Unilateral condylar hyperplasia – A genetic link? Case reports

ABSTRACT

Unilateral condylar hyperplasia is an uncommon condition with unknown etiology which causes overdevelopment of condyle leading to facial asymmetry, mandibular deviation, malocclusion, and articulation dysfunction. Two Indian families with unilateral condylar hyperplasia are presented where the similar abnormality was also detected in one of their parents. The condylar hyperplasia in these two families indicates that mandibular condylar hyperplasia could be genetic in origin.

Keywords: Condylar hyperplasia, facial asymmetry, mandibular condyle

INTRODUCTION

Condylar hyperplasia is an uncommon malformation of the mandible involving a change in the size and morphology of the condylar neck and head.\(^1\) Skeletal asymmetries of the mandible caused by condylar hyperactivity can pose serious functional, esthetic, and psychosocial problems for the patients. Unilateral hyperplasia of the mandibular condyle is generally characterized by a slowly developing, progressive enlargement of the condyle and elongation of the mandibular neck resulting in facial asymmetry and shifting of the midline of the chin to the unaffected side.\(^2\)

The etiology of condylar hyperplasia is controversial and not well understood. Suggested theories include neoplasia, trauma followed by bleeding leading to excessive proliferation in repair, or a response to infection or to abnormal loading.\(^3\) We present here two Indian families with unilateral condylar hyperplasia in mother and son in one family and mother and daughter in another family.

CASE REPORTS

Case 1

A 4-year-old male child patient was referred to the Department of Orthodontics regarding his facial asymmetry. History revealed trauma to face subsequent to trauma the parents noticed asymmetry of their child’s face.

Clinical findings: His medical history is found to be nonrelevant. Clinical examination revealed that his lower face deviated to the right side. The patient did not have any difficulty in opening the mouth. The inspection revealed elongation of left lower half of the face as compared with the right side. The right side of the face appeared flattened [Figure 1].

Intraoral examination showed the molar relationship to be mesial step on both sides with posterior crossbite on the right side. His lower midline relationship deviated to 4 mm to right of maxillary midline [Figure 2].
Radiographic examination: Posteroanterior (PA) cephalogram revealed the deviation of the dental midlines is present [Figure 3].

Panoramic view revealed symmetrical condylar enlargement of the left side and elongated condylar neck as compared to the right side [Figure 4].

During the examination, it was noticed that the 29-year-old mother also had facial asymmetry of which she was unaware. The mother consented to being examined. Her medical history was found to be noncontributory.

Clinical examination of the mother showed the deviation of the lower face toward left side. There was no problem in opening of mouth. Extraorally, there was an elongation of lower half of right side of face as compared to left side of face. The prominence of chin appeared shifted to the left side [Figure 5].

Intraorally, the molar relationship was Angles Class I on both sides. The oral hygiene was poor with maxillary left canine already extracted and multiple carious teeth [Figure 6].

PA cephalogram of mother showed that shift of the dental midline was due to asymmetry of the mandible not positioning within the X-ray unit [Figure 7]. Panoramic view showed condylar enlargement of the right side and elongated condylar neck and ramus as compared to the left side [Figure 8].

Case 2
A 14-year-old female patient had come to the Department of Orthodontics, with the chief complaint of forwardly placed upper front teeth. Her medical history was found to be noncontributory.

On extraoral examination, facial asymmetry was evident for which patient was unaware. There was no history of trauma. The patient did not have any difficulty in opening of mouth. Inspection showed elongation of left side lower half of face as compared to the right side. The left side of the face appeared flattened as the prominence of the chin appeared shifted to the right side [Figure 9].

On intraoral examination, her molar relationship was found to be Angles Class II on right side and end on the relationship on the left side. The lower midline was shifted 3 mm to the right side with respect to maxillary midline [Figure 10].
Radiographic investigations were also carried out. Panoramic view of girl revealed symmetrical condylar enlargement of the left side in comparison to the right side and condylar neck along with the elongation of the left side of ramus [Figure 11].

PA cephalogram of the girl showed a shift of dental midlines due to the asymmetry of the mandible [Figure 12].

Her mother who was 44 years old had accompanied her and asymmetry in her face was also noticed. She was unaware of it and gave consent to be examined. On examination, she did not have any difficulty in opening her mouth. The chin was deviated to the right side as left side of her face was elongated. The left side of face appeared flattened [Figure 13].

Intraorally, her oral mucosa was normal with permanent dentition and a total of 24 teeth. Her oral hygiene was poor and no previous history of trauma. Medical and family history
was noncontributory. There were root stumps and carious teeth present. Maxillary right first molar had already been extracted. Clinically, she showed a lower midline shift to the right side, chin deviation and misalignment [Figure 14].

PA cephalogram of the mother showed a shift of dental midlines due to asymmetry of the mandible [Figure 15].

Panoramic view revealed symmetrical condylar enlargement of the left side and elongated condylar neck as compared to the right side [Figure 16].

