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Evaluation and Comparision of Effect of Mutilated Dentition on Condylar Morphology in Temporomandibular Joint Dis ordered Patients

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Abstract

Introduction

Temporomandibular disorders (TMD) is a compilation of symptoms, seen in various combination first described by Costen (1934, 1937). According to him these symptoms were due to impingement of auriculotemporal or chorda tympanic nerves. He associated TMD with loss of vertical dimension, loss of posterior tooth support, and/or other mutilated dentition conditions; the symptoms can include headache about the vertex and occiput, tinnitus, pain about the ear, impaired hearing, pain about the tongue1

The temporomandibular joint disorders not only include the joint disorders but also the disturbances of masticatory system2.TMD presents with following chief signs3

1. Limitation of jaw opening or function
2. Pain with jaw opening or function
3. Joint sounds.

TMD is a multifactorial disorder that includes stress, trauma, muscular hyperactivity, orthopedic instability, degenerative diseases and inflammatory diseases that affect the joint. 10-70% of population is affected by TMD4. TMD influence the soft tissue (articular disk, muscles) and bony components (condyle, glenoid fossa, articular eminence). The bony changes in TMJ are known to be associated with temporomandibular disorder hence it is essential to identify the bony changes. There is a lot of dispute regarding association of TMJ with dentition status. Dental factors has been correlated to joint sounds,5,6 mandibular movements, Bruxism, wear facets, malocclusion, missing posterior teeth horizontal and vertical overlap.

The nulls hypothesis was that there is no association between condylar morphology changes and mutilated dentition in TMD patients

Materials and Methods

Research protocol of the study was approved by the ethical committee held at Govt. College of Dentistry, Indore. 50 patients who presented with the signs and symptoms of TMD were examined for the disorder and a provisional diagnosis was formulated. These patients were further subjected to CBCT investigation to evaluate their condylar morphological changes. Inclusion Criteria for both the groups were.

1. Patients clinically diagnosed with temporomandibular joint disorder.

2.Patients with the age group between 18-70 yrs.

3.Patients with no history of any systemic disease or intake of drugs which are known to cause TMD.

Exclusion Criteria for both the groups was-

1. Patients who have undergone trauma of maxillofacial region.
2. Patients with the congenital abnormalities affecting jaw joint.
3. Patients who had undergone orthodontic treatment.
4. Patients suspected to have bruxism.
5. Patients having any kind of intraoral pathology that limits the intraoral examination.
6. Patients who's CBCTs do not show a clear TMJ or the TMJ of poor density will be excluded.
7. CBCTs showing incidental findings of pathologies involving the jaws.

Criteria for grouping the patient into mutilated dentition group.

Patients having the following features will be grouped in the mutilated dentition group.-Mediotrusive contact; Posterior bite collapse; Wear facets till 2 point on 4 point scale by Johansan and Omar; Missing tooth in any quadrant; Overjet and overbite greater than 4mm; Open bite; Crowding in any arch.

The slices used for assessment of condylar morphology were Custom Slicing and Oblique Slicing in CBCT

For condylar morphology

Evaluation of condylar shapes on coronal sections

Type 1- Convex ; Type 2- Rounded; Type 3- Flat; Type4- Angled; Type 5- Concave

Evaluation of condylar shapes on sagittal sections

Type 1- Rounded; Type 2- Flat; Type 3 - Beak-like; Type 4 – Concave2 was done**.**

Evaluation of condyle on both coronal and sagittal sections also includes -Erosions, Subcortical cyst/ Ely's cyst,Sclerosis of underlying bone, Generalized sclerosis, Loose joint body (osteophytes), Marginal bony overgrowth.

The right and left condylar size were measured for their mediolateral and anteroposterior dimensions in coronal and sagittal sections respectively. Standarization of measurement of mediolateral dimension was done by measuring all the coronal images at a distance of 6mm from most superior point, measurement of anteroposterior dimension was done by measuring all the sagittal images at a distance of 3mm from most superior point.

