



Original article

Edentulous patients' knowledge of dental hygiene and care of prostheses

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Objective: The aim of this study was to analyse denture users' oral care habits with regard to the use of their prostheses.

Background: Rehabilitative treatment is only successful when patients are motivated and aware of correct prosthesis use and hygiene.

Materials and methods: Questionnaires were distributed to 150 complete denture users at the Federal University of Bahia School of Dentistry, the Esmeralda Natividade Health Center, the Bahian Science Development Foundation and a Salvador nursing home. The questionnaire included information on gender, age, length of prosthesis use, cleaning methods and materials, etc. The data were analysed using EpiInfo version 6 software. The chi-squared test was used for statistical analysis, with a significance level of 5%.

Results: Questionnaire results showed that 78% of the subjects, with an average age of 67.3 years, had used the same complete denture for over 5 years. 64% slept with their prostheses and 44% removed them from the mouth only for cleaning. None of the patients interviewed knew anything about brushes designed specifically for complete dentures. 37.3% had a restricted diet and 44% believed that a complete denture would last for more than 10 years.

Conclusion: Within the limitations of this study, it was concluded that the edentulous patients surveyed had limited awareness of prosthetic hygiene and long-term oral care despite extended periods of denture use.

Keywords: prostheses, complete dentures, dental habits, hygiene, dental care.

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Introduction

One of the main objectives of the rehabilitative treatment of edentulous patients is to improve their health by establishing functionality. This can be accomplished with complete dentures. Therefore, correct prosthetic use and care are of great importance to patients, not only for aesthetic and functional reasons, but also for the health of the supporting tissues and appropriate conservation of the prosthesis itself. Dentists must guide and motivate patients in complete denture maintenance,

which can be considered a complex rehabilitative treatment¹. According to the literature, patients commonly report that they are not given instructions about cleaning dentures and general oral care, and are not informed of the need for periodic dental visits¹.

Denture use among the elderly is common in Brazil and according to the Brazilian Ministry of Health, 57.9% of the population over 65 wore dentures in the upper jaw and 24.8% in the lower jaw².

When edentulous patients are fitted with complete dentures, an important phase of oral and

denture care begins³. Initial recommendations to patients include the need for periodic dental visits for maintenance and additional explanations regarding denture cleaning and use¹. 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 use⁴.

Besides these issues, information such as epidemiological and related-health data, must be considered of vital importance for health assistance planning. This paper aims at evaluating patient knowledge regarding the use and care of complete dentures, taking into account instructions currently provided by dentists.

Literature review

Oral mucosal lesions are relatively common among complete denture wearers, particularly among those with loose fitting dentures and/or poor denture hygiene⁴. Good oral health can be achieved through regular denture care and maintenance⁵.

Daily hygiene has been reported to be the main means of preventing mucosal inflammation⁶ and some authors have reported a deficiency in denture cleaning in their studies^{7,8}. According to Lombardi and Budtz-Jorgensen⁹, old complete dentures may predispose patients to denture stomatitis, because the denture surface may contain porosities that make proper cleaning difficult.

Denture stomatitis is one of the most frequent problems for complete denture users. It is a multifactorial disease caused by several predisposing and aetiological factors⁹. It affects between 11% and 67% of these patients, and is directly related to poor oral hygiene and *Candida albicans* colonisation¹⁰⁻¹³. Other authors have stated that prosthesis age, associated with inappropriate user habits and poor hygiene¹⁴, can lead to or aid in the progression of denture stomatitis^{14,15}. In addition to this condition, chronic oral tissue trauma and irritation can also result from long-term use, especially in association with poor cleaning habits and inadequate prosthesis adaptation^{1,16}.

Poorly fitting dentures with unbalanced occlusion and 24-hour denture use may be involved in the pathogenesis of chronic atrophic candidiasis⁴. Fibrous inflammatory hyperplasia and traumatic ulcers may result from the trauma caused by pressure from overextended denture borders and tipping forces resulting from unbalanced occlusion of a loose fitting complete removable denture¹⁷. In the study by Coelho *et al.*¹⁸, an increase in the

frequency of fibrous inflammatory hyperplasia and angular cheilitis was observed as the length of denture use increased.

