

## Case report

## Central compact osteoma of mandibular condyle

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**SUMMARY**

Osteomas are bone tumours arising from the cortical or medullary bones of craniofacial skeleton. Involvement of frontal bone and paranasal sinuses is more frequent than jaw bones. Jaw osteomas are slow growing benign lesions, which are usually asymptomatic or present as painless swelling. Those involving mandibular condyle are relatively rare and result in significant functional and aesthetic disturbances. This paper reports a case of solitary central compact osteoma of mandibular condyle in an adult Indian female patient. A comprehensive review of previously published reports is also presented.

**BACKGROUND**

Osteomas are rare benign bone neoplasm characterised by abnormal proliferation of mature bone, which can be compact or cancellous in nature. They may arise from the cortical bone and are called peripheral osteoma. While those developing from the endosteal bone are termed as central osteoma.<sup>1</sup> Multiple osteomas are present as a part of Gardner's syndrome. Non-syndromic cases are usually isolated and are called solitary osteomas.

Osteomas are invariably restricted to craniofacial bones, and commonly involve the paranasal sinuses and jaw bone. Mandible is more frequently involved than maxilla. In mandible, the most common sites are the angle and lower border.<sup>1</sup> Osteoma of mandibular condyle is relatively rare and was first reported by Ivy.<sup>2</sup> Although jaw osteomas are slow growing benign lesions, those involving the condyle often produce significant functional and aesthetic disturbances. The purpose of this paper is to report a case of solitary central compact osteoma involving the mandibular condyle in an elderly Indian woman. The lesion presented as bony hard painless swelling in preauricular area, causing reduced mouth opening. The paper also presents a comprehensive review of English literature to identify 28 previously reported cases of osteoma of condyle and discuss them in relation to our experience.

**CASE PRESENTATION**

A 65-year-old Indian woman presented to maxillofacial surgery clinic with chief complaint of progressive inability to open mouth since past 4 years. No history of trauma to face, ear infection or other systemic disease was reported. On extra-oral examination, a localised swelling over the right preauricular region measuring about 2.5 cm was noticed (figure 1A). The swelling was non-tender and bony hard in consistency. The overlying skin was normal and pinchable over the lesion. There

was no temporomandibular joint movement bilaterally on palpation. Mouth opening was significantly restricted with maximum interincisal opening of 3 mm (figure 1B). Intraoral examination showed poor oral hygiene with multiple periodontally involved teeth. Orthopantomogram revealed a well-defined round homogeneous radiopaque mass involving right condyle (figure 2A). Sectional CT of the right condyle showed complete replacement of the condyle anatomy with a hyperdense oval mass measuring 3×2.5 cm (figure 2B). The normal trabecular pattern was replaced with sclerotic bone.

**DIFFERENTIAL DIAGNOSIS**

Based on the history, clinical features and radiological finding, a working diagnosis of central osteoma of condyle was made.

**TREATMENT**

Condylectomy for removal of the pathology was carried out under general anaesthesia, using preauricular approach. The excised lesion was submitted for histological evaluation. Microscopic study of the specimen showed mature lamellar compact bone with scanty marrow spaces (figure 3). Based on the clinical presentation, imaging characteristics and histological findings, a final diagnosis of solitary central compact osteoma of mandibular condyle was established.

**OUTCOME AND FOLLOW-UP**

Due to the financial constraint, prosthetic joint was not chosen for reconstruction. Postoperatively, the patient was put on arch bar with guiding elastics to correct the deviation on mouth opening and stabilise the occlusion. Period of active physiotherapy and traction guided occlusion was followed for 3 months following with the patient showed stable occlusion and mouth opening. Presently the patient is kept on routine long-term follow-up protocol.

**DISCUSSION**

Osteomas are benign osteogenic lesion characterised by formation of mature bone. It almost exclusively involves craniofacial skeleton, with frontal bone and paranasal sinus being the preferred sites. Other bones involved include the temporal bone, orbit, external auditory canal pterygoid bone and jaw.<sup>3</sup> Osteoma of the mandibular condyle has been infrequently reported. Search of English literature from PubMed database, using terms osteoma, solitary, mandible and condyle, revealed 11 titles. References of these papers were comprehensively evaluated and a total of 28 papers (31 cases) of



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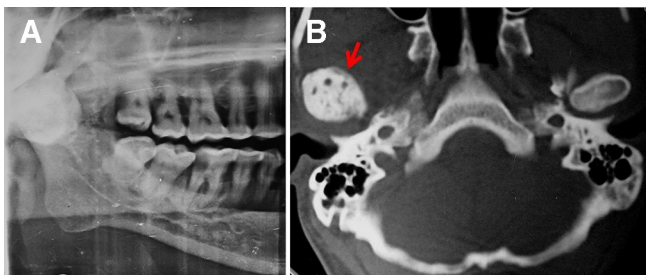


