

## Case Report

# Surgical management of enchondroma with joint transfer: a case report

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## ABSTRACT

The enchondromas are the most common benign bone tumor in the hands, mainly in young patients and its treatment is surgical in most cases due to its possible complications avoided through different procedures such as joint transfer, which allows to maintain a good quality of life for the patient. We present the case of a 42-year-old woman who came to the clinic for blunt trauma in the right hand where she was incidentally diagnosed with enchondroma on the third finger of the proximal interphalangeal joint of the right hand. Articular transfer of the proximal interphalangeal joint was performed. Second toe on the right, at 6 weeks corroborates correct evolution with bone consolidation of the articular transfer grade III and donor zone grade II, without infection complications, the correct recovery of the extensor movement range of this joint improving so their state of life should be the main objective of these procedures.

**Keywords:** Articular transfer, Autograft, Enchondroma, Proximal interphalangeal joint

## INTRODUCTION

The proximal interphalangeal joint plays a critical role in the function of the hand providing approximately one third of the range of motion. Trauma or illness can cause a dysfunctional hand as well as a decrease in the quality of life of the patient, among different treatment options are arthrodesis, implant by arthroplasty and articular transfer, which allows the tissue to maintain its growth potential and preserve mobility.<sup>1-3</sup>

The success of the surgery depends on the skills of the surgeon and the correct hospital infrastructure to perform

it, since the risk of failure due to vascular failure, adhesions, and rigidity is 10% (e), but the benefits that can result include a long-term stability of the joint and resistance to infectious processes.<sup>1</sup>

The enchondromas are the most common benign tumor in the long bones of the hands, this type of tumor starts in the medullar area of the bone and extends towards the cortex creating a prominent mass in the bone, this type of tumors usually does not present with clinical manifestations, therefore its diagnosis is usually incidental, and its surgical treatment by amputation or bone grafts.<sup>4</sup>

**Anatomy**

The second toe is considered the best option for joint transfer due to its wide range of motion compared to the proximal interphalangeal joint, both the proximal and distal interphalangeal joint are bicondylar ellipsoid joints with a large flexion-extension movement of 110 degrees.<sup>1,5</sup>

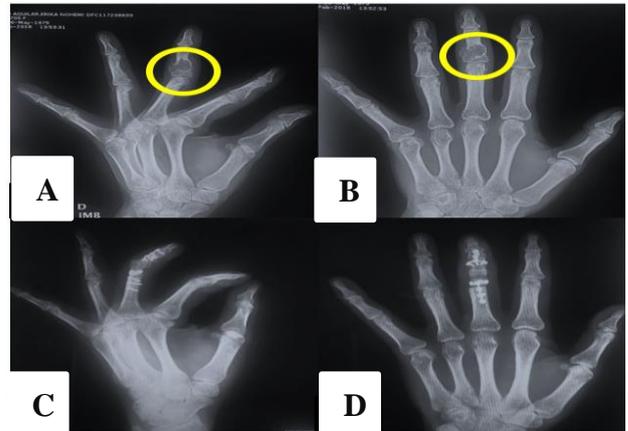
**Rehabilitation**

After surgery, the transferred joint is immobilized by a hand splint, maintaining the proximal interphalangeal joint in full extension for 3 weeks.<sup>5</sup> After this time, exercises to counteract the blockage of the joint are initiated, passive bending of the hand is not allowed until that the union of the bone is checked by means of radiographs when doing it exercise of force for the flexion are initiated.<sup>2</sup>

