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Osteochondroma of the Maxilla: A Rare Case Report and Review of Literature

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ABSTRACT

Background: Osteochondroma is the most common benign bone tumor, typically found in long bones, but its occurrence in the craniofacial region is exceedingly rare. Maxillary involvement is particularly uncommon, with few reported cases in the literature.

Case Presentation: We report a 29-year-old male presenting with a painless intraoral swelling in the anterior maxilla associated with a previously endodontically treated tooth. Radiological evaluation revealed a periapical radiolucency with cortical breach, and complete surgical excision was performed. Histopathology confirmed osteochondroma with features of benign cartilage and endochondral ossification.

Conclusion: Osteochondroma in the maxilla is rare, often mimicking other odontogenic or non-odontogenic lesions. Early diagnosis, appropriate surgical excision, and histopathological confirmation are essential for optimal management and recurrence prevention

1. INTRODUCTION

Osteochondroma (exostosis, osteocartilaginous exostosis) is the most common benign bone tumor, representing **20–50% of benign bone tumors and 10–15% of all bone tumors**【1,2】. It is characterized by a cartilage-capped bony projection arising from the cortex, usually near the metaphysis of long bones such as the **distal femur, proximal tibia, and humerus**【1,3】. Most lesions are solitary, although they may also occur as part of **multiple hereditary exostoses (MHE)**, an autosomal dominant disorder associated with EXT1 and EXT2 gene mutations【8】.

The lesion is believed to originate from aberrant cartilage proliferation at the growth plate with subsequent **endochondral ossification**, resulting in continuity of cortical and medullary bone with the parent site【1,9】. Although most osteochondromas present during the first three decades of life, they are often discovered incidentally or due to complications such as pain, deformity, neurovascular impingement, or pathological fracture【2,3】.

Craniofacial osteochondromas are rare, accounting for less than 1% of reported cases【4】. When present, they most frequently involve the **mandibular condyle and coronoid process**, sites where secondary cartilage persists during growth【5,6】. Condylar osteochondromas may cause progressive **facial asymmetry, malocclusion, and temporomandibular joint dysfunction**, whereas coronoid process lesions are often associated with **restricted mouth opening** due to impingement on the zygomatic arch, a condition termed *Jacob's disease*【5,6,12】.

In contrast, **maxillary osteochondroma is exceptionally rare**, with only sporadic cases reported in the literature【7,13】. The rarity and non-specific clinical features pose significant diagnostic challenges, as such lesions may mimic **odontogenic tumors, fibro-osseous lesions, periapical inflammatory pathology, or reactive bony proliferations**【7】. Radiographically, diagnosis is aided by the demonstration of cortical and medullary continuity of the lesion with adjacent

bone, but overlapping anatomical structures in the maxilla often obscure these findings【2,14】.

Histologically, osteochondroma demonstrates a **cartilage cap undergoing endochondral ossification** with underlying trabecular bone continuous with the host medullary bone【1,7】. Complete surgical excision including the cartilage cap is considered the treatment of choice. Prognosis is excellent, with recurrence being rare provided excision is adequate【9,10】. Although rare, malignant transformation into secondary chondrosarcoma may occur in **<2% of solitary lesions and 5–25% of cases with MHE**【8,10】.

Herein, we present a **rare case of osteochondroma of the anterior maxilla** in a young adult male, with emphasis on the clinical, radiological, surgical, and histopathological features, supplemented by a comprehensive review of the available literature

2. CASE REPORT

A 29-year-old male reported to the Department of Oral and Maxillofacial Surgery with a **chief complaint of swelling and discoloration in the upper front tooth region for 1 month**.

1) Pre-operative Preparation

Diagnosis confirmed through OPG, CBCT, and histopathology correlation showing lesion arising in relation to tooth 11 with buccal cortical breach.

Consent obtained, explaining rare nature of maxillary osteochondroma, need for complete excision including cartilage cap, and risks such as bleeding, flap tear, transient labial mucosal paresthesia, or devitalization of adjacent teeth.

