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Case Report

# Arthroscopic excision of osteoid osteoma of the talus: A case report

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## Abstract

Osteoid osteomas are among the common benign bone tumors. They are typically found in the cortex of long tubular bones, causing characteristic night pain and significant disability. They are commonly found in younger males and are characterized by lesions with a vascularized nidus surrounded by sclerotic bone. They rarely affect the talus. Due to their subtle presentation, they are often missed during clinical examination and on plain radiographs. Computed tomography (CT) is essential for accurate diagnosis. Recently, CT-guided radiofrequency ablation has become the preferred treatment. In this article, we present a case of a large osteoid osteoma of the talar neck with associated impingement. We utilized arthroscopy to identify the subarticular lesion by its characteristic wine-red color and performed curettage of both the lesion and the osteophyte in a single procedure. At 12 months follow-up, the patient reported complete pain relief and improved ankle range of motion.

**Level of evidence IV; Therapeutic study; Case report.**

**Keywords:** Osteoid osteoma; Talus; Arthroscopy.

## Introduction

Osteoid osteomas are benign bone tumors that commonly occur in long bones. First described by Jaffe in 1935[1], they account for 13.5% of benign bone tumors and 2%-3% of all primary bone tumors[2, 3]. They are most frequently observed in male patients aged 5 to 25. While they predominantly affect the cortex of long tubular bones, they have also been identified in the spine, pelvis, ankle, and foot. In the ankle, the talus is the most common site of involvement. And they are misdiagnosed as ankle sprain, ankle impingement syndrome, stress fractures, tenosynovitis, osteonecrosis of the talus, chronic ankle instability, and chronic arthritis. They typically present with regional nocturnal pain due to excess prostaglandin production, which is relieved by nonsteroidal anti-inflammatory drug (NSAIDs) intake. Characterized by a vascularized nidus surrounded by dense sclerotic bone, these tumors trigger an inflammatory reaction that can impair the range of motion. In recent years, osteoid osteoma has been treated using computed tomography (CT) guided radiofrequency ablation. In this article, we present a case of osteoid osteoma of the talus with anterior impingement that was treated with arthroscopy.

## Case description

Following institutional ethical committee approval, written informed consent was obtained from the patient for publication of this case report, including the images. A 21-year-old male presented with left ankle pain for the last six years. The pain began following an injury sustained six years ago, for which he was treated with a below-knee POP cast for 21 days. Despite conservative management, he continued to experience intermittent pain in the left ankle. The pain worsened with activities such as climbing stairs and prolonged walking. It was also associated with nocturnal

Study performed at the Department of Orthopedic Oncology, Apex Super Speciality Hospital, Varanasi, Uttar Pradesh, India.

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discomfort, which was temporarily relieved by medication. On physical examination, the patient exhibited an antalgic gait, tenderness over the anterior aspect of the ankle, and restricted terminal dorsiflexion, while plantar flexion remained full.

Lateral dorsiflexion radiograph of the right ankle revealed the dorsal talar osteophyte just proximal to the talonavicular joint (Figure 1). Sagittal CT view of the right ankle revealed a talar osteophyte and a radiolucent nidus with reactive sclerosis (Figure 2). Nidus localization on CT scan was performed by measuring the distance from the downslope of the talar dome, defined as the point where the talar body cartilage ends on the sagittal view, and by measuring the distance from the medial margin of the neck to the center of the nidus on the axial view. These measurements are illustrated in Figure 2 by the red (6 mm) and green (12 mm) lines, respectively. Sagittal magnetic resonance imaging (MRI) further demonstrated bone edema around the talar neck nidus, with increased signal on the T2-weighted STIR sequence and a decreased signal on the T1-weighted sequence (Figure 3). Based on the patient's history and radiological findings, the diagnosis of osteoid osteoma talus as the cause of anterior impingement of the ankle was confirmed. We opted for arthroscopic treatment as a single modality to address both the osteoid osteoma and the associated impingement, in preference to standard CT-guided ablation, which treats only osteoid osteoma but leaves impingement symptoms unresolved.


