

## Case Report

### Post Traumatic Deformity and Condylar Head Resorption - Report & Review

Suyog K. Pradhan<sup>1</sup>, Yadnit Bhosale<sup>2</sup>, Nandini Dayalan<sup>3</sup>, Ruthika Shivajirao Patil<sup>4</sup>, Ankita Raj<sup>5</sup>, Abhinav Chopra<sup>6</sup>, Shalini Singh<sup>7</sup>

<sup>1</sup>MDS, Prosthodontics and Crown and Bridge, Senior Lecturer, MGM Dental College and Hospital, Kamothe, Navi Mumbai, Maharashtra;

<sup>2</sup>MDS, Prosthodontics and Crown and Bridge, Senior Lecturer, MGM Dental College and Hospital, Kamothe, Navi Mumbai, Maharashtra;

<sup>3</sup>Senior lecturer, Dept of OMFS, Dr.Syamala Reddy dental college hospital & researches center, Bangalore, Karnataka

<sup>4</sup>BDS MDS Prosthodontics, The dental specialists, Banjara Hills Road No.11, Hyderabad, Telengana;

<sup>5</sup>MDS, Reader, Department of maxillofacial surgery, Rama Dental College, hospital and research center, Lakhanpur, Kanpur, Uttar Pradesh;

<sup>6</sup>MDS, Oral and Maxillofacial Surgery, Senior Lecturer, Rayat & Bahra Dental College, SAS Nagar, Punjab;

<sup>7</sup>MDS, Assistant Professor, Department of Conservative Dentistry & Endodontics, Dr. H.S.R.S.M. Dental College & Hospital, Hingoli, Maharashtra.

#### **ABSTRACT:**

Mandibular condyle is one of the most common sites of injury of the facial skeleton. Moreover, in head and neck regions, it is the least diagnosed site of the trauma. Trauma to the mandible, especially to Condylar zone may manifest as asymmetry or bilateral mandibular distortion later in life when the etiology is unknown to most people. The present case report is about an adult female complaining about clicking at the right side as a result of trauma few months back. The Condylar process of the mandible locates away from the direct traumatic insults; however it is a structure with frequent facial traumatic injury. The aim of the study was to evaluate the structural changes of TMJ (soft and hard tissues) immediately after unilateral Condylar fracture using MRI and to evaluate their influence on the prognosis after closed treatment.

**Keywords:** Condylar deformity, Condylar resorption, mandibular condyle, trauma

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**Corresponding author:** Dr. Suyog K. Pradhan, MDS, Prosthodontics and Crown and Bridge, Senior Lecturer, MGM Dental College and Hospital, Kamothe, Navi Mumbai, Maharashtra

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#### **INTRODUCTION:**

Symmetry means similarity in the form, size and relative position of parts which are located on the two opposite sides and are separated by a median plan or a mid line. Thereby, asymmetry means absence of this symmetry. Asymmetry for the human face indicates disproportion between the right and left sides. Although some extent of the asymmetry is normal as well as acceptable, specification and early diagnosis

of developing causes are necessary for managing as well as for controlling the asymmetry.<sup>1</sup>The causes of mandibular asymmetry are divided into 4 types: developmental, pathological, traumatic, and functional (Table 1).The formation of condyle is an essential phase for the formation and function of mandible.<sup>2</sup> The recent findings have shown that the role of condyle in facial growth has been

**Table 1- Causes of mandibular asymmetries.**

CAUSES	EXAMPLES
Developmental	Hemimandibular elongation Hemimandibular hyperplasia Hemifacial microsomia Achondroplasia Hemifacial hypertrophy Torticollis Hemifacial atrophy (Parry-Romberg syndrome)
Pathological	Tumors and cysts Infection Condylar resorption
Traumatic	Condylar fractures
Functional	Mandibular displacement

changed from an active epiphyseal-like growth center to a site for compensatory growth in response to the functional needs of the soft tissue.<sup>3</sup> The growth and development of the jaw as well as the occlusion depend upon the integrity of condyle to a large extent. Although one of the most common sites of trauma to the facial skeleton is condyle of mandible, but it is usually neglected and in case of head and neck traumas, it is the last part to be examined. Unilateral condyle injury during the childhood may lead to the limitation in the jaw opening and also facial asymmetry in the adulthood. Such disorders are usually caused by the infections or traumas.<sup>3</sup>

