

## Proximal Thumb Osteoid Osteoma – A Rare Site of Affection

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**A twenty-two-year-old right-handed male with rare affection of osteoid osteoma of the left thumb was presented. CT was performed revealing a characteristic nidus. Resection of the tumor was performed and histopathology confirmed the diagnosis of osteoid osteoma. At 4-month postoperative follow-up visit, the patient had complete return of functions with full range of motion of the interphalangeal and metacarpophalangeal joints without pain or neurological deficit. Classical symptoms include nighttime pain and effective pain response to non-steroidal anti-inflammatory drugs (NSAIDs). Complete resection is necessary for complete resolution.**

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Osteoid osteoma is a benign lesion affecting most commonly long bones; particularly the metaphyseal and diaphyseal regions (50%). The most common location is the proximal femur and the tibia. However, the spine, hand and foot may all be affected. In the hand, it accounts for only 7-10% of benign tumors with the proximal phalanges being the most common sites (75%), while the metacarpals and carpals the least (2%)<sup>1,2</sup>. The most commonly affected digit is the index while the least is the thumb<sup>3</sup>. A review of the literature revealed that the metacarpals are common sites of involvement as the proximal phalanges<sup>4</sup>.

Most cases occur during the second or third decades of life with a slight male to female predominance (2-3:1)<sup>1</sup>.

Typical symptoms include pain, which is progressive and worse at night or following alcohol consumption. It is, however, typically relieved by non-steroidal anti-inflammatory drugs (NSAIDs)<sup>5</sup>. A physical examination may reveal swelling, effusion and other anatomic changes, such as scoliosis secondary to paravertebral spasms. Other features may include nail hypertrophy and premature physal closure in adolescents<sup>4</sup>.

Typical X-ray findings consist of a reactive or sclerotic cortex surrounding an area of lucency referred to as the nidus<sup>1</sup>. The nidus is < 1.5 cm; otherwise the diagnosis of osteoblastoma may come into question. CT is the modality of choice to reveal the nidus<sup>5</sup>. Because of the high vascularity of this lesion, bone scans, and angiography may also be used, but they are not typically performed due to their low specificity. Histologically, the nidus is highly vascular and composed of osteoid trabeculae of woven bone<sup>3,5,6</sup>.

NSAIDs may be used to relieve the pain. Successful treatment of persistent osteoid osteoma consists of a complete resection<sup>1,5,6</sup>. Other treatment modalities, such as radiofrequency ablation have also been suggested<sup>2</sup>.

The aim of this presentation is to highlight uncommon diagnosis of osteoid osteoma of the thumb.

### THE CASE

A twenty-two-year-old right-handed male presented with

a 4-year history of pain and hypersensitivity involving the proximal phalanx of the left thumb. The pain was sharp and throbbing in nature occurring 7–10 times per day, each for a few minutes. There was no day or night difference in the severity of symptoms. However, the pain was relieved by either Diclofenac or Ibuprofen. The patient described the effectiveness of the pain-killer that he could forcefully strike his finger against a table without feeling the same pain.

During the 4-year period, many X-rays and MRIs were performed without reaching a diagnosis. Physical examination revealed approximately 2 cm non-tender, non-mobile hard swelling involving the anterolateral side of the proximal phalanx of the left thumb without any overlying skin changes. Initially, X-ray films revealed periosteal thickening of the radial-volar cortex of the proximal phalanx of the left thumb, see figures 1, 2 and 3.



**Figure 1: AP View of the Left Thumb Showing Thickening and Hypersclerosis of the Radial Cortex of the Proximal Phalanx**

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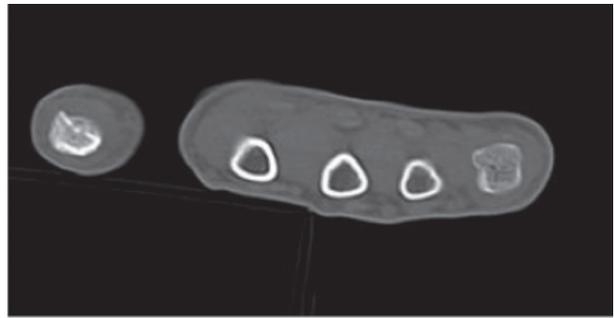


**Figure 2: Lateral View of the Left Thumb Demonstrating Thickening and Hypersclerosis of the Volar Cortex of the Proximal Phalanx**

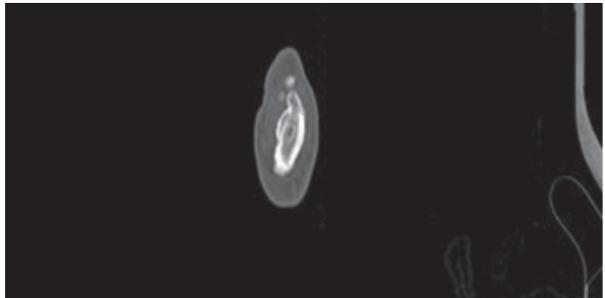


**Figure 3: Oblique View of the Left Thumb Demonstrating the Cortical Thickening More Clearly**

Taking the patient's history into consideration together with the X-ray findings, one-millimeter slice thickness CT was performed revealing a characteristic nidus, see figures 4 and 5.

