Proximal Hamstring Ruptures

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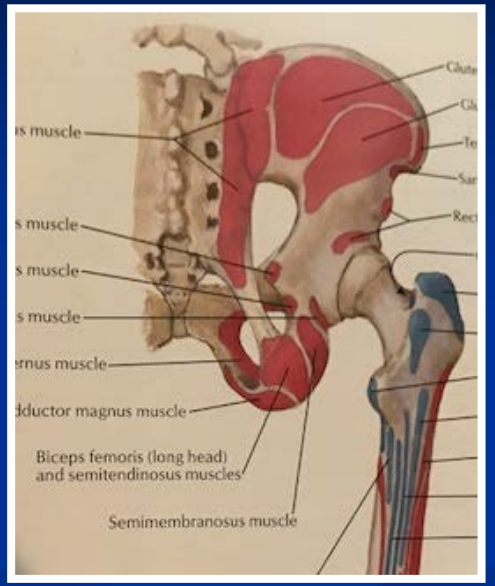
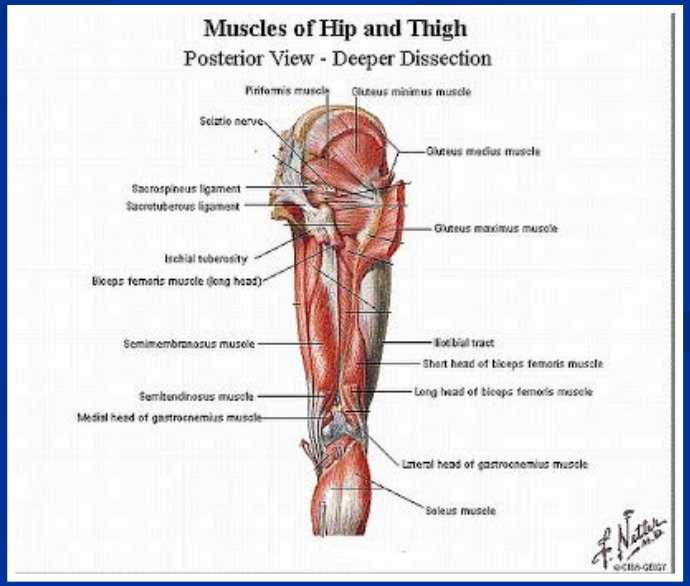
May 10, 2018

Anatomy

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





History

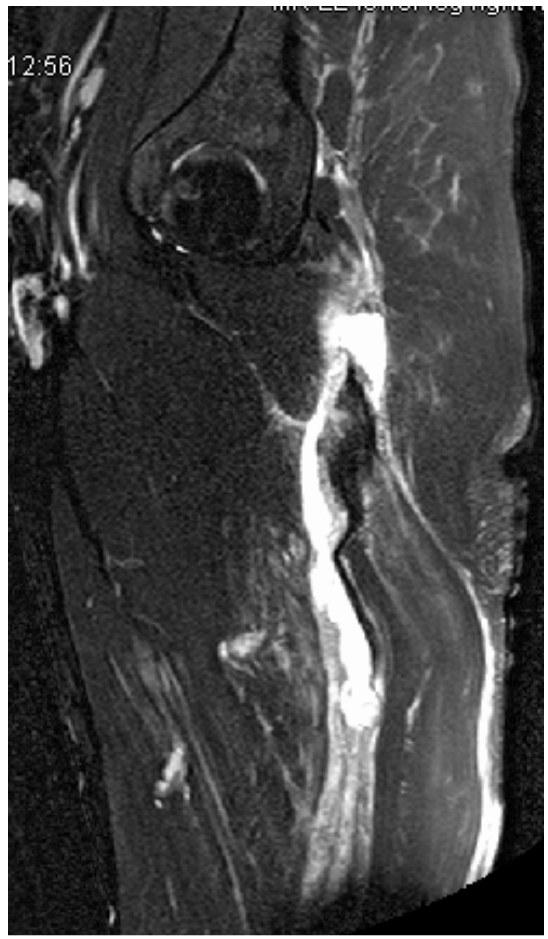
- Sudden pop
- Pain
- Eccentric injury
  - Hip flexion
  - Knee extension

