Hemimandibular hyperplasia treated by early high condylectomy: A case report

A case of hemimandibular hyperplasia in a young patient treated 12 years ago is presented. Clinical and radiographic findings were consistent with a diagnosis of right hemimandibular hyperplasia. An early high condylectomy was performed. In our opinion, the esthetic and functional results after this long-term follow-up are fairly satisfactory. We present a brief review of the literature to make a differentiation between condylar hyperplasia and hemimandibular hyperplasia and to stress the importance of early condylectomy to correct this disease. (Int J Adult Orthod Orthognath Surg 2001;16:227–234)

The lower jaw presented the following peculiarities: projection from the thickened neck of the right condyle was a mass of bone about an inch in length, and having somewhat the form of an inverted pyramid. (Frederic S. Eve, May 15th, 1883)

Hemimandibular hyperplasia (HH) is a rare malformation of non-neoplastic origin characterized by a 3-dimensional enlargement of one side of the mandible, i.e., the enlargement of the condyle, the condylar neck, and the ascending and horizontal rami. The anomaly terminates exactly at the symphysis of the affected side, and for this reason it is called hemimandibular hyperplasia. Clinically, this malformation is characterized by facial asymmetry and shifting of the midline of the chin to the unaffected side. The unilateral asymmetric increase in facial height gives rise to a sloping rima oris, but the mouth can be opened without restriction. If the anomaly occurs before puberty, the maxilla follows the downward growth of the mandible, and the teeth of the affected side usually remain in occlusion but on a lower level than the teeth of the normal side, with a consequent tilting of the occlusal plane in the transverse dimension. Normally, the dental occlusion is a Class II division 2 malocclusion (deep bite) with the mandibular midline centered. If the maxilla is unable to follow the mandibular growth, an open bite becomes evident on the affected side. Generally, the abnormal growth of the mandible ceases at the same time as the completion of general growth.

Orthopantomograms of HH patients reveal pathognomic findings. The ascending ramus is elongated, and this is expressed by the enlargement of the condyle and the elongation and thickening of the condylar neck. The lower border of the mandible is bowed downward and positioned at a lower level than that on the normal side, clearly demonstrated by an increased distance between the dental roots and the alveolar canal. This is always manifested in the premolar and molar area. The very enlarged condyle is generally irregularly formed. All these findings are particularly noticeable in comparison with the unaffected side.

The etiology of HH is still under discussion. In the literature, genetic factors, circulatory problems, hormonal disturbances, traumatic lesions, and arthrosis have been proposed to be etiologic factors of the disease.

Hemimandibular hyperplasia was clearly described by Obwegeser and Makek and must be distinguished from...
solitary and exclusive hyperplasia of the condyle. The latter involves only the condyle, which is radiographically homogeneously enlarged, but the horizontal ramus is not increased in height and the mandibular canal is not displaced. Clinically, the facial appearance is distorted, with an increase in the height of the affected side. The chin is shifted to the normal side. An open bite and a crossbite might be present on the affected side, while in HH a crossbite is almost never present. Normally, the dental midline is deviated toward the unaffected side but may also be centered, depending on the vector and speed of growth.

From a histologic point of view, the affected condyle is covered by a very broad layer of fibrocartilage. The cells are large, the cytoplasm is vesicular, and there is abundant newly produced cartilage matrix between cells. The fibrocartilaginous layer is distributed in a diffuse but regular manner all over the condylar head.1

Bone scanning, a tracer method based on the injection of phosphates labeled with a radionuclide, is a noninvasive technique to evaluate whether the condylar growth is still active. The most commonly used radionuclide is 99m technetium (99mTC), because it emits 140-KeV gamma radiation, which is sufficiently penetrating to escape the body in needed quantity, is readily detected, and has a 6-hour half-life.6

In the literature, various surgical treatments have been proposed (condylectomy, condylar shave, orthognathic surgery, etc), depending on the patient's age, the presence of active or inactive condylar growth, and the severity of facial appearance.7 In this report, a case of HH treated by early high condylectomy without pre- and postsurgical orthodontic therapy and followed up for 12 years is presented.

**Report of case**

In April 1988, a 12-year-old boy was referred to the Department of Maxillofacial Surgery, University Hospital of Parma, complaining of temporomandibular joint (TMJ) discomfort and subluxation of the right condyle for almost 10 months. There was no history of trauma or inflammatory disease. Clinical examination revealed significant facial asymmetry, deviation of the chin to the left side, and an increase in the vertical height of the middle and lower facial thirds on the right side (Fig 1a). The maximum mouth opening was 37 mm. Excursion and protrusive movements were not restricted. Reciprocal clicking was heard during the movement of the right TMJ. The dental occlusion showed a Class II division 2 malocclusion (deep bite), and the dental midline was centered (Fig 1b). A panoramic radiograph revealed a discrepancy in size and morphology between the right and left condyles, enlargement of the right condyle, and elongation of the right ascending ramus, as well as an enlargement of the skeletal base of the right hemimandible in all its dimensions, together with a downward growth. The gonial angle was characteristically rounded off, and the mandibular canal was displaced to the lower border of the mandible (Fig 1c).

A 99mTC bone scan showed high activity in and around the right TMJ. It is important to observe that in this case, as in others described in the literature,8,9 the pathosis also involves the maxilla with maxillary monolateral vertical growth, including the maxillary sinus.

Clinical and radiographic findings were consistent with a diagnosis of right hemimandibular hyperplasia. An early high condylectomy was performed. The condyle was removed with a fissure bur and the condylar stump was smoothed with a round bur. The resection had been radiographically planned to re-establish symmetry with the contralateral condyle. The surrounding anatomic structures were preserved with great care; the disc was intact and well positioned over the newly created right condyle. Maxillomandibular fixation was performed for 10 days, and a 6-month period of physical therapy was done to rehabilitate the TMJ.

