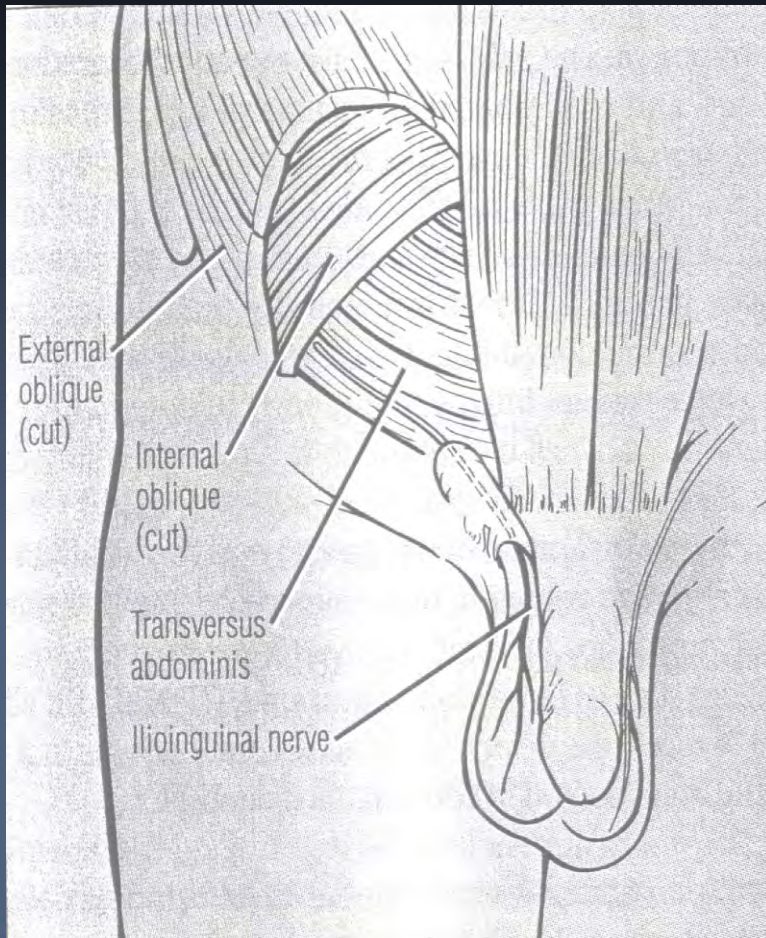
*From Meyers WC et al. Am J Sports Med 2000;28:2-8.

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



“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



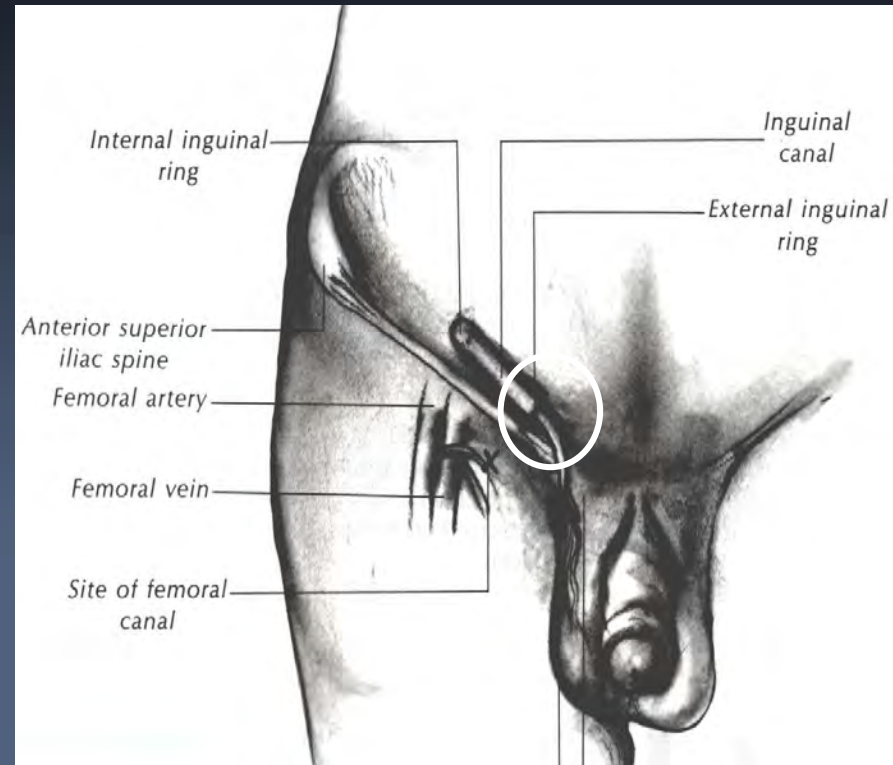
General Approach: History

- 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 \pm Situp

Athletic Pubalgia: Abdominal Muscle Testing



Obliques

Tender inguinal floor/rectus	80.3%
Weak inguinal floor	90.2%
Pain resisted sit-up	63.8%
Pain resisted trunk rotation	73.3%
Pain resisted adduction	57.6%
Inguinal hernia (clinically suspected)	1.0%

