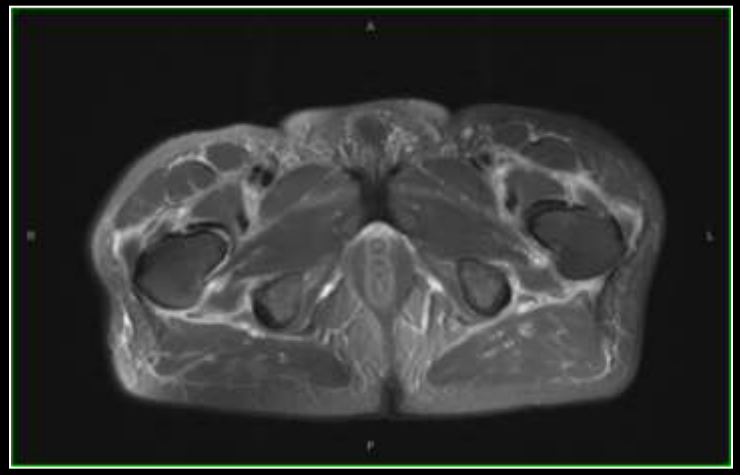
MUSCLE DISORDERS

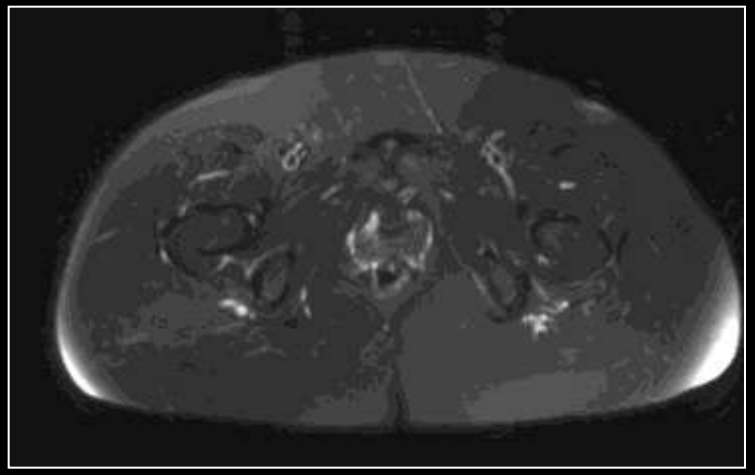
KG 4/15/2010

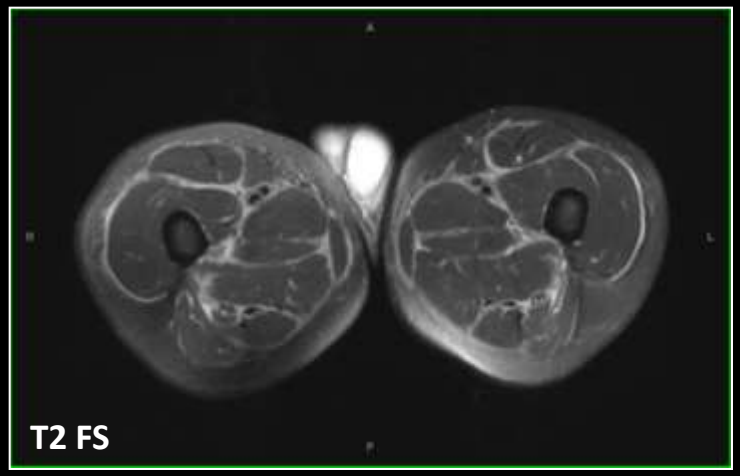
"The Quizmaster"

- 12 unknowns
- 1 best diagnosis

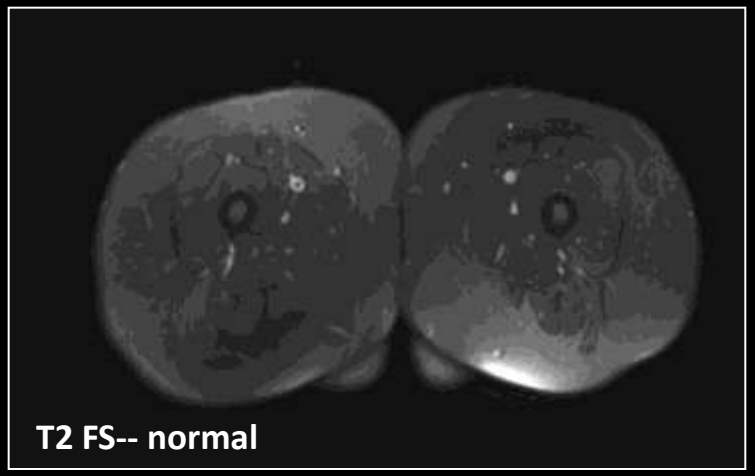
51 yo F with right shoulder pain



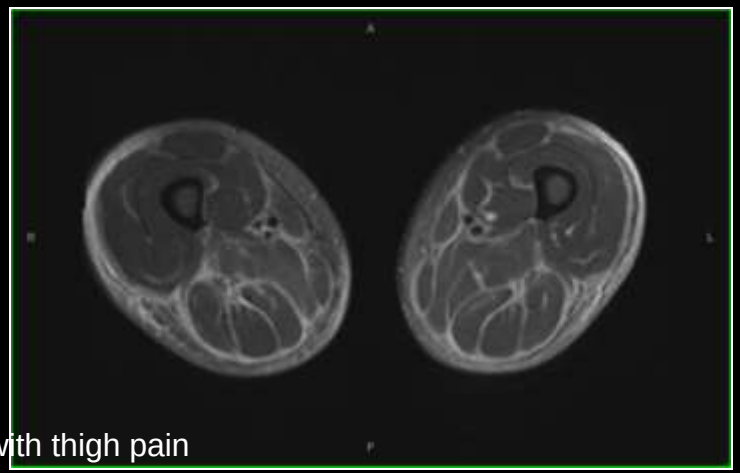


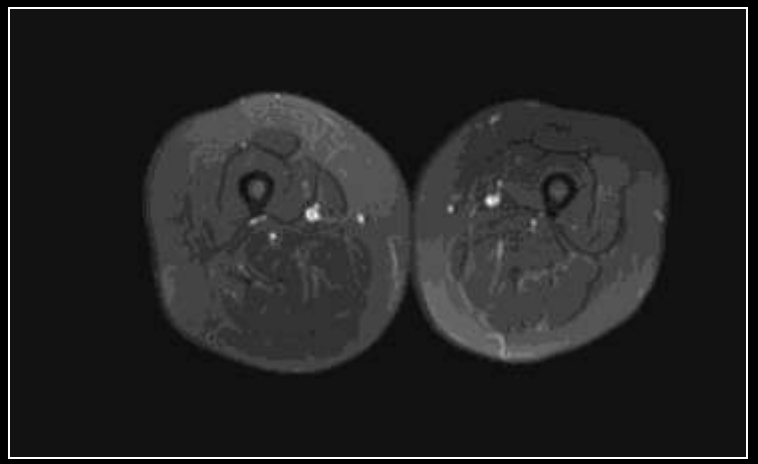


T2 FS



T2 FS-- normal



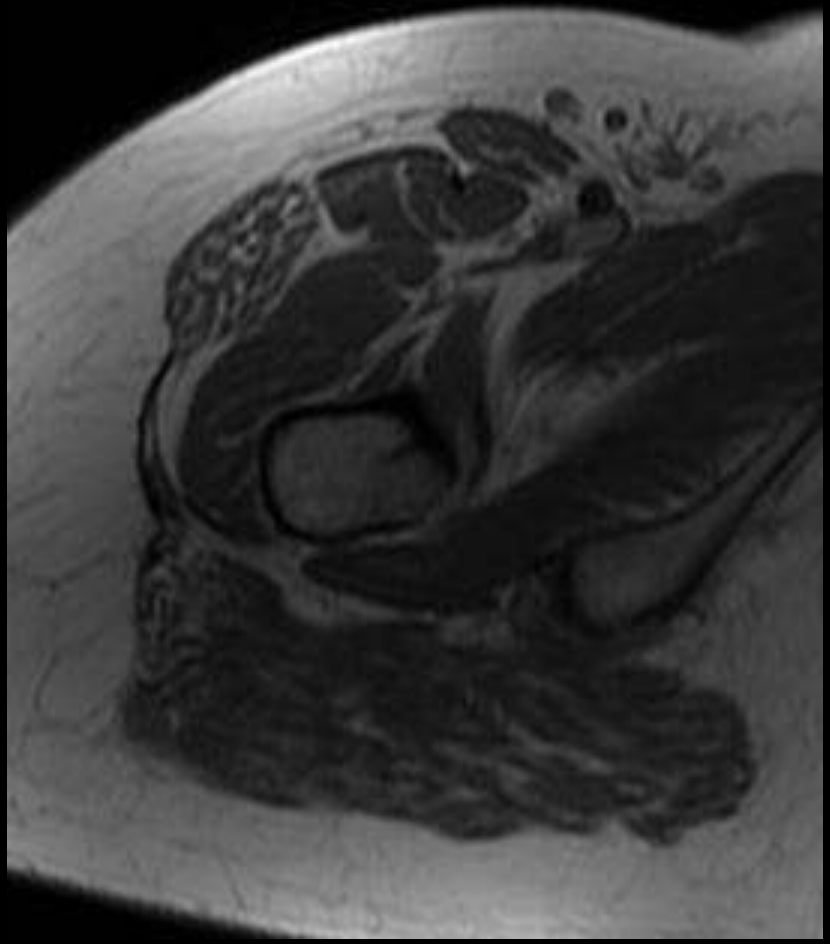


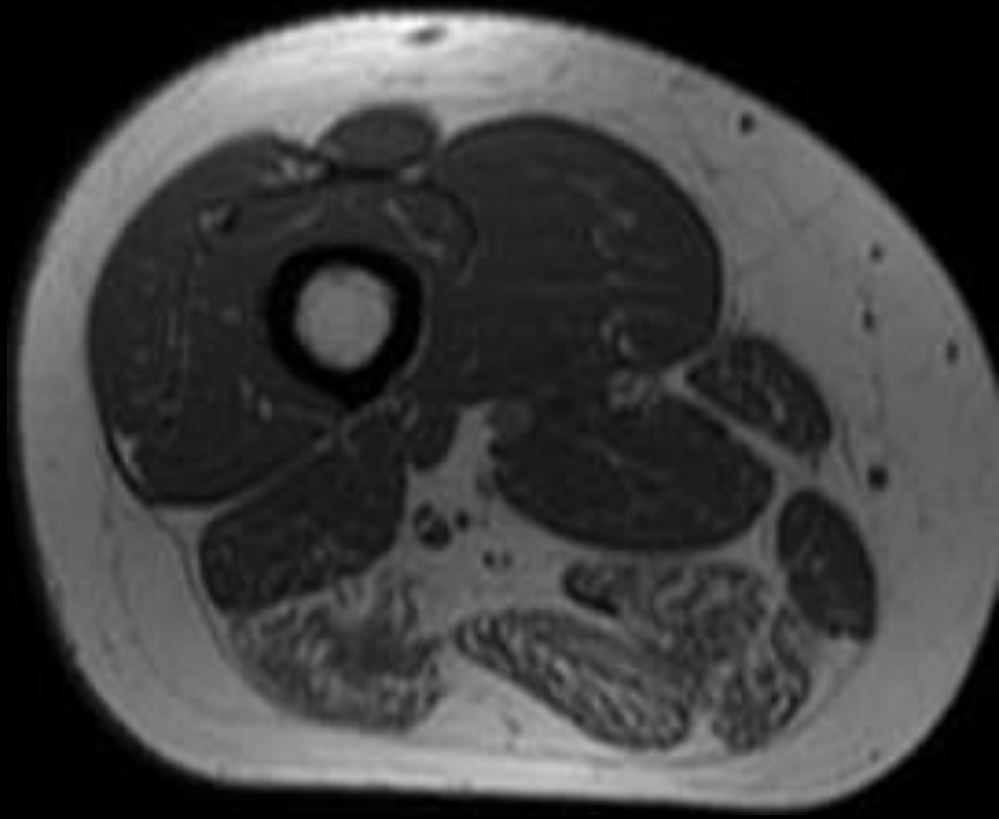
54 yo F with thigh pain

54 yo M with foot pain

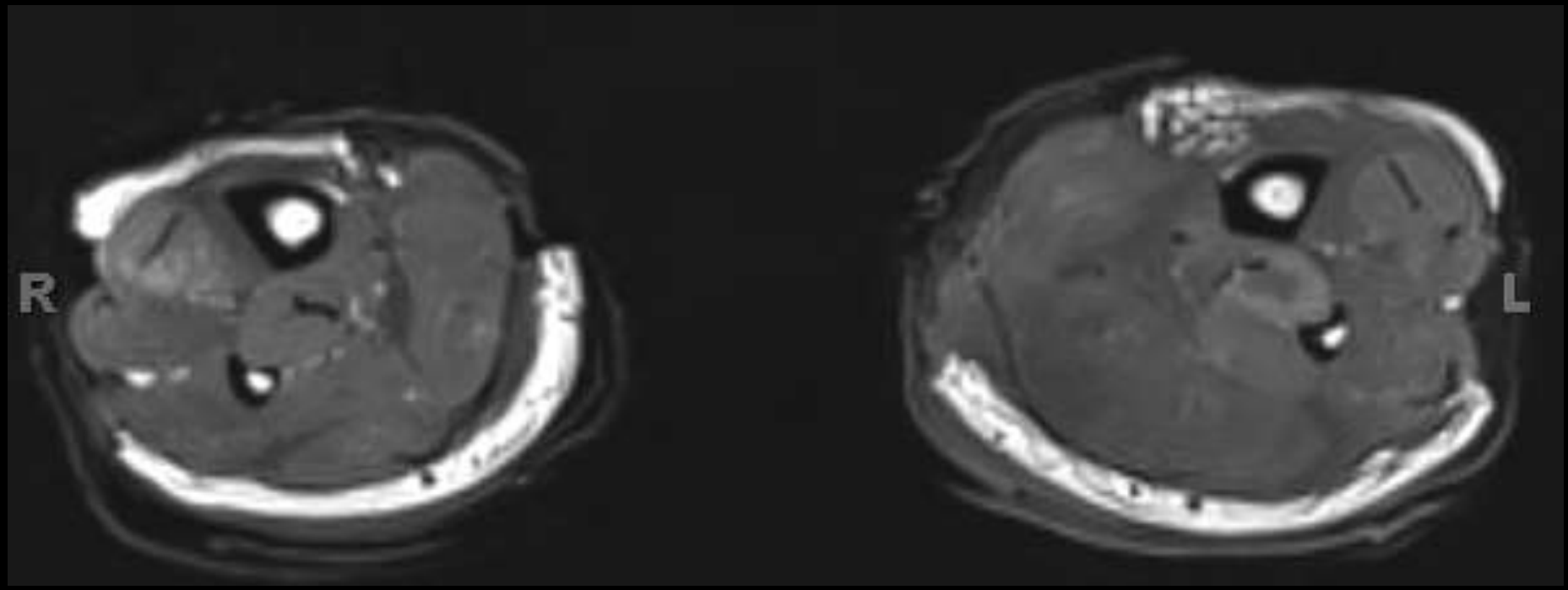
35 yo M with limited neck extension

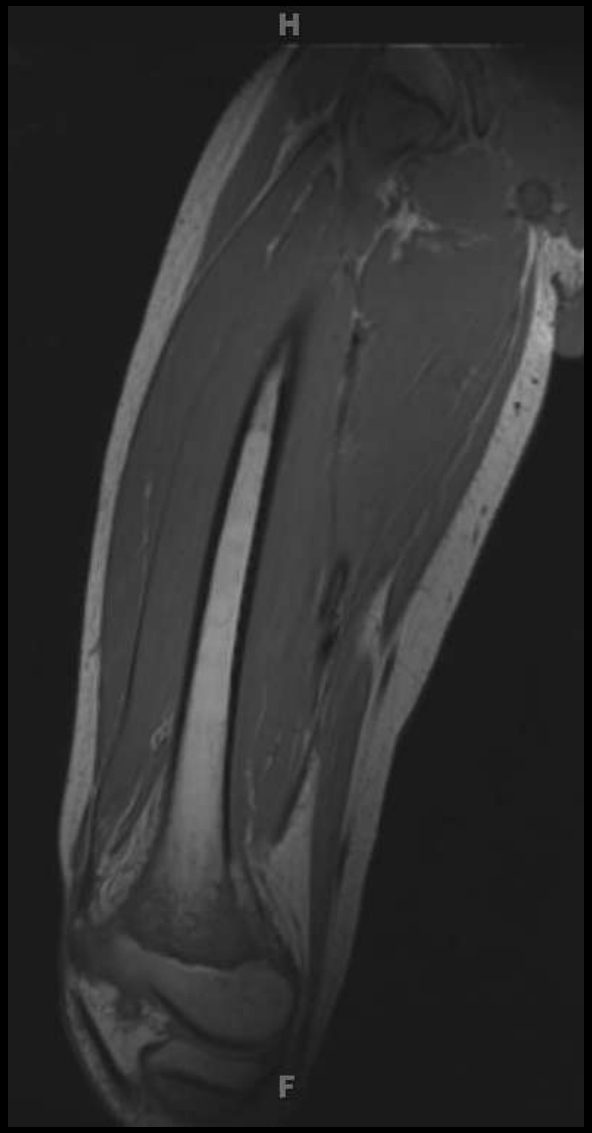
47 yo F with history of trauma





23 yo M with calf pain and inability to walk





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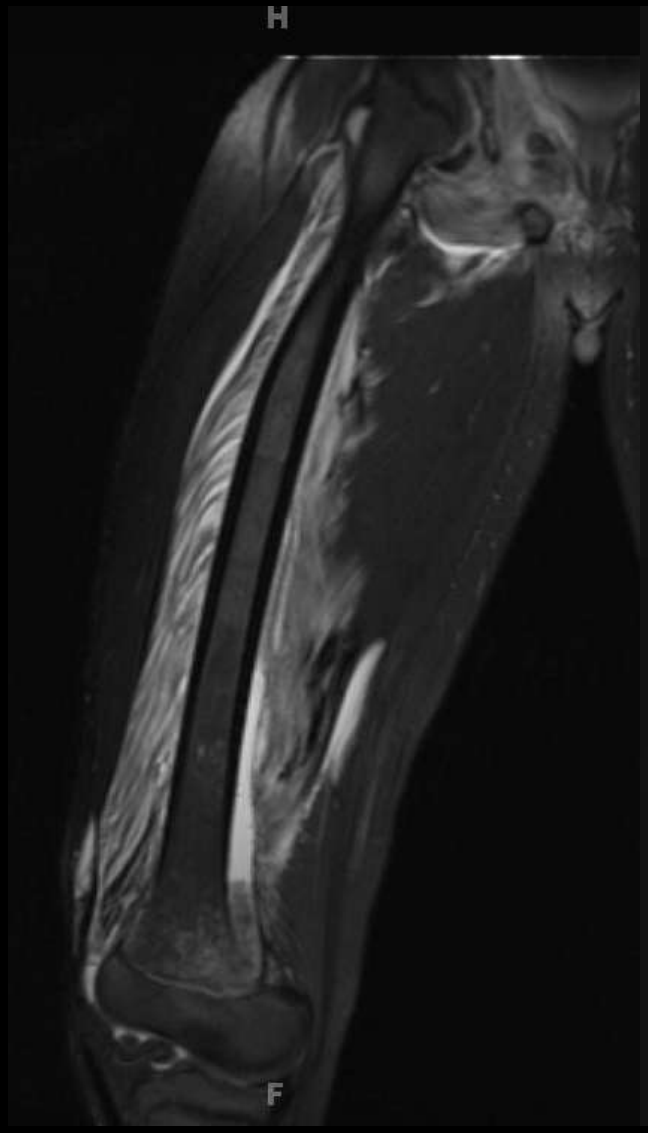
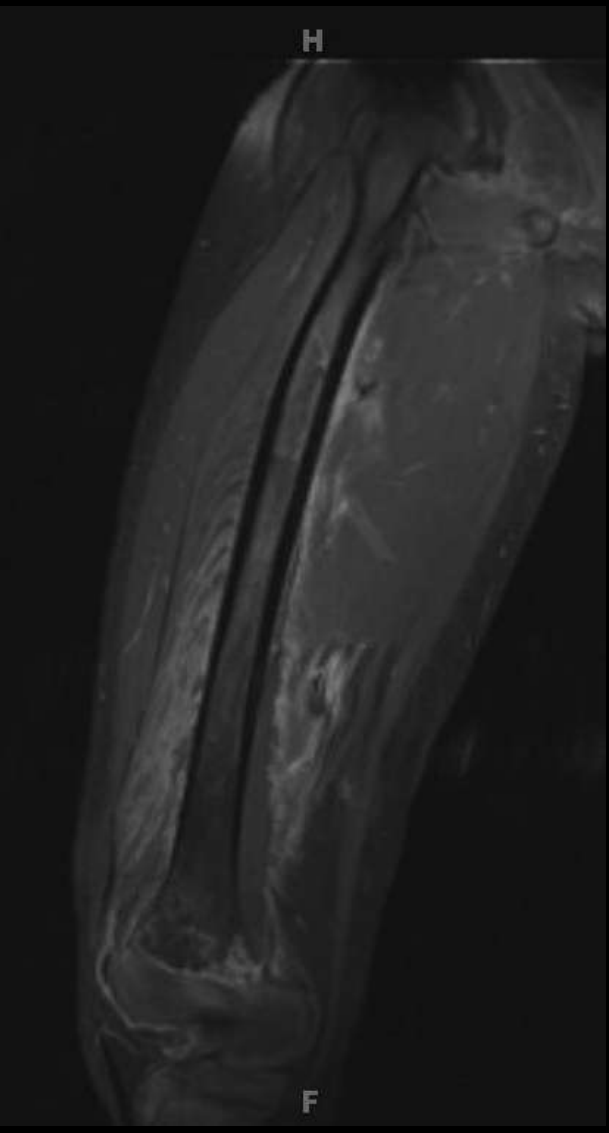


