



Relationship Between TMJ Disorders and Malocclusion

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ABSTRACT

Temporomandibular disorders are a class of degenerative and musculoskeletal conditions associated with morphological and functional deformities. It is prevalent among all age groups causing various symptoms, including pain, discomfort, even limiting the functions. Malocclusion is one of the predisposing factors causing TMJ disorders. Hence the objective of this study was to evaluate the relationship between TMJ disorders and malocclusion. A retrospective study was conducted. Data was collected through reviewing records of 86000 patients visiting a dental hospital in Chennai. A total of 294 patients who had reported with TMJ problems were evaluated. Data such as age, gender, symptoms, associated with TMD, presence of malocclusion, patient's profile were noted. The data collected were analysed statistically through IBM SPSS software. A total of 294 patients reported with TMJ disorders in all age groups from June (2019) to March (2020). TMJ disorders were prevalent more in the age group of 20-40years (57.4%) and more among males (52.58%). About 54.79% of the patients with TMD had malocclusion. In this study, TMJ disorders and malocclusion were significantly associated with each other.



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collective term embracing a number of clinical complaints related to the muscles of mastication, temporomandibular joint and/or associated with orofacial structures (Firestone, 1997).

The TMJ and its associated structures play an essential role in mandibular movements and also help in the distribution of stress produced by various actions such as chewing, swallowing and speaking (Griffiths, 1983). Such TMJ disorders cause a series of symptoms and signs in the population including painful joint sounds, restricted mouth opening, deviation of the mandible, pain in the muscles of mastication etc., (Tanaka et al., 2008)

INTRODUCTION

Temporomandibular disorders (TMD) are defined by American Academy of Orofacial Pain (AAOP) as a

The etiology of TMD is multifactorial, including systemic, psychological and structural factors (Mohlin et al., 1991). One of such factors is malocclusion

which can be considered predisposing for TMJ disorders (Egermark-Eriksson *et al.*, 1983). Previous reports showed controversial results regarding the TMD and malocclusion relationship (Michelotti and Iodice, 2010; Zonnenberg and Mulder, 2013).

Few studies reported the association between TMJ disorders and craniofacial anomalies such as open bite, cross bite, excessive overjet (Egermark-Eriksson *et al.*, 1990; Mohlin *et al.*, 1991). However, some reported less influence on the signs and symptoms of TMD even after orthodontic correction of anomalies (Larsson and nnerman, 1981; Pilley *et al.*, 1997).

Only limited studies have been conducted in patients of all age groups. Previously our team has conducted numerous cross-sectional studies (Felicita *et al.*, 2012; Rubika *et al.*, 2015; Krishnan *et al.*, 2018), clinical trials (Jain *et al.*, 2014; Felicita, 2017a; Samantha *et al.*, 2017), in-vitro studies (Kumar *et al.*, 2011; Dinesh *et al.*, 2013; Kamisetty *et al.*, 2015; Sivamurthy and Sundari, 2016; Vikram *et al.*, 2017), case reports (Felicita, 2017b, 2018), literature reviews (Krishnan and Pandian, 2015; Viswanath *et al.*, 2015) over the past many years. Now we are focussing on epidemiological surveys. Hence, an attempt has been made in this study to assess the relationship of TMD and malocclusion among patients of the Chennai population.

MATERIALS AND METHODS

Sampling

This study was conducted in a university setting. The study samples were chosen from the patients visiting a hospital in Chennai from June (2019) - March (2020).

Data collection

The retrospective study was carried out among patients of all ages. Data collection was done through reviewing records of 86000 patients between June (2019) - March (2020). Data such as patient's age, gender, symptoms associated with TMD, presence of malocclusion, patient's profile were noted. The data collected were cross verified with intraoral photographs.

Inclusion criteria

Patients of all ages who reported with one or more TMJ problems.

Exclusion criteria

Patients with systemic diseases, development abnormalities, parafunctional habits, traumatic

injuries in dentofacial region, history of orthodontic management were excluded.

Incomplete/censored data were excluded too.

Approval

Ethical clearance was obtained from the Institutional scientific review board of the university (SDC/SIHEC/ 2020/ DIASDATA/ 0619-0320).

