

Prevalence of Temporomandibular Disorders among Partially Edentulous Patients: A Hospital Based Cross-Sectional Study

¹.Reshmi M,* ².Vinni T K**, ³.Gilsa K Vasunni***, ⁴.Pramod Kumar A V***
⁵.Reshmi R S*

*Junior resident, ** Associate Professor, ***Professor, Department of Prosthodontics, Govt. Dental College, Kozhikode, Kerala, India.
Corresponding Author: Reshmi M

Abstract:

Aim: The purpose of this study is to investigate prevalence of temporomandibular disorders (TMD) among partially edentulous patients.

Background: The prevalence of TMD signs in partially edentulous patients has not been well- documented. On the contrary, much of the published work has been attributed to the complete denturewearing and the dentate patients.

Methods: A total of 150 samples with Kennedy Class I or Class II partially edentulous arch, with age group range 30 to 75 were selected. The evaluation of TMD was done using Helkimo index. The results were analysed by Frequency distribution and Chi-square test.

Result: On evaluation of signs of TMD, the Frequency distribution of clinical dysfunction index (Di) showed that 60.7% of the samples were free of any signs and the Frequency distribution of anamnestic index (Ai), based on subjective findings shows that 66.7% of the samples were free of any symptoms. On evaluating different signs of TMD, 84% of the population had normal range of movement (≥ 40 mm), 69.3% had smooth movements without temporomandibular joint (TMJ) sounds or deviation in both opening and closing movements ≤ 2 mm, 98% did not have tenderness to palpation in masticatory muscles, 96% did not have tenderness to palpation in TMJ region and 86.7% did not have pain on movement of mandible. There was statistically significant difference between male and female subjects ($p=0.017$) and no significant difference among different age groups. When comparing Kennedy Class I and Class II edentulous subjects, Class I maxilla group subjects were least affected.

Conclusion: There is a low prevalence of the signs and symptoms of TMD among subjects who were included in this study. As TMD is a multifactorial condition, none of the literature shows a standardized protocol for the assessment and treatment and the results given were inconsistent. Thus more research is required in this field.

Date of Submission: 29-03-2018

Date of acceptance: 14-04-2018

I. Introduction

Temporomandibular disorders (TMD) are recognized as the most common chronic orofacial pain condition confronting dentists and other health care providers ¹. In terms of relation between TMDs and age, high prevalence of such signs and symptoms has been reported among adults. ² Temporomandibular disorders (TMD) are defined by the American Academy of Orofacial Pain as "a collective term that embraces a number of clinical problems that involve the masticatory muscles, the temporomandibular joint (TMJ), and the associated structures". ³ Pain or tenderness in TMJ region, difficulty in chewing or deviation of mandible while opening mouth, clicking sound during chewing and sensation of an uncomfortable bite are some of the signs and symptoms. ⁴

The etiology of TMD is multifactorial and these include trauma, genetics, anatomical factors and occlusion. The most popular theories regarding TMD etiology are based on the bio psychosocial model, which involves a combination of biological, psychological and social factors. ^{5,6} It is well-established that a high percentage of patients who have a naturally occurring "occlusal abnormality" do not exhibit disease, while patients with ideal occlusion can and do exhibit temporomandibular disorder. So evidences point to many other etiologic factors such as anatomical susceptibility of temporomandibular tissues to trauma, polyarthritic diseases, joint laxity, repetitive parafunctional behaviours, and stress-related muscle dysfunction. In fact, current evidence points to these etiologic factors as more likely causative agents of disease than any structural irregularity of the occlusion or the joint. ⁷ Shetty *et al* concluded that the female subjects had a significantly higher prevalence of TMJ dysfunction signs than male subjects and the masseter muscle was the most commonly involved. ⁸

The earliest and still popular etiologic theory proposed that temporomandibular disorders are induced by abnormal structure, usually described as a malocclusion of the teeth or jaws.⁹ Gupta *et al* reported that supra eruption of opposing maxillary molars and drift of adjacent teeth had a significant association with asymptomatic clicking of the TMJ, and that clicking of the TMJ was a frequent finding in patients with longer duration of molar loss.¹⁰ Mahmood *et al* found that there is a relation between TMJ dysfunction and partial edentulism, with females having a higher prevalence of TMJ dysfunction signs than males, as well as the span and time of edentulousness.¹¹

As the association between tooth loss and TMD remain controversial and the prevalence of TMD signs in partially edentulous patients has not been well documented, this study aims to assess the prevalence of TMD among Kennedy's Class I or Class II partially edentulous subjects with age between 30 to 75.

