

Behaviours and Hygiene Habits of a sample population of complete denture wearers in Ahmedabad

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Abstract:

Objective: The aim of this study was to analyze the behaviors and hygiene habits of complete denture patients in the local population of Ahmedabad.

Method: Questionnaires were answered by 374 patients wearing complete upper and lower dentures. The questionnaire included information on gender, age, length of prosthesis use, cleaning methods and materials, etc.

Results: All patients reported no difficulty in cleaning their dentures and cleaned their dentures at least once a day. All of them used brushing (mechanical method) and the majority of them used only water while brushing their dentures. The use of soap or chemical agents for immersion or cleaning was negligent. 75% reported cleaning the oral tissues daily with the brush; the most frequently brushed region was the tongue. Almost all (97.33%) patients removed their dentures at night and most patients (94.39%) reported having received instruction on denture-cleaning by the dentist.

Conclusion: Within the limitations of this study, it was concluded that the edentulous patients surveyed had adequate frequency of cleaning the dentures and the oral cavity, habit of removing of dentures at night but the methods and products used for denture care were not adequate. Further research should enquire into the recommendations by the dentists, relation of socio-economic status with use of denture cleansing solutions as well as the association of the findings with denture stomatitis.

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Introduction:

Rehabilitative treatment is successful only when patients are motivated and aware of correct prosthesis use and hygiene. The quality of the denture fitting surface, occlusal relations, denture age and hygiene are important factors contributing to the prevalence of oral mucosal lesions associated with denture use.^[1] Daily hygiene has been reported to be the main means of preventing mucosal inflammation.^[2] The patient's correct cleansing of complete dentures is essential to prevent staining of dentures^[3-4] and the coating of dentures with a biofilm which could damage the adjacent mucosa and cause systemic diseases.^[5] The adherence of *Candida albicans* to the acrylic surfaces of dentures is implicated as the first step in the pathogenesis of associated stomatitis. Grant et al.^[6] demonstrated that there is a strong correlation between unsatisfactory cleaning and the prevalence of *Candida*. A lack of preventive hygiene programmes^[7], denture cleanliness and denture removal overnight^[8] were found to be associated with denture stomatitis.^[9,10] Other authors also have reported a deficiency in denture cleaning in their studies.^[11,12] Improvements in oral and prosthetic hygiene are also considered significant factors for the treatment of prosthesis-related stomatitis.^[13,14]

A variety of habits related to denture hygiene and duration of wearing of dentures has been reported in the literature. Therefore a study was conducted with the objective of determining the behaviors and hygiene habits of complete denture patients in the local population of Ahmedabad.

The aim of this study was to analyze the behaviors and hygiene habits of complete denture patients in the local population of Ahmedabad.

Materials and Methods:

A cross sectional survey was conducted among complete denture patients already treated in AMC Dental College, Ahmedabad to evaluate their hygiene and denture-wearing habits. The information was collected using a single interviewer-administered questionnaire used in a previously published study.^[15] The questionnaire recorded the demographic information and the responses to closed-ended questions related to denture stomatitis such as denture age, denture hygiene habits and nocturnal denture-wearing habits. The interviews were conducted in the local language Gujarati. The questionnaire was translated from English into Gujarati and then from Gujarati back to English to ensure linguistic validity. Prior to use, the questionnaire were pre-tested for clarity and understandability using a small sample of five volunteers patients not included in the study. After a pilot study among 72 patients, the required sample size for a 95% confidence level and 5% margin of error was estimated to be 370 and therefore the study was expanded to 374 patients. The nature and purpose of the survey was explained to the subjects and written consent was obtained. This protocol was approved by the Ethics Committee of Ahmedabad Medical Education Trust, Ahmedabad, India. A percentage analysis of collected data for various factors was obtained for better understanding and for comparison with other previously published studies.

Results:

374 patients, consisting of 239 males and 135 females with an age range of 42- 74 years answered the questionnaires. The results obtained for various factors considered are as tabulated in Tables 1 to 10.