DISCUSSION

Condylar hyperplasia resulting in facial asymmetry is not only an esthetic problem for an individual but also a functional disturbance to the temporomandibular joints and occlusion. Asymmetric conditions attributed to condylar hyperplasia of the mandible were first reported by Adams in 1836. Lohrann in 1918 reported about condylar hyperplasia followed by Guroca and Meisels in 1926. Unilateral hyperplasia of the condyle is a slow, progressive, and excessive growth of condyle leading to facial asymmetry and midline shift of the chin.

The other differential diagnosis includes hemifacial hyperplasia and synovial chondromatosis. Obwegeser and Makek proposed a definite classification for condylar hyperplasia into two types: hemimandibular hyperplasia and hemimandibular elongation. Hemimandibular hyperplasia is characterized by a three-dimensional enlargement of one side of the condyle, the condylar neck, the ascending and horizontal rami. Hemimandibular elongation is characterized by horizontal displacement of the mandible plus chin toward the unaffected side. Hemimandibular hyperplasia is characterized clinically by elongation of one side of mandible with no increase in bone mass production.

The hyperplasia of the condyle causes downward and forward displacement of the body and ramus resulting in tilting of the occlusal plane in a transverse dimension, cross bite on the affected side and facial asymmetry. The mouth can be opened without restriction. There is fullness of the face on the affected side and flattening of face on the contralateral side. Both the chin and the midline of the lower teeth are shifted to the side opposite to the elongation. The teeth on the affected side are usually in infraocclusion when compared
to teeth on the opposite side.\(^7\) An open bite might exist on the abnormal side depending on either the rate of increasing enlargement of condyle on the downward growth of the maxillary alveolus and teeth.\(^1\)

Radiographically in condylar hyperplasia, the condyle may appear relatively normal but symmetrically enlarged, or it may be altered in shape or irregular in outline. It may appear more radiopaque due to the presence of additional bone. The ramus and mandibular body on the affected side may also be enlarged.\(^8\) These features were found clinically and radiographically in both the cases presented here.

The etiology of condylar hyperplasia includes trauma, partial hemihypertrophy, arterosis, osteochondromatosis, and neurotrophic disturbances.\(^3\) Authors have debated whether intrinsic or extrinsic factors regulate the growth of the condyle.\(^6\) The condyle is a major factor of growth, serving as growth center.\(^4\) The traditional view was that the cartilage of the condyle mimics the epiphyseal cartilage of long bones; therefore, the condyle is the primary growth center of the mandible.\(^9\) This theory supports intrinsic factors playing major roles in condylar hyperplasia.\(^10,11\) An alternative view is that the condyle is just like other parts of the mandible in terms of growth capability with the only difference being that chondrogenesis takes place in the periosteum that covers the head of the condyle.\(^12\)

Oberg et al. (1962) undertook a microradiographic, autoradiographic, and histological analysis of one case and showed conclusively an increase in vascularity affecting the upper posterior part of the condylar cartilage from whence the growth was commencing.\(^{13}\) Based on these theories local circulatory problems, previous trauma, hormonal disturbances, abnormal leading, and cartilaginous exostosis have been suggested as possible etiological factors.\(^{3,14,15}\)

Genetic, acquired, functional factors, age groups, also have a role in morphological changes in condyle.\(^{16,17}\) The appearance of mandibular condyle varies greatly among different age groups and individuals. Perhaps too long it has been dwelt on the assumption that the mandible is one bone when phylogenetically it should be considered as two separate bony units.

Interestingly, a possible genetic role for condylar hyperplasia has not been mentioned in previous articles, although many authorities allude to the familial incidence of the condition, there is no direct confirmation of this. The occurrence of a brother and sister exhibiting a mirror image condylar hyperplasia has been reported. A family with mirror image of condylar hyperplasia in two male siblings along with similar abnormality in the father suggests that condylar hyperplasia could be genetic in origin, either autosomal dominant or Y-linked, although with only few cases and two generations of history it is difficult to determine this with any degree of certainty.\(^{18,19}\)

**CONCLUSION**

Facial asymmetries caused by condylar hyperactivity can cause considerable inconvenience to patients. Two cases of unilateral condylar hyperplasia in Indian family were presented. In one case son and mother had unilateral condylar hyperplasia suggesting a genetic origin, possibly Y-linked or autosomal dominant. In the second case, daughter and mother had unilateral condylar hyperplasia further supporting genetic relationship.

PA cephalometric projections are helpful for detection of horizontal shift of the mandibular midline. Unilateral condylar hyperplasia is a rare condition which results from increased activity of the condylar growth center. Careful history, clinical and radiographic examination will usually reveal the true nature of the condition. Diagnosing the cause can be challenging and should be done carefully for planning and initiating the treatment modality for both functional activity and for esthetic appearance. Different theories have been...
given regarding etiology of condylar hyperplasia, but there is a need to further conduct more studies regarding the role of genetics in etiology of unilateral condylar hyperplasia as is being indicated in our case reports.

Declaration of patient consent
The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest
There are no conflicts of interest.

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