**CASE REPORT**

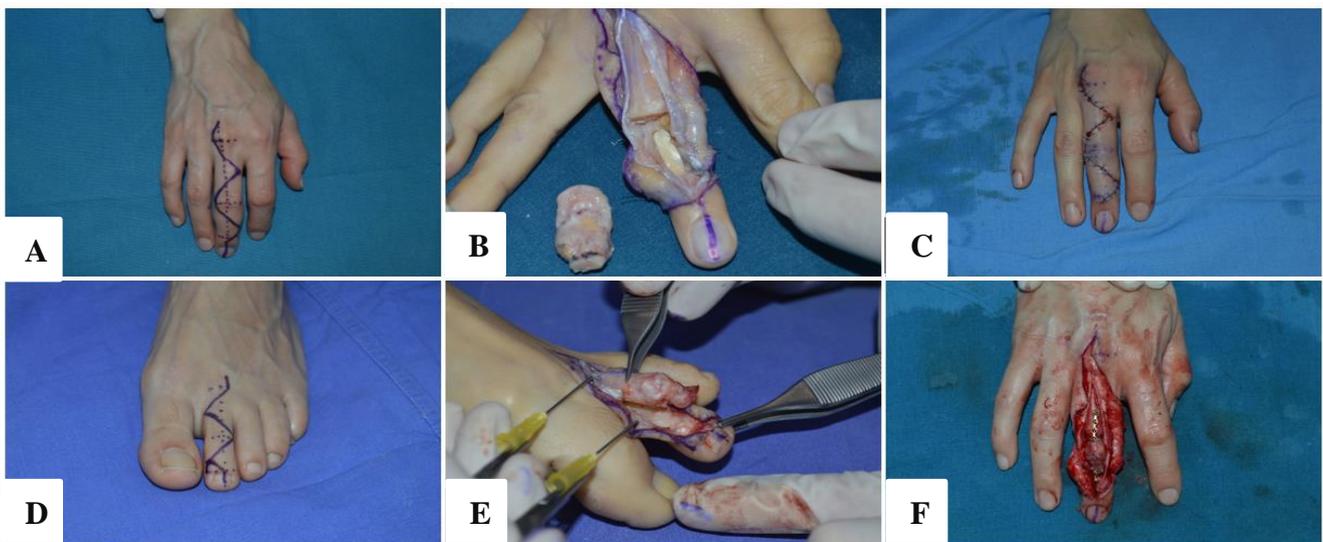
A 42-year-old female patient with no history of chronic degenerative diseases being her only personal history of allergic rhinitis admitted to the hospital due to blunt trauma in the right hand and as a radiological finding Figure 1, AP and oblique radiograph of the left hand. Images A and B show tissues without apparent alterations, bone structures with good mineralization status, with slight sclerosis of the interphalangeal joint surfaces, due to possible degenerative joint disease. In the proximal third of the middle phalanx of the third finger, an amorphous image with lobulated edges is observed, predominantly radiolucent, identifying small radiopaque images in its interior that suggest a calcified matrix. This image conditions cortical attenuation, no data are observed suggesting interrupted periosteal reaction. First diagnostic possibility, enchondroma.

In the postoperative period C and D images, radiopaque material with metallic density is identified in relation to joint transfer. Without data that suggest rejection of the material.



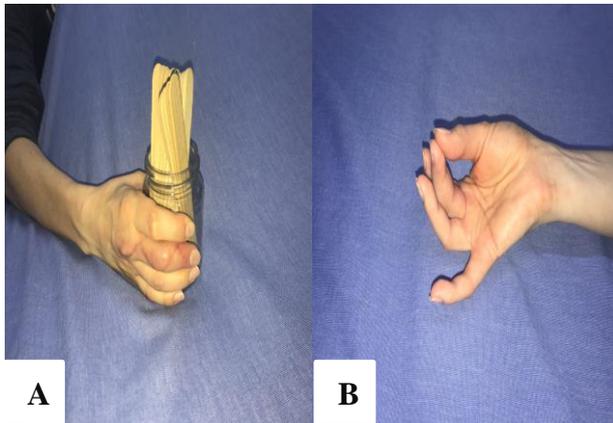
**Figure 1: A) Oblique radiograph, B) A-P radiograph of the left hand, C) postoperative oblique radiograph, D) postoperative A-P radiograph of the right hand.**

A tumor mass was identified at the level of the proximal interphalangeal joint of the third finger of the right hand that corresponded to enchondroma for which tumor resection is scheduled at the level of the same joint, then the resection of the proximal interphalangeal joint and reconstruction is carried out by transferring the proximal interphalangeal joint from the second toe of the left foot to the right hand (Figure 2) with an approximate duration of 7 hours, at 6 weeks corroborates correct evolution with bone consolidation of the articular transfer grade III and donor zone grade II, without infection complications, the correct recovery of the extensor movement range of this joint improving so their state of life should be the main objective of these procedures.



**Figure 2: A) Pre-operative marking in hand, B) Chondroma excision, C) Fixation of neoarticularization with plates and screws, D) Preoperative foot marking, E) Block cut of the joint to be transferred, F) Primary closure with neoarticularization.**

Pathology report: Tubular fragment of 6x3x2.5cm, cartilaginous lesion of 4x3cm. Free edges of tumor lesion. Nodular lesion of mature hyaline cartilage of variable cellularity, small and hyperchromatic nuclei. enchondroma, lesion-free edges, with a healthy border closest to the 6mm lesion.



