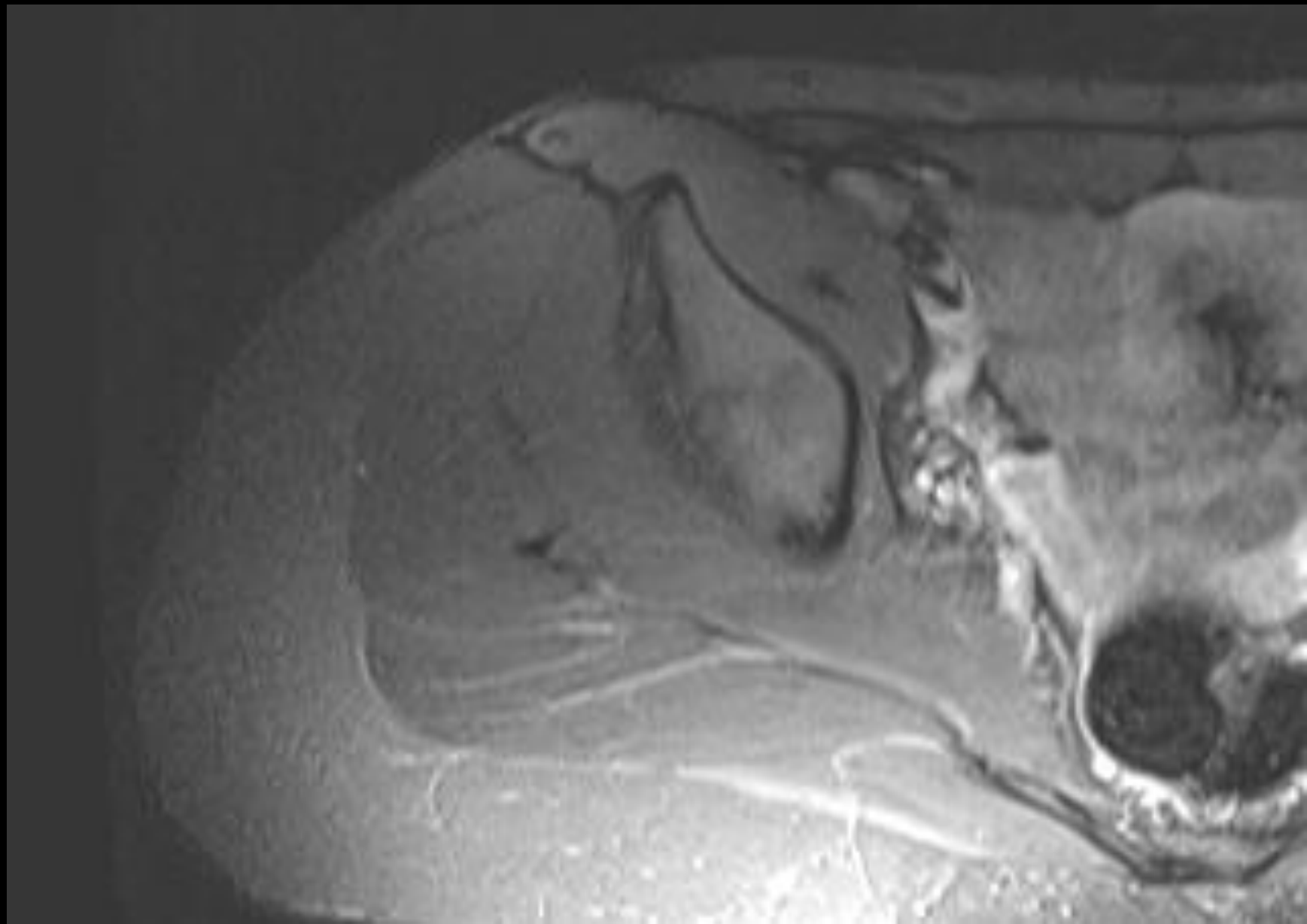
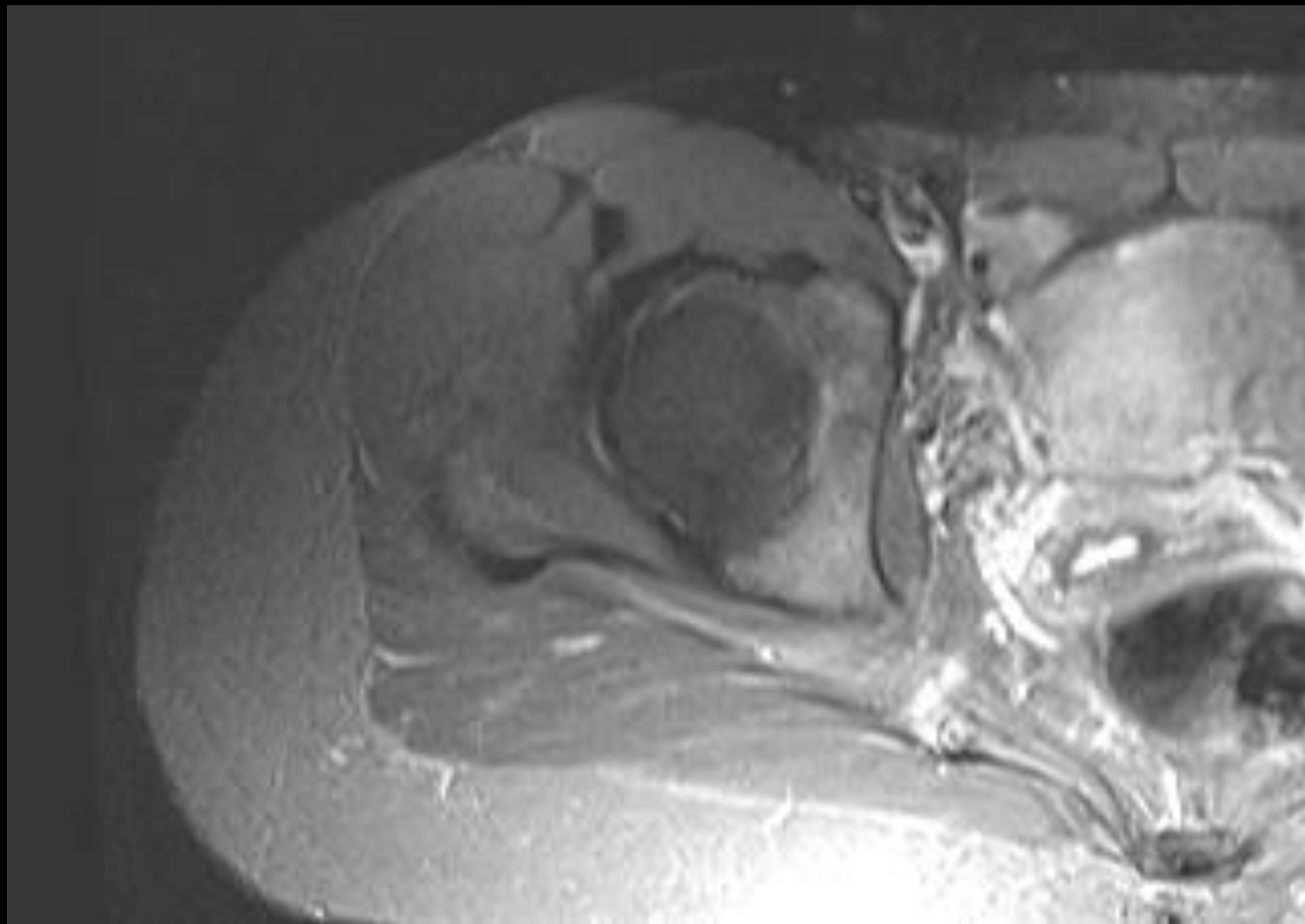
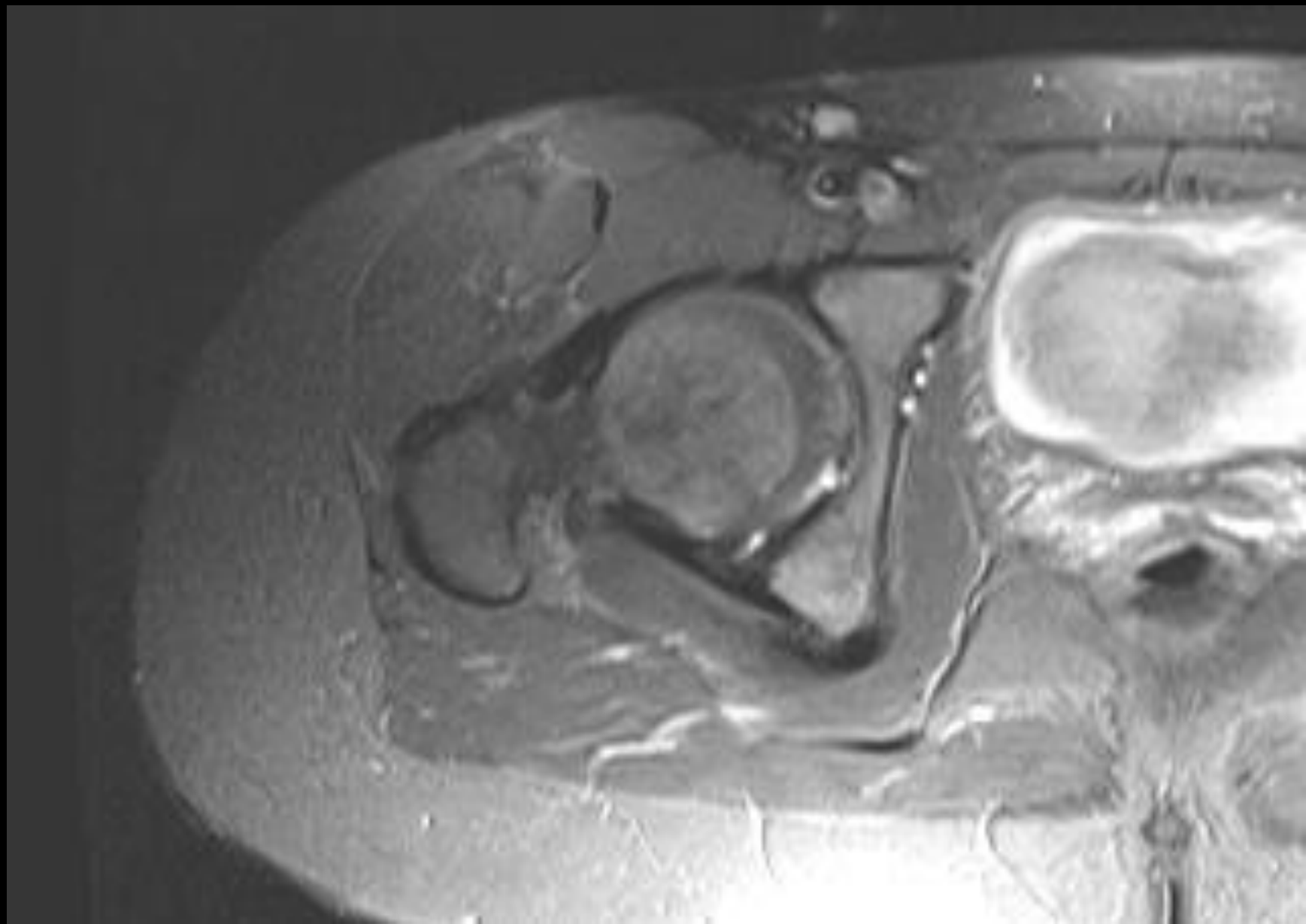


