Periosteal Hand Chondromas

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Two cases of periosteal chondromas of the finger phalanges are presented. A review is made of the condition and the conclusion is reached —on the basis of observation— that the clinical and image-based findings of phalangeal lesions are similar to those of tumors in other more usual locations. Post-resection bone grafting could be resorted to more frequently.

Key words: *periosteal chondroma, phalanx, hand.*

Condromas periósticos de la mano

Se presentan dos casos de condromas periósticos en las falanges de los dedos de las manos. Se hace una revisión de la entidad y se concluye con la observación de que los hallazgos clínicos y de imagen de las lesiones en aquella localización son similares a los del tumor en otros asientos más comunes. En la mano también podría ser más frecuente el uso de injertos óseos después de la resección.

Palabras clave: *condroma perióstico, falange, mano.*

Periosteal or juxtacortical chondromas are benign bone tumors of a periosteal origin and a chondral lineage. They are relatively rare, accounting for around 20% of chondromas and less than 0.65% of all primary bone tumors. About 25% of cases are to be found in the hand[1-4]. Since this is a rare and ill-documented location, we herewith present new clinical cases and provide a review of this entity.

CASE REPORTS

Case 1

Forty-year old brick-layer with no pathological antecedents of note. In April 2002 he presented with pain and a tumor in his left hand that had been developing steadily for the past months. Physical examination revealed a hard and deep tumor at the ventral aspect of the base of the first digit, which was painful to touch and to the digit's mobility; the first digit's movements were limited (Fig. 1). No axillary adenopahies were detected.

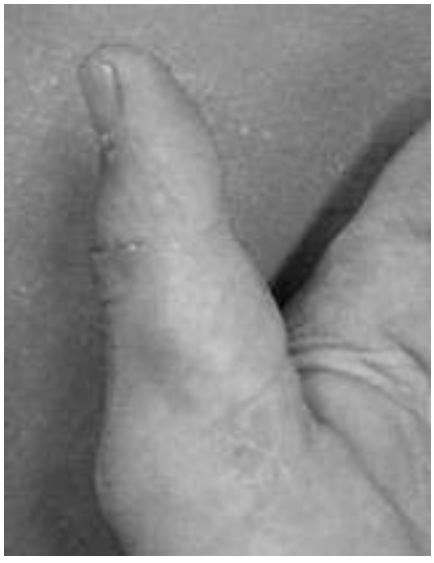

Figure 1. *Case 1. View of the dinger prior to treatment.*

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A plain radiograph was taken that showed a well circumscribed osteolytic image with a sclerotic border located eccentrically at the ventral aspect of the proximal half of the digit's first phalanx (Figs.2A and B). The MRi showed a mass that showed a hypointense signal in T1-weighted sequences and hyperintense in T2-weighted ones, with multiple hypointense areas inside and a heterogeneous signal enhancement on administering a contract medium (Figs. 3A and B, and 4). The lesion was 4.5 cm at its longer axis, it displaced the flexor tendon of the first digit and eroded the digit's underlying phalanx, which presented with a sclerotic border.

A closed trocar biopsy helped diagnose the entity as a periosteal chondroma (Fig. 5). On June 6th 2002 a hemicortical intraarticular block tumor resection was made, which was completed by curetting the bony bed where the tumor was located (intralesional resection). A freeze-dried graft was carved out and placed onto the resection site with two cortical screws. Postoperatively, a hematoma was formed at the surgical wound site, which