T2FS

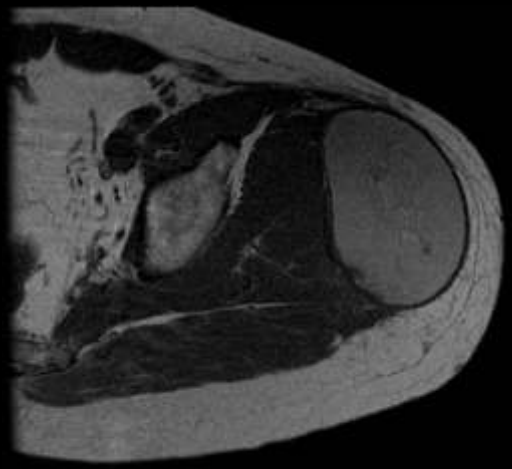


T1FS post

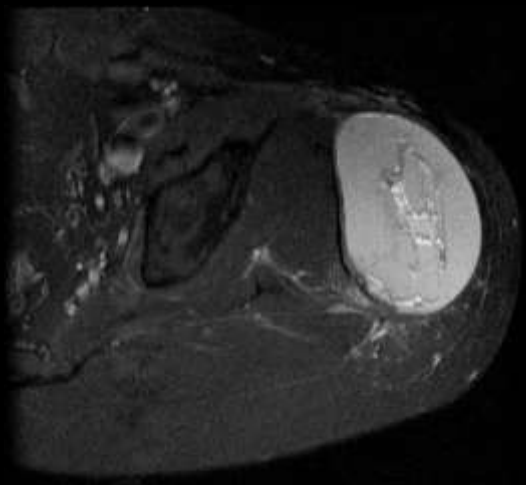
12 yo M with knee pain and fevers

41 yo F who recently underwent bowel surgery

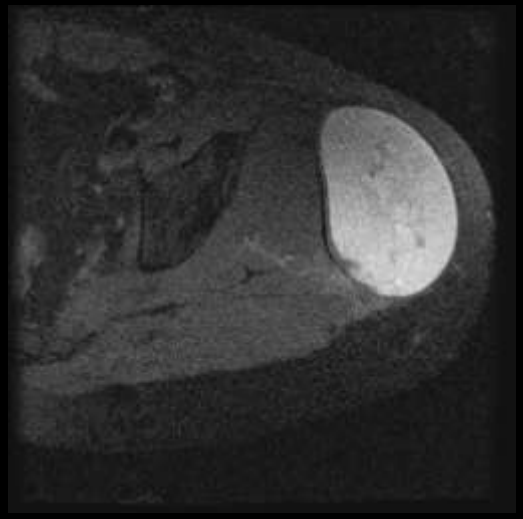
37 yo M in MCA several months ago



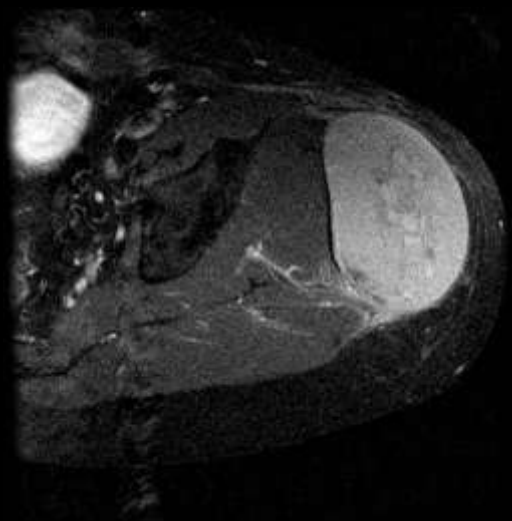
T1 SE



T2 FSE FS

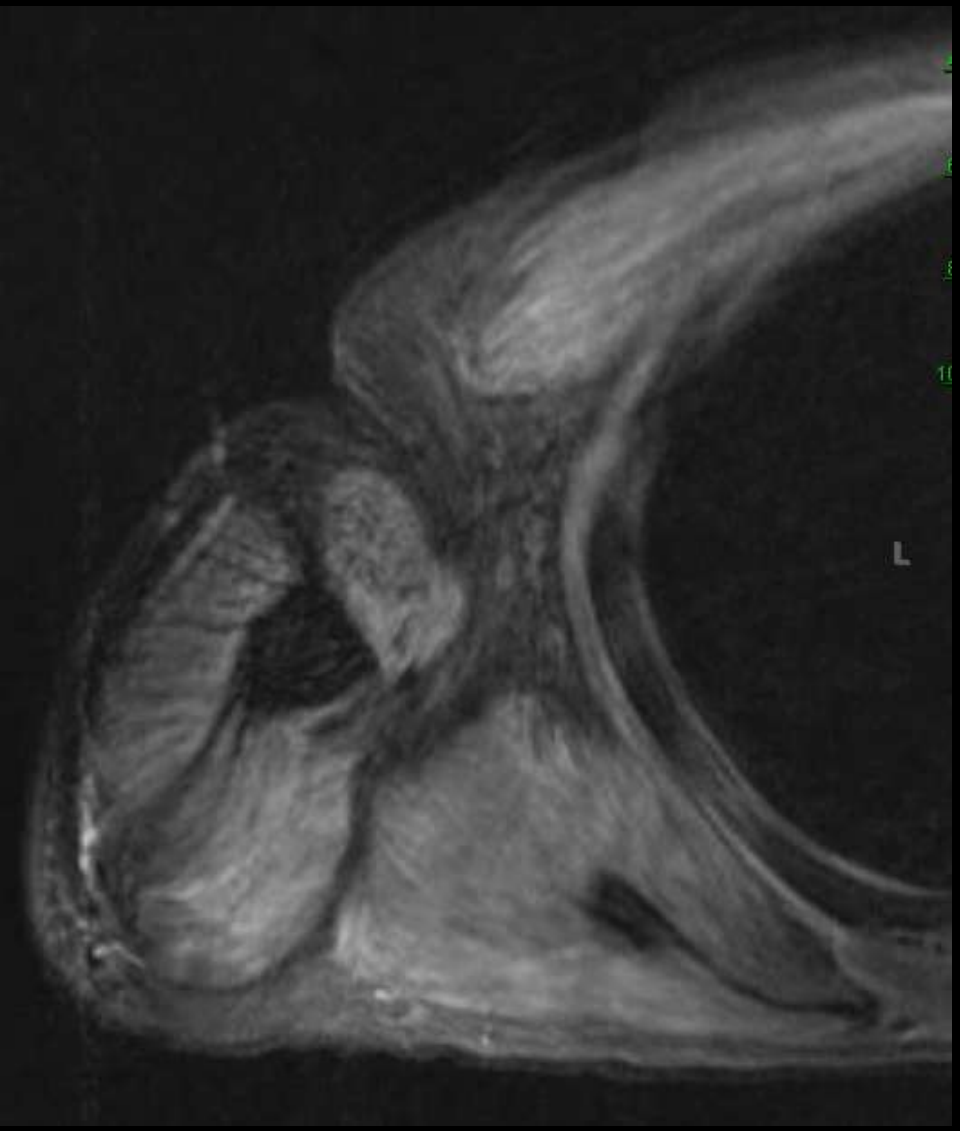


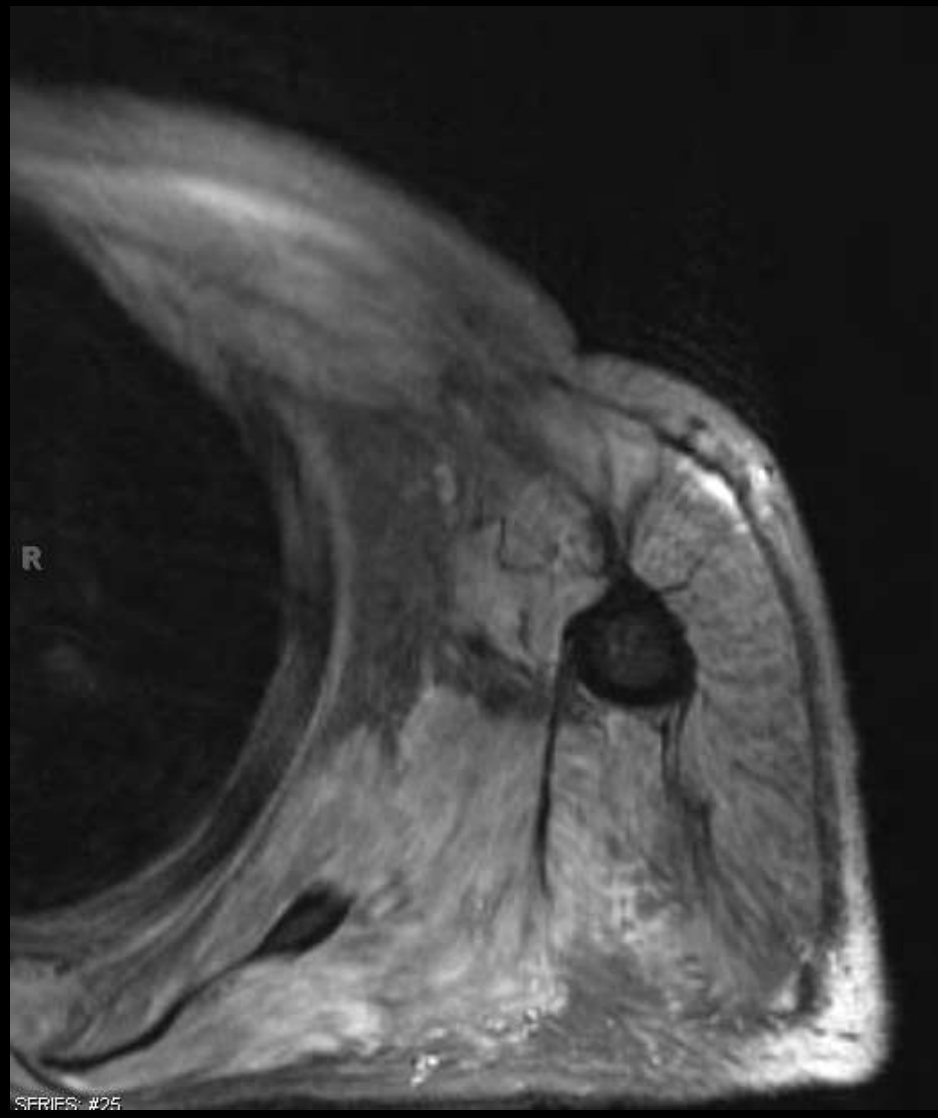
T1 SE FS Pre

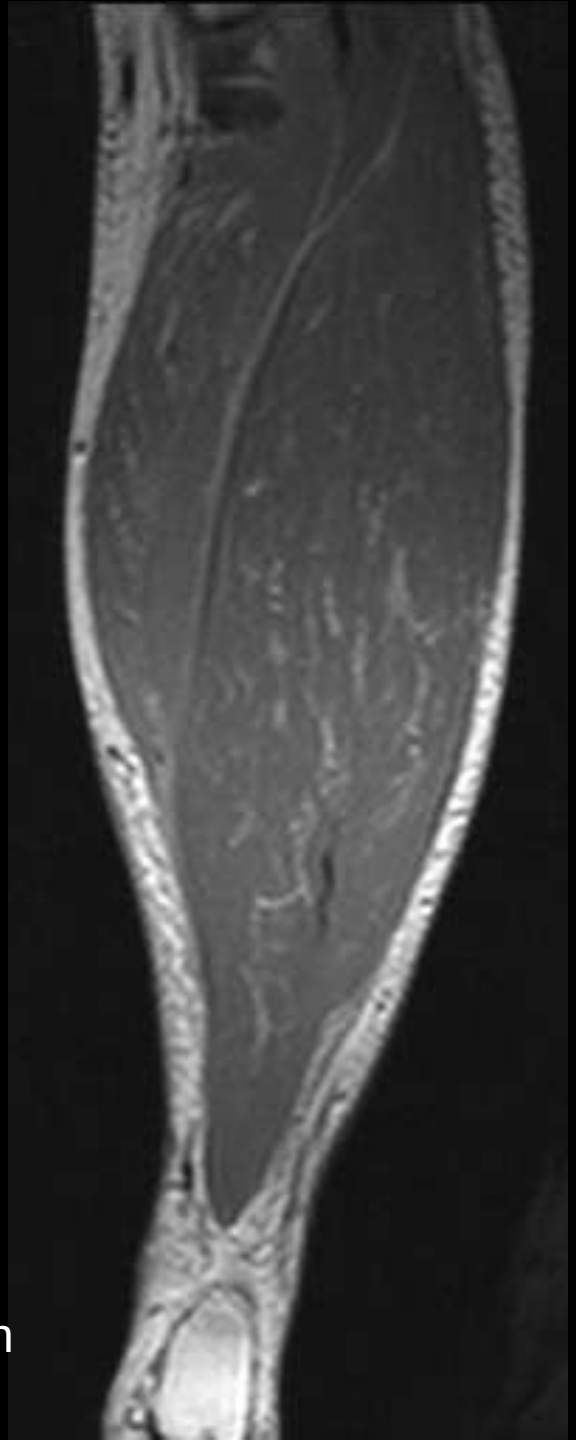


T1 SE FS Post

60 yo M with weakness and muscle pain







Middle aged man with calf pain

TYPES OF MUSCLE INJURIES

- Denervation
- Laceration
- Strain
- Contusion
- Fascial Tear
- Avulsion
- Fatigue
- Iatrogenic

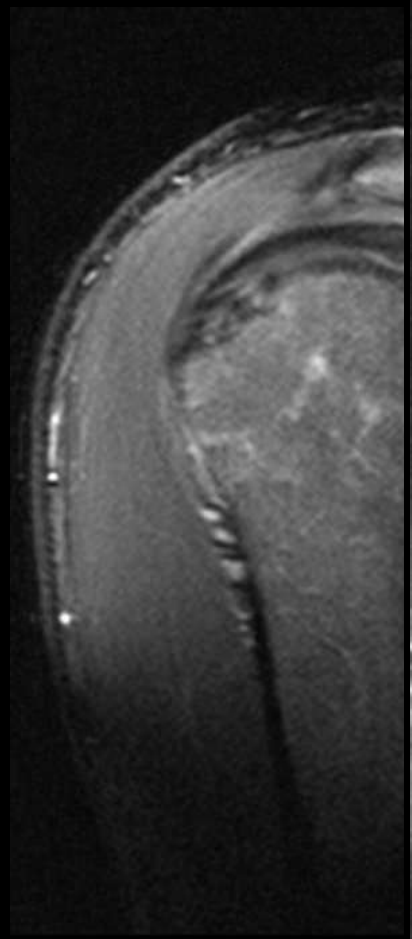
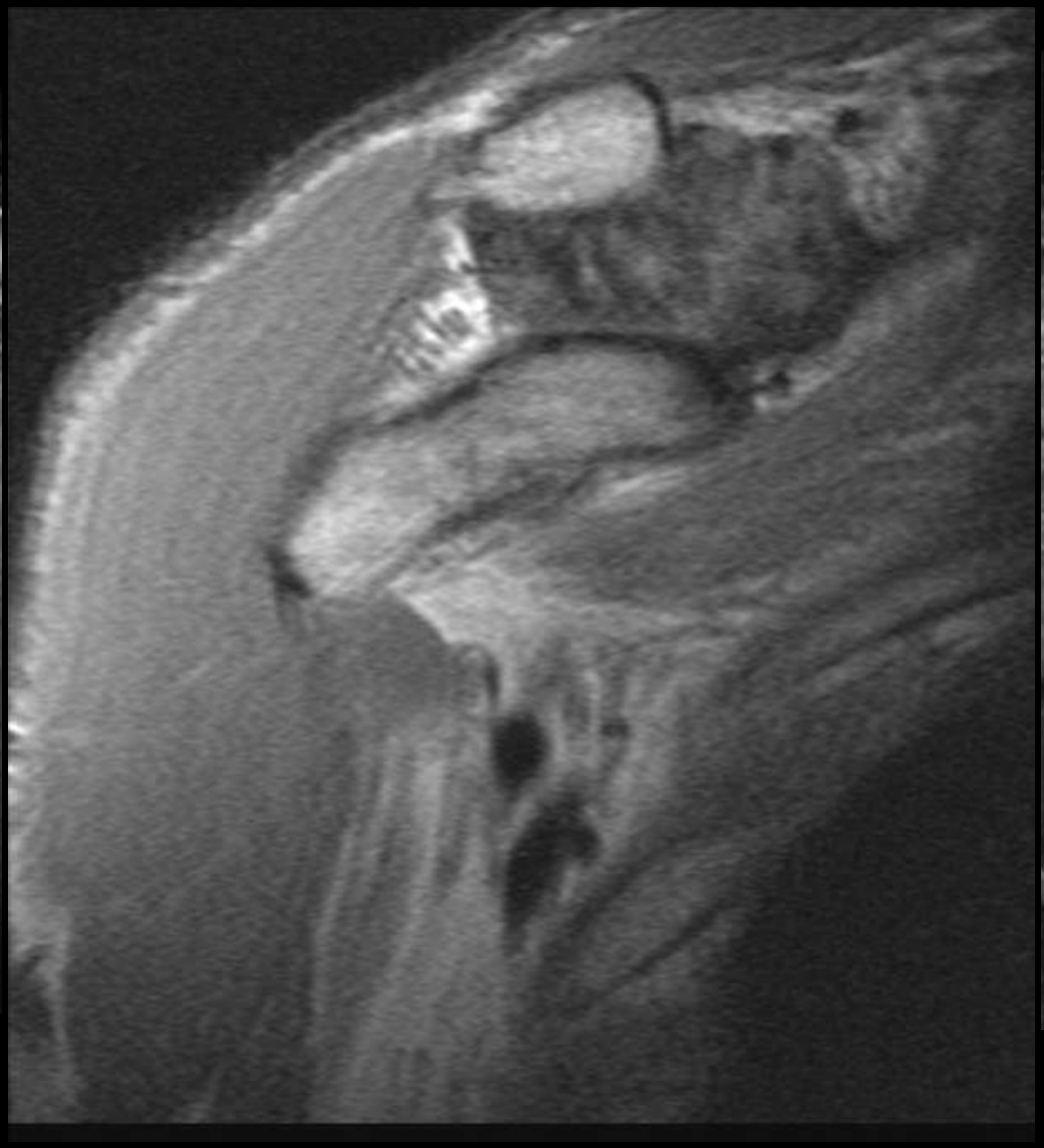
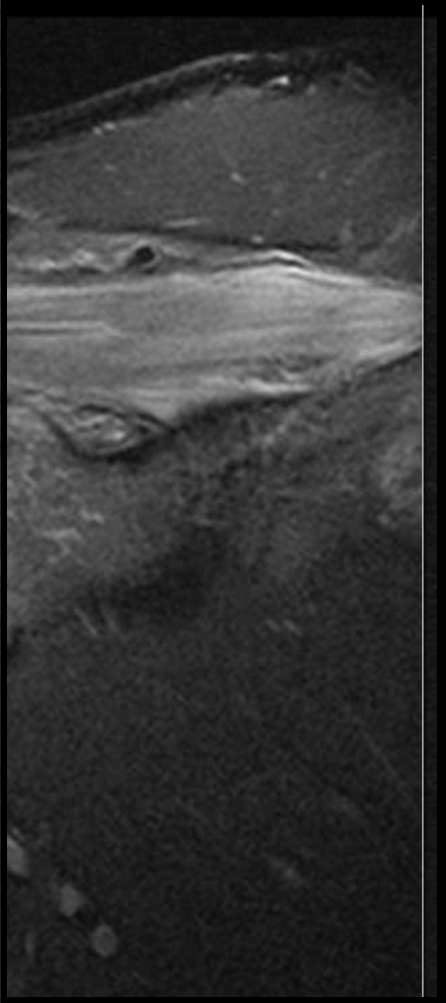
MUSCLE DENERVATION

- Acutely denervated muscle does not show signal abnormality
- High signal on T2WI is usually does not become evident for 2-4 weeks after denervation has occurred

- If innervation is restored, MR findings eventually return to normal. If innervation is not restored, fatty atrophy occurs over a period of months, indicating irreversible changes in the muscle

- Unlike strained muscles:
  - No perifascial edema
  - Specific nerve territory

48 yo M with right shoulder pain and weakness after MCA 8 months ago

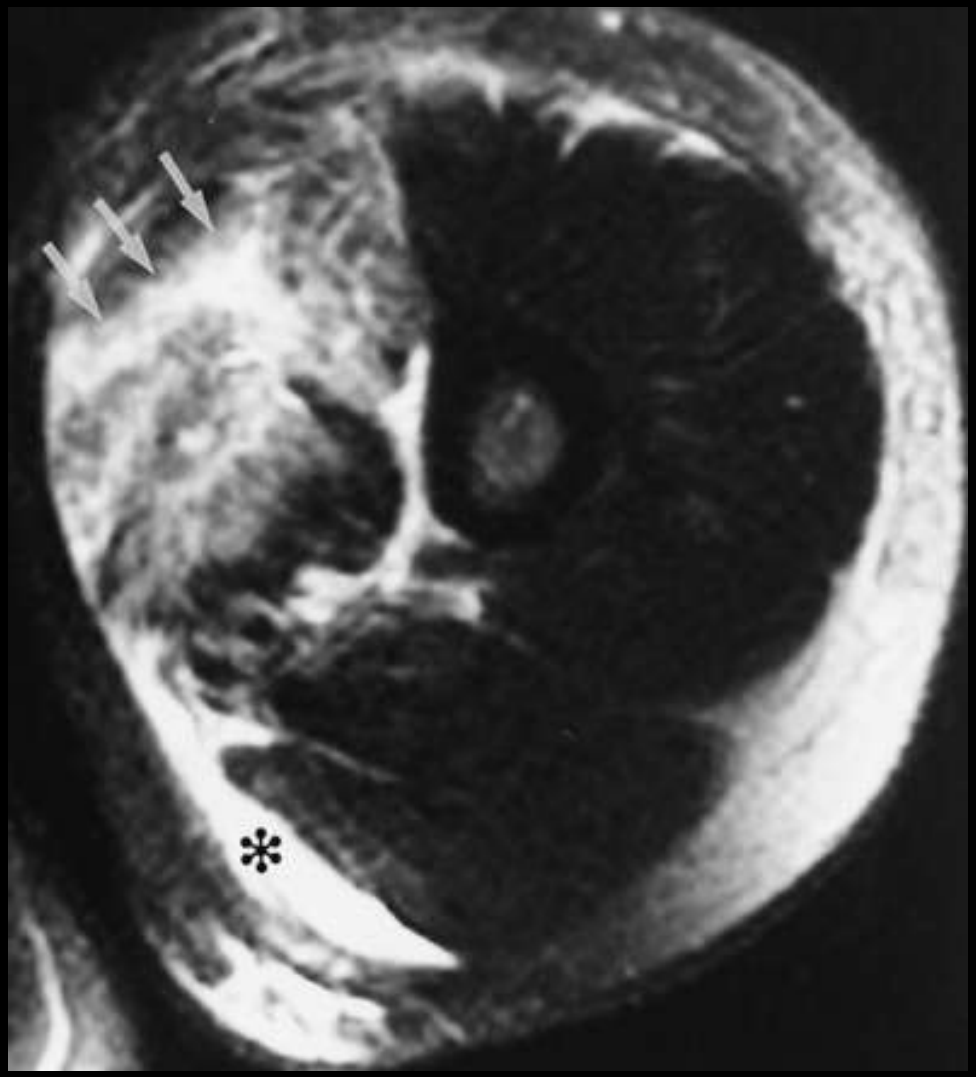




Suprascapular nerve compression by HO

MUSCLE LACERATION

- Produced by penetrating injury, such as a knife
- In the acute setting, these are rarely imaged with MR
- Show focal, sharply marginated discontinuity of fibers and high T2 signal intensity caused by hemorrhage and edema

May, David et al. *Abnormal Signal Intensity in Skeletal muscle at MR Imaging: Patterns, Pearls, and Pitfalls*. Radiographics, Oct 2000; 295-315



May, David et al. *Abnormal Signal Intensity in Skeletal muscle at MR Imaging: Patterns, Pearls, and Pitfalls*. Radiographics. Oct 2000: 295-315

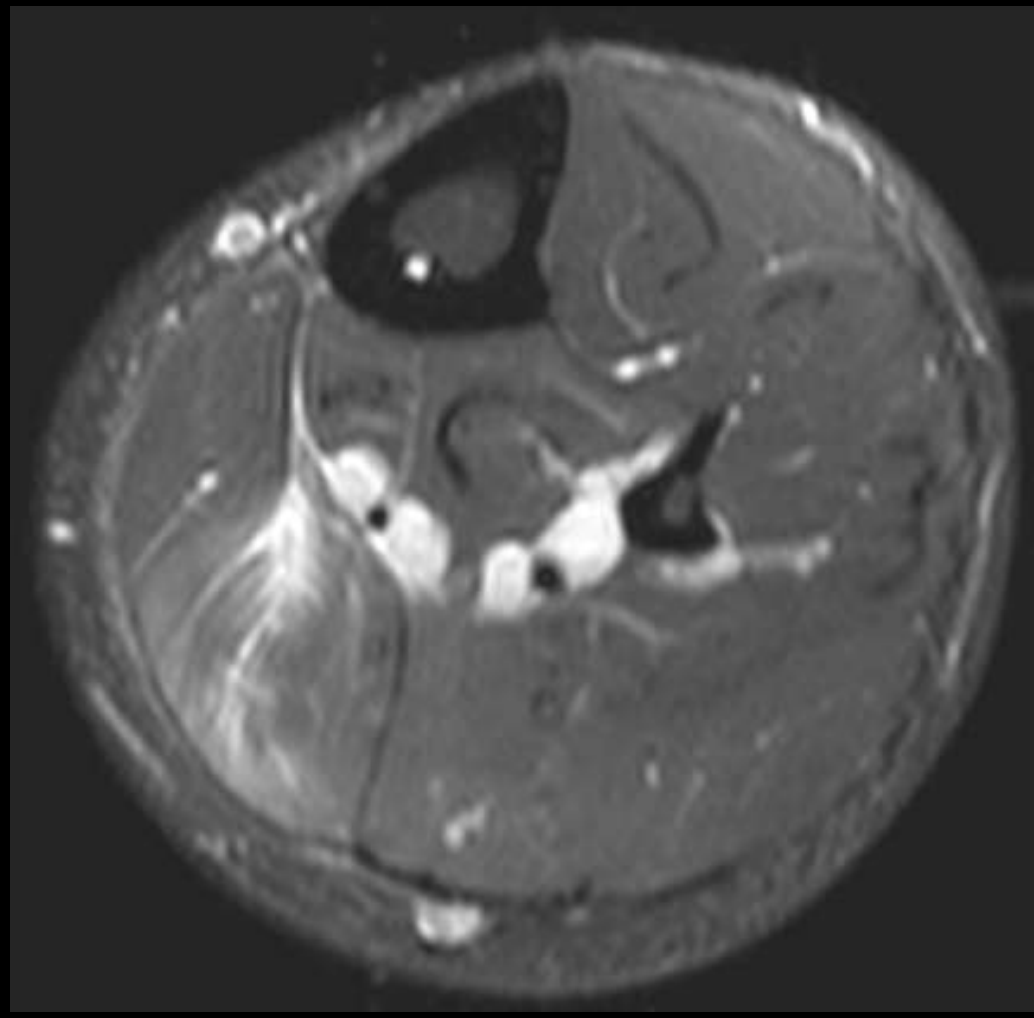
MUSCLE STRAIN

MUSCLE STRAIN

- Most common pathology we see
- Occur in muscles that cross 2 articulations
- Usually occurs with eccentric contraction (contract during elongation)
  - Hamstrings
  - Rectus Femoris
  - Gastrocnemius

First Degree/Mild/Low grade injury

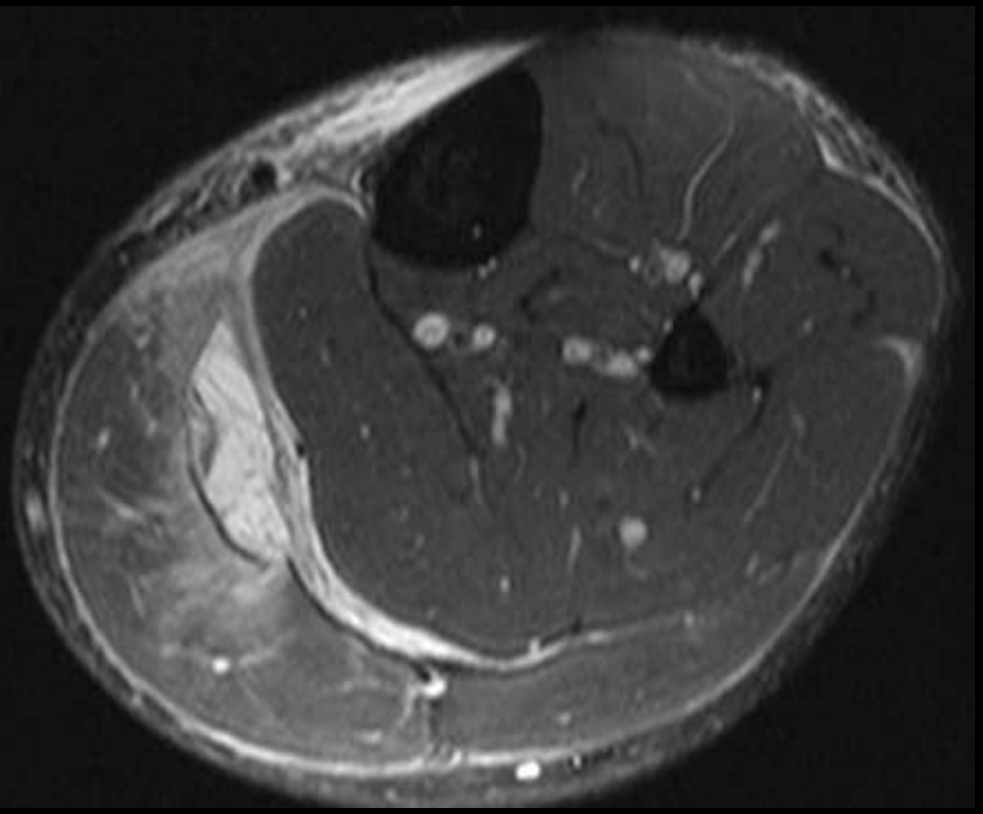
- No significant loss of strength or range of motion
- Heals completely with appropriate rest from aggravating activities
- (+) Increased signal on T2 and STIR
  - Edema and hemorrhage at the MTJ that extends into adjacent muscle fascicles
  - Feathery appearance on MRI
- (-)No architectural distortion of muscle or tendon

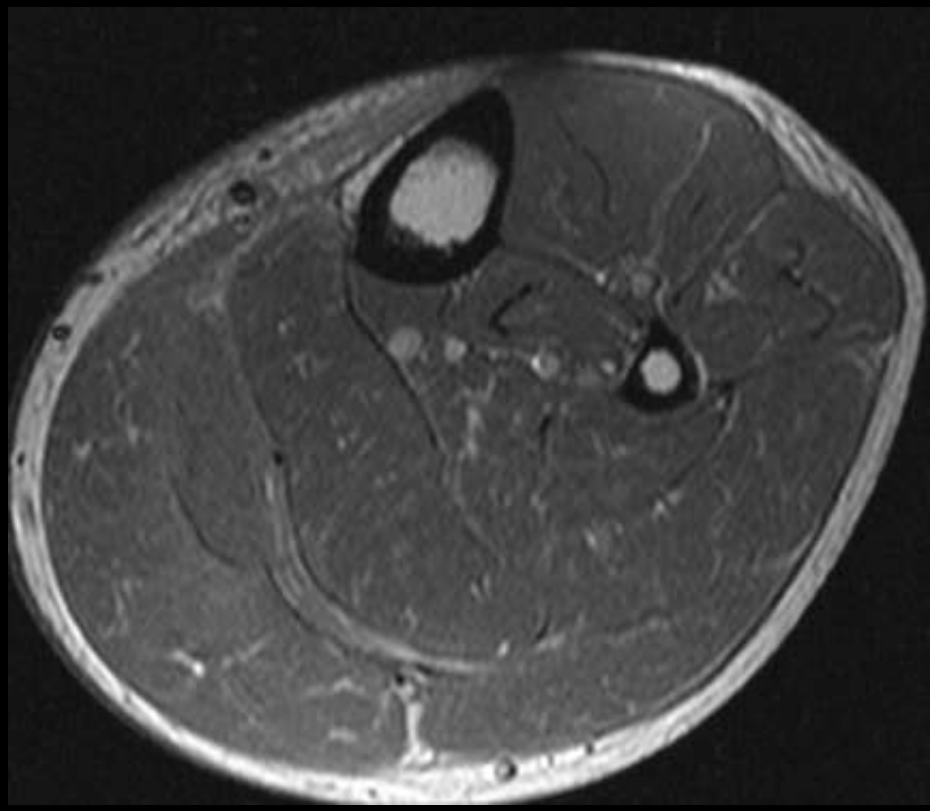


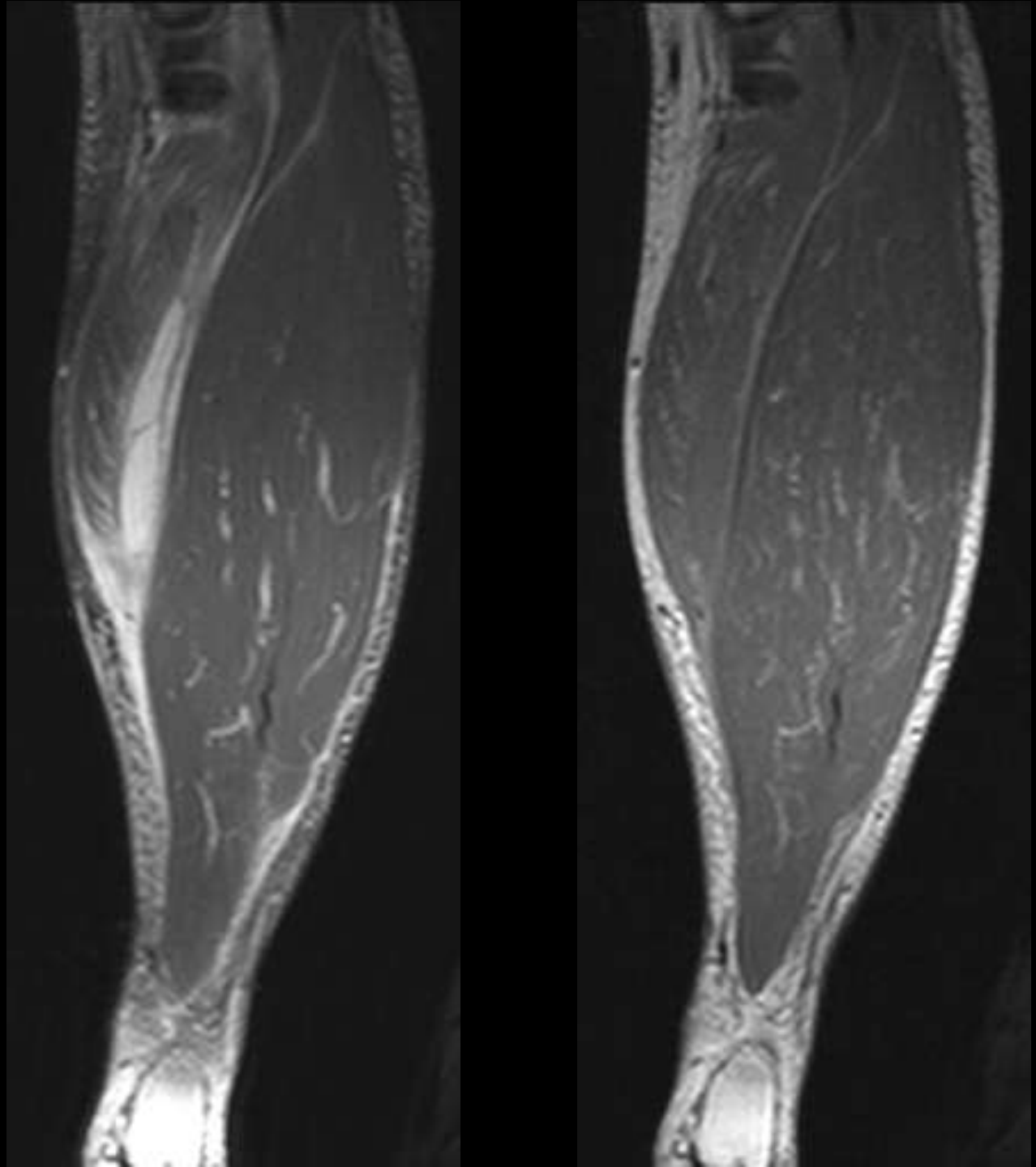
AJR 2004; 183:975-984: Connell, David A. et al: Longitudinal study Comparing sonographic ad MRI assessments of acute and healing hamstrings injuries

Second Degree/Moderate grade tear

- Some loss of strength
- Pain relief within 2 weeks and return to sports after about 3 weeks
- Increased signal on T2 and STIR
- Hematoma at MTJ
- Perifascial fluid
- Architectural distortion



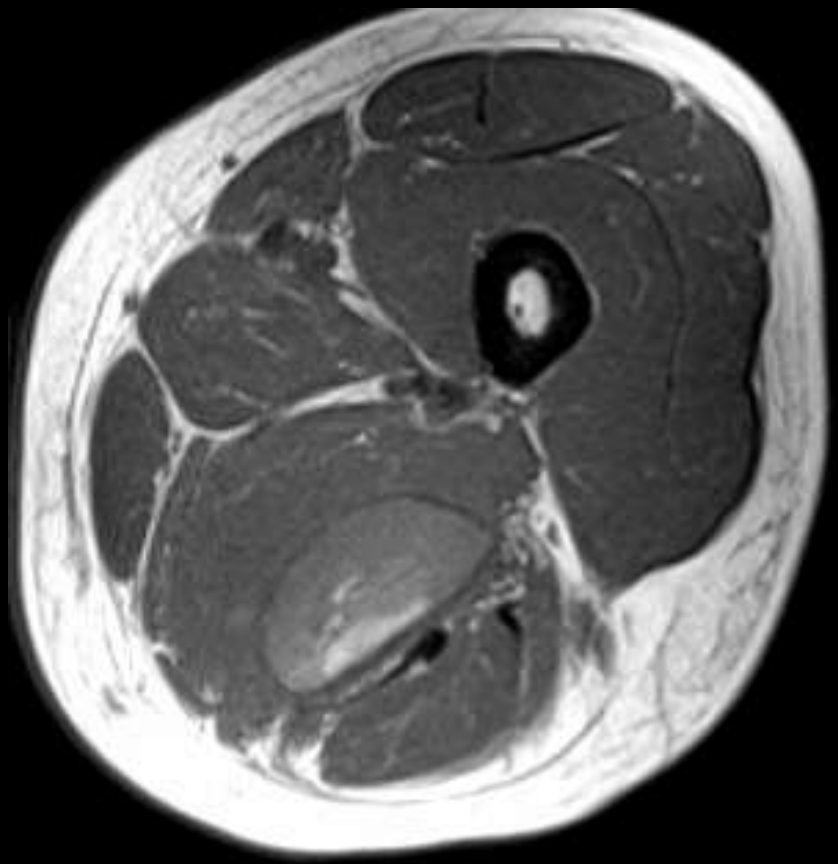




Moderate grade strain

Third Degree/Severe/High grade tear

- Complete musculotendinous disruption, with or without retraction
- Loss of strength
- Prompt surgery may be required
- Diagnosis usually made on clinical grounds but MR is helpful:
  - For preoperative assessment of the extent of retraction
  - To pinpoint hematomas which require perc drainage