Condylar resorption can initiate following a macro trauma to the face. The macro trauma consists of one episode of a large-magnitude force that is transmitted to the articular structures of TMJ. Generally, the force is of a sufficient magnitude that it is acutely injurious to the affected articular tissues. Occlusion is not altered at the time of macro trauma, but temporomandibular joint alterations can occur over a period of time after the macro trauma, which leads to a progressive mandibular retrusion. The bone loss at mandibular condyle has been described as a result of Orthognathic surgery, local and systemic arthritis, post-traumatic remodeling and/or hormonal imbalance.<sup>4</sup> The osseous resorption of condyle that occurs without the obvious cause is termed as idiopathic Condylar resorption (ICR). The Condylar resorption can be aggressive i.e., occurs in months or slow that takes years. The manifestations of the Condylar resorption are: receding chin (facial imbalance), snoring and apnea (smaller airway) and bite disturbances (anterior open bite, posterior tooth wear and muscle pain).<sup>4</sup>

**Causes of Mandibular Resorption:**

Following are the most common causes of mandibular resorption:

- A) The systemic factors and compressive factors.
- B) Anything that compresses the TMJ (bad bite, bad dentistry, bad Orthognathic surgery, bruxism, repetitive oral habits, etc.) can cause the bone changes through inflammation.
- C) Any systemic condition that raises inflammation in the body (arthritis, low estrogen, anorexia, infections, etc) will exacerbate the resorption caused by compression. Both sides of the equation require treatment.

**CASE REPORT:**

A 27 year old female reported with the chief complaint of pain and clicking on wide jaw movements on the right side since 4 months, which has gradually aggravated. There was history of a mirror fall on the right temporal region 8 months back. No relevant medical history. Extra oral examination revealed no facial asymmetry in frontal view. Vertical mouth opening was normal as well as the lateral movements of mandible were in normal range. In temporomandibular joint examination, when opening and closing the mouth, clicking on the right side joint was observed, which indicates anterior disk displacement with reduction. Examination of salivary glands and cervical lymph nodes did not show any significant pathology. By the above clinical examination and mandibular asymmetry; right side TMD (anterior disk displacement with reduction) was made as provisional diagnosis, which were caused by deviation of the head of the right condyle from its development axis because of an unknown childhood trauma. CBCT was done which

revealed the erosion in the articular surface in superior surface of right condyle which suggested degenerative changes. MRI was done (Figure 1&2) for further evaluation which revealed mild flattening of temporal condyle noted on right side. Also, subtle STIR hypodensity noted in the right condyle. Focal defect was noted on the right side. The disc shows slightly altered

shape with focal hyper intensity of the mid and posterior band of the disc, which suggested focal irregularity with depression of the condyle of mandible on right side with degenerative changes in the intervening disc- likely to represent osteoarthritis or post traumatic changes.



