

# Prevalence of Temporomandibular Disorders in Patients Wearing Complete Dentures Visiting A Medical College in South India

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## ABSTRACT

**Introduction:** The last decades have witnessed a paradigm shift in the number of elderly people in the population. Advancing age is commonly associated with increased periodontal problems, dental decay, loss of teeth and resultant increased use of denture. This study is an effort to study the prevalence of temporomandibular disorders among denture wearers and to formulate dental treatment protocols if necessary. Aim of the study was to determine the prevalence of temporomandibular disorders (TMD) in patients wearing complete denture (CD) and compare the same in those with complete set of natural teeth.

**Material and methods:** After taking written pre-informed consent, 473 patients were selected from dental outpatient department. Percentage of complete denture wearers was 38.47 while dentate patients made upto 61.5%. They were subjected to questionnaire and clinical examination for temporomandibular joint.

**Results:** Findings of this study indicate that there was a difference between the two groups regarding the prevalence of temporomandibular features. In the group of dentate patients, the prevalence of temporomandibular disorder signs (with the exception of crepitus sound of the joint) was 29.2% while it was 14.3% in complete denture wearers. Temporomandibular joint tenderness was 12.4% in dentate and 4.4% in CD wearers. Clicking sound was 10.7% in dentate and 3.3% only in the denture-wearing patients. CD wearers exhibited signs of crepitus sound of temporomandibular joint more as compared to dentate patients. The muscles which most commonly demonstrated tenderness were lateral pterygoid in dentate group and masseter and temporalis muscles among denture wearers respectively.

**Conclusion:** Owing to greater number of geriatric population using complete denture, it is prudent for dental care providers to be aware of the consequences of denture use over anatomy and physiology of temporomandibular joint.

**Keywords:** Occlusion, Temporomandibular dysfunction, temporomandibular joint, signs, prevalence, denture wearer

edentulous denture wearer patients.

## MATERIAL AND METHOD

### Selection of the patients

A total of 5576 patients visited the dental outpatient department at Karnataka institute of medical sciences in Hubli over twelve month's period (April 2015 to March 2016). 3075 patients (1466 male; 1609 female) had chief complaint related to prosthodontics. Among 1241 patients with problems related to complete denture were shortlisted. 969 patients did not meet the inclusion criteria and were excluded thereby leaving 272 (21.9%) completely edentulous, CD wearers. Finally total of 182 complete denture wearers and 291 randomly selected dentate patients who were willing to participate and complete the questionnaire and undergo the clinical examination were selected for this study. Figure 1 shows the method used for selection of patients in this study. Prior informed consent and ethical clearance were obtained before the start of the study.

### Examination of the joint

Extra-auricular, bilateral, digital palpation was done to assess joint tenderness. Joint sounds were determined with the aid of a stethoscope placed in front of the external auditory meatus. Clicking, popping and crepitus of the TMJ, either unilateral or bilateral, were recorded. The maximum mouth opening or interincisal distance was measured using a millimeter ruler after asking the patient to open as wide as possible while remaining comfortable. Mouth opening was also assessed for any deviation in the pathway of mandibular movements. The primary muscles of mastication were palpated bi-manually for any signs and tenderness.

### Examination of complete denture

The existing complete dentures were examined thoroughly for support, retention, stability, occlusion, vertical dimension at rest and at occlusion, freeway space and palatal extension of denture base following the MacEntee and Wyatt method.<sup>8</sup>

## INTRODUCTION

Temporomandibular disorder (TMD) is an umbrella term that includes anatomical and physiological disorders associated with the temporomandibular joints, muscles of mastication, or both.<sup>1,2</sup> Results of various epidemiological prevalence studies have shown that approximately 50% of the general population may experience symptoms or signs of TMD but only 3% to 7% of the general population reported to seek treatment.<sup>3,4</sup> Review of existing literature confirms that majority of people who seek treatment are women in second – third decade of life.<sup>5</sup> Signs and symptoms of TMD seem to decrease with increasing age as reported by various authors and this can be another reason why elderly patients don't seek treatment as often as expected.<sup>6,7</sup> Thus, with this hypothesis the authors planned the following study to compare the prevalence of TMD in dentate and

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### STATISTICAL ANALYSIS

Data recorded from patient’s questionnaire, clinical examination Of TMJ and denture examination were analysed using the SPSS software, Release 11.0. The Statistical test employed was chi-square test. Level of significance was set at P<0.05.

### RESULTS

In this parallel study, 182 (79 male and 103 females) completely edentulous patients and 291 dentate patients (110 male and 181 females) were included. The mean age of the edentulous sample was 65.3 (SD±8.53) years and mean denture age was 7 (SD±5.4) years. The mean age of dentate sample was 28.1 (SD± 7.16) years. Table 1 shows the demographics of patients included in the study.