II. Materials and methods

A cross-sectional study was conducted in 150 partially edentulous patients who reported to the Department of Prosthodontics, Govt. Dental College, Kozhikode. An informed consent was obtained from the patients before commencement of the study. Those subjects having Kennedy Class I or Class II partially edentulous situation for at least 6 months or more, and having age range between 30 to 75 years were included in the study. Those subjects with known history of TMD before being partially edentulous, subjects with history of trauma or diseases in the TMJ region and medically compromised patients were excluded from the study.

The comprehensive examination included an intraoral examination, clinical stomatognathic examination and completion of the questionnaire that included questions about personal details, in addition to symptoms of TMD. The examinations were conducted by the same examiner. The incidence of TMD signs and symptoms was evaluated using a questionnaire based on the Helkimo index. It consisted of a questionnaire for subjective symptoms (anamnesic index-Ai) and an examination for clinical signs (clinical dysfunction index-Di).

The questionnaire consisted of 13 questions for the evaluation of the presence of pain in the TMJ, head and neck during mastication, presence of parafunctional habits and limitations in movement, joint clicks, a feeling of tiredness or fatigue in TMJ region, duration of symptoms and the severity of symptoms. The anamnesic dysfunction index (Ai) was divided into three groups, based on answers obtained.

Physical examinations were carried out with the use of a dental mirror, a probe, a metallic ruler, a divider, and a stethoscope. The clinical dysfunction index (Di) was divided into four groups according to severity of recorded signs. Maximal opening and overbite were measured with an ordinary ruler. TMJ sounds were determined with a stethoscope for diagnosis of clicking or crepitation.

The palpated muscles were: masseter, temporalis (tendon), lateral pterygoid, medial pterygoid, and the anterior part of the digastric. The lateral and posterior part of the TMJ was palpated and the subject's involuntary pain reaction or the reported pain perception when asked was recorded.

Data collected was analysed with SPSS software. Chi-square test was used to evaluate the differences of frequencies in various subgroups. A *p*-value less than 0.05 were considered statistically significant.

III. Results:

The present study was conducted to evaluate the signs and symptoms of TMD in partially edentulous patients. The evaluation was done using Helkimo index, which has two parts: an examination part and a questionnaire, both representing the signs and symptoms of TMD respectively. The variables compared were gender, age, different classes of edentulism and various signs of TMD

71.1% of the males and 57.1% of females were clinically symptom free, and this difference between gender was statistically significant ($p=0.017$) which showed that females were more affected than males. (Table 1) 78.6% of the samples in the age group of 61 to 70yrs were symptom free, while in the 51 to 60yrs age group, only 52.4% samples were symptom free. This means that this age group included more affected samples and this difference was not statistically significant ($p=0.064$). Moreover, as the age increases, the sample showed mild or no symptoms.

On comparing different situations of Kennedy's Class I and Class II cases, there was a statistically significant difference ($p = 0.001$) in signs of TMD. Class I maxilla & Class II mandible combination (40 %) and Class I mandibular edentulous situation (40.7%) included the more affected individuals and class I maxilla group included more asymptomatic individuals (77.8%) (Graph 1)

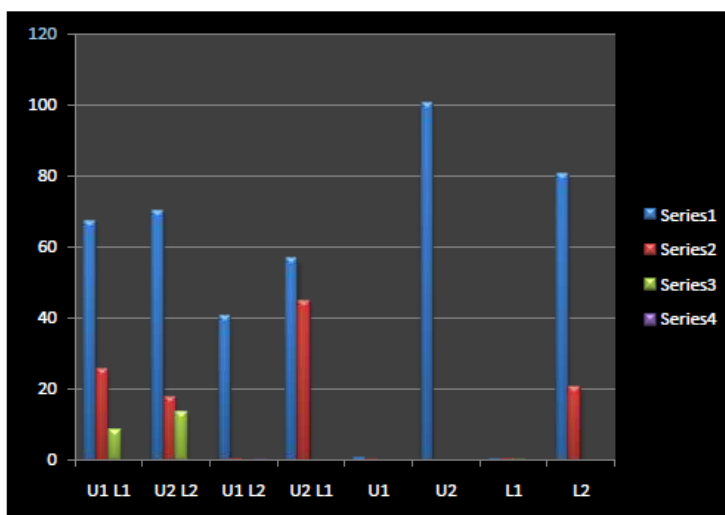
The frequency distribution of clinical dysfunction index (Di), based on the evaluation of signs of TMD showed that 60.7% of the samples were free of any signs and the frequency distribution of anamnesic index (Ai), based on subjective findings showed that 66.7% of the samples were free of any symptoms.