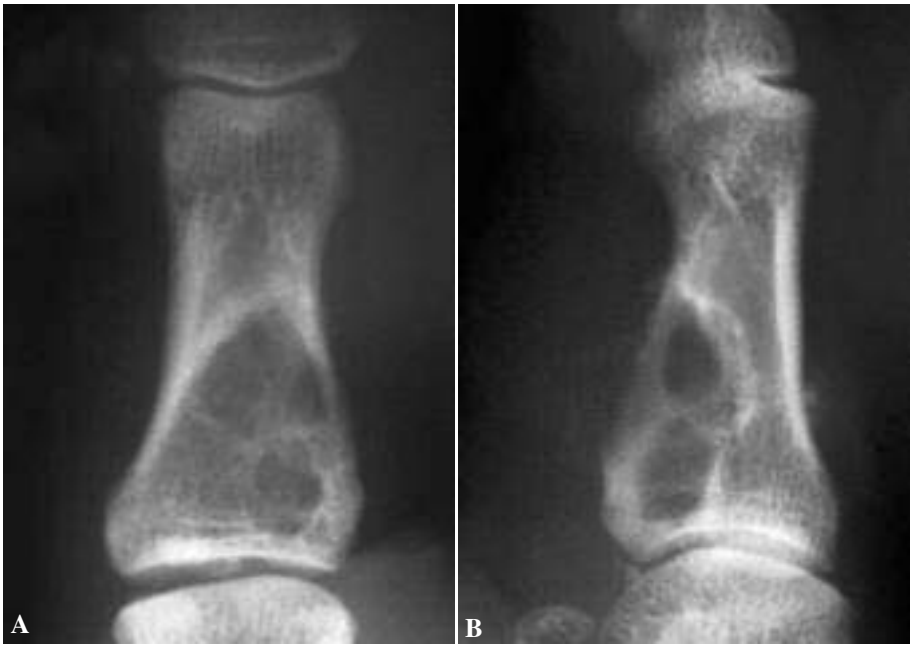

Figure 2. *Case 1. A/P (A) and lateral (B) x-ray of the proximal phalanx of the first digit. B A*

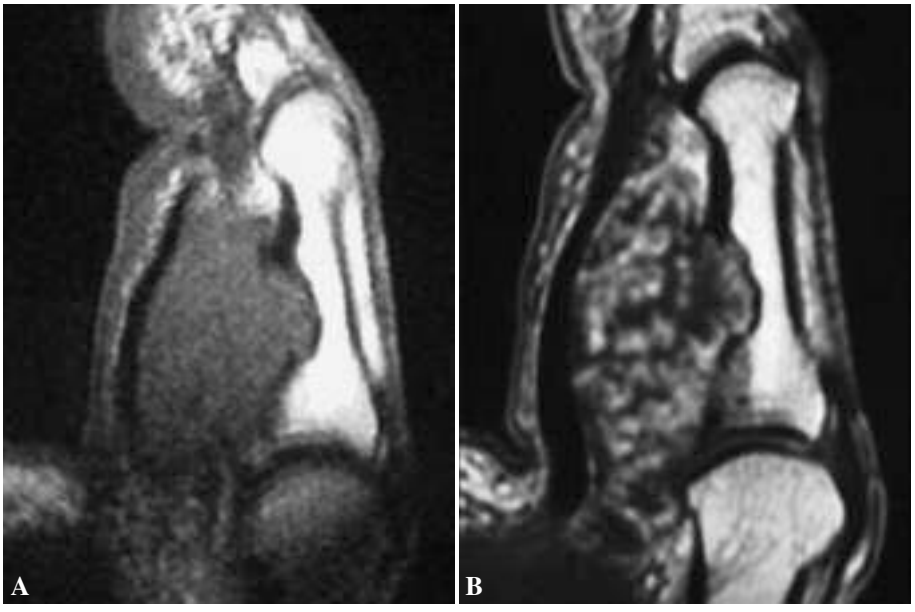

Figure 3. *Case 1. Sagittal T1-weighted MRi (A) View after contrast injection (B). A B*