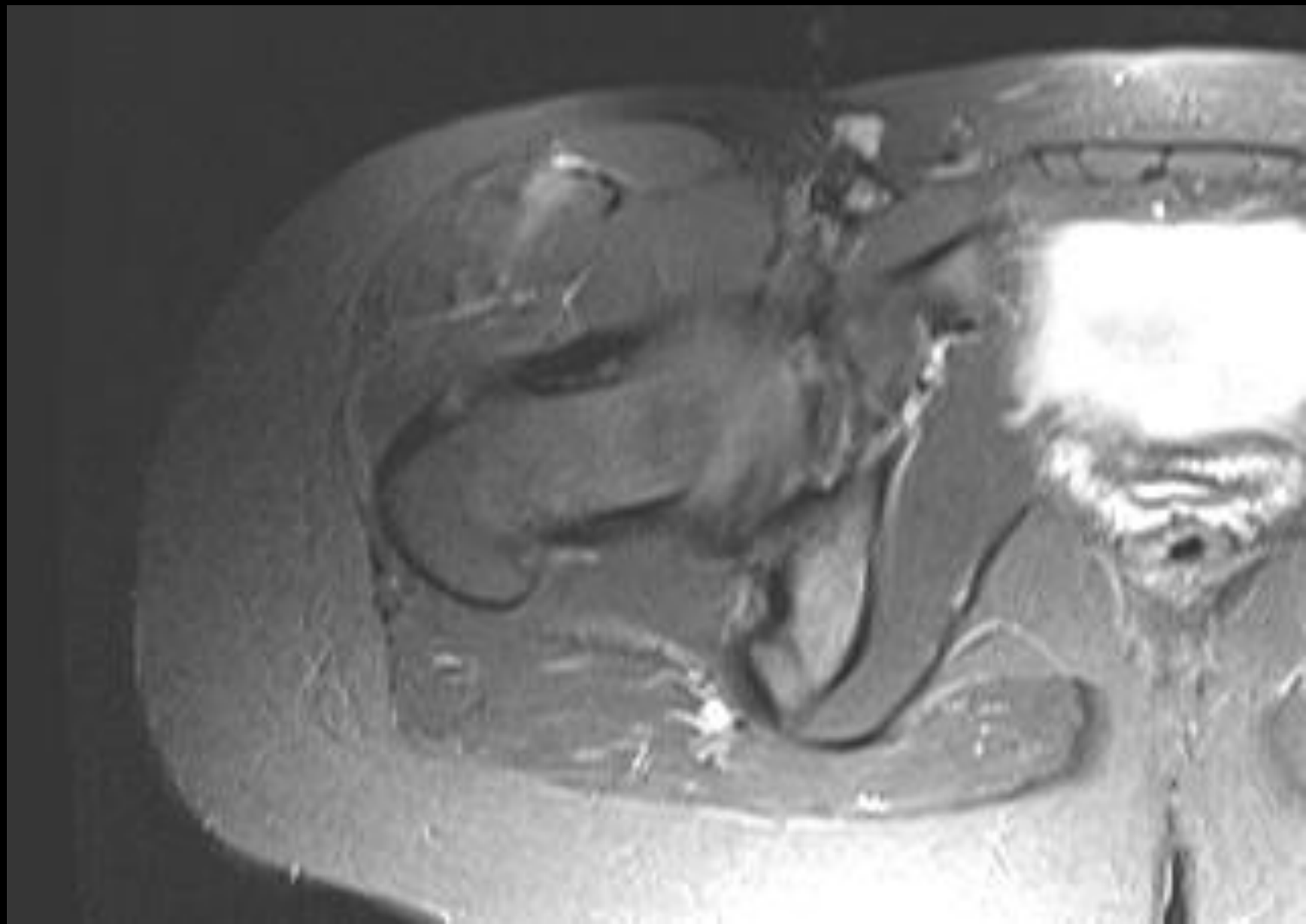


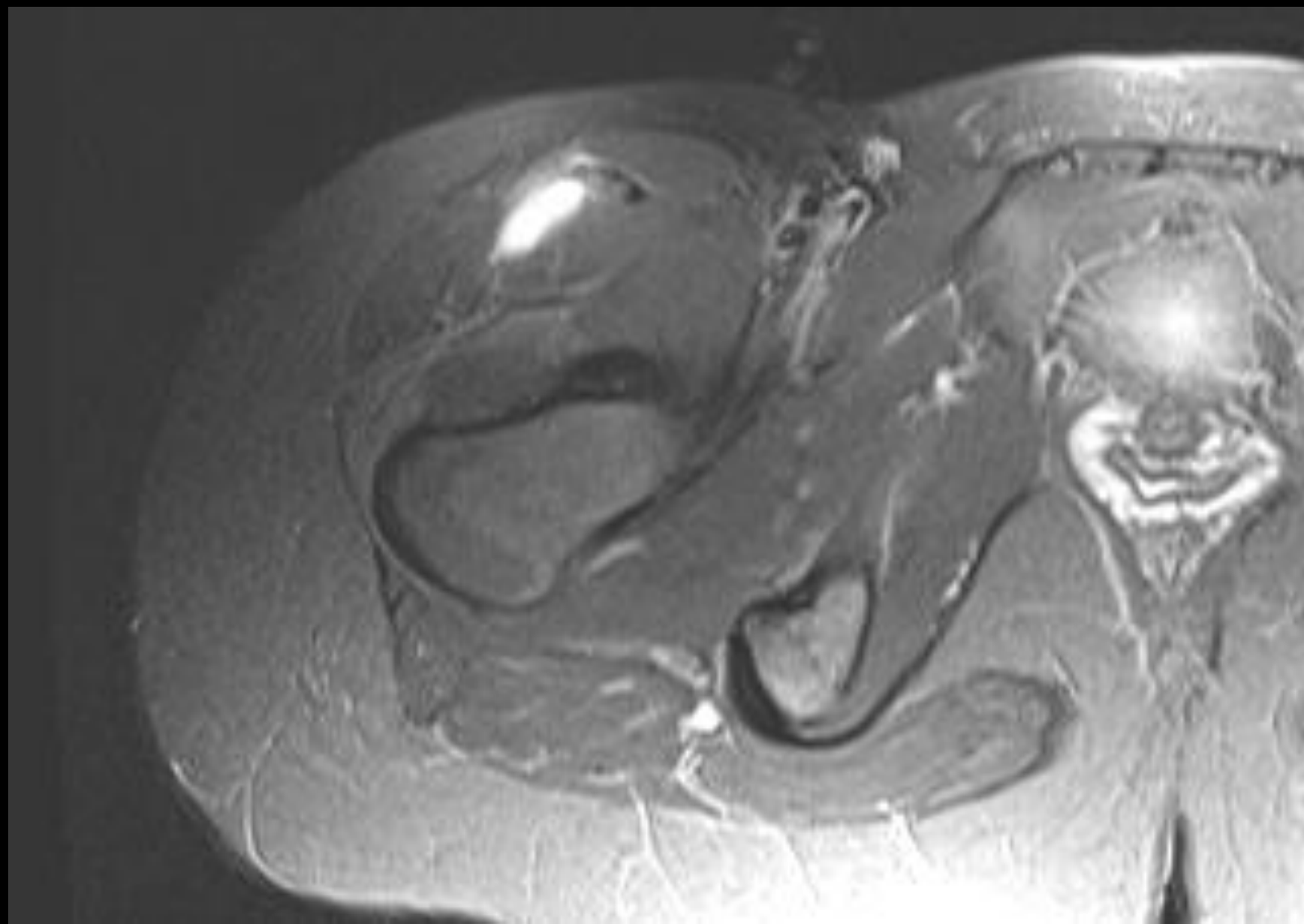
29 yo F with anterior thigh pain and swelling  
after hitting a softball and trying to sprint.  
Difficulty extending leg and cannot flex her hip  
to get in and out of a car.