**Figure 1** Photograph showing localised preauricular swelling (A) and restricted mouth opening (B).

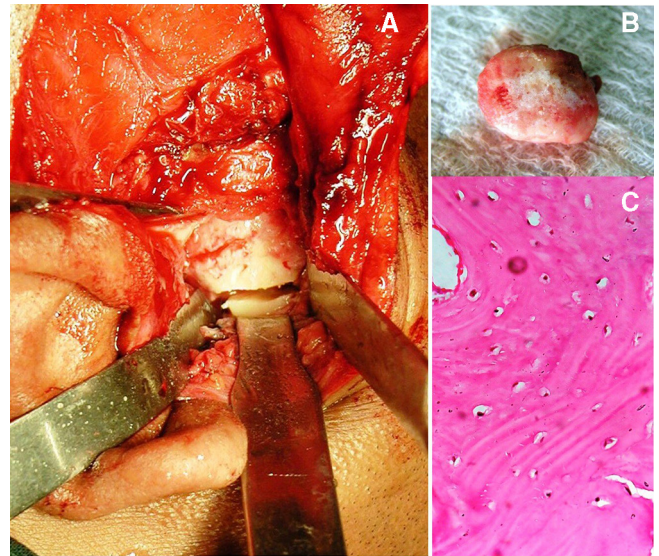
osteoma of mandibular condyle were identified. These papers were reviewed for demographic details, aetiology, clinical presentation, location, type, histological characteristic and treatment provided (table 1).<sup>24-30</sup>

Three theories have been proposed to explain the pathogenesis of osteoma, developmental, neoplastic and reactive.<sup>31</sup> The developmental theory suggests osteoma to be a developmental anomaly or an end stage of a hamartomatous process like fibrous dysplasia. However, it is unlikely that osteomas are developmental disorder as it is rarely seen in young age group. In the review of cases of condylar osteoma, the mean age was 38.67, with youngest individual being 19 years of age.<sup>18</sup> Males were more frequently affected than females in ratio of 2:1. Although osteomas are largely considered to be benign neoplasm, some authors believe it to be a reactive response to trauma or infection. Trauma as a precursor to the pathology is supported by the fact that in mandible, the most common sites are the angle and lower border which are susceptible to injury. Condyle is another region, which is exposed to trauma from direct injury or an indirect blow at chin or body of mandible. Positive history of trauma was reported in 4 out of 29 cases of osteoma of condyle (13.78%). No history of trauma could be elicited in the present case. Although the association of trauma with osteoma of condyle appears to be low, it can be due to the fact that it was ignored during history recording or the event may not be significant to be remembered by the patient, giving a false negative result. The location of mandibular osteomas in proximity to areas of muscle attachment, that is, masseter and medial pterygoid (lower border and angle of mandible) suggests that muscle traction along with trauma may play a role in its development. Condyle is susceptible to injury and is under traction of lateral pterygoid muscle, which may be the underlying factor for development of osteoma in this region. Some of the reported cases suggest that middle ear infection may stimulate an inflammatory hyperplasia and overgrowth of the condyle.<sup>13</sup>

Osteomas are slow growing lesion. It may be an incidental finding on radiograph or present as asymptomatic swelling.



**Figure 2** Orthopantomogram showing radiopaque lesion involving right condyle (A); CT revealing the hyperdense lesion replacing the condylar head (arrow head) (B).



**Figure 3** Intraoperative image showing exposure of lesion with preauricular incision and osteotomy cut placed for condylectomy (A), excised mass (B). Photomicrograph showing dense compact bone with osteocytes ( $\times 40$  magnification) (C).

Symptoms depend on the site involved. Osteomas of paranasal sinus cause sinusitis, headache and ophthalmological manifestations.<sup>23</sup> Unlike mandibular osteoma which is asymptomatic or causes painless swelling, those involving condyle cause noticeable functional and aesthetic disturbances. The clinical features include preauricular swelling, restriction or inability of mouth opening, malocclusion and mandibular prognathism with deviation of chin to the contralateral side. Reduced mouth opening with localised bony swelling in preauricular area was the presenting features of the current case. However, no occlusal discrepancy was noted.