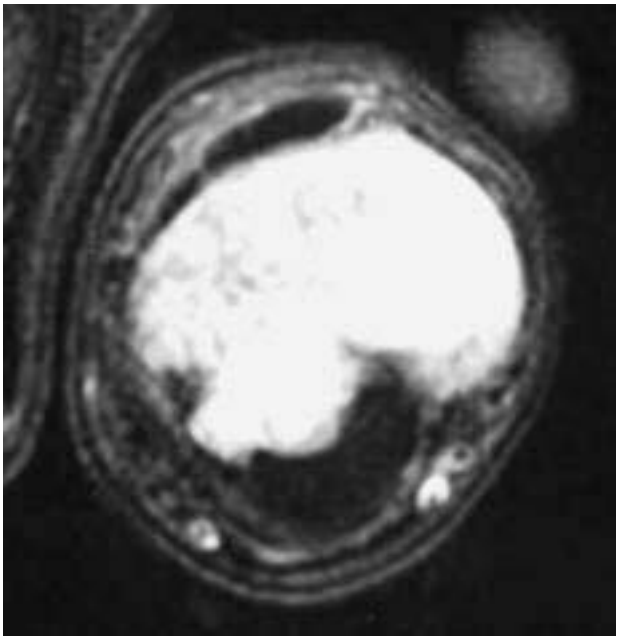

Figure 4. *Case 1. Axial T2 weighted MRi.*

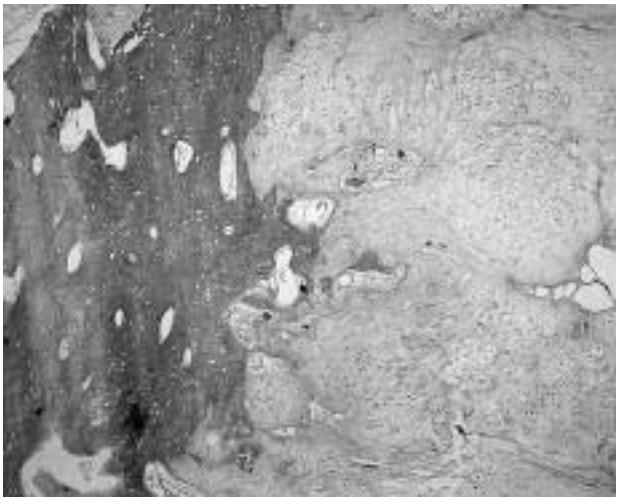

Figure 5. *The pathology lab study of case 1 shows a hypocellular lobulated tumor originating from the periosteum.*

had to be squeeze drained repeatedly. The digit was kept immobilized for 35 days, after which rehabilitation started. The patient went back to his job three months after surgery. At present, two and a half years later, the patient is still doing his same job with no pain or limitations, with a very well incorporated bone graft (Figs. 6A and B, and 7). Mobility of the metacarpo-phalangeal joint of the first digit is normal, with normal extension and 40° extension at the interphalangeal joint. There are no signs of tumor recurrence.

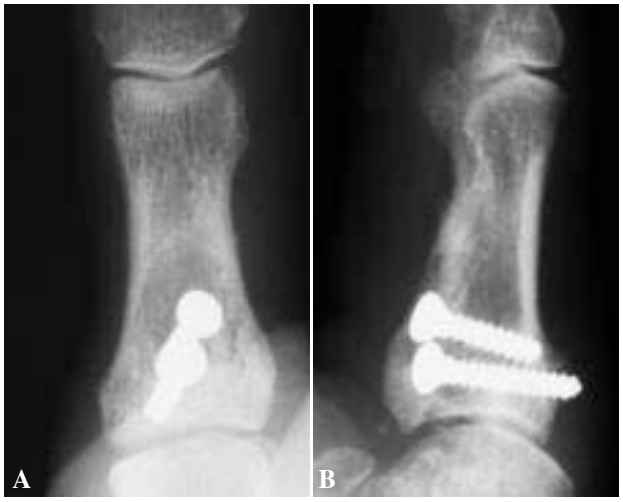

Figure 6. *Case 1. Final radiographical result, two years after surgical treatment, in A/P (A) and lateral (B) views.*