Athletic Pubalgia: Imaging

- Plain X Rays
- Dynamic ultrasound
- Pelvic MRI



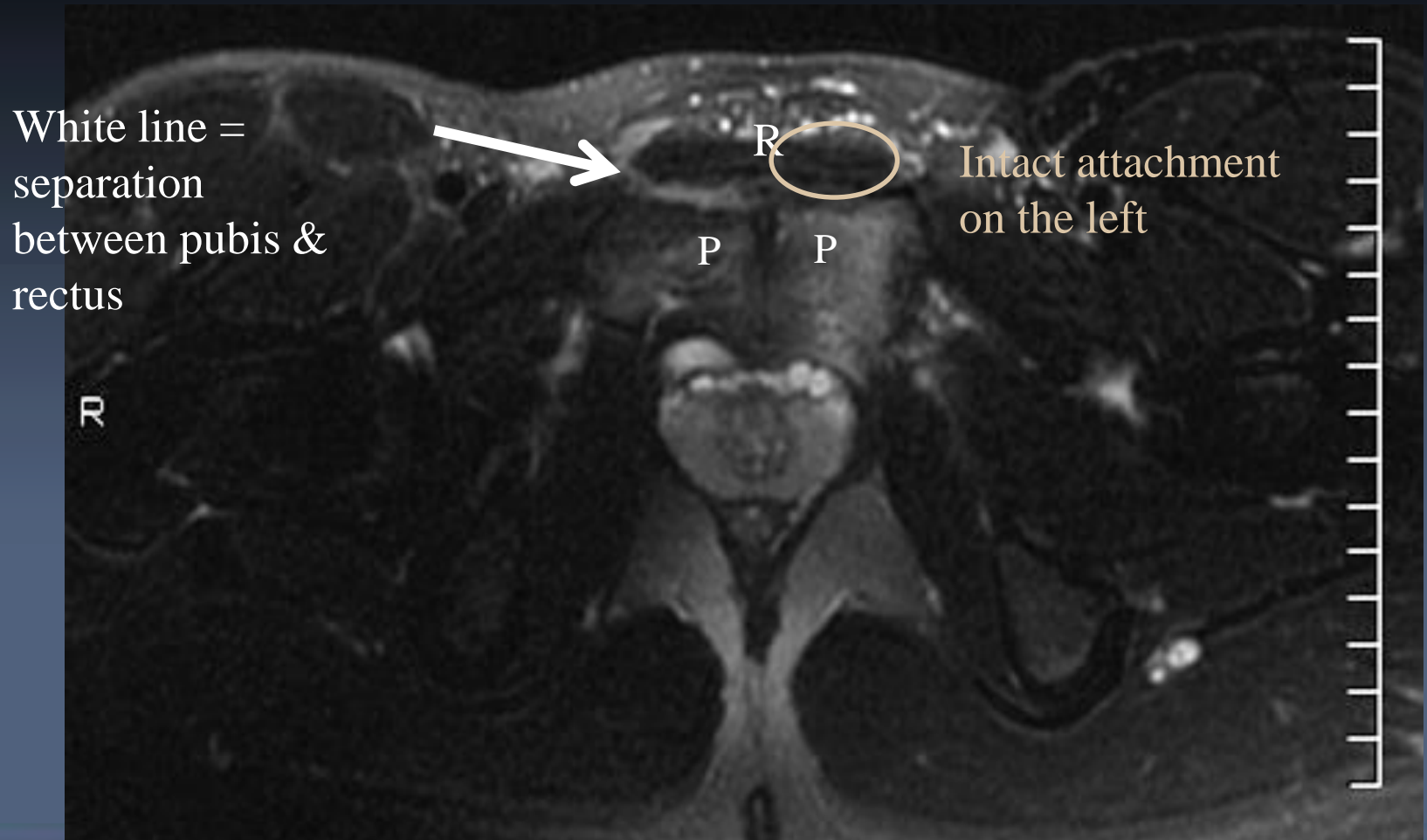
From Minnich Amer J Sports Med 2011

Pathophysiologic Mechanisms

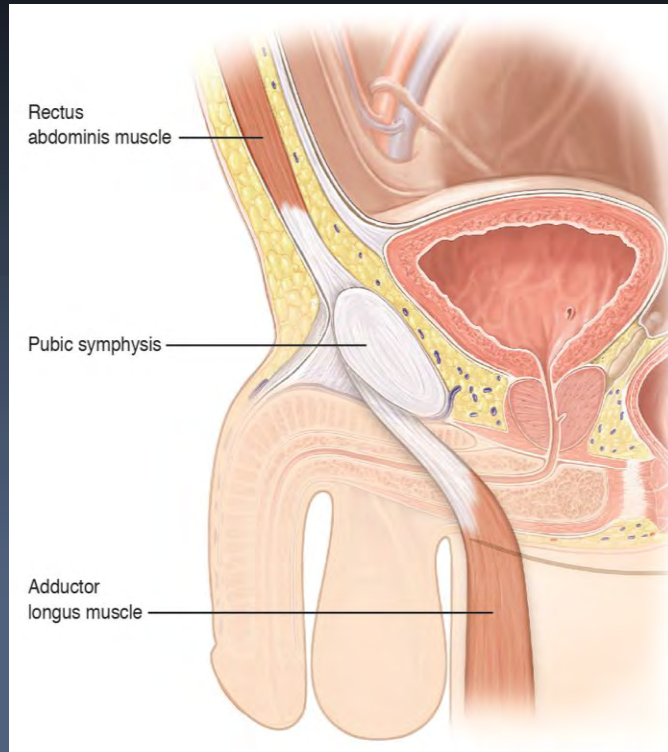
- Rectus tendon injury, rectus/adductor complex
- Posterior abdominal wall/inguinal floor defect
- Inguinal/genital neuropathy



MRI Rectus Abdominus Tear: Transverse T2-weighted image



MRI: Rectus Adductor Imaging: Sagittal View



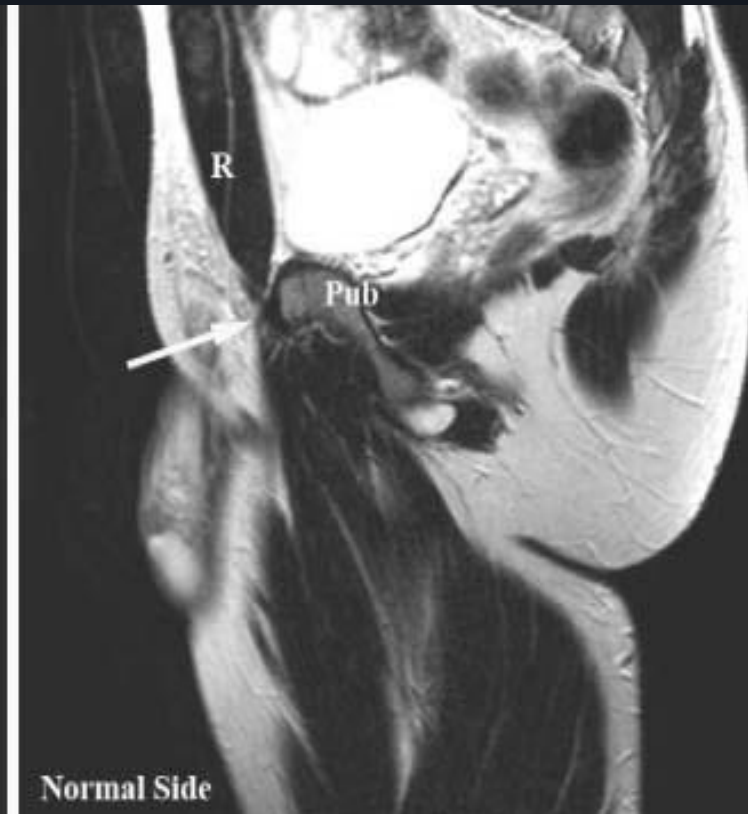
From Brunt LM. Master
Techniques Hernia Surgery 2012

