

**Solitary Osteochondroma of the Second Metacarpal Bone.**

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**ABSTRACT**

Solitary osteochondroma is a common benign bone tumor, usually developed in long bones. However, its localization in the metacarpal bones is exceptional. Only few cases have been reported in the literature.

We report the case of a 21-year-old right handed female who presented with a painful mass of the dorsal aspect of her left hand. This mass appeared at the age of 10 and was growing progressively ever since. For the last three months, she complained of an insidious and intermittent pain localized specifically over the swelling. There was no history of trauma to the hand.

On physical examination there was a swelling of 3,5 cm in diameter, hard in consistency. The mass appeared to be continuous with the second metacarpal bone.

Plain radiographs and Magnetic resonance imaging findings were consistent with a benign osteochondroma with no radiological evidence of malignancy.

An excisional biopsy with an osteotomy was performed and histological examination confirmed the diagnosis of osteochondroma.

*Keywords: Osteochondroma ; Bone ; Tumor ; Benign ; Metacarpal ; Hand.*

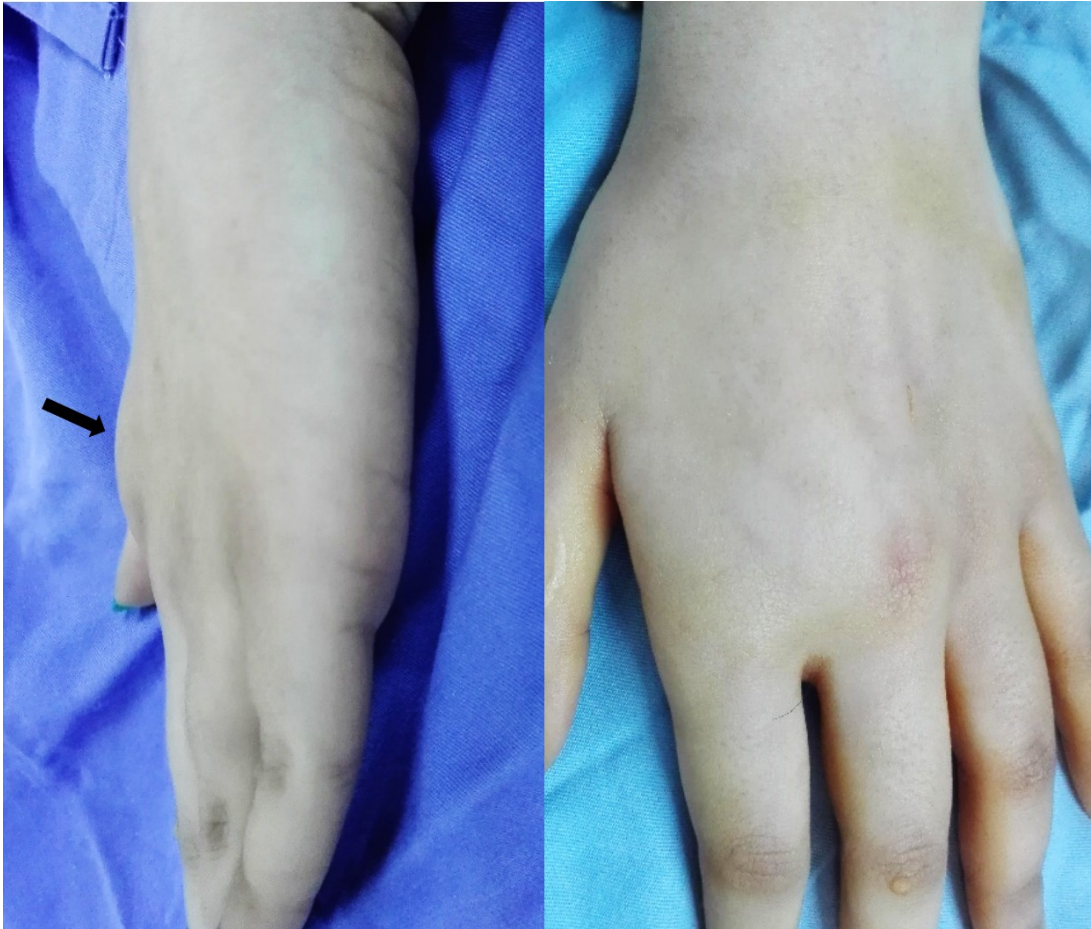
**1. INTRODUCTION**

Osteochondroma is a common benign bone tumor usually localized in the long bones arising from the cortical surface. Its location in the hand has been rarely reported. Even more, the metacarpal bone is exceptionally involved [1]. We report the case of an osteochondroma of the second metacarpal bone.