Data analysis

The data collected was entered into the excel sheet. Data was analysed through frequency and Chi-square tests using SPSS software.

RESULTS AND DISCUSSION

A total of 294 patients reported to the hospital with TMJ problems. The mean age of the study population was 33.4. Majority of the study population (58.36%) belonged to the age group of 20-40yrs (Graph 1). The X-axis shows the age group distribution and Y-axis shows the distribution of the study population. There was a higher incidence of TMJ disorders in the age group of 20-40years(58.36%-purple).

Among them, 52.58% of the patients were males, and 47.44% were females (Graph 2). Prevalence of TMJ disorders was higher among males (52.56%-black) than females (47.44%-red).

About 50.68% of the patients presented with a straight profile, 33.56% with a convex and 15.75% with a concave profile (Graph 3). Patients with straight profile (50.68%-violet) were more prevalent followed by convex (33.56%-pink) and concave (15.75%-dark blue).

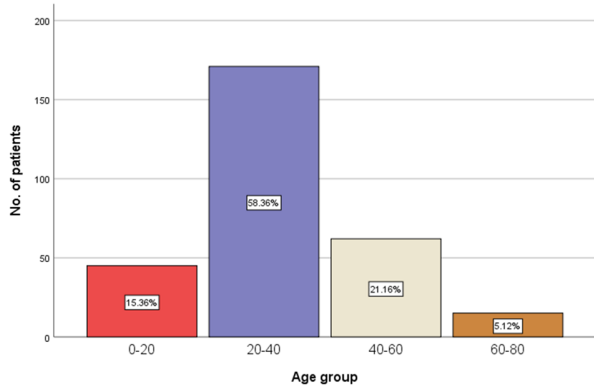
In the present study, 54.79% of the patients who reported with TMJ problems had malocclusion (Graph 4). Prevalence of malocclusion was higher among the patients with TMJ disorders (54.79%-blue).

There is an increased prevalence of malocclusion among patients of age group 20-40yrs (Graph 5).

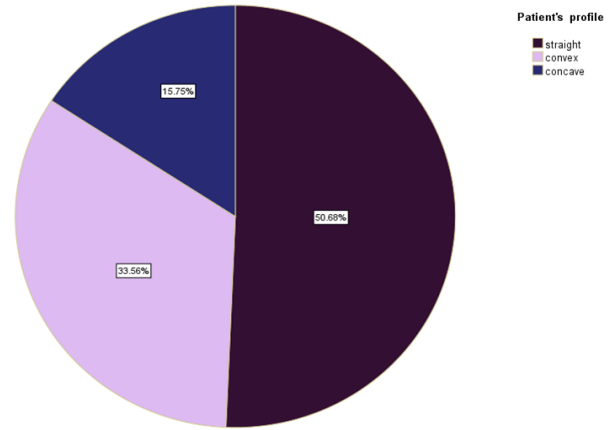
There is no significant difference in the prevalence of malocclusion between different genders (Graph 6). The X-axis shows the gender distribution and Y-axis shows the distribution of the study population.

Pain (38.91%) and joint clicking (38.91%) were the highest reported TMJ symptoms among the study population (Graph 7). The X-axis shows the TMJ symptoms, and Y-axis shows the patient's count. Pain (38.91%-green) and Clicking joints (38.91%-grey) were the most common symptoms reported among the study population.

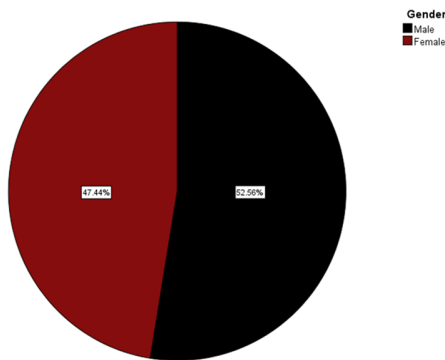
There is a significant increase in the presence of malocclusion among the patients with joint clicking (Graph 8).