The features of TMD were seen in 29.2% dentate and 14.3% CD wearers included in this study. Table 2 summarizes the comparison of frequency and distribution of TMD features in both these groups. CD wearers’ exhibited tenderness more commonly in masseter, temporalis and medial pterygoid muscle. While dentate patients reported tenderness in lateral pterygoid

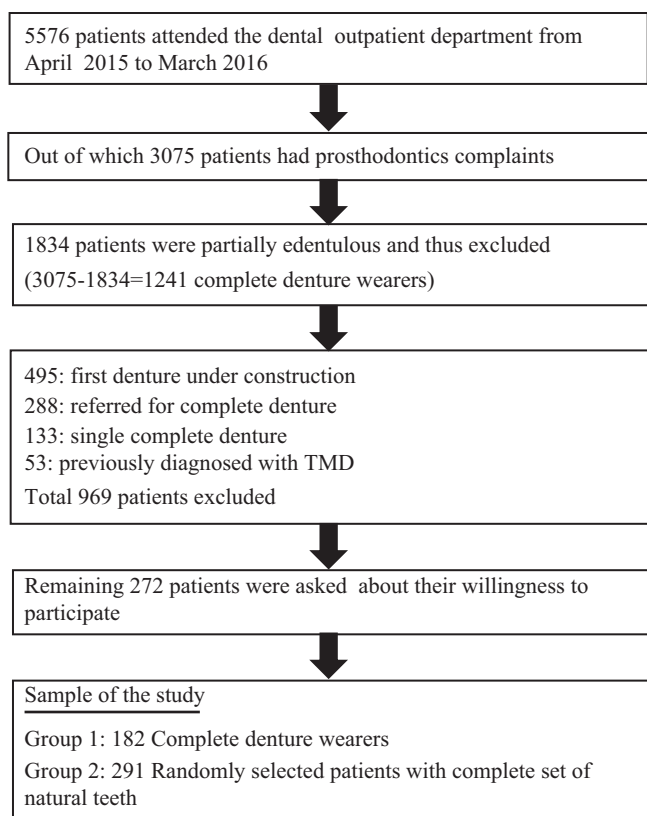


Figure-1: Showing the method of selection of patients in this study

Groups	Number of patients	Males	females	Age range	Mean age
Group 1: Complete denture wearers	182	79(43.4%)	103(56.5%)	47-82 years	65.3(SD±8.53 )years
Group 2: Dentate patients	291	110(37.8%)	181(62.2%)	17-46 years	28.1(SD± 7.16) years

Table-1: Demographics of patients included in the study

Group	Prevalence of features	Tenderness		Joint sound		Deviation
		TMJ	Muscle	clicking	crepitus	
CD(182)	26(14.3%)	8(4.4%)	21(11.5%)	6(3.3%)	17(9.3%)	3(1.7%)
Dentate(291)	85(29.2%)	36(12.4%) (P<0.05)	38(13.1%)	31(10.7%) (P<0.05)	6(2.1%) (P<0.05)	7(2.4%)

Table-2: Showing the prevalence of features of TMD in dentate patients and denture wearer patients

muscles more frequently. Figure 2 shows the prevalence of muscle tenderness in both the groups.

### DISCUSSION

Temporomandibular disorders (TMD) are a collective term given to “variety of clinical problems that include the masticatory musculature, the temporomandibular joints and associated structures, or both.”<sup>1,2</sup> Owing to the multifactorial aetiology, myriad clinical presentation and high prevalence, TMD has attained a top rank among dental disorders which are difficult to treat.<sup>9,10</sup>

Temporomandibular dysfunction syndrome as described by Schwart, “is characterized by tenderness of the joint and the muscles, increasing dull pain on mouth opening, reduced mouth opening, referred pain to the angle of mandible and muscles of the neck, deviated mouth opening, head ache and joint sounds.”<sup>11</sup> Various epidemiological studies have presented different opinions on the prevalence of TMD signs in dentate population.<sup>3-5</sup> Despite prevalence of TMD in elderly population is 15-25% edentulous subjects generally do not present with TMD symptoms.<sup>6,10</sup> Few studies have concluded even higher prevalence of TMD symptoms among CD wearers than those with natural dentition.<sup>12,13</sup> Predisposing factors are change of the rest position, reduction of vertical dimension of occlusion and resultant shift in the vertical and horizontal mandibular positions; positional drifting of the condyles in the mandibular fossae.<sup>14</sup> Moreover, loss of teeth results in cessation of proprioceptive feedback from teeth to TMJ. These factors coupled with emotional factors and advancing age predisposes to increased TMD’s in edentulous patients.<sup>15</sup> The present study is an effort to study the influence of complete denture on TMD