**2. CASE REPORT**

A 21-year-old right handed female, without any significant pathological history, presented to our outpatient department with a painful mass of the dorsal aspect of her left hand. This mass appeared at the age of 10 and was growing progressively ever since. For the last three months, she complained of an insidious and intermittent pain localized specifically over the swelling. No analgesic medication was taken. There was no history of fever or any similar pain or swelling elsewhere in her body. There was no history of trauma to the hand.

32 On physical examination there was a swelling of 3,5 cm in diameter, hard in consistency,  
33 with no tenderness or redness (Fig.1). The mass appeared to be continuous with the second  
34 metacarpal bone. The metacarpo-phalangeal joint was mobile without any limitation. The  
35 overlying skin was freely mobile. The grip strength was normal.



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37 **Figure 1:** Clinical appearance showing the swelling on the dorsal aspect of the left hand.

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39 Plain radiographs of the left hand revealed a well-defined and non-invasive heterogenous  
40 sessile bony lesion. It was protruding from the neck and the diaphysis of the second  
41 metacarpal bone. Cortical wall was thin but without any cortical destruction or periosteal  
42 reaction (Fig.2).

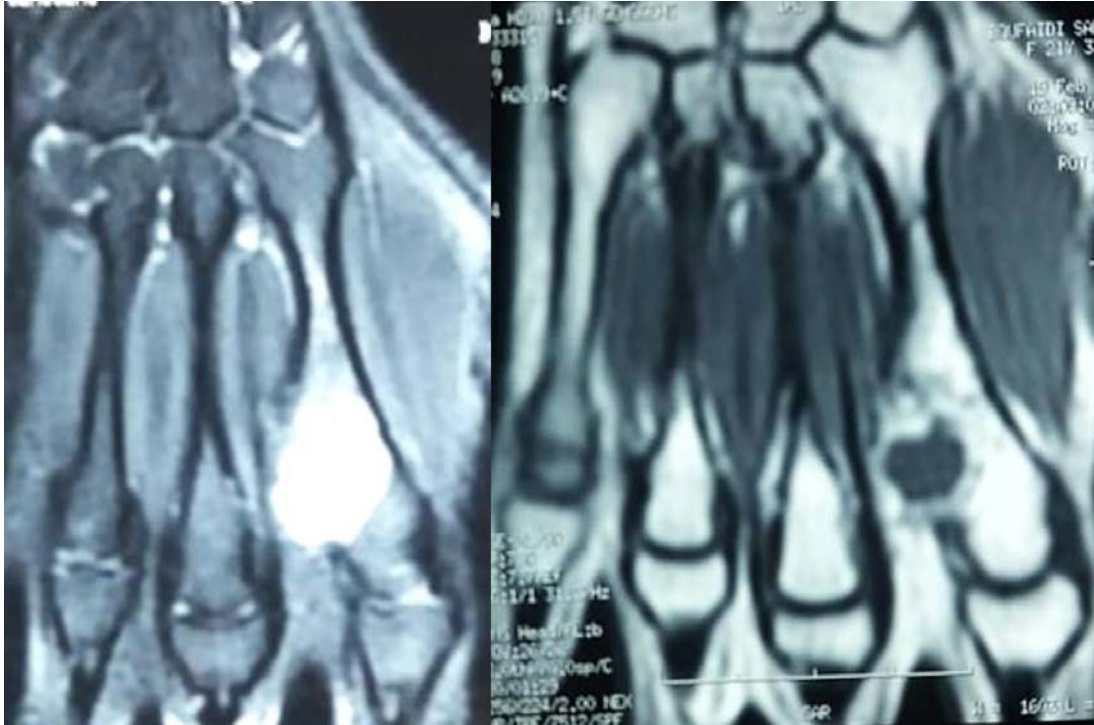


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44 **Figure 2:** X-rays of the left hand showing a well-defined and non-invasive heterogenous  
45 sessile bony lesion, protruding from the neck and the diaphysis of the second metacarpal  
46 bone.

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48 Magnetic resonance imaging (MRI) of the left hand showed a bone forming tumor with a  
49 large implantation area developing from the diaphysis of the second metacarpal bone and  
50 having the same signal as the adjacent bone. The lesion was continuous with the medullar  
51 cavity. A cartilage cap, measuring 10 mm in thickness, was found overlying the bony lesion  
52 with high signal intensity on T2 weighted images. A signal enhancement was present on the  
53 periphery after gadolinium administration. Adjacent bone and joints but also soft tissues  
54 were normal. These findings are characteristic of a benign osteochondroma with no  
55 radiological evidence of malignancy (Fig.3).