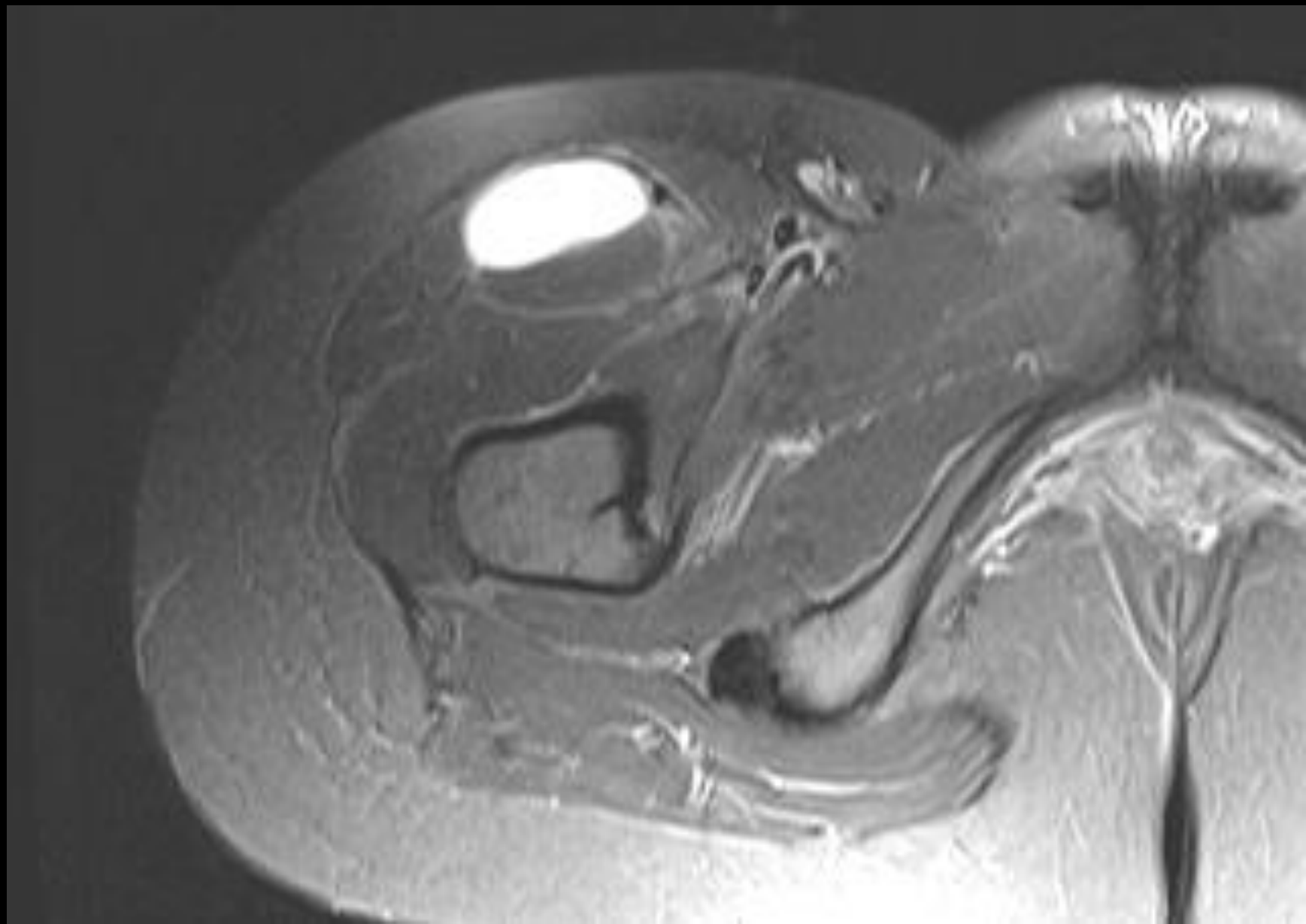


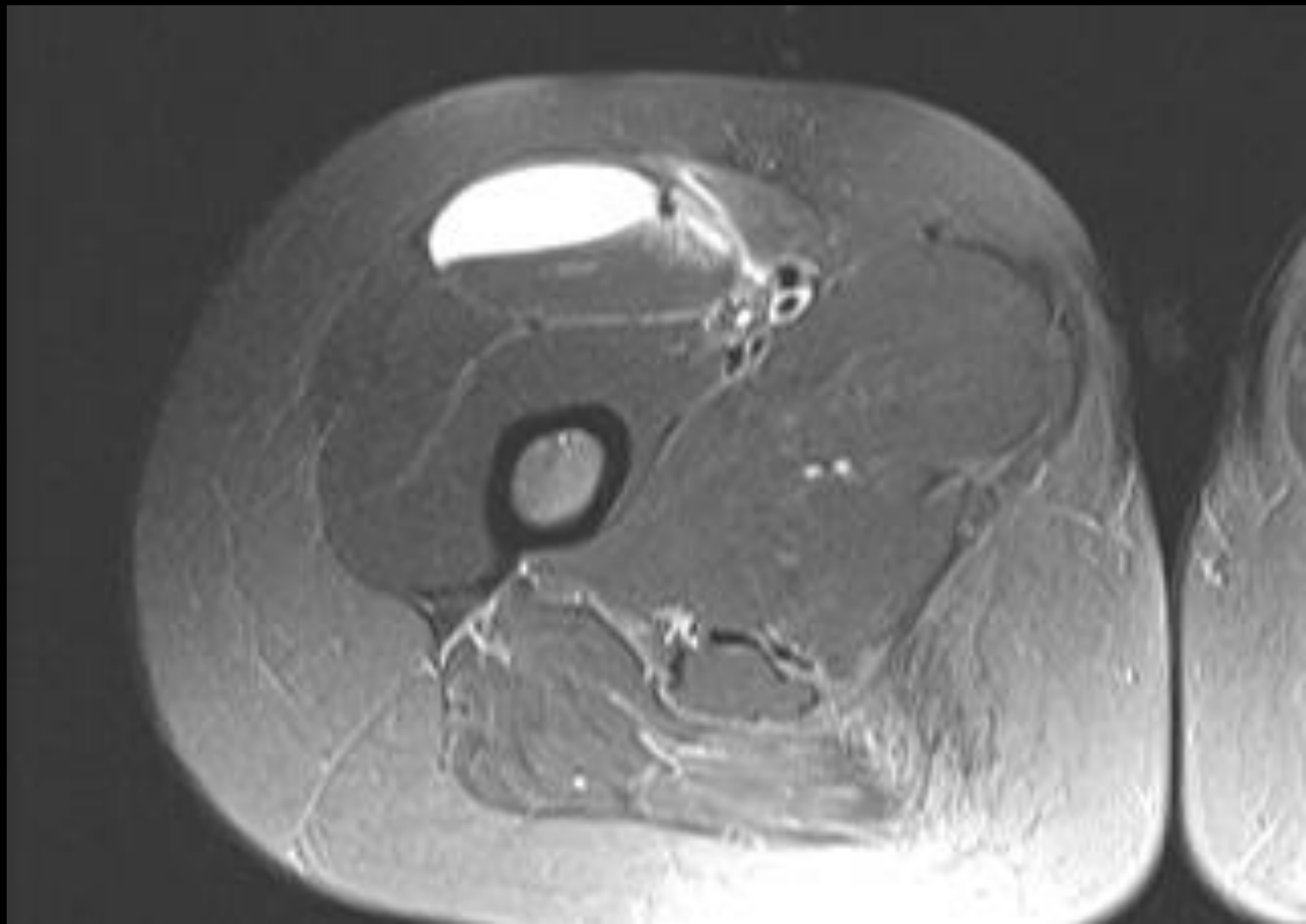




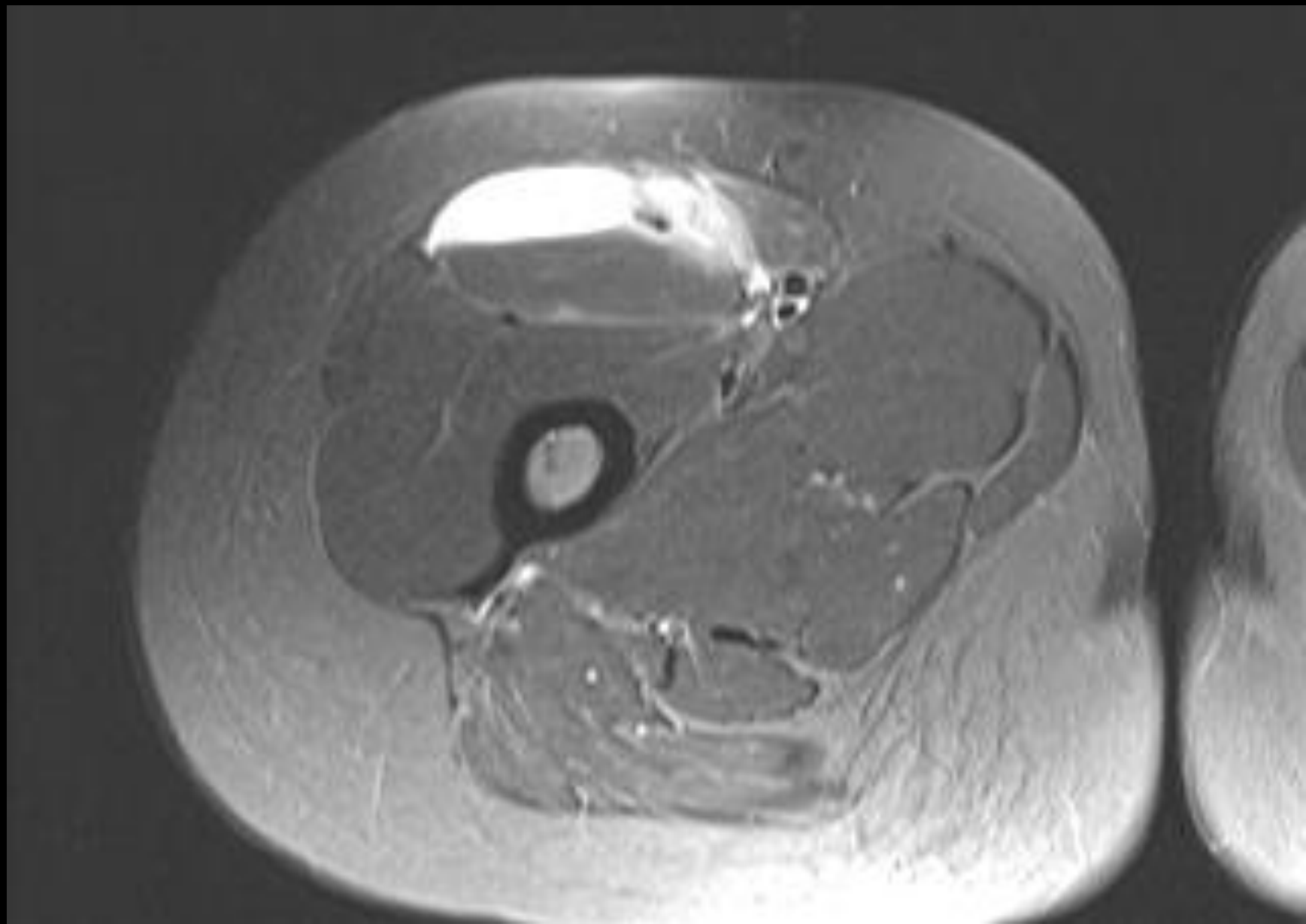


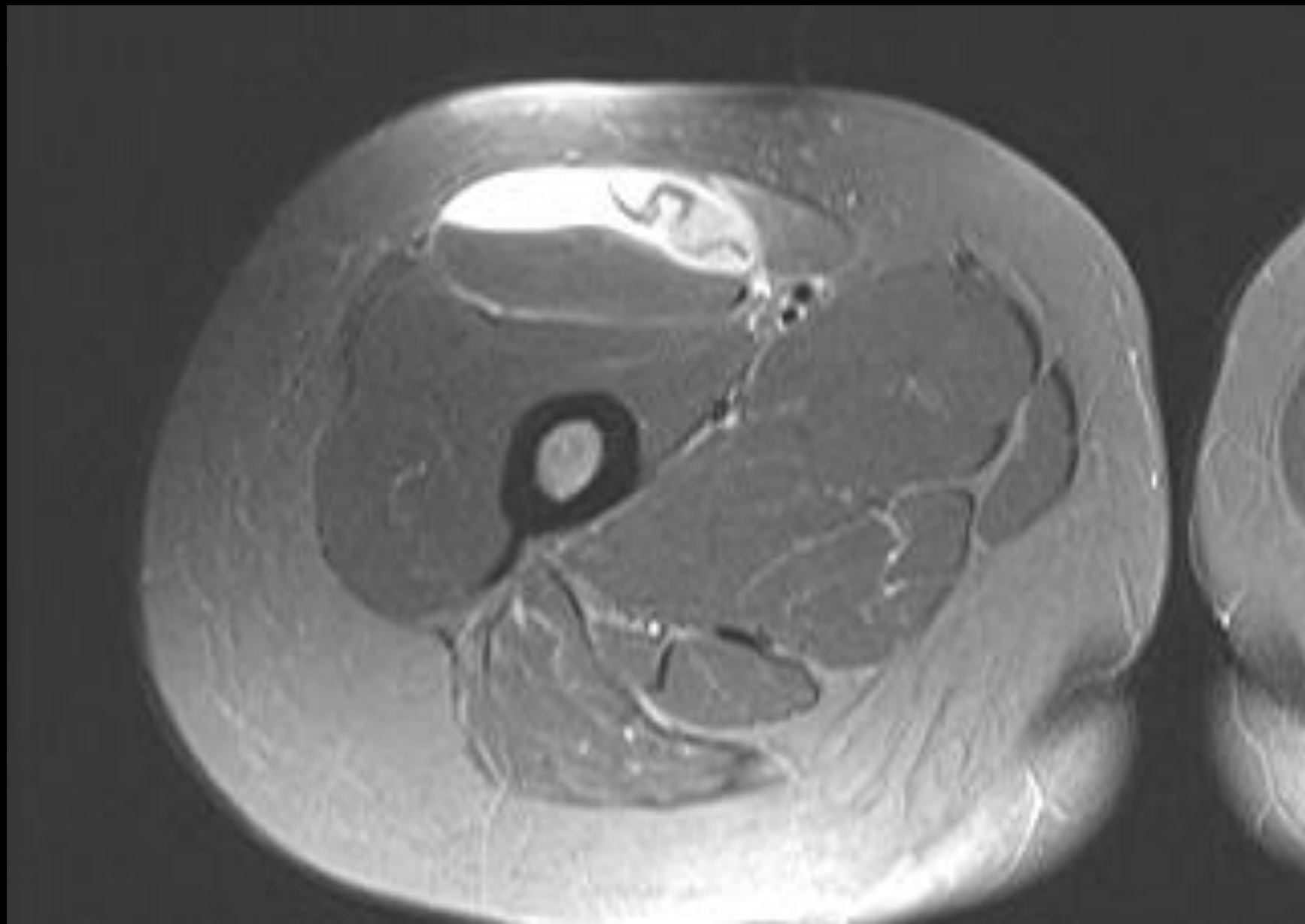


