

## Pseudotumor Deltoideus Associated With Persistent Focal Mid-Arm Pain: A Case Report

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### ABSTRACT

#### Background:

Pseudotumor deltoideus is a benign cortical change at the site where the deltoid muscle inserts on the humerus. It is often found by chance. On a plain radiograph, however, it can look like infection or a bone tumour. Reports of patients whose pain continues at the exact site of the lesion are few.

#### Case presentation:

A 44-year-old woman had localised pain in the right mid-arm for about three years. Analgesics did not relieve it. She reported no trauma, overhead activity, strenuous exercise or occupational overuse. Examination showed a well-defined area of tenderness over the mid-arm, at the site of the radiographic abnormality. Shoulder movement was full, and resisted abduction reproduced the pain. There was no swelling, palpable mass or neurological symptom. Radiographs of the right humerus showed focal cortical irregularity and thickening at the deltoid insertion. MRI of the arm showed focal cortical and periosteal thickening. There was no aggressive marrow abnormality, soft-tissue mass or collection. Shoulder MRI showed mild supraspinatus tendinosis, acromioclavicular degenerative change and features of mild adhesive capsulitis. These findings were considered unlikely to explain the isolated mid-arm tenderness. She was treated with analgesics and gabapentin. Biopsy and surgery were not undertaken because the imaging was considered typical and showed no aggressive features. After three months the pain had improved only slightly, and the focal tenderness remained.

#### Conclusion:

Pseudotumor deltoideus can be diagnosed from its site and its radiographic and MRI appearance. When pain and tenderness persist at the same site, the patient needs clinical follow-up. Biopsy may be avoided when the clinical and imaging findings are characteristic and show no suspicious features.

**Keywords:** Cortical Thickening, Deltoid Tuberosity, Humerus, Magnetic Resonance Imaging, Pseudotumor Deltoideus

### INTRODUCTION

The deltoid muscle is the main abductor of the shoulder. It arises from the lateral third of the clavicle, the acromion and the spine of the scapula. Its three parts converge on a tendon that inserts into the deltoid tuberosity on the lateral surface of the humeral shaft, at about the middle of the arm. The tuberosity is a rough, V-shaped area of bone. It lies close to the radial groove, which carries the radial nerve and the profunda brachii vessels. A large muscle pulls on a small area of bone here, so the cortex at this site is often thick and uneven. On a plain radiograph, this normal irregularity can be hard to tell apart from disease.

Pseudotumor deltoideus was first described in 2001. The term was used for an eccentric irregularity of the cortex at or near the deltoid tuberosity.<sup>1</sup> The original report described five patients. Some were referred because of pain. In others, the change was found by chance on a radiograph taken for another reason. The lesions showed a relative lucency at the tuberosity on radiographs, variable uptake on bone scan, and mild cortical irregularity or eccentric marrow change on CT and MRI. Extended follow-up suggested an inactive or slow process, and the patients were managed without surgery. The name reflects the main clinical problem. The lesion is not a tumour, but it can look like one.

The anatomy of the insertion is not the same in every person. A cadaveric study of eight fresh-frozen shoulders traced the anterior, middle and posterior parts of the deltoid down to the humerus. The

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authors found variation in how and where these parts attached, and they measured the size of the insertion footprint.<sup>2</sup> Such variation may explain why the cortex at the tuberosity looks different from one patient to the next. It may also explain why some people show a focal bony change at this site and others do not. A clinician who knows the range of normal anatomy is less likely to mistake it for a lesion.

The differential diagnosis on a plain radiograph is wide. Lucency, cortical irregularity and periosteal reaction in the humeral shaft can suggest osteomyelitis, a stress reaction, an osteoid osteoma or a primary bone tumour. When the patient also has pain at the same site, the concern for infection or neoplasm rises. A case report described a 45-year-old man with right shoulder pain and cortical thickening of the proximal humerus.<sup>3</sup> The authors noted that pain together with an irregular cortex can mimic infection or tumour. This can lead to more tests than are needed. They advised CT or MRI for such patients and warned against biopsy when the imaging is typical.