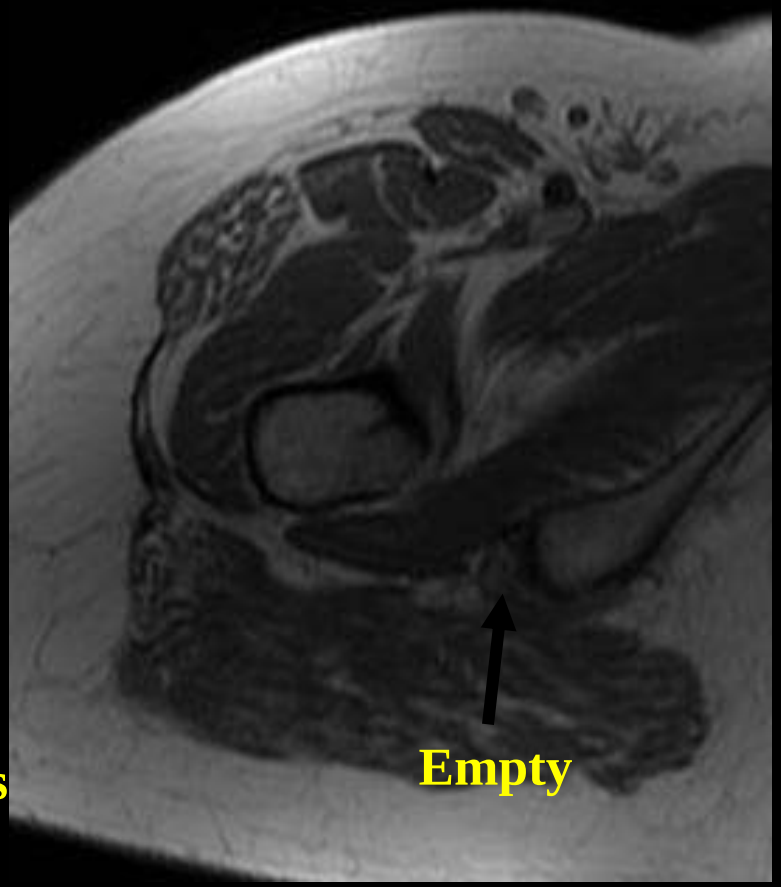
Courtesy of A. Matin

CHRONIC CHANGES AFTER TEARS

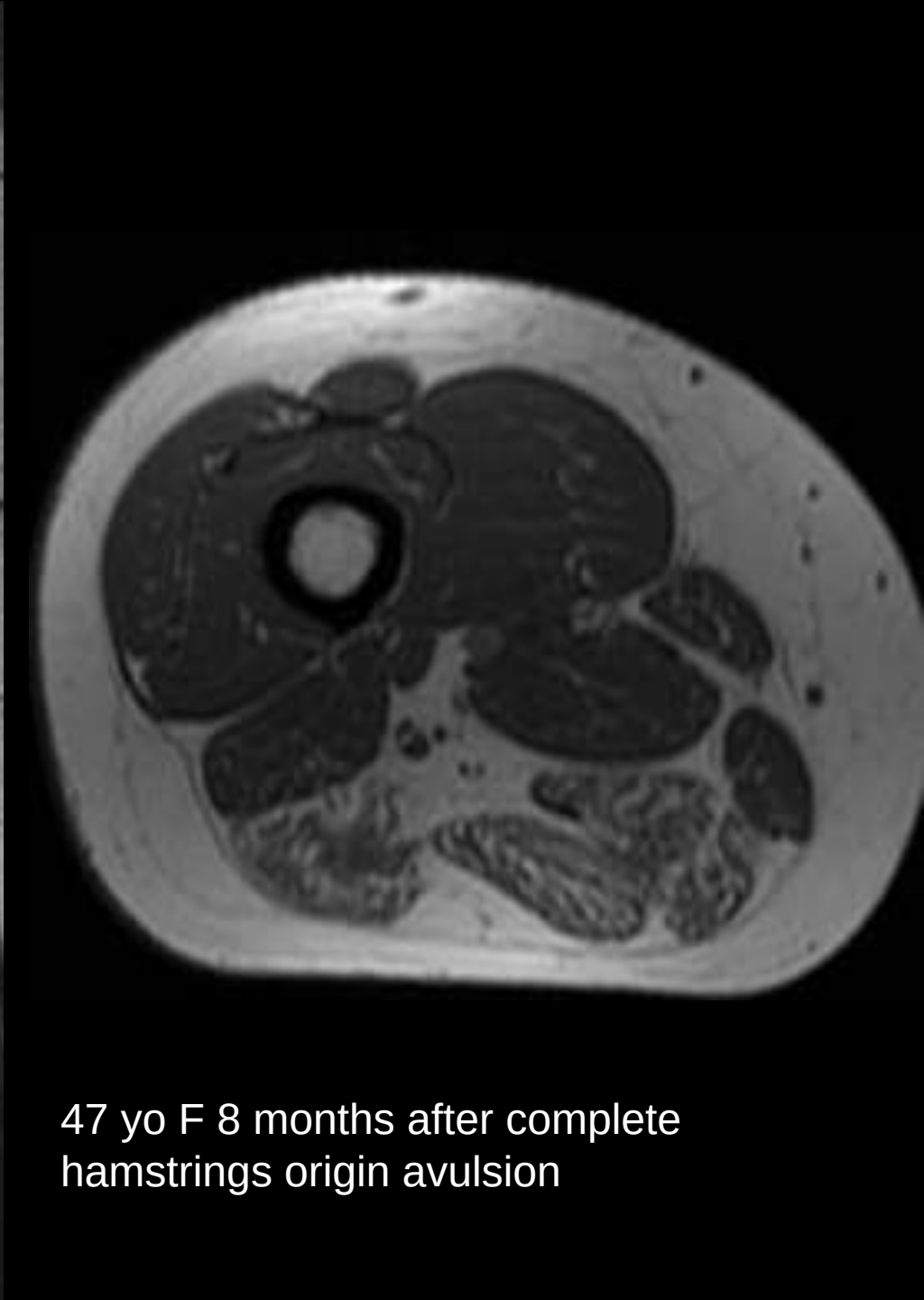
*Tendon thickening or attenuation
*Muscle atrophy

Normal Example

Our Patient



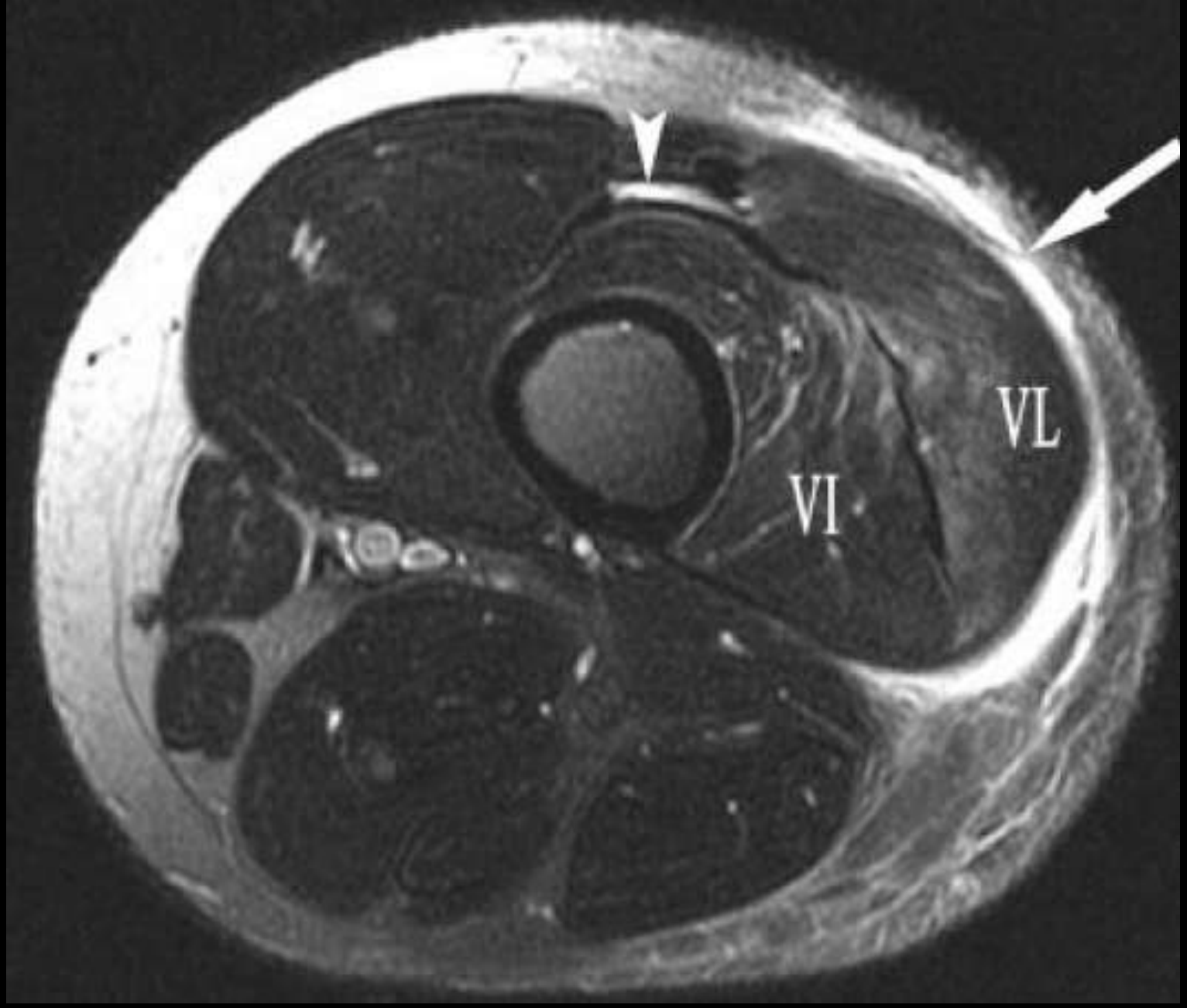
Koulouris, G. et al. Radiographics 2005;25:571-586



47 yo F 8 months after complete hamstrings origin avulsion

MUSCLE CONTUSION

- Imaging similar to a low grade muscle strain
  - High signal on T2 and STIR: diffuse or geographic pattern, no fiber discontinuity
    - *with contusion , overlying edema within subcutaneous fat
- History is different than muscle strain
  - Direct trauma, usually a blunt object
- Larger in size than strain injury but shorter recovery times

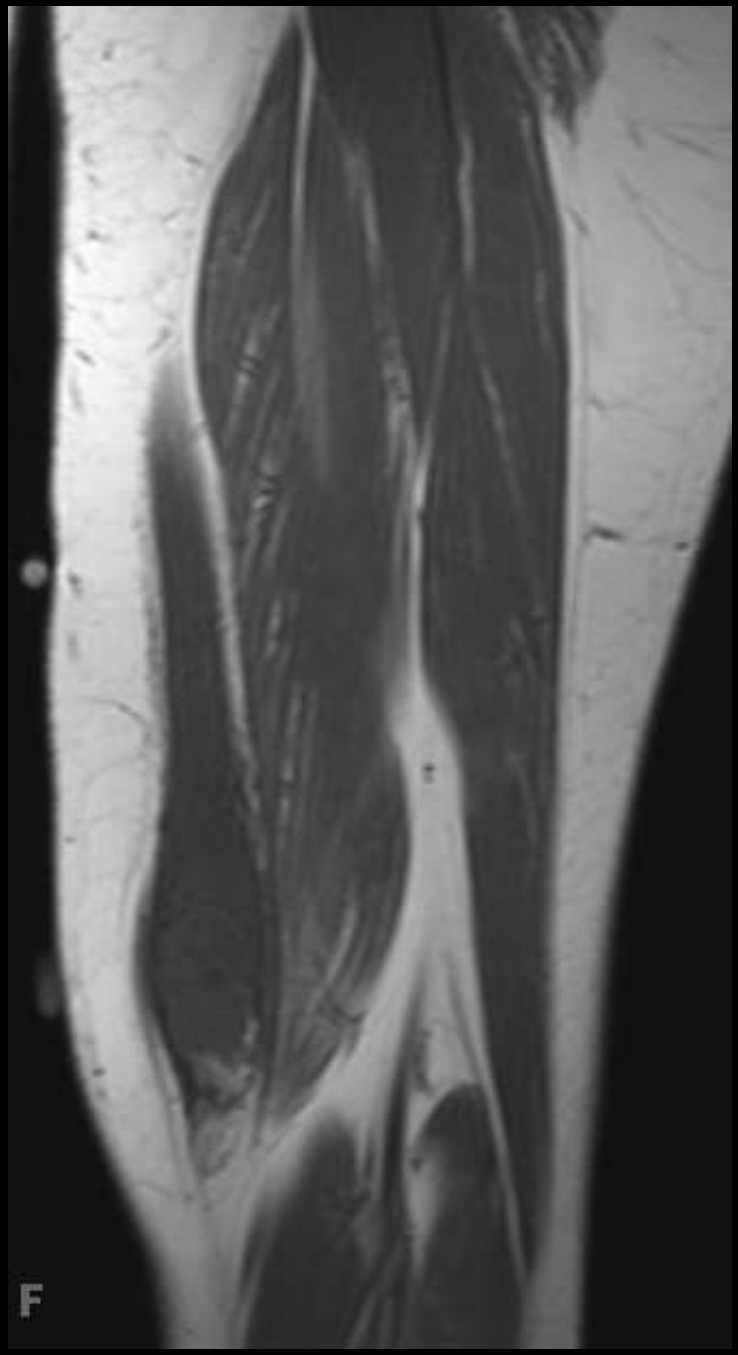


May, David et al. *Abnormal Signal Intensity in Skeletal muscle at MR Imaging: Patterns, Pearls, and Pitfalls*. Radiographics, Oct 2000; 295-315

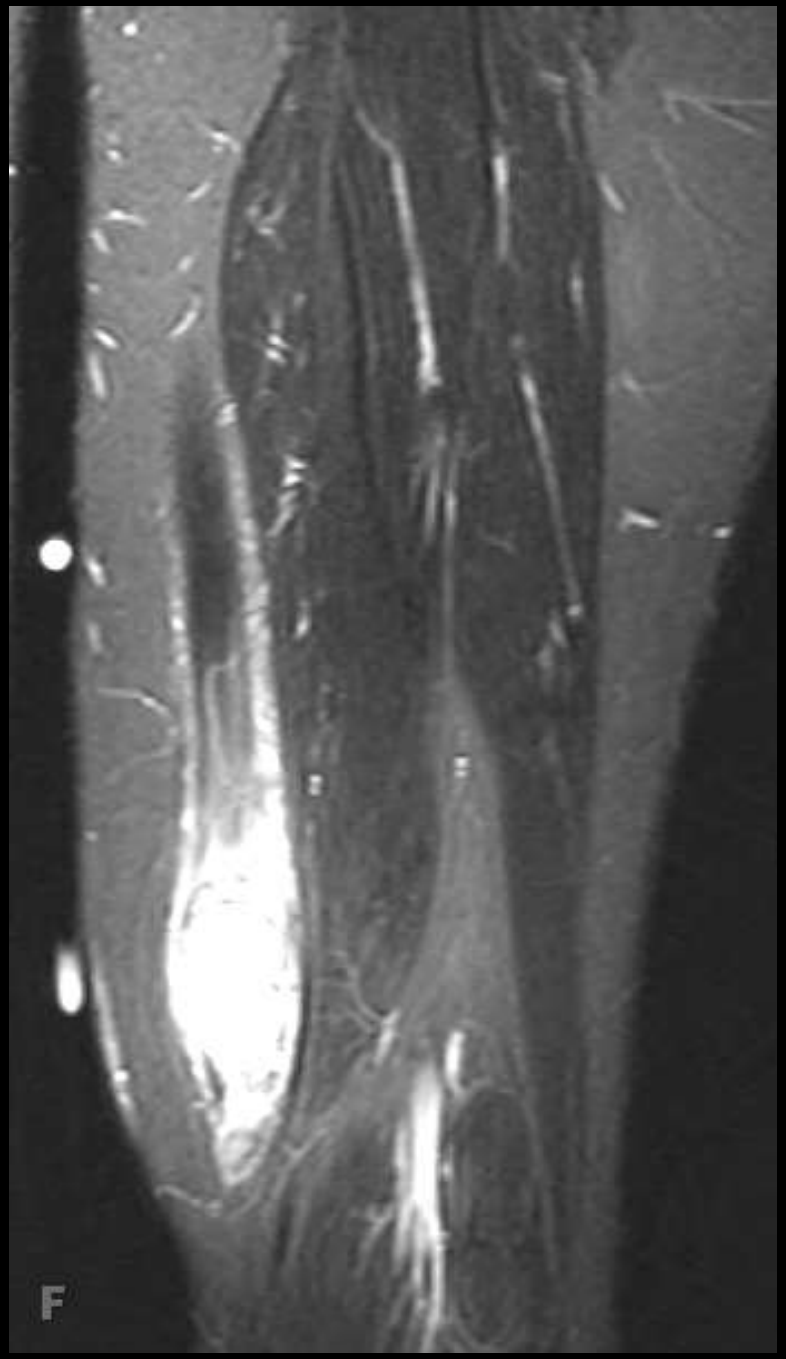
SEQUELAE OF MUSCLE INJURY

14 yo M with persistent left thigh swelling and pain

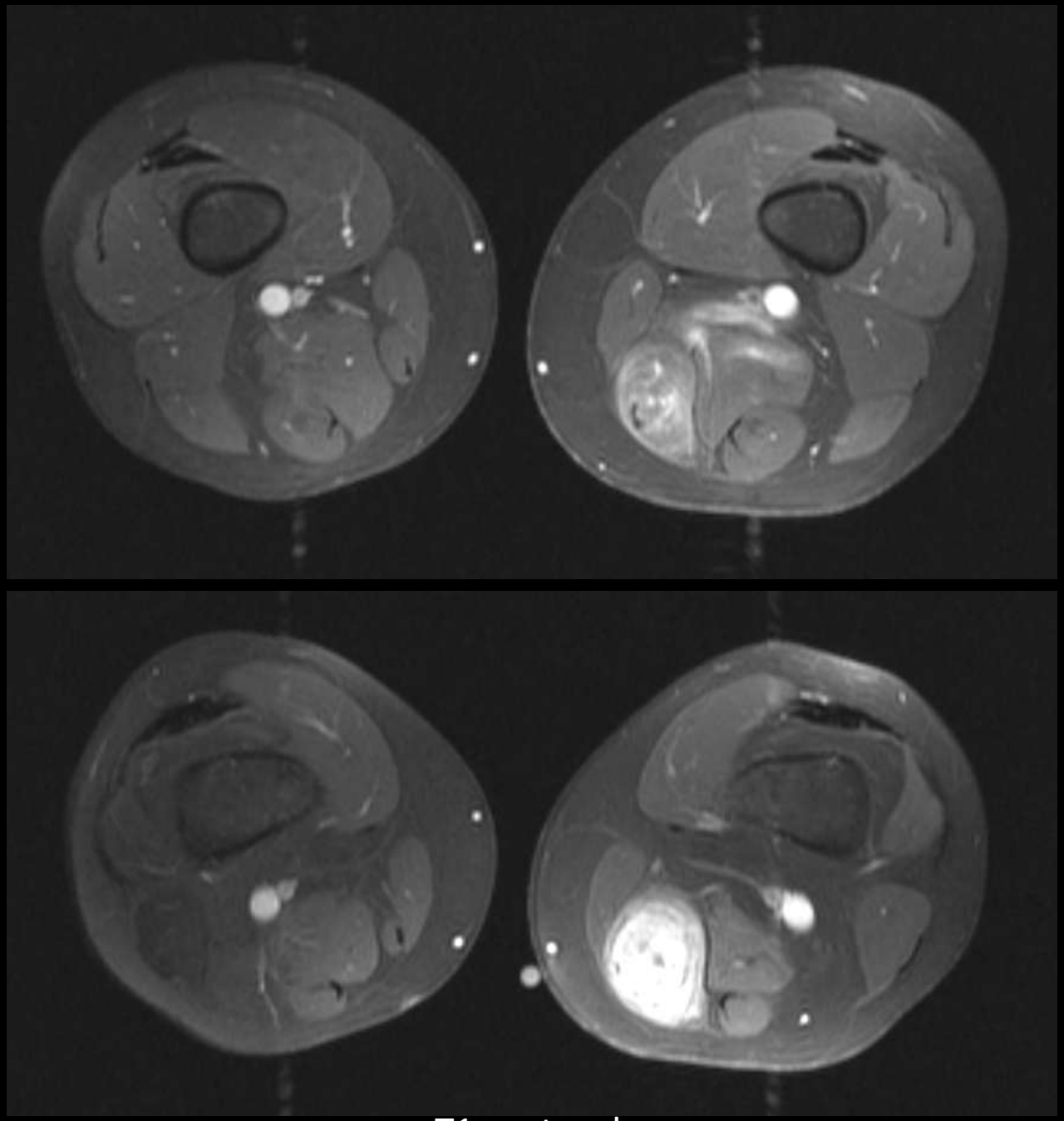
No response to physical therapy



T1



STIR



T1 post gad


L

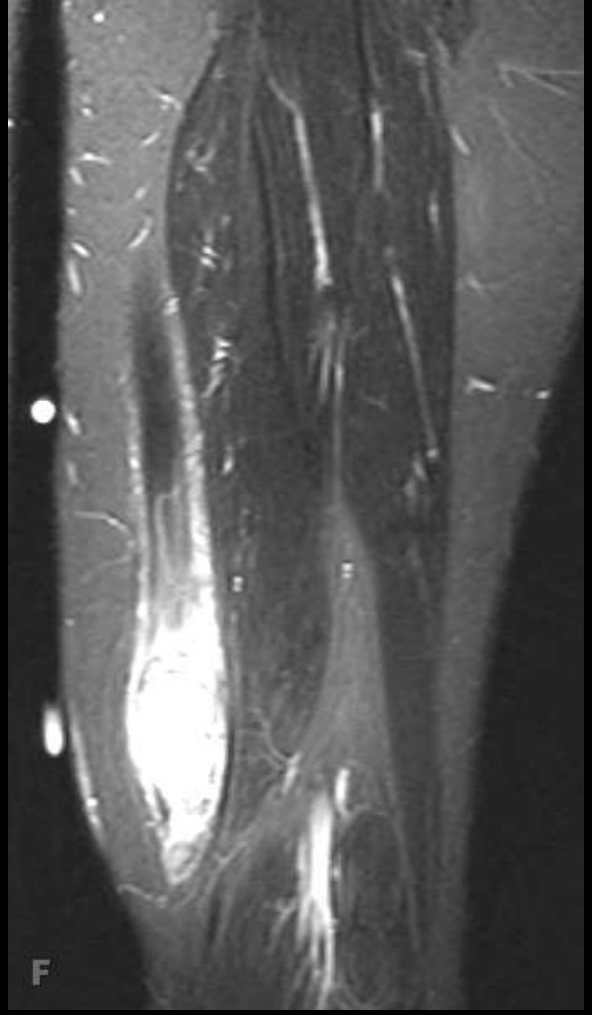
MYOSITIS OSSIFICANS

- Trauma, paralysis, burns
- Radiographic findings:
  - Zonal pattern of mineralization
  - Ossifies from the outside in
  - May merge with the underlying bone and resemble an osteochondroma
  - May be resorbed over a period of 1-5 years

MYOSITIS OSSIFICANS

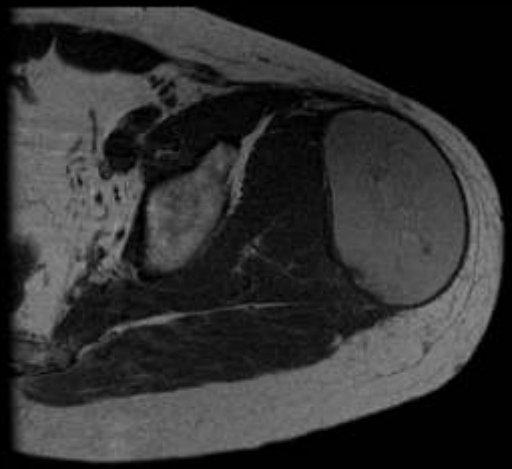
- MRI findings
  - EARLY: heterogenous muscle edema
  - SUBACUTE: mass like region of high T2 signal during first days to weeks after the injury (difficult to distinguish from sarcoma)
  - LATE: older lesions develop peripheral calc: peripheral low signal intensity and central fat signal intensity.
- Recognition of peripheral calcification pattern is important for making the correct diagnosis because biopsy, particularly of the central portion, may lead to a false diagnosis of osteosarcoma due to the presence of abundant osteoid and mitotic spindle cells

May, David et al. *Abnormal Signal Intensity in Skeletal muscle at MR Imaging: Patterns, Pearls, and Pitfalls*. Radiographics, Oct 2000; 295-315

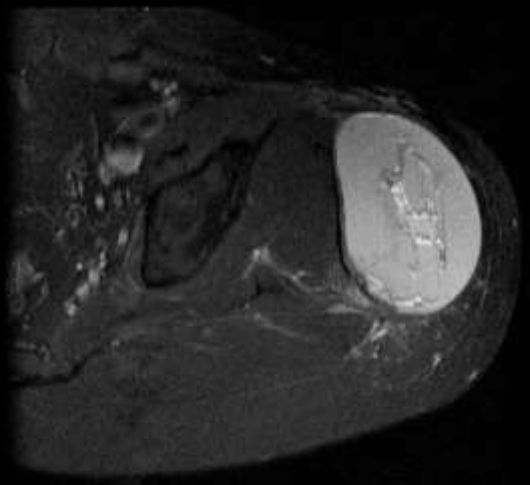


*Workup should ALWAYS begin with plain films
*Short term follow up in 3-4 weeks with X-ray or CT scan is necessary to confirm suspected MO
*Allows postponement of a biopsy or surgical procedure until diagnostic imaging features have declared themselves

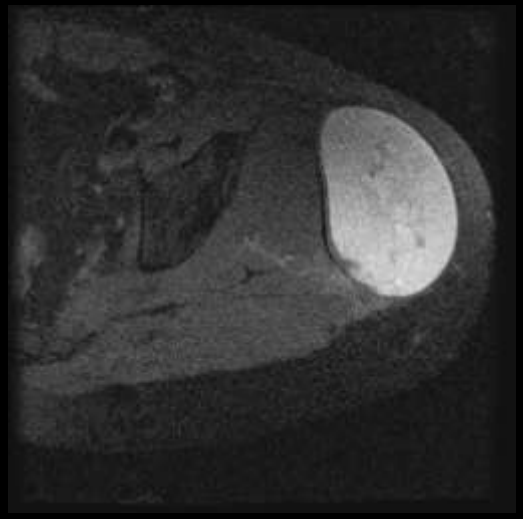
37 year old male several months after motorcycle accident



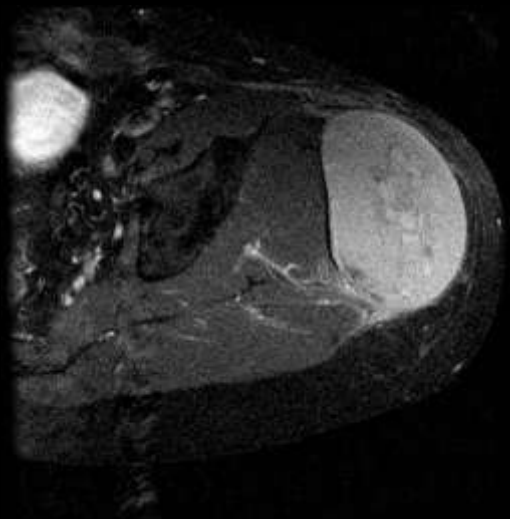
T1 SE



T2 FSE FS



T1 SE FS Pre



T1 SE FS Post

Chronic Degloving Injury

- Skin and subcutaneous fatty tissue abruptly separating from the underlying fascia
- Disrupted capillaries may continuously drain into the perifascial plane, filling up the virtual cavity with blood, lymph, and debris
- An inflammatory reaction commonly creates a peripheral capsule

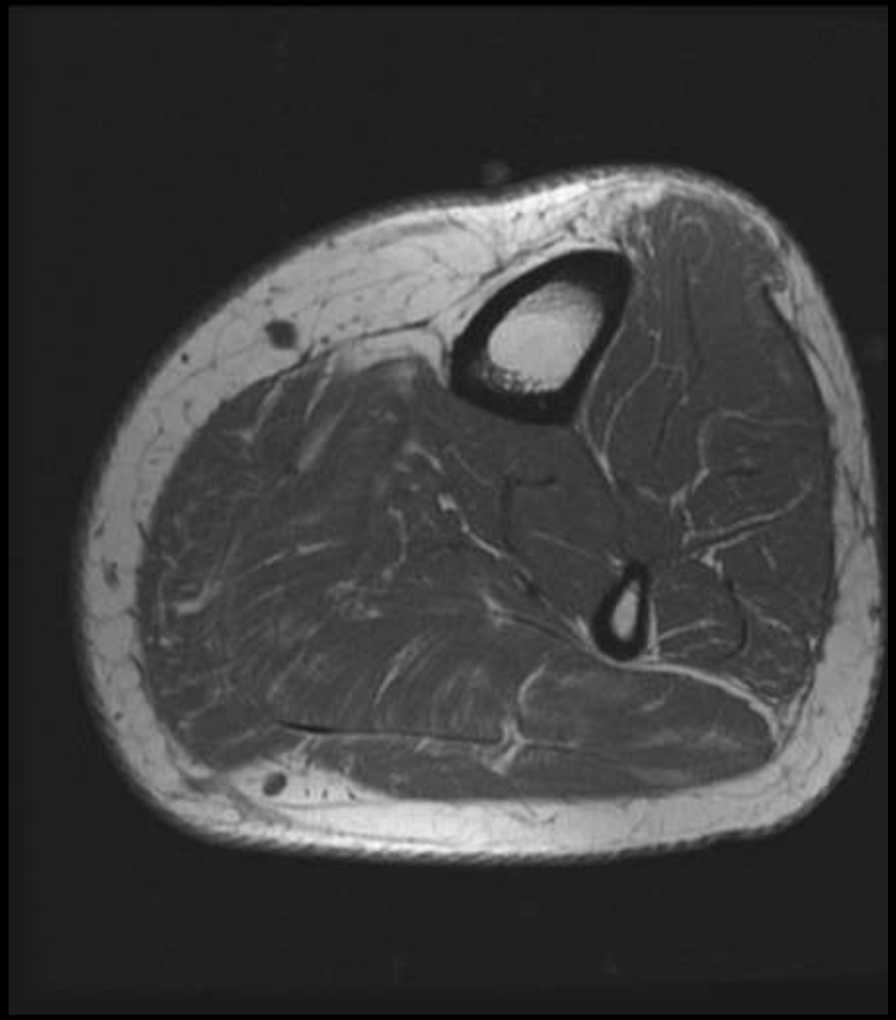
32 yo M with increasing left leg mass after MCA one month prior

