

ONE STAGE TREATMENT PROTOCOL FOR UNILATERAL CONDYLAR HYPERPLASIA WITH FACIAL ASYMMETRY

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ABSTRACT

Condylar hyperplasia (CH) is defined as a condition which causes overgrowth of the condylar head and neck also because the mandible, which ultimately creating functional, aesthetic and facial deformities. The aetiology and pathogenesis of condylar hyperplasia (CH) isn't well understood and is controversial. Diagnosis is confirmed on the premise of proper clinical, radiological and histological examination.

The timing of surgery and treatment planning is mainly influenced by specific growth pattern of the condyles, in forms of rate, magnitude and direction of growth. Treatment of CH directly depends on age, degree of deformity present and hypofunction of condyles. Here we reported two reported two cases of CH treated with different surgical modalities.

CH can cause many challenges in diagnosing and initiating the correct treatment strategy for both functional activity and for aesthetic appearance.

Key words: Facial asymmetry–Condylar hyperplasia (CH)–Condylectomy–Intra oral distraction

1 INTRODUCTION

Condylar hyperplasia (CH) is defined as a condition which causes overgrowth of the condylar head and neck also because the mandible, which ultimately creating functional, aesthetic and facial deformities.(1-2) This condition was first described by Robert Adams in 1836 as a complication of rheumatoid arthritis.(3) CH mostly occur during puberty and barely begins after age of 20's.(4)

The aetiology and pathogenesis of condylar hyperplasia (CH) isn't well understood and is controversial. Suggested theories include neoplasia, trauma(5-8) followed by bleeding results in excessive proliferation during repair process, or a response to infection(3,9,10),or to abnormal loading, hormonal influences, hypervascularity (11-13)and possible

genetic role.(14) Approximately one third of bilateral cases have a significant history of the condylar hyperplasia.(4) Unilateral hyperplasia of the condyle process is more common than bilateral one and is usually characterized by a slowly growing, progressive enlargement of the one condyle and elongation of the mandibular neck, outward bowing and downward growth of body and ramus of mandible on affected side, which ultimately results in fullness of face on the affected side and flattening of face on the contralateral side which ultimately leading to facial asymmetry and shifting of the midline of the chin to the unaffected side.(15)

OBWEGESER and MAKEK (16) classified the facial asymmetry presented with CH into 3 categories:

Type I CH is related to chin and mandibular midline deviated to the unaffected side. Type II CH is related to an ipsilateral open bite or compensatory vertical overdevelopment of the maxilla on the involved side with occlusal plane canting. most ordinarily, the mandibular midline is straight

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Type I	Hemimandibular elongation with a horizontal growth vector.
Type II	Hemimandibular hyperplasia with a vertical growth vector.
Type III	A combination of the 2 entities.

and therefore the chin is a smaller amount deviated. The type III CH is combination of type I and II. The prevalence ratio of type I and II CH is approximately 15:1.

SLOOTWEG AND MULLER (17) classified CH into 4 histologically different kinds which is based on the arrangement and morphology of the different layers of the condyle (fibrous articular layer, undifferentiated mesenchyme proliferative layer, transitional layer, and hypertrophic cartilage layer).

Diagnosis is confirmed on the premise of proper clinical, radiological and histological examination. This paper reports two cases of unilateral mandibular condylar hyperplasia in a young female with review of literature.

Case 1-

A 20 year old female patient reported to the department of OMFS, complaining of progressive facial deformity on left side of face and changes in her facial appearance from approximately 6 years. At the age of 14 years, she started noticing that her lower jaw started deviating to the right side (**Fig.-1**).

This condition was asymptomatic and there was no history of any trauma or any recurrent infection. Her medical history was non contributory and there was no any family history of skeletal disease or any other chronic disease. The extraoral examination presented facial asymmetry on left side of face and downward growth of lower border at left body and angle region of mandible and the chin was deviated to the opposite side. On mouth opening, the lower jaw deviated to the right side. The interincisal opening was adequate (35 mm). Palpatory findings revealed the bony hard, non tender, non fluctuant growth presented on lower border in left body and angle region of mandible. Intraorally, there was canting of the occlusion presented on left side (**Fig.-2**).

Investigations like panoramic radiograph, lateral and postero-anterior cephalogram, computed tomographic scan (axial and coronal with 3-dimensionally reformatted images) are included. The radiographic images revealed outward bowing of enlarged condylar neck and ramus with downward growth present at angle and body on the left side of the mandible with inferiorly displaced inferior alveolar canal (**Fig-3**).