Cross-sectional imaging is the main step in diagnosis. On CT, the lesion may show an elongated lucency in the cortex. On MRI, the cortex may show high T2 signal without a soft-tissue mass or aggressive marrow change.<sup>4</sup> These findings, at the typical site, allow a confident diagnosis. For this reason the lesion has been called a “touch me not” lesion of the humerus. A biopsy of a benign variant adds risk and cost, and it can cause the patient needless worry. In one reported patient, anti-inflammatory drugs and physiotherapy relieved the pain and restored shoulder movement within two months. The radiographic appearance did not change.

Deciding whether the lesion is the cause of pain is a separate problem. Many reported cases were found by chance. When a patient has arm or shoulder pain, the clinician has to decide whether the lesion explains it or whether another cause is present. The shoulder is a common source of pain felt in the lateral arm. Imaging of the shoulder also often shows abnormal findings in people with no symptoms. In one ultrasound study of 51 men aged 40 to 70 years with no shoulder symptoms, acromioclavicular joint osteoarthritis was found in 65% and supraspinatus tendinosis in 39%.<sup>5</sup> A finding on shoulder imaging therefore does not prove that the shoulder is the source of pain. The clinical picture, and in particular the site of tenderness, has to guide the decision.

Reports of pseudotumor deltoideus with long-standing pain that stays at the exact site of the lesion are few. Most descriptions focus on the imaging and on avoiding biopsy. Less is known about patients whose pain persists despite treatment. We report a 44-year-old woman with about three years of focal mid-arm pain and tenderness over a typical pseudotumor deltoideus. MRI of the shoulder showed other mild changes that did not fit her symptoms. This report describes how the diagnosis was reached from the imaging and clinical findings, why biopsy was avoided, and how the persistent pain was managed.

### **CASE REPORT**

A 44-year-old woman presented with pain in the right mid-arm that had been present for about three years. The pain was localised and not diffuse. It had persisted despite treatment with analgesics. She reported no earlier trauma, no repetitive overhead shoulder activity, no strenuous exercise and no occupational overuse.

Examination showed a clearly defined area of tenderness over the mid-arm. This matched the site of the radiographic abnormality. The shoulder had a full range of movement. Resisted abduction reproduced the pain. There was no swelling or palpable soft-tissue mass. She had no neurological

symptoms.

Plain radiographs of the right humerus showed focal cortical irregularity and thickening at the level of the deltoid insertion (Figure 1). The site and appearance were typical of pseudotumor deltoideus. Because the pain and tenderness were at the same site, the finding was not treated as incidental, and MRI was requested.

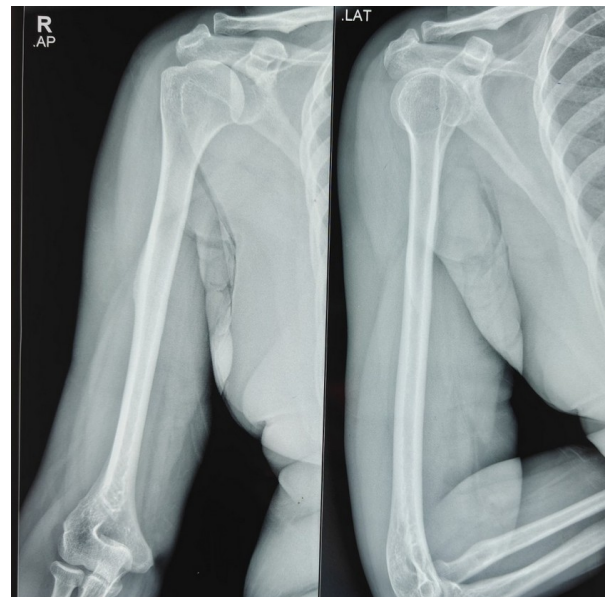


*Figure 1 : Radiographs of the right humerus, anteroposterior (left) and lateral (right) views, showing focal cortical irregularity and thickening at the deltoid insertion, in keeping with pseudotumor deltoideus.*