Table 1. Percentage distribution of patients according to the time of edentulousness (in years)

	<1	1 to 5	6 to 10	11 to 15	16 to 20	21 to 25
Males	15.06	43.51	10.88	10.88	17.57	2.20
Females	15.56	61.48	15.56	3.70	3.70	0
Total	15.24	50	12.57	8.29	12.57	1.33

Table 2. Percentage distribution of patients according to time of use (years) of complete dentures

	<1	1 to 5	6 to 10	11 to 15	16 to 20	21 to 25
Males	17.57	41.42	3.35	10.88	12.97	0
Females	31.11	45.93	19.26	0	3.70	0
Total	22.46	43.05	17.91	6.95	9.63	0

Table 3. Percentage distribution of patients according to age (in years) of current complete dentures

	<1	1 to 5	6 to 10	11 to 15	16 to 20	21 to 25
Males	23.85	54.39	21.76	0	0	0
Females	38.52	50.37	11.11	0	0	0
Total	29.14	52.94	17.92	0	0	0

Table 4. Percentage distribution of patients according to instructions provided by the dentist on complete denture cleansing

	Received instruction	Did not receive instruction
Males	93.31	6.69
Females	96.30	3.70
Total	94.39	5.61

Table 5. Percentage distribution of patients according to the denture cleaning method used

	water and toothbrush	water and soap and toothbrush	water and dentifrice and toothbrush
Males	54.40	30.54	15.06
Females	65.19	15.55	19.26
Total	58.29	25.13	16.58

Table 6. Percentage distribution of patients according to habit of soaking dentures

	Does not soak	Soaks in water	Soaks in denture cleanser & water
Males	63.18	32.64	4.18
Females	69.63	30.37	0
Total	65.51	31.82	2.67

Table 7. Percentage distribution of patients according to the frequency of cleaning of dentures

	Once a day	Twice a day	Thrice a day
Males	47.70	49.79	2.51
Females	42.22	54.07	3.71
Total	45.72	51.34	2.94

Table 8. Distribution of patients according to the difficulty of cleaning dentures for each gender

	Yes	No
Males	17.57	82.43
Females	0	100
Total	11.23	88.77

Table 9. Percentage distribution of patients who cleaned regions of the oral cavity for each gender

	Palate	Tongue	Ridge	Does not clean
Males	38.91	66.11	30.54	25.94
Females	50.37	54.07	26.67	22.96
Total	43.05	61.76	29.14	24.87

Table 10. Percentage distribution of patients according to nocturnal denture-wearing habit

	Removes denture at night	Does not remove denture at night
Males	100	0
Females	92.59	7.41
Total	97.33	2.67

Discussion

Age of dentures

In the present study sample, 67 patients had used the same prosthesis for more than 5 years, though 129 were using complete dentures since more than 5 years. (Table 2 & 3). Therefore, 51.93% of the patients of the patients had not replaced their dentures after 5 years of use. According to Lombardi and Budtz-Jorgensen, old complete dentures may predispose patients to denture stomatitis, because the denture surface may contain porosities that make proper cleaning difficult.^[16]

Method of cleaning

In this study, all patients (100%) used brushing (mechanical method) for denture cleansing. Similar results were obtained in previous studies by Peracini et al. (100%)^[15] and Jeganthan et al. (97%).^[12] Other studies have reported that 86% (Polyzois)^[17], 80.1% (Coelho et al.)^[18], 79.7% (Marchini et al.)^[19], 57.1% (Kulak-Ozkan et al)^[9] and

40.59% (Dikbas et al)^[20] of patients brushed their dentures as the cleaning method of choice.

The majority (58.29%) reported brushing only with water. 25.13% used soap while 16.58% used toothpaste with the toothbrush (Table 5). Only 2.67% of the patients in present study reported the use of immersion in denture cleaning solutions. In previous studies, De Castellucci Barbosa et al.^[21] found 8%, Ozcan et al.^[22] found 17.1% and Veres et al.^[23] found 63% of those interviewed used only water to clean their prostheses, whereas the most commonly used method was brushing with were toothpaste and a toothbrush.^[15,21,23]

Mechanical methods, such as toothbrushes, are recommended for routine cleaning. However, they may lead to surface abrasion, which is undesirable for aesthetic and biological reasons.^[24] Denture pigmentation and abrasions are associated with toothpaste and toothbrush use.^[25] Dentifrice has the advantage of being simple to use and relatively inexpensive. However, if used with an improper

brushing technique, dentifrice can damage the prosthesis material^[20] due to the potential abrasive wear of the denture material.^[3] Brushing with toothpaste may make denture surfaces rougher, which increases the accumulation of plaque and reduces the shine of complete denture surfaces.^[24]

In addition, brushing alone, with or without dentifrice, is an inadequate approach for controlling denture plaque^[4] and mechanical methods are not normally sufficient to remove the micro-organisms that colonize resinous materials.^[26] Toothpaste has little effect on denture hygiene when used by individuals with deficient motor coordination.^[27] Both patients and dentists frequently neglect these factors.^[28]

In the present study, 31.82% soaked their dentures in water before cleaning (Table 6). However, in the sample studied, none used chlorhexidine to clean the prosthesis.

