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Bifid Mandibular Condyles: Report of Four Cases

Abstract: Anatomic variations in the condylar morphology, like bifid mandibular condyles, are a relatively uncommon anomaly. We report four cases (two in patients and two in archived specimens) of bifid mandibular condyles with emphasis on their aetiopathogenesis and radiographic features. A case of bifid mandibular condyles in a patient with rheumatoid arthritis is reported which, to the best of our knowledge, is the first reported case in the literature.

Clinical Relevance: Anatomical variations, like bifid mandibular condyles, may mimic a fracture/tumour. Therefore, knowledge and awareness about this entity is important for a general dental practitioner.

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Bifid mandibular condyle (BMC) was first described in 1941¹ and, since then, only a few cases have been reported. It can take the form of sequelae of teratogenic embryopathy, developmental anomalies, surgical condylectomy, condylar fractures, etc.^{2,3} The occurrence of BMC can be unilateral or bilateral. Patients are usually asymptomatic and it is often identified as an incidental finding during routine radiographic examination.⁴ With the

advancement of imaging techniques, there has been an increase in the number of reported cases in recent years.

Case reports

Case No. 1

A 57-year-old female patient, diagnosed to be suffering from rheumatoid arthritis for one and a half years, underwent a screening panoramic radiographic

evaluation to check for the TMJ involvement. The patient had polyarthralgia of one-year's duration, which began with pain in the knee joints and progressed to involve the wrists, elbows, shoulders and small joints of the hands. The patient did not report pain or discomfort in the TMJ. Mouth opening was unrestricted with deviation to the right-hand side on maximal opening. Crepitus was present in bilateral TMJs.

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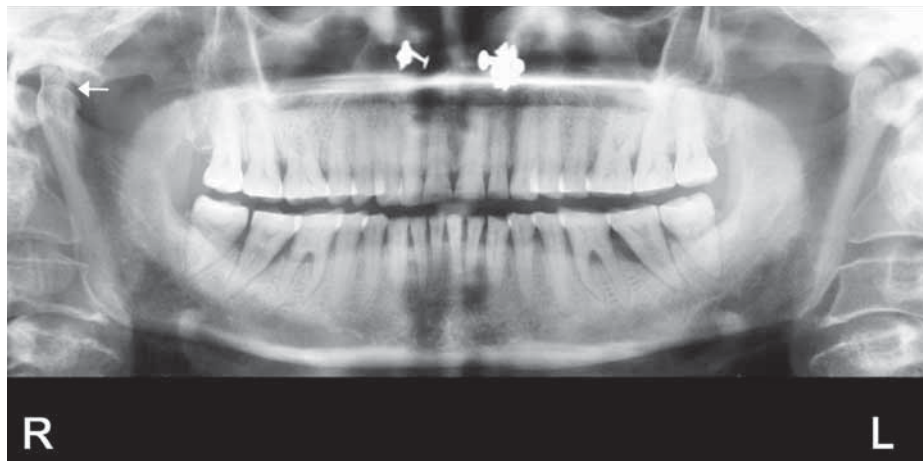


Figure 1. Case 1: Panoramic radiograph showing a bifid right mandibular condyle (see arrow).



Figure 2. Case 1: Coronal section of CT showing bilateral bifid mandibular condyles (see arrows).

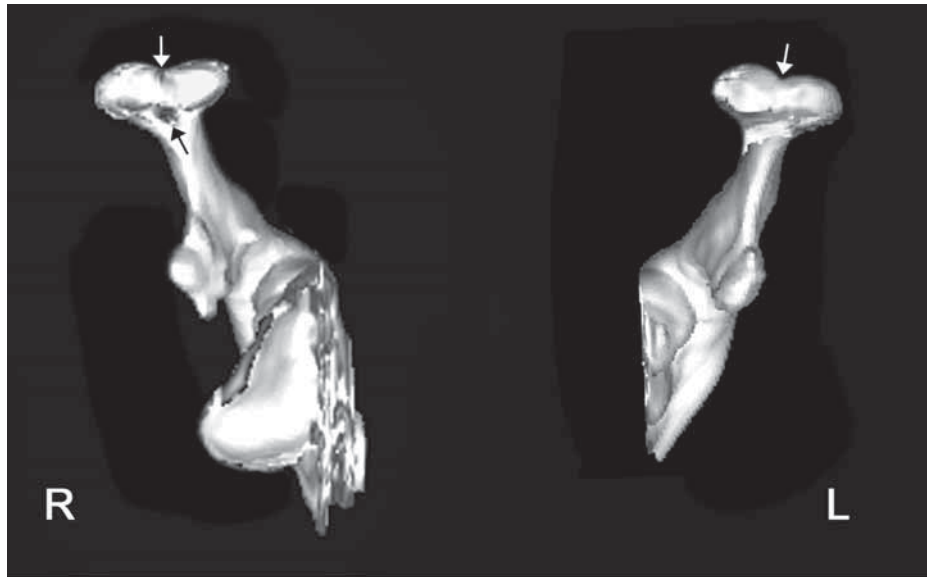


Figure 3. Case 1: 3-D reconstruction showing bilateral bifid mandibular condyles (anterior view) (see arrows).