Osteoma may arise from the medullary bone (central type). As the lesion grows the proliferating mass almost entirely replaces the normal anatomy of condyle. Whereas peripheral osteoma presents as localised pedunculated or mushroom like projections for the cortex. Peripheral osteomas of condyle (76%) are almost three times more common than the central variant (24%). Condyle head is by far most commonly involved site, followed by neck, sigmoid notch and ascending ramus. Left condyle was more frequently affected (70% cases). The size of lesion ranged from 18 to 50 mm. In the present case, the right condyle was entirely replaced by central lesion forming an oval radiodense mass measuring 30mm. Although bone scan is not indicated in every case, when performed it helps to study the physiologic activity of osteoma. It determines whether it is a long-standing lesion with no further growth potential or actively growing mass. Bone scintigraphy performed to evaluate condylar osteoma by Sayan *et al* and Siar *et al* showed increased uptake of technetium (<sup>99m</sup>Tc) radioisotope at the involved site.<sup>16 17</sup> Histologically osteoma is composed of mature lamellar bone with minimal marrow space (compact osteoma) or with fibrofatty marrow tissue (cancellous osteoma). Microscopic study of the present case showed compact bone having mature lamellae with scanty marrow. Nine of the previously reported case of condylar osteoma was compact while seven were cancellous in nature.

Management of craniofacial osteoma is indicated only for large symptomatic lesions. Osteoma involving condyle produces functional and morphological changes in temporomandibular joint early in its development, leading to progressive shift of occlusion

**Table 1** Review of solitary osteoma involving condyle

No	Author; year	Country	Age/sex	Trauma history	Clinical presentation	Side	Location	Type	Size (mm)	Pathological variant	Treatment
1	Ivy; 1927 <sup>2</sup>	USA	35/F	–	Swelling, deviation of the chin, malocclusion.	Right	Condyle head	NA	30	NA	Condylectomy
	Case 1										
	Case 2	USA	27/F		Facial asymmetry, malocclusion	Left	Condyle head	NA	NA	NA	Condylectomy
2	Worman; 1946 <sup>4</sup>	NA	24/F		Inability to open mouth, malocclusion	Left	Condyle head	C	30	Ca	Condylectomy
3	Miles; 1951 <sup>5</sup>	NA	40/F	NA	Swelling	Left	Condyle head	NA	NA	Co	NA
4	Thoma; 1954 <sup>6</sup>	USA	37/M	NA	Swelling, facial asymmetry, pain, difficulty in opening mouth	Left	Condyle head	C	40	Ca	Condylectomy
5	Nelson; 1972 <sup>7</sup>	NA	49/M	+	Swelling	Right	Anteromedial aspect of condyle	P	30	Co	Excision
6	MacLennan; 1974 <sup>8</sup>	UK	31/F	–	Pain, swelling, facial asymmetry, deviation of jaw, malocclusion.	Left	Subcondyle and vertical ramus	P	50	Co	Subcondylectomy
7	Nwoku; 1974 <sup>9</sup>	Germany	34/F	NA	Facial asymmetry, malocclusion	Right	Condyle head	NA	NA	NA	Subcondylectomy
8	Wang-Norderud; 1976 <sup>10</sup>	Egypt	35/M	–	Facial asymmetry, mandibular prognathism	Left	Anteromedial aspect of condyle	P	40	Ca	Condylectomy
9	Weinberg; 1977 <sup>11</sup>	NA	31/M	–	Malocclusion	Left	Condyle head	NA	30	Ca	Condylectomy
10	Seymour; 1981 <sup>12</sup>	UK	70/M	NA	Difficulty in eating, facial asymmetry, deviation of chin	Right	Condyle head	NA	NA	NA	Excision
11	Papavasiliou; 1983 <sup>13</sup>	UK	74/F	–	Severe pain, trismus, preauricular swelling	Left	Condyle head and neck	P	18	Co	Condylectomy
12	Bessho; 1987 <sup>14</sup>	Japan	26/M	+	Painless swelling	Right	Mandibular notch	P	34	Co	Excision
13	Kondoh; 1998 <sup>15</sup>	Japan	40/M	NA	Malocclusion, facial asymmetry, difficulty in opening mouth	Left	Medial pole of condyle	P	40	Co	Excision
14	Sayan; 2002 <sup>16</sup>	Turkey	NA/F	NA	NA	Left	Condyle head	P	Na	NA	NA
15	Siar; 2004 <sup>17</sup>	Malaysia	32/F	NA	Progressive painless restriction of mouth opening	Left	Neck of condyle	P	48	Ca	Condylectomy
16	Mancini; 2005 <sup>18</sup>	Brazil	19/M	NA	Facial asymmetry, chin deviation, malocclusion	Right	Condyle head	NA	28	Co	Condylectomy
17	Ortakoğlu; 2005 <sup>19</sup>	Turkey	22/M	NA	Mandibular deviation, malocclusion	NA	NA	NA	NA	NA	Condylectomy
18	Woldenberg; 2005 <sup>20</sup>	Israel	46/F	NA	Pain	Left	Condyle, coronoid notch, ascending ramus	P	25	NA	NA
19	Yonezu; 2007 <sup>21</sup>	Japan	50/M	NA	Diffuse swelling, pain, limited mouth opening	Left	Lateral surface of condyle head	P	NA	Ca	Excision
20	Cogburn; 2008 <sup>22</sup>	USA	22/M	–	Malocclusion, trismus, inability to chew	Left	Anterior surface of condyle	P	NA	NA	Endoscopic excision and recontouring