A frontal PA cephalometric analysis (Grummon's analysis) was done to assess facial asymmetry presented on left side. Bone scintigraphy report reveals active growth centre present at left condyle and increased osteoblastic activity at left condyle region. A final diagnosis of CH type II (left) was made.

A preauricular incision was made under nasotracheal intubation. Layer wise dissection was done to expose left Mandibular condyle. To remove the hyperplastic condylar head, Condylectomy was performed (approx 18 mm in length was resected) preserving the articular disk and the bony edge and the residual neck was smoothed. (**Fig-4**).

Mandibular labio-buccal degloving incision was made to expose the lower border of mandible on left side. Recontouring of lower border of mandible was done by chisel and mallet and finally rough bony margins were smoothed.

The wound was closed in many layers by 3-0 Polyglactin 910 and 3-0 braided black silk in preauricular region and 3-0 Polyglactin 910 suture material for intra oral site. An extraoral compression dressing was applied, patient was advised to have soft diet, medication for pain control and antibiotic were prescribed. No significant post operative complications were present. Orthopantomogram and Posteroanterior view of mandible was advised post operatively to assess the correction which was found to be satisfactory. The patient is under regular follow-up after surgery (**Fig.-5 & 6**). Histopathological examination of resected condyle head showed thickened irregular bony trabeculae with osteoblast rimming.

Case 2-

A 21 year-old female patient reported to the department of OMFS, complaining of progressive facial deformity on right side of face and changes in her facial appearance from approximately 4 years. At the age of 17, she started noticing that her lower jaw was deviating to the left side. Her medical history was non-contributory and there was no family history of any skeletal disease or any other chronic disease. The extraoral examination presented facial asymmetry on right side of face with slight elongation of face on right side and the chin was deviated to the left side. The maximum interincisal opening was adequate (36 mm). Intraorally, there was canting of the occlusion presented on right side and midline shifted to left side (5mm). A final diagnosis of CH type II (right) was made. (**Fig-7**)

Patient was advised for CT scan-face and Bone scintigraphy. DICOM images were send for medical 3D printing (**Fig.8-A&B**). Mock surgery was done on 3D printed model and patient was planned for condylectomy (right) along with intra oral distractor placement on left side for correction of facial asymmetry. (**Fig.9**)

2 DISCUSSION

Lohamann in 1918 had reported initially about unilateral condylar hyperplasia, later it was reported by Gruca and Meisels in 1926. In 1946 Rushton (2) did an extensive review and found 29 cases of condylar hyperplasia and added three more cases of his own. For proper diagnosis it is very important to identify the type of growth pattern occurring in condylar hyperplasia and to rule out active or inactive form of CH. CH usually occurs during the pubertal age or second decade of life and can also continues to late 20s.(4) The differential diagnosis of condylar lesions are –