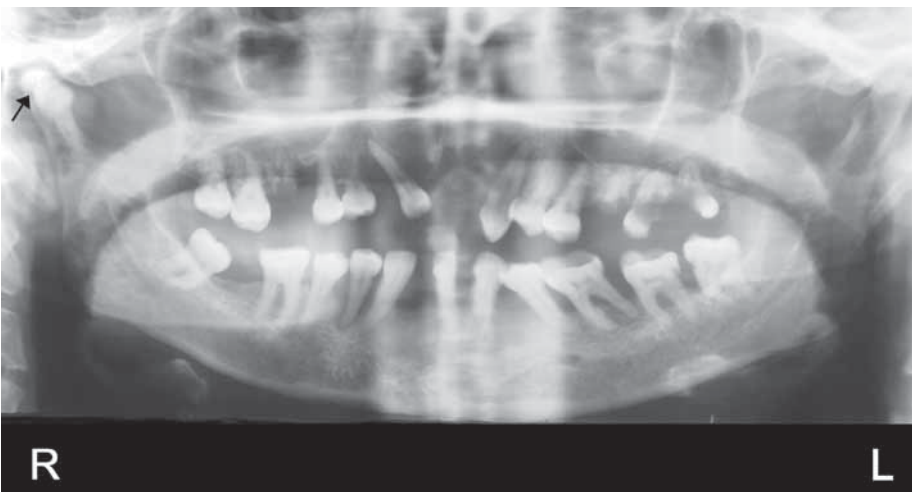


Figure 4. Case 2: Panoramic radiograph showing a bifid right mandibular condyle (see arrow).

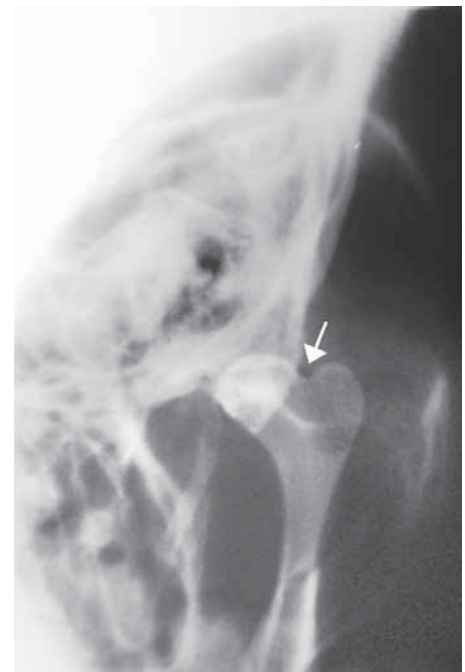


Figure 5. Case 2: Transorbital view showing medial and lateral condylar heads (see arrow).

A panoramic radiograph revealed a bifid right mandibular condyle (the right condylar head was duplicated) (Figure 1). A CT scan showed bifid left and right condyles. The articular surface of the left condyle had a notch (dividing it into medial and lateral heads), which was not evident on the panoramic radiograph. The articular surface of the right condyle had a prominent groove, dividing it into medial and lateral heads (Figure 2). A 3-D reconstruction also showed a bifid right condylar neck (which was not evident on the panoramic radiographic or coronal section of CT) (Figure 3).

Case No. 2

A 46-year-old female with suspected generalized periodontal disease was referred for radiographic evaluation of the crestal alveolar bone. A panoramic radiograph revealed a bifid right mandibular condyle (the right condylar head was duplicated) (Figure 4). A transorbital view was also advised which showed a depression on the articular surface of the right condylar head (dividing it into medial and lateral condylar heads), confirming the presence of a bifid condyle (Figure 5).

The patient did not report pain

or discomfort in the TMJ. Mouth opening was normal. The patient also reported a trauma involving the mandible five years ago.

Anatomical specimens

On screening about 50 archived

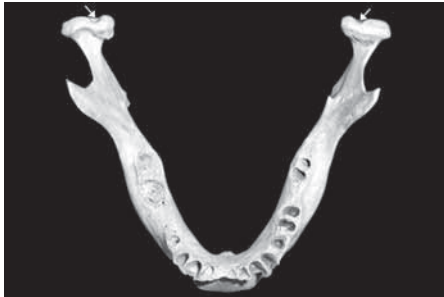


Figure 6. Case 3: Anatomical specimen showing bilateral bifid mandibular condyles (see arrows).

departmental mandibular specimens for any evidence of BMCs, two specimens with BMCs were found. One specimen was observed to have bilateral bifid condyles (a deep groove dividing the condylar head into two distinct condylar heads was observed on each condyle) (Figure 6). A second specimen was observed to have a bifid left condyle (a groove was present in the antero-posterior direction) (Figure 7).