Sagittal MRI

MRI: Rectus Tendon Injury

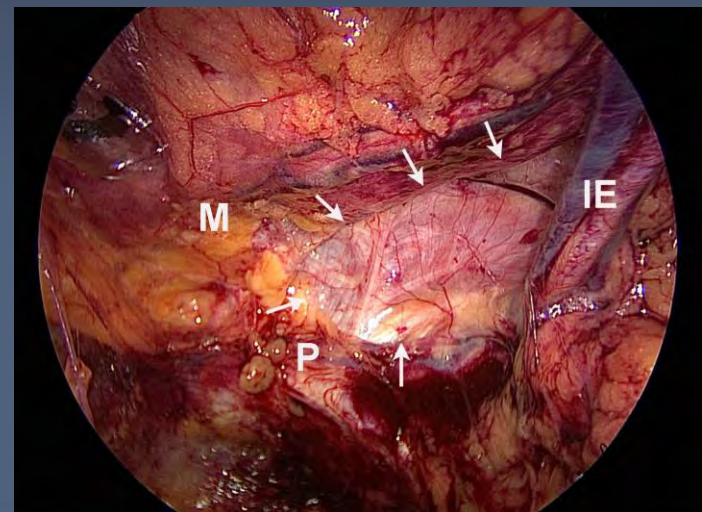
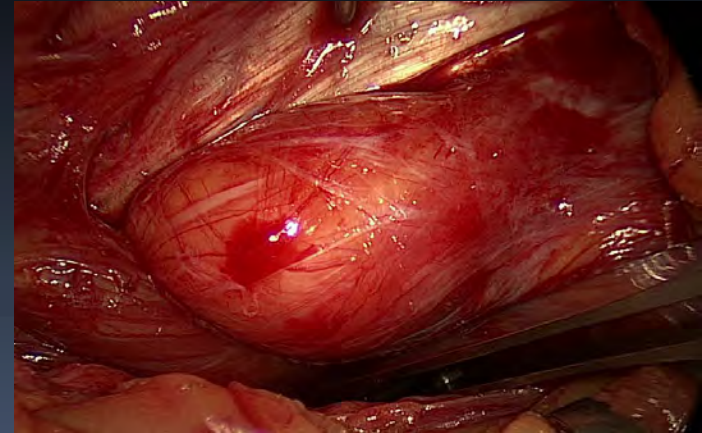
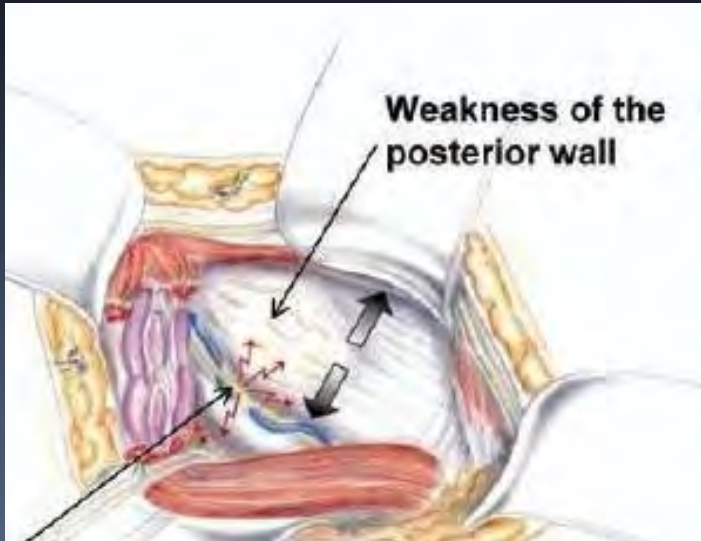


Torn Side



Normal Side

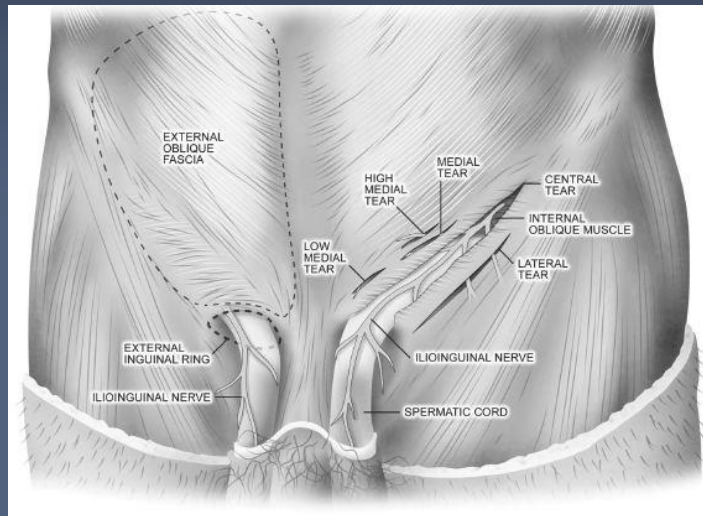
Posterior Abdominal Wall/ Inguinal Floor Defect-Disruption



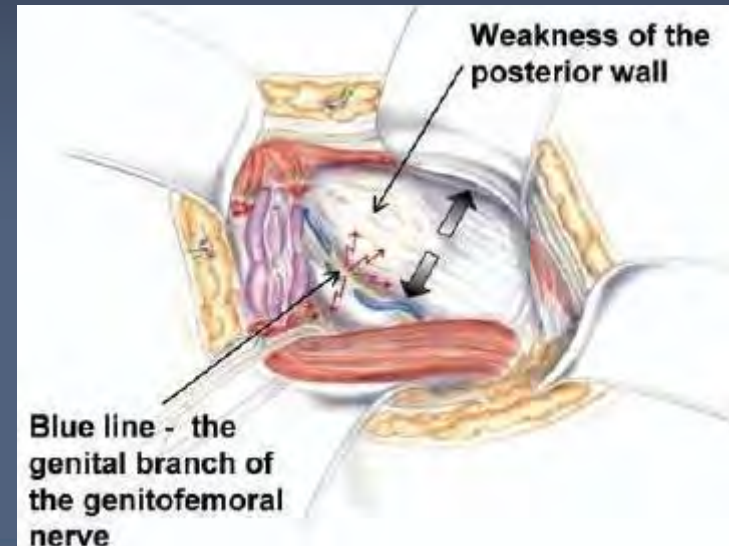
Minnich Amer J Sports Med 2011

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....

Meyers WC et al Ann Surg
2008;248:656.

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 MacLennan,¹ P O'Dwyer,¹¹
D Sanders,⁸ M Kurzer¹²

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

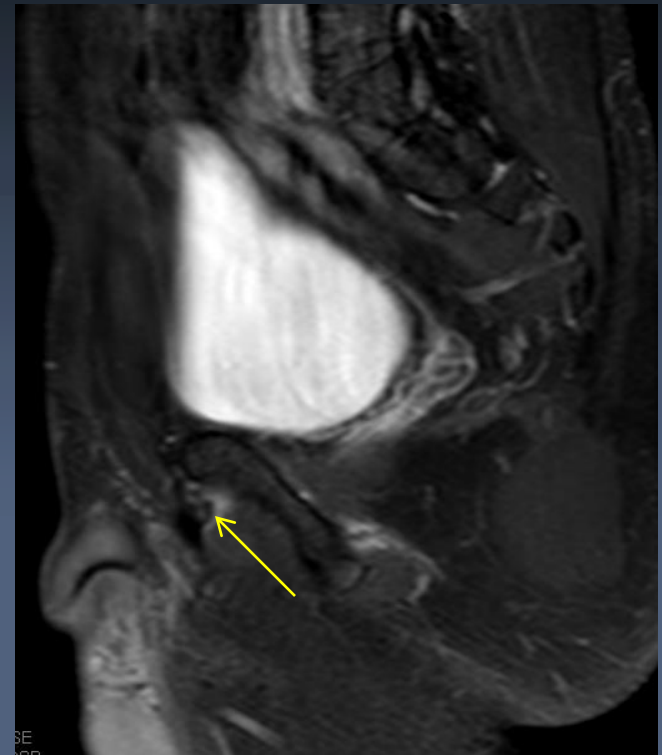
Time	Discomfort	Treatment
1– 2 months	ID VAS 0–2 at rest; 6–7 on exercise; cannot undertake any sporting activity	Prehabilitation, rest and analgesia (see box 1)
>2 months	On going ID —chronic groin pain—failure of rehabilitation	Surgical repair either open or laparoscopic with postoperation rehabilitation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

VAS, visual analogue scale.

