



## Management of Osteoid Osteoma in the Hand: Report of Eight Cases and Review of the Literature

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### Authors' contributions

This work was carried out in collaboration among all authors. Author CE designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Authors MR and AR managed the analyses of the study. Author AM managed the literature searches. All authors read and approved the final manuscript.

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Case Study

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### ABSTRACT

Osteoid osteoma is a rare, very painful bone tumor. We report a series of eight patients with osteoid osteoma of the hand. The average age of our patients was 27 years old. On radiological imaging of the hand, the typical appearance of osteoid osteoma was present in 100% of the cases. Surgical treatment by en bloc excision and curettage of the tumor with filling with a cancellous graft gave favorable results in our series.

*Keywords:* Osteoid osteoma; hand; cancellous graft.

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## 1. INTRODUCTION

The osteoid osteoma is a very painful bone tumor, the essential feature of which is the existence of a small rounded mass (less than 1.5 cm), called the nidus, isolated by Jaffé in 1935 [1]. Its most frequent location is the femur and the tibia; the localization of the hand and the carp remains a rare localization.

The objective of our work through a series of 8 cases is to better understand the particular symptomatology of the osteoid osteoma in the hand, as well as the diagnostic and therapeutic approaches of this tumor.

## 2. PATIENTS AND METHODS

We report a series of 8 patients with osteoid osteoma of the hand diagnosed and treated in the orthopedic surgery department of the university hospital center IBN ROCHD in Casablanca over a period of 6 years from February 2014 to January 2020.

The average age of our patients was 27 years with extremes of 17 to 47 years. The sex distribution showed a male predominance with a sex ratio of 1.5. The location was at the base of the first phalanx in four cases, two patients had the tumor at the base of the first metacarpal and at the semilunar in two cases. The average time between symptom onset and intervention was quite high: 18 months, with extremes of 5 months to 5 years.

The reason for consultation was essentially the pain that was present in 100% of cases, this essentially nocturnal pain; It was only calmed by aspirin and its derivatives in 50% of cases. A trauma was found to cause symptomatology in three patients: 37,5 % of the cases.

Radiographically, all patients underwent an x-ray of the hand, face and profile. The typical appearance of osteoid osteoma (nidus surrounded by bone sclerosis) was present in 100% of the cases (Fig. 1).

The computed tomography of the hand performed in all the patients showed the nidus image evocative of the osteoid osteoma in the form of a small hypodensity with clear contours, without signs of rupture of the cortex, it also objectified at the level of the semi Lunar a lacunar image without rupture of the cortical (Fig. 2).

The technetium 99 scintigraphy performed in two patients was consistently positive, showing a well-defined homogeneous focus of hyperfixation.

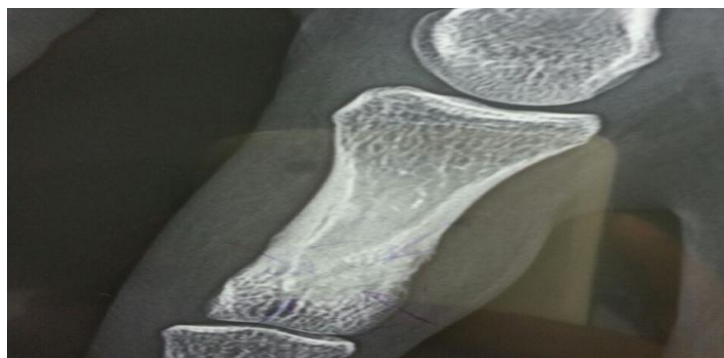
The treatment was surgical in all our patients, it consisted of a block excision and curettage of the tumor with filling by a spongy graft (Fig. 3).

The anatomopathological examination of the surgical specimen concluded with certainty the diagnosis of the osteoid osteoma.

