Case Report

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Orthopaedics Section

Solitary Osteochondroma of the Distal Radius in a 17-Year-Old Female: A Rare Case Report

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ABSTRACT

Osteochondroma is the most common benign bone tumour, but its occurrence at the distal radius is rare. These tumours usually arise from the metaphyseal region of long bones such as the femur, tibia, and humerus, making distal radial involvement particularly uncommon. Here, a case of a 17-year-old female with a progressively enlarging, painless swelling over her dominant wrist is presented. Radiographs revealed a sessile bony outgrowth continuous with the cortex and medulla of the distal radius, and Magnetic Resonance Imaging (MRI) confirmed a cartilage-capped lesion without soft tissue extension. The mass, measuring 4.5×4.5×3 cm, was excised completely via a volar approach with base curettage and bone cementing. Histopathology confirmed the diagnosis of osteochondroma. Postoperative recovery was uneventful, and at six-month follow-up, the patient had full wrist function and no recurrence. This case highlights the importance of thorough radiological evaluation for accurate diagnosis and surgical planning. Distal radial osteochondromas are uncommon in adolescents, and reporting such cases adds to the limited global and regional literature. Complete excision provides excellent functional and cosmetic outcomes, emphasising the need for awareness of this rare presentation in clinical practice.

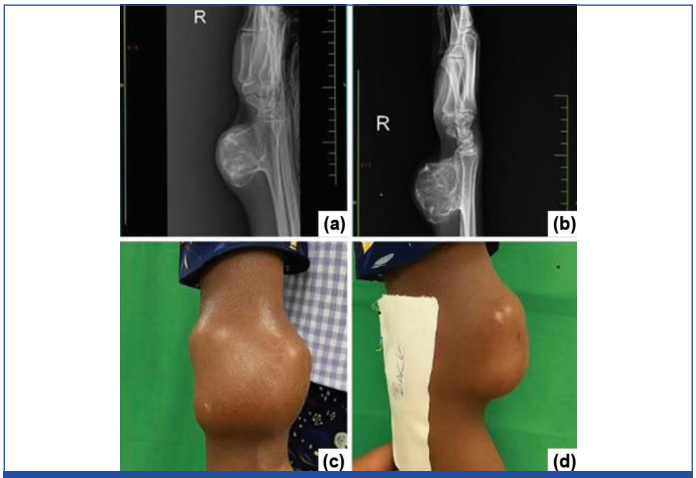
Keywords: Adolescent health, Bone neoplasms, Exostosis, Forearm, Orthopaedic surgery

CASE REPORT

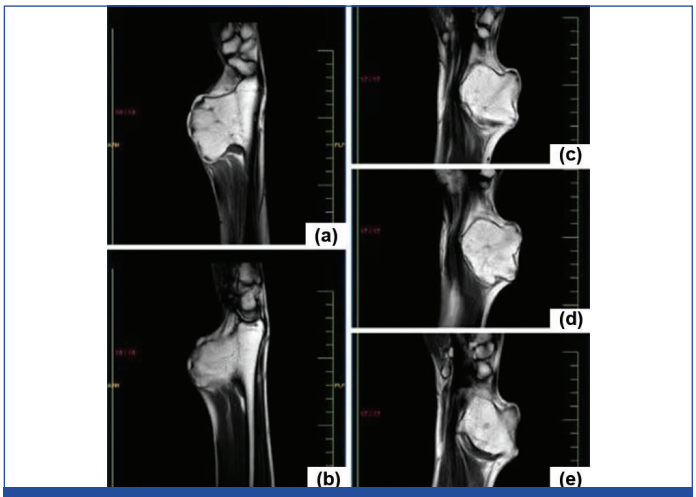
A 17-year-old right-handed female presented with a one-year history of a progressively enlarging, painless swelling over her right distal forearm. There was no history of trauma, constitutional symptoms, relevant medical illness, or family history of bone tumours. She had no significant habits. The swelling was causing cosmetic concern but no functional limitation.

On examination, there was a firm, immobile, non-tender mass over the volar aspect of the distal radius. The overlying skin was normal, wrist movements were preserved, and neurovascular status was intact. Systemic examination was unremarkable. A provisional diagnosis of a benign bony tumour was made. Differential diagnoses considered included osteochondroma, parosteal osteosarcoma, and enchondroma.