MRI of the right arm showed focal cortical and periosteal thickening at the deltoid insertion (Figure 2). There was no soft-tissue mass, collection or aggressive marrow abnormality. The surrounding muscle was normal. With the typical site on the radiograph, these findings were in keeping with pseudotumor deltoideus. No MRI feature suggested an aggressive bone or soft-tissue lesion.

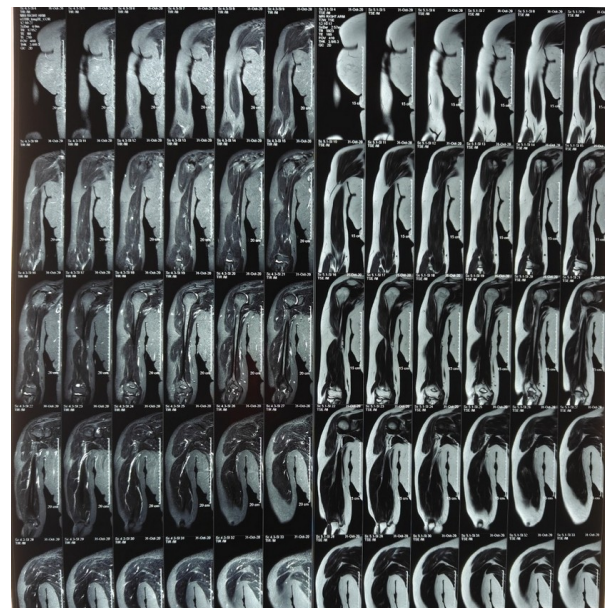


*Figure 2 : MRI of the right arm, coronal fat-suppressed (left) and T2-weighted (right) series, showing focal cortical and periosteal thickening at the deltoid insertion without a soft-tissue mass, collection or aggressive marrow abnormality.*

MRI of the right shoulder was also done to look for another source of pain. It showed mild supraspinatus tendinosis,

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acromioclavicular degenerative change and imaging features suggestive of mild adhesive capsulitis (Figures 3, 4 and 5). These findings were considered unlikely to explain the isolated mid-arm tenderness in a patient whose shoulder moved normally.

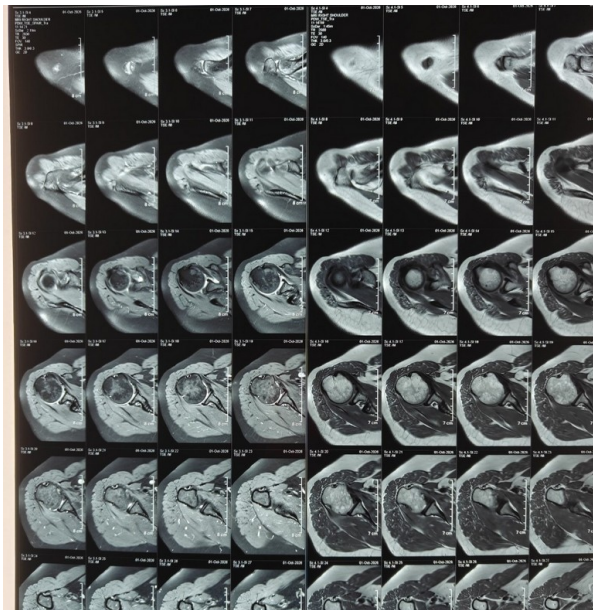


*Figure 3 : MRI of the right shoulder, axial proton-density fat-suppressed (left) and T2-weighted (right) series, showing mild supraspinatus tendinosis and acromioclavicular degenerative change.*