Seen A et al Br J Sports Med 2014; 48:1079-87.

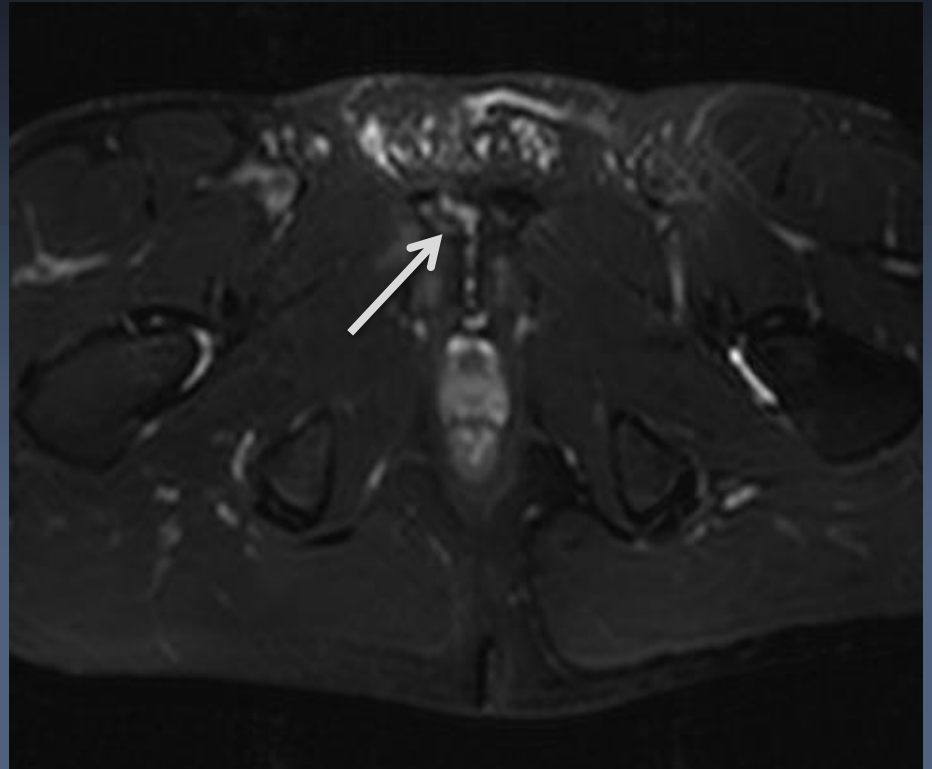
Athletic Hernia/Pubalgia Case

- 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



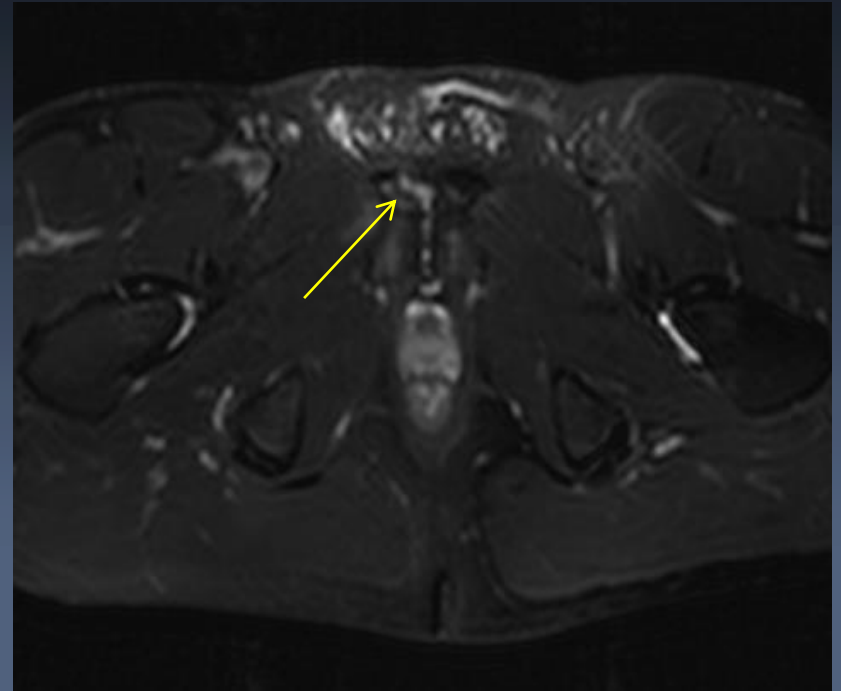
Athletic Hernia/Pubalgia Case

- 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

Paajanen H, et al. *Surgery* 2011;150:99-107.

- 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

PRT: Surgery vs Nonoperative Management

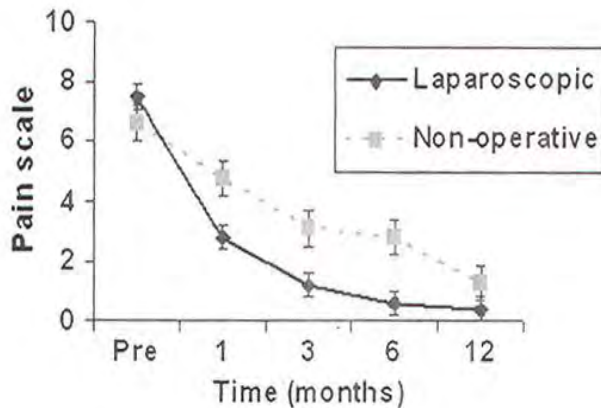
Paajanen H, Et al. Surgery 2011;150:99-107.

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)

Hannu Paajanen, MD,^a Tuomas Brinck, MD,^b Heikki Hermunen, MD,^c and Ilari Airo, MD,^d *Kuopio, Helsinki, and Mikkelä, Finland*

Return to Sport	Operative (N=30)	Conservative* (N=30)	p
1 month	20 (67%)	6 (20%)	<0.0001
3 months	27 (90%)	8 (27%)	<0.0001
12 months	29 (97%)	15 (50%)	<0.0001