Peracini et al.^[15] reported 58.49% of the patients using cleaning by immersion and among the substances used for immersion of the dentures, water was the most frequent (38.71%) followed by sodium hypochlorite (33.87%). In the study by Baran and Nalçacı^[29], 42.9% of patients immersed their dentures in water and only 1.6% immersed then in hypochlorite solution. Hoad-Reddick et al.^[13] found that a combination of methods (brushing and soaking) was used more frequently. Veres et al.^[23] also found that the majority of patients (59%) brushed and immersed their dentures, whereas 36% only brushed their dentures, and only 5% used immersion as the only method of cleaning. Budtz-Jorgensen^[2] found that fewer than 60% of prosthesis wearers use chemical cleaning products and among those who cleaned their prostheses with chemical disinfectants, 92% used substances containing sodium hypochlorite. De Castellucci Barbosa et al.^[21] reported the use of disinfecting substances in only 16.8% of the sample studied. Peltola et al.^[25] also found that denture immersion products were used infrequently (27.1%), with a mixture of water and sodium hypochlorite as the most common solution (54.7%). Marchini et al.^[19] found the use of products for immersing dentures was less frequent than mechanical methods, i.e. only 27.1% used such products. The most commonly utilised solution was a mixture of water and sodium hypochlorite (54.7%), followed by water and sodium bicarbonate (12.5%), with other combinations being reported at a frequency of less than 8%.

Chemical methods have the advantage of being simple to use. However, chemical methods have disadvantages such as high cost and metal corrosion as well as the bleaching of acrylic resin resulting in damage to the denture base.^[3,30]

Chemical agents may be an important alternative, especially for elderly patients and those with motor deficiencies.^[2] Improvement in denture and oral hygiene has been observed by immersion in cleansers such as chlorhexidine^[31], alkaline peroxides and sodium hypochlorite.^[27,32] Prosthesis immersion in chlorhexidine gluconate has been shown to be effective against fungi, prevent bacterial colonisation and inhibit the development of inflammation.^[31] Alkaline peroxides are effective at sterilizing prostheses as they achieve a 99% kill rate of most organisms when dentures are soaked for the recommended 10- to 20-min periods. Moreover, the oxidising agents help to remove stains and provide some antimicrobial action.^[4] Ghalichebaf et al.^[33] tested four prosthesis cleaning immersion agents and discovered that the most effective were those with high sodium hypochlorite content. Sodium hypochlorite has both bactericidal and fungicidal effects and acts directly on the plaque's organic matrix. It is also used as a complete denture immersion solution for the temporary treatment of denture stomatitis. Dychdala^[34] stated that when prostheses are immersed for 5 min in 0.525% sodium hypochlorite solution, effective disinfection occurs. Barnabe' et al.^[26] using sodium hypochlorite at 0.05% concluded that when combined with mild soap, a significant reduction in clinical signs of denture stomatitis was observed.

Ideally, both mechanical and chemical mechanisms should be used together to achieve better plaque control.^[12] The combination of brushing and soaking method has been recommended as the effective way for cleaning dentures.^[3,35,36] In a survey by Veres et al.^[37] concerning dentists' attitudes, it was pointed out that 71% of private dentists advised a combination method to their patients.

Frequency of cleaning

All of the study population said they clean their dentures at least once a day (Table 7). These results agree with those of Peracini (99.06%)^[15], Marchini et al. (98.7%)^[19], Nevalainen et al. (96.0%)^[38] and De Castellucci Barbosa et al. (98.0%).^[21] Hoad-Reddick et al.^[13] and Dikbas et al.^[20] showed that only 79.1% of a sample of 233

patients and 70.0% of a sample of 234 patients, respectively, cleaned their dentures at least once a day.

Most patients in this study cleaned their dentures once (45.72%) or twice a day (51.34%) and 11 patients out of 374 (2.94%) cleaned their dentures 3 times daily (Table 7). This is in contrast to the findings of Peracini et al.^[15] who reported 73.58% cleaned their dentures 3 or more times daily and Dikbas et al.^[20], who reported 25% of individuals reported cleaning their dentures 3 times a day. However, according to Pietrokovski et al.^[39], 96% of patients reported cleaning their dentures 2 or more times *per day*. De Castellucci Barbosa et al.^[21] reported 62.7% patients cleaned their complete dentures three or more times daily. A lower frequency was presented by Ozcan et al.^[22] in which 45.7% of a sample of 70 individuals reported cleaning their prostheses more than once a day.