**Figure 1.** Preoperative radiograph showing an apparently normal ankle joint with an osteophyte over the talar head.

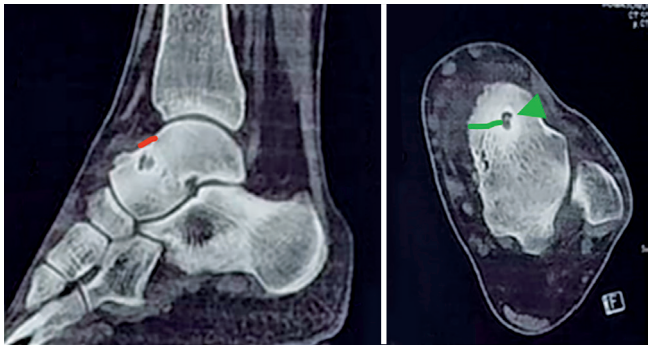

**Figure 2.** Computed tomography scan showing an anterior osteophyte with an osteoid osteoma nidus in the talar neck with surrounding sclerosis. Nidus localization: 6 mm from the talar cartilage and 1 cm from the medial talar neck, as indicated by the red line, green line, and green arrow.

## Surgical procedure

Under tourniquet control, the tibialis anterior tendon and superficial peroneal nerve were marked. Joint insufflation was performed with 10 cc of normal saline to avoid cartilage injury during portal entry. A standard anteromedial portal was created medial to the tibialis anterior tendon, and under direct visualization, an anterolateral portal was established with the ankle maintained in a neutral position.

Using a 30° arthroscope, the anterior tibial rim, talar dome, talar neck, and dorsal talar osteophyte were visualized following gentle synovectomy. A 4-mm curved-tip arthroscopic probe aided in lesion localization by measuring the distance from the talar body cartilage to the center of the talar neck, and from the medial margin of the neck to the nidus center. Maintaining the foot in a neutral position not only increased the joint's range of motion but also protected the talar body cartilage.

A 5.5-mm arthroscopic burr was used to remove the roof of the nidus, which revealed the characteristic wine-colored subarticular osteoid osteoma nidus (Figure 4). The nidus was excised using a 5.0-mm curette, followed by burring until normal bone trabeculae were exposed. Completeness of excision was confirmed by the appearance of normal trabeculae and the absence of any residual fluffy, wine-colored tissue.

An arthroscopic shaver was employed to debride synovial tissue around the dorsal talar osteophyte, exposing its margins, after which the osteophyte was burred gradually from medial to lateral and distally towards the talonavicular joint, creating a saucer-shaped contour. The completeness of osteophyte removal was confirmed by achieving full ankle dorsiflexion and by assessing the ankle under lateral fluoroscopic view.

Intraoperatively, following excision of the osteoma and osteophyte, terminal dorsiflexion was nearly restored, comparable to the contralateral side. The patient was permitted full weight-bearing ambulation from the first postoperative day, along with gradual ankle range of motion exercises. Postoperative radiographs confirmed complete removal of the tumor and osteophyte (Figure 5). At the time of suture removal on day 14, the patient reported a visual analog scale (VAs) of 0. At one-year follow-up, the patient remained pain-free (VAS 0), with the Foot and Ankle Ability Measure score improving from 45 to 100.

**Figure 3.** Magnetic resonance imaging showing osteoid osteoma lesion over the talar neck with surrounding edema.

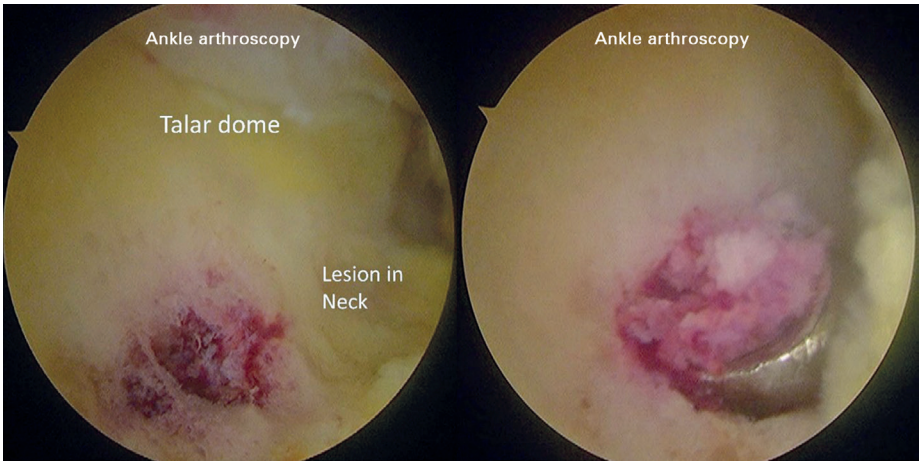


**Figure 4.** Arthroscopy view of a wine-colored subarticular osteoid osteoma lesion over the neck of the talus and scooping of the lesion by a curette.