Medications: Patient given prophylactic antibiotics and analgesic pre-loading. Antiseptic mouth rinse (0.12% chlorhexidine) administered 10 minutes before incision.

Setup: Sterile preparation with povidone-iodine extraorally and chlorhexidine intraorally. Instruments arranged including scalpel with No.15 blade, Molt elevator, Minnesota retractor, Lucas 86 curette, round bur with handpiece, saline irrigation, and 3-0 silk sutures.

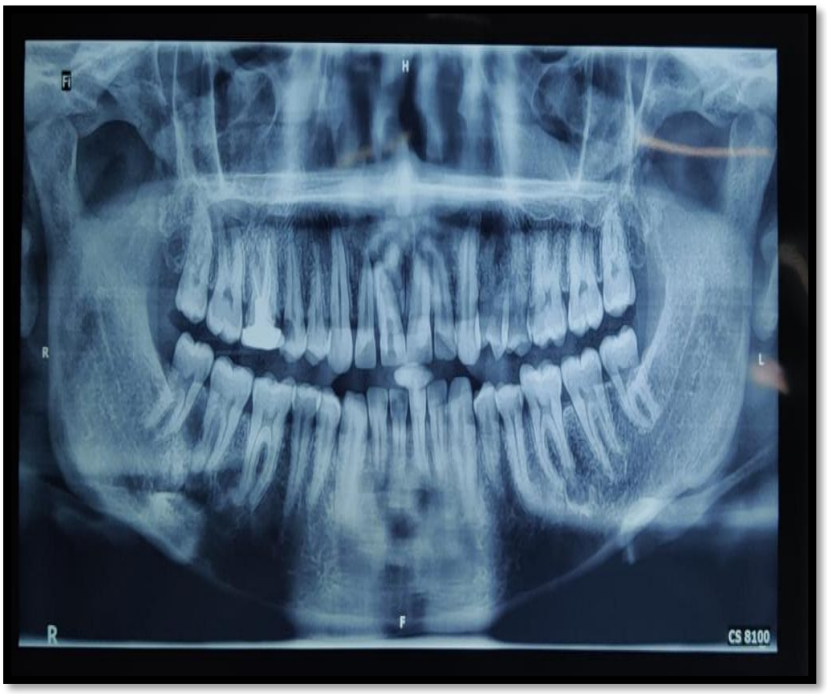

Fig.1 represnts the Preoperative Radiographic investigation [OPG]

Fig.2 Represents the CBCT investigation done preoperatively seen in A and B

2) Anaesthesia

Local anesthesia with vasoconstrictor administered by buccal infiltration from 11–13 region and palatal infiltration near cervical areas of the same teeth.

Supplementary nasopalatine block given near incisive papilla for complete anesthesia.

Adequate blanching and numbness confirmed before incision.