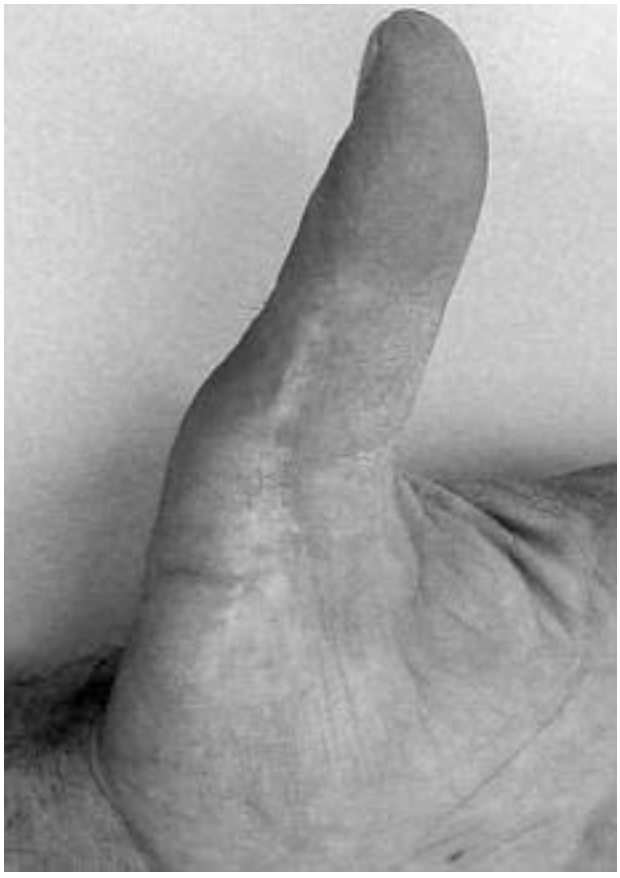

Figure 7. *Case 1. View of the finger two years after treatment.*

Forty-nine-year old sales representative who had sustained a fracture of the third finger of his right hand 20 years before and had had discomfort since then. In May 2002, he presented with increased pain and a lump that had

been growing steadily for the past 4 years, with no new trauma. Physical examination revealed a hard tumor adhered to the depth of the dorsal aspect of the third finger at the level of the middle phalanx, which hurt on palpation (Fig. 8). The finger's mobility was normal and no axillary adenopathies were detected.

The plan x-ray showed an osteolytic image at the proximal end of the middle phalanx of the finger, which was eccentric, apparently lobulated and with a thin sclerotic border; there was another larger suppurating mass at the dorsal aspect of the finger with a calcified matrix and periphery (Figs. 9A y B). The MRi showed a well-defined tumor with a maximum diameter of 2 cm that had a significant soft tissue component and involvement of the middle phalanx of the finger.

The tumor showed a hyperintense image both in T2 weighted sequences and on administration of a contrast medium (Figs. 10A and B). On 19th June 2002 an excisional biopsy was carried out through a dorsal approach, which confirmed the periosteal chondroma diagnosis (Fig. 11). An intercalary hemicortical block resection was performed at the phalanx, scraping the tumor site with a curette and reamers. A freeze-dried heterograft was elevated and fixated with two mini-fragment screws.

The post-operative period proceeded uneventfully. The finger was kept immobile for two weeks, after which rehabilitation was begun. The patient went back to his job 5 moths after surgery and at present, two years and a half later, still does the same job without any pain or functional limitations (Figs. 12A and B). Extension of the proximal interphalangeal joint of the finger was limited to 10°, and flexion of the distal interphalangeal joint to 30° (Fig. 13).