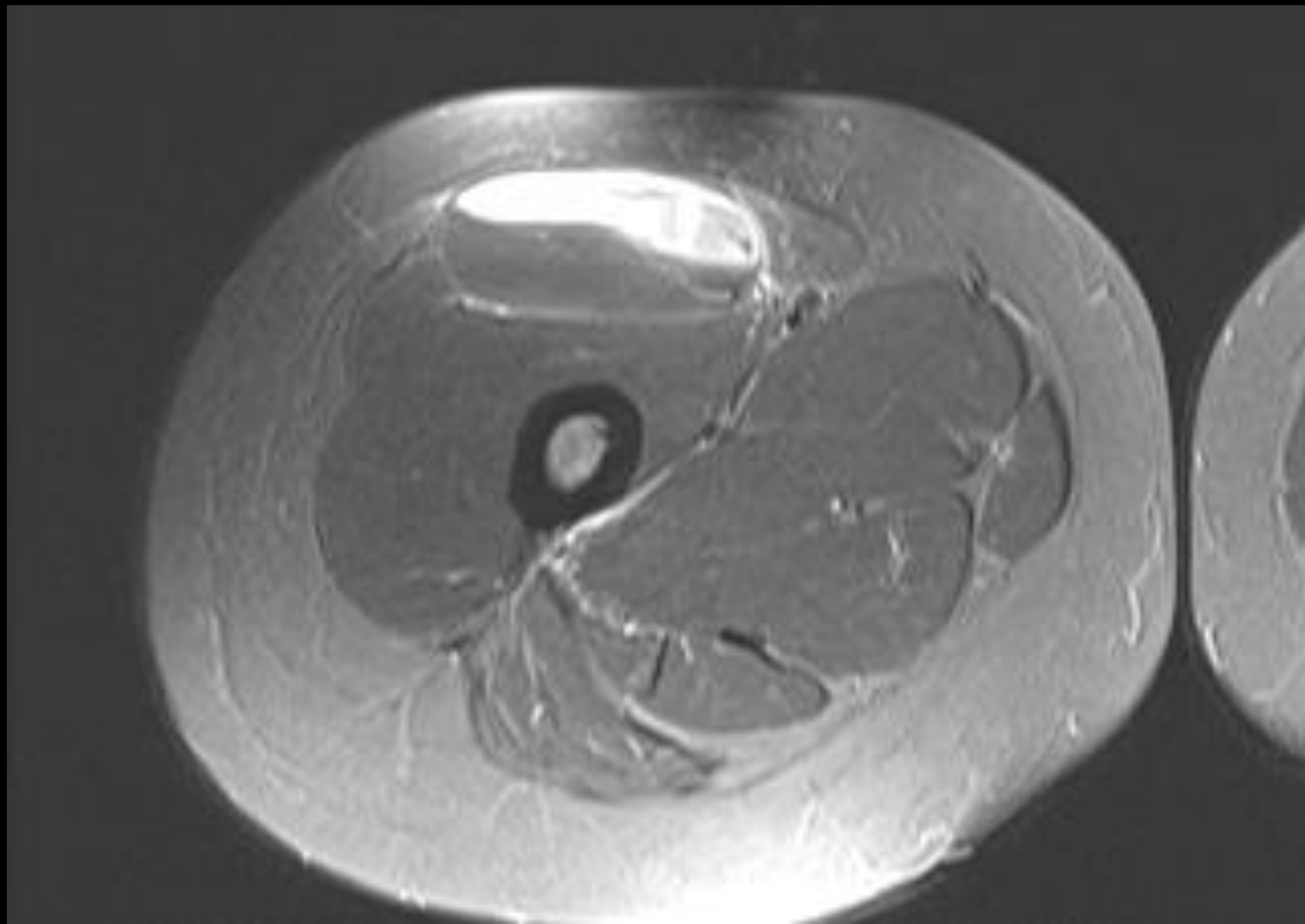


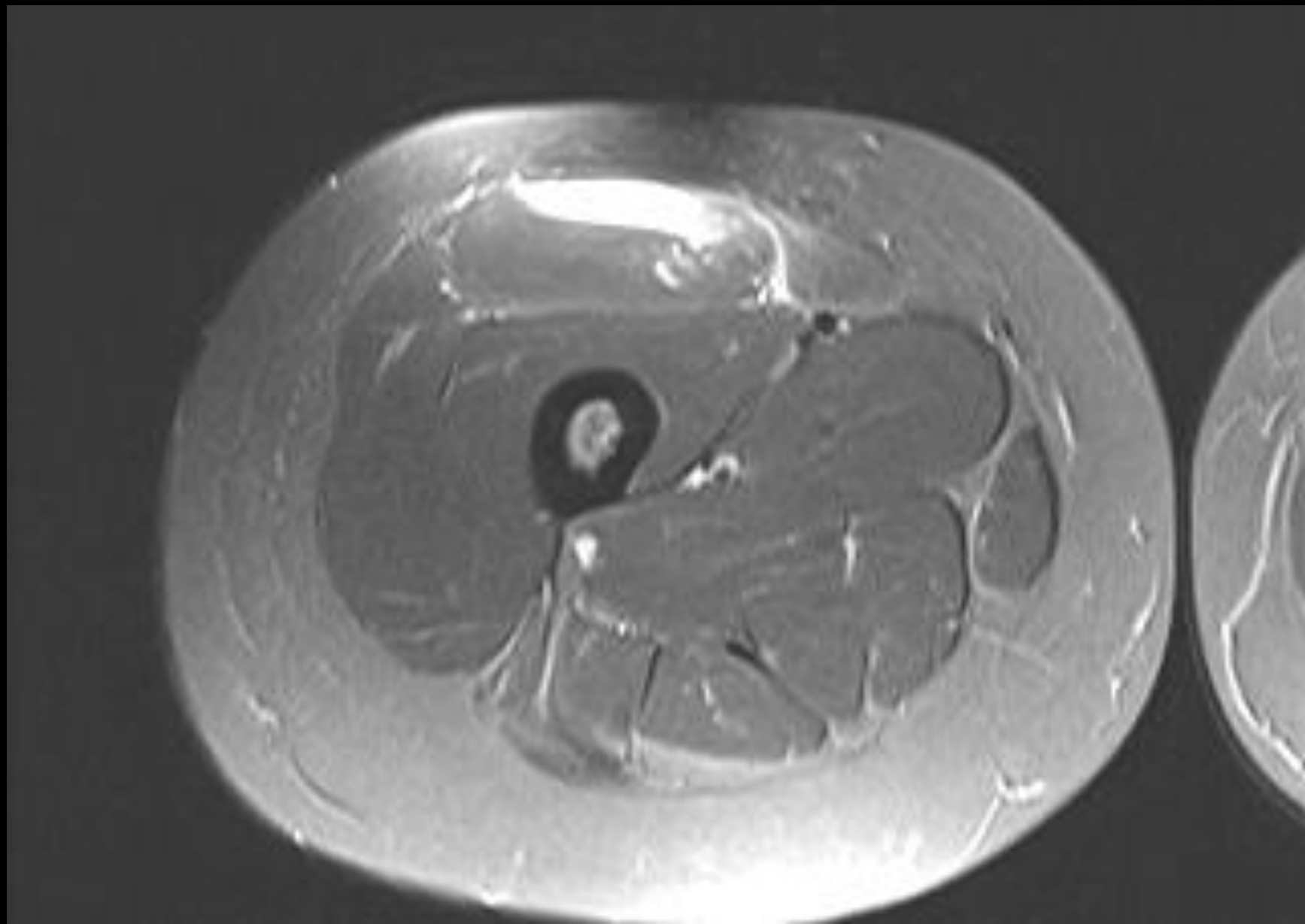


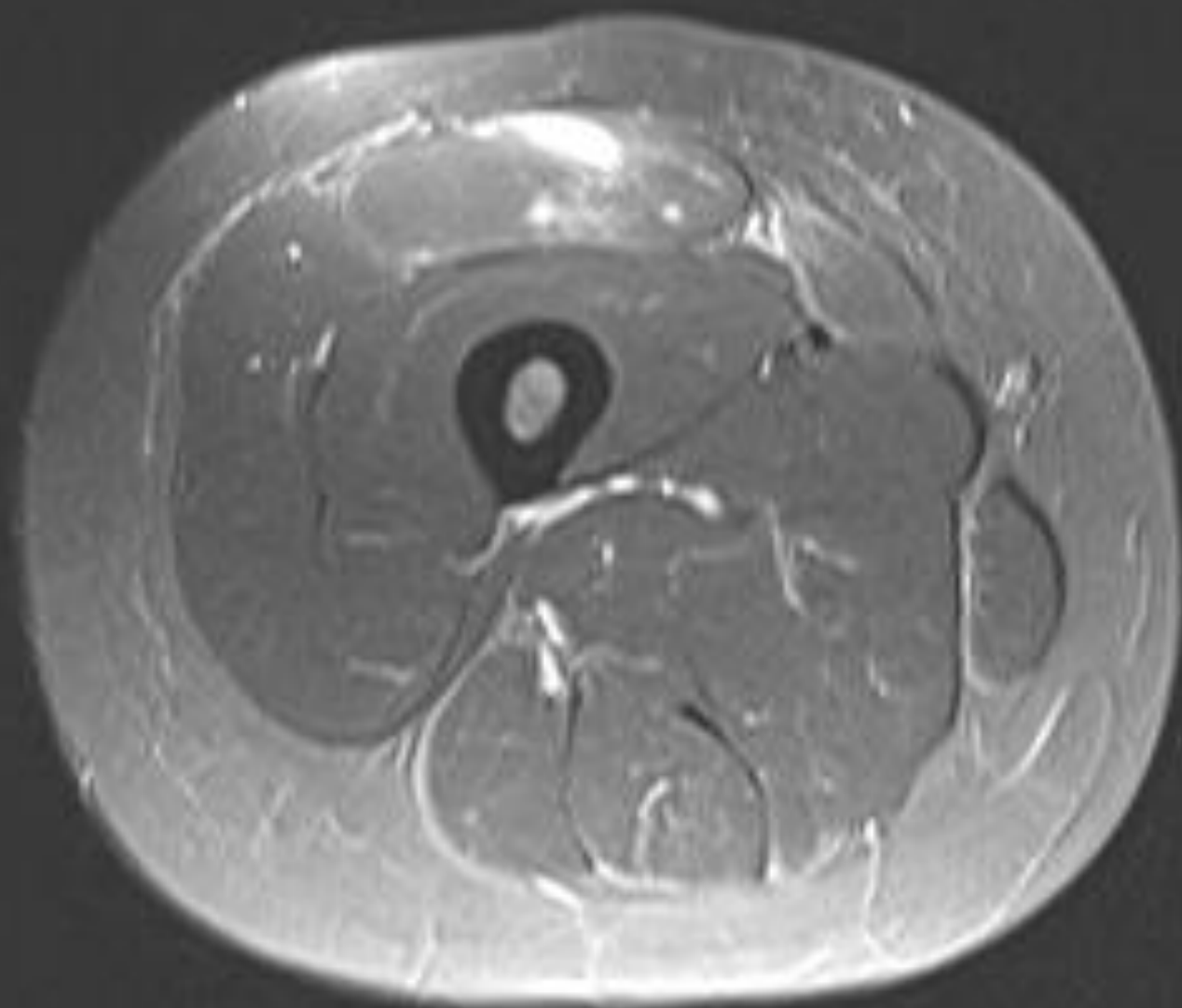


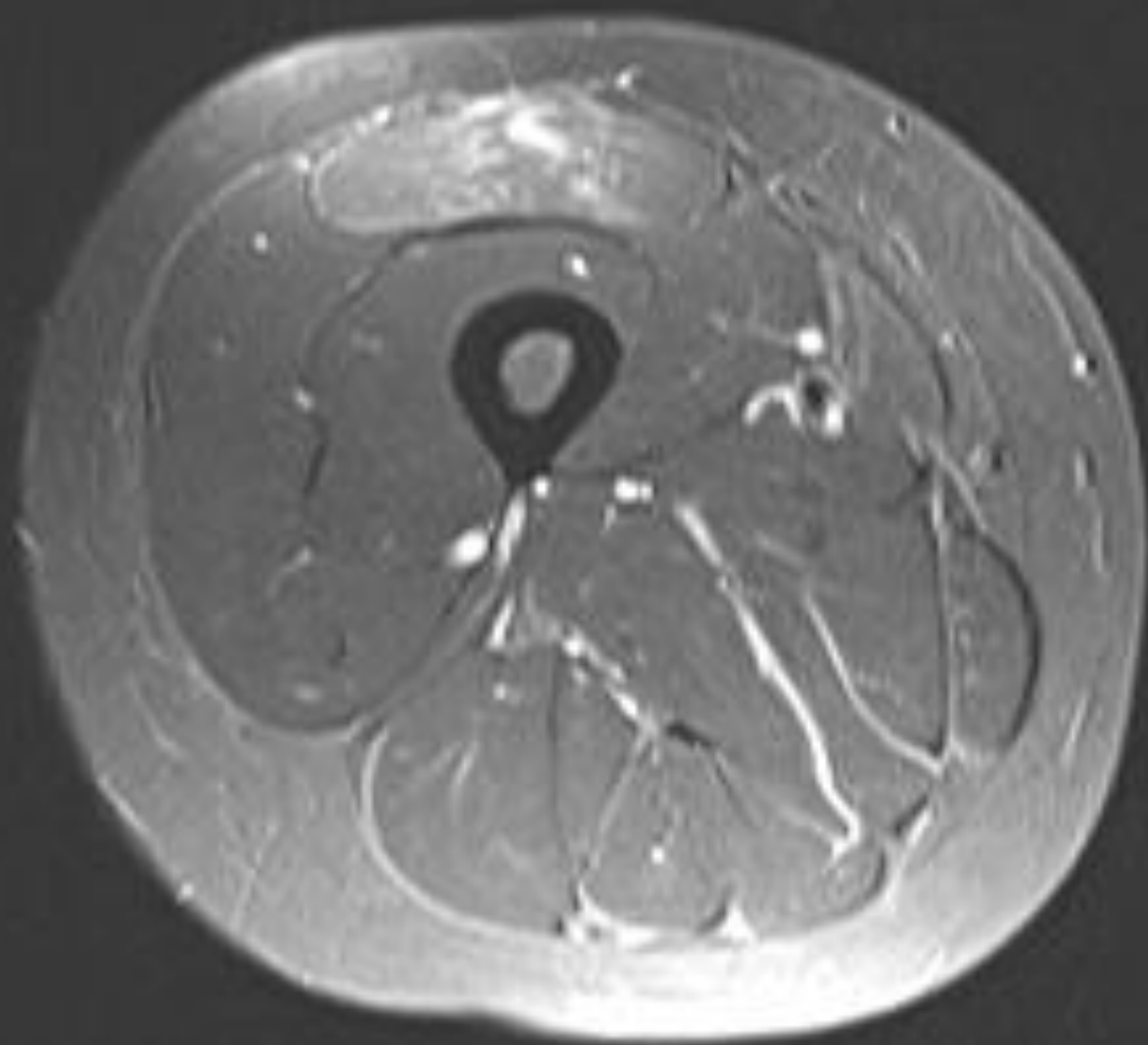


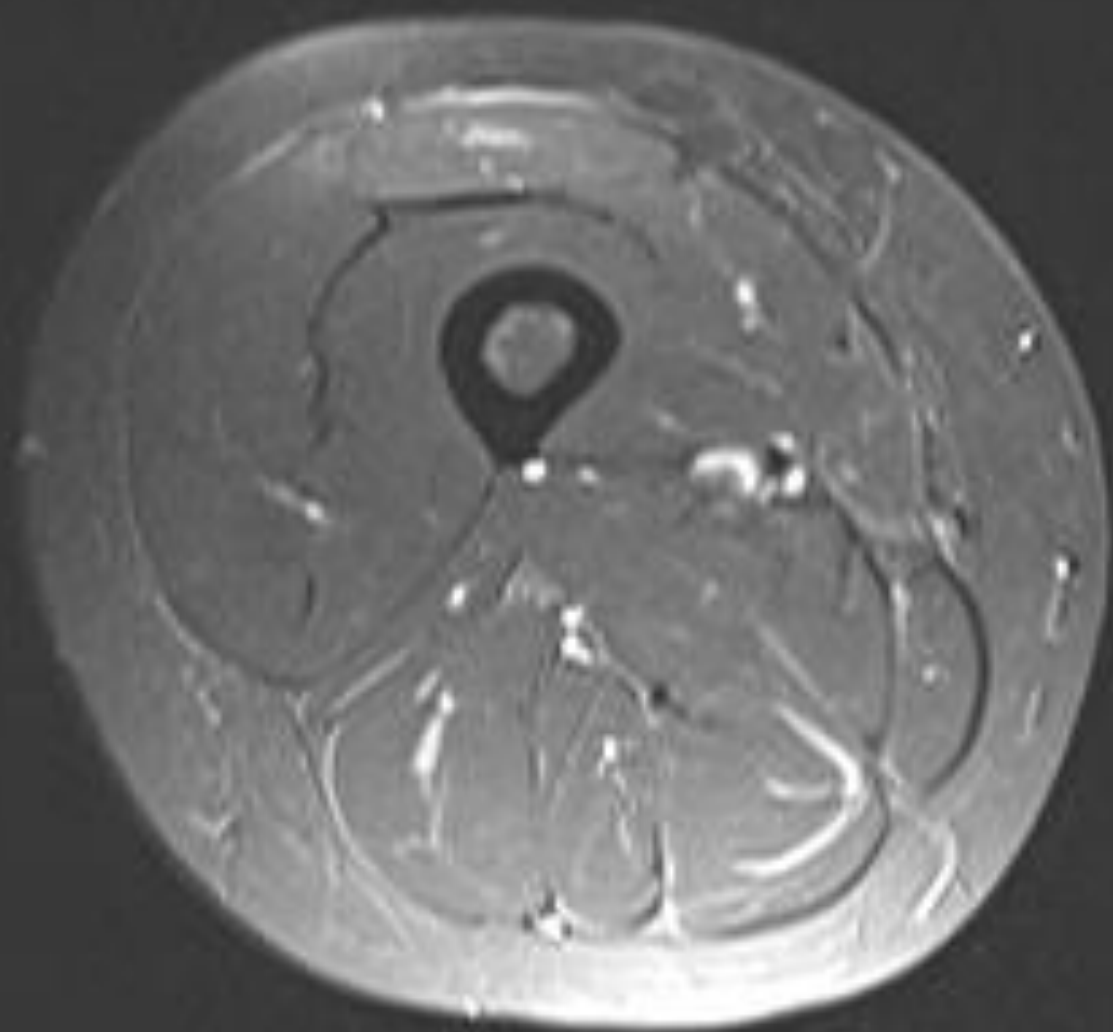