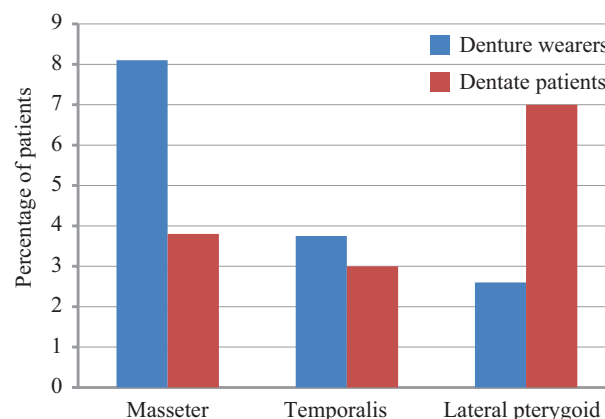


Figure-2: Shows the prevalence of tenderness in masseter, temporalis and lateral pterygoid in denture wearers and dentate patients

Findings	Level	Maxillary	Mandibular	Total
Retention	Good	25(14%)	12(7%)	10.5
	moderate	53(29%)	26(15%)	22.0
	Poor	104(57%)	144(78%)	67.5
stability	Stable	111(61%)	87(48%)	54.5
	Unstable	71(39%)	95(52%)	45.5
Wear of artificial teeth	Minimum	35(19%)		19
	Moderate	60(33%)		33
	Severe	87(48%)		48
Freeway space	2-4mm	13(7.1%)		7.1
	5-7mm	41(22.6%)		22.6
	>7mm	128(70.3%)		70.3
Denture fracture	No fracture	95(52%)	129(71%)	61.3
	Fatigue	76(42%)	33(18%)	30.0
	Accidental	11(6%)	20(11%)	8.5
Deterioration of base	Minimum	31(17.1%)		17.1
	Moderate	100(55.3%)		55.3
	Severe	51(28.3%)		28.3
Number of sets of denture used	1	142(78.3%)		78.3
	2	35(19.1%)		19.1
	3 or more	5(3.2%)		3.2

**Table-3:** Shows the summary of key findings of denture examination.

in edentulous patients and to compare it with dentate patients. In this study, the mean age of dentulous and CD wearers was 28 and 65 years, respectively. Similarly, the percentage of female in both groups was more. Recent epidemiologic studies have generally found that women have significantly more frequent and more severe TMD signs and symptoms than men.<sup>16</sup> Bush FM et al concluded that “more women than men appear to seek treatment for TMD symptoms” and explained this on the basis of biological, psychosocial and hormonal differences between the two groups.<sup>17</sup> Gender predilection was also reported by Shetty et al. They found that 56.6% of males reported signs of TMD when compared with 62.5% females.<sup>9</sup>

The frequency of TMD signs in the dentate patients was two times higher than that in denture wearers. Dentate patients also exhibited more tenderness and joint sounds on clinical examination compared to CD wearing patients. ( $p < 0.05$ ) Participants in both the groups unanimously reported TMJ to be the most painful site. Joint sounds (clicking or crepitus) were very common among patients with TMD but none was actively seeking treatment. Similar results were reported by Al-Shumailan and Manaseer.<sup>13</sup> However, Ribeiro et al., found that patients with complete dentures had TMD symptoms with a frequency similar to natural dentate patients.<sup>18</sup>

The patients with natural teeth had significantly higher percentage of clicking (10.7%) than CD wearer patients (3.3%). However, the denture wearing group had significantly higher incidence of crepitus than dentate patients (9.3% vs 2.1% respectively). Increased frequency of crepitus can be explained by its association with degenerative disease of the articular surfaces, often associated with aging.<sup>19</sup>

The mean value of maximum opening for CD wearer group (39.7mm) was lower than that for dentate group (45.6 mm). Humphrey et al conducted a study and reported that bite force was 5-6 times greater in dentate subjects than in the denture wearers.<sup>20</sup> This could be explained by the fact that CD wearers usually avoid foods that are difficult to chew. Thus, it can be concluded that CD wearers seldom exceed their tissue tolerance

and adaptability and this could explain why they exhibit fewer signs of TMD.<sup>19</sup> The denture wearing patients were not satisfied with the existing denture. Table 3 shows the summary of key findings of denture examination. Results of certain studies from the past literature don't match with our results which may be because of not following a standard procedure for denture examination.<sup>21,22</sup>

There still remains a controversy regarding the prevalence TMD features in edentulous population which can be attributed to lack of standard diagnostic protocol. Bader proposed a classification for TMD disorders in edentulous patients based on both clinical and radiological features.<sup>23</sup> This innovative diagnostic algorithm is helpful not only in diagnosis but also in management of TMD disorders in geriatric population lacking teeth.

## CONCLUSION

Owing to greater number of geriatric population using complete denture, it is prudent for dental care providers to be aware of the consequences of denture use over anatomy and physiology of temporomandibular joint.

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