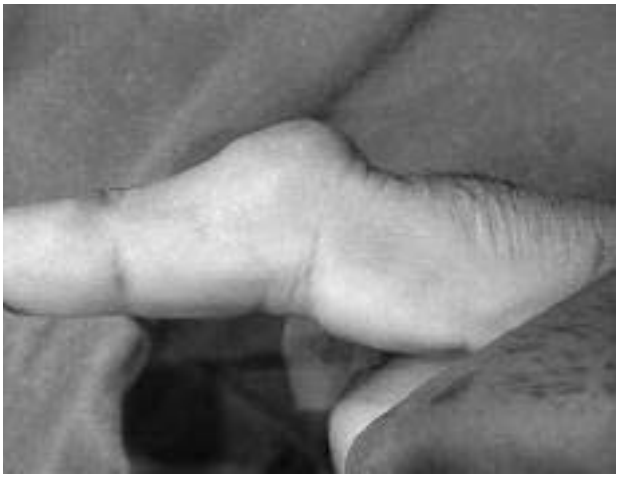

Figure 8. *Case 2. View of the third finger before treatment.*

DISCUSSION

Periosteal chondromas are show-growing benign cartilage tumors that were first described in 1952 by Lichtenstein and Hall. In 1956 called them juxtacortical given the fact that they originate on the cortical surface of the bone in or under the periosteum. They may appear as latent (stage 1) or as active (stage 2), they do not regress spontaneously and or suffer any sarcomatous transformations[5].

The tumor is more frequent in males (2/1), normally adolescent or young adults, and tends to be located at the diaphysis or the metaphysis of a tube-shaped bone; its most characteristic location is the proximal humerus at the attach-

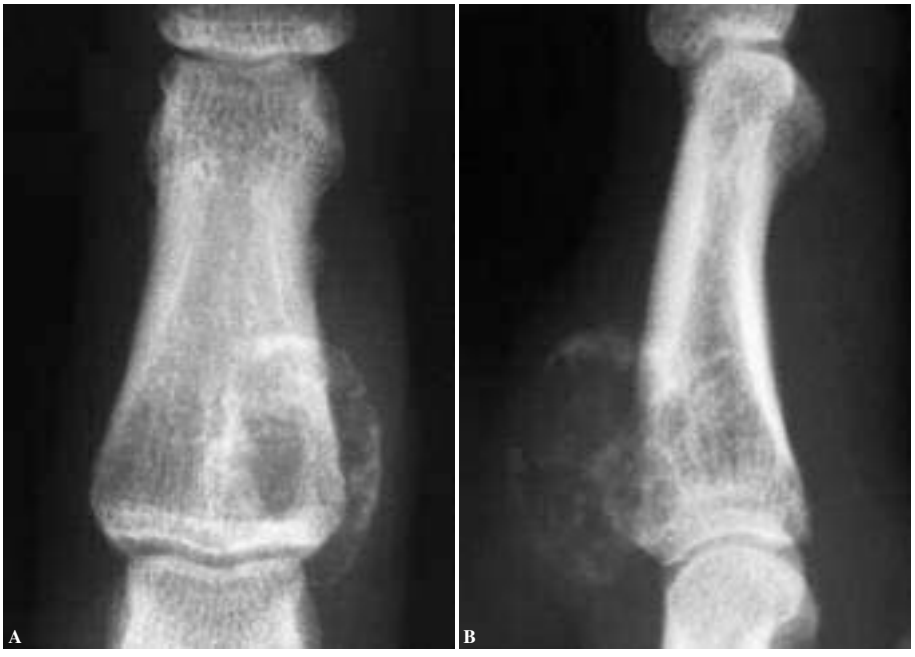

Figure 9. *Case 2. A/P (A) and lateral (B) x-rays of the middle phalanx of the third finger.*