Plain radiographs demonstrated a sessile bony lesion continuous with the cortex and medulla of the distal radius [Table/Fig-1]. MRI revealed a 3.8 mm thin cartilage-capped exostosis without soft-tissue involvement. Based on imaging, a diagnosis of solitary osteochondroma of the distal radius was made [Table/Fig-2].



[Table/Fig-1]: Preoperative radiograph (a,b) and clinical image (c,d) showing a sessile bony lesion continuous with the cortex and medulla of the distal radius.

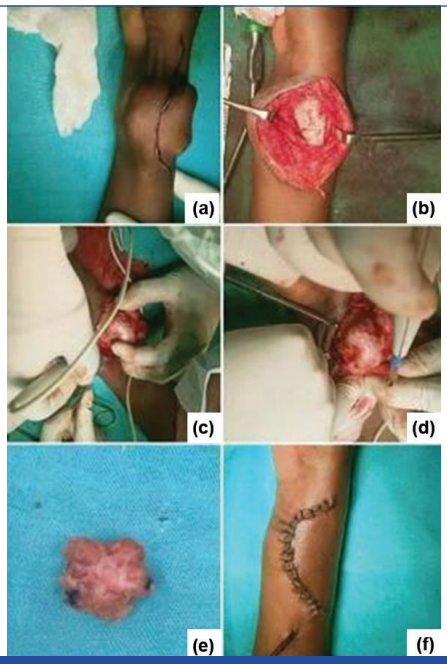


[Table/Fig-2]: MRI sagittal cut-section (a,b) and coronal cut-section (c-e) demonstrating a cartilage-capped osteochondroma without soft-tissue invasion.

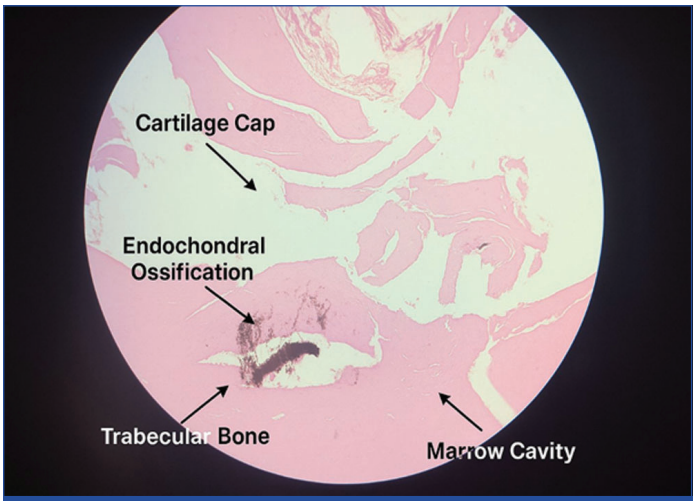
The patient underwent surgery under regional anesthesia. Through a volar approach, the lesion measuring 4.5×4.5×3 cm was excised completely, followed by curettage of the base. The defect was filled with a calcium phosphate bone substitute (HydroSet™, Stryker, Kalamazoo, MI, USA), and a surgical drain was placed, which was removed on the second postoperative day [Table/Fig-3].

Gross examination of the excised specimen revealed a lobulated, firm, pinkish white bony mass covered by a smooth, bluish-white cartilaginous cap. Histopathological examination was performed on Haematoxylin and Eosin (H&E) stained sections at 10x magnification. The slides showed a hyaline cartilage cap of variable thickness with orderly endochondral ossification at the base, merging with underlying trabecular bone. The chondrocytes within the cap were arranged in clusters and columns, without cytological atypia or pleomorphism. The marrow cavity of the lesion was continuous with the native medullary cavity and contained normal haematopoietic elements [Table/Fig-4]. There was no evidence of necrosis, irregular lobulation, or malignant transformation. All the histopathological findings were consistent with osteochondroma. An immediate

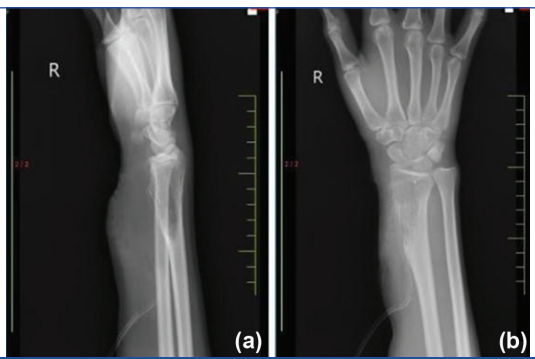
postoperative radiograph was done, showing complete excision of the bony tumour and a drain placed in situ [Table/Fig-5]. At the six-month follow-up, the patient was asymptomatic, with full wrist function and no recurrence.