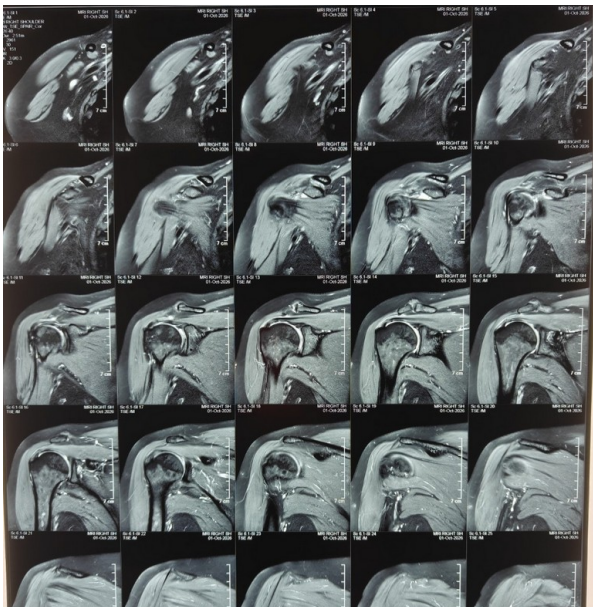


*Figure 4 : MRI of the right shoulder, coronal fat-suppressed series, showing mild supraspinatus tendinosis and acromioclavicular degenerative change, with features of mild adhesive capsulitis.*

The diagnosis of pseudotumor deltoideus was based on the characteristic location of cortical thickening along with irregularity at the deltoid insertion. The diagnosis was also supported by MRI findings showing no aggressive marrow changes, soft-tissue mass or presence of any collection. The absence of trauma made chronic avulsion injury less likely. Localized tenderness corresponding to the lesion and pain reproduced during resisted abduction supported clinical correlation. Other shoulder MRI abnormalities were considered unlikely to explain the focal mid-arm pain. These findings supported an imaging-based diagnosis of

pseudotumor deltoideus, and biopsy was avoided in view of the characteristic benign imaging features.

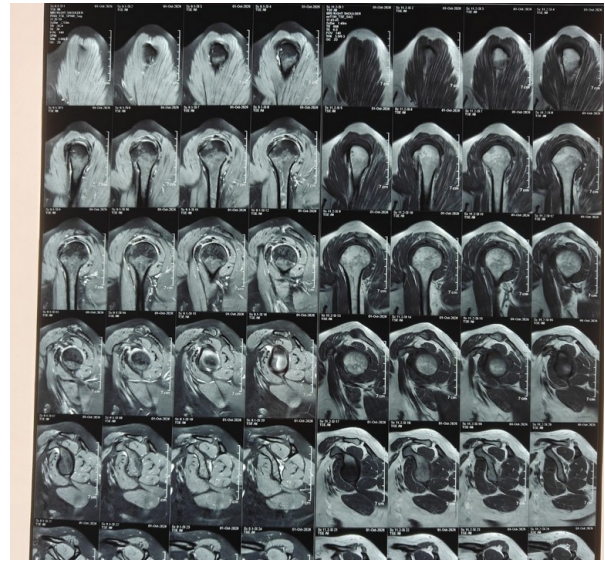


*Figure 5 : MRI of the right shoulder, sagittal proton-density fat-suppressed (left) and T1-weighted (right) series, showing mild supraspinatus tendinosis and features of mild adhesive capsulitis.*

She was treated without surgery, with analgesics and gabapentin. Biopsy and surgery were not done, because the imaging was typical and MRI showed no aggressive feature. She was followed clinically for three months. The pain improved slightly. The focal tenderness at the same site remained. Shoulder movement stayed normal, and no neurological symptoms developed.