Exam

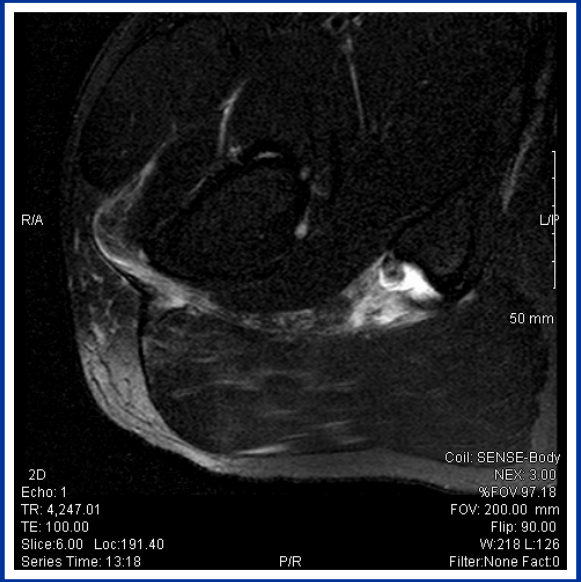
- Swelling
- Ecchymosis
- TTP over ischium or musculotendinous junction
- Occasional palpable gap

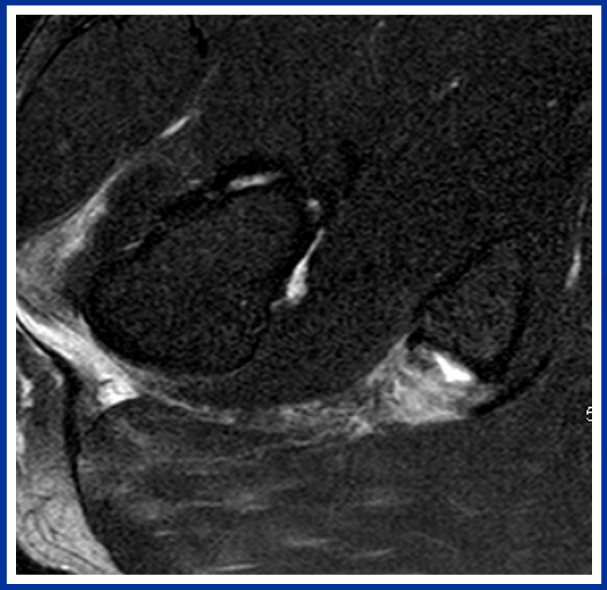
Imaging

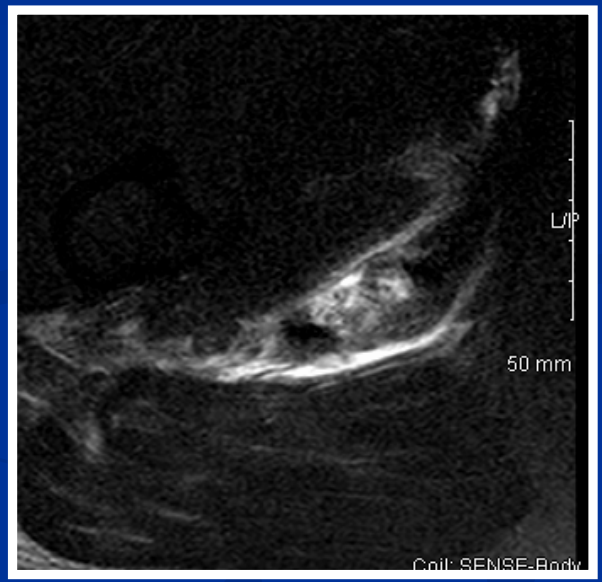
- AP pelvis XR-typically normal