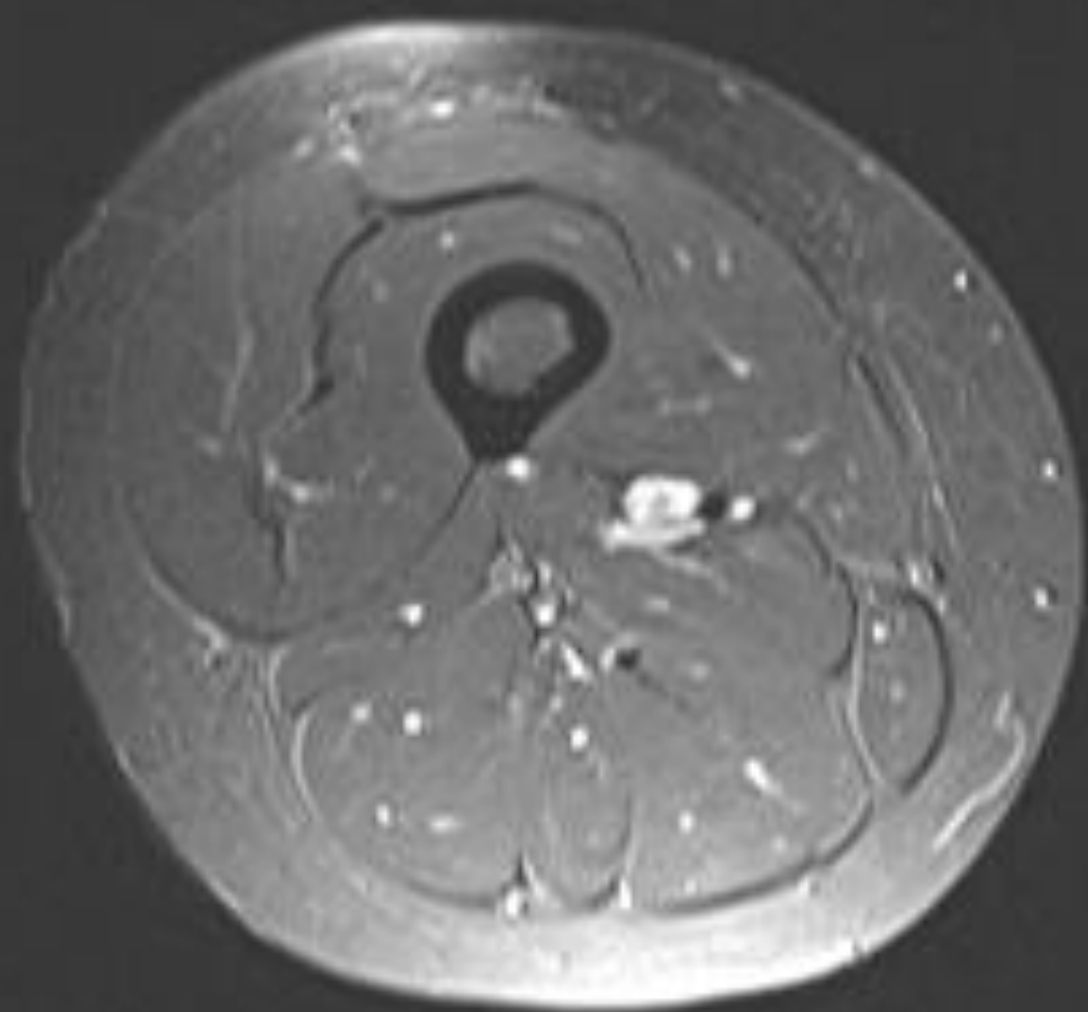




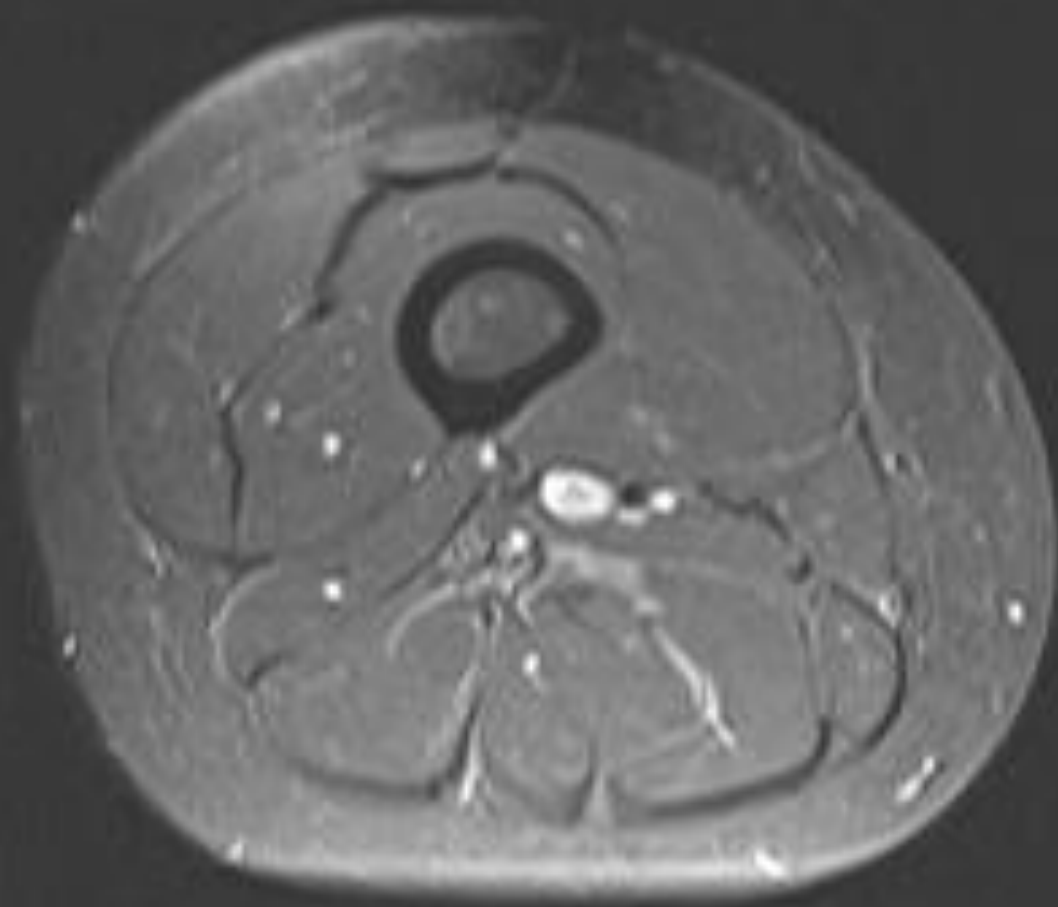


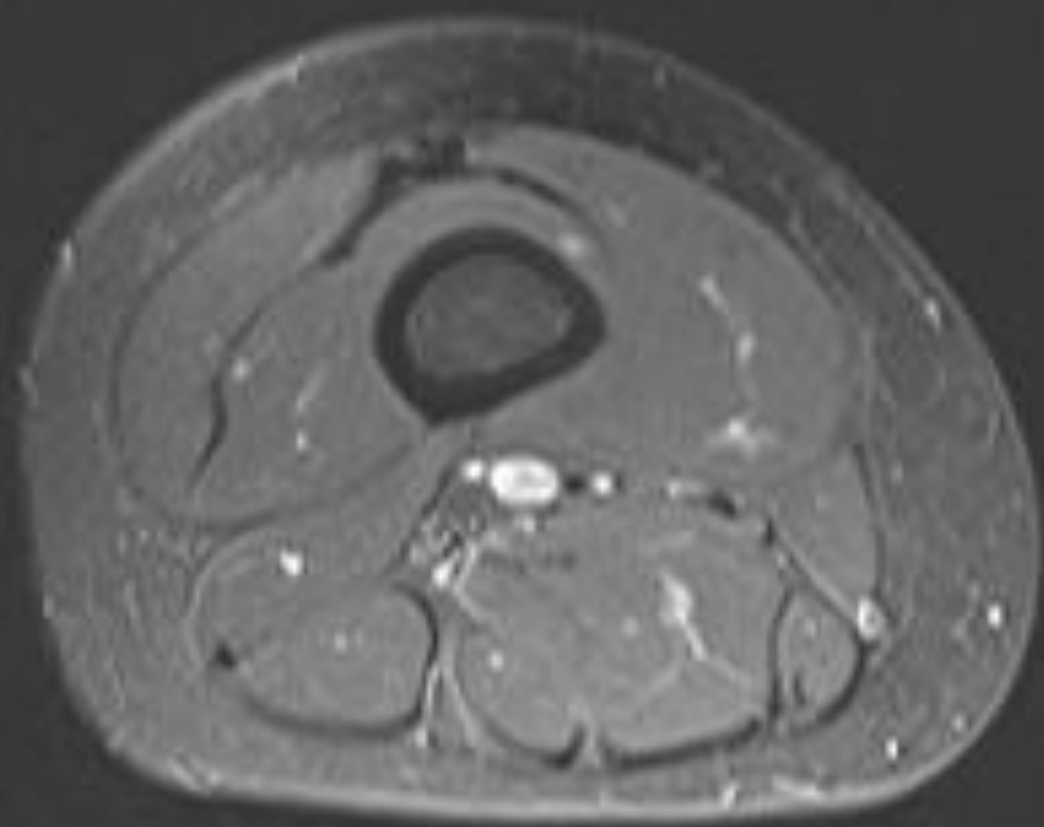


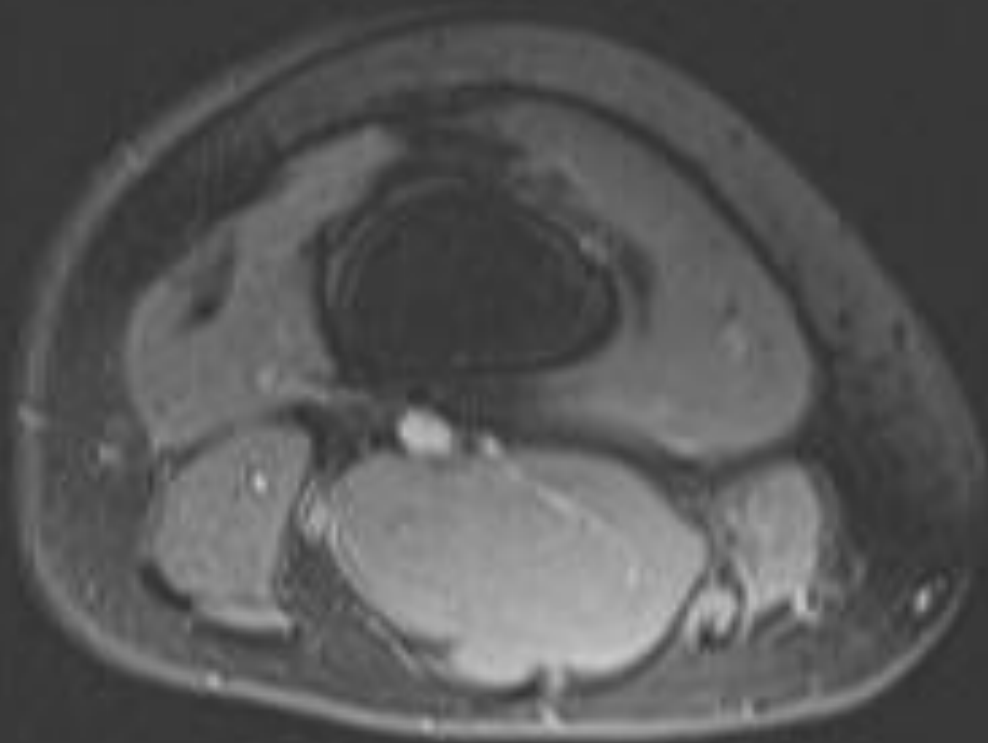