Statistical analysis

Condylar changes

	Present	Not present	Total
Mutilated dentition	32	1	33
Normal dentition	13	4	17
	45	5	50

By Fischer exact test the **p value is .04** which is statistically significant. Fischer's exact test was applied instead of Chi squre because two of the frequencies in the 2*2 table are less than 5

p value- 0.752 for condylar bone changes in coronal section is statistically insignificant; p value- 0.49 for condylar bone changes in sagittal section is also statistically insignificant

Results

The following results were obtained in this study.

1. The two by two table shows that condylar changes were more significant in the mutilated dentition group as compared to normal dentition group , having p value .04
2. The graphic representation shows that condylar changes distribution in two groups, the normal condylar morphology was more common in the

normal dentition group as compared to mutilated dentition group.

3. The grading range in mutilated dentition group shows severe condylar changes indicating association of mutilated dentition with TMD
4. The percentage of abnormal condylar bone changes were high in mutilated dentition group.
5. Flattening of the condyle was the most common condylar bone change found in the mutilated dentition group followed by sclerosis of underlying bone
6. In normal dentition group the most common condylar bone change was flattening followed by erosion.

Discussion

TMJ pain is a multifactorial problem that requires a comprehensive team approach following a medical model. It is important to rule out other causes of facial pain before investigating the teeth as the primary etiologic agent. Diagnosis is therefore the key to successful treatment; cure when possible and manage when not. When major comprehensive dental care is anticipated, then occlusion is of the utmost importance and a standard dental model of care should be followed; for example, centric relation/centric occlusion should be established, proper anterior form, function and esthetics ascertained, and posterior determinants of occlusion respected. There are different schools of thoughts in regards to the association of dentition status and TMD disorder, most of the patients who report with TMD complain are of young age group with few missing teeth and less mutilation, but for the occlusion and dentition status to be pathologic even small changes can play a role. Thus dentition status should be evaluated as a etiological factor for the deviation in form of the condyle or as a co-determinant factor in the pathophysiology of TMD disorder. Occlusion is essential for quality restorative dentistry, prosthodontics, and stability of the stomatognathic system and can be a factor in TMD7. Practitioners must also be cognizant that the potential exists for the teeth and the effects of a pathologic occlusion to contribute to TMD pain and be etiologic.

The parameters studied here were the missing tooth , incisal and occlusal wear, horizontal and vertical overlap, posterior bite collapse, mediotrusive contacts and crowding in the TMD symptomatic patients. The relation between the dentition status and temporomandibular joint disorder is important because if there is no relation then there should be no intervention by the dentist and if there is a relation then dentist should play a vital role in treating TMD2 . Study by Khojastepour et al showed statistically significant relation between TMD and condylar bone changes in CBCT4

Seligman and Pullinger, 2000 studied anterior open bite, cross bite, anterior attrition, RCPICP slide length, overjet , Wang MQ 2009 8studied missing posterior teeth found association between these dental factor and TMD in different population group. Study by Tallents R H9 found relation between missing posterior teeth and inraarticular temporomandibular disorders. Study by Nasser Barghi found decrease in the amplitude of clicking after missing tooth replacement10No statistically significant difference was found when evaluating for signs and symptoms of TMD after denture fabrication in edentulous patients11. In 2007 the association between anerior tooth wear and temporomandibular disorder pain was studied by Oliver and found no association between excessive tooth wear and TMD pain. In all these studies there was no consistent factor which was found to be associated with TMD. Our aim in the study was to assess the severity of condylar changes in patients with TMD having mutilation . In our study group the changes were statistically more significant in the mutilation group, the association between mutilation and TMD as a etiological factor still remains a controversial topic but it(mutilation) can be considered as

a aggravating factor in TMD group. The number of convex condyle in the coronal sections and round condyle in the sagittal sections were most common.

These shapes without any findings of erosions, sub cortical cyst, loose joint body, sclerosis and marginal bony overgrowth were considered normal.