Discussion

Bifid condyles are a relatively uncommon anomaly; 48 cases have so far been reported in living individuals. Bifid condyles appear to involve the left-hand side more often. Bilateral occurrence of BMC is an uncommon anomaly, with only 10 cases being documented in living individuals.⁵⁻⁹ They are found to occur in patients of various ages (3–67 years) and ethnic backgrounds with an equal gender predilection.

It is often identified as an incidental finding during routine radiographic examination.⁴ Studies have shown that, in the majority of cases, there was no history of trauma or symptoms associated with the temporomandibular joint.^{4,10} However, vague symptoms such as swelling,¹¹ pain and articular clicking,^{12,13} ankylosis,¹⁴⁻¹⁷ restriction of mandibular movement and facial asymmetry¹⁸ have often been reported in many cases. An instance of BMC associated with polythelia (supernumerary nipples), polydactyly (supernumerary rudimentary postaxial sixth fingers) and clinodactyly have also been reported.¹⁹

Condylar splitting usually ranges

from a shallow groove on the condyle to two distinct condyles with a separate neck; the orientation of the two heads may be (coronal) medio-lateral or (sagittal) anterior-posterior.²⁰

Hrdlicka¹ observed 21 specimens with BMC while examining dried skulls of males and females from different races in a Smithsonian Institute Collection at Washington DC. In specimens with BMC, changes in the glenoid fossa in the form of two articular facets were observed. The majority of the specimens with BMC had arthritic changes. Schier was the first to document BMC in a living individual.²¹

Aetiopathogenesis

A list of proposed aetiologies for BMC includes genetic^{12,22} developmental^{1,23-26} or traumatic.^{27,28}

In cases with developmental BMC, there is a separate glenoid fossa for each of the two-condylar heads whereas, in cases of traumatic origin, only one glenoid fossa is present.^{14,20}

Szentpetery *et al.*²⁰ proposed that the existence of two different types of condylar head orientation might be related to a cause that is particular for each type. In cases where orientation of the condylar heads is in the sagittal plane, trauma is implicated as the cause, whereas, in cases with orientation in the coronal plane, persistence of fibrous tissue septa is suggested. Although this concept may fit most of the cases, Thomason and Yusuf¹⁸ reported cases of bifid condyle formation during the healing period following trauma with antero-posterior orientation of the condylar heads. Cases of medio-lateral orientation of the condylar heads following a fracture have also been reported.²⁹⁻³²

Our first case with BMC was a diagnosed case of rheumatoid arthritis. A Medline search of the medical literature (from January 1948 to June 2005) using key words 'bifid mandibular condyles, rheumatoid arthritis' for English language case reports of BMC in patients with rheumatoid arthritis, was performed. No papers were found, which shows that this report is the first in the literature. Since we do not have a panoramic radiograph of the patient, taken prior to the development of the disease, the possibility of rheumatoid arthritis causing a BMC cannot be ruled

out. However, there is a report of abrupt condylar destruction of the mandible in juvenile idiopathic arthritis.³³

Diagnosis

Identification of BMC in living individuals is possible only by radiographic evaluation. Conventional radiographs might indicate the presence of BMC but will not give extensive information about the morphological changes in the condyle. Advanced imaging modalities, like the CT scan, can provide a better way of evaluating morphological variations; reconstructed images further improve the clarity.³⁴ Magnetic resonance imaging (MRI) is also commonly used to evaluate internal derangement and joint disc.³⁵ Differential diagnosis of the anomaly may include:

- Condylar tumours (osteochondroma, chondroblastoma);
- Condylar hyperplasia;
- TMJ chondromatosis; and
- Degenerative changes (osteoarthritis and juvenile chronic arthritis).³⁵

Treatment

Treatment for BMC depends on the symptoms present. Patients with articular internal derangement should be treated with occlusal splints and

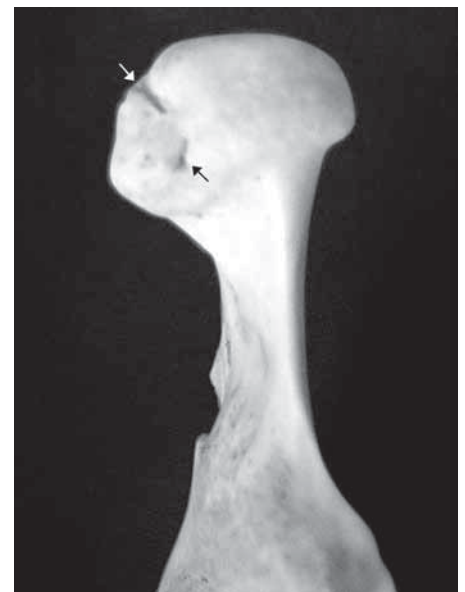


Figure 7. Case 4: Anatomical specimen showing a bifid left mandibular condyle (see arrows).

arthroscopic surgery.³⁴ Patients with ankylosis or asymmetry, or those without the benefit of conservative treatment, are treated through arthrotomy and condylar replacement with a costochondral graft or TMJ prosthesis.³⁴ As our patients were asymptomatic with respect to TMJ, they were not advised to have any treatment.

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