**Figure 3: A) Rehabilitation, B) Patient follow-up with 5 rehabilitation cycles.**

## DISCUSSION

Enchondroma is a benign, intramedullary, cartilaginous tumor and is the most common bone tumor of the hand. It often presents in the third and fourth decades of life.<sup>7-16</sup> Articular transference can represent an excellent therapeutic option because of the morphological, functional similarity and because it is an autograft, it maintains its growth capacities and preserves the movement, it also avoids the rejection of it.<sup>1</sup> If the patient does not have bone or tendon diseases, it may be the best option for patients who require a wide range of motion.<sup>3</sup> With the correct rehabilitation and follow-up, patients can have an excellent quality of life.<sup>5</sup> Figure 3 complications include in 1% of patients, the risk of recurrence or transformation to malignancy, being more common complications the deformities of the fingers such as the chronic pain, local subcutaneous infection due to cortical bone defects, and even rupture of the terminal extensor tendon causing finger deformation.<sup>4</sup>

Limitations of study was the lack of integration of the neo articulation, formation of adhesions due to incorrect debridement of damaged tissue, arthrosis.<sup>6</sup>

## CONCLUSION

The opportune treatment of the enchondromas diminish the possible complications that this can provoke as much aesthetic as functional or even its possible transformation to malignancy. Joint transfer may be the best therapeutic attitude because by means of this procedure the range of extensor movement is recovered almost in its entirety, improving the quality of life of the patient, in addition in

most cases it is an autograft which avoids the rejection of the same and the waiting time for the transfer.

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## REFERENCES

1. Pappalardo M, Laurence VG, Yu-Te L. Chimeric free vascularized metatarsophalangeal joint with toe fillet flap: a technique for reconstruction of the posttraumatic metacarpophalangeal joint with concomitant soft tissue defect. *J Hand Surg Am.* 2018;43(2):193.e1-e6.
2. Yu-Te L, Yung Loh CY. A Novel technique for correcting extensor lag in vascularized toe pip joint transfers. *Tech Hand Surg.* 2016;20:104-7.
3. Hierner R, Berger AK. Long-term results after vascularised joint transfer for finger joint reconstruction. *J Plas Recon Aesthe Surg.* 2008;1338-46.
4. Hui Lu, Md, Qiang Chen. Enchondroma in the distal phalanx of the finger an observational study of 34 cases in a single institution. *Medicine.* 2016;95:38.
5. Katz RD, Higgins JP. Microvascular toe joint for proximal interphalangeal joint replacement indications, technique, and outcomes. *Hand Clin.* 2018;207-16.
6. Hsu CC, Loh CY, Kao D, Moran SL, Lin YT. The impact of transferred vascularized toe joint length on motion arc of reconstructed finger proximal interphalangeal joints: a cadaveric study. *J Hand Surg.* 2017 Oct;42(8):789-93.
7. Bachoura A, Rice IS, Lubahn AR, Lubahn JD. The surgical management of hand enchondroma without postcurettage void augmentation: authors' experience and a systematic review. *Hand.* 2015 Sep 1;10(3):461-71.
8. Figl M, Leixnering M. Retrospective review of outcome after surgical treatment of enchondromas in the hand. *Arch Orthop Trauma. Surg.* 2009;129:729-34.
9. Gaulke R, Suppelna G. Solitary enchondroma at the hand. Long-term follow-up study after operative treatment. *J Hand Surg (Br).* 2004;29:64-6.
10. Goto T, Yokokura S, Kawano H, Yamamoto A, Matsuda K, Nakamura K. Simple curettage without bone grafting for enchondromata of the hand: with special reference to replacement of the cortical window. *J Hand Surg.* 2002 Oct;27(5):446-51.

11. Hasselgren G, Forssblad P, Tornvall A. Bone grafting unnecessary in the treatment of enchondromas in the hand. *J Hand Surg Am.* 1991;16:139-42.
12. Joosten U, Joist A, Frebel T, Walter M, Langer M. The use of an in situ curing hydroxyapatite cement as an alternative to bone graft following removal of enchondroma of the hand. *J Hand Surg.* 2000 Jun;25(3):288-91.
13. Kuur E, Hansen SL, Lindequist S. Treatment of solitary enchondromas in fingers. *J Hand Surg (Br).* 1989;14:109-12.
14. Morii T, Mochizuki K, Tajima T, Satomi K. Treatment outcome of enchondroma by simple curettage without augmentation. *J Orthopaedic Science.* 2010 Jan 1;15(1):112-7.
15. Takigawa K. Chondroma of the bones of the hand. A review of 110 cases. *J Bone Joint Surg.* 1971;53:1591-600.
16. Yanagawa T, Watanabe H, Shinozaki T, et al. Curettage of benign bone tumors without grafts gives sufficient bone strength. *Acta Orthop.* 2009;80:9-13.

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