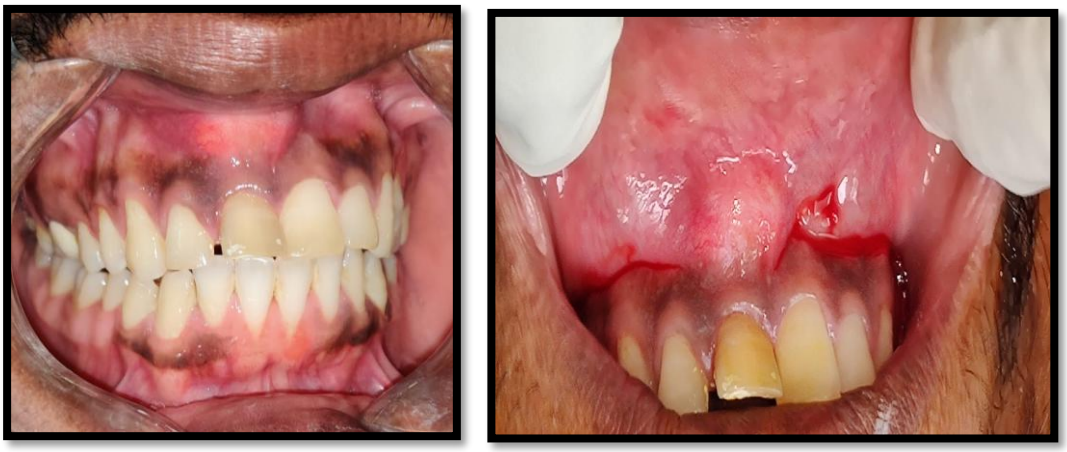

fig.3. Represents Pre Operative Intraoral Photograph

3) Incision Design

A trapezoidal mucoperiosteal flap was designed extending from tooth 11 to 13.

Sulcular incision made along cervical margins of 11–13, with vertical releasing incisions placed at the distal line angles of 11 and 13.

A No.15 blade was used, preserving interdental papilla for optimal esthetic healing.

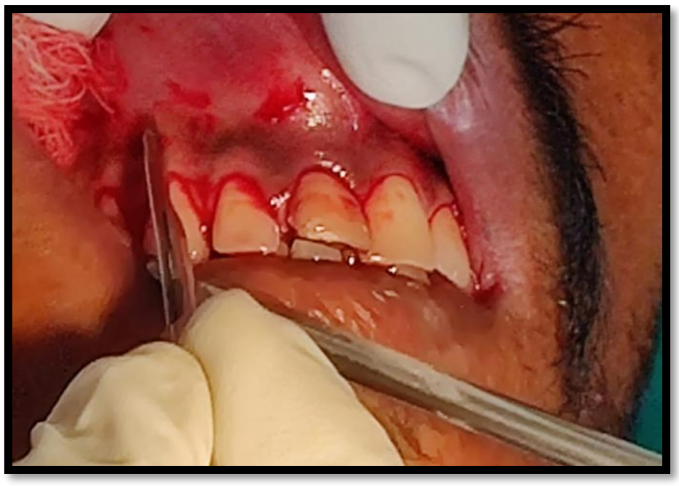

Fig.4 Represents the Vertical releasing Incision.

4) Flap Elevation

Using a Molt 9 elevator, the flap was raised as a full-thickness mucoperiosteal flap.

Gentle reflection was done to expose the periapical region while protecting tissues with a Minnesota retractor.

Flap was elevated sufficiently to visualize cortical breach overlying the lesion.

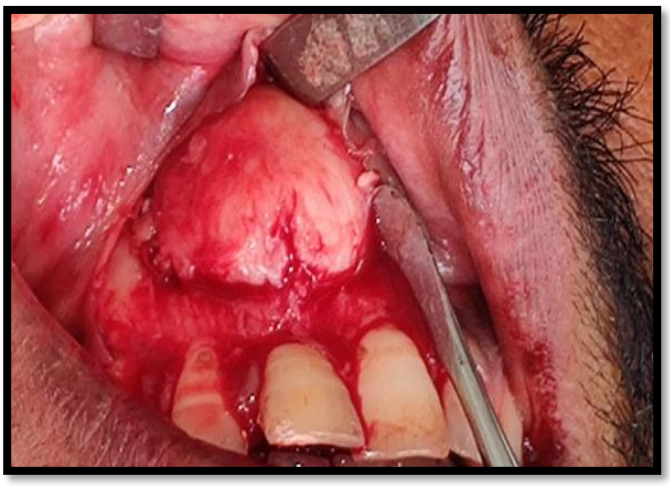

Fig.5 Represents the Flap elevation

5) Exposure & Cortical Access

Buccal cortical thinning and breach were identified corresponding to the CBCT findings.

The bony window was gently enlarged with a round bur under sterile saline irrigation to gain access to the lesion, keeping safe distance from the roots of 11–13.

6) Lesion Identification & Dissection

A firm bony-cartilaginous mass was visualized. The surface showed features suggestive of cartilage-cap origin.

Using a periosteal elevator and fine curette, the lesion's margins were delineated circumferentially from the host bone.

