ABSTRACT:

Condylar hyperplasia (CH) is a rare idiopathic condition affecting the mandibular condyle where the growth of the condylar head and/or neck continues beyond the normal growth period. The disorder presents clinically as facial asymmetry and occlusal discrepancy. In this paper we are presenting two cases of CH that were managed at our centres between 2012 and 2017 with good successful outcome. This paper highlights the clinical presentation, investigation and the surgical management with brief literature review.

KEYWORDS: Condylar Hyperplasia, Facial Asymmetry, Condylectomy, Orthognathic Surgery, Case Report, Oman.

INTRODUCTION

Condylar Hyperplasia (CH) is a non-neoplastic pathology of unknown aetiology resulting from excessive growth of the condyle head and/or neck. It presents clinically as a classical progressive unilateral facial asymmetry.1-4 Epidemiological data have shown a female predominance with theories suggestive of a possible role of oestrogen hormone.2,5 Due to the continued excessive growth of the condyle, this pathological process can adversely affect the mandibular morphology, dental occlusion, temporomandibular joint function and indirectly the maxillary
growth. Clinical and imaging examinations are essential for establishing accurate diagnosis of CH.

In this paper, we are presenting two cases of unilateral CH in female patients diagnosed and managed at our centre with different surgical options and a satisfactory outcome for our presented cases.

CASE 1:

A 17-year-old female presented to the Oral and Maxillofacial Surgery Department of Al Nahdha Hospital, Oman in February 2012 complaining of a progressive facial asymmetry, which was noticed by the patient over the past 2 years. Clinical examination showed marked facial asymmetry with chin deviation to the right side and mild mandibular prognathism (Fig.1A). Intra-orally, there was a midline shift of 11mm to the right and a reverse overjet, which was more marked on the right side. In addition, there was an anterior open bite in relation to the left upper lateral incisor (Fig.1B). Radiographic examinations showed a discrepancy between the left and right sides of mandible with a 6mm elongation of the left condylar neck. The ramus was elongated downwards and forwards with no effects on the coronoid process (Fig. 1C). Bone scan using technetium$^{99m}$ showed significant increase in the condylar uptake on left side (Fig. 1D), confirming the diagnosis of active left condylar hyperplasia (type 1B as per wolford’s classification of CH).

Due to the disturbed psychosocial status of the patient, there was an urgent need for treatment; therefore, the patient underwent left proportional condylectomy with removal 6 mm of the condylar head. Post-operatively, clinical reviews showed significant improvement of the facial
profile with good facial symmetry and dental alignment. The patient was referred for orthodontic
treatment to further facilitate the correction of the minor dental discrepancy but the patient opted
to reject the orthodontic treatment as she was happy with the outcome. 5 years follow up showed
stable skeletal and dental results (Fig 1E-G).

CASE 2:

A 29-year-old female presented to the Oral Surgery Department at Oman Dental College in
October 2017 complaining of facial asymmetry that was noticed by the patient over many years
(Fig. 2A). The patient had a history of minor trauma to the left side of the face without fractures.
Clinical examination revealed marked facial asymmetry and chin deviation to the left side.
Clinically, there was an 8 mm left midline shift and a left posterior cross bite (Fig. 2B).
Radiographic assessments showed marked elongation of the right condyle and the
technetium$^{99m}$ bone scan showed inactivity of the condylar growth (Fig. 2 C and D). Based on
the clinical and medical imaging, inactive right CH was confirmed and the patient is now
planned for combined orthodontic-orthognathic surgery treatment modality.

Discussion:

The mandibular condyle is a known centre of growth in the facial skeleton. Scientific literature
showed that 99% of the facial growth is completed at age 15 years and 18 years in females and
males, respectively, CH occurs with equal rate in males and females as well as unilateral and
bilateral. CH represents a disorder, where the growth of the condyle continues beyond the
normal growth period. Previous literature has shown that CH often presents in the second or third decades of life and more commonly affects women than men. Raijmakers et al conducted a meta-analysis in 2012, which revealed that woman develops CH significantly more frequently (64%). However, there was no evidence to suggest that the side affected by CH was linked to sex. Our presented cases are in line with published literature in term of age at presentation and gender.

There is a lot of ambiguity surrounding the aetiology of CH. Extrinsic and intrinsic factors have been suggested in association with the development of CH. The suggested intrinsic factors includes; alteration of the condylar vascularization, hormonal disorders and cartilaginous hypertrophy. The extrinsic factors include micro-trauma and infections. The suggested factors may act as initiating factor for the disease process but the clear pathogeneses remains unclear.