Despite the wide condylectomy, the occlusion was maintained throughout 2 years of close follow-up. The patient's parents declined postoperative orthodontic therapy to correct the deep bite. Twelve years later, there has been no recurrence, and the patient has a good dental occlusion (Figs 1d and 1e) and facial appearance (Fig 1f). The
panoramic radiograph demonstrates readaptation of the condyle in the fossa (Fig 1g). No subluxation, TMJ pain, or dysfunction is observed. A secondary surgical procedure should be carried out to contour the lower border of the right hemimandible with a genioplasty, but the patient is satisfied with his body image and does not want to undergo more surgery.

Discussion

Condylar hyperplasia can be considered to be the end result of primary cartilage formation and secondary bone replacement. It is a condition without a definitive etiology. In 1979 Cherrick stated that the potential for continued cartilage formation and therefore condylar development persisted in the TMJ throughout life. However, in the case of condylar hyperplasia, the pathogenesis of the excessive formation of cartilage and bone still remains unknown. A valid diagnostic procedure is 99mTc scintigraphy, which could demonstrate increased bone activity. According to Obwegeser and Makek, we are able to observe clinically and radiologically 2 completely different types of the pure form of this disease (HH and the exclusive and solitary condylar hyperplasia).

Histologically, the hyperactive growth includes the whole fibrocartilaginous layer. Therefore, this entity could be theoretically arrested by the removal of the cartilage. The disease is reported to be a self-limiting process that can cease activity at any time. It appears to arise as an acceleration of growth in younger patients, perhaps triggered by the metabolic events during the adolescent growth spurt, or as a prolongation of growth in older individuals caused by one side continuing to grow beyond the mid-20s, an age at which growth should have ceased.

The condyle seems to be an essential element for normal mandibular growth and development. In 1977, Delaire explained the role of the condyle as a functional rectifier and not the dominant element that controls and directs the growth of the jaw. This hypothesis can explain why the mandible is able to grow and translate in the directions even after condylar surgery, as with condylectomy or condylar shave. Delaire supported the early condylectomy as the most efficacious intervention for young patients. This case report shows some important modifications in the facial skeleton, and quite good functional and esthetic results, obtained in a 12-year-old patient treated by early high condylectomy, without pre- or postsurgical orthodontic therapy.

If evidence of abnormal condylar growth is present, as assessed clinically by the 99mTc and on several cephalograms, then condylar surgery should be undertaken before the patient develops a severe facial deformity (Figs 2a to 2d).

Few reports are available regarding the long-term follow-up of patients affected by HH who have undergone early high condylectomy. In the case of young patients with HH, this procedure should be performed as soon as possible to prevent the development of an oblique occlusal plane and ipsilateral compensatory maxillary growth and to improve symmetry by the spontaneous remodeling processes in the facial structures. If surgery is delayed until the end of growth, the surgeon will be unable to take advantage of the spontaneous remodeling of the tissues obtained during growth with a single condylectomy. In such a case, orthognathic surgery would be much more extensive, usually involving the maxilla, the mandible, the chin, the lower border of the mandible, and, sometimes, the condyle as well (Figs 2e to 2h). However, in young patients we support a “wait and see” approach until the end of facial growth in all cases where condylar growth is not so rapid and the facial aspect is still good.

In adult patients, if condylar hyperplasia is inactive, orthognathic surgery is the therapeutic solution, but if active condylar growth is still present, we prefer to perform condylectomy together with standard orthognathic surgery.

The present 12-year follow-up demonstrates that, in this case, condylar surgery was a simple and straightforward decision. We consider the operative results to be fairly satisfactory.
Fig 1a  (left) Patient’s preoperative frontal view showing the evident facial asymmetry.

Fig 1b  (below) Patient’s preoperative dental occlusion showing a Class II division 2 malocclusion (deep bite), but the dental midline is centered.

Fig 1c  The preoperative panoramic radiograph reveals a discrepancy in size and morphology between the right and left condyles, enlargement of the right condyle, and elongation of the right ascending ramus.
Fig 1d  Patient’s dental occlusion 12 years after condylectomy obtained without pre- or postsurgical orthodontic treatment.

Fig 1e  Patient’s lateral movement 12 years after surgery. No subluxation, TMJ pain, or dysfunction is observed.

Fig 1f  Patient’s frontal view 12 years after the operation. The facial appearance and symmetry are quite good.

Fig 1g  Panoramic radiograph 12 years after the condylectomy demonstrates readaptation of the right condyle in the fossa.
Fig 2a  (left) Patient’s preoperative frontal view. Severe facial asymmetry is evident.

Fig 2b  (above) The preoperative panoramic radiograph shows the great discrepancy in size and morphology between the right and left condyles, along with an enlargement of the skeletal basis of the right hemimandible in all its dimensions.

Fig 2c  (left) Posteroanterior cephalogram of the patient showing the inferior displacement of the mandibular angle and the ipsilateral compensatory maxillary growth.

Fig 2d  (above) Patient’s preoperative dental occlusion showing an oblique occlusal plane, a right open bite, and a centered dental midline.
Fig 2e  Panoramic radiograph after extensive orthognathic surgery involving the maxilla (Le Fort I osteotomy), the mandible (Obwegeser-Dal Pont osteotomy), the chin, the lower border of the right mandible, and the condyle (condylectomy).

Fig 2f  (right) Posteroanterior cephalogram showing the skeletal symmetry after orthognathic surgery.

Fig 2g  Postoperative dental occlusion 3 years after surgery.

Fig 2h  (right) Postoperative view of the patient 3 years after surgery. The facial symmetry is good.
References