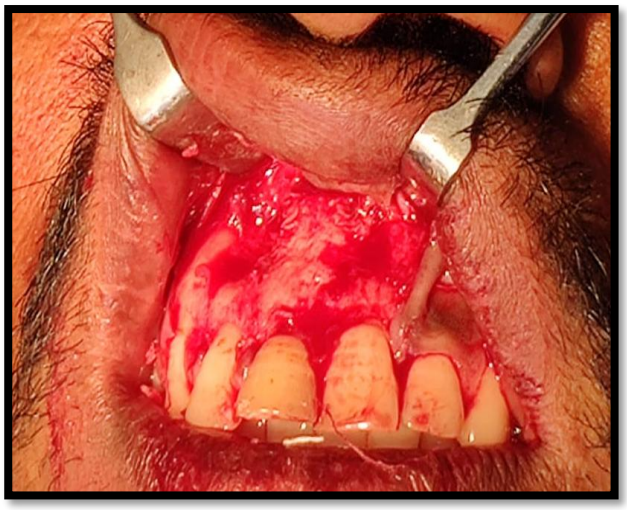

Fig.6. Represents Exposure cortical access and irrigation.

7) Excision of Lesion

The lesion was excised en bloc using surgical curettes and osteotome.

The cut was made flush with host bone at its base to ensure removal of the entire cartilage cap and avoid recurrence.

The mass was carefully handled to prevent fragmentation, and orientation was preserved for histopathology.

8) Curettage & Peripheral Ostectomy

After excision, the cavity was curetted thoroughly with a Lucas 86 curette to remove residual fibrocartilaginous tissue.

Peripheral ostectomy was performed with a round bur until pinpoint osseous bleeding ("paprika sign") confirmed adequate margin clearance.

9) Hemostasis

Copious saline irrigation carried out to clear debris.

Minor oozing controlled with gauze pressure; no major bleeding encountered.

10) Final Irrigation

Cavity was irrigated with combination of betadine + normal saline + metronidazole solution, followed by plain saline to minimize cytotoxicity.

11) Closure

The mucoperiosteal flap was re-approximated without tension.

Interrupted 3-0 silk sutures were placed at the vertical releases and along the crestal incision for primary closure.

Hemostasis confirmed before patient was dismissed.

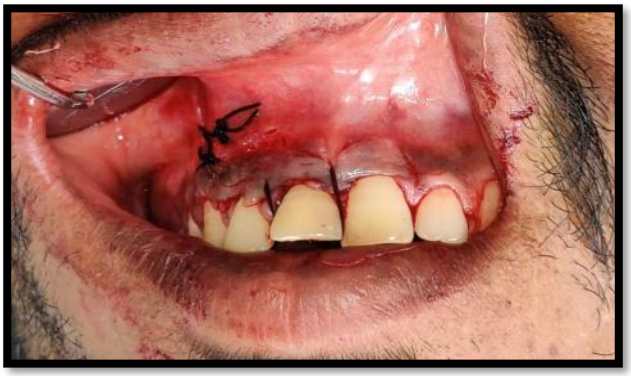

Fig. 7 .Interupted sutures 3-0 given.

12) Specimen Handling

Excised specimen placed in 10% neutral buffered formalin and labeled with patient details (site: 11–13 anterior maxilla).

Histopathological requisition included query for osteochondroma with specific request for evaluation of cartilage cap and endochondral ossification.

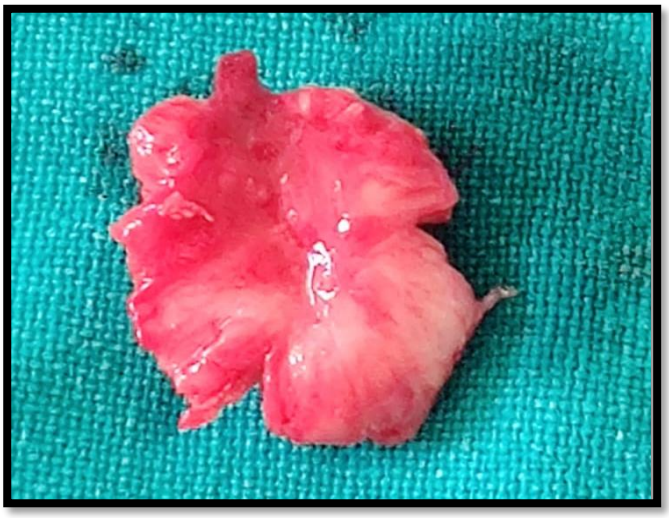

Fig.8 Represents Excised specimen.