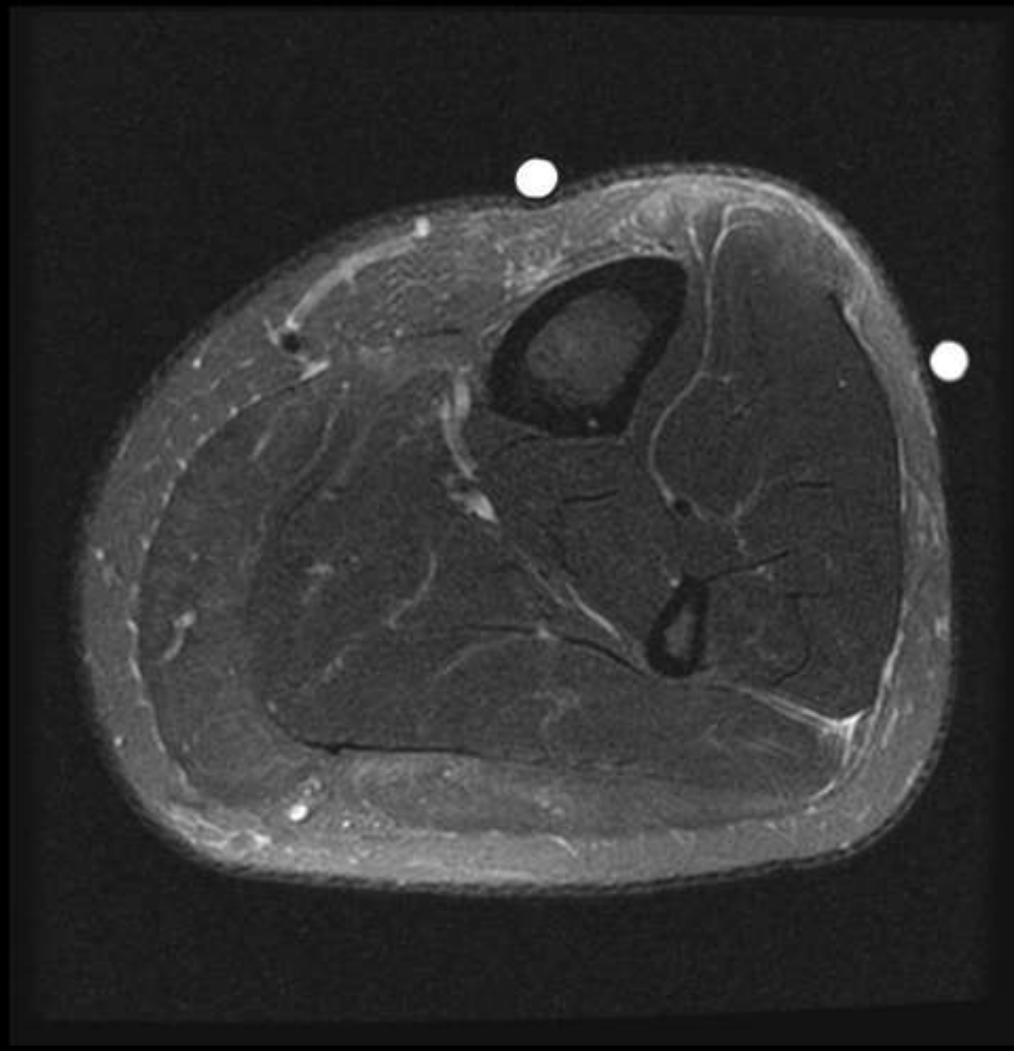
T1

Injury disrupts segmental perforating vessels and results in a hematoma composed of hemolymphatic fluid with a mixture of viable and necrotic fat

STIR

41 yo M with anterior lower leg pain





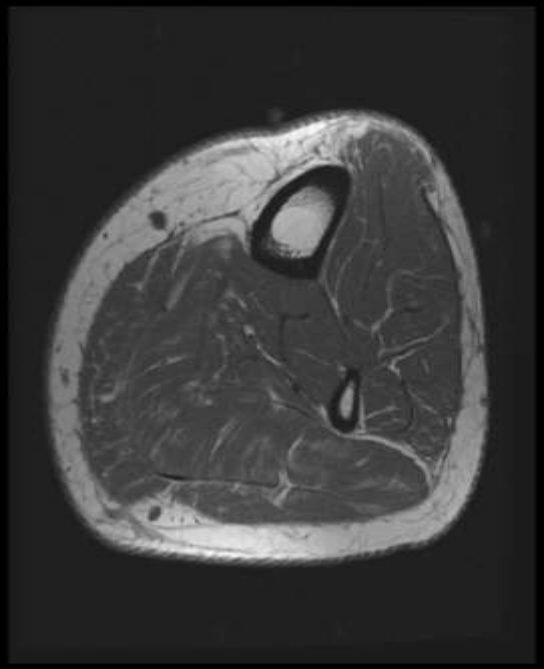
MUSCLE HERNIATION

- Protrusion of muscle through a focal fascial defect
  - Traumatic: tear of the fascial sheath due to penetrating wounds or violent impact associated with fractures.
  - Constitutional: Muscular overuse or hypertrophy may lead to fascial rupture at weak spots such as those traversed by vessels and nerves

- Rarely, a familial cause: congenital weakness in the fascia in some persons

MUSCLE HERNIATION

- Usually occur in the middle to lower portion of the leg
- Anterior tibialis muscle is most commonly involved
- May be multiple and bilateral



Mellado, J.M. Muscle hernias of the lower leg: MRI findings. *Skeletal Radiology 1999. 28:465-69*

MUSCLE HERNIATION

- Asymptomatic hernias are treated conservatively
- For severe symptoms or cosmetic complaints, fasciotomy is the preferred surgical technique

- Fascial repair (closing fascial defect) may result in compartment syndrome and is no longer performed

Mellado, J.M. Muscle hernias of the lower leg: MRI findings. *Skeletal Radiology 1999. 28:465-69*

MUSCLE ISCHEMIA AND NECROSIS

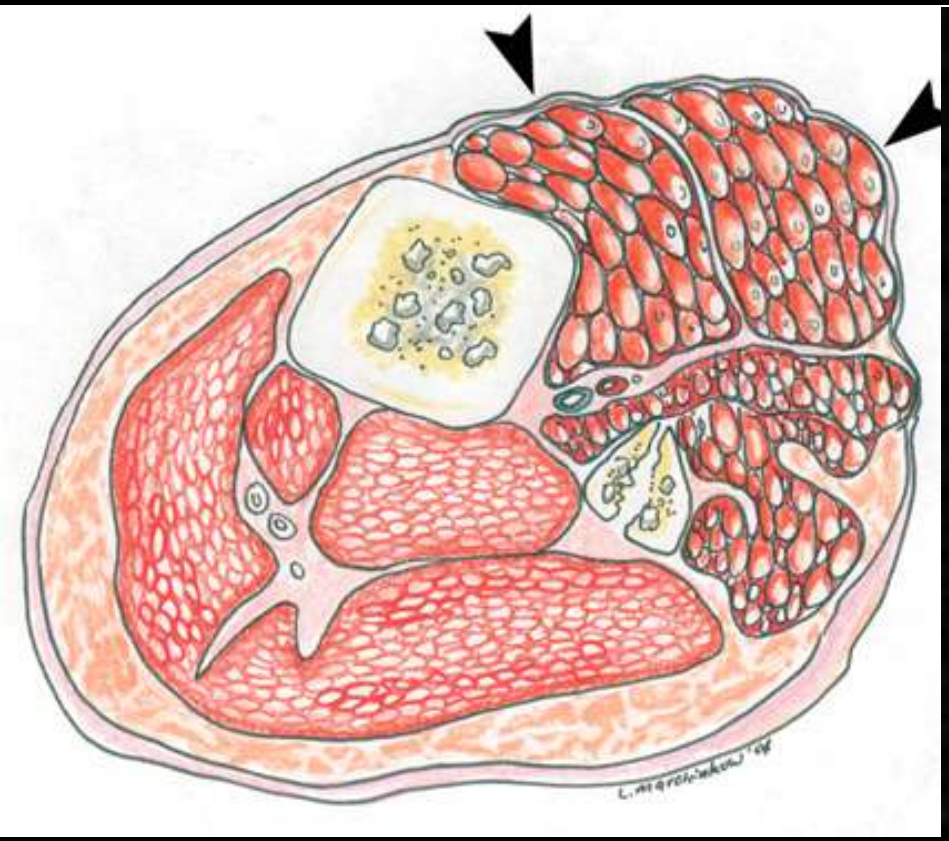
- Compartment syndrome
- Myonecrosis and Rhabdomyolysis
- Diabetic Muscle Infarct

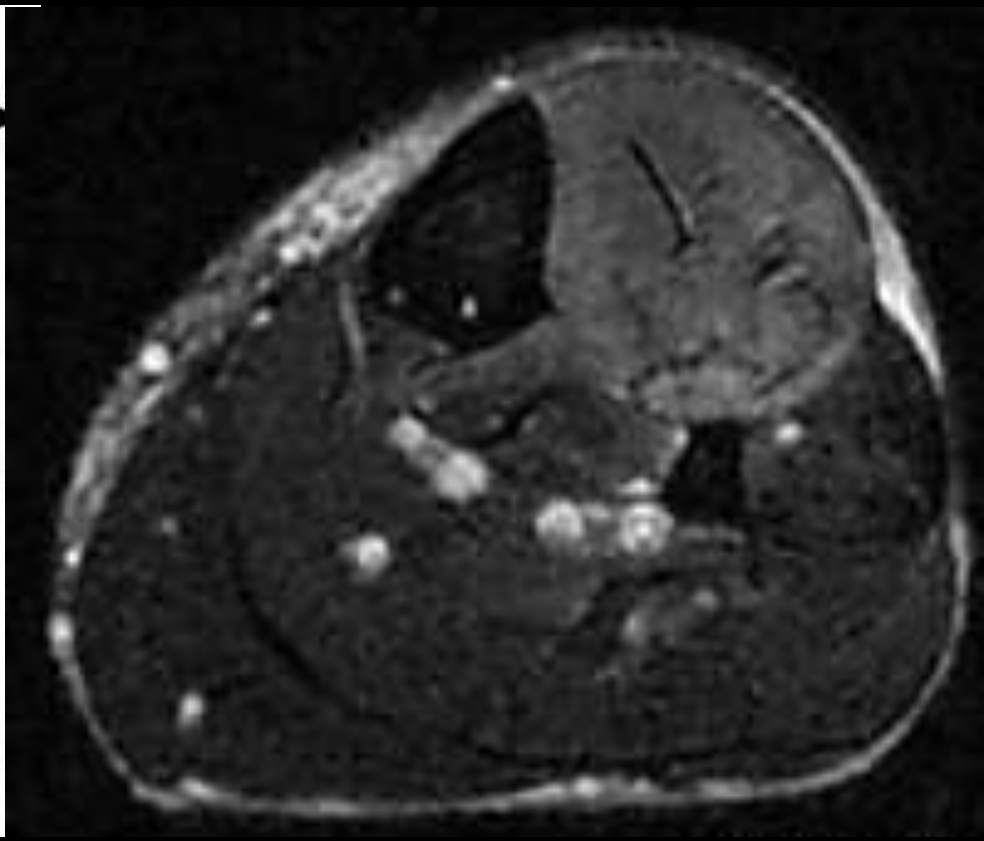
Causes of ACS

- Blunt or penetrating trauma
  - fracture
  - soft tissue contusion
  - crush injury
  - gunshot wound
  - vascular injury
- Thermal or electrical injury
- Iatrogenic insult
  - Reperfusion edema
  - Arthroscopy, osteotomy, arhtrodesis, THA
  - Pt positioning during long operations
  - Extravasation of contrast material or other parenteral drugs in the forearm
  - Anticoagulation
  - Hematoma formation after transaxillary arteriography
  - Prolonged application of an excessively tight cast, constrictive dressing, blood pressure monitor, or pneumatic antishock garment

Resnick IDJ 558

Compartment Syndrome





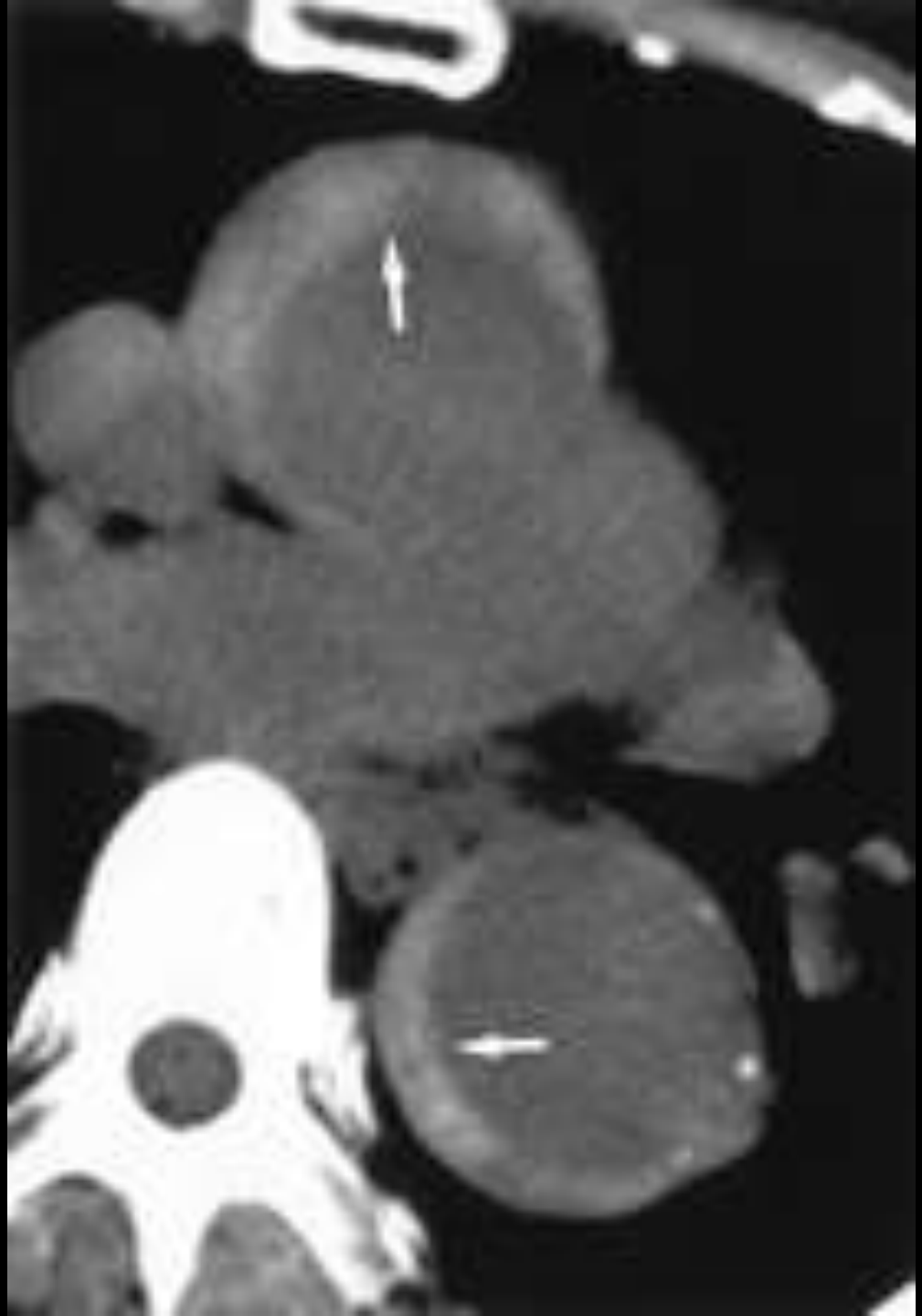
AJR

Compartment Syndrome

- Serious complication of fractures of the tibial shaft
- Most important diagnostic feature is the presence of inappropriate pain even after stabilization of the fracture by a cast or by internal or external fixation
- Pain is made worse by passive stretching of the muscles involved and there is an assoc sensory disturbance
  - 4 Ps: paresthesia, pallor, paresis, lack of pulse
- It has been shown that muscle can tolerate only 4 hours of ischemia without injury
- Treatment: Surgical fasciotomy and decompression

Hyder, N. Compartment syndrome in tibial shaft fracture missed because of a local nerve block. JBJS 1996 78-B: 499-500.

66 yo M referred for CT angiogram



Chew, F. Radiology Case Reports, Vol1. 2006.

- 4 hours after the injection, the patient was brought to the operating room for fasciotomy, washout, and placement of vacuum drainage device.
- At surgery, subfascial edema was found in the biceps compartment but the tissues appeared healthy and viable
- The biceps fascia was divided longitudinally and the tissues were irrigated

Post op radiograph

54 yo M with foot pain

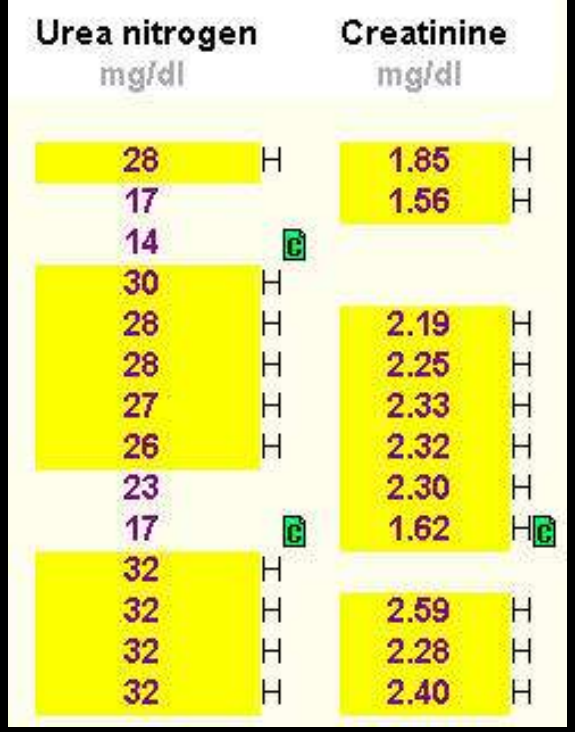
Compartment syndrome and subsequent myonecrosis

**Sheet-like calcification or ossification of abductor hallucis and quadratus plantaris

JD

23 year old man with bilateral calf swelling and inability to walk

Creatine kinase IntUnits/L
17300 C
52440 C
68540 C
85800 C
107100 C
166050 C
160050 C
192720 C



Urea nitrogen mg/dl	Creatinine mg/dl
28 H	1.85 H
17	1.56 H
14 C	
30 H	
28 H	2.19 H
28 H	2.25 H
27 H	2.33 H
26 H	2.32 H
23	2.30 H
17 C	1.62 H C
32 H	
32 H	2.59 H
32 H	2.28 H
32 H	2.40 H

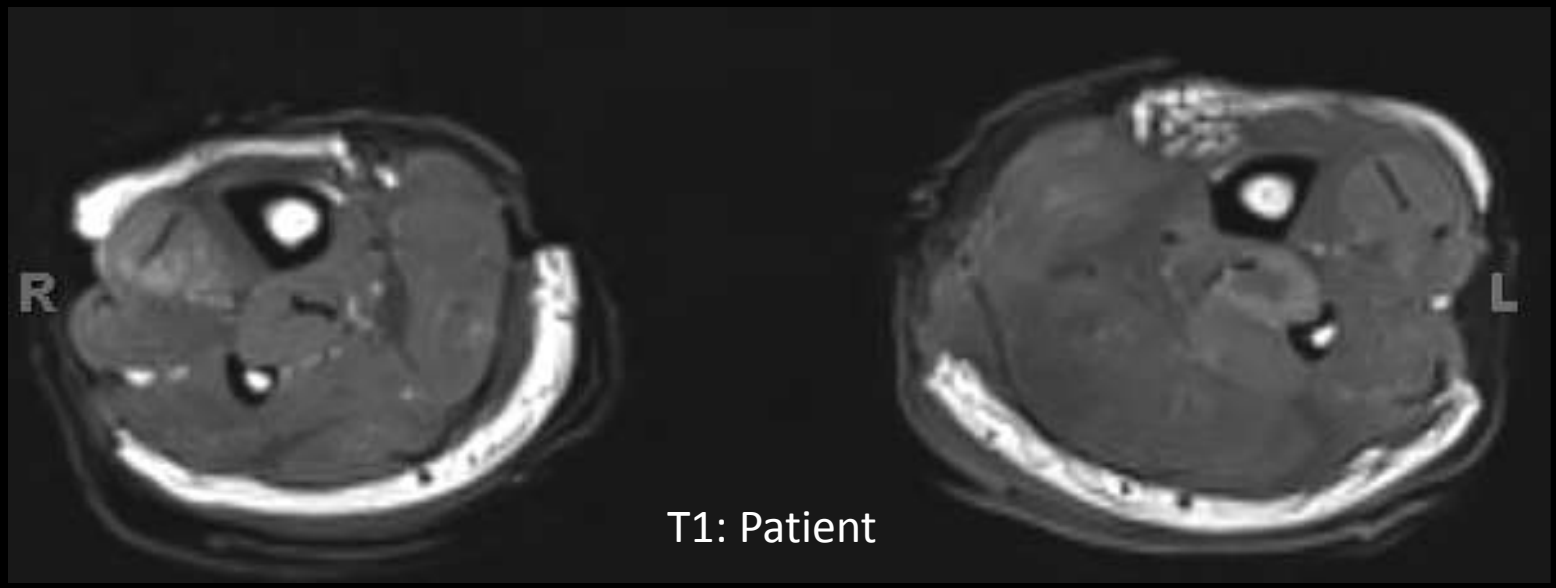
Supplements:

Glucosamine
Antiestrogen
Protein powder
Dicalcium phosphate
Stearic acid
Caffeine

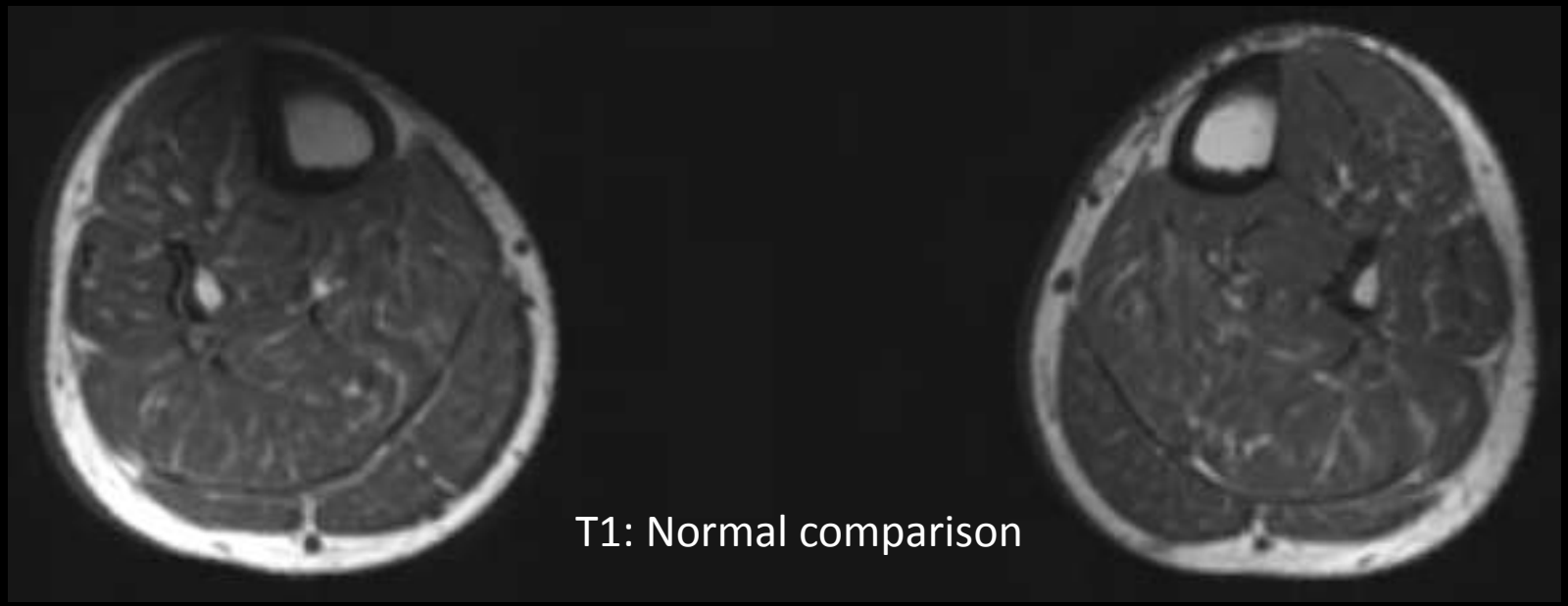
- Compartment pressures in calves 35-45 mm Hg (nl 0-15)

- Operative findings:
  - Left side:
    - Immediate bulging of purple-gray muscle from medial calf
    - Massively swollen soleus and gastroc
    - Posterior compartment with poorly contractile musculature
  - Right side:
    - Similar but less severe findings, preserved contractile function

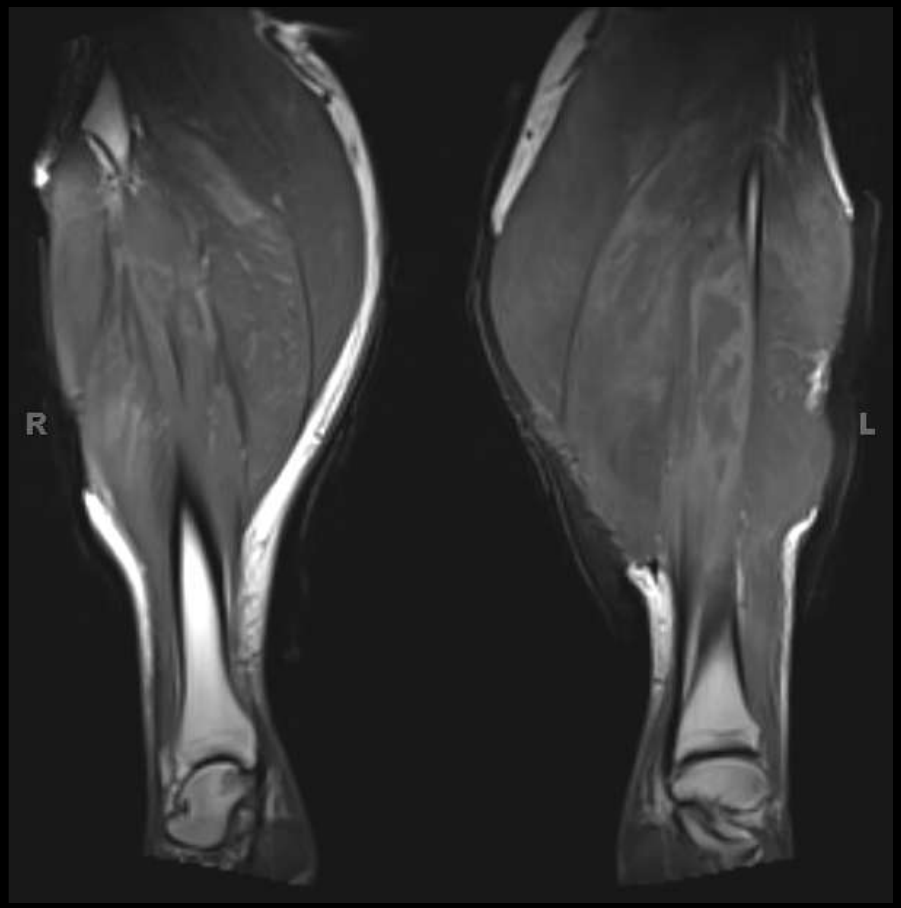
- Procedure:
  - Right and left calf four-compartment fasciotomies