Obwesger and makek in 1986 published a classification system of CH, which was based on asymmetry and growth vector. More recently, Wolford et al in 2014 proposed a simpler classification system that was based on the suggestion of CH being a pathological condition causing an over development of the condylar head and/or neck of the mandible. The proposed classification is made of four subtypes and our presented cases are classified as type 1B, which comprises a unilateral asymmetric abnormal condylar overgrowth, leaving an obvious asymmetrical condyle, chin deviation towards the contralateral side and facial asymmetry.

Accurate diagnosis of CH is essential for proper treatment. Many diagnostic methods are available, which includes; clinical examination, orthopantomogram (OPG) and nuclear imaging.
Clinical examination and OPG assessment are often referred as the gold standard in the process of CH diagnosis, however, they do not provide any valuable information regarding the burnout or staging of the condylar hyperactivity.\textsuperscript{7,9,11,16} Nuclear imaging which includes, Scintigraphy (Technetium\textsuperscript{99m}), Single Photon Emission Computed Tomography (SPECT) and Positron Emission Tomography (PET), provides detailed information on the condylar activity and cessation of growth, thus assisting the formulation of appropriate treatment plan.\textsuperscript{8-10,16,17}.

Different treatment protocols have been suggested in the literature for the management of CH (Fig.4).\textsuperscript{18-20} Prior to determining the type of treatment, careful assessment and consideration should be given to the patient’s age, activity status of the condyle, level of facial asymmetry and occlusal discrepancy, and the psychological status of the patient.\textsuperscript{6,18,21,22} Published studies have confirmed that on one hand condylectomy is recommended in patients with continued active growth of CH.\textsuperscript{18,19} On the other hand, orthognathic surgery is the more appropriate surgical management in cases of inactive CH.\textsuperscript{21}

There is no consensus regarding the optimal timing for the surgical treatment of CH. Some studies suggested deferring the treatment until the activity of the CH has arrested then preforming the corrective orthognathic surgery, although, this may cause the patient to suffer from functional problem, worsening the esthetic and the psychosocial stigmata associated with facial deformity.\textsuperscript{18,19} Nowadays, there is a good support from published studies for early surgical interventions, which mainly entails high condylectomy or more recently proportional condylectomy.\textsuperscript{6,21,22} Wolford \textit{et al}, advocated that early high condylectomy, at age 15 years in females and 17-18 years in males, is regarded as a minor intervention where 3-5 mm is removed from the upper part of the condylar head. This intervention often leads to excellent esthetic and
Another treatment modality suggested in the literature is the simultaneous combination of high condylectomy and orthognathic surgery, which thought to reduce further needs for surgical intervention, however, recent studies showed there are risk of relapse associated with this treatment modality that was seen more in maxilla than mandible, thus requiring secondary surgical intervention. More recently, published work by Farniz et al. showed that proportional condylectomy is superior to high condylectomy due to the low need for further corrective orthognathic surgery (16% for proportional condylectomy compared to 91% for high condylectomy). Proportional condylectomy entails the removal of the difference observed between the hyperplastic and the opposing healthy condyle. The amount removed is usually estimated based on pre-operative OPG.

In our first reported case, the CH lesion was active and due to the overwhelming psychosocial issues with the patient, a proportional condylectomy was preformed, which gave a successful outcomes and stable result with a 4 years follow-up, obviating the need for further surgical intervention. However, in the second, as the CH was inactive, Case 2 is currently undergoing orthodontic-orthognathic treatment.

**Conclusion:**

Condylar hyperplasia is a relatively rare idiopathic condition affecting the mandibular condyle. Careful assessment and investigations are essential prior to the formulating of the required treatment plan that should take into consideration, the patient’s needs and the condyle growth status.
REFERENCES:


Figure 1: Case 1 (A) pre-operative frontal photograph showing asymmetrical face with chin deviation to the right side, (B) anterior dental view showing occlusal discrepancy (C) Te99m sintigraphy showing continued growth of the left condyle, and (D) pre-operative OPG showing elongation of the left condylar neck, (E) 4 years post-operative frontal view showing symmetrical face with improved appearance, (F) 4 years post-operative dental view showing marked improvement in dental occlusion and a residual minor anterior dental discrepancy, (G) post-operative OPG showing bilateral symmetrical condyles and rami segments.
**Figure 2:** Case 2 (A) clinical photograph showing asymmetrical face with chin deviation to the left side, (B) anterior dental view showing occlusal discrepancy with midline shift to the right side (C) Tc$^{99m}$ scintigraphy showing cessation of condylar growth, and (D) an OPG showing elongation of the right condylar neck.

**Figure 3:** Diagram summarizing treatment options of condylar hyperplasia (CH).