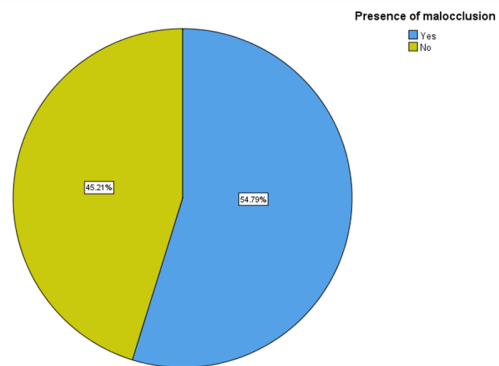
Graph 1: Bar chart showing the distribution of the study population with the presence of TMJ disorders based on age group



Graph 3: Pie chart showing the distribution of the study population with the presence of TMJ disorders based on different facial profiles



Graph 2: Pie chart showing the distribution of the study population with the presence of TMJ disorders based on gender

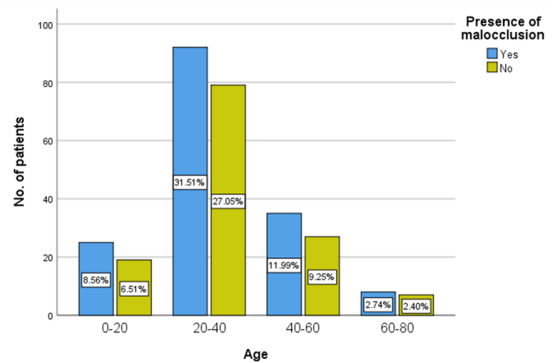


Graph 4: Pie chart showing the distribution of the study population with TMJ disorders presented with malocclusion

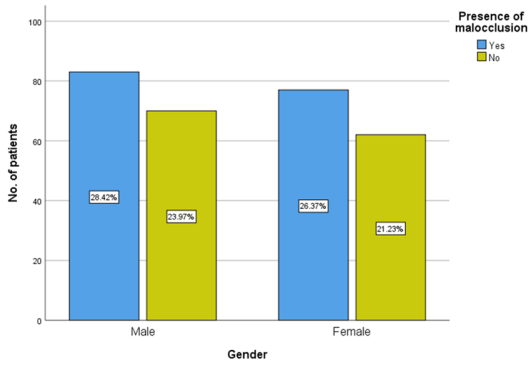
Graph 5 shows the X-axis shows the age group distribution and Y-axis shows the distribution of the study population. There was a higher incidence of TMJ disorders in the age group of 20-40 years (31.51%-blue) which was however not statistically significant (Chi-square test; $\chi^2=0.223$, $df=3$, $p\text{-Value}=0.974$ (>0.05)).

Graph 6 shows there was not significant difference in the presence of malocclusion among different genders (Chi-square test; $\chi^2=0.039$, $df=1$, $p\text{-Value}=0.844$ (>0.05)).

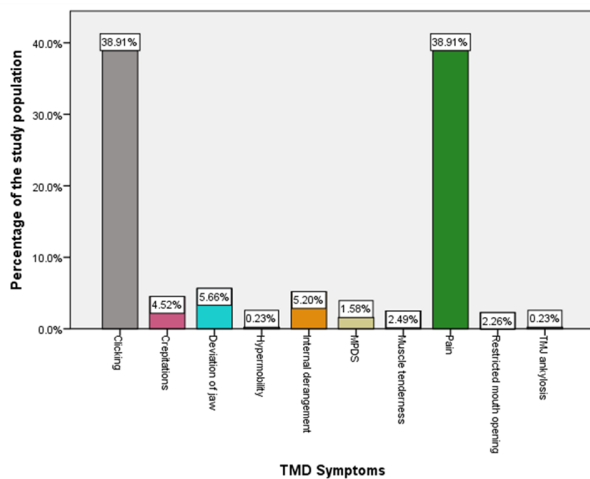
Graph 8 shows the X-axis shows the TMJ symptoms, and Y-axis shows the distribution of the study population. Higher incidence of malocclusion was prevalent among patients with clicking joints (22.85%-blue) which was not statistically significant (Chi-square test; $\chi^2=5.979$, $df=10$, $p\text{-Value}=0.817$ (>0.05)).