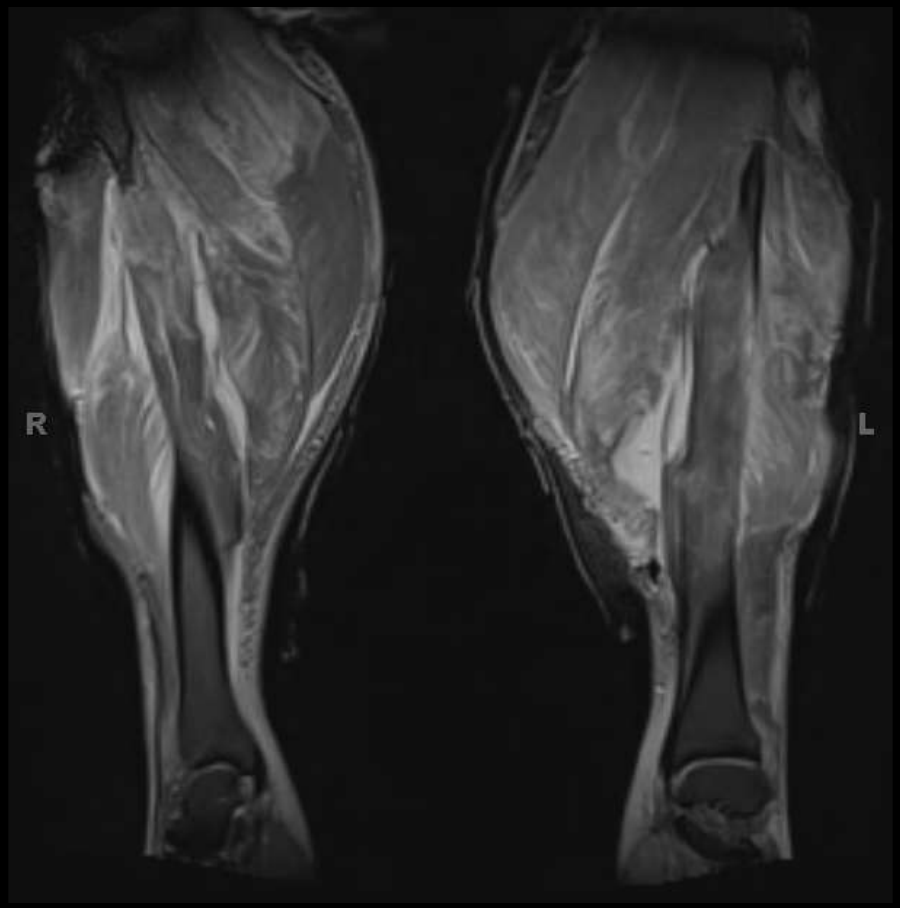


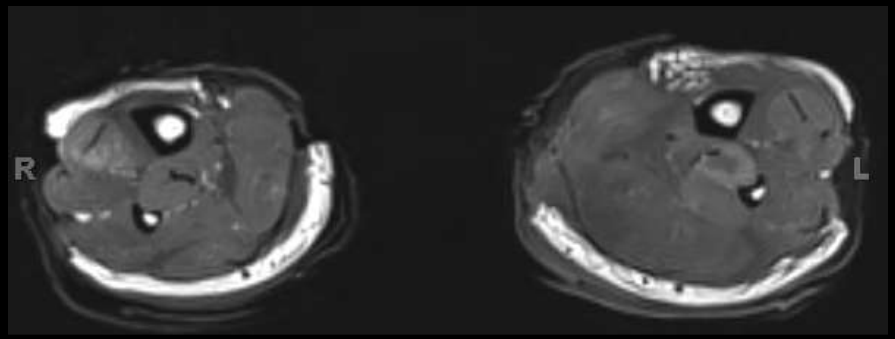
T1: Patient

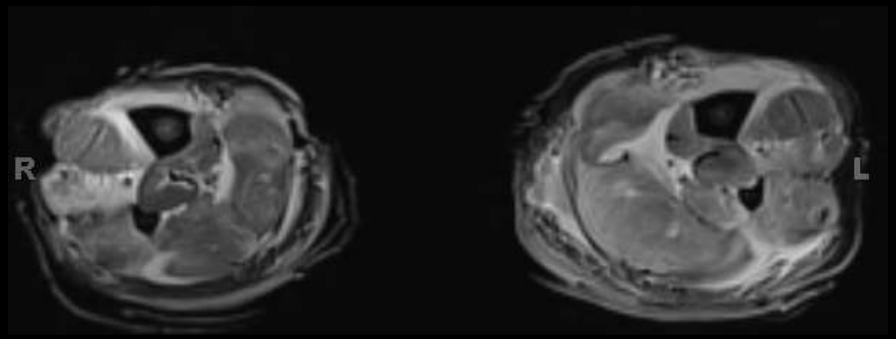


T1: Normal comparison





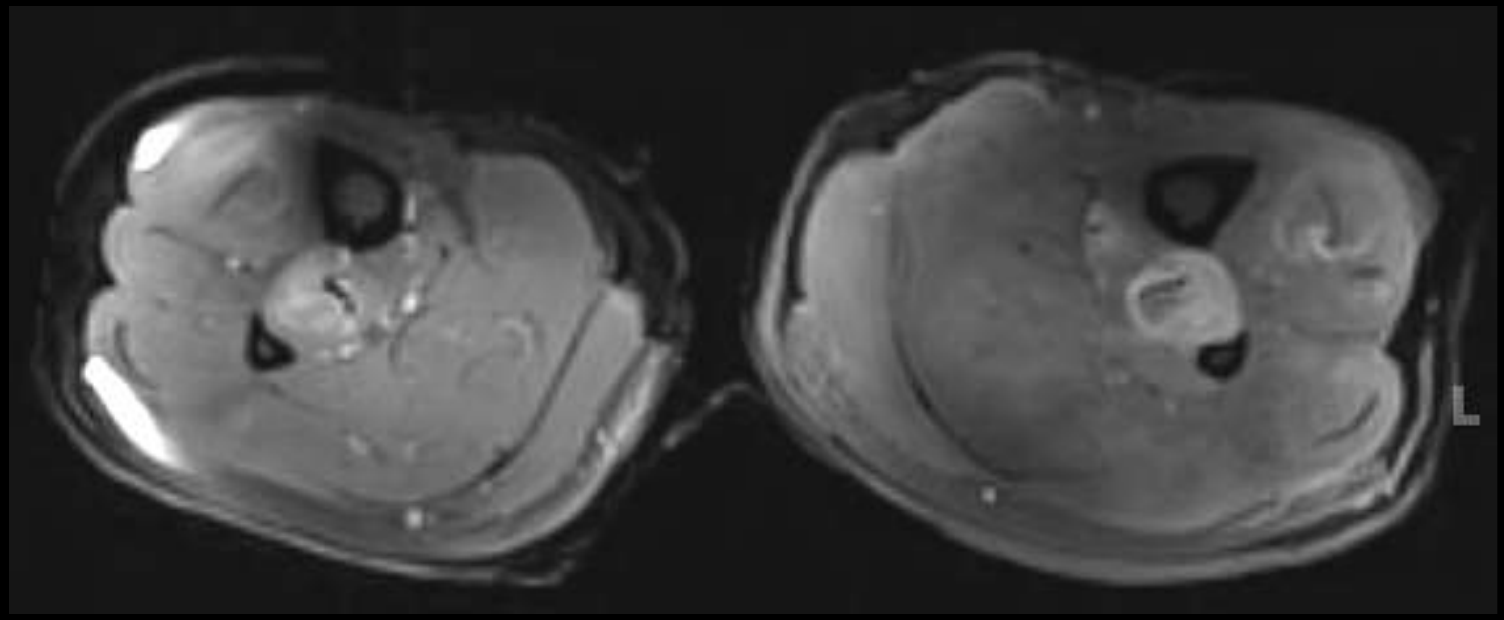




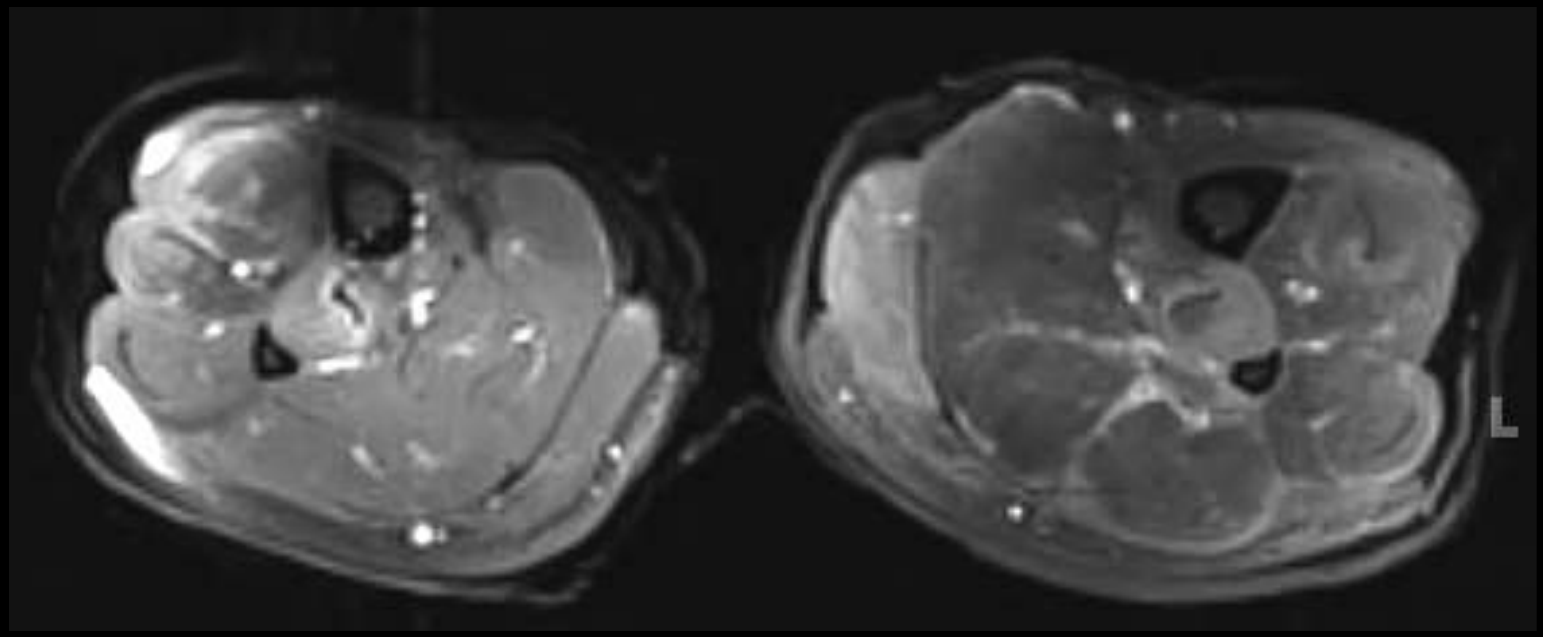
T1

T2FS

T1 FS pre



T1 FS post



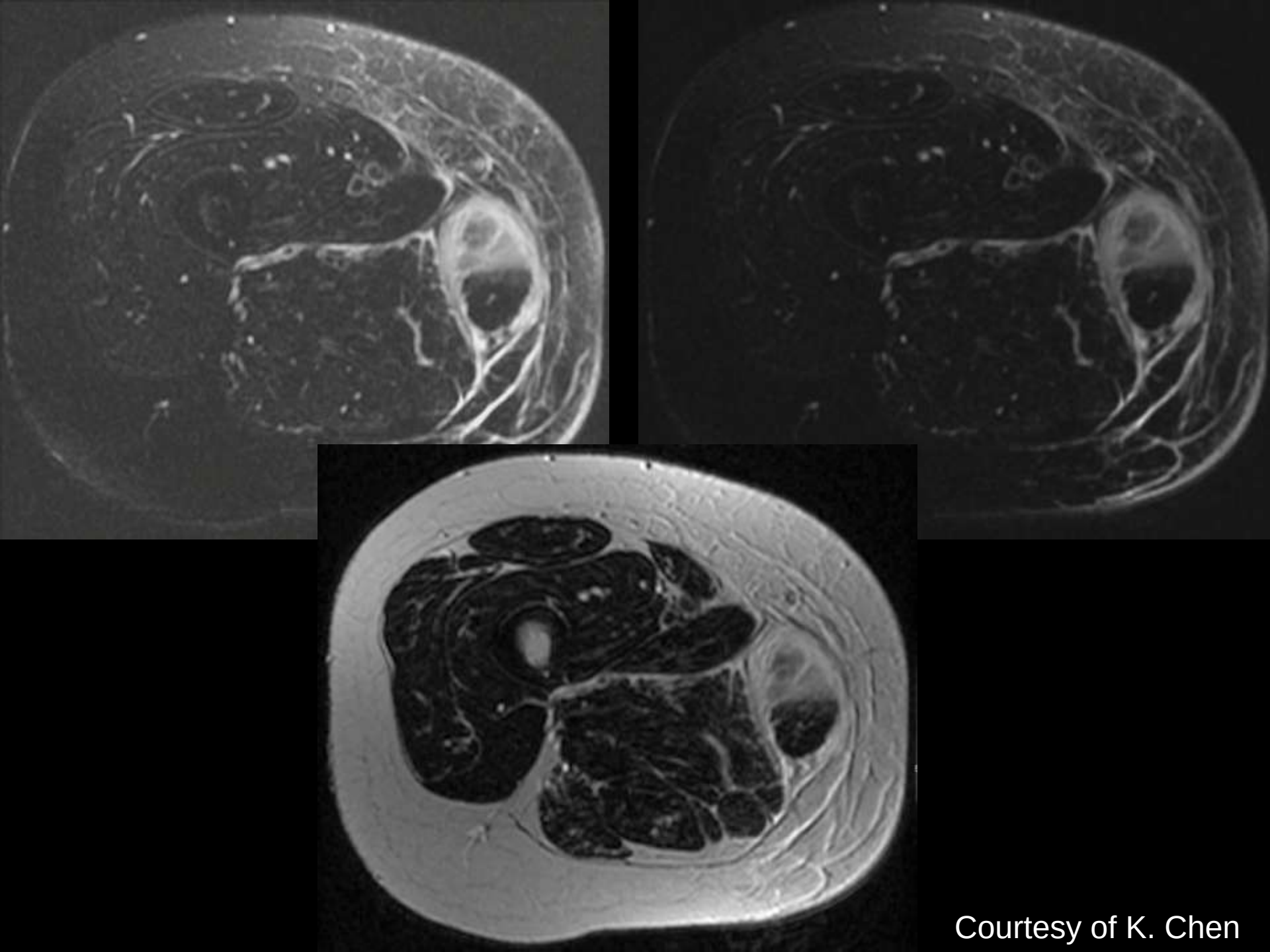
Rhabdomyolysis, compartment syndrome and myonecrosis

Rhabdomyolysis

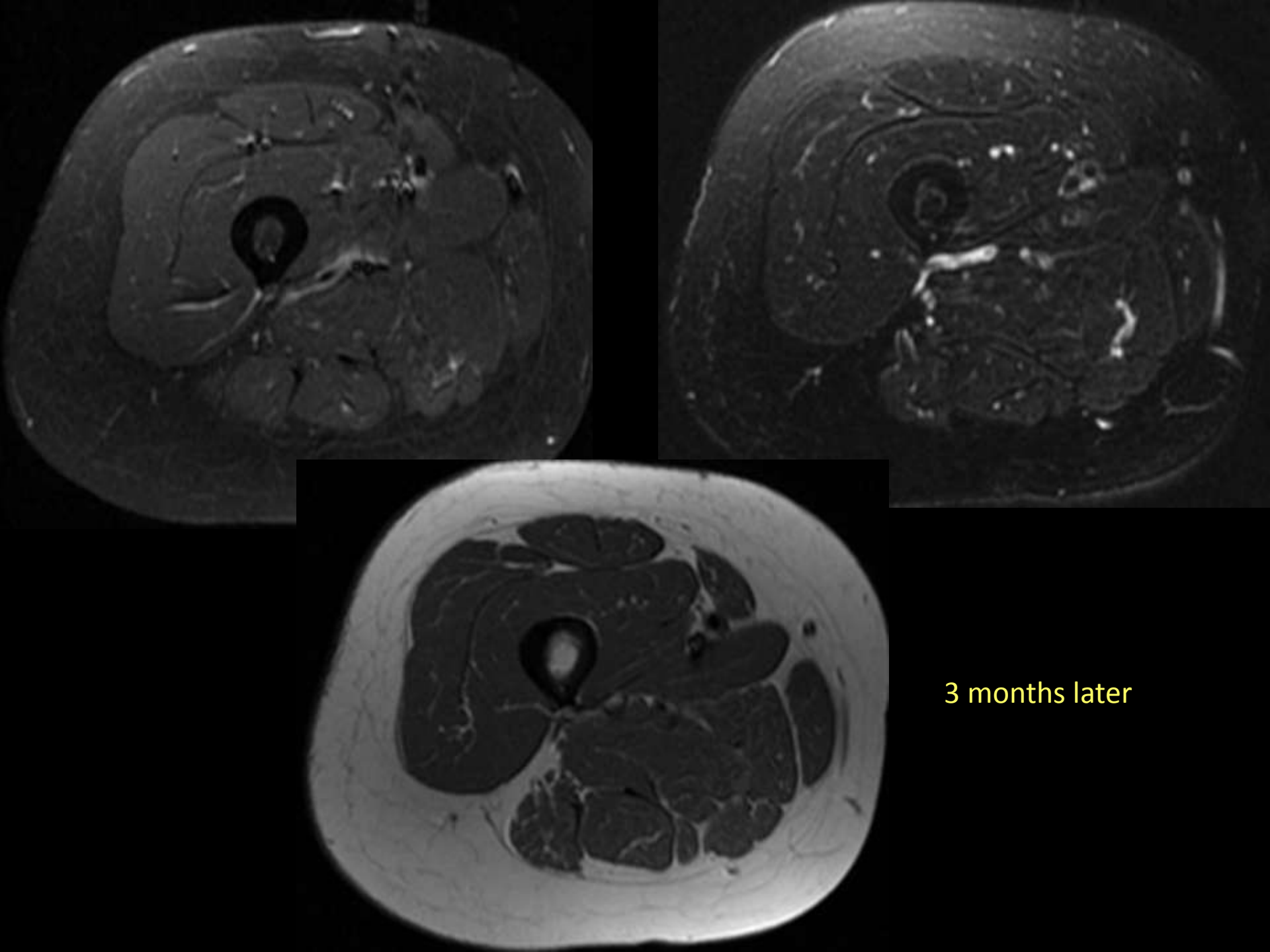
- Striated muscle dissolution or disintegration
- Damages the sarcolemma, leading to muscle necrosis and release of toxins (potassium, phosphate, myoglobin, creatine kinase, urate)
- This leads to myoglobinemia, which often results in myoglobinuria
- Locally, the released products result in microvascular damage, capillary leak, and increased intracompartmental pressure, reduced tissue perfusion and ischemia
- Early complications: hyperkalemia, cardiac arrythmia/arrest
- Late complications: acute renal failure and DIC
- ***MRI is the method of choice in patients with clinical diagnosis of rhabdomyolysis to evaluate the distribution and extent of muscle lesions, especially when fasciotomy is considered for treatment; also to assess for muscle viability.***

35 yo M with limited neck extension

54-year old woman with type II diabetes mellitus presenting with acute thigh pain



Courtesy of K. Chen


3 months later

Diabetic Muscle Infarction

- Middle aged: mean 42 yo
- Poorly controlled or longstanding diabetes
- 77% have type 1 diabetes
- 94% have known microvascular diabetic complication (neuropathy, retinopathy, nephropathy)
- ABRUPT ONSET OF SEVERE PAIN THAT OCCURS AT REST
- THIGH muscles most commonly affected (80%)

Resnick. IDJ. 565-7.

Diabetic Muscle Infarction

- First described in 1965
- Caused by thrombosis of small and medium sized arterioles
- Occurs because of hypercoagulability and associated vascular endothelial damage
- Although histopathologic diagnosis is sometimes necessary, muscle infarction can often be diagnosed when the characteristic clinical presentation is combined with typical imaging findings

Resnick. IDJ. 565-7.

Diabetic Muscle Infarction

- Imaging DDx
  - Pyomyositis (insidious onset of symptoms; more than 1 month before clinical presentation)
  - Necrotizing fasciitis (fever, leukocytosis)
  - Non infectious myositis: focal myositis, proliferative myositis (biopsy is necessary in some cases)

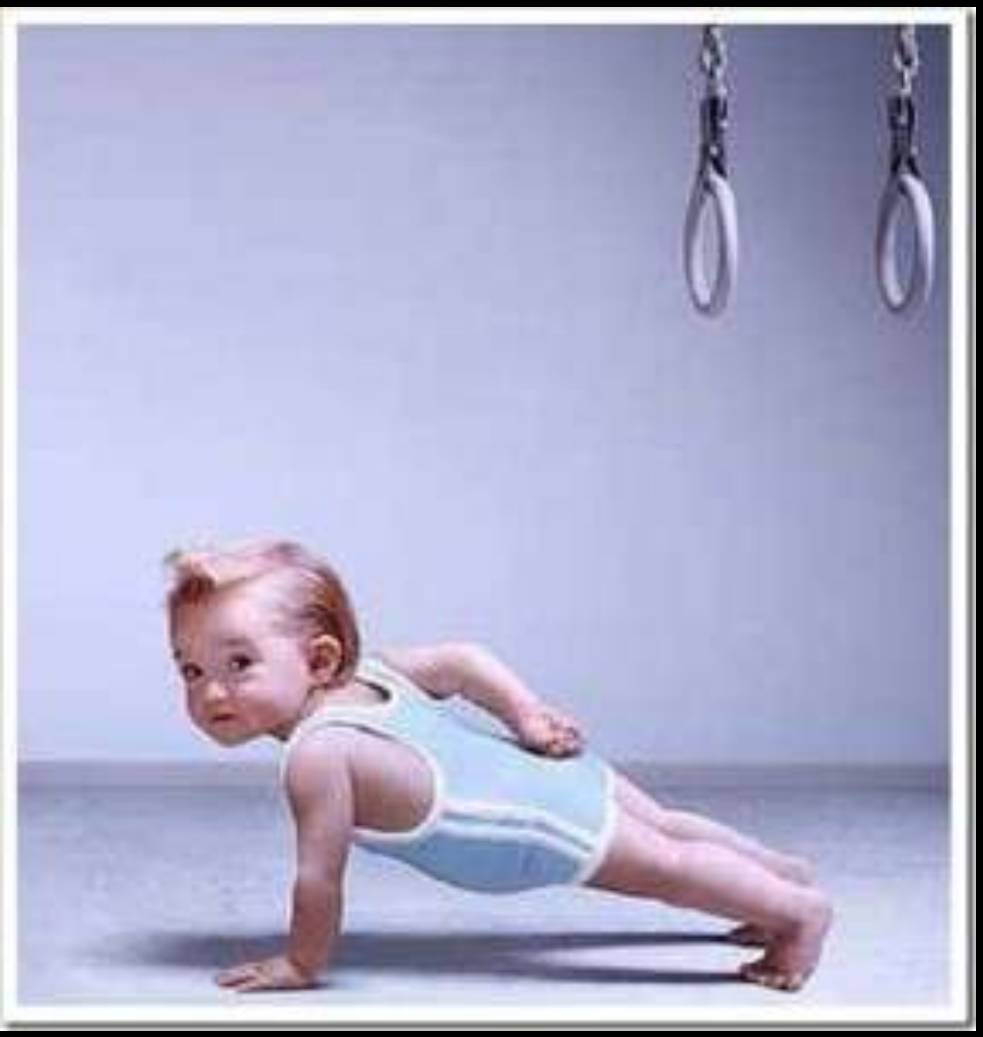
Resnick. IDJ. 565-7.

Before they were BONERS

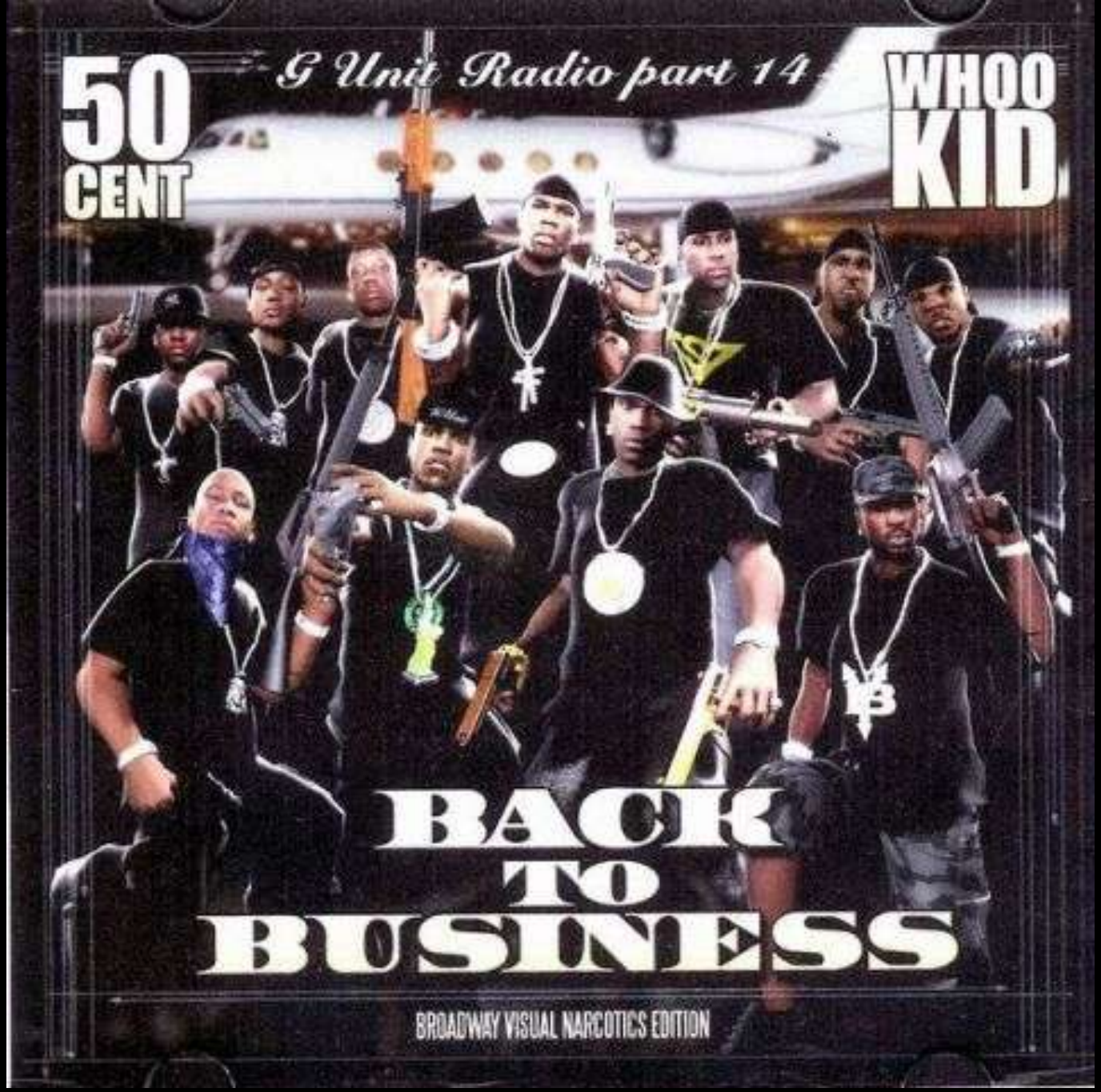

2004
AIRBRUSH TAN:
BUY ONE, GET ONE
50% OFF
Platinum
TAN & SPA
SAN DIEGO
HORTON PLAZA
(619) 233-4099
FIRST TIME CUSTOMERS ONLY.
NOT VALID WITH ANY OTHER SPECIAL OR DISCOUNT.
REQUIRES SIGN-UP FOR EMAIL NEWSLETTER. COUPON
EXPIRES AT SOLE DISCRETION OF PLATINUM TAN.

"Didn't you say you were in the mood for a little Indian tonight?"

