

The prevalence of temporomandibular joint dysfunction among patients wearing complete dentures

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Abstract

This study investigates the prevalence of temporomandibular joint dysfunction among complete denture wearers and relates the incidence to various features.

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Introduction

A statement commonly accepted by many dentists is that complete denture wearers do not suffer from temporomandibular joint (TMJ) dysfunction. Some possible reasons for this statement are:¹

(a) Denture wearers are usually adapted to an impaired oral function and therefore accept some mandibular dysfunction without complaint.

(b) Most dentists do not perform a functional examination of the masticatory system for their patients with the result that many symptoms remain concealed.

(c) There are relatively few epidemiological studies of complete denture wearers.

The statement, however, is not valid since epidemiological investigations showed that complete denture wearers also suffer from TMJ dysfunction (Table 1).²⁻¹² However, a review of the available literature revealed only one study¹³ concerning the TMJ dysfunction among complete denture wearers.

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Table 1. Incidence of complete denture wearers among patients with TMJ disturbances

Author	No. of patients	Complete denture wearers (%)
Copland (1960) ²	186	14.5
Boering (1966) ³	400	13
Franks (1967) ⁴	751	7
Gelb et al. (1967) ⁵	742	10
Utiola and Kotilainen (1968) ⁶	119	14
Zarb and Thompson (1970) ⁷	56	23
Carlsson and Svärdröm (1971) ⁸	299	8
Thomson (1971) ⁹	100	11
Heløe and Heløe (1975) ¹⁰	406	2
Rosenbaum (1975) ¹¹	279	8.9
Carlsson et al. (1976) ¹²	1213	5

Adapted from Carlsson GE;¹ Choy and Smith.¹³

Thus the aim of this study was to find out the prevalence of TMJ dysfunction among complete denture wearers and to determine the significance of some factors involved.

Materials and methods

One hundred patients who had worn complete dentures for at least one year and attending the complete denture clinic for new dentures were examined.

The study included:

(a) A history in relation to sex, age, years of denture experience, number of dentures worn, age of last denture, and the time period of daily denture wearing.

(b) A questionnaire concerning opening of the mouth and temporomandibular joint pain.

(c) A clinical examination in relation to midline deviation when opening the mouth, reaction of

muscles on palpation (temporalis, masseter, lateral pterygoid, medial pterygoid) in the manner advocated by Meyerowitz.¹⁴

(d) Examination of dentures. The vertical dimension of occlusion was determined using the rest position of the mandible and considered 'correct' when the interocclusal distance was found to be 2-4 mm; 'increased' when the interocclusal distance was less than 2 mm; and 'decreased' when the interocclusal distance was more than 4 mm. The coincidence of centric relation and centric occlusion was evaluated. Complete denture wearers who presented with one or more of the following disturbances formed the TMJ dysfunction group:

- a₁, a₂: difficulty and/or pain on opening the mouth,
- b: pain in the temporomandibular joint region,
- c: deviation of the mandible when opening the mouth.

The data obtained were analysed by using the Chi-square test.

Results and discussion

On the basis of our diagnostic criteria, 19 denture wearers (19 per cent) were classified as suffering from TMJ dysfunction. This prevalence agrees with the finding of Choy and Smith¹³ who reported 15 per cent in a sample of 161 complete denture wearers. Loisel¹⁵ in a sample of 2000 patients including 520 complete denture wearers, reported that none of them suffered from TMJ disturbances. On the other hand, Bergman and Carlsson¹⁶ reported that 25 per cent in a sample of 54 complete denture wearers who were interviewed one year after they had been fitted with dentures had symptoms of functional disorders of the masticatory system.

In our study one patient presented with all four disturbances (a₁, a₂, b, c) and another one three of them (a₂, b, c). Three more patients presented with two disturbances (a₁, a₂, a₂ b, bc) while 14 presented with only one (1a₁, 1a₂, 3b, 9c).

The distribution of each disturbance among the 19 TMJ patients was as follows:

1. Midline deviation when opening the mouth: 12 (63.15 per cent).
2. Pain in TMJ: 7 (37 per cent).
3. Pain on opening the mouth: 5 (26 per cent).
4. Difficulty in opening the mouth: 3 (16 per cent).

The clinical examination relative to the reaction of the principal muscles of mastication on palpation revealed that a positive finding was rare among our sample. Only three (3 per cent) of subjects exhibited

Table 2. Prevalence of TMJ dysfunction in relation to sex

Sex	Denture wearers	TMJ patients	Percentage
Male	47	6	12.77
Female	53	13	24.52
Total	100	19	19

$\chi^2 = 3.06$; $df = 1$; $p > 0.05$.