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



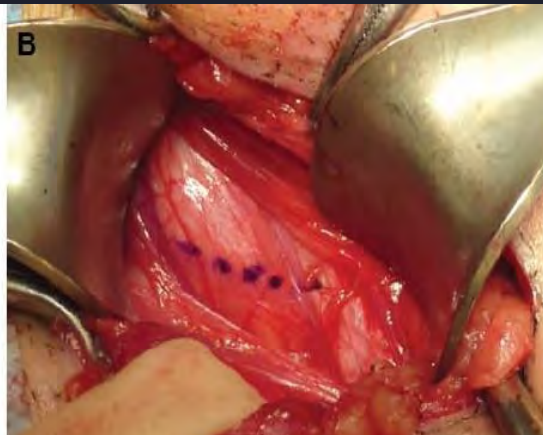
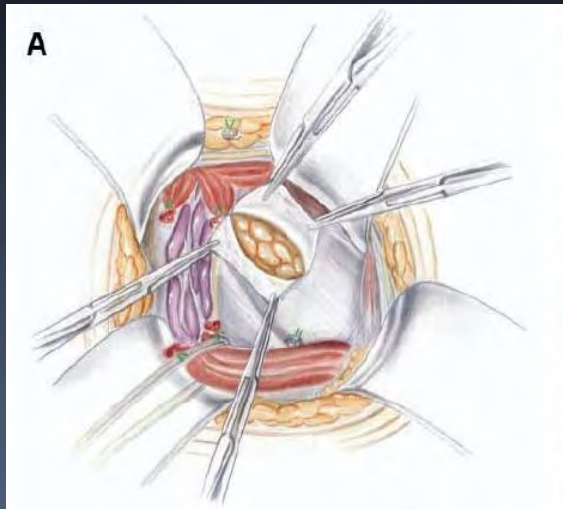
Surgical Approaches

1. Primary pelvic floor repair (Meyers: modified Bassini) \pm adductor release
2. Minimal repair technique (primary repair) \pm genital n. neurectomy
3. Open anterior mesh repair \pm ilioinguinal neurectomy
4. Laparoscopic (posterior) mesh repair
5. Inguinal ligament release (laparoscopic) (Lloyd)

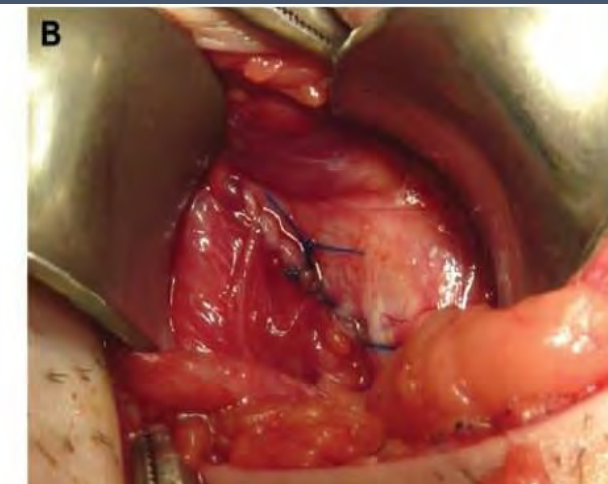
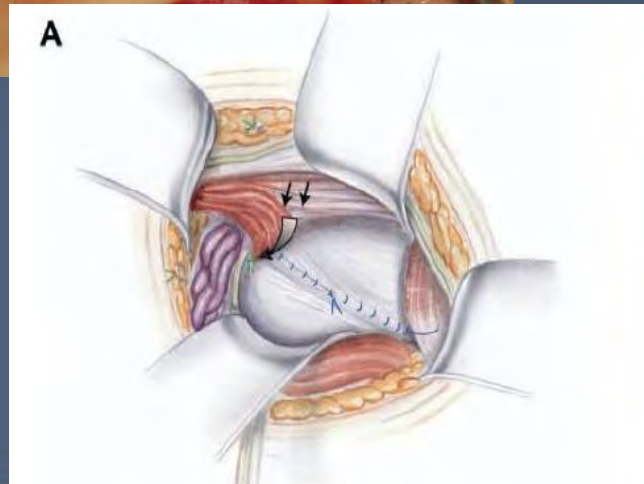
Sports Hernia

Diagnosis and Treatment Highlighting a Minimal Repair Surgical Technique

John M. Minnich,^{*} MD, John B. Hanks,[†] MD, Ulrike Muschawek,[‡] MD,
L. Michael Brunt,[§] MD, and David R. Diduch,^{*||} MD

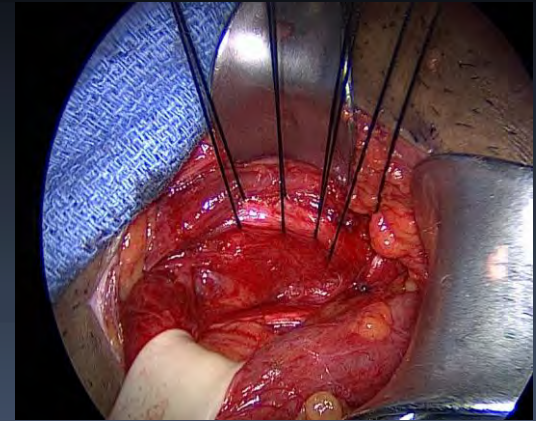


Amer J Sports Med
2011;39:1341-49.



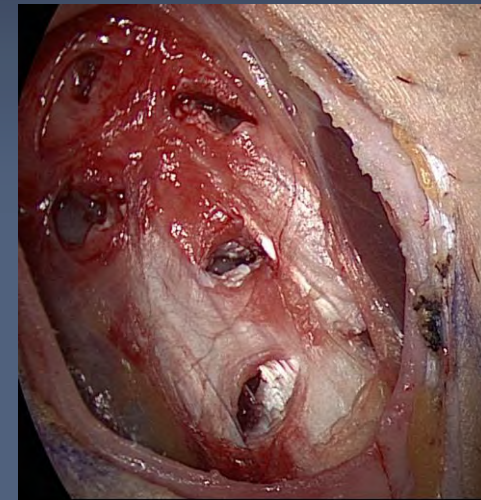
WUMC St. Louis: Anterior Mesh Approach

- Inguinal floor repair using a tension free mesh approach (lightweight polypropylene mesh)
- Anesthesia: local with sedation (93%)
- Selective ilioinguinal neurectomy



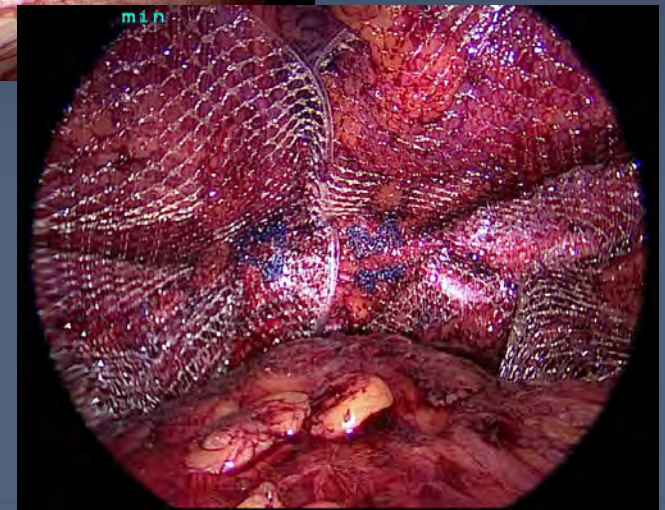
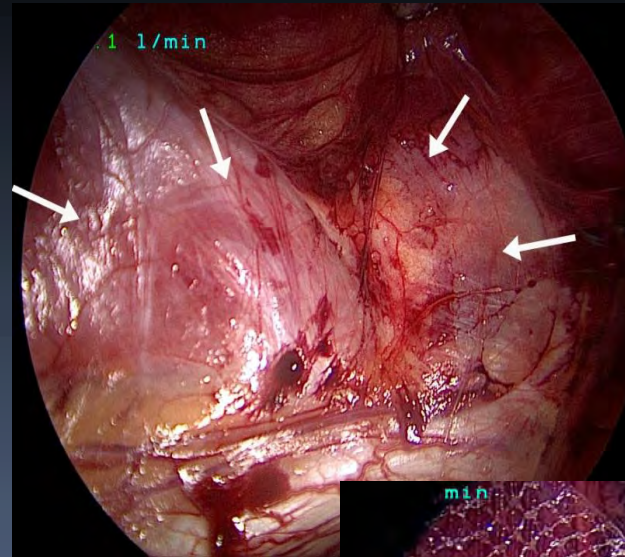
WUMC St. Louis: Partial Adductor Release