- MRI



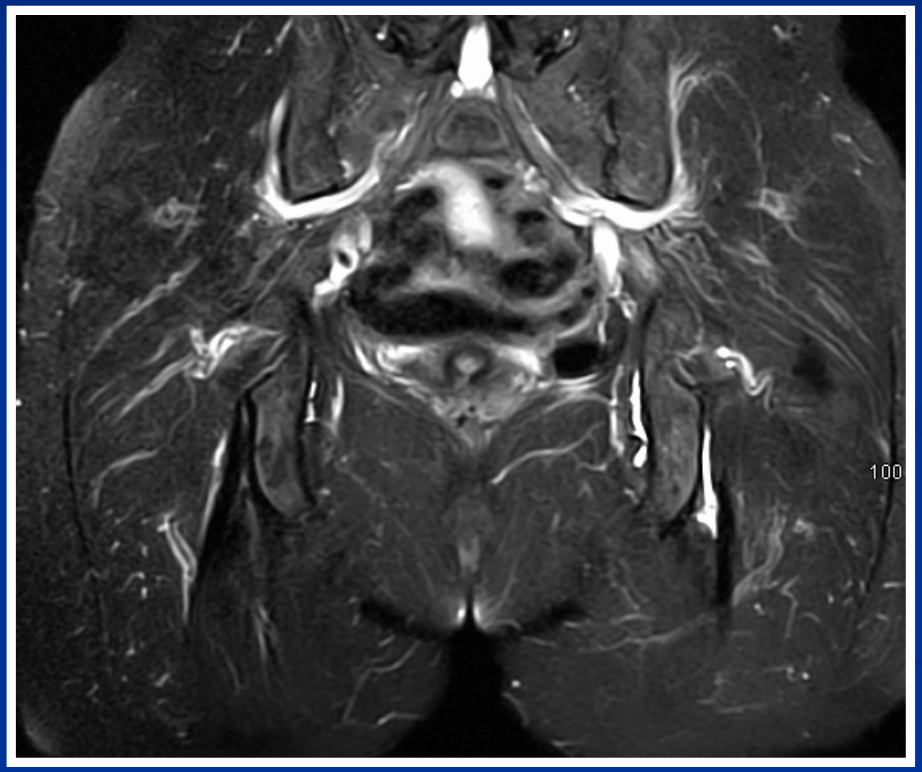
MRI Acute


R/A
L/P
50 mm
2D
Echo: 1
TR: 4,247.01
TE: 100.00
Slice:6.00 Loc:191.40
Series Time: 13:18
P/R
Coil: SENSE-Body
NEX: 3.00
%FOV 97.18
FOV: 200.00 mm
Flip: 90.00
W:218 L:126
Filter:None Fact:0