Continued

Table 1 Continued

No	Author; year	Country	Age/sex	Trauma history	Clinical presentation	Side	Location	Type	Size (mm)	Pathological variant	Treatment
21	Nah; 2011 <sup>23</sup>										
	Case 1	Korea	29/F	NA	NA	NA	Anterior surface of condyle head	P	NA	NA	NA
	Case 2	Korea	44/F	NA	Difficulty in chewing	Left	Anterior surface of condyle head	p	NA	NA	NA
	Case 3	Korea	56/F	NA	Difficulty in chewing	Left	Anterior surface of condyle head	p	NA	NA	NA
22	Chaurasia; 2012 <sup>24</sup>	India	45/F	NA	Swelling, facial asymmetry	Left	Condyle neck	P	22	NA	Conservative
23	Misra; 2013 <sup>25</sup>	India	22/M	–	Difficulty in mouth opening	Left	Condyle, sigmoid notch, glenoid fossa	C	32	Co	Condylectomy
24	Kashid; 2013 <sup>26</sup>	India	48/M	NA	Deviation of jaw, inability to chew, altered occlusion, facial asymmetry, swelling	Left	Anteromedial aspect of condyle	P	NA	Ca	Condylectomy
25	Rajshekar <i>et al</i> ; 2015 <sup>27</sup>	India	35/M	+	Reduced mouth opening,	Right	Condyle head	C	30	NA	Condylectomy
26	Zafar; 2016 <sup>28</sup>	Pakistan	60/M	–	Pain on mastication, deviation of lower jaw, facial asymmetry, malocclusion	Right	Condyle head	C	30	Co	Condylectomy
27	de Souza; 2017 <sup>29</sup>	Brazil	67/F	–	Pain. Limited mouth opening, aesthetic disturbance	Right	Condyle head	C	20	Co	Condylectomy with TMJ reconstruction
28	Ostrosky 2019 <sup>30</sup>	South Africa	60/M	+	Deviated opening, facial asymmetry	Left	Medial condyle pole	C	30	Ca	Condylectomy with TMJ reconstruction

–, negative history of trauma; +, positive history of trauma; C, central; Ca, cancellous; Co, cortical; F, female; M, male; NA, data not available; P, peripheral; TMJ, temporomandibular joint.

with deviation of mandible to unaffected side. Large lesion leads to mechanical restriction of normal joint movements, resulting in trismus and pain. Surgical intervention is commonly indicated for condylar osteoma to relieve the symptoms and prevent its progression. Condylectomy and surgical excision of the bony mass are the two most commonly reported procedures. Use of costochondral graft for reconstruction after resection of osteoma was reported in young patient by Mancini *et al*.<sup>18</sup> Preauricular incision with its modifications is the approach of choice to surgically access the pathology. Cogburn *et al* performed excision of

osteoma with recontouring of condyle using endoscopy assisted intraoral approach, thus avoiding preauricular scar.<sup>22</sup>

Osteoma of mandibular condyle is rare bony pathology commonly seen in adults. Unlike craniofacial osteoma, these lesions frequently cause functional and aesthetic disturbance. As the mass grows, it results in progressive restriction of mouth opening and should be considered as possible cause of trismus. Condyle head is most preferred site, with peripheral variant arising from the cortical bone being more common. Condylectomy or surgical excision of the mass in the most commonly reported treatment.

### Learning points

- ▶ Osteomas are benign bone tumours, which arise either from the cortex or medulla. In head and neck region, it frequently involves frontal bone and paranasal sinuses.
- ▶ Those involving mandibular condyle are relatively rare and result in significant functional and aesthetic disturbances.
- ▶ This paper describes a case of solitary central compact osteoma of mandible condyle with its management.
- ▶ A comprehensive review of English literature for osteoma of mandible condyle in terms of demographic details, aetiology, clinical presentation, location, type, histological characteristic and treatment provided is discussed.

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