

MORPHOLOGICAL CHANGES SEEN IN THE CONDYLE ASSOCIATED WITH AGE, DENTITION AND TEMPOROMANDIBULAR DISORDERS.

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ABSTRACT: *The aim of this research is to evaluate the morphological changes in the condylar and its association with age, dentition and temporomandibular disorders by using panoramic radiograph. Patients may complain of severe pain, discomfort, restriction of mouth opening, clicking sound and more in the temporomandibular region and therefore it will be correlated with the temporomandibular disorders. The study consists of 100 individuals who visited Saveetha Dental College, Chennai, India and categorized into 4 groups according to age: 3-10, 15-20, 30-50 and 60-80 years with 25 patients in each group. Patients were subjected for digital panoramic radiographs. A questionnaire consisting of 12 questions was designed to record the symptoms and clinical examination was performed to record the signs and symptoms of temporomandibular disorders.*

KEYWORDS: *Morphological changes, temporomandibular, condyle, disorders.*

1. INTRODUCTION

Temporomandibular joint is one of the most complex articulations of the human body working bilaterally and simultaneously connecting the mandible to the cranium referred to as craniomandibular articulation or ginglymoarthrodial joint. (Kumar et al., n.d.) (Ashwinirani et al., 2018) The features that differentiate and make this joint unique are its articular surface covered by fibrocartilage instead of hyaline cartilage. Moreover, human condyles differ greatly in their shapes and dimensions. (Ikeda and Kawamura, 2009) It is believed that TMJ growth is affected by ageing, state of occlusion, functional jaw movement during opening and closing the mouth. (Ashwinirani et al., 2018) (Burket et al., 2008) Although structural changes are thought to be related to TMJ dysfunction, the mechanism of these structural changes affected by such reactive processes as remodeling, aging, and osteoarthritis, still has not been completely clarified. Furthermore, there have been some extensive examinations of the human condyle using autopsy specimens that have concentrated their attention on morphologic changes. (Burket et al., 2008) However, the changes in the human condyle with regard to aging or occlusal loss have not been completely elucidated. Temporomandibular disorders (TMD) constitute a complex set of specific entities with a wide range of reported prevalence. (Sanchez-Woodworth et al., 1988) The term “temporomandibular disorders” (TMD), is a collective term embracing a number of clinical problems that involve the masticatory musculature, the temporomandibular joint (TMJ) and associated structures, or both. (Okeson, 1985) These

disorders are characterized by facial pain in the region of the TMJ and/or the muscles of mastication, limitation or deviation in the mandibular range of motion, and TMJ sounds during jaw movement and function.

In addition, panoramic radiography has been recommended as a screening tool in patients with TMJ complaints and may be appropriate for determining gross bony changes in the condyle. There can be a lack of correlation between radiographic findings and TMD symptomatology, and patients without TMD symptomatology can present with condylar changes demonstrated by panoramic imaging.(Okeson, 1985)(Hegde and Others, 2005) Additionally, morphologic changes may occur on the basis of simple developmental variability as well as remodelling of the condyle to accommodate developmental variations, malocclusion, trauma, endocrine disturbances and radiation therapy. Genetic, acquired, functional factors, age groups, individuals also have a role in morphologic changes in shapes and sizes of condyle. Thus variability in the shapes and sizes of condyles should be considered as an important factor in diagnosing the disorders of temporomandibular joints among asymptomatic patients. Prevalence of minor bone changes in condyles of patients with asymptomatic TMJs serve as a predictor for future TMJ problems as a person advances with age.(Hegde and Others, 2005; Kreutziger and Mahan, 1975) Moreover ,the appearance of mandibular condyle varies among different age groups & individuals. These variations may be in the form of flattening, osteophyte, erosion, sclerosis, ely's cyst (subcortical cyst), small round, excavated, ossicles have been reported in symptomatic as well as asymptomatic patients. Several studies on bone changes in patients with TMD are conducted but limited literature exists on prevalence of bone changes of condyles and their variations among people with different age groups, gender and occlusal condition in asymptomatic TMJs particularly among Indian population.(Kreutziger and Mahan, 1975; Pereira et al., 1994)

2. MATERIALS AND METHODS

The study consists of 100 individuals who visited Saveetha Dental College, Chennai, India and categorized into 4 groups according to age: 3-10, 15-20,30-50 and 60-80 years with 25 patients in each group. Patients were subjected for digital panoramic radiographs and appropriate candidates were considered for the study after obtaining their consent. All patients were clinically diagnosed with or without TMD and also with symptomatic or asymptomatic patients. Not only that but an informed consent was taken from the patients prior to the clinical and radiographic examination. A questionnaire designed to record the symptoms was used. Clinical examination was performed to record the signs and symptoms of temporomandibular disorders.

Questionnaire included the following questions:

- 1) Do you have difficulty in mouth opening?
- 2) Do you feel pain during eating and mouth opening?
- 3) Is there any clicking sound during mouth opening/
- 4) Duration of pain/clicking sound?
- 5) Do you have any neck, shoulders or joint pains?
- 6) O you feel pain in front of the ears?
- 7) Do you suffer from severe headaches?
- 8) Do you grin or clench your teeth?
- 9) Have you had any accidents or trauma previously, if so, please mention it below?
- 10) Do you consider your bite as normal?

- 11) Do you have a habit of chewing food on one side only?
- 12) Are you a denture wearer? If yes, does it fit well?