[Table/Fig-3]: Intraoperative images showing: (a) pre operative clinical image of distal end radius; (b) Volar approach for careful dissection of skin and soft-tissues to reach osteochondroma; (c,d) Mass being dissected from surrounding soft-tissues; (e) Mass measuring 4.5×4.5×3 cm was sent for histopathological examination; (f) Closure completed in layers.



[Table/Fig-4]: Histopathological smear suggestive of the findings of osteochondroma, with the smear performed on Haematoxylin and Eosin (H&E) stained sections at 10x magnification, consistent with the findings of hyaline cartilage cap of variable thickness with orderly endochondral ossification at the base, merging with underlying trabecular bone. The chondrocytes within the cap were arranged in clusters and columns, without cytological atypia or pleomorphism. The marrow cavity of the lesion was continuous with the native medullary cavity and contained normal haematopoietic elements.



[Table/Fig-5a,b]: Immediate postoperative radiograph of right forearm with wrist anteroposterior and lateral view showing complete excision of tumour.

DISCUSSION

Osteochondroma is the most common benign bone tumour, accounting for 35-50% of benign bone lesions [1,2]. However, its occurrence in the distal radius is rare, representing less than 5% of cases [3]. Most distal radial lesions are associated with hereditary multiple exostoses [4], making solitary osteochondromas at this site even rarer. This patient presented with a solitary lesion in adolescence, consistent with reported trends that these tumours typically manifest during growth periods [1,2].

Several studies from India and worldwide have documented solitary distal radial osteochondromas presenting either as incidental findings or with complications such as deformity and compressive neuropathy [5-7]. In contrast, the patient presented only with cosmetic concerns, with no neurovascular compromise, deformity, or functional restriction, highlighting a relatively early and uncomplicated presentation.

Radiological evaluation, especially MRI, is considered crucial for assessing cartilage cap thickness and excluding malignant transformation [8,9]. Literature suggests that a cap thickness >2 cm or irregular margins are suspicious for malignancy [8]. In this case, MRI revealed a 3.8 mm thin, regular cartilage cap without soft tissue involvement, aligning with benign characteristics described in prior reports.

Surgical excision remains the treatment of choice in symptomatic, enlarging, or cosmetically concerning lesions [10,11]. Case reports by Ramaswamy R et al., and Jain R et al., described successful outcomes after complete excision of distal radial osteochondromas, like this case, where complete excision with base curettage provided excellent cosmetic and functional recovery [5,6]. The use of bone cement to fill the defect supported early mobilisation and may help prevent recurrence, like results reported in analyses of benign bone tumours and distal radius fractures with bone defect filling using calcium phosphate/sulphate cements [12].

Interestingly, other studies have documented distal radial osteochondromas causing carpal tunnel syndrome [13-16] or presenting in association with hereditary multiple exostoses [4]. Unlike these cases, the patient had no compressive symptoms or syndromic associations, reinforcing the variability in clinical presentation. The absence of recurrence at six months in this case is also consistent with earlier studies reporting low recurrence rates after complete excision [7,10,11].

Overall, findings in this case report support the literature that solitary distal radial osteochondromas, although rare, have excellent outcomes when managed with timely diagnosis and complete surgical removal. However, this case adds value by demonstrating a purely cosmetic presentation in an adolescent female without deformity or functional limitation, underscoring the importance of early recognition and surgical intervention.

CONCLUSION(S)

Solitary osteochondroma of the distal radius is an uncommon entity in adolescents. MRI-guided surgical planning, careful histopathological evaluation, and complete excision provide excellent outcomes. Thorough radiological evaluation is crucial for diagnosing rare presentations of osteochondroma and for planning safe and complete surgical excision. Long-term follow-up is advised to detect recurrence.

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