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

- Rectus Femoris
- Vastus Medialis
- Vastus Intermedius
- Vastus Lateralis
Rectus Femoris

- **Origin:** Direct (straight) head from AIIS, 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
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

Intramuscular Degloving Injury

# Acute Quadriceps Muscle Strains

## Prognostic features of MRI

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

References

Radsource.com


Essential Anatomy Application