Scott “the ringman” Yochim



Fed “the washboard” Discepola

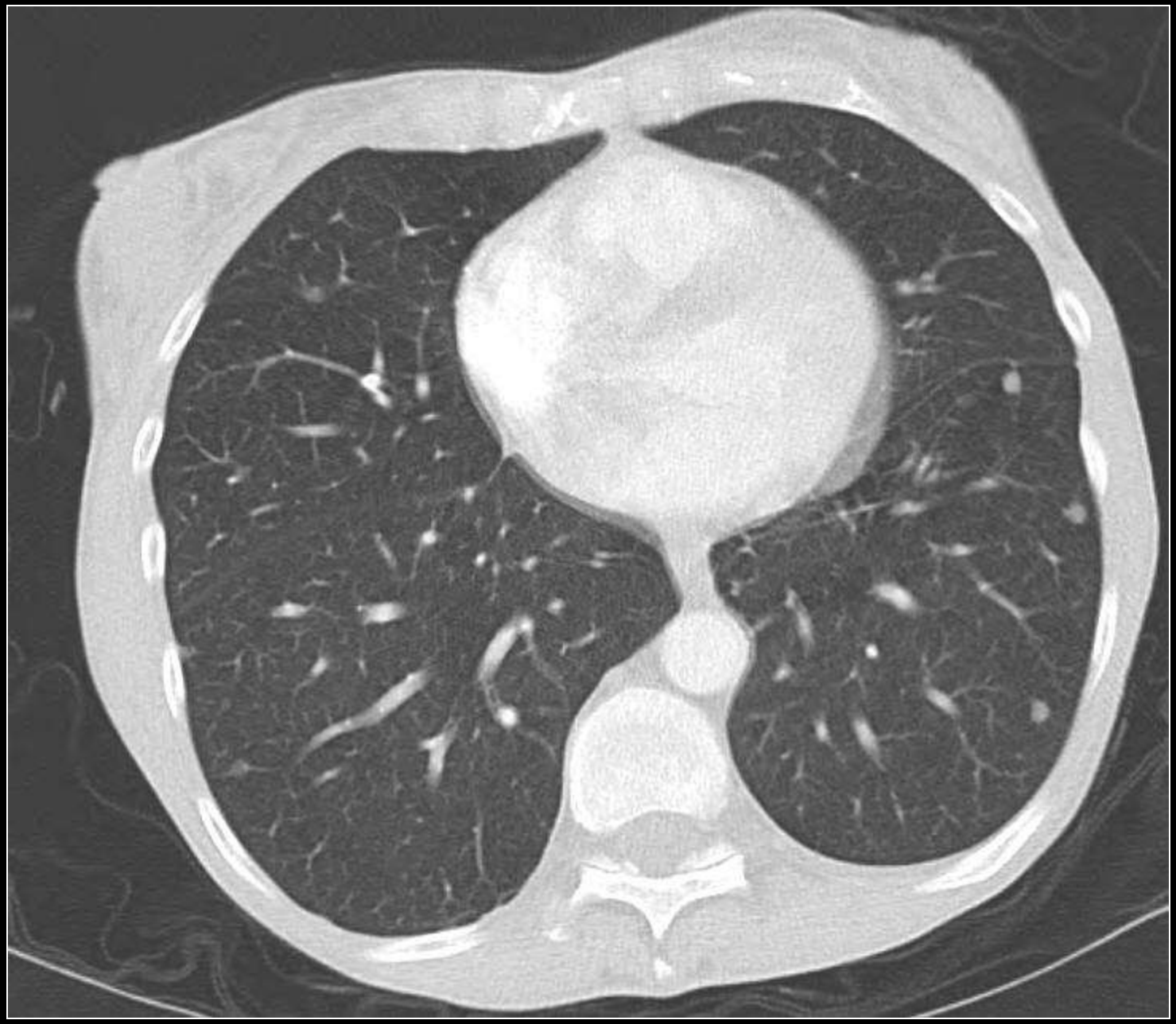

50 CENT
G Unit Radio part 14
WHOO KID
BACK TO BUSINESS
BROADWAY VISUAL NARCOTICS EDITION

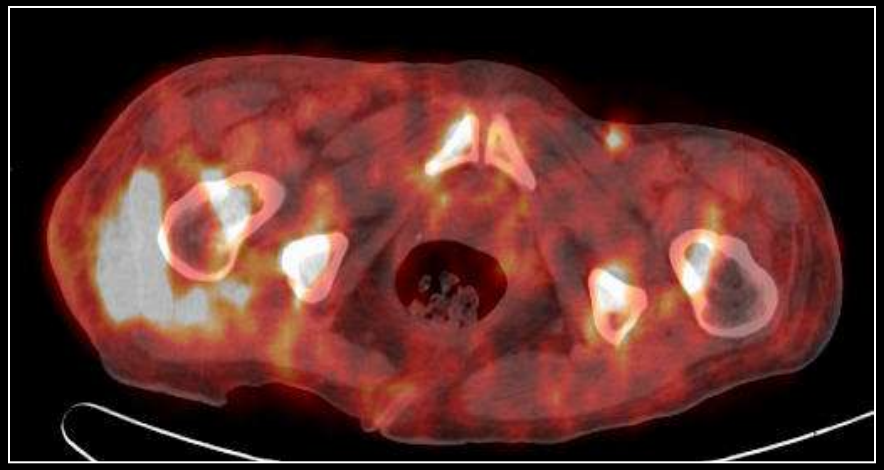
MYOSITIS

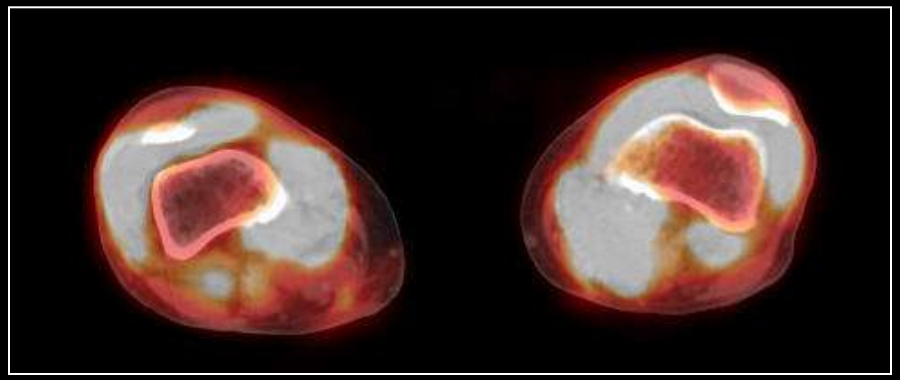
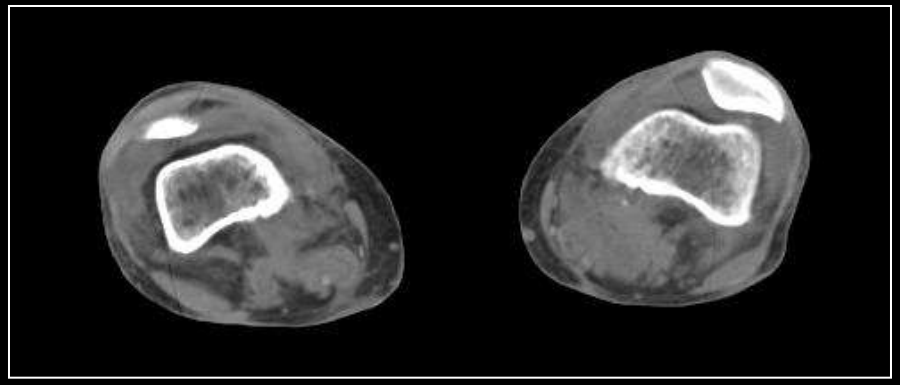
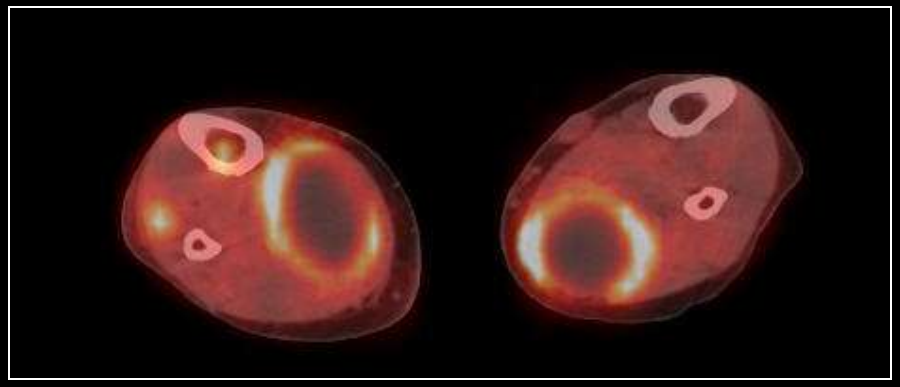
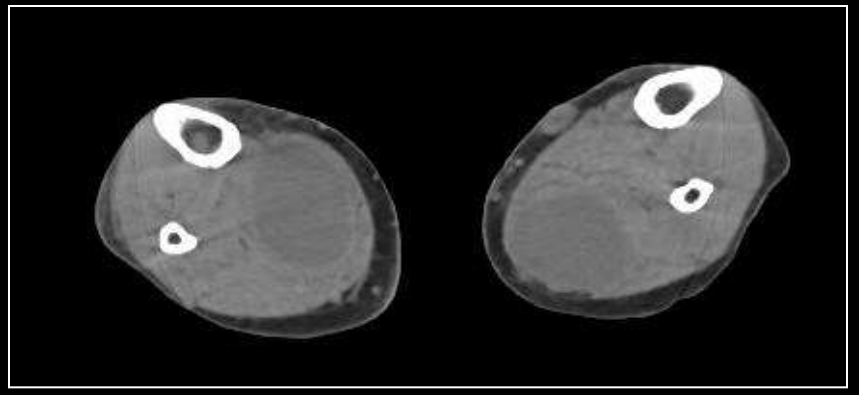
INFECTIOUS ENTITIES AFFECTING MUSCLE:

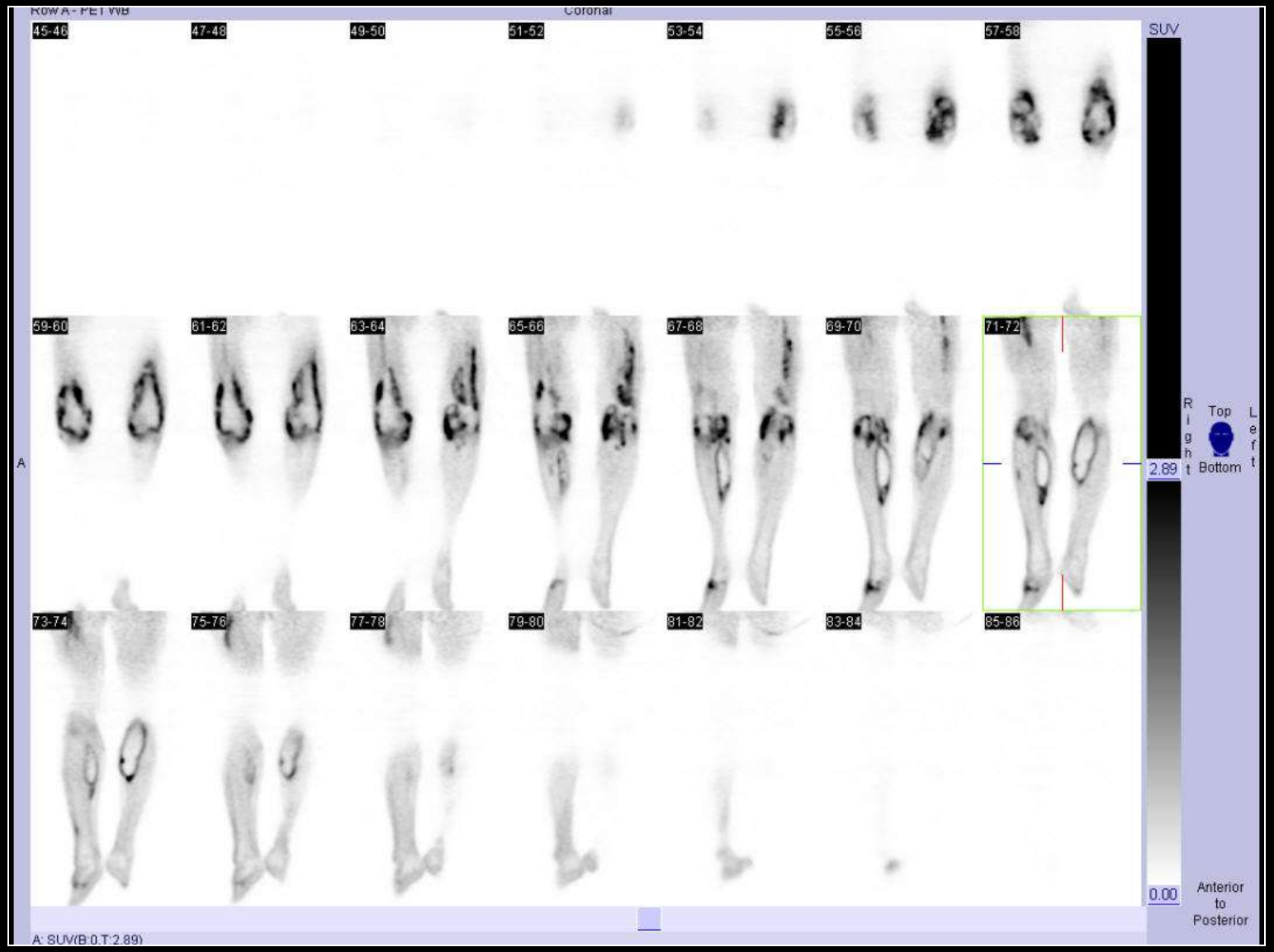
- Pyomyositis
- Necrotizing fasciitis

55 yo F with 2 weeks lower extremity swelling, pain and cough






Row A - PET WB
Coronal
45-46
47-48
49-50
51-52
53-54
55-56
57-58
59-60
61-62
63-64
65-66
67-68
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73-74
75-76
77-78
79-80
81-82
83-84
85-86
SUV
2.89
0.00
A
Right
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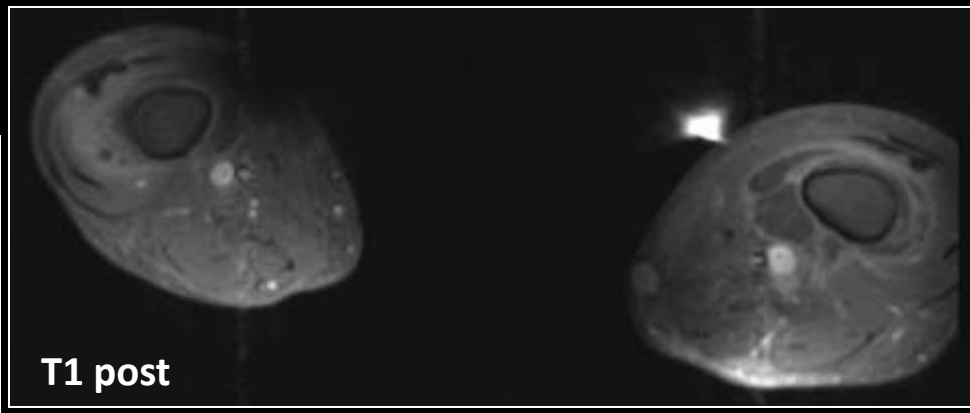
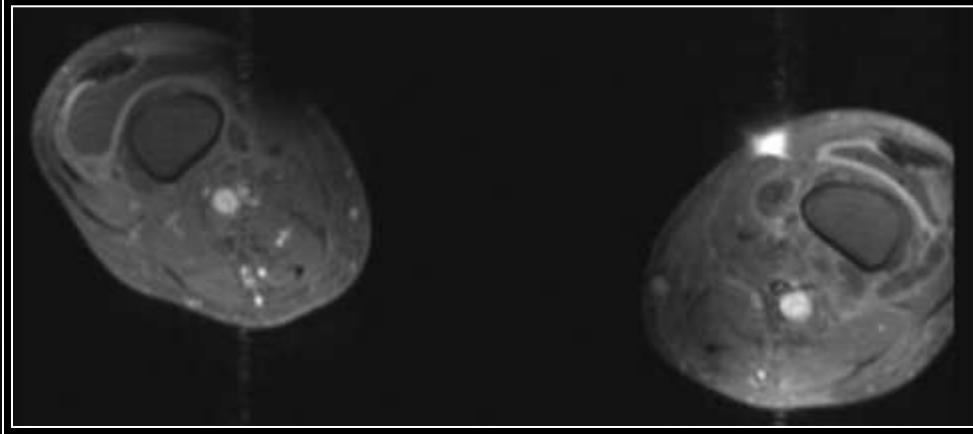
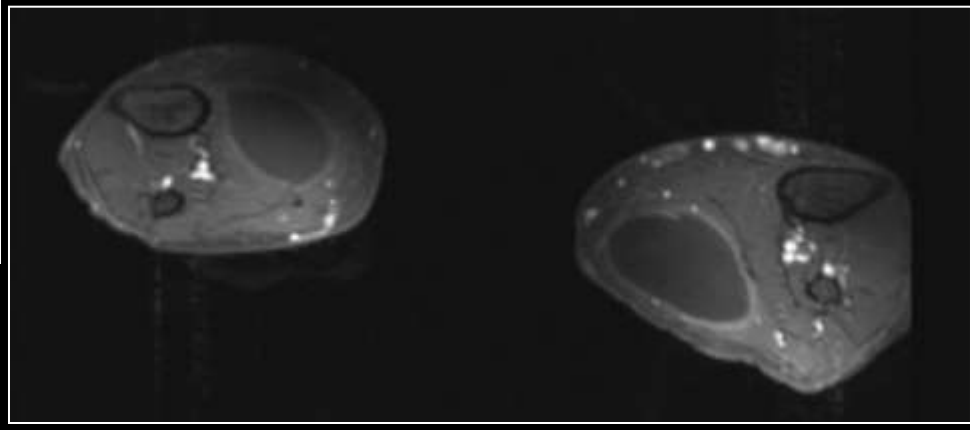
Anterior to Posterior
A: SUV(B:0,T:2.89)


R
L
STIR


T1 post



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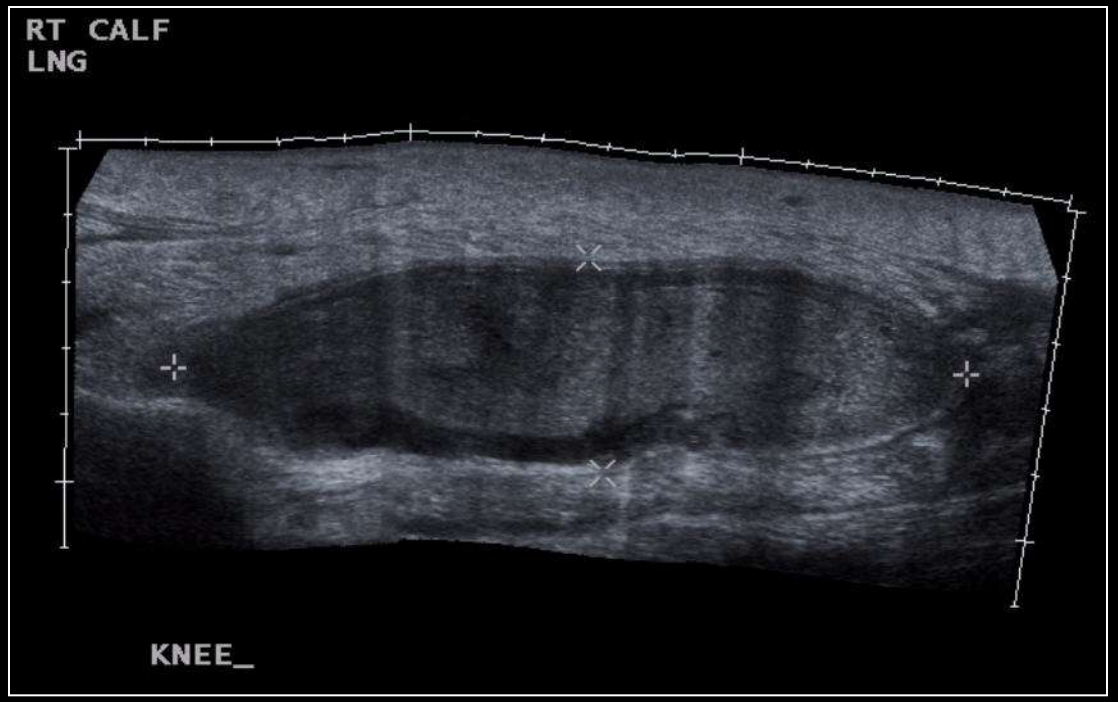

RT CALF
LNG
KNEE_

Diagnosis

- PET
  - Diffuse myositis or myonecrosis with secondary inflammation
- MR
  - Myositis with microabscesses in v. intermedius
  - Subacute hematomas in gastrocnemii

- US aspiration
  - R calf: S. aureus
- Bilateral Knee Aspirates
  - Elevated Neutrophils
  - S. aureus
- OR
  - Bilateral knee irrigation
  - Bilateral calf incision/irrigation
  - “cloudy fluid”
- BCx on admission: S. aureus
- CK < 25 (low)
- TTE: negative for veg

Final Diagnosis

Staph Aureus Bacteremia

Pyomyositis and Multiple intramuscular abscesses

Septic arthritis

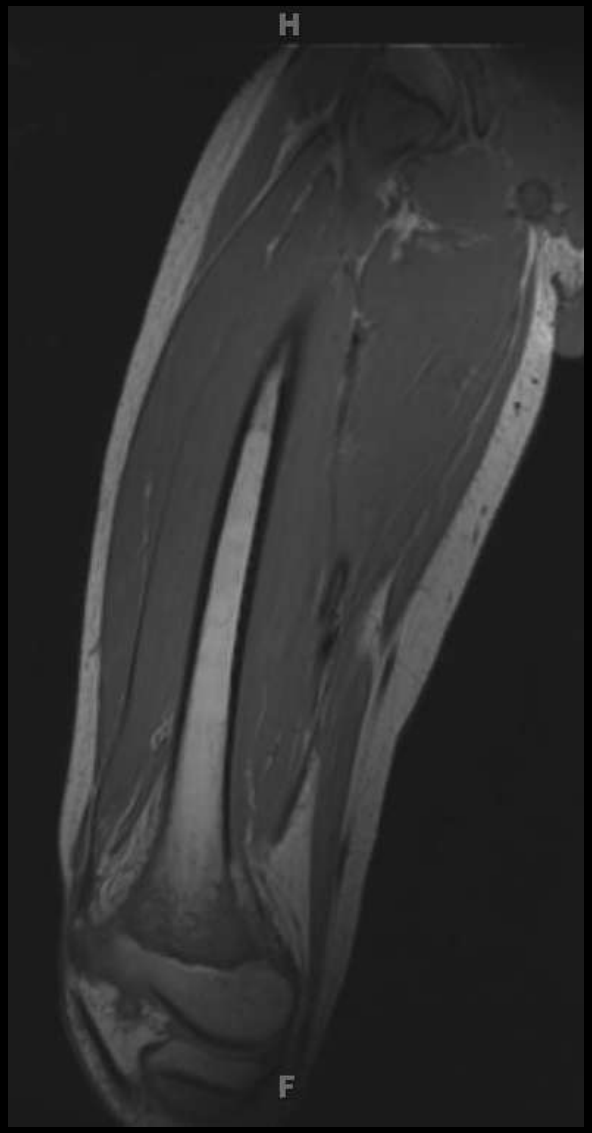
Septic Emboli

Pyomyositis

- Skeletal muscle is particularly resistant to infection
  - Unless concurrent disease
    - Diabetes, HIV, chronic steroid use, connective tissue disorder, history of malignancy
    - Key elements in the development of PM are damaged muscle with varying degrees of immunosuppression and a source of bacteremia
- S. aureus is the most common agent (90%) in both tropical and temperate climates
  - Tends to occur in the large muscles of the lower extremities

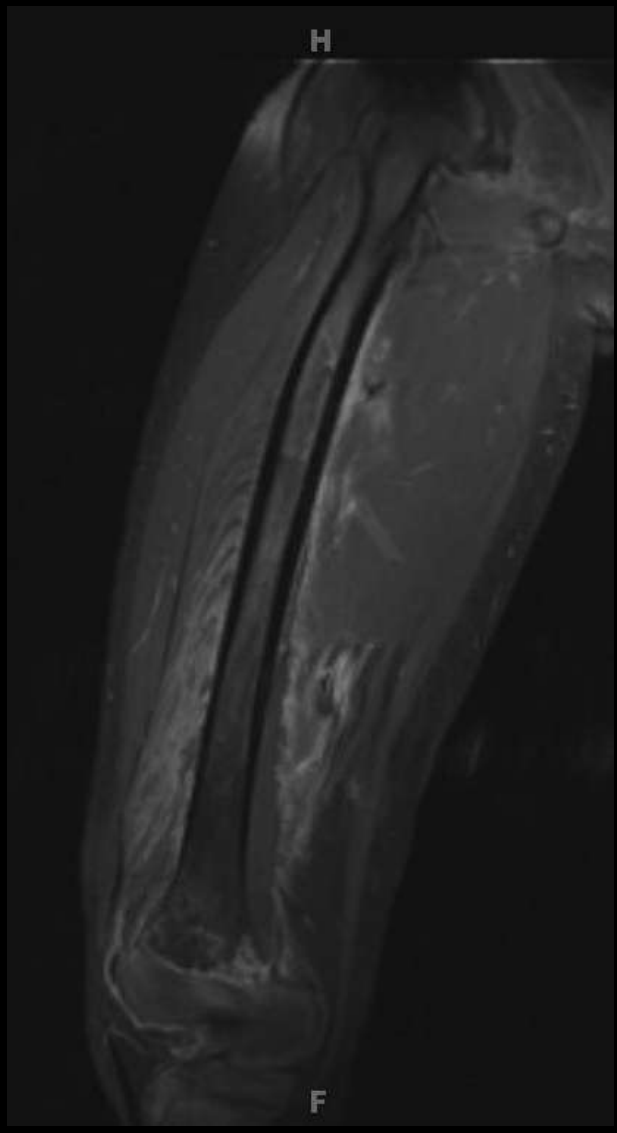
Gordon, B. Pyomyositis: Characterisitics at CT and MR Iimaging. Radiology Oct 1995 279-86

12 yo M with knee and thigh pain and fevers



T1

T2FS



T1FS post

T2FS

OPERATIVE PROCEDURE: 1. irrigation and debridement, right knee with arthrotomy.
2. irrigation and debridement, right femur (including bone).

FINDINGS: The knee was drained and approximately 5 cc of cloudy fluid was aspirated and was sent for culture. The dissection was carried out medially into the subvastus area and the abscess was entered. Purulent material was aspirated again, approximately 5 cc was aspirated although approximately 100 cc was drained and this was sent also for Gram stain and culture.

01/24/2008 16:15 Final	Fluid Knee Aerobic culture	Gram stain • Rare polymorphonuclear leukocytes seen. • No organisms seen.	• Rare Staphylococcus aureus • ********** • No evidence of inducible clindamycin resist detected in this isolate of Staphylococcus a Therefore, it can be considered susceptible clindamycin. Susceptibility Results
01/24/2008 14:35 Final	Fluid Thigh, right Aerobic culture	Gram stain • Abundant polymorphonuclear leukocytes seen. • Moderate Gram Positive Cocci	• Abundant Staphylococcus aureus • ********** • No evidence of inducible clindamycin resist detected in this isolate of Staphylococcus a Therefore, it can be considered susceptible clindamycin. Susceptibility Results
01/24/2008 00:18 Final	Fluid Knee, right Aerobic culture	Gram stain • Moderate polymorphonuclear leukocytes seen. • No organisms seen.	• Rare Staphylococcus aureus • ********** • No evidence of inducible clindamycin resist detected in this isolate of Staphylococcus a Therefore, it can be considered susceptible clindamycin. Susceptibility Results
01/23/2008 22:10 Preliminary	Blood Blood culture		• Staphylococcus aureus in 1 of 2 bottles • For susceptibility results, refer to accessio 08-025-000650 on the Blood culture from 1/ • ********** • Test result called to Phoebe Lee, MD on 1/ 9:12:22 AM by C. Masadao.

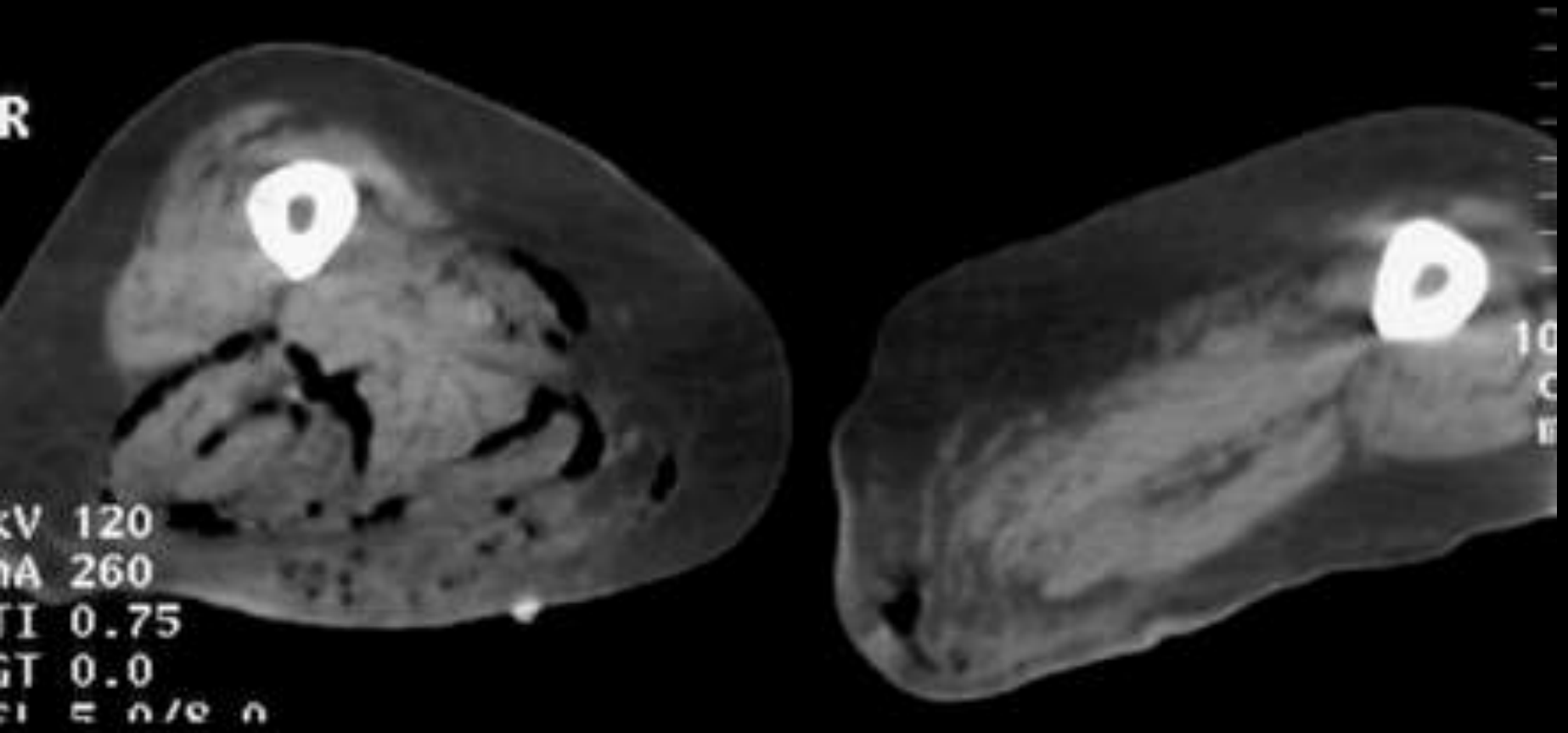
Acute osteomyelitis
Subperiosteal abscess
Knee and hip septic arthritis
Myositis

- Taken back to OR 2 more times for I&D of knee and femur

45 yo M with hx of IV drug abuse

Fayad, L. et al. Musculoskeletal Infection. Radiographics Nov 2007, 1723-1736

61 year old woman with diabetes



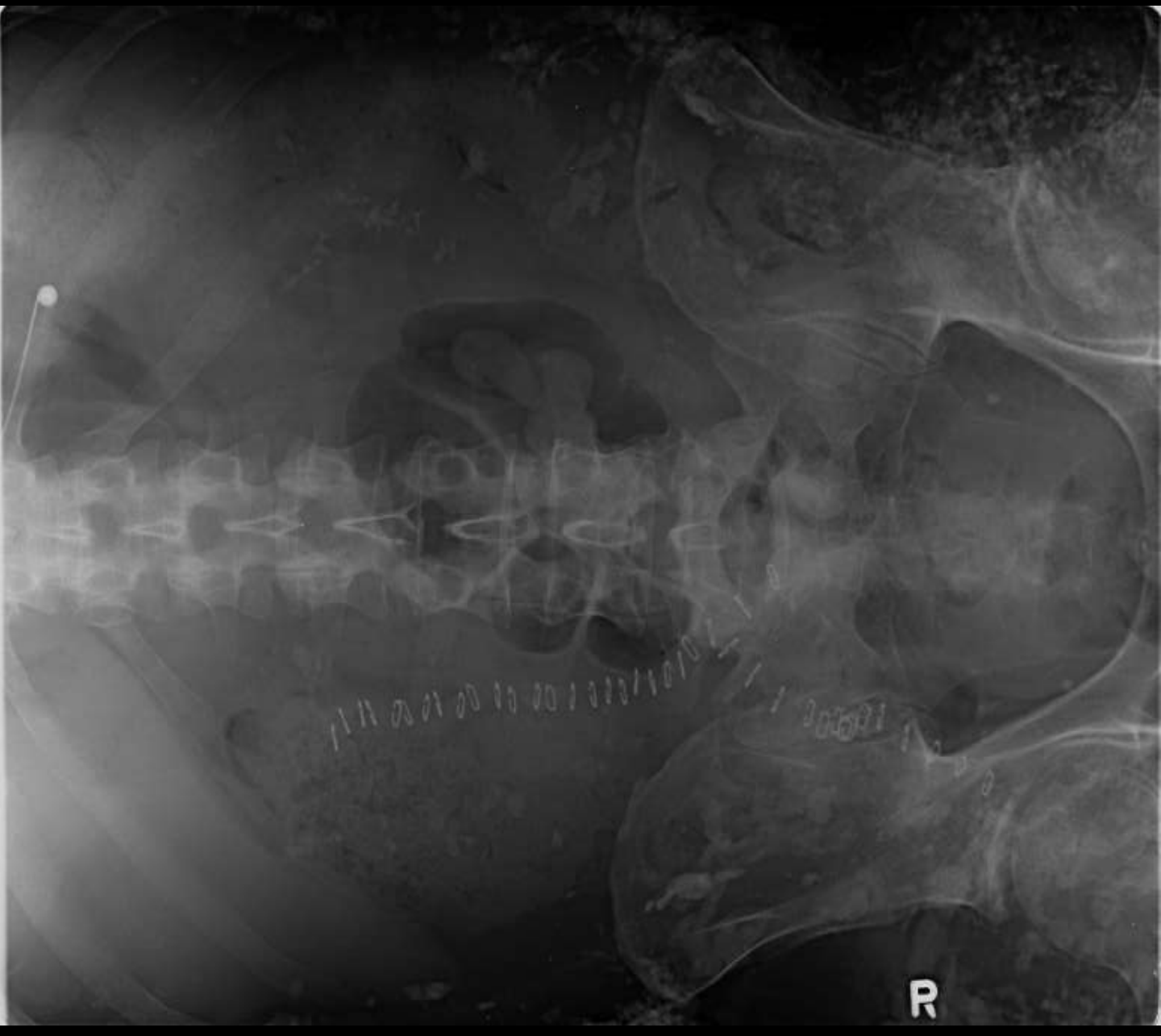
NECROTIZING FASCIITIS:
Surgical Emergency
Fascial Biopsy is the gold standard for diagnosis