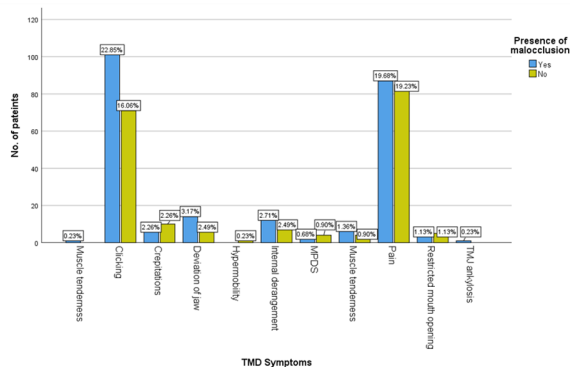
Graph 5: Bar chart showing the distribution of the study population with TMJ disorders presented with malocclusion based on age group



Graph 6: Bar chart showing the distribution of the study population with TMJ disorders presented with malocclusion based on gender



Graph 7: Bar graph showing the distribution of study population with various TMJ symptoms



Graph 8: Bar graph showing the association of study population with various TMJ symptoms based on presence of malocclusion

Since there is an unclear opinion in malocclusion being an etiologic factor of TMD, it is essential to study the extent of its contribution to TMD. Hence, this study was intended to evaluate any association between different aspects of malocclusion and TMD. In the present study, patients with history of development abnormalities, parafunctional habits, traumatic injuries in the dentofacial region and history of previous orthodontic management were excluded to rule out the effects of those on TMJ.

In this study, 294 patients had reported with TMJ symptoms from June 2019 to March 2020. A study by (Muthukrishnan and Sekar, 2015) in the Chennai population reported TMD in the patients with a prevalence rate of 53.7%.

In the present study, males showed higher prevalence of TMD compared to females, however it is not statistically significant. Many previous studies reported a higher incidence of TMD among females than males (Schmid-Schwab et al., 2013; Chisnoiu et al., 2015) as women are more sensitive to pain conditions than males.

In this study, TMD was more prevalent in the age group of 20-40 yrs. This is in accordance with the study by (Muthukrishnan and Sekar, 2015) who reported higher prevalence of TMD among patients belonging to 18-30 years of age. However, a study by (Glass et al., 1993) reported higher prevalence of TMD with increase in age.

In the present study, pain and clicking joints were the most common symptoms reported in patients with TMD. This is in accordance with many other studies that reported similar findings (Al-Gadhaan et al., 2018; Al-Khotani et al., 2016; Jang et al., 2016).

About 54.79% of the patients with TMJ problems reported the presence of malocclusion in this study. This study showed association between malocclusion and TMD. These results are in accordance with many studies that reported a significant relationship of malocclusion in TMD (Egermark-Eriksson et al., 1990; Gesch et al., 2004; Sánchez-Pérez et al., 2013; Sujatha et al., 2018). However, few studies reported results that are contradicting the present study (Godoy et al., 2007; Aboalnaga et al., 2019).

Orthodontic treatment at an earlier age is necessary to reduce the progress of TMJ disorders. Few studies have shown a significant reduction in the prevalence of TMD by orthodontic treatment (Olsson and Lindqvist, 1992; Henrikson, 1999). A study by (Larsson and nnerman, 1981) reported that patients who had received orthodontic treatment were less severely affected by TMD than those people who had not undergone orthodontic management. (Solberg

et al., 1986) studied the TMJ changes in young adults through autopsy and concluded that malocclusion was associated with morphological changes in the TMJ.

Limitations

This study has several limitations. Since this is a retrospective study, the sample size is very less and is limited to certain geographical locations. Parameters such as characteristics of malocclusion and its features were not included. Hence, cohort study with the inclusion of these parameters among a larger population is required.

CONCLUSION

Within the limits of this study, there is an association in the incidence of TMD among the patients with malocclusion. Oral health intervention programs are needed to screen/diagnose orthodontic issues and TMJ disorders in order to identify and offer treatment preventing it from progressing to severe disorders.

Conflict of interest

The authors declare that they have no conflict of interest for this study.

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