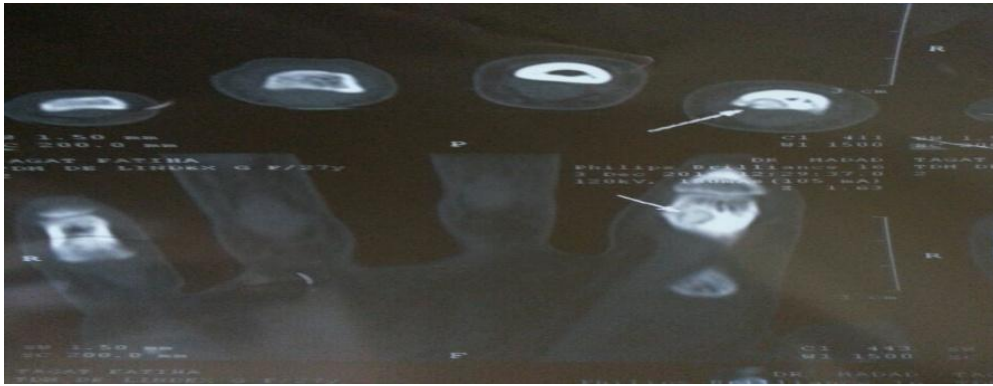
## 3. RESULTS

After a one-year follow-up, the progression was favorable with sedation of the pain, recovery of the mobility and the stability, and a good osteointegration of the graft to the radiography of control.

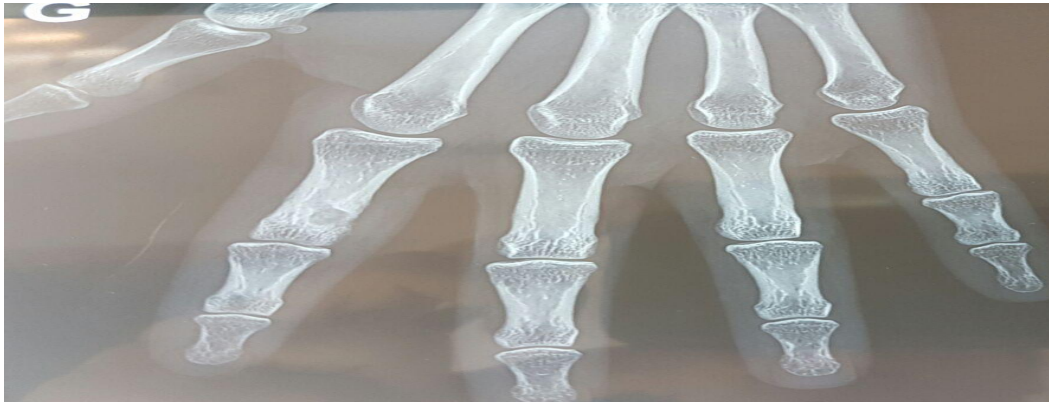
We noted a single case of recurrence at 6 months (osteoid osteoma of the base of the first phalanx); The patient received a resection of the base of the first phalanx with graft and arthrodesis, the evolution was favorable thereafter.



**Fig. 1. X-ray of the hand showing the appearance the typical appearance of osteoid osteoma of the first phalanx of the index finger in the form of a nidus surrounded by bone sclerosis**



**Fig. 2. CT of the hand showing the image in nidus in the form of a hypodensity with clear contours, without signs of rupture of the cortical**



**Fig. 3. X-ray of postoperative control of the hand after curetting of the osteoid osteoma of the first phalanx of the index and filling with a spongy graft**

#### 4. DISCUSSION

Osteoid osteoma is a benign tumor which accounts for 11% of all benign bone tumors for Dahlin [2] and 3% of the total primary bone tumors for Amari [3].

They usually occur in the 2<sup>nd</sup> and 3<sup>rd</sup> decades of life. The sex ratio usually varies from 2: 1 to 3: 1. Carp and hand involvement ranges from 6% to 13% of all osteoid osteoids.

A solitary lesion most commonly occurs in long bones but is extremely rare in the hand [4].

