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Case Report

# Imaging of Osteoid Osteoma on MRI

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**Received:** June 17, 2018; **Published:** October 29, 2018

## Abstract

Osteoid osteoma is a treatable benign bone tumor of unknown etiology, composed of a central nidus which is an atypical bone completely enclosed within a well vascularised stroma and a peripheral sclerotic periosteal reaction. In this case report we focus on the various imaging manifestations of the tumor and discuss clinical features, pathogenesis and treatment. MRI depicted more clearly bone marrow and soft tissue abnormalities adjacent to the lesion, and in the nidus. On the other hand, CT is more specific when it comes to detecting the lesion's nidus.

***Keywords:*** *Osteoid Osteoma; Nidus*

## Introduction

Osteoid osteoma was first described in 1930 by Bergstrand and it was Jaffe who first characterized osteoid osteoma as a discrete clinical entity in 1935 [1,2]. Osteoid osteoma is a benign osteoblastic neoplasm typically smaller than 1.5 cm. They account for nearly 10% of all benign bone lesions and there is a male predilection (M:F 2-4:1) [2]. This condition most often afflicts adolescents and young adults and can cause significant morbidity and goes undiagnosed until its detected by imaging [1]. An osteoid osteoma is composed of three concentric parts in the centre is nidus which is formed by meshwork of dilated vessels, osteoblasts, osteoid and woven bone. It may have a central region of mineralisation. Nidus is surrounded by fibrovascular rim has reactive sclerosis as third part [3]. The nidus releases prostaglandins (via Cox-1 and Cox-2) which in turn result in pain worse at night and may awaken the patient from sleep. Osteoid osteomas may arise anywhere in the axial or appendicular skeleton however more than 50% of lesions occur in the femur or tibia [3,4].

The majority of tumors involve the cortex of long bones, usually in the diaphysis or metadiaphysis. Conservative management with NSAIDs may be good alternative to surgery with respect to long-term symptomatic relief [3].

## Case Report

A 22-year-old male with right medial thigh pain that had gradually increased over the prior 3 years. His pain was worse at night and Non-steroidal anti-inflammatory medications provided temporary relief of his symptoms. Local tenderness was present and the patient demonstrated full range of motion of his right lower extremity. X-ray revealed no abnormality however MR Images revealed well defined lesion in metaphyseal region of tibia measuring which heterogeneously hyperintense in the centre and hypointense at periphery on T2W and PD sequences and post contrast images shows heterogenous enhancement with subtle non-enhancing areas in the centre and periphery.

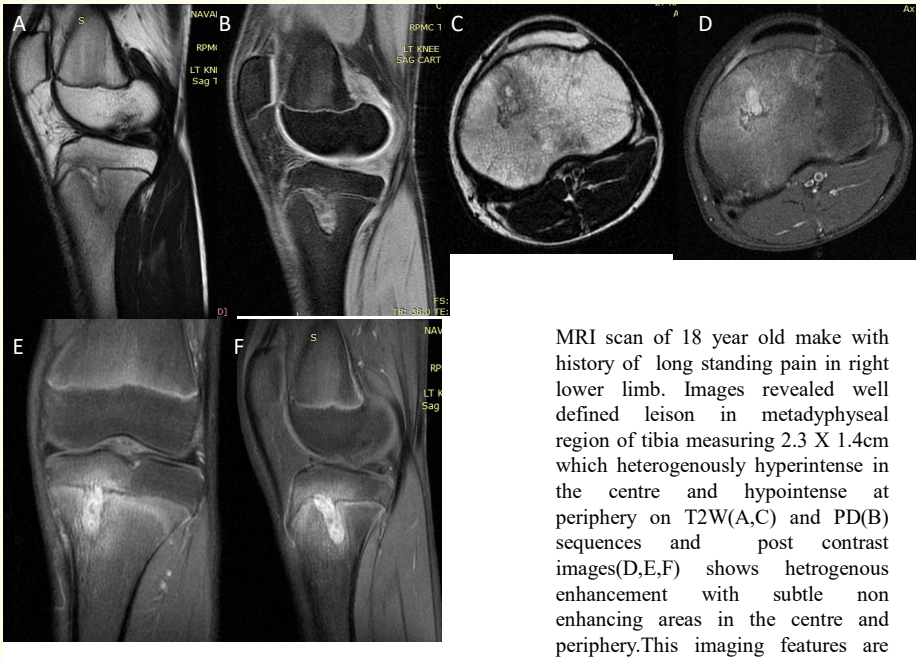


***Figure:*** *MRI scan of 18 year old make with history of long standing pain in right lower limb. Images revealed well defined lesion in metadyphyseal region of tibia measuring 2.3 X 1.4 cm which heterogeneously hyperintense in the centre and hypointense at periphery on T2W(A,C) and PD(B) sequences and post contrast images (D,E,F) shows heterogenous enhancement with subtle non-enhancing areas in the centre and periphery. This imaging features are characteristic of osteoid osteoma.*

## Discussion

Osteoid osteoma's are benign bone forming tumours that typically occur in children and adolescents [1]. They have characteristic lucent nidus < 2 cm and surrounding thick solid periosteal reaction and classically cause nocturnal pain that is relieved by the use of NSAID's e.g. aspirin. They account for approximately 10% of all benign bone lesions and there is a male predilection (M:F 2-4:1) [4,5]. An osteoid osteoma is composed of three concentric parts first one is nidus which is meshwork of dilated vessels, osteoblasts, osteoid and woven bone having central region of mineralisation, second is fibrovascular rim and third is surrounding reactive sclerosis [5]. The nidus releases prostaglandins which in turn result in pain and is relieved by NSAID's. Most osteoid osteomas occur in long tubular bones of the limbs but essentially any bone may be involved. The long bones of the limbs are involved in 65 - 80% of cases with femur most common (especially neck of femur) and also tibial diaphysis [6,7].

Furthermore, osteoid osteomas are usually cortical lesions but they can occur anywhere within the bone including medullary, subperiosteal, and intracapsular [8-10].

### Radiological features

In our case x-ray of patients showed with the cortical type osteoid osteoma the radiographs are usually normal or may show a solid periosteal reaction with cortical thickening. The nidus is sometimes visible as a well circumscribed lucent region, occasionally with a central sclerotic dot, nidus was visualized in our case. CT is the diagnostic modality of choice for detection and characterisation of osteoid osteoma for tumor detection and characterization. We did thin-section CT (1 - 2-mm slices) reconstructed in bone. CT is often helpful when the suspected nidus is obscured by surrounding sclerosis on radiograph [11].

Dynamic contrast-enhanced CT has been useful in differentiating osteoid Brodie abscess [7,12,13]. The tumor nidus has rapid early arterial enhancement of perilesional arteries parallels nidus enhancement both in timing and degree of enhancement. Osteoid osteomas shows mark early enhancement as compared to Brodie abscesses and bone cysts, which are avascular [12].

## Conclusion

Osteoid osteomas are benign painful bone tumors of young adolescents with a predilection for the long bones of lower limb. Conventional radiographs and CT are often sufficient for diagnosis in the correct clinical findings typical imaging characteristics include a radiolucent intracortical nidus with cortical thickening and reactive sclerosis.

## Acknowledgements

We are grateful to almighty for his blessings.

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**Volume 9 Issue 11 November 2018**