**Figure 5.** Postoperative radiograph showing tumor removal.

## Discussion

Osteoid osteoma accounts for 13.5% of benign bone tumors[1-3] and primarily affects long bones. The radiological features of osteoid osteoma vary based on its location within the bone, which is classified into three subtypes: cortical (75%), medullary (20%), and subperiosteal (5%). It accounts for 2%-11% of all bone tumors of the ankle and foot, with the talus being the most common site[1]. Juxta-articular osteoid osteomas in the ankle can be challenging to diagnose. These small, isolated lesions consist of prostaglandins-secreting highly vascularized nidus surrounded by sclerotic bone. Patients typically present with pain and swelling in the affected region and report a history of severe nocturnal pain, which is relieved by NSAIDs. Due to their nonspecific symptoms, they are often misdiagnosed and treated for other conditions, leading to a diagnostic delay of approximately 2.5 to 10 years[3-5].

In cases of suspected osteoid osteoma, a CT scan is essential for diagnosis. On CT imaging, it appears as a translucent nidus surrounded by a dense zone of sclerotic osteoid, with a network of fine new-bone trabeculae in a vascular fibrous matrix[2]. Patients with atypical clinical history and imaging findings, without signs of joint instability or anterior talofibular ligament tenderness, may undergo a CT or MRI scan of the ankle to detect early-stage lesions.

Nonsurgical treatment with NSAIDs was reported to take two to four years for complete symptomatic relief. Open surgery is least preferred due to difficulty in identifying the site of nidus and excessive removal of bone[6]. At present, the treatment of choice for osteoid osteoma is CT-guided ablation techniques such as radiofrequency ablation, cryoablation, and microwave ablation[6,7]. Multiple surgical modalities for the treatment of osteoma of the talus have been reported. Rashid et al.[8] performed subtalar arthrodesis, and the lesion was curetted from the talar dome. Ibrahim Assafiri et al.[9] performed arthroscopic excision combined with radiofrequency ablation. A dorsal talar osteophyte serves as a topographical guide for identifying the location of the nidus[10]. Unlike open surgery, arthroscopy enhances visualization of juxta-articular osteoid osteoma lesions due to their characteristic cherry-red appearance. Associated lesions, such as osteophyte impingement, osteochondral lesions, or loose bodies, can also be addressed[10]. Additionally, postoperative compliance is generally better with arthroscopy.

Osteoid osteoma typically presents as nocturnal bone pain that responds well to NSAIDs. However, it is often overlooked, especially when the pain is attributed to a prior injury. Clinicians should be aware of this curable condition when evaluating patients with chronic ankle and foot pain. Computed tomography scan remains the most effective tool for identifying the nidus. In cases where subarticular osteoid osteoma is associated with osteophyte impingement, arthroscopy can serve as a comprehensive treatment approach, addressing both conditions simultaneously.

**Authors' contributions:** Each author contributed individually and significantly to the development of this article: AKJ *(https://orcid.org/0000-0001-7362-6889) Performed surgery and formatting of the article; SKJ *(https://orcid.org/ 0009-0003-0329-0998) Conceived and planned the activities that led to the study; SKS *(https://orcid.org/0009-0000-2501-7739) Performed surgery, interpreted the results of the study and formatting of the article; SP *(https://orcid.org/0009-0005-8621-1558) Clinical examination and data collection; ST *(https://orcid.org/0009-0006-3222-2363) Participated in the review process; MY *(https://orcid.org/0009-0007-1095-2485) Data collection and review process. All authors read and approved the final manuscript. All authors read and approved the final manuscript. *ORCID (Open Researcher and Contributor ID)

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