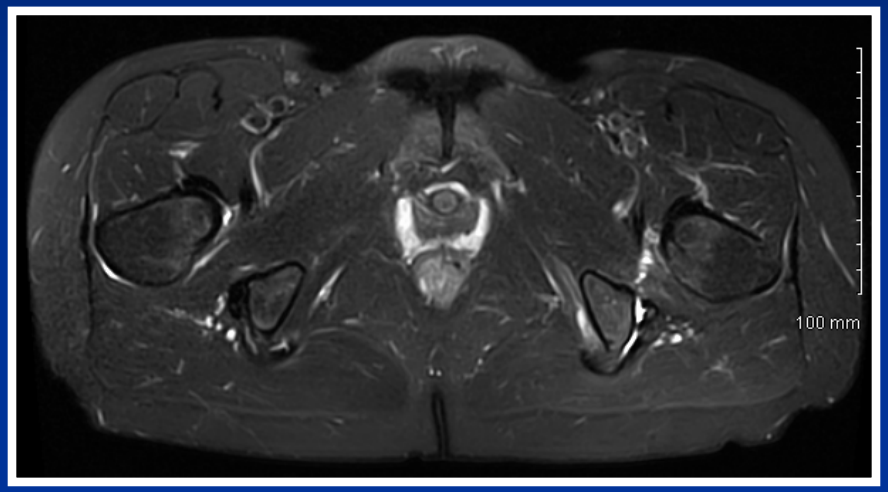


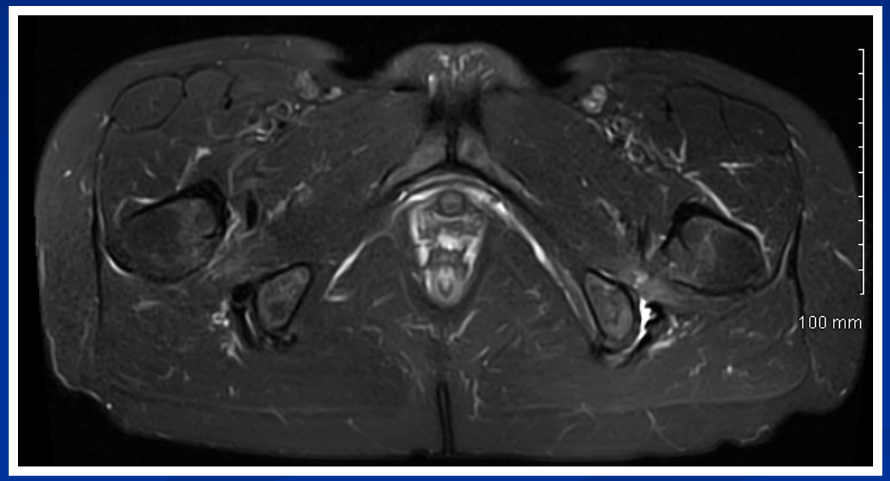

L/P
50 mm
Coil: SENSE-Body

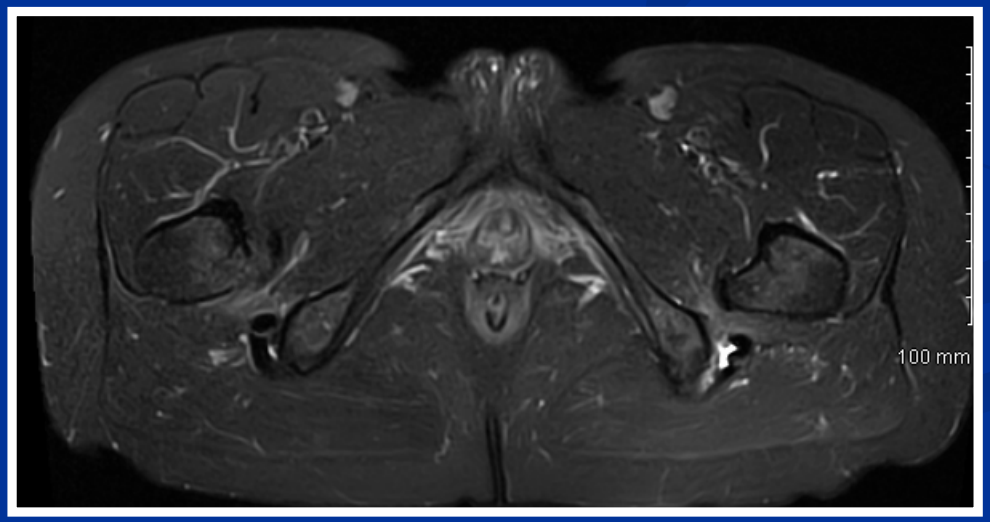
MRI Chronic



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
- Hofmann KJ, et al, JBJS 2014
  - 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)