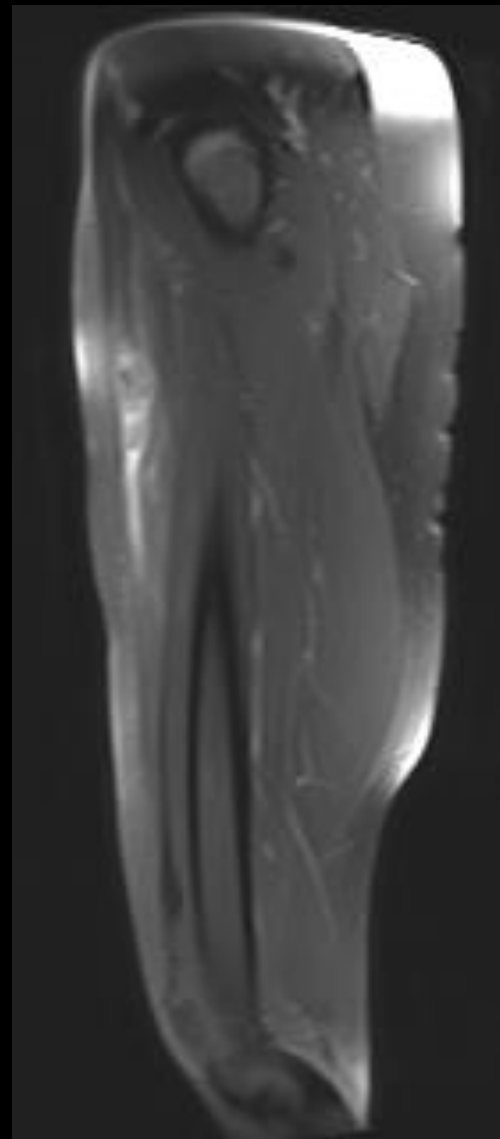
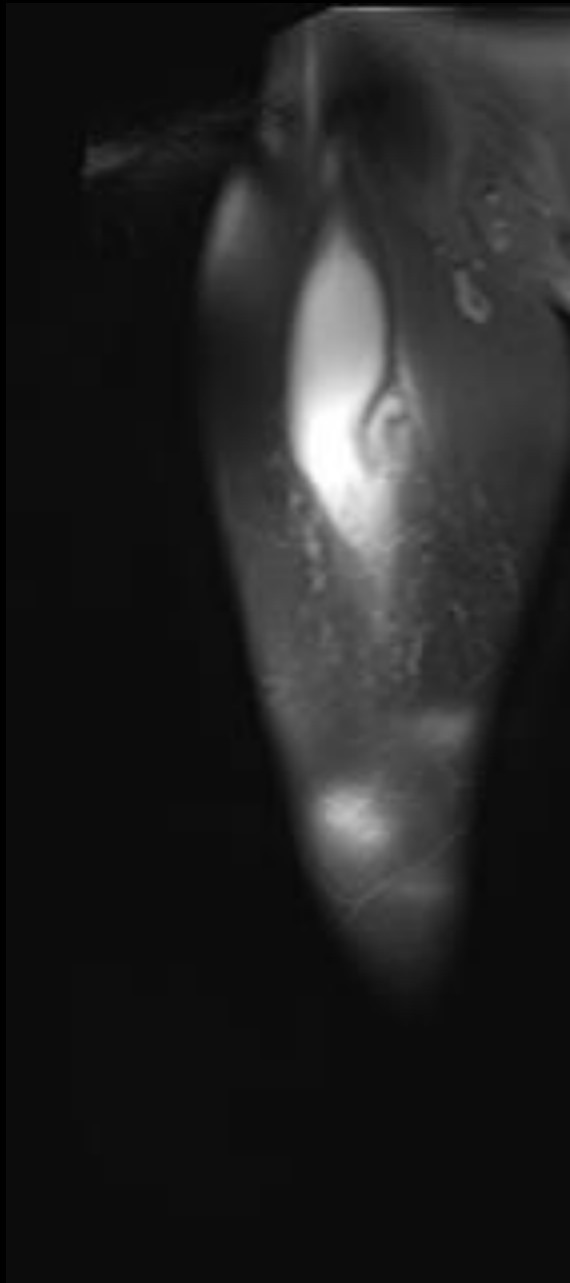
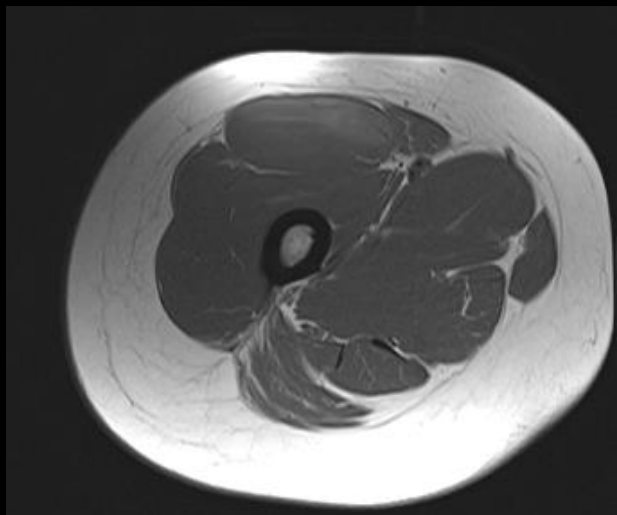
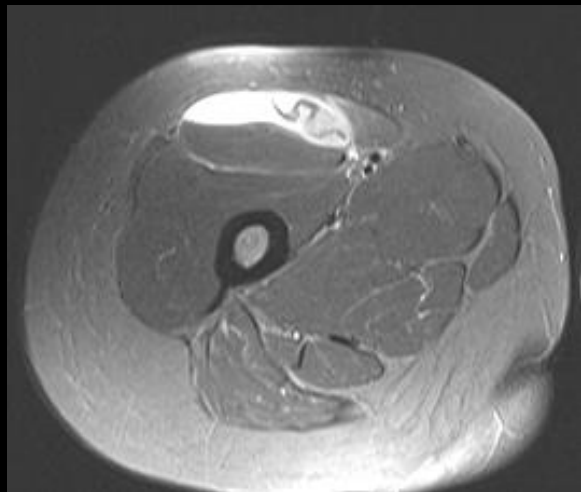