**Figure 1- CBCT showing erosion in the articular surface in superior surface of right condyle**



**Figure 2- MRI showing mild flattening of condyle noted on right side**

## DISCUSSION:

The causes of asymmetry can be varied like genetic defects in the mechanisms, which can induce the symmetry, and also the environmental factors. One of the causes of asymmetry is trauma. The untreated mandibular fracture may lead to different degrees of the asymmetry. The Condylar fractures comprise of almost more than 50% of all the mandibular fractures in children. The weakest region of the mandible is the Condylar neck and it is also the most susceptible part to fracture.<sup>2</sup> Due of the well-protected position of the condyle by articular capsule, most of the intracapsular injuries are caused by the indirect injuries to mandible portions such as angle, body, or the symphyseal region. The displacement of a fractured Condylar head usually occurs in the anteromedial direction because of the strong lateral ligament. Generally, it is usually associated with the superior impaction of the fractured Condylar neck upward into the glenoid fossa because of the function of elevator muscles attached to the ramus, which then finally leads to the shortening of ramus. Trauma to the Condylar zone during childhood may lead to the discontinuance of its development and thereby impaired function. Hence, in most of the cases, the trauma is not diagnosed correctly. If the development of the condyle is being stopped because of trauma, due to the short ramus, asymmetry will be formed and the chin will be deviated towards the affected condyle. Loss of the function is usually caused by the joint ankylosis.<sup>5</sup> The Condylar resorption manifests with the decreased Condylar size, mandibular ramus and also progressive class II open bite. Yamada *et al.* have found that the flattening of Condylar head was the most frequent unilateral Condylar change. Furthermore, many authors noted that the Condylar resorption may be related to a lateral mandibular shift and a retrognathic mandible in the patients who demonstrate TMD symptoms.<sup>6</sup> In order to observe the head of the condyle, best diagnostic method is CBCT images in search of the areas of resorption and also the interruptions of the bone cortex. Irrespective of the etiological factors that trigger the Condylar resorption, all converge into a single pathway in which there is no balance between the bone apposition and remodeling.<sup>7</sup> The free radicals cause the oxidation reactions with the molecules which can have damaging effects on the tissues. This can be triggered by excessive loads in TMJ which causes a mechanism of the hypoxia-reperfusion. When there is inflammation, bone damage and joint dysfunction, a high oxidation state has been demonstrated in the synovial fluid of temporomandibular joint. Cytokines of temporomandibular joint are produced by the osteoblasts and synoviocytes. The cytokines TNF- $\alpha$ , IL-6 and receptor activator nuclear ligand factor kappa-beta (RANKL) have been associated with the Condylar

resorption and its severity occurs in accordance with its concentration. Several therapeutic options for the management of Condylar resorption are available, each with its advantages and disadvantages. In the patients who do not want to be exposed to the surgical treatment, conservative orthodontic treatment etc is recommended.<sup>8</sup> However, in the patients who are interested in correcting their aesthetics, Orthognathic surgery combined with the occlusal guard and pharmacotherapy is a very good option. In the present paper, the final diagnosis of post traumatic changes was made by keeping in mind the pathology that hematoma secondary to trauma in the joint space caused the cortical resorption of the Condylar head and exposure of the cancellous part which was causing the osteoblastic activity and thereby, leading to decrease in the joint space which eventually was causing rubbing of head with the glenoid fossa and leading to pain. It is very crucial to clinically distinguish the type of the asymmetry, i.e., whether it is skeletal, functional, or a combination of both in order to differently plan the treatment.<sup>9</sup> Some study showed that the most distortional structures are the mandibular ramus with its condyle and the coronoid processes. The erroneous treatment plans may lead to the patient's and the orthodontist's disappointment.<sup>10</sup> Thereby, accurate diagnosis of the asymmetry and resorption along with its etiology before the treatment is fundamental to recognition of the limitations and possible therapeutic options.

## CONCLUSION:

The present case showed that since there was significant Condylar asymmetry and resorption, hence the diagnosis of traumas to the condyle is very important. Many studies have suggested that increasing age and altered loading may diminish Condylar growth capacity of the TMJ. In addition to it, the correct diagnosis of the type of asymmetry and its etiology are also equally necessary because of the completely different orthodontic and the surgical treatment plans, and moreover the maxillofacial radiologist plays an important role in diagnosis and treatment of this field. TMJ rehabilitation of patients with Condylar resorption requires careful treatment planning.

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