- 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

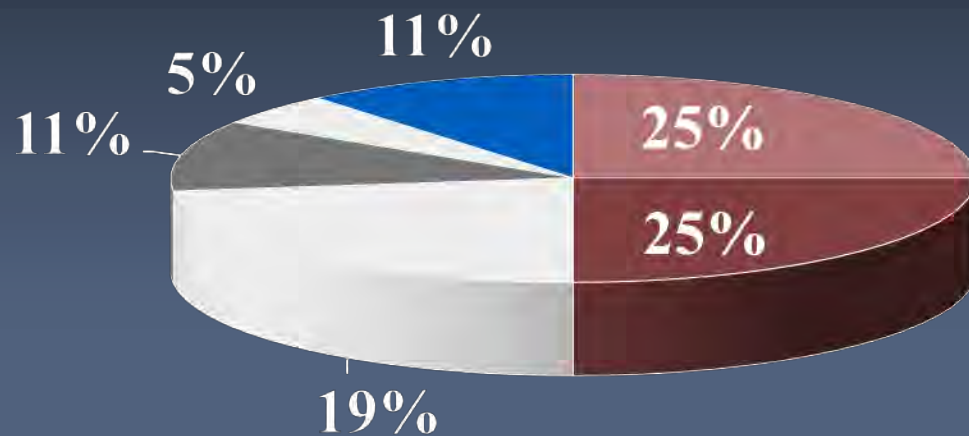
- Used in selected athletes by our group
- Prior open inguinal surgery
- Demonstrable rectus tendon injury on MRI



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%

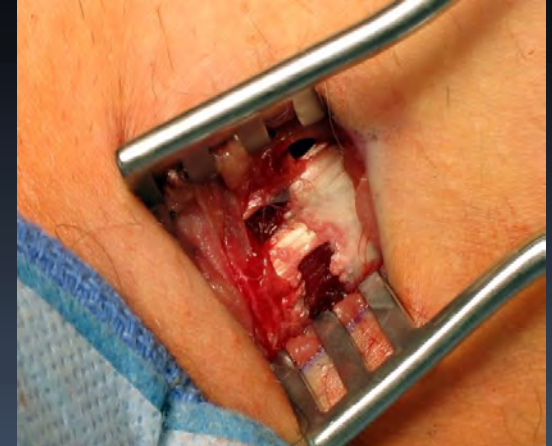
WUMC St. Louis Results: Type of Sport



- Hockey
- Football
- Soccer
- Basketball
- Track
- Baseball
- Other

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

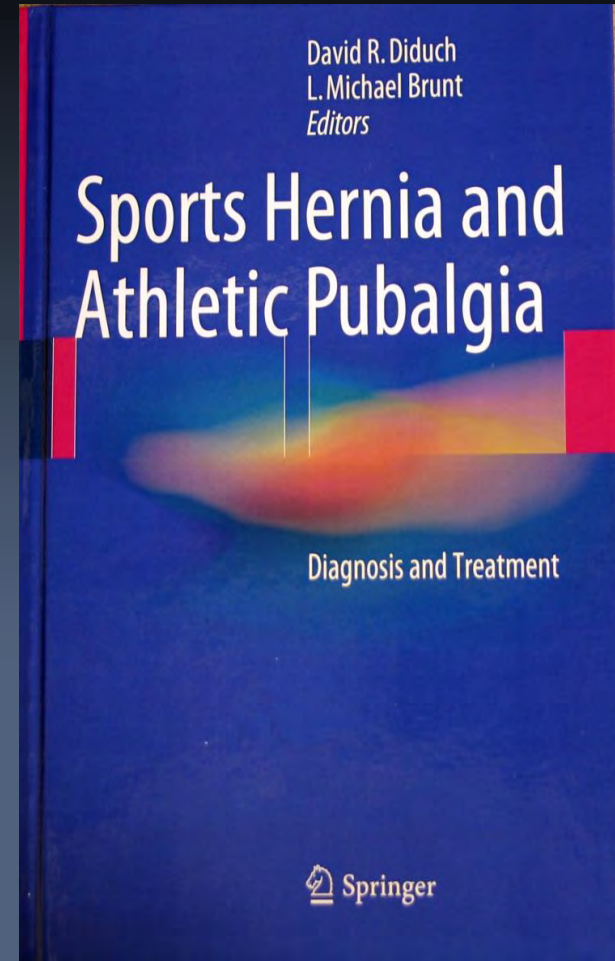
- 3-4 weeks: increase speed, function, volume and intensity to maximum, progress to full sprinting, cutting drills
- 4-5 weeks: advanced exercises, progress to game play
- Should be based on symptomatic progression

Modified from Ray Barile, ATC
St. Louis Blues



Sports Hernia and Athletic Pubalgia

<http://www.springer.com/medicine/book/978-1-4899-7420-4>. 2014



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

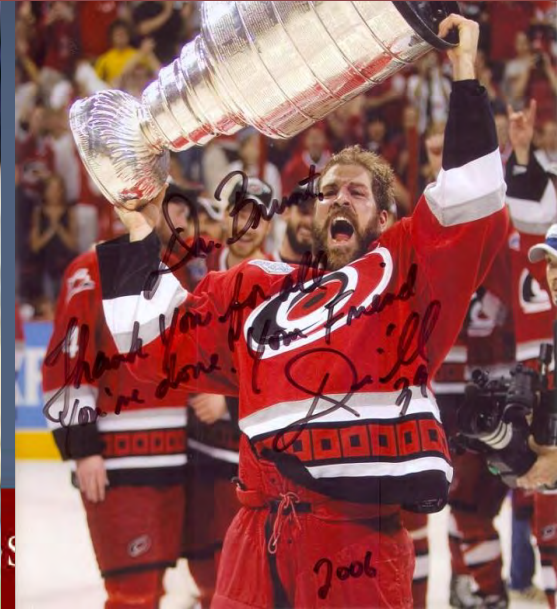
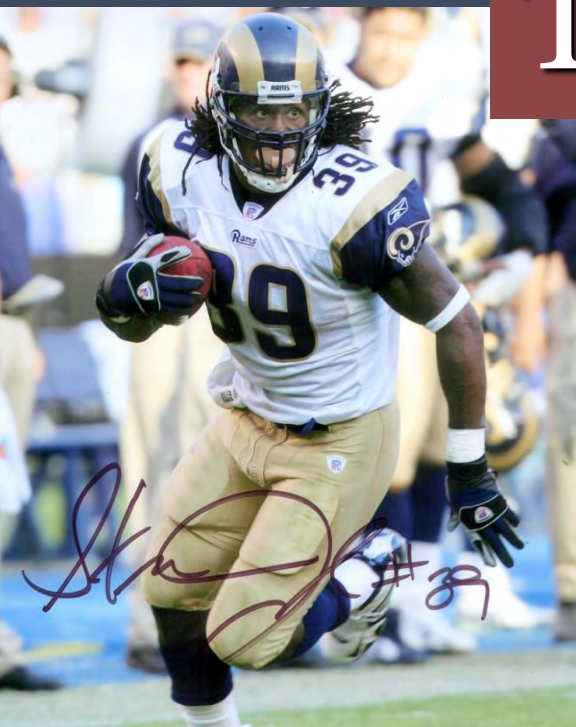


