



MRI EVALUATION OF DELAYED ONSET MUSCLE SORENESS (DOMS): A CASE REPORT

Radiology

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ABSTRACT

Delayed onset muscle soreness (DOMS) is a self-limiting musculoskeletal condition that commonly occurs following unaccustomed or strenuous physical activity. Although clinical diagnosis is often sufficient, MRI can be invaluable in confirming the diagnosis, excluding structural injury, and assessing the extent of muscle involvement. We present a case of a 43-year-old male with MRI-confirmed DOMS following a gym-related activity, with emphasis on imaging features and differential diagnosis.

KEYWORDS

Delayed onset muscle soreness, DOMS, MRI, muscle edema, exertional myopathy, gym injury

INTRODUCTION

Symptoms of DOMS commonly emerge within 12 to 24 hours post unfamiliar exertion and tend to reach peak intensity between 24 and 72 hours, usually presenting as localized pain, stiffness, and sensitivity on palpation. While clinical assessment is often diagnostic, MRI offers a detailed, non-invasive modality to evaluate muscular changes, especially when symptoms are severe or persistent. Imaging also helps rule out muscle tears, hematomas, or compartment syndrome [1,2].

Case Presentation

A 43-year-old male presented with pain and swelling in the left elbow and arm for three days following a strenuous gym session involving weight training. The patient denied any direct trauma or fall but reported increasing discomfort and functional limitation in the left upper limb.

On examination, the arm was mildly swollen and tender, with restricted elbow flexion due to pain. There was no skin discoloration or neurovascular compromise. Plain radiographs of the elbow and arm showed no bony abnormalities or soft tissue swelling.

Given the persistent symptoms and normal X-ray findings, an MRI was performed to assess soft tissue structures.

MRI Findings

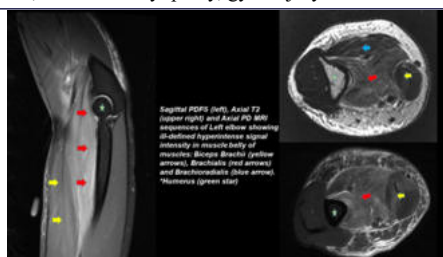
Magnetic resonance imaging of the affected upper limb and shoulder was performed using a 3-Tesla system. The key findings included:

T2-weighted and PD-weighted sequences (with and without fat suppression), revealed ill-defined hyperintense signal changes predominantly within the muscle belly of the biceps brachii, brachialis, and brachioradialis muscles. These findings were consistent with muscle edema, with no evidence of fiber discontinuity, partial or complete muscle tear, hematoma, fluid collection, or fascial plane disruption.

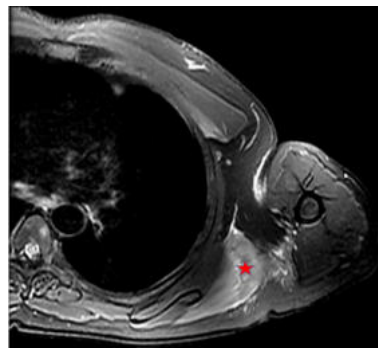
Additionally, similar ill-defined hyperintense signal changes, consistent with muscle edema, were noted in the muscle belly of the latissimus dorsi muscle, adjacent to the left scapula, on T2-weighted and STIR images. This area also showed no signs of fiber discontinuity or muscle tear. Edema was concomitantly observed in the left axillary region.

Further assessment showed no evidence of tendon injury, joint effusion, or bone marrow edema, and no fracture was identified. Minimal subcutaneous edema was also observed around the elbow.

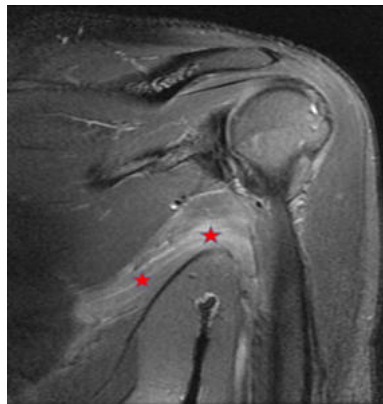
These findings were diagnostic of exercise-induced muscle injury consistent with DOMS, in the absence of structural damage.



1) Sagittal PDFS (left), Axial T2 (upper right) and Axial PD MRI sequences of Left elbow showing ill-defined hyperintense signal intensity in muscle belly of muscles: Biceps Brachii (yellow arrows), Brachialis (red arrows) and Brachioradialis (blue arrow).



2) Axial T2 FS MRI of the Left Elbow showing hyperintense signal (edema) in the latissimus dorsi muscle (★) adjoining the scapula, consistent with contusion.



Images

3) Coronal T2FS MRI showing hyperintense signal (edema) in the left axilla (*).

DISCUSSION

DOMS is a benign myopathy resulting from eccentric or unfamiliar exercise, particularly when involving high mechanical stress. Histologically, it is characterized by mild muscle fiber disruption, inflammatory infiltration, and edema [3]. MRI plays a crucial role when clinical differentiation from muscle strain, tear, or rhabdomyolysis is unclear.

On MRI, DOMS typically presents as:

- Symmetric or focal muscle edema,
- High signal intensity on fluid-sensitive sequences (STIR/T2),
- No fiber discontinuity or hemorrhage,
- Absence of fascial enhancement or compartmental fluid.

It is essential to distinguish DOMS from more serious injuries like grade II/III muscle tears or compartment syndrome, which may show hematoma, fascial disruption, and muscle retraction [4,5].

The patient in this case responded well to conservative management, including rest, NSAIDs, and gradual return to activity, with complete resolution of symptoms in 7 days.

CONCLUSION

MRI is an excellent modality for evaluating muscle-related pain when the clinical picture is ambiguous or when initial radiographs are inconclusive. This report underscores the hallmark imaging features of DOMS and emphasizes the need to distinguish it from clinically significant muscular injuries. A precise imaging diagnosis can prevent unnecessary interventions and reassure patients experiencing severe post-exercise discomfort.

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