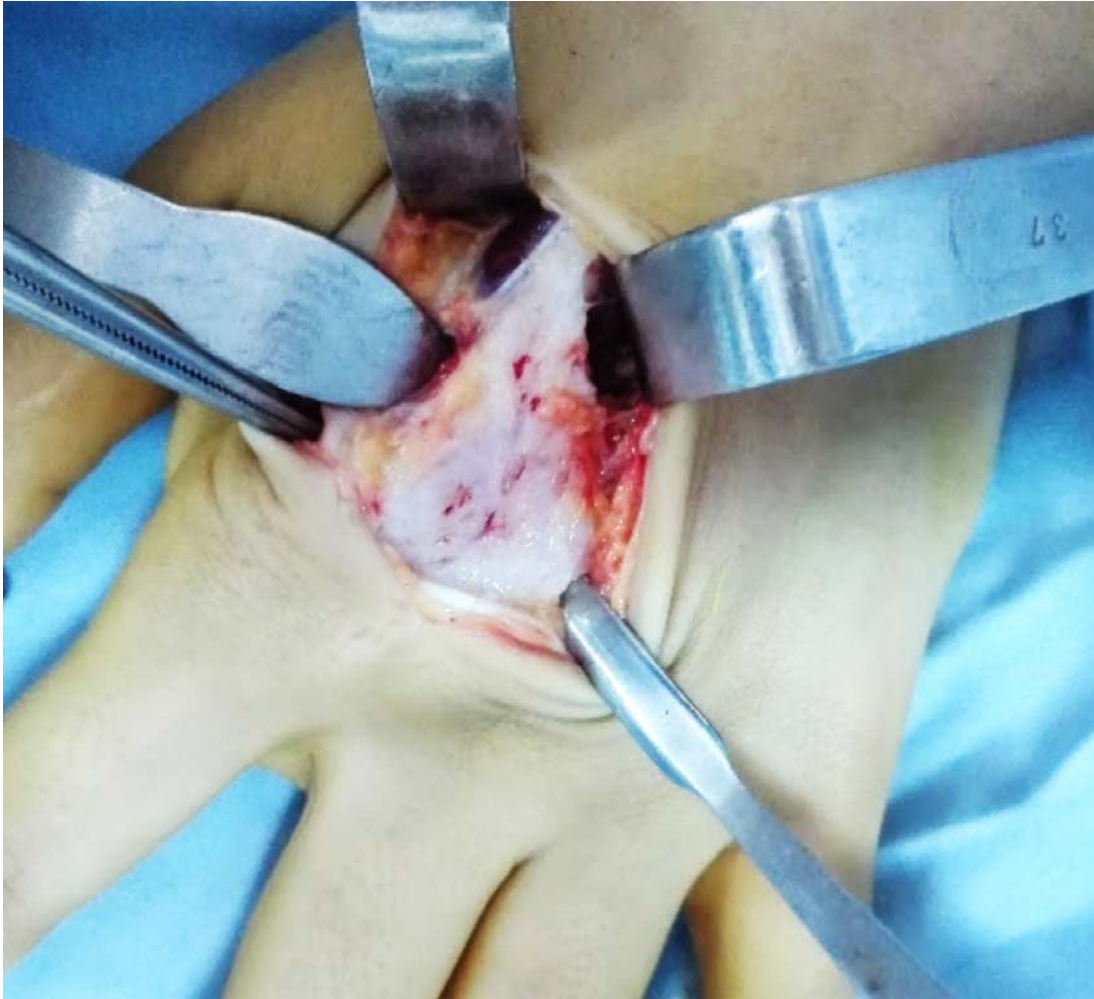


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57 **Figure 3:** MRI of the left hand showing the cartilage cap overlying the bony lesion,  
58 measuring 10 mm in thickness, with high signal intensity on T2 weighted images. A signal  
59 enhancement was present on the periphery after gadolinium administration.

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61 The patient underwent surgery under general anesthesia. The lesion was approached by a  
62 dorsal incision. The vascular elements and tendons were dissected and the lesion was  
63 exposed (Fig.4). We performed an excisional biopsy with an osteotomy (Fig.5). The void was  
64 curetted and rinsed using a saline solution.



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**Figure 4:** Intraoperative image showing the aspect of the lesion before excision.

UNDER



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69 **Figure 5:** Intraoperative image after performing an excisional biopsy with an osteotomy.

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71 Immediate post-operative radiographs of the left hand showed complete resection of the  
72 lesion. (Fig.6)

73 Histological examination confirmed the diagnosis of osteochondroma.

74 Healing was uneventful; the patient had a satisfactory recovery from surgery and a good  
75 range of motion of the metacarpo-phalangeal joint. She has been on regular follow-ups and  
76 she was satisfied with the result.