Figure 1. Extraoral image showing Left CH type II



Figure 4. Intra operative image showing condylectomy



Figure 2. Intraoral image showing canting of occlusal plane



Figure 5. Post operative image showing correction of deformity

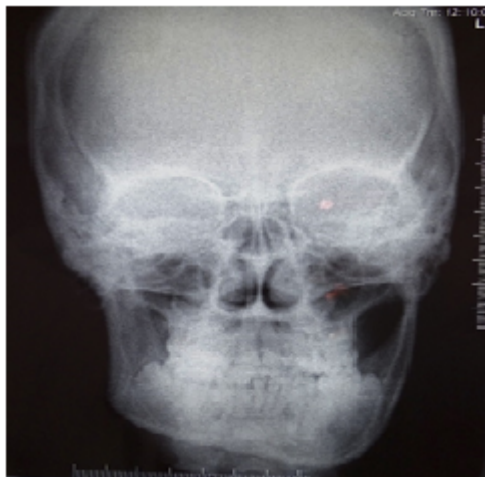


Figure 3. PA view of mandible showing bowing of left ramus of mandible

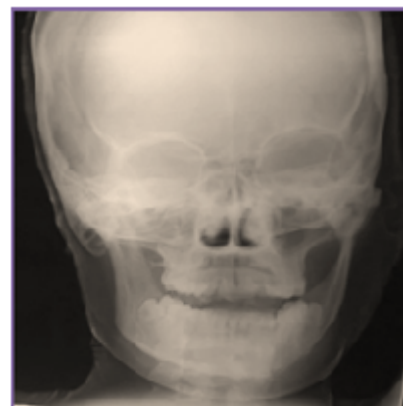


Figure 6. Post operative PA view of mandible



Figure 7. Pre-operative intra oral image showing midline deviation

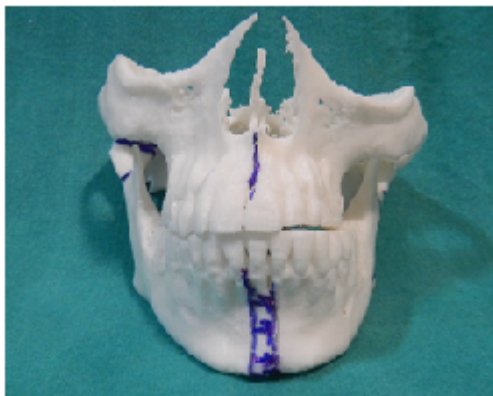


Figure 8. (A) 3 D printed model showing midline shifting

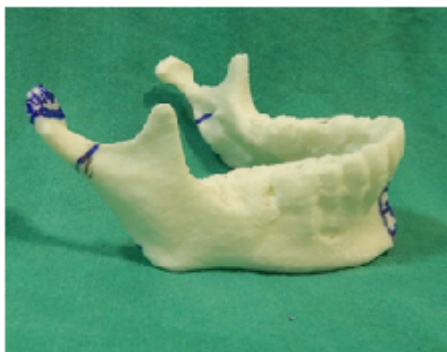


Figure 8.(B) 3 D printed model showing right CH type II

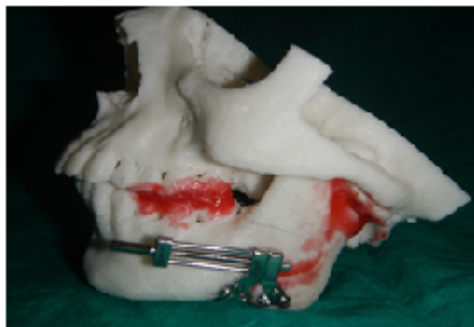


Figure 9. 3 D printed model showing osteotomy and placement of intra-oral distractor

condylar hyperplasia, fibro-osteoma, giant cell tumour, fibrous dysplasia, fibrosarcoma, myxoma, chondrosarcoma, osteoma, osteoblastoma, chondroma, chondroblastoma and osteochondroma (18,19). However, the diagnosis of condylar hyperplasia is formed by a mix of clinical, histopathological and radiological findings. (14)

The timing of surgery and treatment planning is mainly influenced by specific growth pattern of the condyles, in forms of rate, magnitude and direction of growth. Treatment of CH directly depends on age, degree of deformity present and hypofunction of condyles.(20) the essential considerations within the management of facial asymmetry related to CH must include control of the growth process to permit more balanced facial development. This can be done by condylectomy or condylar shave in actively growing cases (21) and correction of many other facial asymmetries. If compensatory growth has completed then only condylectomy and osteotomies often of mandible and maxilla are enough to restore normal occlusion and facial symmetry. (22,23)

Radiographically, the affected condyle may appear relatively normal but it is symmetrically enlarged, or is deformed in shape (e.g., conical, spherical, lobulated, elongated) or irregular in shape. It may appear more radiopaque due to presence of additional bone deposition. Morphologic abnormality like elongation of the condylar head and neck present. On the affected side, the ramus and mandibular body can be enlarged. For the confirmation of diagnosis sequential study models, radiological and scintigraphic methods are commonly used. Lateral and posteroanterior cephalograms (24), transcranial and panoramic radiographs are taken to evaluate the possible dissimilarities in shape, size and length of the condyle, condylar neck, mandibular body or rami on the affected and unaffected side. The cephalograms are used for purpose of tracing and determining bilateral discrepancies which leads to the skeletal asymmetry as well as assessment of the deviation of dental and skeletal midlines from mid sagittal plane, elongation of the mandibular condyle/condylar neck on affected side and downward bowing or growth of the mandibular ramus or body. CT (25) is taken to evaluate if the bone growth is generalized or localized. If generalized then it confirms the diagnosis, CH.