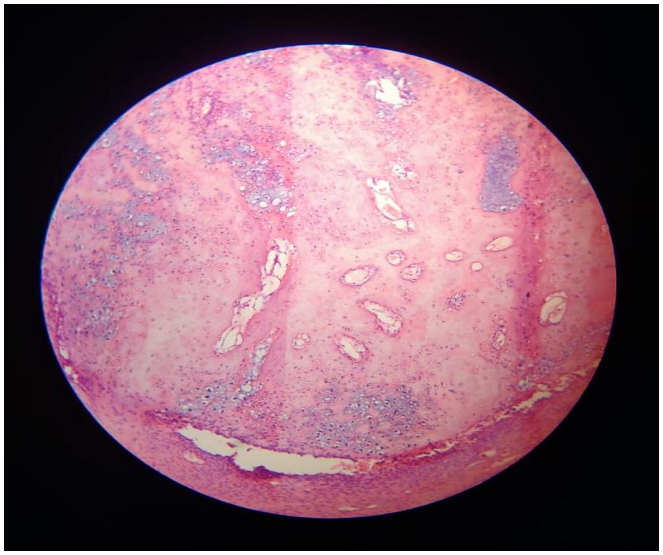

Fig.9.Represents the Histopathological evaluation.

13) Immediate Post-operative Care

Cold compression advised for the first 6 hours in intermittent cycles.

Prescribed analgesics and antibiotics.

Patient instructed to avoid brushing in surgical area for 24 h, resume with soft brush thereafter, and use chlorhexidine mouthwash twice daily for 1 week.

Advised soft, cool diet for 48 h, avoidance of hot/spicy foods, and to refrain from smoking or forceful spitting.

14) Follow-up

Day 7: Sutures removed; healing was satisfactory.

1 month: Soft-tissue maturation evident; no residual swelling or tenderness.

3–6 months: CBCT showed satisfactory bone fill with no recurrence.

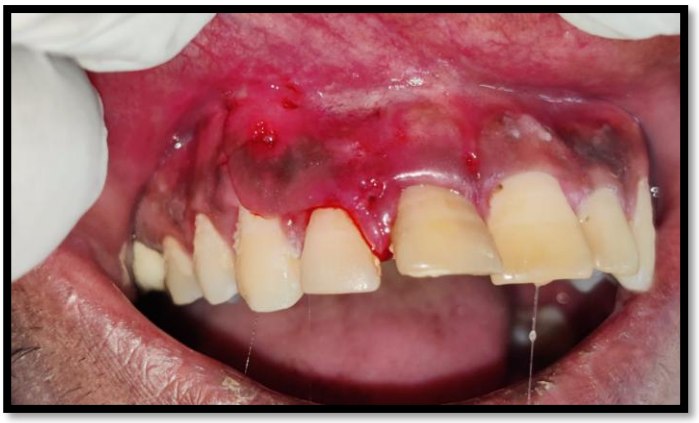

Fig. 10 Represents the post operative follow up after 7 days.

3. DISCUSSION

Osteochondroma represents the most frequent benign bone tumor, but its occurrence in the craniofacial skeleton remains exceptionally rare. The lesion arises due to aberrant cartilage proliferation at the growth plate, with subsequent endochondral ossification forming a cartilage-capped exostosis continuous with underlying cortical and medullary bone【16】. The exact pathogenesis remains debated, with proposed mechanisms including a developmental anomaly, reactive hyperplasia secondary to trauma or irritation, or a true neoplastic process driven by genetic and molecular alterations【19】.