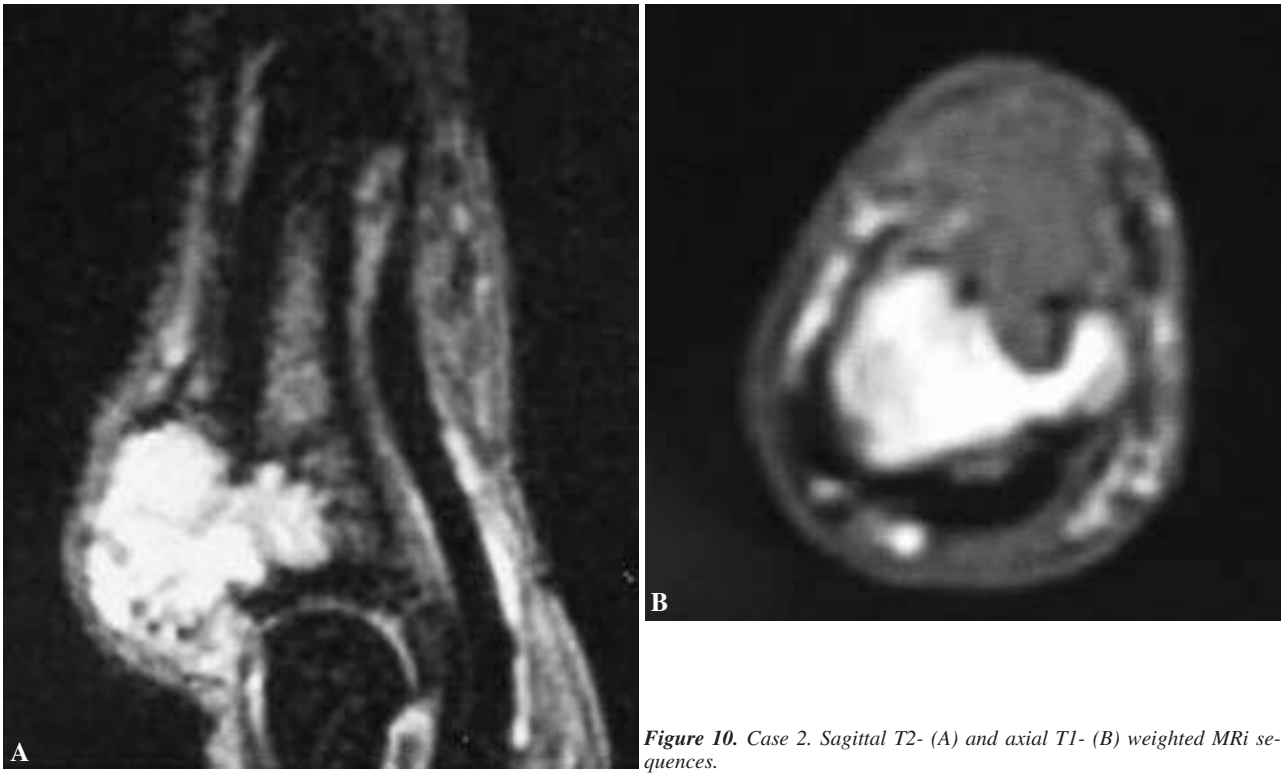

Figure 10. *Case 2. Sagittal T2- (A) and axial T1- (B) weighted MRi sequences.*

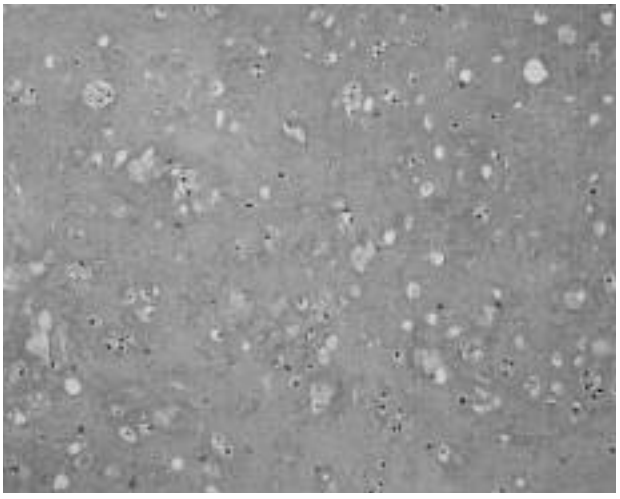

Figure 11. *Pathological study of Case 2. View of a proteoglycan-rich basophillic matrix with scattered similarly-sized chondrocytes arranged in lacunar space; these show no nuclear pleoformisms with virtually no binucleation or mytosis.*

ment site of the deltoid muscle[2],[4,6,7]. Periosteal chondromas are rare in the hand and have only been described as isolated clinical cases[3,7] or as part of small series[2], which do not normally refer specifically to the location mentioned above. They are estimated to account for 4% of total chondromas[2], and they occur more frequently in the metacarpals than in the phalanges[3].