17 patients were of normal dentition, out of these 15 had condylar changes and 2 patients had no changes in the condyle morphology. 33 patients were with mutilated dentition out of these 32 presented with some or the other condylar changes and 1 patient had no changes in the condyle morphology.

The maximum change observed was flattening of the condyle in the coronal section and sagittal sections, followed by sclerosis of underlying bone.

There was discrepancy in the size between right and left condyle , decrease in the size of the affected condyle in both the anteroposterior and mediolateral dimensions The change in size also had a relation with the mutilation.

The patients who reported with unilateral pain their radiographic findings showed decrease in size of the same side condyle and hypertrophy was observed on the contralateral side, as the number was not so high it was difficult to prove any statistical correlation.

Conclusions

The results of the study suggest that TMD has an effect on condylar morphology as almost all patients had some abnormal changes. Both right and left condyles were affected in TMD. While studying the CBCT it was found that Mutilated dentition is associated with extensive condylar changes as compared to normal dentition group. The severity of condylar bone changes was more frequent in mutilation group as compared to group of normal dentition. When arranged in odinal order the mean condylar bone changes in mutilation group were more significant as compared to normal dentition group. The distribution of all the abnormal changes in coronal and sagittal section when evaluated individually were found to be statistically insignificant in mutilation group may be because of less number of samples in individual group.

It was also found that unilateral TMJ pain showed restorative changes of condyle on the affected side and formative changes on the contralateral side condyle(these bony changes are in correlation with the theory of bone resorption at pressure and formation at traction).The most prevalent dental factor was mediotrusive contact by virtue of its dynamic nature. Conclusions about the association of any single dental factor with TMD and condylar bone changes cannot be ruled out. According to Okeson the correction of mutilation with irreversible therapy in TMD patients should always be preceded by conservative approach through reversible therapy2

Statement regarding treatment of mutilation for correction of TMD cannot be made through this study. But it is always recommended that to do reversible therapy. When there are strong evidences that primary cause of TMD is prevalent occlusal condition irreversible therapy can be undertaken.

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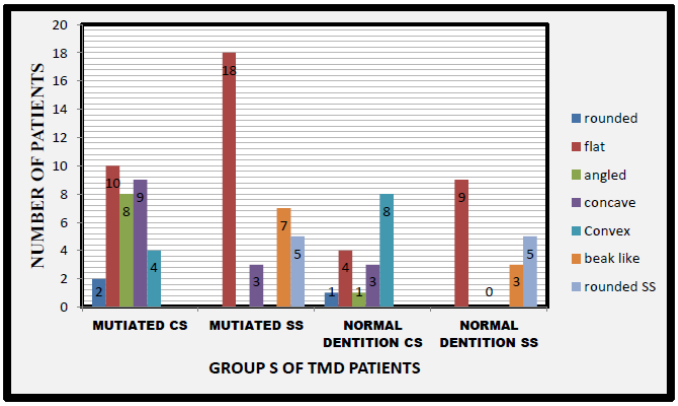
Legends Figure and Tables



Graph 1: Graphic Representation Of Condylar Morphological Changes

Group	N	Total Bony changes	
		Mean ±SD	Median
Mutilated dentition group	33	3.64± 1.729	4
Normal dentition group	17	1.82± 1.77	1

Table 1: Mean Condylar Changes In Two Groups

Condylar bone changes	Mutilated dentition group	Normal dentition group
Erosion	9 (18%)	3
Subcortical cyst	6 (12%)	0
Sclerosis of underlying bone	12 (24%)	0
Generalized sclerosis	0	0
Osteophyte	1 (2%)	0
Marginal bony overgrowth	5 (10%)	0

Table 2: Distribution Of Condylar Changes In TMD Symptomatic Patients With Mutilated Dentition And Normal Dentition

Condylar bone changes	Mutilated dentition group	Normal dentition group	P value
Coronal section			0.752
Rounded	2	1	
Flat	10	4	
Angled	8	1	
Concave	4	3	
Sagittal section			0.49
Flat	18	9	
Beak like	7	3	
Concave	3	0	

Table 3: Condylar Morphological Changes In Two Groups