Hofmann KJ, et al, JBJS 2014

- Results
  - Mean LEFS 70.2/80(max)
  - SF-12v2
    - Physical 52.5
    - Mental 54.1
  - Hamstring strength
    - 45° flexion ave 62% univolved (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

Cohen SB, et al. AJSM 2012

- 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
- Subbu R, et al AJSM 2015
- 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→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

Bodendorfer

TABLE 2
Outcomes for Operatively and Nonoperatively Treated Proximal Hamstring Avulsions[a]

	Operative	No.	Nonoperative	No.	*P* Value
Patient satisfaction, %	90.81 ± 9.72	300	52.94	17	<.001
Return to sport or preinjury activity level, %	79.75	553	70.59	17	.363
Strength testing, %	85.01 ± 6.3	376	63.95	10	<.001
Single-legged hop test, cm	119.1 ± 14.12	14	56.62 ± 15.92	21	<.001
LEFS score	72.77 ± 6.55	58	69.53 ± 4.04	28	<.001
SF-12 score	53.15	72	53.3	17	NC

[a]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[a]

	Incidence, %	No.
Rerupture	2.17	16
Reoperation	2.57	19
Infection/wound complications	3.25	24
Neurologic complications	7.99	59
Peri-incisional numbness	5.42	40
DVT/PE	0.68	5
Miscellaneous	1.08	8
Total	23.17	171

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

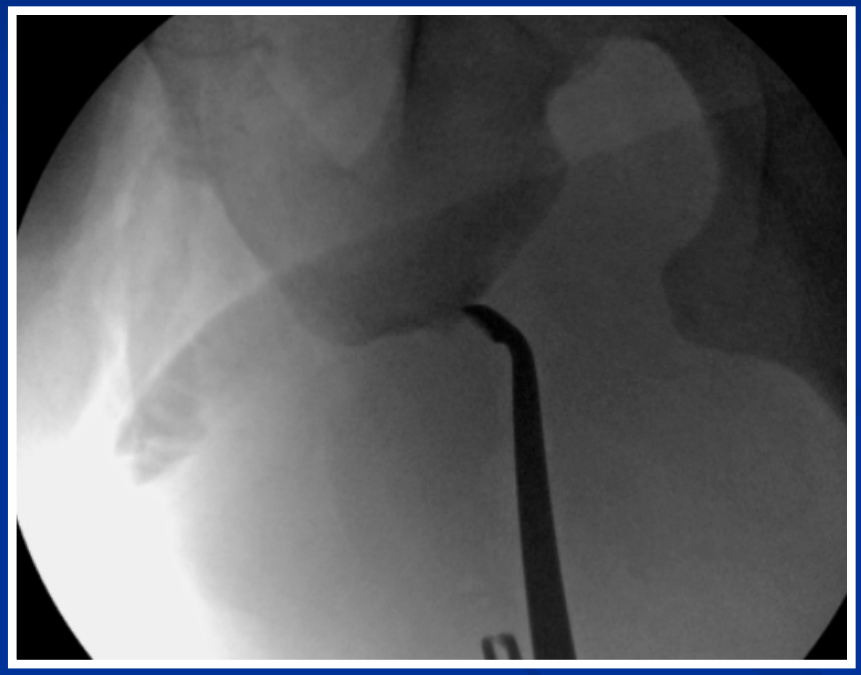
- Non op
  - Physical Therapy
  - WBAT
  - May have buttock pain, difficulty with sitting, weakness
  - Late sciatic n symptoms
  - More difficult to address down the line
- Operative
  - More predictable in the active patient
  - Compliance with rehab is critical
  - Discuss potential complications
  - 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 n thigh
- Fascia
- Hematoma

Surgery

- Dissection
  - Acute is straight forward
  - 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 currettes
- Caution with burr

Surgery

- Fixation
  - Variable
  - Bioanchors
  - TAP
- Closure
  - Repair the fascia
  - Subcuticular and dermabond on the skin for hygeine 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