Periosteal chondromas, when they are not asymptomatic and are discovered incidentally, present with symptoms of insidious swelling and, subsequently, moderate pain. Nevertheless, the lesion could also irritate neighboring nerves and deforms the bone is originates at. Unlike enchondromas, they are discovered as a result of a pathological fracture only in exceptional cases[3]. Their radiographical appearance is characteristic in almost half of the cases. Typical forms show erosions of the cortical surface of the bone where it is located with a well-defined sclerotic margin separated from the medullary cavity by the remaining córtex[2,8,9]. On the fringes of the erosion there seems to be a small Codman's triangle that could be mistaken for a malignant tumor[5]. The lesion tends o be smaller than 3-5 cm and shows a prominent soft tissue mass with a variable ossification and calcification pattern[1,2,6,8].

Computed axial tomography (CAT) is useful to confirm the periosteal nature of the tumor when this cannot be done through plain films. The MRi shows a lobulated mass that is well-circumscribed by the periosteum on the bone surface, with a hyperintense matrix surrounded by a hypoitnese T2-weighted image and a hypo and iso intense T1-weighted image with respect to the muscle. The lesion shows gadolinium-enhancement at the periphery; matrix calcifications result in a focal signal decrease in all sequences but with no intensity changes that may suggest swelling in the adjoining tissues[9]. All in all, MRi is the imaging technique of choice for the management of a periosteal chondroma.