Table 3. Prevalence of TMJ dysfunction in relation to age

Age (years)	Denture wearers	TMJ patients	Percentage
< 60	22	6	27.27
60-69	38	3	7.89
> 69	40	10	25.00
Total	100	19	19

$\chi^2 = 4.96$; $df = 2$; $p > 0.05$.

Table 4. Prevalence of TMJ dysfunction in relation to years of denture experience

Years	Denture wearers	TMJ patients	Percentage
1-9	40	4	10.00
10-19	36	9	25.00
> 19	24	6	25.00
Total	100	19	19

$\chi^2 = 3.5$; $df = 2$; $p > 0.05$.

Table 5. Prevalence of TMJ dysfunction in relation to number of dentures worn

No. of dentures	Denture wearers	TMJ patients	Percentage
1	75	13	17.33
2	10	3	30.00
> 2	15	3	20.00
Total	100	19	19

$\chi^2 = 0.93$; $df = 2$; $p > 0.05$.

Table 6. Prevalence of TMJ dysfunction in relation to age of last denture

Years	Denture wearers	TMJ patients	Percentage
1-9	60	8	13.33
10-19	25	8	32.00
> 19	15	3	20.00
Total	100	19	19

$\chi^2 = 4$; $df = 2$; $p > 0.05$.

Table 7. Prevalence of TMJ dysfunction in relation to time period of denture wearing

Time period of daily denture wearing	Denture wearing	TMJ patients	Percentage
Day and night	37	10	27.02
Day	63	9	14.28
Total	100	19	19

$\chi^2 = 1.7$; $df = 1$; $p < 0.05$.

Table 8. Prevalence of TMJ dysfunction in relation to vertical dimension

Vertical dimension of occlusion	Denture wearing	TMJ patients	Percentage
Correct	26	2	7.69
Incorrect (increased and decreased)	74	17	22.97
Total	100	19	19

$\chi^2 = 3.99$; $df = 1$; $p < 0.05$.

Table 9. Prevalence of TMJ dysfunction in relation to centric relation

Centric relation	Denture wearing	TMJ patients	Percentage
Correct	32	2	6.25
Incorrect	68	17	25.00
Total	100	19	19

$\chi^2 = 6.26$; $df = 1$; $p > 0.025$.

a slight reaction to palpation of the muscles (one of the masseter and two of the medial pterygoid).

Meyerowitz,¹⁴ studying a sample of 190 patients all completely edentulous, reported that 59 per cent of female subjects and 28 per cent of males had tenderness in all of the masticatory muscles with the pterygoids and masseters most frequently affected. However, Choy and Smith¹³ reported a lower incidence of muscle reaction to palpation (13.8 per cent and 25 per cent) although they agree that the lateral pterygoid was the most commonly involved muscle.

The prevalence of TMJ dysfunction in relation to sex (Table 2), age (Table 3), years of denture experience (Table 4), number of dentures worn (Table 5), age of last denture (Table 6), time period of daily denture wearing (Table 7) was not statistically significant ($p > 0.05$). The prevalence of TMJ

in relation to vertical dimension (Table 8: $p < 0.05$) and centric relation (Table 9: $p < 0.025$) were statistically significant.

Gibson,¹⁷ studying the results of a survey among 202 patients, reported that overclosure of the vertical dimension caused by faulty dentures was the commonest cause of pain in the temporomandibular joint.

In our study we found that 17 of the 74 complete denture wearers with incorrect (16 decreased and one increased) vertical dimension (22.5 per cent) presented with TMJ disturbances, while the prevalence was extremely low (7.4 per cent) among the subjects having correct vertical dimension (Table 8). According to Carlsson and Svärdröm,⁸ a distance of more than 3 mm between retruded and intercuspal positions in complete denture wearers may cause TMJ disturbances. An occlusal correction leads to recovery in most of the patients. This study also found that 17 of the 68 complete denture wearers with incorrect centric relation (25 per cent) exhibited TMJ disturbances, while the prevalence was very low (6.3 per cent) for the subjects with correct centric relation.

Our findings combined with the aforementioned studies underline the importance of including a functional analysis of the masticatory system in the examination and diagnosis of patients with complete dentures.

Conclusions

The following conclusions can be drawn from this study.

1. The prevalence of TMJ dysfunction in a sample of 100 complete denture wearers was found to be 19 per cent.
2. The prevalence in relation to sex, age, years of denture experience, number of dentures worn, age of last denture and time period of daily denture-wearing was not statistically significant.
3. The prevalence in relation to vertical dimension of occlusion (usually decreased) and centric relation of complete dentures was statistically significant.

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