

## Original article

## Enchondroma of the distal phalanx

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**ABSTRACT.** Enchondroma is the most frequent benign tumor in hand bones. It occasionally occurs in the distal phalanx of the fingers; it is usually an asymptomatic lesion, but pain may occur when it is associated with a fracture. The most recommended treatment is lesion curettage and application of a bone graft, besides fixation as needed. Five cases with location in the distal phalanx are reported, as well as treatment results from January 1978 to May 2010. Of the 5 patients, 4 were females and one was male. The most frequently affected digit was the middle finger followed by the little finger. The most frequent symptom at the time of diagnosis was pain. Lesion curettage was performed in all cases, with the use of an autologous distal radius bone graft in 4 and coralline graft in one. Mean follow-up was 193 months (2-384 months). No complications or relapses were reported.

**Key words:** enchondroma, finger, hand.

**RESUMEN.** En los huesos de la mano el enchondroma es el tumor benigno más frecuente. Ocasionalmente se presenta en la falange distal de los dedos, siendo en la mayoría una lesión asintomática, pero puede presentarse con dolor cuando se asocia a una fractura. El tratamiento más recomendado es el legrado de la lesión con aplicación de injerto óseo además de la fijación necesaria. Se informa de 5 casos de localización en la falange distal y los resultados del tratamiento de Enero de 1978 a Mayo de 2010. Cuatro de los pacientes son mujeres y 1 hombre. El dedo más frecuentemente afectado es el anular seguido del meñique. El síntoma más frecuente al momento del diagnóstico fue dolor. En todos los casos se realizó legrado de la lesión con aplicación de injerto óseo autógeno de radio distal en 4 y coralina en 1. El seguimiento promedio fue de 193 meses (2 a 384 meses). No hubo complicaciones, ni recidivas.

**Palabras clave:** enchondroma, dedo, mano.

## Introduction

Enchondroma is the primary tumor most frequently reported in the long bones of the hand;<sup>1</sup> it represents as much as two thirds of bone lesions. The hand and the wrist are

some of the most frequent sites for enchondromas, accounting for 54% of cases. They appear between the first and 4<sup>th</sup> decades of life. The hands are a frequent site of isolated<sup>2</sup> and multiple lesions (Ollier disease and Maffucci syndrome),<sup>3,4</sup> which occur more frequently among males than females.<sup>5</sup> The most frequent sites are the proximal and middle phalanx, followed by the metacarpals;<sup>6,7</sup> they are much less frequent in the distal phalanx.<sup>2,8-11</sup> The lesion is commonly asymptomatic and is detected when a fracture occurs or as an incidental radiologic finding.<sup>12,13</sup> Distal phalanx enchondromas have been reported as unusual lesions (Nakajo et al. 2005).<sup>1,4,14,15</sup>

The typical radiographic characteristics of enchondroma include a well delimited central lucent image in the shaft or metaphysis of hand bones (*Figures 1 and 2*).<sup>1,16,17</sup> As the enchondroma grows the cortices become thinner, which predisposes to fractures (*Figure 3*).<sup>2,18</sup> Occasionally more sophisticated imaging studies are required to make the diagnosis, such as CT or MRI. Takigawa (1971)<sup>1,4,19</sup> classifies the radiographic images of enchondroma in five types:

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central (58%), eccentric (19%), combined (21%), polycentric (11%), and giant (3%) (Figure 4). An additional type of radiographic presentation is enchondroma protuberans.<sup>20,21</sup> The most accepted theory is that enchondromas develop in cartilage fragments originating in the central physis.<sup>16</sup>

The histopathologic appearance of enchondroma is similar to that of normal cartilage in terms of the amount and characteristics of chondrocytes (small nuclei with scarce mitoses), which are spread in hyalin matrix lacunae, with connective tissue septa and calcifications resulting in a nodular appearance. Often times phalanx enchondromas show a greater mitotic activity, which could suggest malignancy, even though their clinical behavior is benign.<sup>18,19</sup>

The treatment of solitary lesions depends on the symptoms, the characteristics of the lesion and the risk of fracture. In patients with pain, cortical deformity or risk of fracture surgical management is recommended. The proposed treatment consists of curettage of lesions as soon as the diagnosis is made (Figures 5A and B).<sup>19</sup> The recurrence rate of enchondroma after curettage is 2-15%.