Fayad, L. et al. Musculoskeletal Infection. Radiographics Nov 2007, 1723-1736

Idiopathic Inflammatory Myopathies

- Unknown causes
- Characterized by nonsuppurtive inflammation of muscle
  - Dermatomyositis
  - Polymyositis
  - Juvenile dermatomyositis
  - Inclusion body myositis
  - Focal Myositis
  - Idiopathic eosinophilic Fasciitis

40 yo F who recently underwent abdominal surgery


R

Dermatomyositis

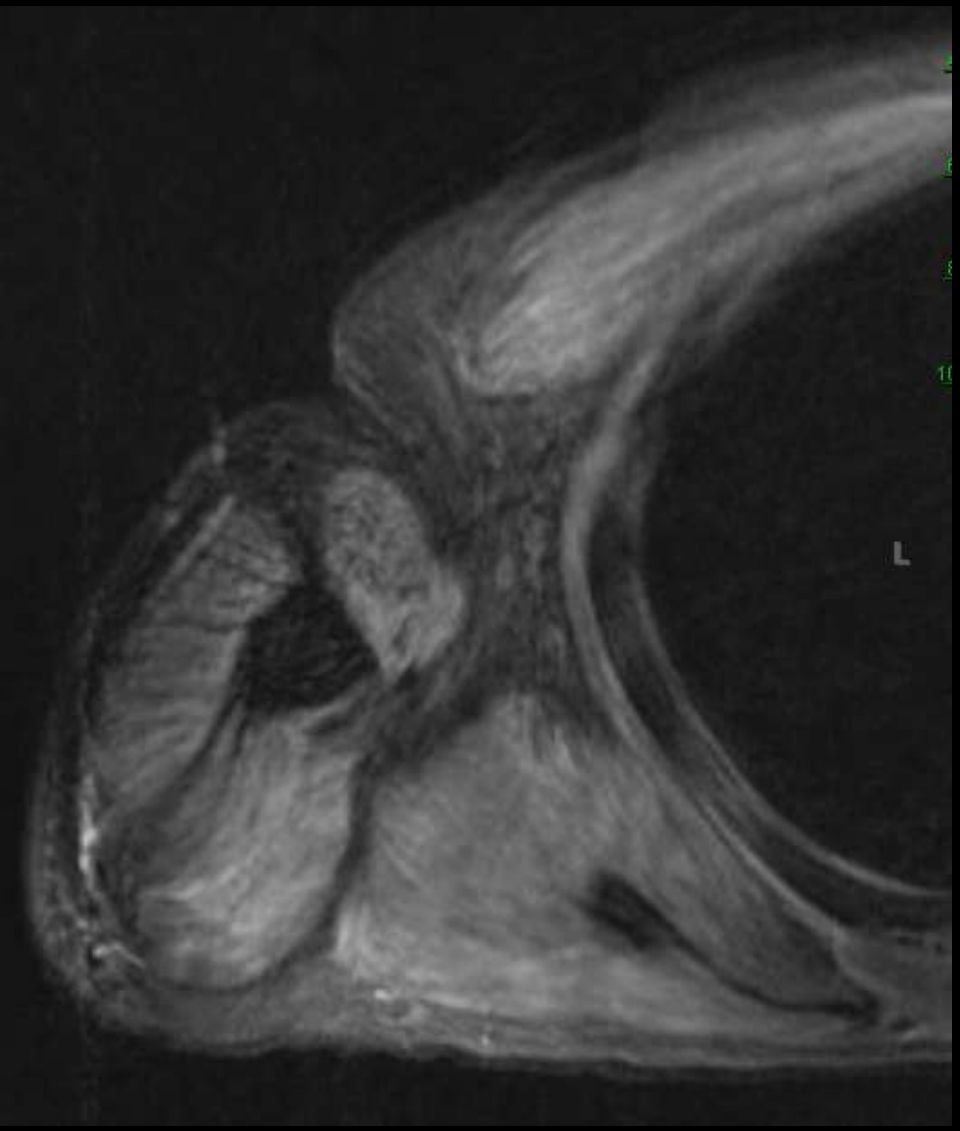
- Hallmark: weakness and inflammatory infiltrates in proximal muscles
- Extent of calcification relates to severity of illness
- Intermuscular or fascial calcification is characteristic
- Median age at diagnosis is 51 yo
- Significant FEMALE predominance
- More likely than polymyositis to affect organ systems other than muscle:
  - Dysphagia
  - Pulmonary fibrosis
  - Cancer

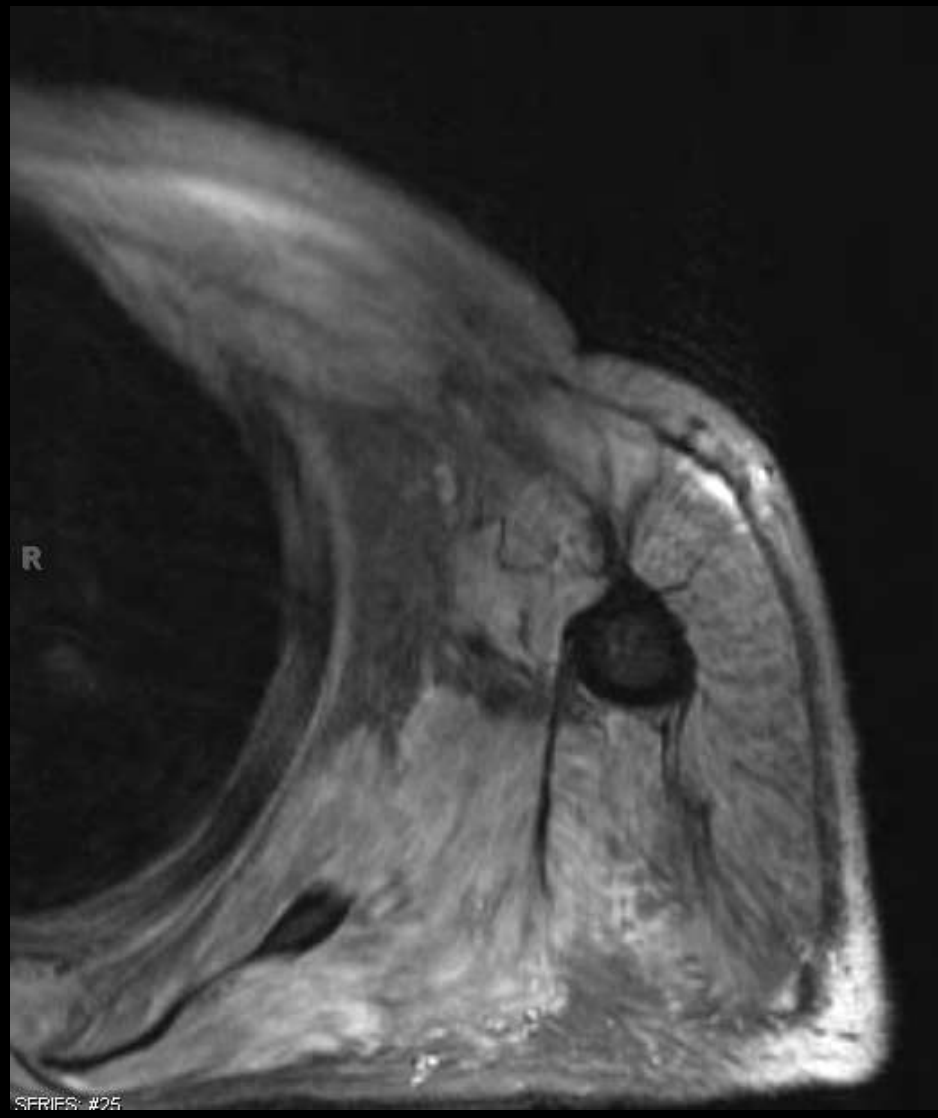
27 yo F with generalized malaise


R
R
LAB

60 yo M with diffuse muscle pain and generalized weakness

Ax T2 FS



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Lossy 8:1 PSNR:42.7
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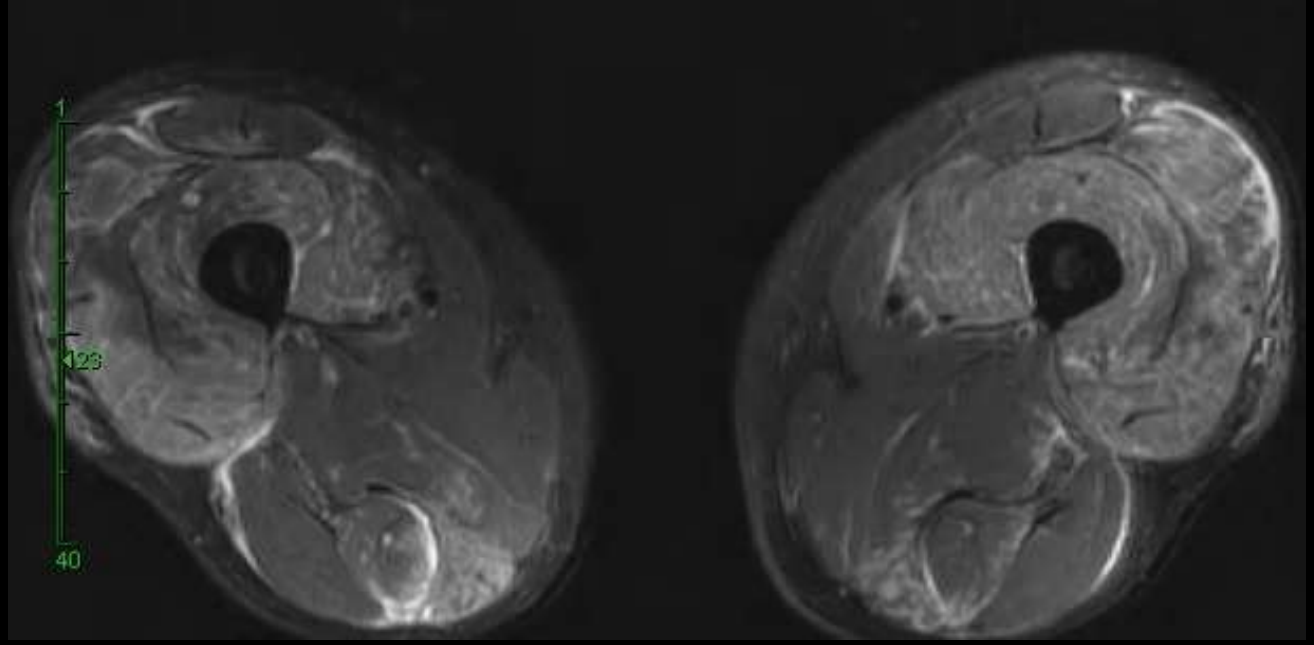
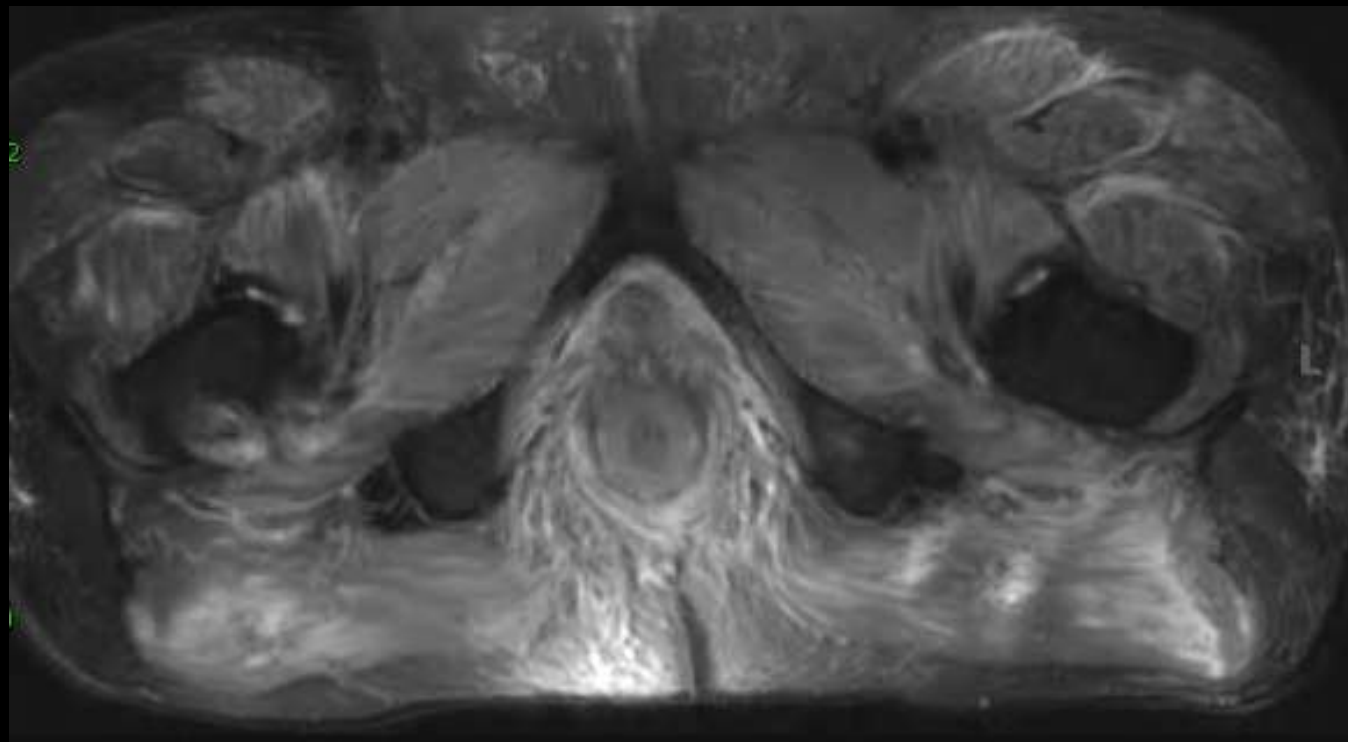
4:45:20
SLI
P: 4.89 r
W: 401 L:1

STIR

T1



T2 FS



FINDINGS

There is severe multifocal myositis characterized by muscle edema in a bilateral, patchy and slightly asymmetric fashion, with normal muscle bulk and no fatty atrophy. Virtually the entire pelvic musculature is involved. In the thighs, there is relative sparing of the rectus femoris and adductor muscles. The most inflammation is present in the vastus lateralis bilaterally, which would be a potential biopsy site with a high diagnostic yield. In the upper extremities, there is myositis of the pectoralis and latissimus dorsi muscles bilaterally as well as the serratus muscles and rotator cuff and deltoid muscles. There is a small amount of involvement of the brachialis muscles bilaterally and sparing of the biceps and triceps muscles.

There is mild skin edema overlying the vastus lateralis bilaterally.

The pattern of involvement is typical for the active phase of dermatomyositis or polymyositis.

In addition, there is evidence of hemosiderosis with intensely low signal intensity on the T2-weighted and STIR images within the lower lumbar spine, sacrum, and both proximal femora as well as the pelvis. Less hemosiderin deposition is seen in the humeri.

IMPRESSION:

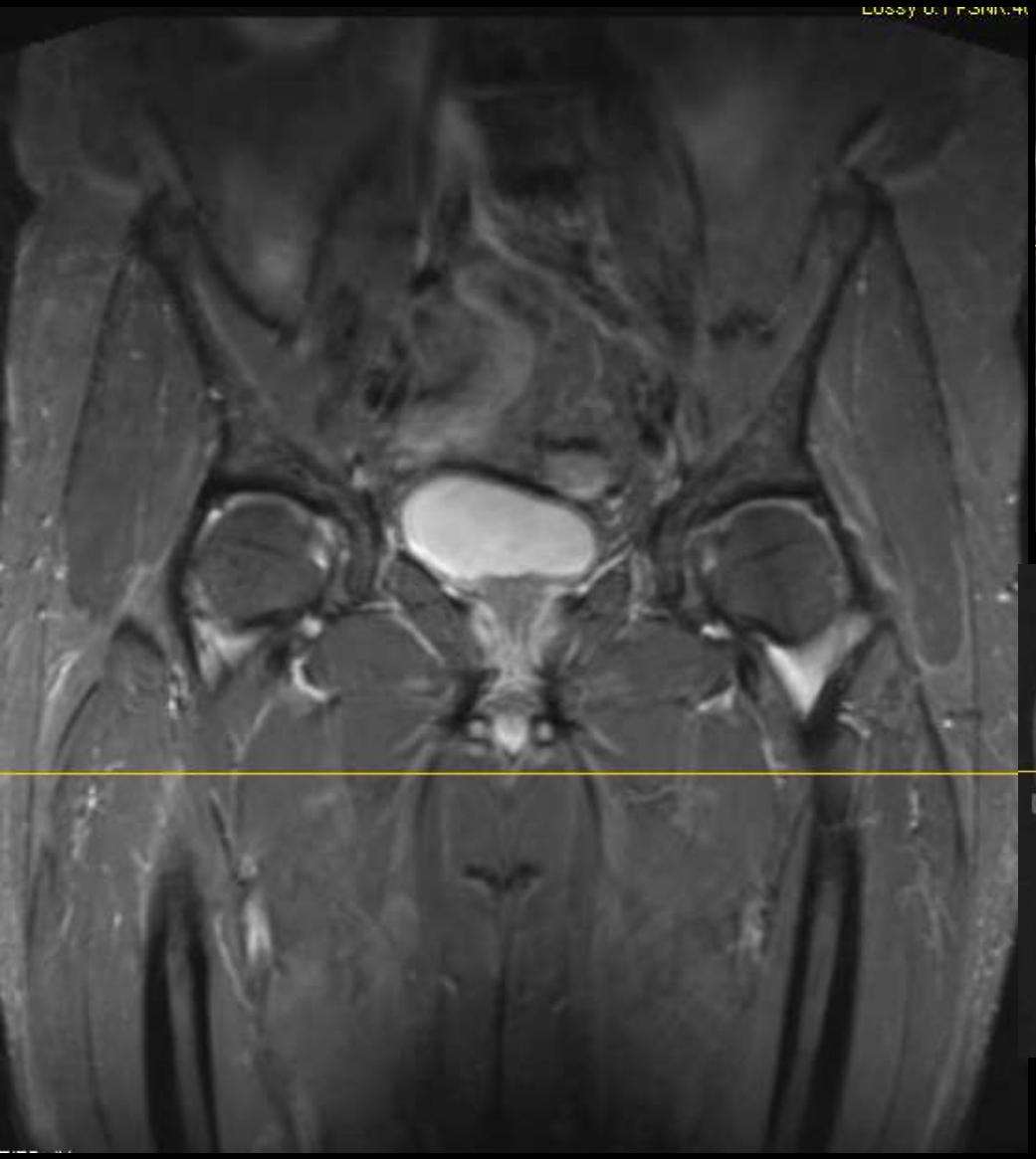
1. Extensive active myositis of the pelvis, thighs, and both shoulder girdles in a pattern of dermatomyositis or polymyositis. Severe inflammation without fatty atrophy is present in the vastus lateralis muscles bilaterally, which if biopsy, would likely be of high diagnostic yield. 2. Marrow changes of hemosiderosis.

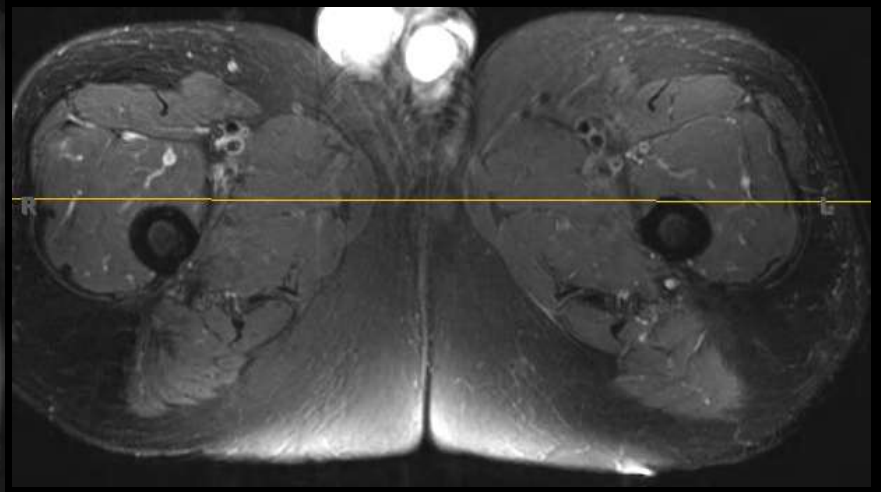
Muscle Biopsy

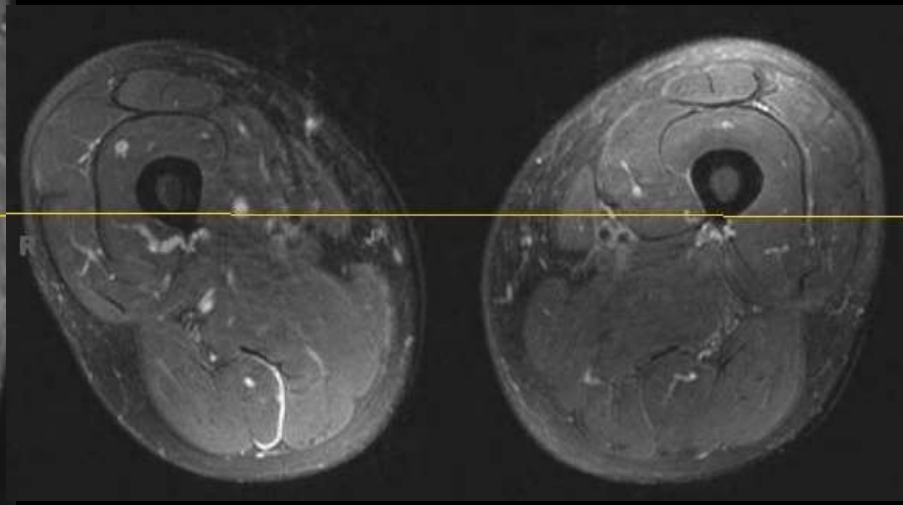
DIAGNOSIS:
SKELETAL MUSCLE, LEFT QUADRICEPS, BIOPSY
- MYOSITIS WITH PERIFASCICULAR ATROPHY (SEE COMMENT)

rxp/11/24/2006 17:00 By this signature, I attest that the above diagnosis is based upon my personal
examination of the slides(and/or other material indicated in the diagnosis).
Robert E. Schmidt, M.D., Ph.D.
Report Electronically Reviewed and Signed Out By Robert E. Schmidt, M.D., Ph.D.
Microscopic Description and Comment:
Microscopic examination of the left quadriceps muscle biopsy material shows two pieces of striated muscle tissue with perifascicular atrophy and a patchy endomysial lymphoplasmacytic infiltrate with a minor eosinophil component. In addition to atrophy, a subset of the perifascicular fibers exhibits basophilia and plump nuclei with relatively open chromatin and prominent nucleoli, consistent with regeneration. There is no evidence of increase in the amount of endomysial/interstitial connective tissue, group atrophy, or angionecrosis. This pattern is that of a myositis.

4 months post-treatment





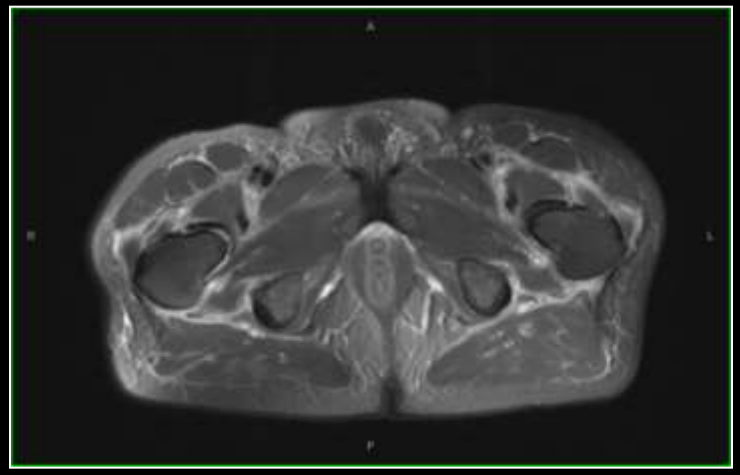


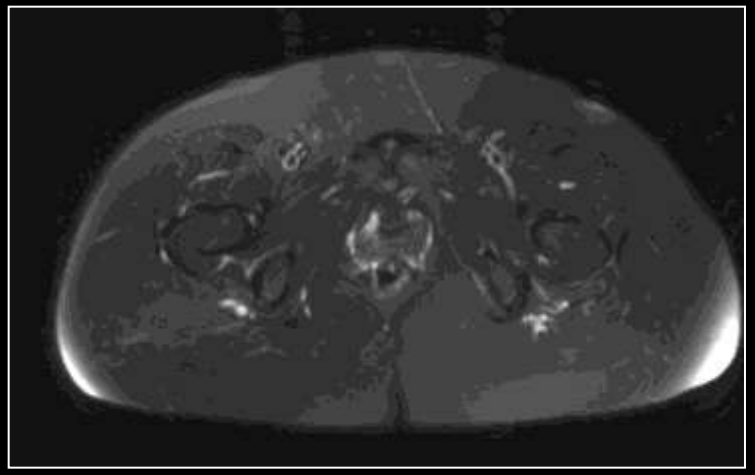
Polymyositis

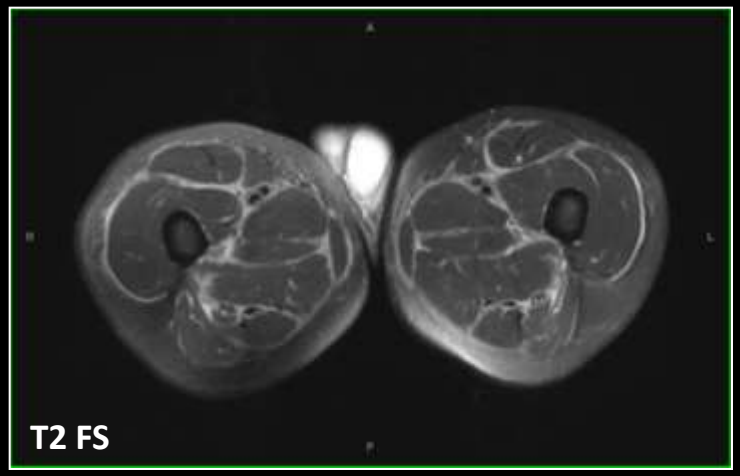
How we can help

- MRI displays areas with the most edema and the least atrophy
- With MR imaging directing the site of biopsy, the sensitivity is 97%
- Accurate assessment of disease activity with serial studies is important when selecting and adjusting the effective dosage of steroids and other immunosuppressives

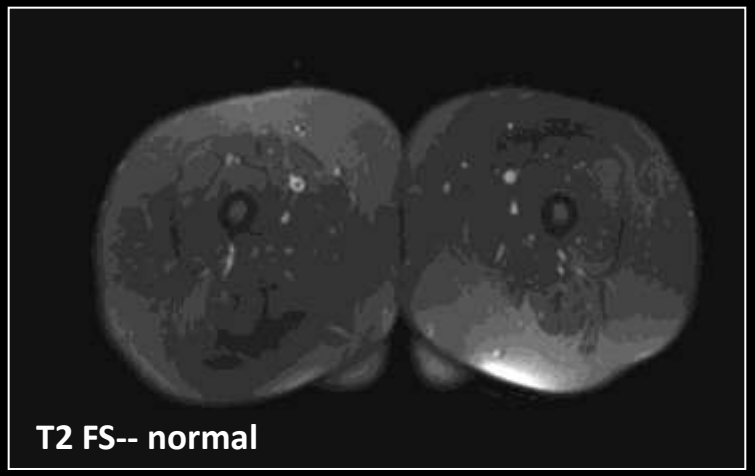
55 yo M with bilateral thigh muscle pain