4. CRANIOFACIAL PRESENTATION

While the metaphyseal regions of long bones such as the distal femur and proximal tibia account for the vast majority of osteochondromas, craniofacial involvement is distinctly uncommon. Within the maxillofacial skeleton, the **mandibular condyle** is the most frequently affected site, leading to progressive facial asymmetry, occlusal derangement, and temporomandibular joint dysfunction【11,18】. Osteochondromas of the **coronoid process** are also documented and are classically associated with Jacob's disease, manifesting as progressive restriction in mouth opening due to impingement against the zygomatic arch【12】.

In contrast, **maxillary osteochondroma is exceedingly rare**, with fewer than 30 well-documented cases in the English literature【13】. Its scarcity often leads to diagnostic confusion with odontogenic and non-odontogenic lesions such as osteoma, ossifying fibroma, or periapical inflammatory pathology, as occurred in our case.

5. RADIOGRAPHIC FEATURES

The hallmark radiographic appearance of osteochondroma is continuity of the cortical and medullary bone of the lesion with that of the host bone【14】. However, in the maxilla, overlapping anatomic structures may obscure these features. In the present case, CBCT revealed a periapical hypodensity with cortical breach, initially mimicking periapical pathology of tooth 11. This reinforces the importance of cross-sectional imaging for accurate diagnosis, as conventional periapical or panoramic radiographs may be misleading. White and Pharoah【15】 highlight CBCT as an indispensable modality in differentiating exostotic lesions in complex maxillofacial regions.

6. HISTOPATHOLOGY

The diagnostic confirmation of osteochondroma lies in histopathology. Microscopically, the lesion demonstrates a **cartilage cap** undergoing endochondral ossification, with the trabecular bone beneath showing continuity with the medullary bone of the parent site【16,17】. In the present case, biopsy confirmed benign cartilage with endochondral ossification, consistent with classical descriptions.

7. MANAGEMENT

Surgical excision remains the gold standard for solitary osteochondroma. The surgical principle is complete resection including the cartilage cap, as residual cartilaginous tissue is implicated in recurrence【13,18】. Our patient underwent intraoral excision with peripheral ostectomy and curettage of surrounding bone to ensure clearance. Long-term prognosis is excellent for solitary lesions; however, malignant transformation into secondary chondrosarcoma has been reported in <2% of solitary osteochondromas and in up to 25% of hereditary multiple exostoses【19,20】. Accordingly, careful long-term follow-up is warranted.

8. LITERATURE REVIEW

Review of literature indicates that **osteochondroma of the maxilla is an extreme rarity**. Pogrel et al.【13】 described one of the earliest maxillary cases, emphasizing the diagnostic confusion with odontogenic lesions. Subsequent reports by Yamamoto et al.【18】 and Lee et al.【11】 demonstrated condylar osteochondromas producing significant functional and esthetic impairment, highlighting that site of involvement strongly dictates clinical presentation. In contrast, our case presented merely as a painless swelling in the anterior maxilla, underscoring the heterogeneity of symptoms.

Garrison et al. and Porter & Simpson【19】 further stressed the importance of excising the entire cartilage cap to prevent recurrence or malignant transformation. Ahmed【20】 described rare instances of secondary chondrosarcoma developing from longstanding osteochondroma, reinforcing the need for vigilant follow-up even in apparently benign lesions.

Taken together, the literature supports that although osteochondroma is a common benign tumor of the appendicular skeleton, **intraoral and maxillary lesions represent a true diagnostic challenge**, requiring integration of advanced imaging, histopathology, and meticulous surgical excision for optimal outcomes.

9. CONCLUSION

Maxillary osteochondroma is an extremely rare entity that should be considered in the differential diagnosis of periapical and intraoral bony swellings. CBCT and histopathology remain pivotal for definitive diagnosis. Complete surgical excision yields excellent prognosis, though vigilant follow-up is warranted due to risk of recurrence or rare malignant transformation.

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