### Material and methods

The first author's records of patients with hand enchondroma from January 1978 to May 2010 were reviewed and their characteristics were assessed. Specific data of patients were analyzed, such as: age, sex, finger involved, symptoms, clinical presentation, complete X-rays, Takigawa classification, description of the surgical technique, complications and final result.

### Results

A total of 39 patients were included, 5 of them with location in the distal phalanx (12.8 %). There were four females and one male (80% and 20%, respectively), ages 22-41 years (mean age 31.5 years). The most frequently affected finger was the ring finger with 3 cases (60%), followed by the little finger, with 2 cases (40%). The most frequent symptom was



**Figure 2.** AP and lateral X-ray of a distal phalanx enchondroma. The well delimited, radiolucent lesion is seen, which widens and thickens the anteroposterior diameter of the cortices. Classified by Takigawa as central.



**Figure 1.** AP hand X-ray showing the characteristic image of a distal phalanx enchondroma in the ring finger.

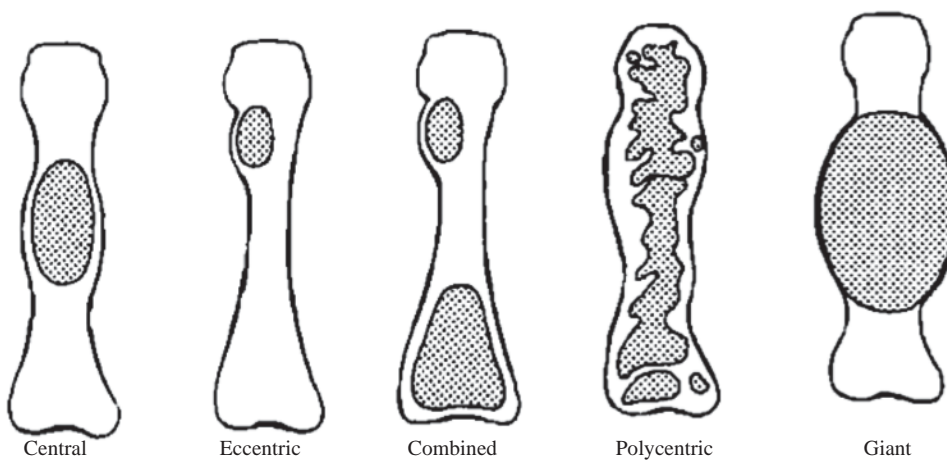


**Figure 3.** AP and lateral X-rays of a distal phalanx enchondroma. Solution of continuity of the shaft bone tissue is observed associated with the tumor.