# Components of the Quadriceps Muscle Group

RF  
VM  
VL  
VI

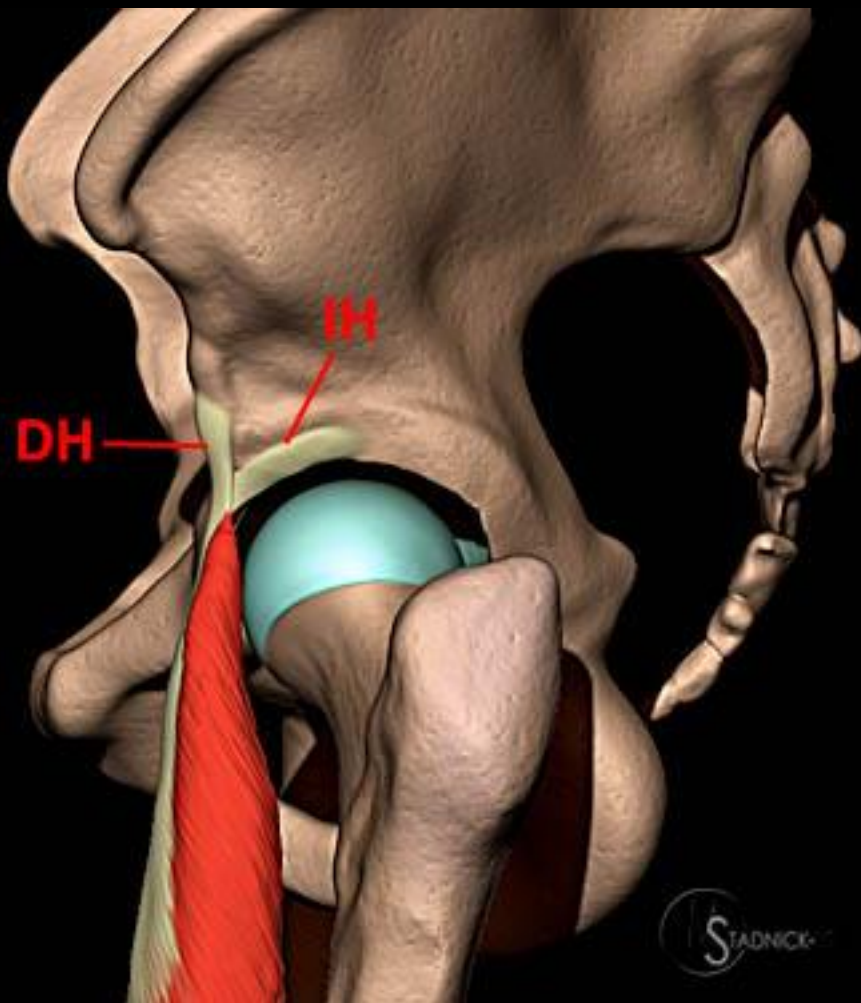
Rectus Femoris  
Vastus Medialis  
Vastus Intermedius  
Vastus Lateralis



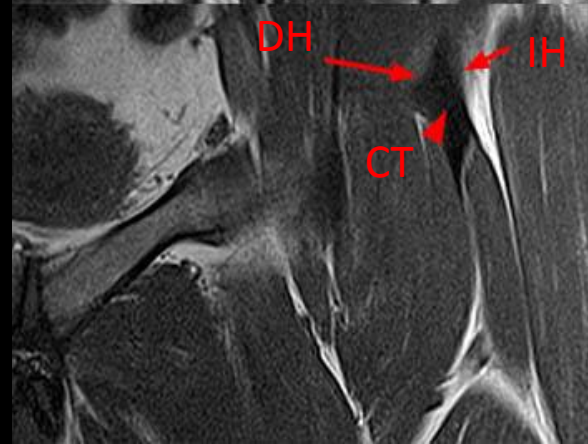
# Rectus Femoris

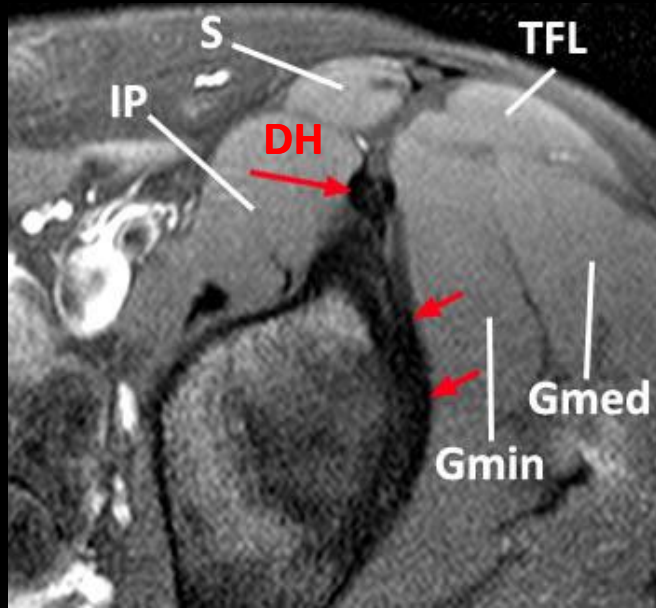
- Origin: Direct (straight) head from AIIIS, Indirect (reflected) head from supra-acetabular ridge and hip capsule
- Insertion: Base of the patella
- Action: Crosses both hip and knee. Extends knee, accessory flexor of hip
- Innervation: Muscular br of the femoral nerve (L2-L4)
- Arterial Supply: Lateral circumflex femoral artery

# Origin of the Rectus Femoris

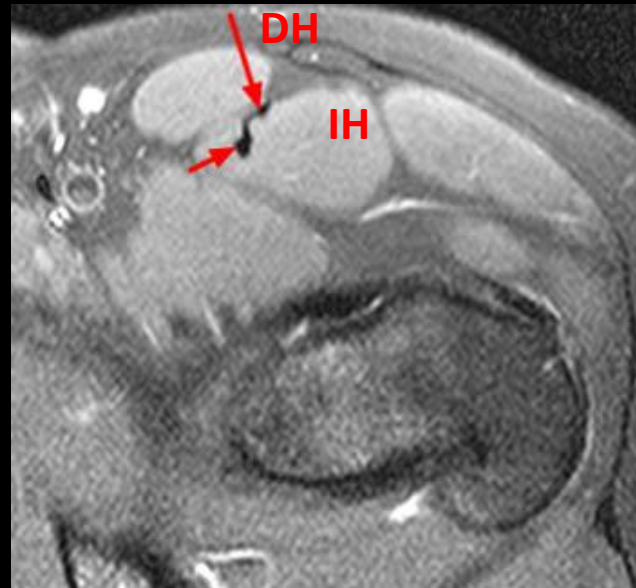
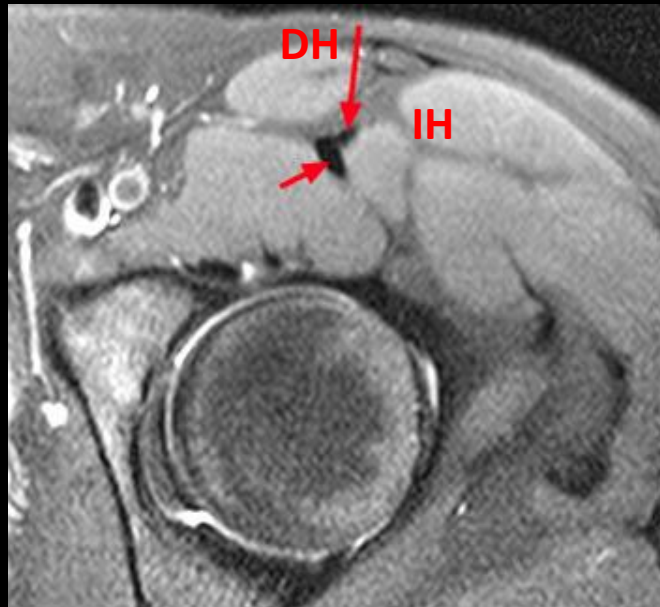
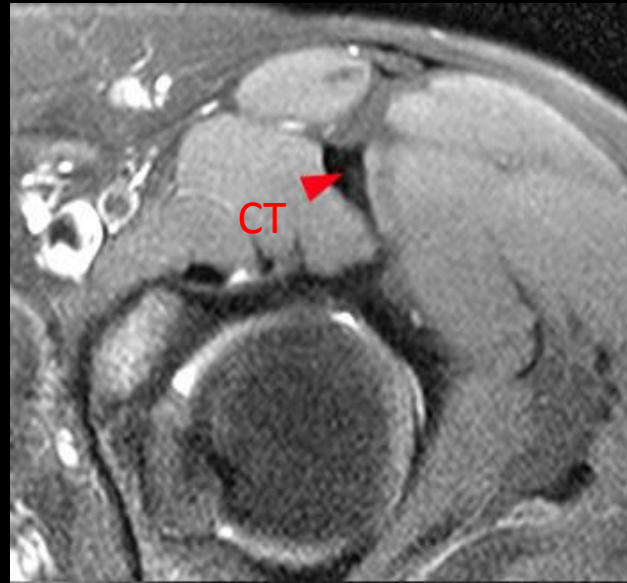


