

## Myositis Ossificans in the Shoulder – A Case Report

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## Abstract

Myositis ossificans is a non-neoplastic, rare medical condition characterized by heterotopic bone formation in non-skeletal muscle or soft tissues. It is an idiopathic disorder in which trauma plays a significant contributing role, typically appearing 4 to 12 weeks after the injury. While the elbow is the most common site, myositis ossificans can occur anywhere in the body and is particularly common in young athletes, especially males in their second to third decades of life. This case study reports the observation of a 27-year-old male who presented with a shoulder mass 9 years after trauma sustained while playing volleyball. The condition was diagnosed as myositis ossificans in the shoulder, around the deltoid muscles. Excision of the mass was performed after confirmation through MRI scans and biopsy.

**Keywords:** myositis ossificans; non-neoplastic; rare; shoulder

## Introduction

Myositis ossificans (MO) is a rare condition characterized by non-neoplastic heterotopic ossification in extra-skeletal muscles and usually presents in young athletic males in the second and third decades of life.<sup>1</sup> It is usually isolated, confined, and well-encapsulated.<sup>2</sup> The terms “heterotopic ossification” and “myositis ossificans” are often used interchangeably in the literature.<sup>3</sup> Its most common site of occurrence is over the shaft of long bones, where muscles are prone to direct trauma.<sup>4</sup> Heterotopic ossification rarely affects the shoulder region.<sup>5</sup> Three stages are usually associated with the progression of myositis ossificans: early, intermediate, and mature stages. The mature stage exhibits a zonal pattern of mineralization.<sup>6,7</sup> This article reports a young, healthy male patient with MO in the shoulder, a rare site, caused by trauma.

The patient had been living with a mass on his right shoulder and associated anxiety for around 9 years. Surgical treatment with adequate follow-up was functionally effective, leading to patient satisfaction and a return to normal function. The consent form was signed by the patient for publishing the case report.

## Case Description

A 27-year-old male reported a cosmetically unacceptable mass on his right shoulder region, which was affecting his daily life and requiring medical attention. The patient, who had played volleyball for 9 years, sustained a right shoulder injury, causing pain and difficulty with shoulder movement. He went to the local hospital after an X-ray and was given painkillers. However, after 4–5 months, he noticed swelling on his shoulder, which gradually

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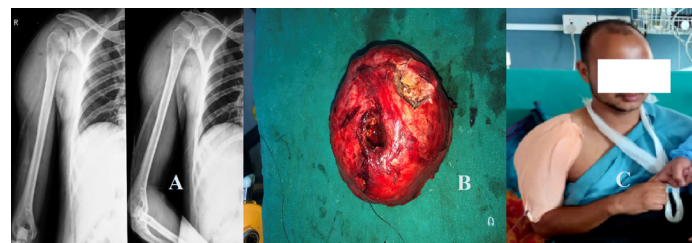
expanded more than before, but he chose to ignore it. After a year of injury, a significant swelling and mass on the right shoulder led to a hospital visit in Nepal, where X-rays and MRIs were performed. He was advised to go to a cancer hospital, but he returned home due to a lack of money. The swelling continued to increase without any systemic issues. Over the next few years, he lived with the mass on the right side of his shoulder, performing his daily work as tolerated. After 7–8 years, he visited a cancer hospital and was advised to undergo shoulder disarticulation. However, the patient left the hospital without obtaining any hospital records or reports. After 3–4 months, he visited a local hospital where an X-ray of the right shoulder was done. He was advised to undergo disarticulation and use a prosthesis, but he still disagreed. His relatives, who work at our hospital, brought him to us after he had visited all other centers four or five months prior, complaining of a lump on his right shoulder.

The patient reported a 9-year-old trauma-related problem, causing swelling and a palpable mass. Over the past three years, the swelling has progressively increased. Every shoulder mass should be investigated and requires a diagnosis. Progressive growth led the patient to seek medical attention. A local examination revealed a firm, non-tender mass in the shoulder region around the deltoid muscles, with no ecchymosis, bruises, or dilated vessels. There was no movement in the affected shoulder, and it was held in an approximately 20-degree abducted position. Since there had been no additional systemic symptoms for nine years, the issue had not been resolved, suggesting that malignancy was ruled out, though it could not be confirmed. An X-ray of the right shoulder was done, which revealed a radiolucent shadow around the shoulder joint. Blood investigations—CBC, ESR, CRP, serum alkaline phosphatase, serum phosphatase, serum calcium, and magnesium—were conducted, all of which were within the normal range. After counseling, a Biopsy and MRI were done, and he was asked to wait for the printed reports. After the biopsy and MRI reports, the patient was diagnosed with myositis ossificans and was advised to undergo surgery for mass excision, to which the patient agreed. Accordingly, the patient was admitted to our department, clear consent was taken for surgery, pre-operative investigations were completed, and pre-anesthesia checks were done. The patient was taken for surgery after pre-anesthetic check-up and clearance. Following the patient's transfer to the operating room, the patient received a brachial plexus block and sedation from the anesthesia team. Under aseptic technique, using a deltoid-pectoral approach, the mass was carefully dissected. The neurovascular and soft tissue structures were freed from the mass, and the entire mass, along with its remittent, was removed. The mass was measured at 26×24×20 cm and weighed around 2 kg. The wound was thoroughly washed and irrigated. After excision, the right shoulder joint was mobilized on the operating table, and no mechanical block was found. The wound was closed in layers over a No. 16 vacuum drain. When the post-operative right shoulder's X-ray was delivered, it revealed normal joint alignment, the absence of the mass shadow, and no fractures in the surrounding bone. The patient's