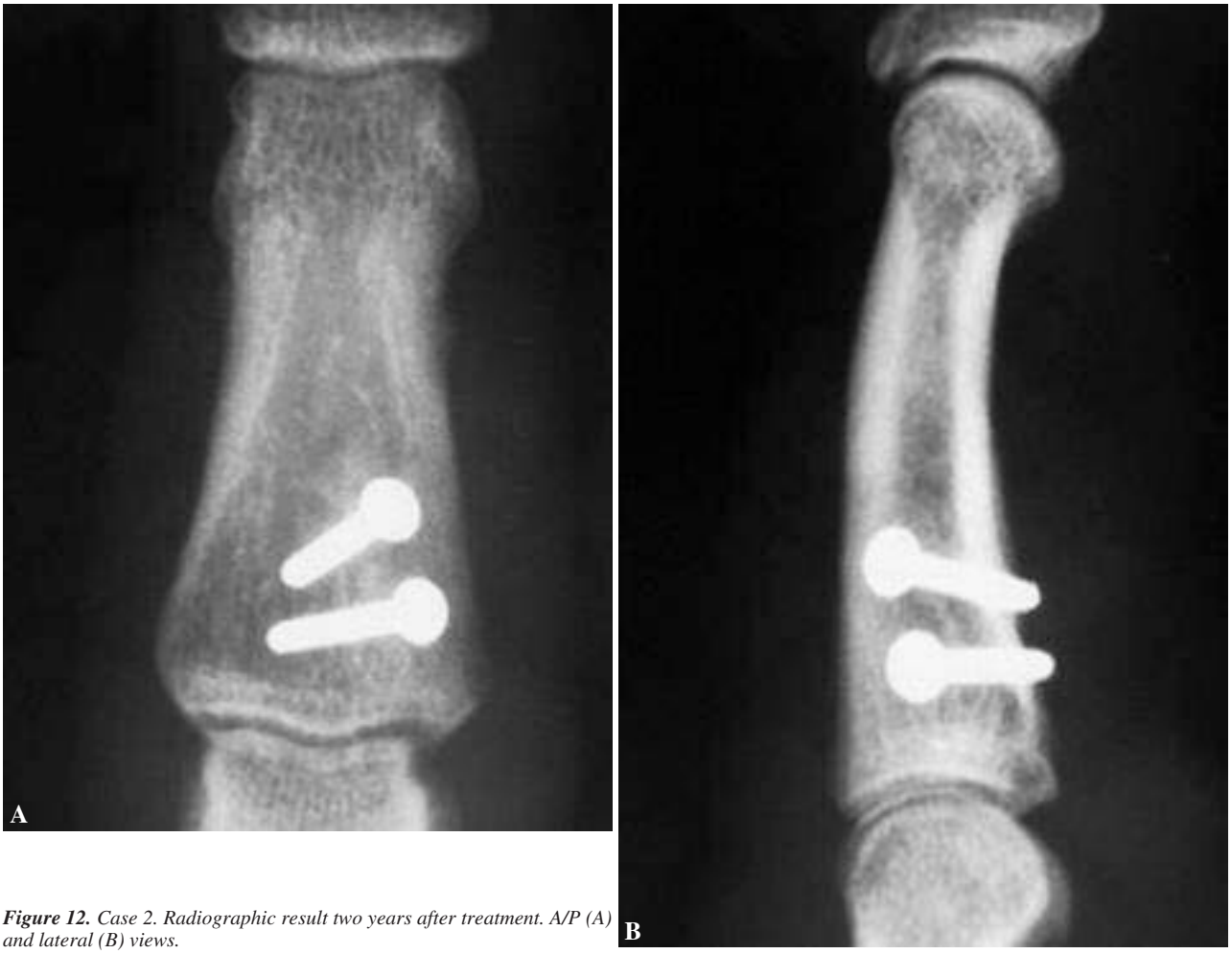

Figure 12. *Case 2. Radiographic result two years after treatment. A/P (A) and lateral (B) views.*

Figure 13. Case 2. View of the hand two years after surgical treatment.

Our cases indicate that the clinical and imaging characteristics of periosteal chondromas of the hand are similar to those of the same tumors found in other locations.

The differential radiographic diagnosis of periosteal chondromas includes other lesions found on the bone surface (periosteal chondrosarcomas and osteosarcomas, osteochondromas, periosteal desmoids, myositis ossificans, etc.), bone tumors and pseudotumoral lesions located excentrically in the bone (aneurysmatic bone cysts, cortical fibrous defects, non ossifying fibromas, etc.), and cortical erosions resulting from the pressure exercised by neighboring soft tissue masses. In the hand, given the degree of superficiality of the bones, periosteal chondromas could be mistaken for soft tissue chondromas, ganglions, lipomas, foreign body granulomas and other soft tissue benign and malignant tumors[1,10-12].

Histolologically the periosteal chondroma presents with well-differentiated hyaline cartilage lobes that may contain focal calcifications or ossifications within a basophillic matrix separated by fibrous septa. A fibrous capsule is always

present and, in some areas, the lesion is covered by intact periosteum or by reactive bone tissue[1,6].

Although no mitosis was found, some cases are characterized by a mixoid matrix, hypercellularity, binucleation, hyperchromaticity or moderate nuclear atypia which could, in isolation, be interpreted as low-grade chondrosarcomas[2,8]. Such a diagnosis could be considered if the patients were older and had lesions of a larger size, with an associated soft tissue mass, a tendency to invade bone gaps and showing more enhancement in the bone scan[1,8,9].

Although small and asymptomatic lesions can be monitored, the treatment of choice for periosteal chondromas is an intralesional, marginal[4] or even wide resection provided that the lesion is larger than 3 cm[8]. At any rate, an incomplete resection favors local recurrences, which occur in less than 3% of cases[4,8].

Finally, bone grafting is not necessary for reconstruction given that lesions tend to be small, with the exception of the fingers, where the phalanges are so small that they could induce a pathological fracture after an isolated resection, as noted by Savornin and Foult[3] and by the authors of this paper.

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