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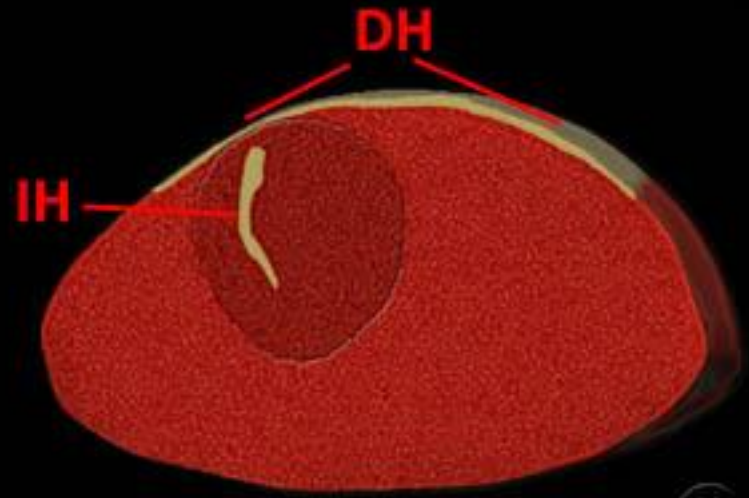
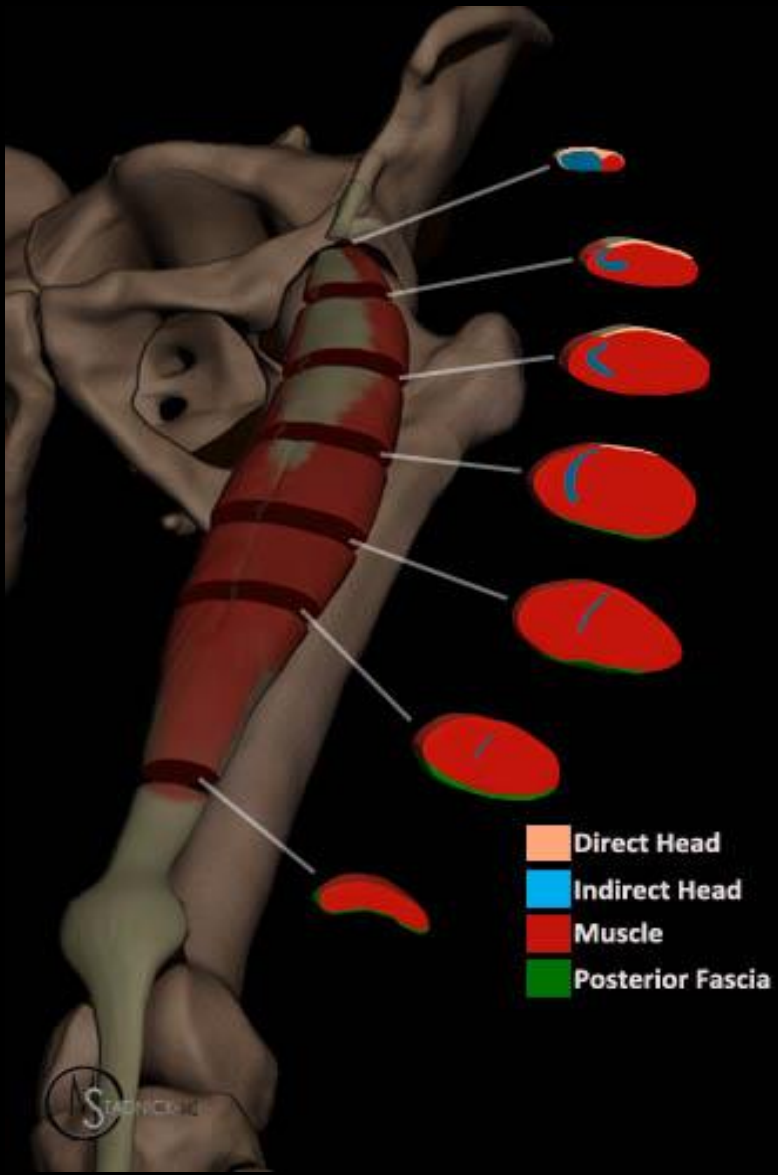




IH







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# Rectus Femoris Injury

- Common lower extremity muscle to be injured in athletes, second to the hamstrings.
- Predisposed to injury than the rest of the quadriceps vastus muscles because it crosses 2 joints and tendency to an eccentric forceful contraction with high percentage of type II fast twitch fibers when kicking
- Injury common in kicking or sprinting athletes
- RF: Recent or remote injury to RF or hamstring, low muscle strength, limited flexibility, muscle fatigue, inadequate warm-up and improper technique. Certain drugs (steroids, fluoroquinolone) hx of diabetes, gout, SLE, RA, kidney failure and obesity.

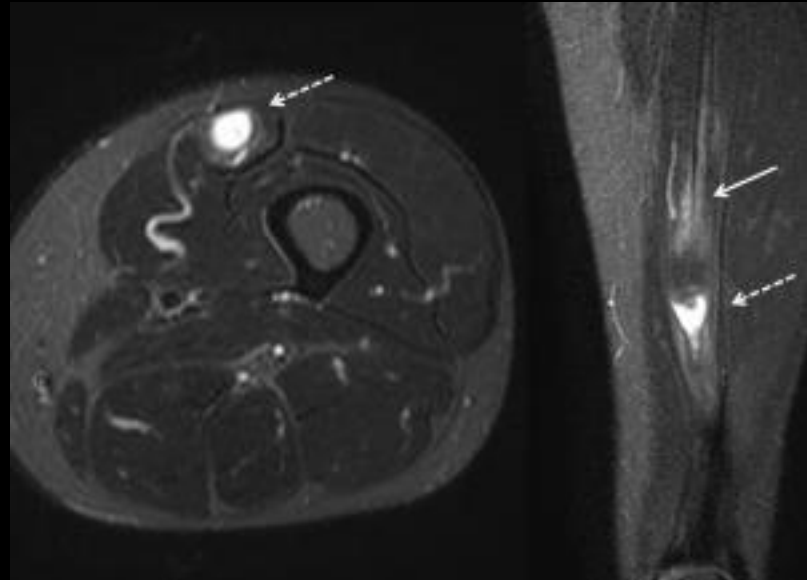
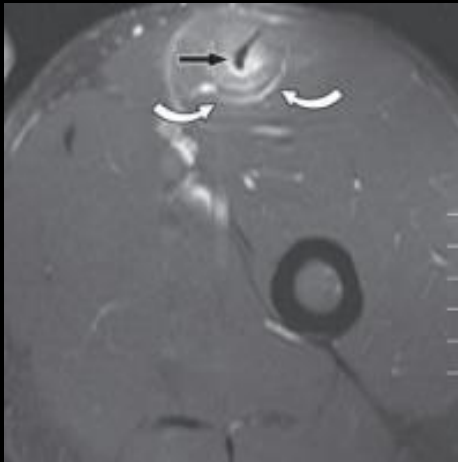
# Types of RF Injuries

- Anterior inferior iliac spine avulsion
- Injuries to the origin of the direct and indirect heads
- Muscle contusion
- Proximal and distal myotendinous injuries

# Grading of Myotendinous Injuries

- Myotendinous junction injury most common type of RF tear (especially for IH)
- Grade 1: microscopic injury without functional loss. MR- edema and peritendinous interstitial hemorrhage with no focal area of tear. Edema extends to adjacent muscle fibers producing a “feathery” appearance. Less than 5% of myofibrils are affected.
- Grade 2: partial tear with partial loss of muscle strength and ROM. MR- partial tear of the myotendinous junc, acute- fluid filled partial defect and hemorrhage, “bull’s eye sign” on axial T2 with hypointense central tendon surrounded by hemorrhage or peritendinous fluid
- Grade 3: complete tear with or without retraction with complete functional impairment

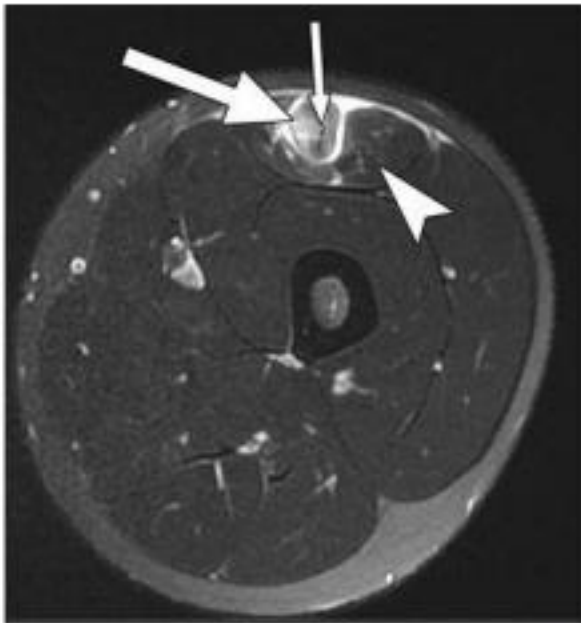
# Bull's Eye Sign



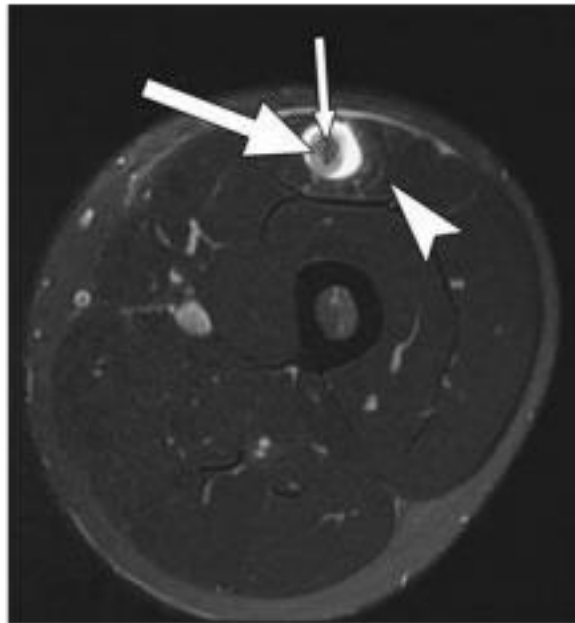
AJR 2008 190:3, W182-W186

Mariluis et al. Rev Argen. Radiol 2015; 79 (4):182-191

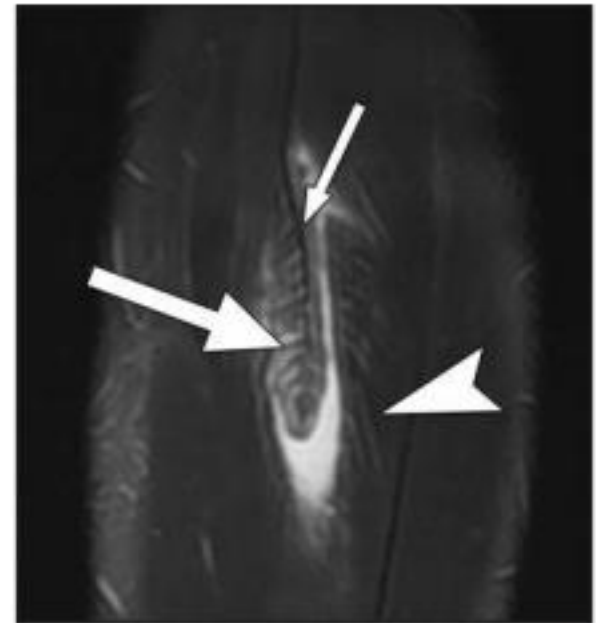
# Intramuscular Degloving Injury



A



B



C

# Acute Quadriceps Muscle Strains

## Prognostic features of MRI

Worse Prognosis	Better Prognosis
IH (27 days for recovery with rehab) Location: Middle (34 days) Proximal (19 days) Length: At least 13 cm (32 days) Less (14 days)	DH (9 days) Vasti (4.4 days) Negative MRI but signs and symptoms of quadriceps injury (5.7 days)

# References

Radsources.com

Gyftopoulos et al. Normal Anatomy and strains of the deep musculotendinous junction of the proximal rectus femoris: MRI features. AJR 2008 190:3, W182-W186

Mariluis et al. Muscle injuries of the rectus femoris muscle. MR update. Rev Argen. Radiol 2015; 79 (4):182-191

Kassarjian A, Rodrigo RM, Santisteban JM. Intramuscular degloving injuries to the rectus femoris: findings at MRI. AJR 2014;202:W1-W6.

Cross TM, Gibbs N, Houang MT, Cameron M. Acute quadriceps muscle strains. Magnetic resonance imaging features and prognosis. Am J Sports Med 2004;32:710-719.

Essential Anatomy Application