### DISCUSSION

Our patient had a typical pseudotumor deltoideus and about three years of pain that stayed at the same site. The lesion can be an incidental finding. Hanna et al. described a 39-year-old man whose lesion was found only after a fracture of the proximal humerus. His radiograph showed a single-layer periosteal reaction on the lateral cortex at the level of the deltoid tuberosity.<sup>6</sup> Such reports show that the same radiographic finding can be painless in one person and linked to symptoms in another. Although the lesion has a benign imaging appearance, its relationship to persistent focal pain requires clinical correlation. The pain lasted about three years, the tenderness lay directly over the lesion, and resisted abduction reproduced it. Other causes were considered less likely on clinical and imaging grounds, although histopathological confirmation was not obtained.

The first alternative is a chronic avulsion injury of the deltoid insertion. Donnelly et al. described three adolescents with this injury. Its imaging findings overlapped with those of tumour and infection.<sup>7</sup> Stevens et al. found that old avulsion injuries can leave a protuberant mass of bone that resembles a neoplasm or an infection. They noted that MRI is the best test for injury to muscle and tendon.<sup>8</sup> Our patient gave no history of trauma, overhead activity or overuse. MRI showed no oedema in the adjacent muscle or soft tissue. These points made an active traction injury unlikely.

Other upper limb lesions can also look like tumours. Anderson et al. reported five patients in whom tendinosis and tear of the latissimus dorsi formed a pseudotumor of the upper limb.<sup>9</sup> Bennett and El-Khoury list cortical irregularities of the proximal humerus, including pseudotumor humeri, among the pitfalls of musculoskeletal imaging.<sup>10</sup> A non-ossifying fibroma is a benign metaphyseal lesion of the growing

skeleton.<sup>11</sup> Our patient was an adult, and the abnormality lay at the deltoid insertion in the shaft. These features did not fit that diagnosis.

Persistent pain was the reason for more imaging. Damron et al. reviewed joint-related tumours that mimic sports-related injuries, and the review supports careful assessment when pain does not settle.<sup>12</sup> MRI was used to assess for features suggestive of an aggressive lesion. It showed no soft-tissue mass, collection or aggressive marrow change. Given the characteristic location and absence of aggressive imaging features, biopsy or surgery was not pursued. No tissue was taken, so the diagnosis rests on the imaging and the clinical course.

The shoulder MRI showed mild supraspinatus tendinosis, acromioclavicular degenerative change and features of mild adhesive capsulitis. Sher et al. found rotator cuff tears on MRI in 34% of 96 people with no shoulder symptoms, and the rate rose with age.<sup>13</sup> Such findings are common and are not always the source of pain. Adhesive capsulitis causes a painful loss of both active and passive movement.<sup>14</sup> Our patient had full movement, and the tenderness was in the mid-arm. These shoulder findings were considered unlikely to explain her symptoms. They may still have added to her pain, and this cannot be excluded.

Management stayed conservative. A typical lesion without aggressive features generally does not require a biopsy. Our approach followed the clinical picture as well as the images. Persistent pain led to more imaging and not to an early biopsy. Once MRI showed a benign pattern, treatment stayed non-operative. Continued clinical follow-up remained important because the focal pain persisted. The plan would change if the pain increased, if a mass appeared or if the imaging changed. The treatment included gabapentin. The best evidence for gabapentin is in neuropathic pain. Wiffen et al. found that about three or four in ten people with postherpetic neuralgia or painful diabetic neuropathy had at least 50% pain relief, compared with one or two in ten given placebo.<sup>15</sup> Our patient had no neurological symptoms. A specific neuropathic indication for gabapentin was not documented, and its contribution to the slight improvement could not be established.

## CONCLUSION

Pseudotumor deltoideus can usually be recognised from its site and its appearance on radiographs and MRI. In this patient the lesion lay at the site of persistent, highly localised pain and tenderness. MRI showed no aggressive feature, and the pain improved only slightly over three months of conservative care. Persistent symptoms at the same site should be followed clinically. Biopsy may be avoided when clinical assessment and imaging demonstrate characteristic benign features without findings suspicious for another process.