In the carp, the Ghiam series [4], which reported 33 intracarpian cases and 5 other cases recorded in the Anglo-Saxon literature, showed the predominance of the semi-lunar (33%), which represented 34% All cases; While we have no case on the hooked bone, the pisiform, the trapezoid and the large bone trapezium,

these bones are reached in respectively: 24%, 6%, 6% and 3% 7% of the cases in the literature [3,5].

Metacarpal and phalangeal involvement was well described (the first case recorded in 1926 was an osteoid osteoma of P1 of the fourth finger), the second phalanx is reached more rarely, at the level of P1-P2 one often notes a digital hypertrophy Segmentation with decreased mobility of the above and underlying joints, the third phalanx has been identified 24 times in the literature; At this level the particular clinical aspect is the nail hypertrophy (pseudo-hippocratism). The main symptom is the pain that may be absent [6], this absence of pain should not eliminate the diagnosis and is due to the absence of nerve tissue inside the nidus. Radiographically, the cortical location is the most frequent, it is the usual seat of the phalangeal attacks; it is here that the reaction of sclerosis can mask the nidus,

responsible for the digital hypertrophy, it is necessary to know to seek it, by X-rays and tomographies of different penetrations; The nidus being able to be eccentric, on the other hand, sitting at one end of the condensation [7].

The more rare intraspongous localization is sometimes encountered in the carpal bones; the osteoma takes on the appearance of a rounded opacity, or of a transparent zone with little peripheral sclerosis.

Subperiosteal localization is the rarest by hand [8]; we do not have any. When standard radios are doubtful or negative, preoperative scintigraphy of technetium 99 [9] is required, which shows hyperfixation of the osteoma, thus allowing directed tomographies to be made if necessary.

Finally, arteriography is not a routine examination. In the presence of a positive scintigraphy, it shows the existence of an irregularly shaped vessel feeding a hypervascularized zone with a vascular peloton of early onset which persists late in the venous phase [10]. Computed tomography to a useful makeup, when standard examinations are normal.

Histologically, osteomas are composed of a normal-appearing, dense mass of lamellar bone. Although they contain osteoblasts, fibroblasts and giant cells in intertrabecular stroma, haemopoetic cells are rarely observed. [11]

Osteoid osteoma presents itself as a focal point of evolutionary osseous remodeling. The central nidus with an average diameter of 1 cm is composed of: small bone spans whose calcification is progressively made by small confluent foci, a very vascularized connective tissue, differentiated cells with predominant osteoblasts. [12]

The peripheral condensation is made of a compact bone with abundant vascularization. Nerve fibers have been detected by special staining in both the sclerosis surrounding the nidus and within the nidus itself; They seem to be the starting point of pain, through the autonomic nervous system. Finally, the existence of synovitis in juxta-articular sites has been noted. [13,14]

The treatment is surgical and involves block resection [15], which is preferred to the curettage of the lesion because of:

- The radical nature of this method to reduce the risk of not resecting the nidus.
- The need for a more precise histological diagnosis, which can only be established on a complete piece, thus eliminating doubtful diagnoses.

This resection can be supplemented by the placement of autologous bone grafts, in the event of significant loss of substance, compromising the stability of the affected part, or supplemented by reconstruction due to the juxta-articular nature of the lesion.

The main difficulty of this treatment lies in the choice of the approach in case of intracarpal localization, or when the nidus could not be accurately detected preoperatively and in the extent of bone excision in case of localizations Phalanges.

## 5. CONCLUSION

Osteoid osteoma is a rare, very painful benign tumor, the surgery of which is the only curative treatment possible, which constantly brings healing if the excision of the nidus has been total, it has benefited greatly from advances in imaging and techniques of Minimally invasive surgery.

## CONSENT AND ETHICAL APPROVAL

As per university standard guideline, participant consent and ethical approval have been collected and preserved by the authors.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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