If growth is localized, a biopsy must be done differentiate between hyperplasia and tumor. The 3-D tomography is helpful to assess the morphological and structural alterations of the craniofacial bones. Bone scanning with Technetium 99 M pyrophosphate or Technetium 99 methylene diphosphonate can locate the active growth centre of condyle.(26,27,28) Scintiscanning is a vital diagnostic tool for confirmation of active growth centre presented. Condylar hyperplasia is a self-limiting process that may cease active growth at anytime and is mostly seen in patients of age group between 11 and 30 years old.

The various treatment options for CH supported by the literature are:

- 1) high condylectomy
- 2) high condylectomy with bi-maxillary orthognatic surgery

3) orthognatic reconstructive surgery of the residual facial deformity

4) cosmetic procedures with orthodontic compensatory procedures.

Along with the proposed protocol, another analysis criteria should be included to rule out the course of action in each case these are 1) level of facial asymmetry, 2) psychosocial implications of the facial alteration, 3) presence of pain and functional alterations of the TMJ region in affected side and 4) masticatory deficiency presented due to malocclusion. These criteria can cause modification within the proposed treatment protocol.

In the present paper we followed one stage treatment protocol for CH with correction of associated facial asymmetry.

Conclusion

Unilateral condylar hyperplasia is a very rare condition which ultimately results from increased activity of the condylar growth centre. Diagnosis is confirmed after the proper and careful history, clinical examination and radiographic evaluation. CH can cause severe jaw asymmetry which can be managed by surgical intervention. The additional treatment like orthognathic surgery and orthodontic treatment are mandatory for a better cosmetic and proper functional needs and satisfaction for patient.

CH can cause many challenges in diagnosing and initiating the correct treatment strategy for both functional activity and for aesthetic appearance. [

