ORIGINAL RESEARCH PAPER
Volume - 14 | Issue - 06 | June - 2025 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

TREATMENT OF FACIAL ASYMMETRY DUE TO CONDYLAR HYPERPLASIA USING 3D VIRTUAL PLANNING: A CASE REPORT

Dentistry

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ABSTRACT

An uncommon disorder called condylar hyperplasia (CH) causes facial asymmetry due to excessive unilateral bone development. It usually affects people between the ages of 10 and 30, and both men and women are equally affected. The active growth might halt at any moment since the disease is self-limiting. This case report presents a 19-year-old female patient with unilateral condylar hyperplasia who underwent genioplasty, sagittal split osteotomy on the opposite side and condylectomy, and mandibular recontouring on the afflicted side.

KEYWORDS

Condylar hyperplasia, Condylar hyperactivity, Facial asymmetry, Condylectomy, Virtual 3D planning

INTRODUCTION

Condylar hyperplasia is an unusual malformation of non-neoplastic origin for which there is no recognized etiology. [1] This growth aberration is mainly unilateral and is observed in patients aged 10-30 years without known racial or sexual predilections. [2] The chin deviates to the opposite side as a result of the face unilaterally elongating due to the condyle's growth. CH may cause facial asymmetry, mandibular deviation, malocclusion, and articular dysfunction. As long as the asymmetry continues, occlusal changes occur, even if it is self-limiting. [3] The study suggests that trauma, endocrine problems, vascular changes, and arthrosis may all be contributing causes to this disease. [2-4]

Case Report

A 19-year-old female patient reported to Adithri oral and maxillofacial surgery Centre with a chief complaint of the gradual development of asymmetry on the left side of the face for 1 year. [Figure 1] A complete history given by the patient revealed developing asymmetry of the lower left side of the face, which she had noticed from a self-photograph. The patient started noticing deviation of the mandible towards the left side that progressed slowly until it reached the present proportion. She also developed pain 6 months back in the left temporomandibular joint (TMJ) region while opening the mouth. There was no history of trauma, any systemic diseases, infection, or surgery of the face and jaws. Her medical and family histories were non-contributory.

Figure 1

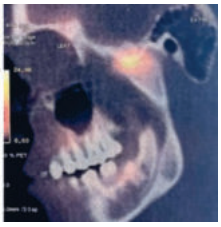

Figure 2

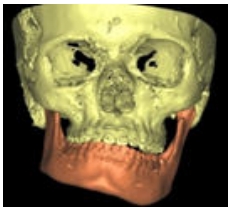

Figure 3

On Extra-oral Examination:

- There was a deviation of the chin towards the left side,
- Roundness of the face was seen on the left side,
- Flattening of the face on the right side,
- Drooping of the left corner of the mouth towards the left.

On Intraoral Examination:

- Displacement of the lower jaw towards the left side was noted.
- Class I malocclusion is seen on the right side, and class III malocclusion is seen on the left side.
- Midline tilt towards the right is seen.

Investigations done were OPG, CBCT and F-18 bone scan. [Fig 2,3] A panoramic radiographic investigation showed an enlarged and deformed left condylar head and neck about 0.4 cm, 1.1cm of elongation of the left ramus and an increase in the height of the left side of the mandible in the first molar region, which confirmed unilateral condylar hyperplasia in relation to the left side. F-18 bone scan revealed left mandibular condylar hyperplasia with elongation of the condylar neck and hypertrophy of the ramus and body of the mandible.

Figure: 4

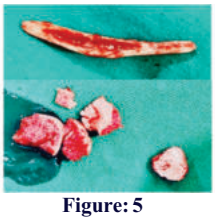

Figure: 5

Figure: 6

Treatment Plan:

- Intra-oral scan and virtual 3D planning was done
- Right sagittal split osteotomy and left condylectomy is advised.
- Mandible right side down fracture by 4 degrees
- Mandible yaw rotation towards left by 3 degrees for midline correction
- Shaving of the lower left border of the mandible is advised.
- Genioplasty bodily shifted towards left by 3 mm and vertical augmentation by 4 mm .

Figures 3 show a pre-operative image after scanning.

The treatment plan was decided as mentioned above, and a shaving

guide for the left mandible, along with final positioning splits, were provided. [as shown in Figure 4]

Consent for surgery was taken from the patient. Under general anaesthesia, a pre-auricular incision was marked and given. Layered dissection was done to expose the condylar head. High condylectomy marking was done, and 2–3 mm of the condylar head was removed. [Figure 5] The reshaping of the condylar head was done.

Using cautery, an intraoral vestibular incision was placed extending from the right premolar region to the right anterior border of the ramus of the mandible. Dissection was done to expose the body and lower border of the mandible. Right sagittal split osteotomy cuts were given. Right side fracture by 4 degrees was done, followed by mandible yaw rotation towards the left by 3 degrees for midline correction and fixed using 2mm 4-hole mini plate.