On evaluating different signs of TMD, the sample population showed that 84% had normal range of movement (≥ 40 mm), 69.3% had smooth movements without TMJ sounds or deviation in both opening and closing movements ≤ 2 mm, 98% did not have tenderness to palpation in masticatory muscles, 96% did not have

tenderness to palpation in TMJ region, and 86.7% did not have pain on movement of mandible. (Table 2)

GENDER		Di0	Dii	Diii	Diiii	TOTAL
Male	Count	27	6	3	2	38
	% within gender	71.1%	15.8%	7.9%	5.2%	100%
Female	Count	64	39	9	0	112
	% within gender	57.1%	34.8%	8.0%	0.0%	100%
Total	Count	91	45	12	2	150
	% within gender	60.7%	30.0%	8.0%	1.3%	100%

Table 1: Distribution (%) of signs (clinical dysfunction index di) based on gender



Graph 1: Distribution (%) of signs (clinical dysfunction index di) in different edentulous situations

	FREQUENCY	PERCENT
Helkimo Anamnestic Index Score		
AiO	100	66.7
Aii	26	17.3
Aiii	24	16
Mandibular Mobility		
Normal Range	126	84
Slightly Impaired	24	16
Impaired Tmj Function		
Closing Movements ≤ 2 Mm	104	69.3
Both Joints And/Or Deviation ≥ 2 Mm	39	26
Locking And/Or Luxation Of The TMJ	7	4.7
TMJ pain		
No tenderness to palpation	144	96
Tenderness in 1-3 palpation sites	5	3.3
Tenderness in 4 or more palpation sites	1	0.7
Muscle pain		
No tenderness to palpation	147	98
Tenderness to palpation laterally	2	1.3
Tenderness to palpation posteriorly	1	0.7
Pain on mandibular movement		
No pain on movement	130	86.7
Pain on 1 movement	13	8.7
Pain 2 or more movements	7	4.7
Helkimo dysfunction index score		
DiO	91	60.7
Dii	45	30
Diii	12	8
Diiii	2	1.3

Table 2: Relationship between number of teeth and clinical signs and symptoms of temporomandibular disorders

IV. Discussion:

The term TMD includes many disorders, including masticatory muscle disorders such as myositis, muscle spasm, muscle contracture, and myofascial pain syndrome; temporomandibular joint disorders such as inflammatory disorders and derangements of the condyle-disk complex; and chronic mandibular hypo mobility and growth disorders. It has been documented that patients with few remaining natural teeth may have a higher incidence of TMJ dysfunction signs. However, there is no sufficient evidence of an association between TMJ dysfunction and partial loss of teeth.¹²

The present study investigated the prevalence of TMD among Kennedy's Class I or class II partially edentulous subjects in the age range 30 to 75. The examination consisted of a questionnaire and a clinical examination for signs of TMD. 150 patients were included in the study, both males (38) and females (112). The results showed that females had more prevalence of TMD than males, patients with Kennedy's Class I maxillary - mandibular situation and mandibular Class II situation had more prevalence of TMD. Moreover, as the age increases, the symptoms of TMD become milder, but the difference between various age groups was statistically insignificant.

A reliable comparison of symptoms and signs of TMD between various epidemiologic studies is problematic or even impossible, because there is a wide variation in results regardless of methods used¹². In this study, the Helkimo index was used for the diagnosis of signs and symptoms of TMD. It consisted of a questionnaire for subjective symptoms (anamnesic index-Ai) and an examination for clinical signs (clinical dysfunction index-Di). The study found that 66.7% of the samples were free of any symptoms. Only 16% of the population had difficulties in opening mouth wide, locking, luxations, pain on movement of mandible, pain in the region of TMJ or masticatory muscles. Moreover, 60.7% of the samples were clinically symptom free. Only 1.3% of the samples showed severe dysfunction. 69.3% of the samples had smooth movement without TMJ sounds or deviation in opening or closing movement ≤ 2 mm and 98% of the samples did not have tenderness to palpation in masticatory muscles.

Many studies have been conducted on the various aspects of the TMD. It has been found that TMDs are common in adults; as many as one third of adults reported had one or more symptoms, which included jaw or neck pain, headache, and clicking or grating within the joint. In this study also it was found that there was a statistically significant difference in the prevalence of clinical signs between males and females. It was also found that 71.1% of the males and 57.1% of females who participated in this study were clinically symptom free. Females tended to report symptoms more frequently than did males. Several studies have found that women have more TMD problems than men. P.T. Koidis *et al* described that clinical and anamnestic examination data established the ratio of women to men as 4:1.¹³

Another finding from this study was the relation of TMD and partial edentulism. The frequency distribution showed that 60.7% of the study samples were free from any clinical signs of TMD and 66.7% of study samples were free from any symptoms of TMD. This led to the conclusion that the prevalence of TMD in partially edentulous patients who reported to Dept. of Prosthodontics, Kozhikode was low. But, there was a statistically significant difference ($p=0.001$) in various situations of Kennedy's Class I and Class II partially edentulous cases. Class I maxilla- Class II mandible combination and mandibular Class I edentulous condition, included the more affected individuals and Class I maxilla group included more asymptomatic individuals. There are different opinions regarding relation of TMD and partial edentulism. Some investigators considered missing molars or occlusion to have a great impact on etiology of TMD, while others do not, hence the available data is inconsistent regarding this.