Ray Barile, Head ATC
St. Louis Blues

ADEATER

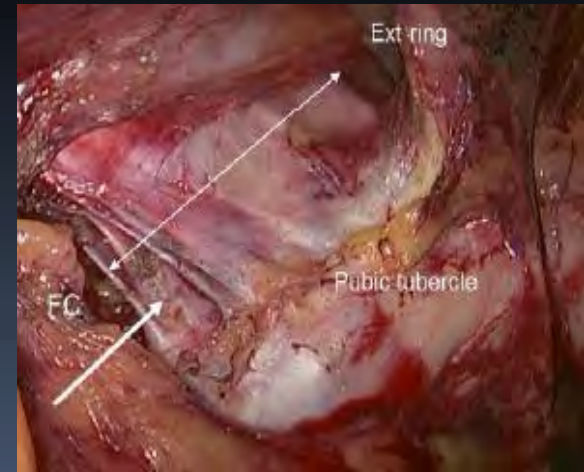


Thank You!



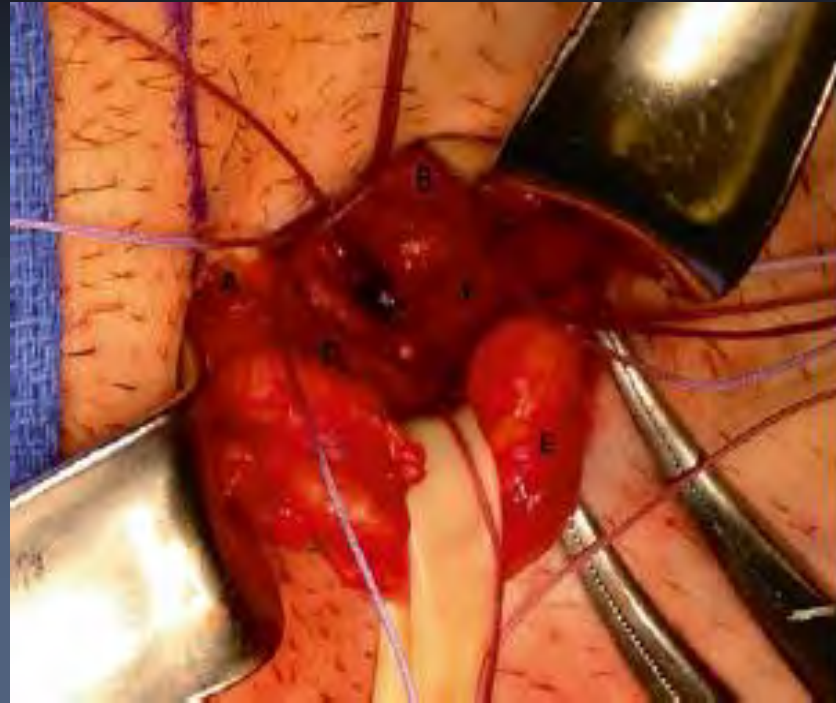
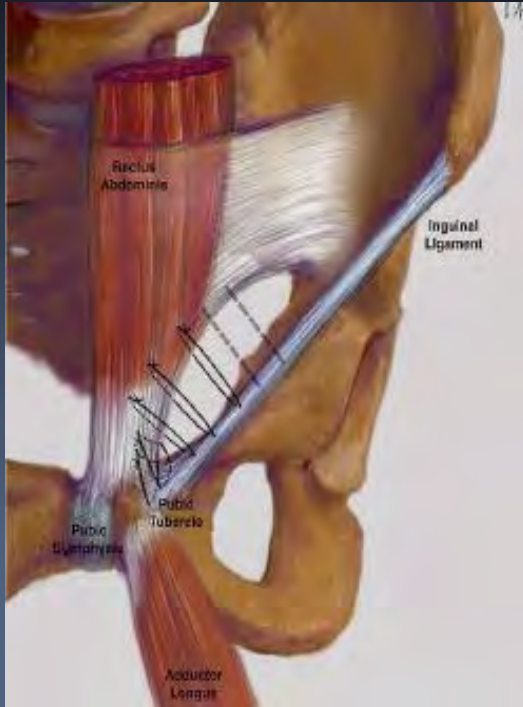
Inguinal Ligament Release – (Lloyd Procedure)

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



Lloyd D. In: Sports Hernia and Athletic Pubalgia, Chap 13, Springer, 2014.

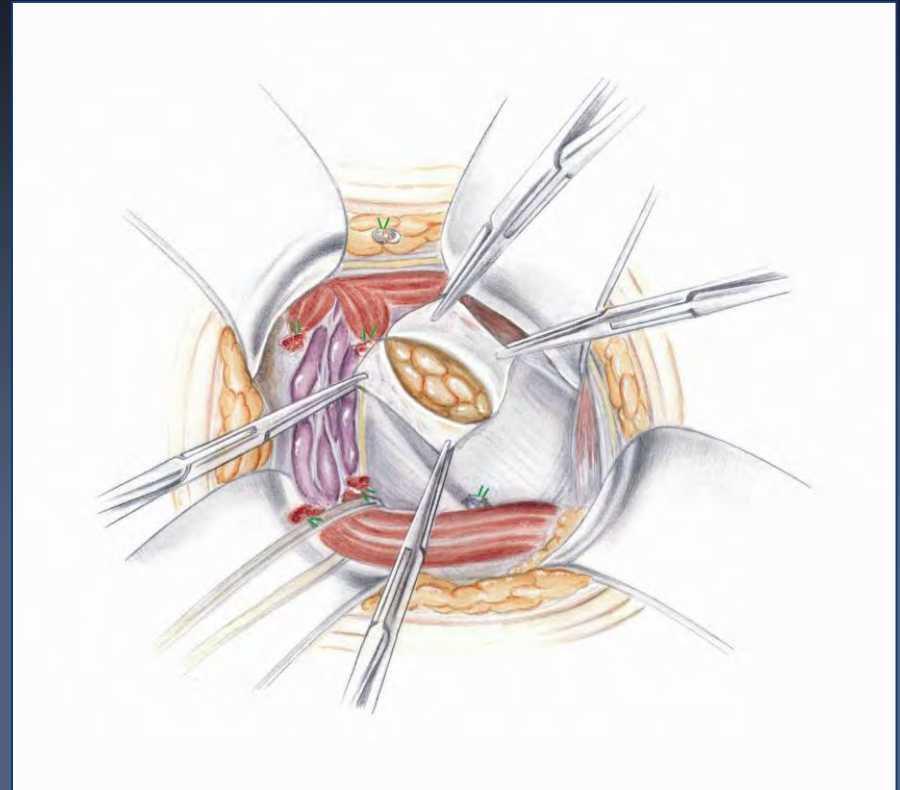
Primary Pelvic Floor Repair (Meyers)