REFERENCES

- [1] Utumi ER, Pedron IG, Perrella A, Zambon CE, Cecchetti MM, Cavalcanti MGP. Osteochondroma of the temporomandibular joint: a case report. *Brazilian Dental Journal*. 2010;21(3):253–258. Available from: <https://dx.doi.org/10.1590/s0103-64402010000300014>.
- [2] Motamedi MH. Treatment of condylar hyperplasia of the mandible using unilateral ramus osteotomies. *J Oral Maxillofac Surg*. 1996;54(10):1161–1170.
- [3] Feldmann G, Linder-Aronson S, Rindler A, Soderstrom A. Orthodontic and surgical treatment of unilateral condylar hyperplasia during growth—a case report. *The European Journal of Orthodontics*. 1991;13(2):143–148. Available from: <https://dx.doi.org/10.1093/ejo/13.2.143>.
- [4] Rowe NL. Aetiology, clinical features and treatment of mandibular deformity. *Brit Dent J*. 1960;108:41–64.
- [5] Venturin JS, Shintaku WH, Shigeta Y, Ogawa T, Le B, Clark GT. Temporomandibular Joint Condylar Abnormality: Evaluation, Treatment Planning, and Surgical Approach. *Journal of Oral and Maxillofacial Surgery*. 2010;68(5):1189–1196. Available from: <https://dx.doi.org/10.1016/j.joms.2009.08.002>.
- [6] Rushton MA. Unilateral hyperplasia of the jaws in the young. *Int Dent J*. 1951;2:41–76.
- [7] Mutoh Y, Ohashi Y, Uchiyama N, Terada K, Hanada K, Sasaki F. Three-dimensional analysis of condylar hyperplasia with computed tomography. *Journal of Cranio-Maxillofacial Surgery*. 1991;19(2):49–55. Available from: [https://dx.doi.org/10.1016/s1010-5182\(05\)80606-7](https://dx.doi.org/10.1016/s1010-5182(05)80606-7).
- [8] Jacobsen PU, Lund K. Unilateral overgrowth and remodelling processes after fracture of the mandibular condyle: a longitudinal radiographic study. (1972) *Scand. J Dent Res*;80:68–74.
- [9] Gottlieb OP. Hyperplasia of the mandibular condyle. *J Oral Surg*. 1951;9:118–153.
- [10] Beirne OR, Leake DL. Technetium 99m pyrophosphate uptake in a case of unilateral condylar hyperplasia. *J Oral Surg*. 1980;38:385–391.
- [11] Walker RV; 1967.
- [12] Rushton MA. Unilateral Hyperplasia of the Mandibular Condyle. *Proceedings of the Royal Society of Medicine*. 1946;39(7):431–438. Available from: <https://dx.doi.org/10.1177/003591574603900719>.
- [13] Obwegeser HL, Makek MS. Hemimandibular hyperplasia — Hemimandibular elongation. *Journal of Maxillofacial Surgery*. 1986;14:183–208. Available from: [https://dx.doi.org/10.1016/s0301-0503\(86\)80290-9](https://dx.doi.org/10.1016/s0301-0503(86)80290-9).
- [14] MURRAY IPC, FORD JC. Tc-99m Medronate Scintigraphy in Mandibular Condylar Hyperplasia. *Clinical Nuclear Medicine*. 1982;7(10):474–475. Available from: <https://dx.doi.org/10.1097/00003072-198210000-00011>.
- [15] Öberg T, Fajers CM, Lyskl G, Friberg U. Unilateral hyperplasia of the mandibular condylar process.: A histological, microradiographic, and autoradiographic examination of one case. *Acta Odontologica Scandinavica*. 1962;20(6):485–504. Available from: <https://dx.doi.org/10.3109/00016356208993953>.
- [16] Slootweg PJ, Müller H. Condylar hyperplasia. A clinicopathological analysis of 22 cases. *Journal of Maxillofacial Surgery*. 1986;14(4):209–214. Available from: [https://dx.doi.org/10.1016/s0301-0503\(86\)80291-0](https://dx.doi.org/10.1016/s0301-0503(86)80291-0).
- [17] Iannetti G, Cascone P, Belli E, Cordaro L. Condylar hyperplasia: Cephalometric study, treatment planning, and surgical correction (our experience). Elsevier BV; 1989. Available from: [https://dx.doi.org/10.1016/0030-4220\(89\)90154-0](https://dx.doi.org/10.1016/0030-4220(89)90154-0).
- [18] GRUCA A, MEISELS E. ASYMMETRY OF THE MANDIBLE FROM UNILATERAL HYPERTROPHY. *Annals of Surgery*. 1926;83(6):755–767. Available from: <https://dx.doi.org/10.1097/0000658-192606000-00004>.
- [19] Rushton MA. Growth at the mandibular condyle in relation to some deformities. *Br Dent J*. 1944;76:57–68.
- [20] Crank S, Gray S, Sidebottom AJ. Condylar hyperplasia—Review of treatment outcomes and suggested pathway for management. *British Journal of Oral and Maxillofacial Surgery*. 2007;45(7):e60–e61. Available from: <https://dx.doi.org/10.1016/j.bjoms.2007.07.094>.
- [21] Wolford LM. Concomitant temporomandibular joint and orthognathic surgery. *Journal of Oral and Maxillofacial Surgery*. 2003;61(10):1198–1204. Available from: [https://dx.doi.org/10.1016/s0278-2391\(03\)00682-7](https://dx.doi.org/10.1016/s0278-2391(03)00682-7).
- [22] Thoma KH. Hyperostosis of the mandibular condyle. *American Journal of Orthodontics and Oral Surgery*. 1945;31(10):597–607. Available from: [https://dx.doi.org/10.1016/0096-6347\(45\)90189-x](https://dx.doi.org/10.1016/0096-6347(45)90189-x).
- [23] Gordon S, Booker AA, E R. Acquired unilateral condylar hypertrophy. *J Can Dent Assoc*. 1957;23:76–80.
- [24] Eve FS. Hypertrophy of the condyle of the lower jaw. 1883;34:167–72.
- [25] Cisneros GJ, Kaban LB. Computerized skeletal scintigraphy for assessment of mandibular asymmetry. *Journal of Oral and Maxillofacial Surgery*. 1984;42(8):513–520. Available from: [https://dx.doi.org/10.1016/0278-2391\(84\)90010-7](https://dx.doi.org/10.1016/0278-2391(84)90010-7).
- [26] Bruce RA, Hayward JR. Condylar hyperplasia and mandibular asymmetry. *J Oral Surg*. 1968;26(4):281–90.
- [27] Jagielak M, Tomasik D, Piekarczyk B, Piekarczyk J. O.148 Orthognathic surgery of condylar hyperplasia and other deformities disturbing facial symmetry. *Journal of Cranio-*

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HYPERPLASIA WITH FACIAL ASYMMETRY** 1009

Maxillofacial Surgery. 2006;34(4):42–42. Available from:
[https://dx.doi.org/10.1016/s1010-5182\(06\)60177-7](https://dx.doi.org/10.1016/s1010-5182(06)60177-7).

[28] Adams R;.

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