The results of previous studies showed that there is a relation between age and the prevalence of TMD. As the age increases, symptoms were getting milder. But in this study, each age group didn't have sufficient samples. Hence it was not statistically significant. But there are evidences to support this finding. P Koidis *et al* found that there is a statistically significant correlation between severity of symptoms and age among women, and a relative decline by age in the prevalence of symptoms for both sexes.¹³

The present study does have its limitations like small sample size for different partially edentulous situations and that the association between age and prevalence of TMD could not be found.

V. Conclusion:

The present study found that the prevalence of TMD was less among the selected population. Based on the evaluation of signs and symptoms, females had more prevalence of TMD than males, and patients with Kennedy's class I mandibular situation and a combination of maxillary Class I & mandibular Class II situation had more prevalence of TMD. As the age increases the symptoms of TMD became milder, but the difference was statistically insignificant. The field of TMD is undergoing a major transformation as a result of research findings about pain in general, as well as specific advances within the field. As a result, TMDs are currently recognized as a subset of musculoskeletal pain conditions, and this requires a medical perspective to understand and manage TMD patients. For the dental profession, the implications of this information are profound and serious

in most TMD cases, but especially in chronic conditions. More reversible and conservative medically based management strategies are recommended to reduce pain and improve function, an approach that has been shown to be successful for most TMD patients.

References:

- [1]. Dwarkim, S. G., Huggins, K. L. Epidemiology Of Signs And Symptoms In Temporomandibular Disorder, Clinical Signs In Cases And Casteales. *J Am Dent Assoc.*, 1990,120: 273
- [2]. Melkino, M. Studies On Function And Dysfunction Of The Masticatory System. II Index ForAnamenolic And Clinical Dysfunction And Occlusal State. *Swed Dent J.*, 1974,67: 101
- [3]. Okeson JP, De Leeuw R. Differential Diagnosis Of Temporomandibular Disorders And Other Orofacial Pain Disorders. Vol. 55, Dental Clinics Of North America. 2011. P. 105–20.
- [4]. Gupta S, Gupta R. Partial Edentulism And Temporomandibular Joint Disorders.2014;13(12):60–3.
- [5]. Okeson JP, De Leeuw R. Differential Diagnosis Of Temporomandibular Disorders And Other Orofacial Pain Disorders. Vol. 55, Dental Clinics Of North America. 2011. P. 105–20.
- [6]. Dworkin SF, Massoth DL. Temporomandibular Disorders And Chronic Pain Disease Or Illness J Prosthet Dent. 1994;72:29–38.
- [7]. Seligman D a, Pullinger a G, Solberg WK. The prevalence of dental attritionand its association with factors of age, gender, occlusion, and TMJsymptomatology. J Dent Res. 1988;67(10):1323–33.
- [8]. Shet RGK, Rao S, Patel R, Suvvati P, Sadar LR, Yadav RD. Prevalence Of temporomandibular Joint Dysfunction And Its Signs Among The Partially Edentulous Patients In A Village Of North Gujarat. 2013;14(December):1151–5.
- [9]. Krzemień J, Baron S. Axiographic And Clinical Assessment Of Temporomandibular Joint Function In Patients With Partial Edentulism. *Acta BioengBiomech.* 2013;15(1):19–26.
- [10]. Sk G, Pk P, Km B, Mutalik S, Guddattu V. Non-Replaced Mandibular First Molars And Temporomandibular Joint Dysfunction. 2014;3(1).
- [11]. Hama AM, Mahmood Dk. Development Research Evaluation Of Temporomandibular Joint Disorders In. 2016;2–4.
- [12]. KaijaHiltunen. Temporomandibular Disorders In The Elderly A 5-Year Follow- Up Of Signs And Symptoms Of Tmd. 2004.
- [13]. Koidis PT, Zarifi A, Grigoriadou E, Garefis P. Effect Of Age And Sex On Craniomandibular Disorders. J Prosthet Dent. 1993;69(1):93–101.

Reshmi M "Prevalence of Temporomandibular Disorders among Partially Edentulous Patients: A Hospital Based Cross-Sectional Study."IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 17, no. 4, 2018, pp 23-27.