Difficulty of cleaning

Nevalainen et al.^[38] suggested that patients' age of 80 years or more could indicate inefficient cleaning due to commonplace limitations such as a reduction in visual acuity and manual dexterity. However, the maximum age in this group of patients was 74 years and most of them reported having no difficulty in cleaning their dentures (88.77%). (Table 8)

Cleaning of the oral cavity

Of the patients interviewed, 75.13% reported to clean the oral tissues daily; the most frequently brushed region was the tongue (Table 9). Similar findings were reported by Peracini et al.^[15] (72.64%) In the present study, 161 patients (43.05%) reported brushing their palate, 231 (61.76%) reported brushing their tongue and 109 (29.14%) brushed their ridges (Table 8). In the study by Peracini et al.^[15], 52 patients (49.06%) reported brushing their palate, 77 (72.64%) *reported brushing their tongue and 59 (55.66%) brushed their ridges.*

Nocturnal Denture- wearing Habit

Grant et al.^[6] stated that prostheses should not be worn overnight or should be removed for a certain number of hours per day to allow the supporting tissues to recover from the trauma of physical contact.

In this study almost all (97.33%) of the patients removed their dentures at night (Table 10). Contrasting results were obtained in previous studies in which 58.49% (Peracini et al.)^[15] 41.5% (Dikbas et al.)^[20] and 64% (De Castellucci Barbosa et al.)^[21] of

patients, respectively, did not remove their dentures at bedtime. Baran and Nalçacı^[29] also showed that 55.2% of patients slept with their dentures. Marcus et al.^[40] found that nearly one third of the participants of their study slept with both dentures, and 12% slept with the lower denture only. Veres et al.^[23] showed that 49% of the patients wore their dentures continuously. The use of dentures during the day by the patients might result in the accumulation of biofilm on their surface.^[9,13] In a study by Marchini et al.^[19], only 26.3% of the subjects removed their dentures overnight.

Many investigators found the frequency of severe inflammation to be significantly higher in patients who wore their dentures at night.^[41,44] The continuous use of complete dentures is found more frequently in patients with denture stomatitis.^[27] Other investigators found no significant differences in wearing habits between a group with denture stomatitis and a control group.^[13,44-46]

Instructions from the dentist

Previous studies^[3,20] have reported that the majority of denture wearers do not know how to clean their dentures because they have never received instructions from their dentist. To instruct the wearers of removable dentures about proper denture hygiene is one of the responsibilities of dentists. However, it has been observed that the majority of denture wearers do not pay necessary attention to the cleanliness and hygiene of dentures.^[13,20,47,48] This may be due to denture wearers' negligence as well as dentists who give insufficient instruction to their patients about denture cleansing methods (possibly because of lack of knowledge) or neglect spending time on this issue.^[38] It has also been stated that even though the patients get correct instructions from the dentists they might not follow them.^[38] In this study, most patients (94.39%) reported having been advised by their dentists as to how to clean their dentures (Table 4). Though all patients cleaned at least once a day with mechanical method (toothbrush), the hygiene of the dentures cannot be considered adequate because only 2.7% utilized chemical method in combination with the mechanical method.

Conclusion:

All patients used mechanical method of cleaning dentures using toothbrush and tap water only, or toothbrush with toothpaste or soap. Only a negligible number used chemical method, ie.

immersion in cleansing solution in combination with mechanical method. Most patients cleaned their oral cavity at least once a day, removed the dentures at night and reported having received instructions from the dentist. The report of use of over-the-counter products for denture care being absent in the this study give reason for further research into the recommendations given by the dentists to the patients as well as whether socio-economic factors prevent the patients from purchasing over-the-counter denture-care products. Further research with an oral examination of the patients is required to correlate the various factors studied for relation with presence of denture stomatitis.

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Protocol of Research – Questionnaire

Name: _____ Gender _____ Race: _____

Home address: _____ Date of birth: ___ / ___ / ___

Profession: _____

Institution: _____

Business Address: _____

1- History

1.1- How long have you had your teeth extracted? _____

1.2- How long have you been using denture(s)? Upper _____ Lower _____

1.3- How long have you been using the current denture(s)? Upper _____
Lower _____

2- Hygiene

2.1- Have you received any instruction from your dentist on how to clean your denture(s)? Yes () No ()

2.2- How do you clean your denture(s)?

Water + toothbrush ()

Water and dentifrice + toothbrush ()

Water and soap + toothbrush ()

2.3- How often a day do you clean your denture(s)? _____

2.4- Do you have any difficulty cleaning the dentures?

Yes () No () Which part of it? _____

2.5- Do you soak your denture in any substance?

Yes () No () Which? _____

2.6- Do you brush: the roof of the mouth (palate) () tongue () gum (ridge) ()

2.7- Do you use oral rinse? Yes () No () How? _____

2.8- Do you sleep with the denture(s)? Yes () No ()

Source of Support: Nil

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