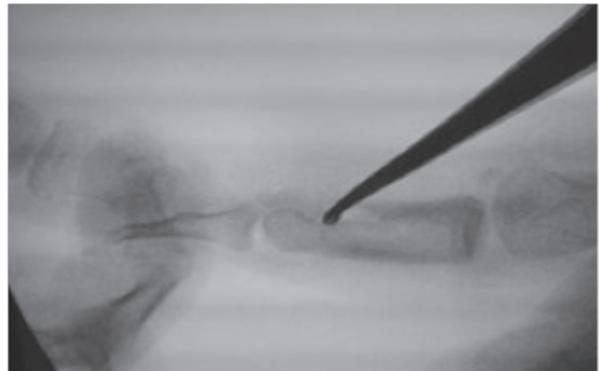


**Figure 4: CT View Showing Left Thumb Cortical Thickening**



**Figure 5: CT View of the Left Thumb Demonstrating the Characteristic Nidus**

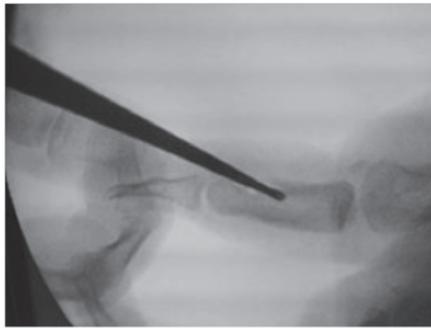
Resection of the tumor was performed via a radial approach. The affected cortex was burred in all three directions, proximal, central and distal until reaching the nidus, see figures 6, 7 and 8. An additional 2 mm bone was also burred around the nidus to ensure complete eradication.



**Figure 6: Intraoperative Fluoroscopic View Showing Distal Burring of the Nidus**

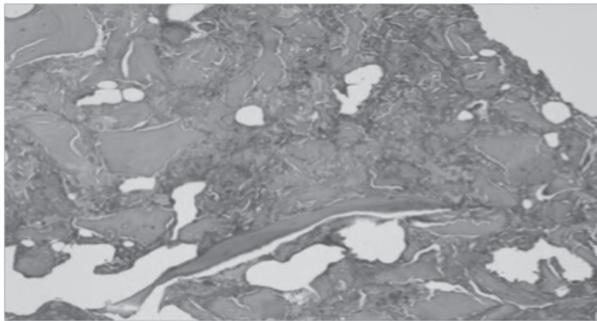


**Figure 7: Intraoperative Fluoroscopic View Showing Central Burring of the Nidus**



**Figure 8: Intraoperative Fluoroscopic View Showing Proximal Burring of the Nidus**

Histopathological examination of the resected tissue revealed fragments of bony tissue consisting of focal interlacing thin trabeculae of variably mineralized woven bone with osteoblastic rimming surrounded by thick lamellar bony trabeculae confirming the diagnosis of osteoid osteoma, see figure 9.



**Figure 9: Thin Trabeculae of Woven Bone with Osteoblastic Rimming Surrounded by Thick Lamellae**

The patient had complete relief of symptoms without any postoperative complications during the first 2-week postoperative visit. At 4-month postoperative follow-up visit, the patient had complete return of functions with a full range of motion of the interphalangeal and metacarpophalangeal joints without pain or neurological deficit.

## DISCUSSION

The thumb is one of the least common sites affected by osteoid osteoma. The pain associated with osteoid osteoma is thought to be due to prostaglandin secretion and COX-1 and COX-2 expression. In atypical locations like the digits, it does not necessarily present with pain<sup>5</sup>. Some patients may present with swelling only; this indeed makes the clinical diagnosis harder demanding more extensive examination<sup>2</sup>.

Although our patient did present with most of the classical symptoms of osteoid osteoma, he was still misdiagnosed owing to the low index of suspicion and failure to utilize correctly the main diagnostic modalities. Thirty-five percent of these cases exhibit atypical radiological findings resulting in missed, false or delayed diagnosis<sup>7</sup>. In our opinion, X-rays of these atypical areas may be hard to interpret. This is due to the small area involved compared to long bones, such as the femur and tibia. Radiological finding may even not reveal any nidus making the diagnosis even difficult<sup>5</sup>. CT remains the modality of choice in diagnosing osteoid osteoma. We believe it is crucial to take

CT with one-millimeter slice thickness to correctly analyze the lesion. This is because the characteristic nidus may be few millimeters in diameter which in turn may be lost in the CT cuts.

Osteoid osteoma responds well to non-steroidal anti-inflammatory drugs (NSAIDs). This is due to COX-1 and COX-2 expression within the tumor. This characteristic feature itself may be utilized as a diagnostic, especially in cases where pain or nidus is absent. Therefore, positive response to NSAIDs elevates the index of suspicion.

Successful treatment consists of complete excision of the tumor because incomplete excision may lead to recurrence and persistent symptoms. Alternative strategies, such as radiofrequency ablation, ethanol injection and interstitial laser photocoagulation have been used<sup>5</sup>. However, due to the close neurovascular structures in the hands, surgery remains the main modality of treatment<sup>5</sup>. Another advantage of surgery is that histopathological confirmation could be established following the excision.

## CONCLUSION

**It is extremely important to have a high index of suspicion for osteoid osteoma, particularly if presenting with the classical symptoms and features. Therefore, it should be included in the differential diagnosis of hand swellings. Appropriate utilization of the diagnostic modalities is crucial to reach the appropriate diagnosis.**

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