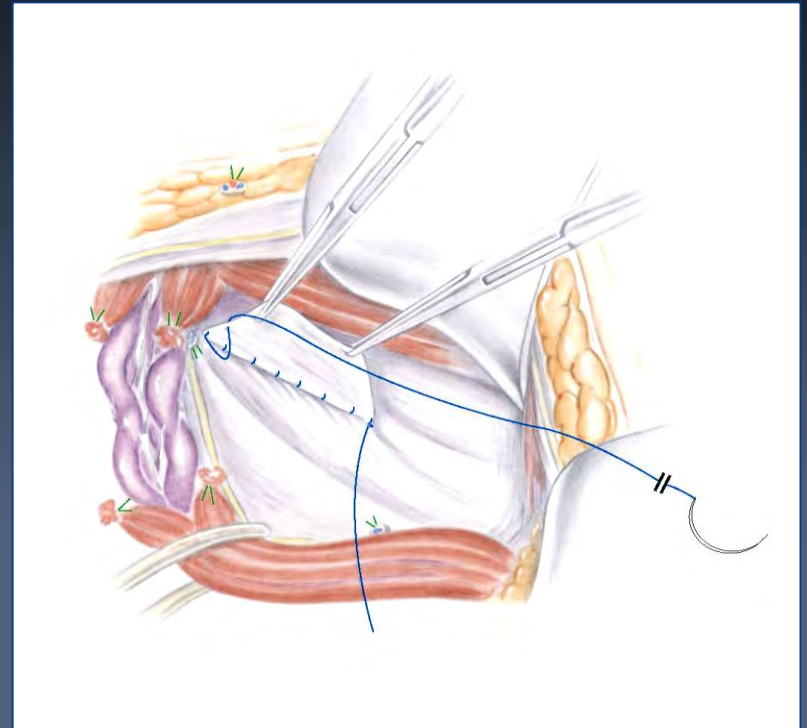
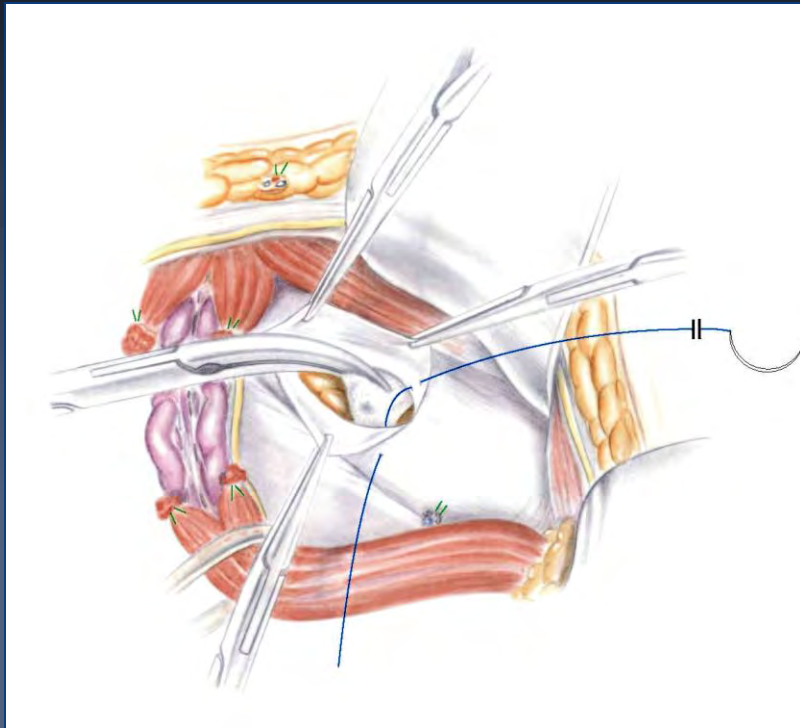
Source: Litwin D, Busconi B. The Open All Suture Repair.
In: Sports Hernia and Athletic Pubalgia. Chap.10. Springer 2014.

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

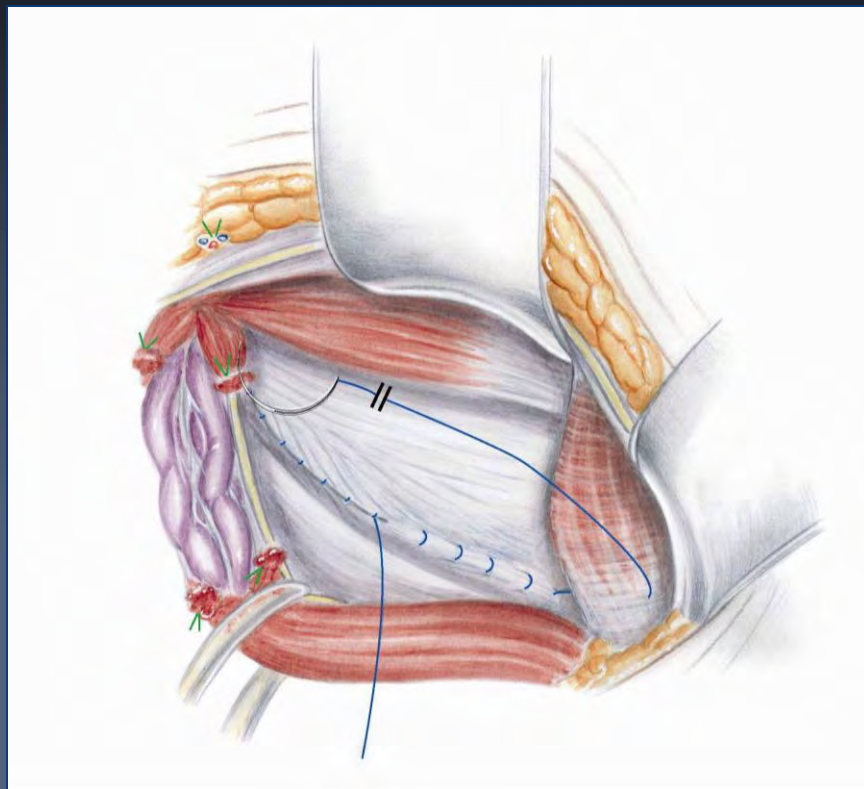


Minimal Repair Technique 2



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