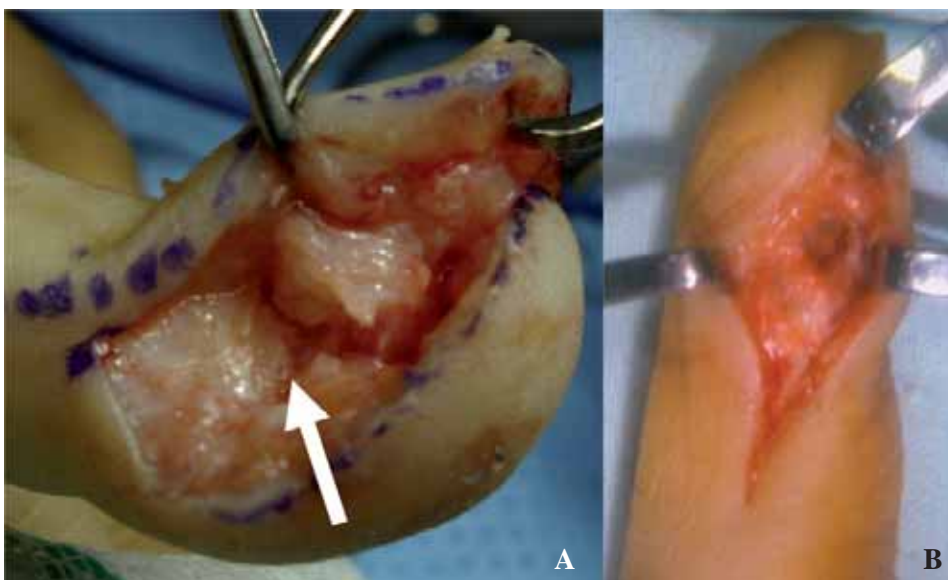
pain, which occurred in all cases, followed by deformity of the finger tip and swelling. In 3 of these cases the cause of pain was fracture of the distal phalanx (60%). In all cases the diagnosis was made with the case history and AP, lateral and oblique X-rays. The X-rays were classified according to the Takigawa classification in 3 central and 2 eccentric lesions. Bone curettage of the lesion was performed in all cases. A distal radius autologous bone graft was used in 4 cases and a coraline graft in one case. The cases with fracture were stabilized with an intramedullary Kirschner nail to fix the fracture line going all the way to the middle phalanx, cutting it distally and bending it half a centimeter away from the pulp. The nail was kept in place for 4-6 weeks until fracture healing and engraftment occurred. After removing the nail a monoarticular aluminum brace was used to immobilize; hydrotherapy was started at home together with flexion and extension exercises 2-3 times a day until distal interphalangeal mobility was recovered. Patients were followed-up from 2 months to 10 years (mean 121 months) and no complications or relapses were reported.

**Discussion**

Enchondromas are benign tumor lesions that frequently appear in the hand. However, distal phalanx lesions are quite rare.<sup>1,4,14</sup> In our series the latter represent 12.8% of hand enchondromas, which coincides with the frequency reported in the literature. The proximal and middle phalanges are the most frequent sites, followed by the metacarpals. Reports state that when the lesions are located in the phalanges the most common radiographic pattern is the central one, which is true for 60% of the cases in our study. Most of our cases with distal phalanx lesions presented with sudden, intense pain associated with a fracture. Therefore immediate treatment was recommended consisting of curettage of the lesion and placement of an autologous bone graft taken from the distal radius of the patient through a small window during the same procedure or a coraline graft. This bone graft was chosen due to the proximity of the donor site and because it usually provides a sufficient amount of bone. The Kirschner nail used in the cases with pathologic fracture is used as a protection until



**Figure 4.** Radiographic classification. Takigawa describes 5 types of radiographic patterns for enchondromas depending on the site of the involved bone.



**Figure 5A.** Detail of the fracture site showing the chondral tissue between the proximal and distal fragments of the phalanx (arrow). **B.** Space created in the phalanx after lesion curettage.

healing occurs, which in all cases happened between weeks 4 and 6 of treatment. Once radiographic evidence of healing was available, the Kirschner nail was removed and the mono-articular aluminum brace was placed; then rehabilitation was started at home. No patient had symptoms after nail removal. All patients recovered complete mobility before 2 months.

As distal phalanx enchondromas are infrequent lesions, the following characteristics should be considered: the differential diagnosis should include other lesions that are frequent in this location, such as glomus and epidermoid cyst.<sup>1,2,5</sup> Clinical data of these lesions are variable; for instance, the glomus shows changes in pain intensity depending on temperature and the distal arterial flow, besides the fact that it may cause subungual color changes. The epidermoid cyst causes more deformity of the unguis bed and the nail than the glomus and enchondroma. Both tumors involve more aggressive clinical pictures than enchondroma and they frequently present before causing a pathologic fracture. We may find data leading to the diagnosis starting with plain X-rays, given that enchondromas have special characteristics; however, other imaging tests like CT, MRI, Doppler ultrasound and angiography may help make the distinction.

Some studies report conservative management with lesion immobilization until fracture healing occurs, followed by the surgical treatment of the enchondroma.<sup>1</sup> We did not find evidence to do this, as both situations may be addressed in the same surgical procedure without any consequences for the patient, while the above mentioned option delays the resolution of the pathology, something that our results support.

The treatment of distal phalanx enchondromas requires profound knowledge of the pathology at this site to obtain the best possible result from the comprehensive management of these patients.

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