

# Excision of Osteoid Osteoma with Intramedullary Reaming: A New Method

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**Abstract-** Osteoid osteoma is a small benign bone tumor usually affects adolescents and young adults. Although this tumor mainly affects the shafts of long bones there have been several reports of subperiosteal and intramedullary involvement. Complete surgical excision is the classic treatment of choice for patients with osteoid osteoma. Despite the small size of the tumor, the operative procedure for its removal can be extensive. The surgeon may have to excise a significant piece of bone to be sure the lesion is removed. There is a risk of fracture if a large amount of bone is removed and therefore internal fixation, bone grafting, or both may be required. In recent years several techniques of minimally invasive treatment of osteoid osteoma have been proposed. We introduce intramedullary reaming as a minimally invasive procedure for the treatment of intramedullary osteoid osteoma in long bones.

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## Introduction

Osteoid osteoma is a small benign osteogenic tumor mainly affects adolescents and young adults (1). Although there is a predilection for the cortex of the shafts of long bones there have been several reports of subperiosteal and intramedullary involvement. Clinical features consist of pain at night relieved by aspirin and other nonsteroidal anti inflammatory medications (2,3). Complete surgical excision is the classic treatment of choice for patients with osteoid osteoma who, despite understanding the natural history of osteoid osteoma and having had a trial of non steroidal anti inflammatory treatment, have continued to have pain. Despite the small size of the lesion, the operative procedure for its removal can be extensive. The surgeon may have to excise a significant piece of bone to be sure the lesion is removed. There is a risk of fracture if a large amount of bone is removed, and therefore internal fixation, bone grafting, or both may be required, especially in weight-bearing bones, such as the femur and tibia. Furthermore aggressive resection has resulted in periarticular stiffness, prolonged hospital stays (4) and late functional recovery. In recent years several techniques of minimally invasive treatment of osteoid osteoma have been proposed. We introduce intramedullary reaming as a minimally invasive procedure for the treatment of

intramedullary osteoid osteoma in long bones. We are not aware of any previous report of this method in the treatment of osteoid osteoma. Our patients were notified that data concerning these cases would be submitted for publication.

## Case Reports

During the year of 2006, two patients underwent intramedullary reaming for presumed osteoid osteoma in tibia. Both patients had classic histories of day and night pain and initial response to antiinflammatory pain medication.

Both of them had typical plain radiographic and CT scan findings that confirmed the diagnosis of osteoid osteoma. First case was a 16 year old young boy who presented with a one year history of increasing pain in the middle third of right tibia. He had initial response to anti inflammatory pain medication. Before the surgery his pain was intolerable and had lower response to NSAID'S treatment. Radiographs and CT scan of his right tibia are shown (Figures 1 and 2)

The second case was a 36 years old woman with an increasing pain in her right tibia.

Diagnosis of osteoid osteoma was confirmed with classic findings in her radiographs and CT scan (Figures 3 and 4).

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## Excision of osteoid osteoma with intramedullary reaming



**Figure 1.** Radiograph of right tibia



**Figure 2.** CT scan demonstrating classic intramedullary osteoid osteoma

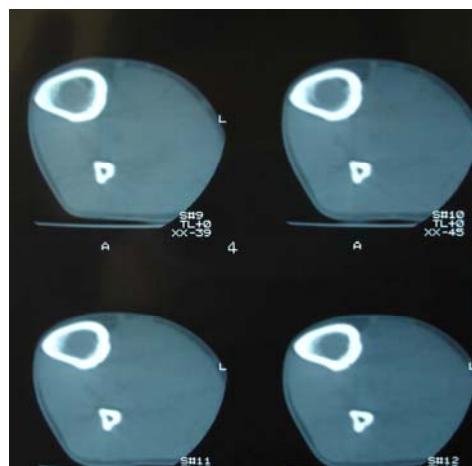


**Figure 3.** Radiograph of right tibia showing sclerosis in diaphysis

Her pain had response to anti-inflammatory medication but she elected to have surgery because she was unwilling to tolerate the pain and wish to avoid the long term use of non-steroidal anti-inflammatory medications.



**Figure 4.** CT scan of right tibia showing intramedullary osteoid osteoma



**Figure 5.** CT scan of case 1 after intramedullary reaming

### Technique

The procedure was performed under spinal anesthesia in 90 ° degrees of knee flexion.

Medullary canal was opened through patellar tendon under image intensification control.

The first ream was done with 6 mm reamer. Both tibiae were reamed up to 13 mm. Pain medication was used only for the first night after the operation. The patients are allowed to bear weight on the involved extremity immediately after the surgery and no crutches or cane is used.

Tumor removal was confirmed with post operative CT scan (Figure 5) and none of them experienced classic

pain of osteoid osteoma during the 2 years follow up after the operation.

### Complications

No fat embolism, tromboembolic event or other major complications occurred during and after the operation. The second case had patellar tendinitis after the surgery and was treated with corticosteroid injection.

### Discussion

In most institutions initial treatment of osteoid osteoma usually consists of a trial of aspirin or other nonsteroidal anti-inflammatory drugs. Kneisl and Simon (5) reported 12 patients with osteoid osteoma who were treated initially with nonsteroidal anti-inflammatory medications. At the end of 21 months follow up only 3 patients required surgery because of intolerance to NSAID and persisting pain despite medication. They suggested that medical treatment of osteoid osteoma should be attempted in patients who are able to tolerate NSAID drugs. However surgery has been offered to those patients who have pain despite medical treatment. Currently, less invasive procedures utilizing pinpoint CT-guided localization has progressively replaced operative excision of osteoid osteoma of most bones (6-11). With this approach, once the nidus is removed, the surrounding sclerotic bone will usually remodel (12). Voto et al, (13) Atar et al, (14) Parlier-Cuara et al, (15) Donley et al (16) reported excision of the osteoid osteoma nidus using CT-assisted localization, a krishner wire inserted into the nidus and a biopsy paunch or trephine inserted over the krishner wire into the bone. Katz et al. (17) reported excellent result in 9 patients after CT-guided resection of an osteoid osteoma using a 6.8 mm core drill. Rosenthal et al. (18) used outpatient percutaneous radiofrequency ablation of osteoid osteomas in 33 patients and he reported 12 percent recurrence and the need for subsequent intervention in these patients. Barei *et al.* (19) reported excellent results with this technique in 10 patients and stated that this technique be used for all patients with extra spinal osteoid osteomas that are not immediately adjacent to neurovascular structures.

Up to 80% of osteoid osteomas are intracortical in location and there are few reports of intra medullary lesions which all have been treated with methods other than our method (20-22). Intramedullary reaming is an interesting alternative to block excision. This method allows removal of osteoid osteoma nidus though a small incision and because there is no risk of fracture it is

much more valuable in cases located in medulla of long weight bearing bones. Further more there is no need for special expensive equipment and it is applicable in every surgery unit. Although no recurrence was observed in our cases, but this technique has been used in a limited number of patients (n=2)

Because of the rarity of intramedullary osteoid osteoma it is difficult to report a large series of such patients in one study. The major drawback of this method and study is loss of histological confirmation of diagnosis. Clinical symptoms and radiographic criteria's were used for diagnosis in our study. Other studies of percutaneous coagulation techniques had the same problem too (4,19).

In the end our results demonstrated intramedullary reaming of osteoid osteoma is a minimally invasive, safe, simple and cost – effective procedure. This method allows an early return to weight bearing and recreational activities and avoids the potential complications of extensive surgeries.

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