Patients underwent a detailed clinical examination. They were examined for mouth opening, deflection, deviation, lateral movements of the mandible, muscles of mastication were palpated for any tenderness. Moreover, the temporomandibular joint was palpated, extra articular and intra auricular for any tenderness. Dentition was clinically examined. Denture wearers were asked regarding the fit of the denture and its efficiency in chewing. Panoramic images were in a standard manner. The films were processed in an automatic processor and only high quality radiographs were considered for the study. In addition, panoramic radiographs were examined by single observers under ideal viewing conditions. (Crow et al., 2005; Muir and Goss, 1990) Radiographic changes in the condyle were recorded as the following:

1. Flattening: loss of an even convexity or concavity of the joint out lines,
2. Erosion: local area of rarefaction in the cortical plate of a joint surface,
3. Ely's cyst (subcortical cyst): Rounded radiolucent area that may be just below the cortical plate or deep in trabecular bone.
4. Small round:
5. Pencil shaped:

In order to assess the interobservers and interobserver reliability 10 radiographs in each age group (a total of 30 radiographs) were selected at random and reexamined after a time gap of 3 months by the same observer and another observer trained in interpreting panoramic image

3. RESULTS AND DISCUSSION

AGE GROUP (YEARS)	DENTITION	
	NORMAL	ABNORMAL
3-10	20	5
15-20	16	9
30-50	13	12
60-80	7	18

Table 1 shows the age and dentition in relation to temporomandibular disorders.

TMD	TOTAL NUMBER OF PATIENTS
Flattening	12
Erosion	2
Ely's Cyst	1
Small Round	6
Pencil Shaped	1

Table 2 shows the types of temporomandibular disorders and the total number of patients associated with it.

The following shows the morphological changes obtained from patients visiting Saveetha Dental College and Hospitals for OPG as below:

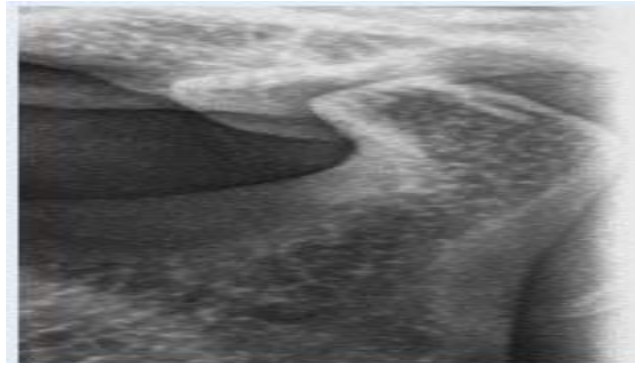


Figure 1 shows flattening of the condyle.



Figure 2 shows the condyle with pencil shaped.



Figure 3 shows eroded condyle.



Figure 4 shows condyle with Ely's Cyst.



Figure 5 shows an example of the condyle with a small round feature.

Morphological changes such as flattening, erosion, Ely's cyst, small round and pencil shaped were mostly detected in symptomatic patients but certain changes were also detected in asymptomatic patients. In this study, the samples were collected in such a way that the subgroups are sufficient to detect any differences. The prevalence of temporomandibular disorders was seen in all the age groups but mostly in individuals around 60-80 years. Furthermore, flattening was the most common finding followed by small round, erosion, Ely's cyst and lastly pencil shaped. Flattening was more observed in both the right and left condyle as well as small round with subjects each having 12 and 6. Erosion, Ely's cyst and pencil shape showed lower prevalence in this study. Moreover, in this study two subjects had erosion and one subject had Ely's cyst, and pencil shaped. Among 100 subjects, around 35 subjects reported signs and symptoms of TMD such as TMJ clicking, pain during mouth opening, pain during eating and mouth opening, pain in front of the ears, jaw deviation, proper occlusion and lastly midline shift or midline diastema. In association with dentition status and condylar morphology, the prevalence of abnormal condylar was not significant as well as age too. (Akerman et al., 1988) Hence, the prevalence of this study was to show that about 22 patients out of 100 patients that visited Saveetha Dental College had temporomandibular disorders such as flattening, erosion, small round, Ely's cyst and pencil shaped. Not only that but age and dentition has not much of significance in the morphological changes of the condylar. (Flygare et al., 1992; Huuonen et al., 2007) The diversity among the prevalence of TMD among different studies can be attributed to the differences in the age groups, the sample sizes, their composition (TMD and non-TMD patients), and the number of examiners, as well as the diagnostic criteria used. (Packota, 1989; Takayama et al., 2008) Though there was no statistically significant association between reported symptoms and radiographic changes in condylar morphology, the symptoms were more frequent in those with radiographically abnormal condyles. (Christiansen et al., 1987; Tabrizi et al., 2016) Clicking was the only TMJ sound that was observed, and this was more in subjects with radiographically normal condyles as compared to those with radiographically abnormal condyles. Though there was no statistically significant correlation between limited lateral movement and abnormal condylar findings it was observed more frequently in those with radiographic abnormal condyles. (Imanimoghaddam et al., 2014; Poveda-Roda et al., 2015)

4. CONCLUSION

In conclusion, the most common type of temporomandibular disorders are flattening followed by small round, erosion, Ely's cyst and lastly pencil shaped. Furthermore, TMD disorders are seen not only seen in the older age group but it is seen more in this current generation.

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CONFLICT OF INTEREST

The authors declare that there was no conflict of interest.

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