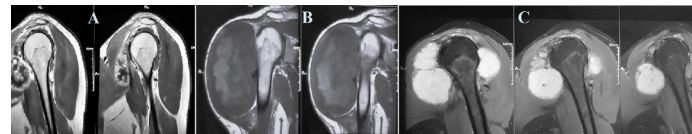
neurovascular status was assessed the next morning, and it was found to be uncompromised. (Figure: 1, 2, 3, 4)



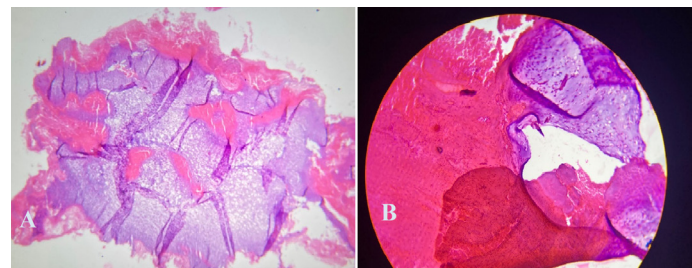
**Figure 1:** A. Clinical picture showing mass on right shoulder; B. Pre-operative X-ray showing radiolucent shadow



**Figure 2:** A. Post-operative X-ray; B. Excised mass; C. Post-operative image showing grip strength



**Figure 3:** A, B. T1 image showing a hypo-intense lesion; C. T2 image showing high signal intensity



**Figure 4:** A. Microscopic view showing zonation phenomenon fibroblastic proliferation; B. Formation of mature lamellar bone

## Discussion

Myositis ossificans (MO) is a non-neoplastic bone growth disorder that occurs extra-osseously, with two primary subtypes: fibrodysplasia ossificans progressiva (FOP), a rare genetic illness, and traumatic myositis ossificans, a condition resulting from trauma.<sup>7</sup> There are three primary forms of myositis ossificans: traumatic, idiopathic, and congenital.<sup>9</sup> Calcified hematomas or necrosis may be mistaken for myositis ossificans without a pathological investigation, possibly due to intramuscular hematoma.<sup>10</sup> Three entities are described by Noble's classification: (i)

progressive MO; (ii) traumatic MO circumscripta; (iii) non-traumatic MO circumscripta.<sup>2</sup> The exact pathophysiology of the condition, which has been linked to neurological, traumatic, and genetic factors, remains uncertain.<sup>3</sup> Some of the prevalent possibilities include: 1) conversion of a muscle hematoma to bone, 2) hematoma calcification, 3) osteoblast proliferation from periosteal rupture, 4) periosteal flaps detached from the muscle, 5) metaplasia of intramuscular connective tissue cells, and 6) individual propensity.<sup>9</sup> It is commonly believed that in trauma-related cases, ossification occurs when fibroblasts and vascular tissue proliferate hemorrhagically and undergo tissue necrosis. However, certain studies have revealed cases of non-traumatic MO.<sup>8</sup> Early biopsy in MO cases may mislead patients into thinking they have sarcoma or fibromatosis. Histological sections reveal mature lesions in peripheral bone, and CT scans detect ossification and a core fatty metaplastic region.<sup>4</sup> In our case, we did not perform a CT scan because the bones appeared normal. Instead, we opted for a biopsy and MRI. The biopsy showed foci of woven bone formation with numerous islets of mature and immature cartilage, with zonation suggestive of myositis ossificans. The MRI indicated a large lobulated heterogeneously enhancing lesion, likely benign, suggestive of myositis ossificans. The diagnosis was confirmed by matching all the investigation reports with clinical judgment.

## Conclusion

Myositis ossificans is a non-neoplastic condition that affects extra-skeletal muscle compartments. We report an interesting case of rare shoulder myositis ossificans, which was cosmetically unacceptable and affected the patient's daily life due to limited movement in the right shoulder, a condition that persisted for nine years. The patient had been advised to undergo disarticulation at different centers, but we opted for surgical excision. This case highlights the importance of patient history and clinical judgment. However, laboratory and radiological investigations also play a crucial role in making the diagnosis.

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