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## REFERENCES

1. Morgan H, Damron T, Cohen H, Allen M. Pseudotumor deltoideus: a previously undescribed anatomic variant at the deltoid insertion site. *Skeletal Radiol.* 2001;30(9):512-518. doi:10.1007/s002560100387
2. Vohra A, Paul B, Saunders P, et al. Anatomic variations of the deltoid muscle insertion: a cadaveric study. *JSES Int.* 2024;8(3):546-550. doi:10.1016/j.jseint.2024.01.013
3. Singh S, Tanwar A. Pseudotumor deltoideus: an underreported and misinterpreted cause of shoulder pain. *Indian J Radiol Imaging.* 2020;30(2):233-236. doi:10.4103/ijri.IJRI\_407\_19
4. Chirayath M, Sebastian S, George A. Pseudotumor deltoideus: touch me not lesion of the humerus. *Cureus.* 2023;15(4):e37427. doi:10.7759/cureus.37427
5. Girish G, Lobo LG, Jacobson JA, Morag Y, Miller B, Jamadar DA. Ultrasound of the shoulder: asymptomatic findings in men. *AJR Am J Roentgenol.* 2011;197(4):W713-W719. doi:10.2214/AJR.11.6971
6. Hanna S, Al-Hindi B, Khaja A. Pseudotumor deltoideus case report: an incidental finding after a proximal humerus fracture. *Acta Sci Orthop.* 2020;3:59-62.
7. Donnelly LF, Helms CA, Bisset GS 3rd. Chronic avulsive injury of the deltoid insertion in adolescents: imaging findings in three cases. *Radiology.* 1999;211(1):233-236. doi:10.1148/radiology.211.1.r99mr03233
8. Stevens MA, El-Khoury GY, Kathol MH, Brandser EA, Chow S. Imaging features of avulsion injuries. *Radiographics.* 1999;19(3):655-672. doi:10.1148/radiographics.19.3.g99ma05655
9. Anderson SE, Hertel R, Johnston JO, Stauffer E, Leinweber E, Steinbach LS. Latissimus dorsi tendinosis and tear: imaging features of a pseudotumor of the upper limb in five patients. *AJR Am J Roentgenol.* 2005;185(5):1145-1151. doi:10.2214/AJR.04.1247
10. Bennett DL, El-Khoury GY. Cortical irregularities of the proximal humerus: pseudotumor humeri. In: Bennett DL, El-Khoury GY, eds. *Pearls and Pitfalls in Musculoskeletal Imaging.* Cambridge University Press; 2013:34-36. doi:10.1017/CBO9781139031141.020
11. Bowers LM, Cohen DM, Bhattacharyya I, Pettigrew JC Jr, Stavropoulos MF. The non-ossifying fibroma: a case report and review of the literature. *Head Neck Pathol.* 2013;7(2):203-210. doi:10.1007/s12105-012-0399-7
12. Damron TA, Morris C, Rougraff B, Tamurian R. Diagnosis and treatment of joint-related tumors that mimic sports-related injuries. *Instr Course Lect.* 2009;58:833-847. PMID:19385590
13. Sher JS, Uribe JW, Posada A, Murphy BJ, Zlatkin MB. Abnormal findings on magnetic resonance images of asymptomatic shoulders. *J Bone Joint Surg Am.* 1995;77(1):10-15. doi:10.2106/00004623-199501000-00002
14. Neviaser AS, Neviaser RJ. Adhesive capsulitis of the shoulder. *J Am Acad Orthop Surg.* 2011;19(9):536-542. doi:10.5435/00124635-201109000-00004
15. Wiffen PJ, Derry S, Bell RF, et al. Gabapentin for chronic neuropathic pain in adults. *Cochrane Database Syst Rev.* 2017;6(6):CD007938. doi:10.1002/14651858.CD007938.pub4

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