Journal of Orthopaedics Study and Sports Medicine

Genesis-JOSSM-3(1)-22
Volume 3 | Issue 1
Open Access

Healing of a High-Grade Partial Rotator Cuff Tear Using Bone Marrow-Derived Mesenchymal Stem Cells: A Case Report

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Citation Moura TC, Simões MC, Pascoal Cortopassi GAR, Silva Reis ED, Healing of a High-Grade Partial Rotator Cuff Tear Using Bone Marrow-Derived Mesenchymal Stem Cells: A Case Report. J Orthop Study Sports Med. 3(1):1-3.

Received: June 1, 2025 | **Published:** June 30, 2025

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Abstract

This case report describes the successful healing of a high-grade partial tear of the supraspinatus tendon in a 70-year-old male patient treated with bone marrow-derived mesenchymal stem cells (BMSCs), combined with hyaluronic acid, dry needling, shockwave therapy, and physiotherapy. Initial MRI revealed a high-grade articular intrateninous tear compromising over 50% of the supraspinatus tendon. The patient underwent ultrasound-guided intralesional injection of BMSCs obtained from the posterior iliac crest, along with dry needling, followed by a multimodal rehabilitation protocol. The procedure was repeated after 30 days. After six months, follow-up MRI confirmed structural healing of the tendon and full clinical recovery, maintained at 1-year follow-up. This case highlights the regenerative potential of ortho-biologics in treating rotator cuff injuries and reducing the need for surgical intervention.

Keywords

Rotator cuff tears; Shoulder pain; High-grade partial tear; Mesenchymal stem cells.

Introduction

Rotator cuff tears are a common cause of shoulder pain and disability, particularly in older and active patients. Partial tears, especially high-grade lesions, may progress and often fail to respond to conservative measures. Regenerative medicine, particularly the use of bone marrow-derived mesenchymal stem cells (BMSCs), has shown promise in enhancing tendon healing and function. This case illustrates the clinical and imaging-based recovery of a partial supraspinatus tear following a targeted regenerative intervention.

Case Presentation

A 70-year-old active retired male patient (initials O.G.G.) presented to our clinic on July 4, 2024, with a 4-month history of progressive left shoulder pain. He reported no trauma, but had nocturnal pain and worsening with elevation and exertion. On physical exam, there were positive signs for rotator cuff pathology: Jobe's test, infraspinatus test, and Speed's test.

An MRI performed on July 17, 2024, revealed:

- A high-grade partial articular tear of the supraspinatus and infraspinatus tendons (0.8 x 0.6 cm), affecting over 50% of tendon thickness.
- Edema in the greater tuberosity and subacromial-subdeltoid bursitis.

Intervention

The patient underwent the following protocol:

1. Bone marrow aspiration (5 ml) from the posterior iliac crest.
2. Ultrasound-guided infiltration of:
    - 5 ml bone marrow aspirate (BMA)
    - 2 ml hyaluronic acid
    - 2 ml of anti-homotoxic agent (Traumeel®)
3. Dry needling performed in the same session.
4. The same procedure (infiltration + dry needling) was repeated after 30 days.
5. Shockwave therapy: 8 sessions (3,000 pulses, 2.5 bar, 8 Hz, weekly).
6. Physiotherapy focused on analgesia, stretching, and myofascial release.

Outcome and Follow-up

The patient showed progressive improvement, with complete resolution of symptoms by 2 months. After 6 months, follow-up MRI (February 11, 2025) revealed:

- Resolution of the partial tear, with only mild degenerative changes and no signs of tendon rupture.
- Evidence of tissue remodeling at the previous lesion site.

At 1-year follow-up, the patient remained asymptomatic and resumed his regular routine and physical activity without limitations.

Imaging

Below is a comparative MRI image demonstrating the healing process of the rotator cuff tear:

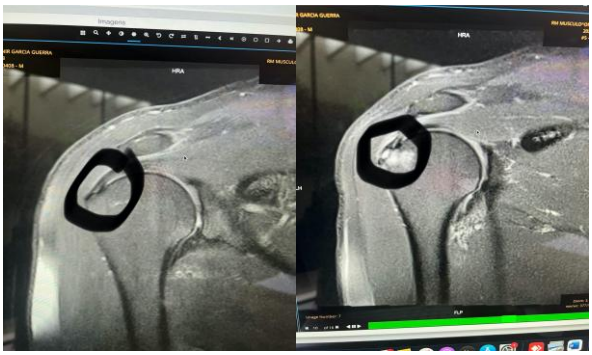

Figure 1: MRI comparison. Left – Follow-up MRI showing tendon healing. Right – Initial MRI showing high-grade partial tear.

Discussion

This case demonstrates a clinically and radiologically confirmed healing of a high-grade partial supraspinatus tear using a multimodal regenerative approach. MSCs have been shown to possess anti-inflammatory, angiogenic, and pro-regenerative properties, contributing to tendon repair. The combined use of ortho-biologics, shockwave therapy, and rehabilitation was key to achieving structural recovery and functional restoration.

Similar studies have reported promising outcomes using MSCs in rotator cuff injuries, but few offer follow-up imaging that confirms tendon healing. This case adds to the growing body of evidence supporting the use of regenerative medicine as a non-surgical alternative for partial rotator cuff tears.

Conclusion

The use of bone marrow-derived MSCs in combination with complementary therapies resulted in complete healing of a high-grade partial supraspinatus tear, as evidenced by MRI and clinical outcomes. Regenerative ortho-biologic strategies should be considered in selected patients to reduce the need for surgery and promote natural healing.

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