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**Figure 6:** Immediate post-operative X-rays of the left hand showing complete resection of the lesion.

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### 3. DISCUSSION

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Solitary osteochondroma is the most common primary bone tumor, usually developed in long bones, mainly localized on the lower femur and the upper tibia [1,2]. However, it develops exceptionally in the metacarpal bones. In a study of 1024 solitary osteochondromas, only 4 cases were situated in the metacarpal bones [3].

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Solitary osteochondromas of the hand are rare in children, usually seen as part of the multiple exostoses syndrome, and extremely rare in adults [2].

93 It's a benign bone tumor usually asymptomatic. Indeed, occurring pain and swelling are  
94 actually the symptoms of a fractured osteochondroma [4] which usually occurs around the  
95 knee and in pedunculated lesions. In contrast, large based osteochondromas (non-  
96 pedunculated lesions as in our case) should not be at risk of fracture.

97 Because of insufficient data, there are no established criteria to predict whether an  
98 osteochondroma will fracture or not [5].

99 Even though it is usually asymptomatic, a slight pain and swelling can occur in other sites  
100 (but the knee) because of the fact that osteochondroma can't bear loads [4] and because of  
101 the irritation of surrounding tissues.

102 X-ray is helpful for the primary diagnosis. For further investigations, CT-scan and MRI are  
103 equivalent for distinguishing the type of the bone tumor, its differential diagnosis and  
104 particularly for the measurement of the cartilage cap thickness with a better specificity with  
105 MRI [6].

106 Its differential diagnosis includes Nora's lesion, florid reactive periostitis and Turrent  
107 exostosis [7] but chondrosarcoma should also be suspected.

108 Nora's lesion or Bizarre Paraosteal Osteochondromatous Proliferation is a soft tissue  
109 ossified tumor with a typically absent medullary involvement [8].

110 Turrent exostosis develops following a trauma [6]. Florid reactive exostosis occurs also  
111 following a trauma but physical examination is characterized by the presence of  
112 swelling/pain and a periosteal reaction is found on radiologic findings.

113 Malignant degeneration is possible even though it is rare in the hand compared to pelvic and  
114 spinal location [6]. The prevalence of malignant transformation of benign osteochondromas  
115 varies from less than 1% for solitary tumors and 2-5% for hereditary multiple exostoses [9].

116 Ongoing growth and pain, after skeletal maturity has been reached, are suspicious for  
117 malignant degeneration.

118 Malignancy is also suspected if radiological images note the presence of radio-lucency, thick  
119 trabeculations, cortical destruction or irregularity, an encroachment of the soft tissue and  
120 adjacent elements, signal anomalies and if the cartilage cap thickness measures over 20  
121 mm [6].

122 In our case, these radiological criteria weren't found but ongoing growth and intermittent pain  
123 were noted.

124 Besides, it's important to notice that radiological investigations aren't a truly reliable method  
125 for identifying or excluding an osteochondroma due to the presence of equivocal findings.

126 Thus, surgical removal should be planned. Indeed, histological examination is essential and  
127 still necessary for the correct differential diagnosis of this disease.

128 Currently, complete resection is the treatment of choice for symptomatic solitary  
129 osteochondromas in adults. [2]

130 However, some authors suggest conservative treatment and observation with regular follow-  
131 ups for asymptomatic lesions [2].



132 Errani and al. [10] suggested avoiding surgical excision of osteochondromas in pediatric  
133 population specifically in long bones which can lead to angular and gross deformity. In short  
134 bones, such as the metacarpal, it is still controversial as long as only few cases have been  
135 reported.

136 Cartilage cap thickness of 2 cm or greater could be used as a good argument for  
137 recommending resection for malignant concerns [6].

138 Recurrence is possible and may be due to incomplete excision [7].

139 Complications are bone deformity, fractures, vasculo-nervous compression and malignant  
140 transformation which can be prevented by a complete excision of the lesion.

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#### 143 **4. CONCLUSION**

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145 In conclusion, osteochondromas are rarely located in the metacarpal bones. Proper  
146 radiologic investigation is necessary to aid the differential diagnosis and the surgical  
147 planning. MRI and CT scan are quite helpful for differential diagnosing and assessing the  
148 risk of malignant transformation. Current treatment for asymptomatic lesions is based on  
149 observation. In the others cases, surgical approach relying on osteotomy is recommended in  
150 order to prevent bone deformity, fracture and malignant degeneration.

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#### 154 **COMPETING INTERESTS**

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UNDER PEER REVIEW