A vestibular incision was given using cautery extending from 31 to the anterior border of ramus of the mandible on the left side, markings were made using 3D printed shaving guide and recontouring was done by the removal of the required amount of bone on the left side, followed by smoothening of the lower border. [Figure 5]

The vestibular incisions on either side were extended anteriorly, followed by genioplasty, where the body was shifted left by 3 mm, and vertical augmentation by 4 mm was done. The occlusion was checked using the final position splint obtained after 3D planning and fixed using 3-hole L-shaped mini plates. To keep the vertical augmentation stable, a small bone graft was taken from the lower left border that was reencountered and placed in between the cuts. The patient showed an immense improvement in the symmetry where the deviation of the chin in comparison with the preoperative period was reduced to a great extent. [Figure 6] Occlusion was achieved postoperatively. Postoperative OPG showed a reduced right condylar head size.

DISCUSSION

An uncommon temporomandibular joint condition known as condylar hyperplasia (CH) results in functional abnormalities of the TMJ and occlusion in addition to facial asymmetry. Both the functionality and appearance of the patient's face are impacted. No other joint has been reported to exhibit identical disease since Adam's 1836 description of it as an enlargement of the mandibular condyle.

Obwegeser and Makak divided condylar hyperplasia into three categories based on radiographic and clinical features: Hemi mandibular elongation, which includes enlarging the condylar neck and moving the ramus and body without tilting the occlusal plane; hemi mandibular hyperplasia, which includes enlarging the condyle, condylar neck, ramus, and body along with tilting the occlusal plane; and condylar hyperplasia of the condyle alone.[4]

CH's causes are yet unknown. In the past, scholars have debated whether the condyle's development is regulated by internal or external forces. The condyle is thought to be the main growth centre of the mandible since its cartilage is thought to mimic the epiphyseal cartilage of long bones. This view suggests that condylar hyperplasia is mostly caused by intrinsic causes.[5]

The condyle is similar to the Para symphysis, symphysis, body, ramus, and coronoid process, according to another theory that suggests extrinsic factors contribute to condylar hyperplasia. The only distinction is that chondrogenesis takes place in the periosteum that covers the condyle's head. The presence of vascular tissues and mechanical stress trigger the start of periosteal chondrogenesis. [6,7]

Based on these theories, the possible causes could be trauma, hormonal changes, vascular disturbances, abnormal loading and cartilaginous exostosis. [8,9]

The Clinical Features Of CH Are:

1. An enlarged mandibular condyle,
2. Elongated condylar neck,
3. Outward bowing
4. Downward growth of the body and ramus of the mandible on the affected side,
5. Causing fullness of face on that side
6. Flattening of face on the contralateral side.[10]

Normann And Painterm Classified Patients Having Condylar Hyperplasia Into 2 Groups:

- The first group is patients having an active hyperplastic growth,
- The second group of patients with a stable situation in which the abnormal growth is completed. [11]

Dental compensation causes the occlusal plane to tilt if the deformity develops prior to the development's completion, whereas posterior open bite is present if the deformity develops after the growth has finished. About 33.33% of the patients did not report discomfort, dysfunction, or contralateral side edema. [12]

For a conclusive diagnosis, a radiological evaluation is necessary, since an OPG may reveal elongation of the condyle's head and neck. For individuals with CH symptoms, a lateral cephalogram is recommended to determine whether any further face or skull bones are affected. The posteroanterior cephalogram shows a shift in the mandibular midline. [13] A non-invasive method to determine if the hyperplastic growth is still present is bone scanning. [14]

When choosing a course of therapy, the existence or lack of active bone development is crucial. A maxillary Le Fort I osteotomy would be performed in conjunction with bilateral sagittal split mandibular osteotomies if the maxilla has moved to compensate for the mandibular occlusal plane to correct inactive bone development. [15] A high condylectomy and mandibular osteotomies, assuming facial asymmetry is present, would have been the course of therapy if the growth was active.

When ostectomies are performed when condylar development is active, the source of hyperplasia is not addressed, which results in further deformity. Conversely, if a condylectomy is performed when bone growth has ceased, it would cause disruption of the TMJ.

Therefore, knowledge of condylar bone growth is an important factor in defining the treatment.[16]

CONCLUSION

Early diagnosis and a thorough radiographic evaluation, including an OPG, lateral ceph, F-18 bone scan, planar scintigraphy, SPECT, and PET scan, are essential for the treatment and surgical planning of unilateral condylar hyperplasia. In addition to facial deformities, it creates clinical problems. Extended follow-up studies are necessary to determine the best therapy options.

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