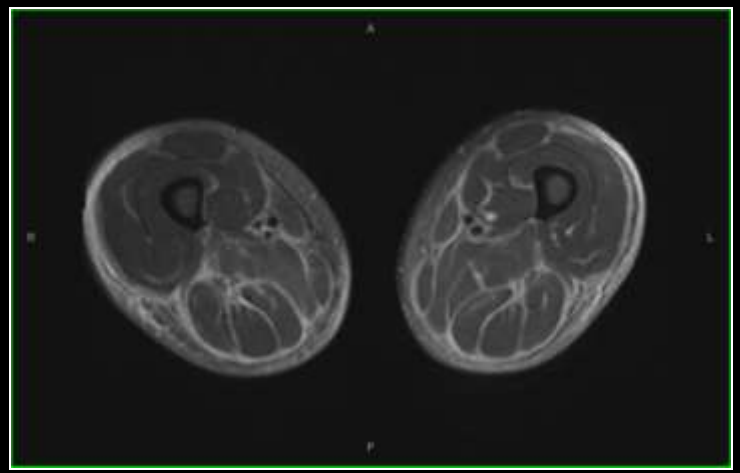


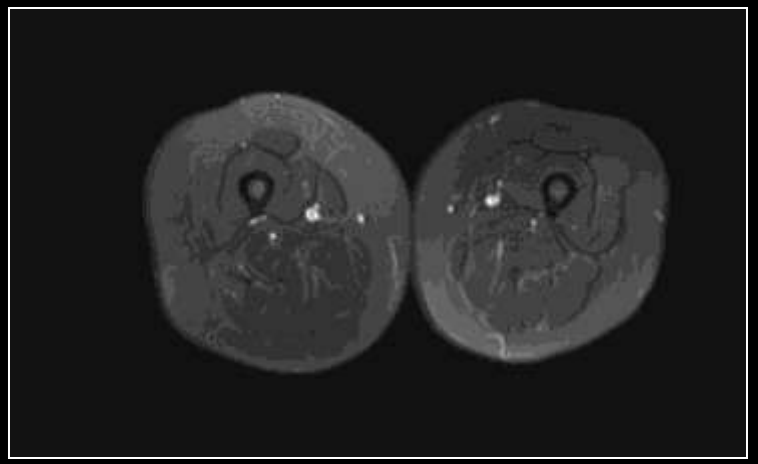


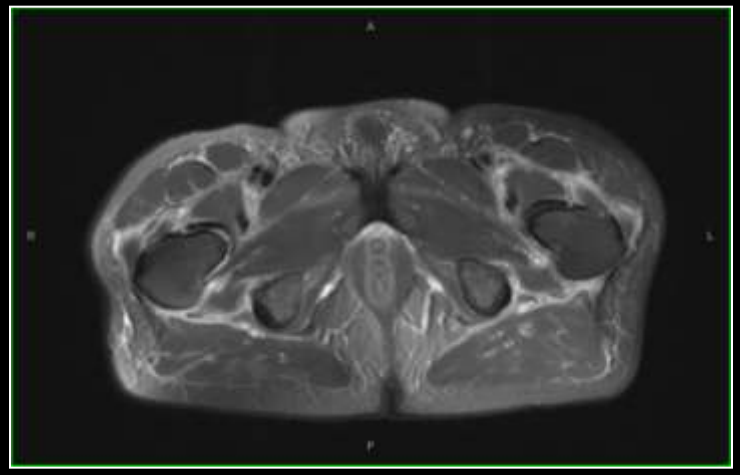
T2 FS

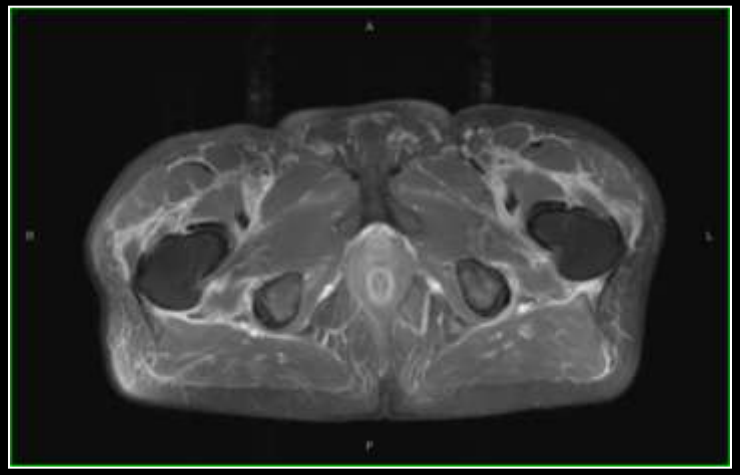


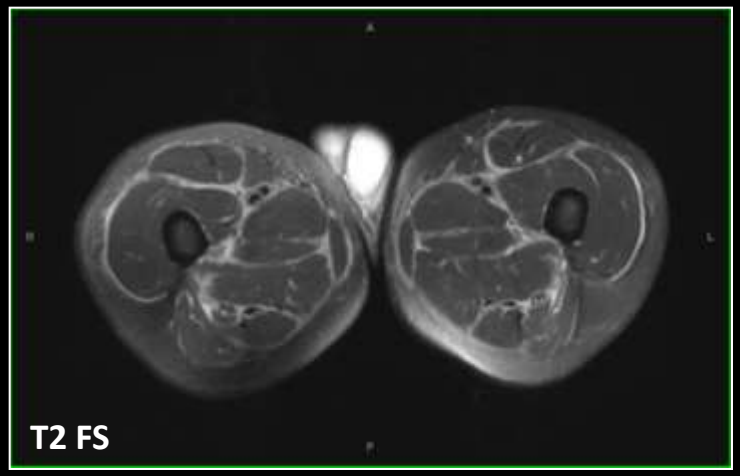
T2 FS-- normal

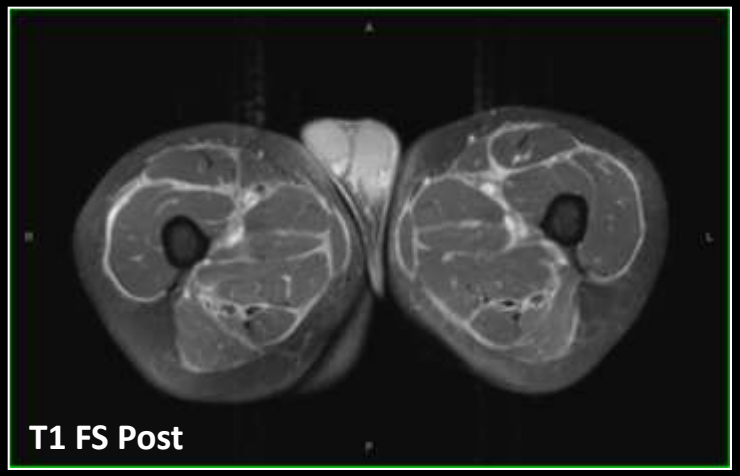


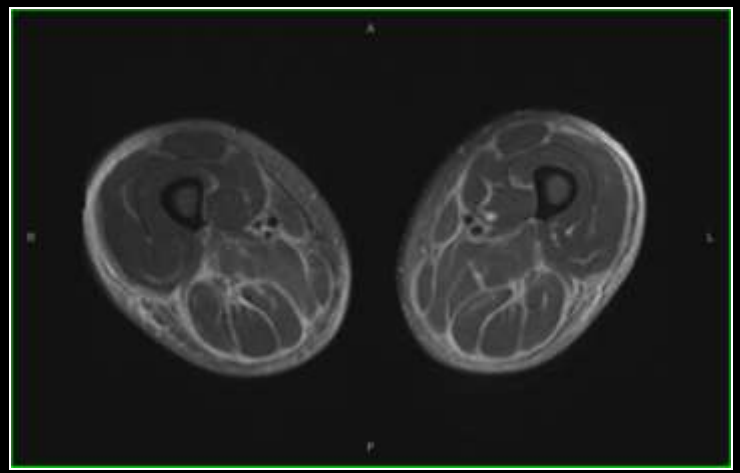


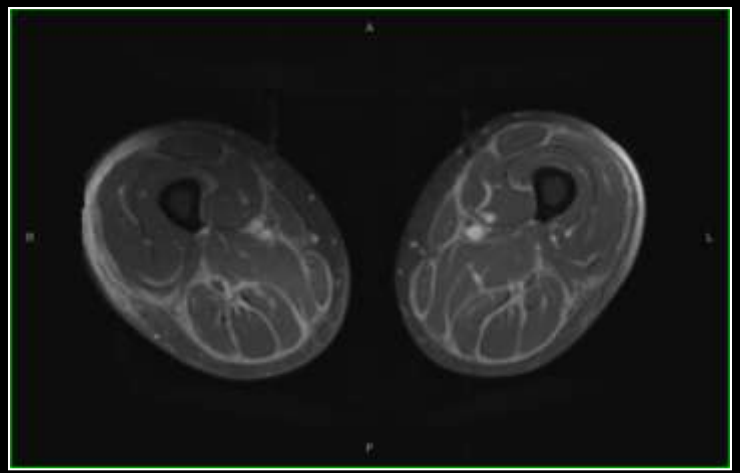





T2 FS


T1 FS Post





Diagnosis

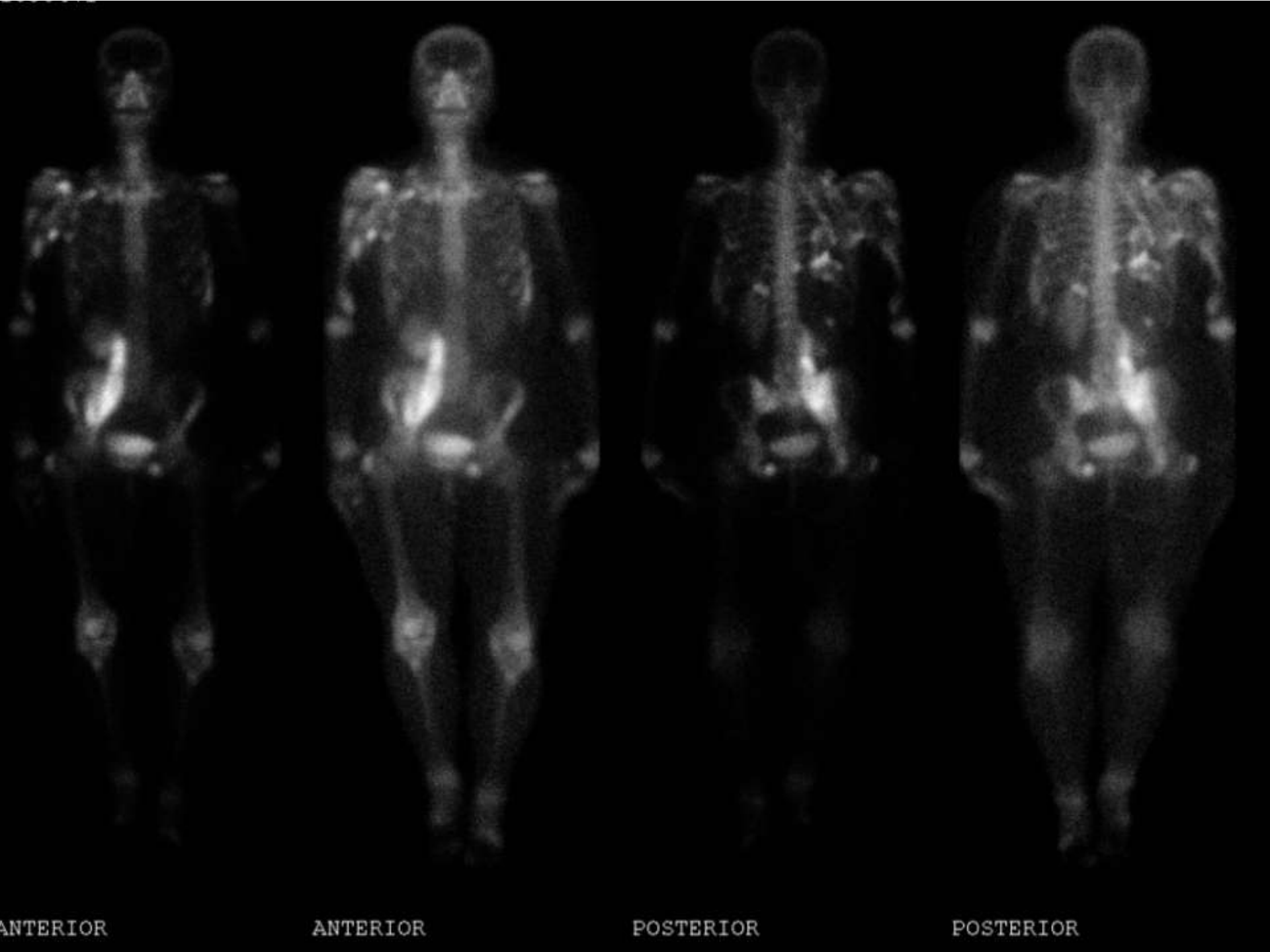
- Radiology IMPRESSION:
  - Eosinophilic fasciitis
  - Fascia superficial to vastus lateralis amenable to biopsy
- Labs
  - Absolute eosinophil count: 2.7 (nl 0.0 – 0.5)
- Surgical Biopsy:
  - Eosinophilic fasciitis
  - “mixed inflammatory infiltrate with readily identifiable eosinophils as well as lymphocytes and some plasma cells. The stromal background has a fibromyxoid appearance to indicate the involvement of the deep connective tissues.”

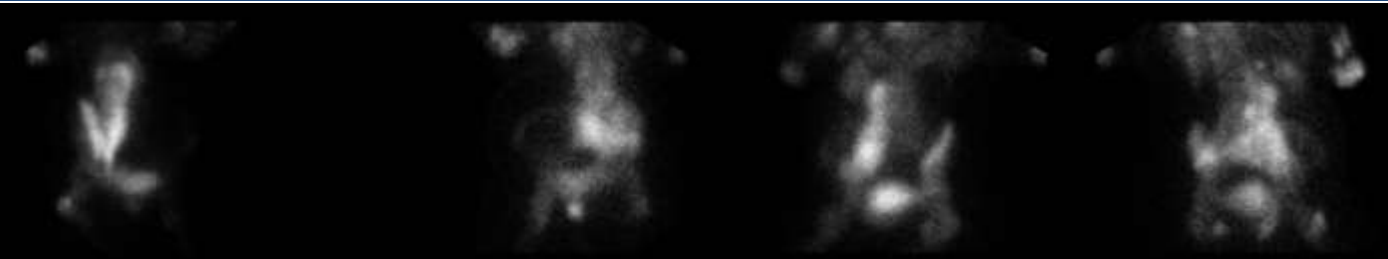
Eosinophilic Fasciitis

- Eosinophilic infiltration of muscle and fascia
- Late findings include fibrosis in the fascia that results in joint contractures
- No known cause for the persistent eosinophilia
- Treatment: STEROIDS

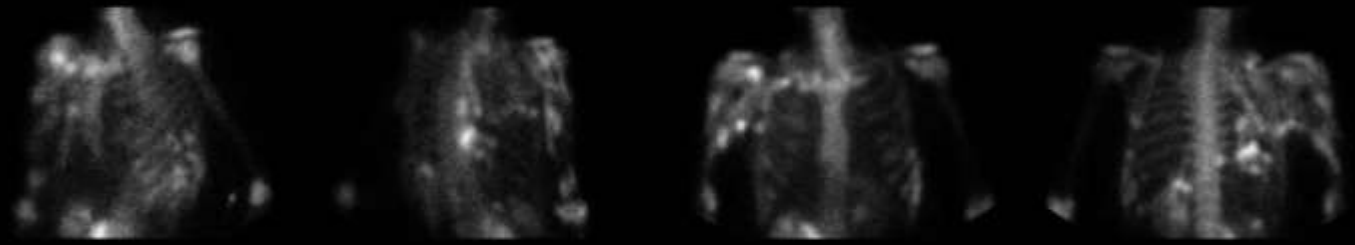
HEREDITARY DISORDERS OF HETEROTOPIC OSSIFICATION

51 yo F with shoulder pain

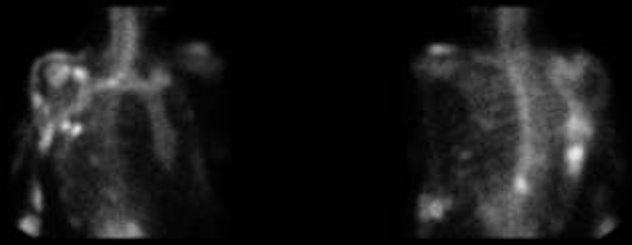

ANTERIOR
ANTERIOR
POSTERIOR
POSTERIOR



RAO PELVIS LPO PELVIS LAO PELVIS RPO PELVIS



LAO RPO ANT POST



RAO LPO


R
DR


R
DR


R
2
2
9
L
2
1
1


R
2
2
9
L
2
1
1

Myositis Ossificans Progressiva

- Since the 1800s—references in medicine describing people who “turn to stone”
- calcification/ossification of subcutaneous fat, skeletal muscle, tendons, aponeuroses, and ligaments.
  - Soft tissue masses coalesce leading to formation of “bony bridges” which cause restriction of respiration and ambulation and skeletal contractures
- Assoc with symmetric malformation of the digits, esp thumbs and great toes

Myositis Ossificans Progressiva

- No known treatment
  - Attempts at resection of heterotopic bone are considered futile because the soft tissue trauma induced by surgery can stimulate recurrent heterotopic ossification.
- Prognosis
  - Pts often develop compromised pulmonary and cardiac function, and premature death may result from respiratory failure caused by ankylosis of the thoracic cage

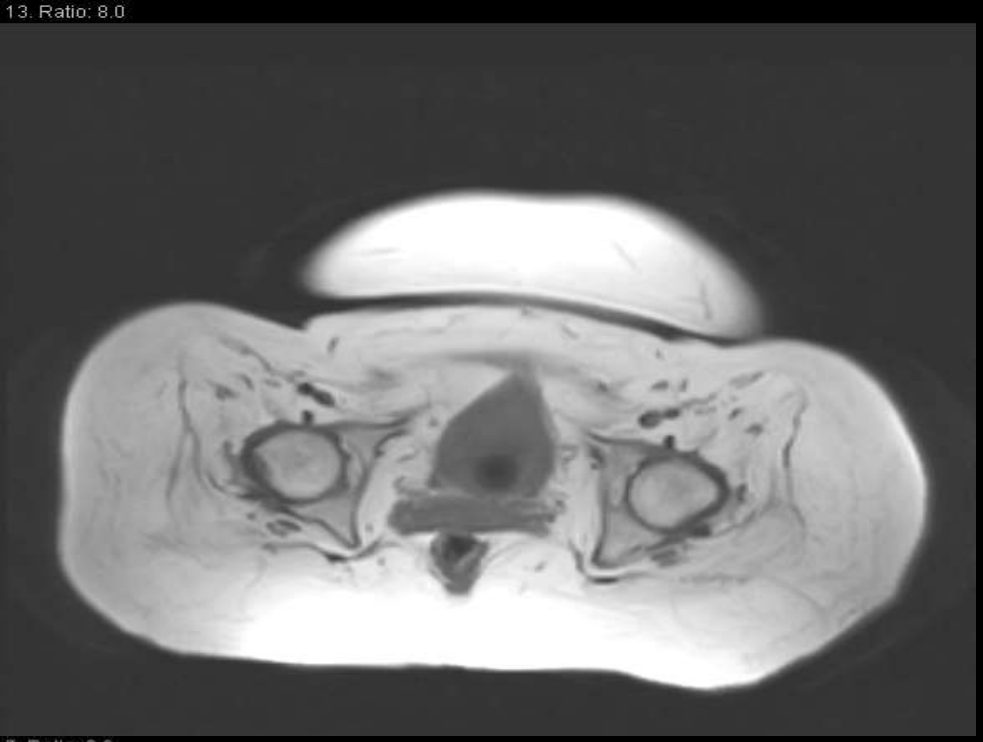
Resnick. IDJ. 584-5.

HERITABLE DISORDERS AFFECTING MUSCLES

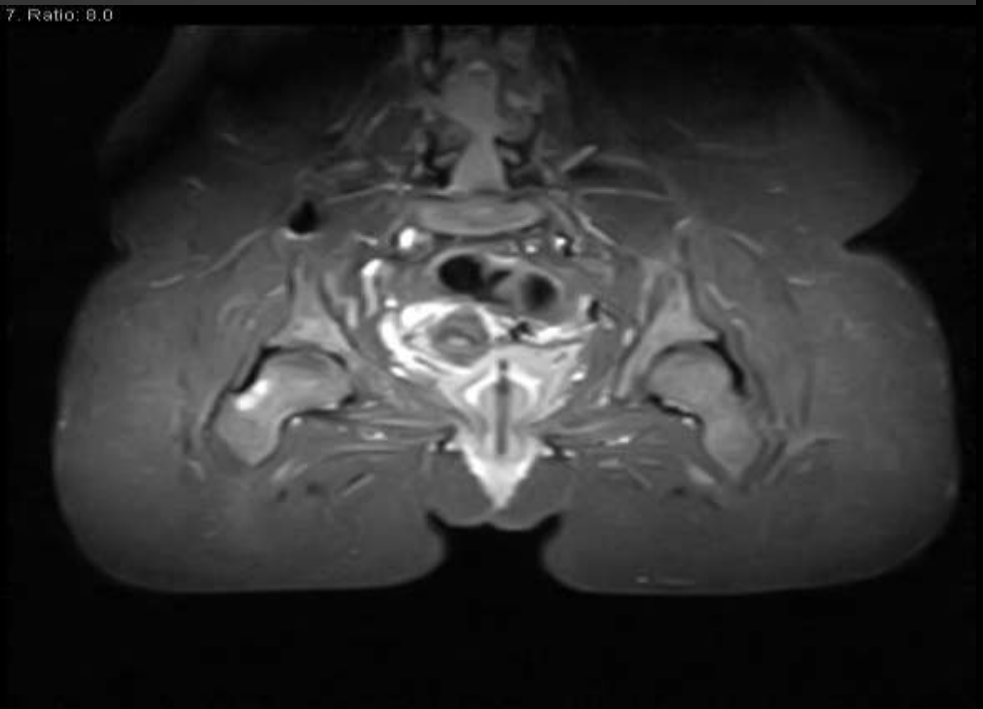
- Muscular Dystrophies
  - Heterogenous group of heritable disorders characterized by progressive muscle weakness and loss of muscle tissue
    - Most common MD is Duchenne
  - Muscles are edematous initially and then rapidly become atrophic

Normal

45 yo F with long standing MD


13. Ratio: 8.0


22. Ratio: 8.0


7. Ratio: 8.0


9. Ratio: 8.0

Muscular Dystrophies: Future MR Applications

- Potential for MRI in diagnosis of MD
  - Biopsy planning, limiting false negative biopsies
  - Distinguishing conditions with similar clinical phenotypes
  - To assess if muscle grossly normal or abnormal in cases of confusing clinical presentations
- Potential for MRI in management of MD
  - Marker for disease progression
  - Marker for response to therapy

Timberlake, J. Muscular Dystrophies: What the radiologist should know. URMC 2006.

KG

- 31 yo F with diminutive gluteal musculature bilaterally
- i.e. “lacking junk in the trunk”

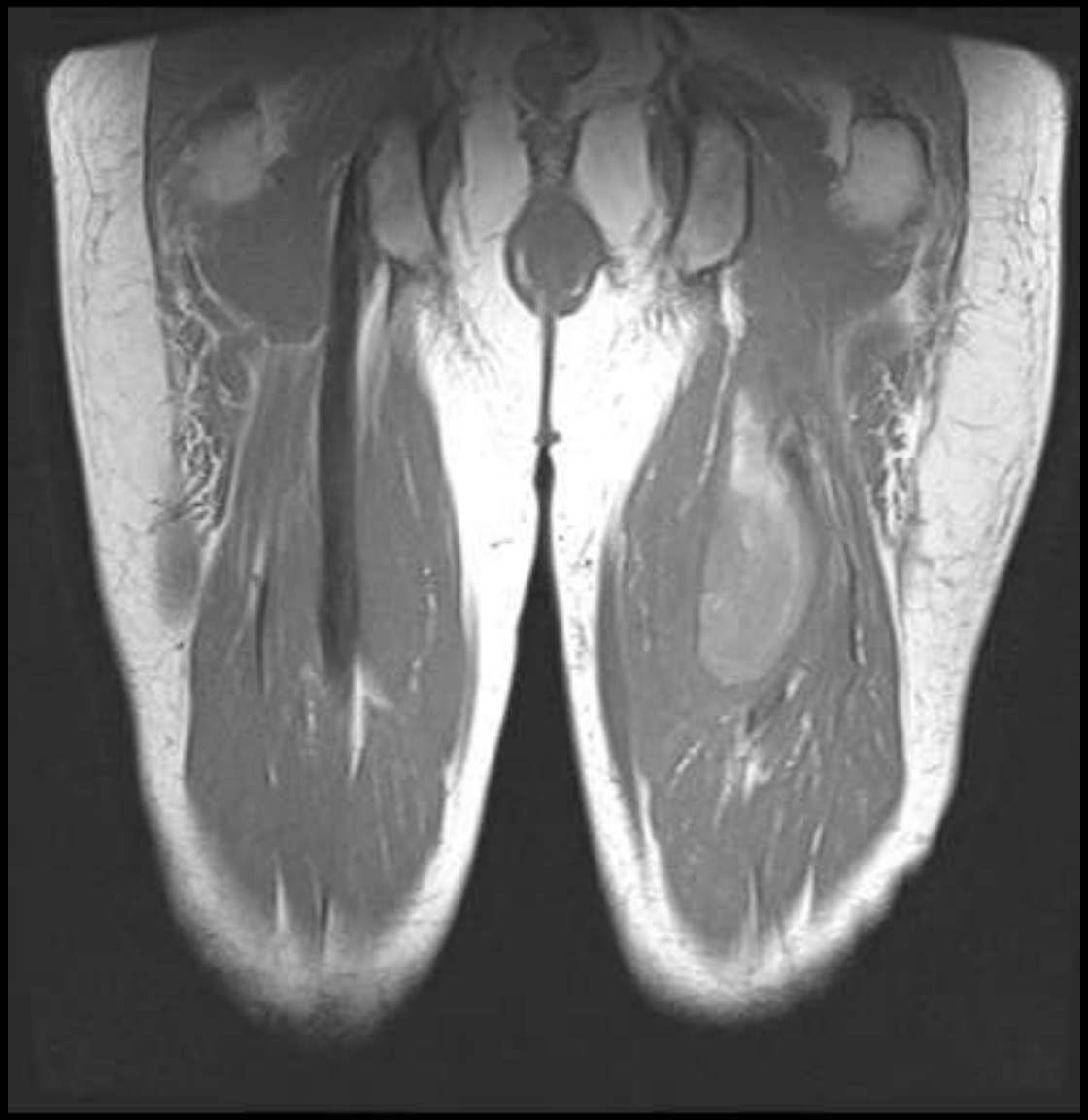

$8000: $758/mo x 12
You'd just have to give up:
**Eating
**Drinking
**Buying new underwear
**Going to the movies
**Getting health insurance
**Buying bagels and coffee for Saturday morning conference
**Parking at Hillcrest and Thornton
Molehill
Mountains
Molehill
Mountains

THANK YOU FOR AN AMAZING YEAR!


THE
END

Overview of Imaging Techniques

- Radiography
- CT
- Sonography
- Scintigraphy
- MR imaging



Indications for MR imaging of Muscle

- To provide prompt diagnosis for initiating proper treatment
- To evaluate a soft tissue mass in a patient without a clear history of trauma
- To assess uncommon causes of muscle pain
- To investigate for an underlying structural cause of neuropathy
- To assess the extent and type of infection
- To evaluate the location and extent of myopathy, especially before biopsy

IDJ Resnick

Causes of T1 Hyperintensity in Muscle

- Common causes
  - Fat deposition
  - Hematoma
  - Gadolinium contrast
  - MR artifacts
- Uncommon causes
  - Proteinaceous material
  - Melanin

IDJ Resnick

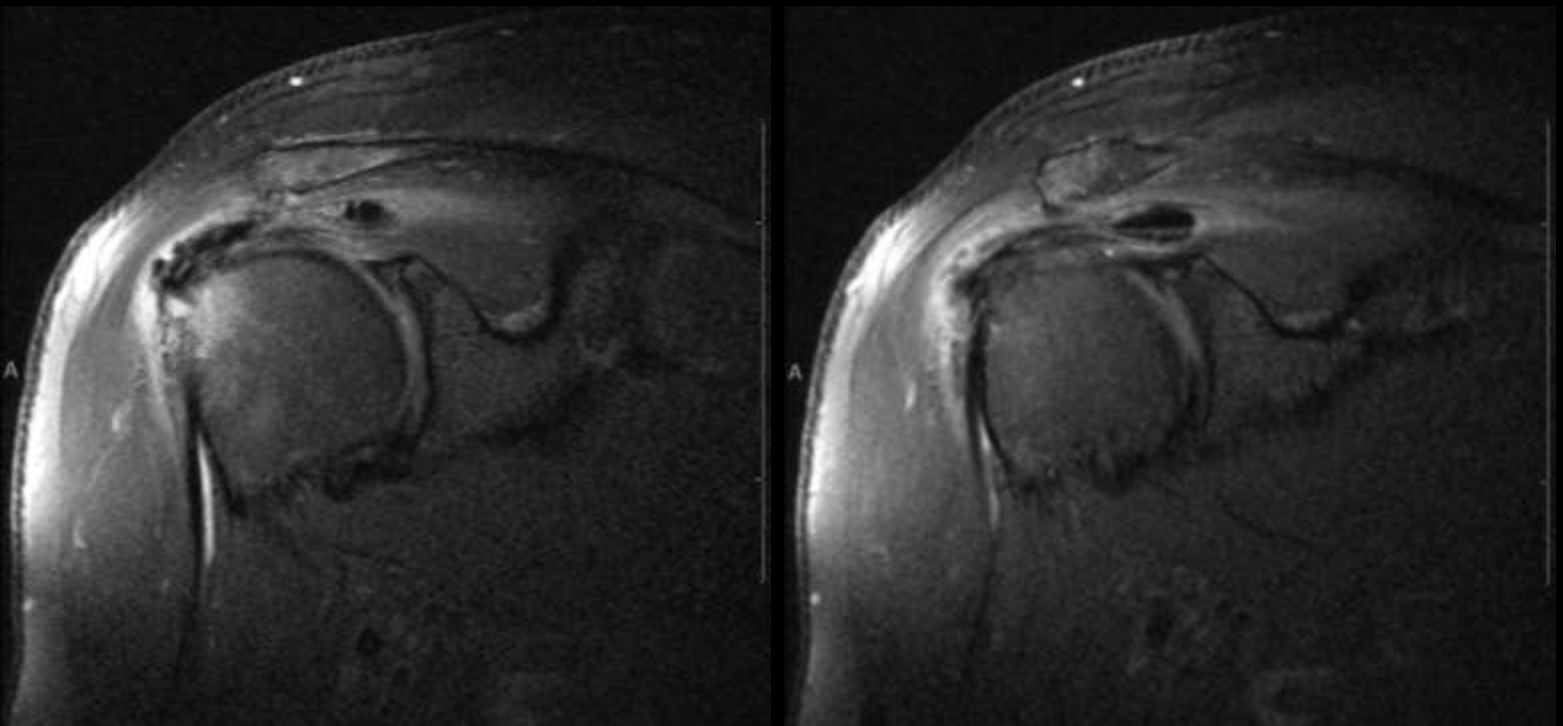
Common causes of T2 Hyperintensity in Muscle

- Muscular exertion
- Trauma
- Vascular insufficiency
- Inflammation-infection
- Inflammation-autoimmune
- Subacute denervation
- Iatrogenic
- Infiltrative neoplasm
- Muscle cell death

IDJ Resnick

Causes of T2 hypointensity in muscle

- Calcification
- Foreign bodies
- Hemosiderin (old hemorrhage)
- MR artifact (flowing blood in a vessel)



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