Treatment of denture stomatitis consists of removing the denture at night, the use of antiseptic and topical or systemic antifungal substances, and in some cases prosthetic substitution. Although complete dentures may dehydrate when placed on a dry surface, possibly leading to dimensional alterations over a period of 8 hours, this would not be sufficient to elicit a clinically significant effect on denture adaptation^{19,20}. Stafford *et al.*¹⁹ also stated that denture removal is a simple and efficient method for the control of fungal infections.

No relationship between denture stomatitis and cleaning frequency was found in the Kulak-Ozkan *et al.*¹³, in which 70 complete denture users were evaluated. Improvements in oral and prosthetic hygiene are also considered significant factors for the treatment of prosthesis-related stomatitis^{21,22}. Examples include immersion in cleansers such as chlorhexidine, alkaline peroxides and sodium hypochlorite^{19,23}. Mechanical methods, such as toothbrushes, are recommended for routine cleaning. However, they may lead to surface abrasion, which is undesirable for aesthetic and biological reasons²⁴, and in addition, mechanical methods are not normally sufficient to remove the micro-organisms that colonise resinous materials²⁵. The relative cost-effectiveness and availability of abrasive toothpastes are advantages, but when incorrect brushing techniques are used, prostheses can be damaged. Toothpaste also has little effect when used by individuals with deficient motor coordination²³. Moreover, brushing with toothpaste may make denture surfaces rougher, which increases the accumulation of plaque and reduces the shine of complete denture surfaces²⁴. Denture pigmentation and abrasions are also associated with toothpaste and toothbrush use²⁶.

Chemical agents may be an important alternative, especially for elderly patients and those with motor deficiencies⁶. Among these agents, studies have shown chlorhexidine to be effective against fungi²⁷. Mechanical cleaning is not enough to remove the micro-organisms that colonise resinous materials and brushing alone, with or without dentifrice, is an inadequate approach for controlling denture plaque³. Both patients and dentists frequently neglect these factors¹⁵.

Alkaline peroxides are effective at sterilising 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 action³. Ghalichebaf *et al.*²⁸ tested four prosthesis cleaning immersion agents and discovered that the most effective were those with a 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 stomatitis²⁸. Dychdala²⁹ stated that when prostheses are immersed for 5 min in 0.525% sodium hypochlorite solution, effective disinfection occurs. Another study using sodium hypochlorite at 0.05% concluded that when combined with mild soap, a significant reduction in clinical signs of denture stomatitis was observed²⁵. Ideally, both mechanical and chemical mechanisms should be used together to achieve better plaque control⁸.

According to Grant *et al.*³⁰, 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 denture users, occlusal forces may be limited, due to the fact that mandibular denture-bearing tissues are more subject to compression and denture movement, resulting in painful irritation³¹. The risk of malnutrition is higher in elderly complete denture users³² and many patients adapt to swallowing very poorly-chewed food³³. Heath³³ stated that the quality of a complete denture is related to the chewing ability it provides. However, a poor relationship can be attributed to the adaptation process, when individuals with badly-adapted prostheses modify their eating habits to optimise chewing ability³⁴.

Therefore, denture use could further compromise the nutritional intake of the elderly³⁵, especially when prosthesis retention/stability limits masticatory performance³⁴. Prostheses users have inferior chewing performance when compared to individuals with natural teeth³¹, and this reduction in chewing ability can restrict food selection^{35,36}.

Adhesives are used to improve complete denture retention, comfort, chewing ability and safety³⁷. Coates³⁸ stated that adhesives do not improve adaptation or masticatory ability. Their use during the adaptation period can be beneficial, but, patients must be motivated to reduce dependence on adhesive use and, perhaps, to completely eliminate it. One of the disadvantages of excessive adhesive use is the danger of masking incorrect prosthesis adaptation.

Patients with complete dentures should be informed about the importance of removing them for a given number of hours per day, as well as

about the need to carry out periodic dental evaluations of prosthesis/soft tissue interaction and to determine when complete dentures should be replaced. It was recommended that patients visit their dentist every year to ensure correct denture fit³⁸.

Taking these factors into account, it becomes clear that dentists should not only produce prostheses, but should also instruct their patients by providing realistic guidelines for and explaining the limitations of complete denture use⁶, as well as emphasising the importance of long-term follow-up visits³⁹.

Material and methods

In this study, 150 complete denture wearers with at least 1 year of use completed questionnaires at the Federal University of Bahia School of Dentistry, the Esmeralda Natividade Health Center, the Bahian Science Development Foundation and a Salvador nursing home. All patients were selected randomly from among those who sought treatment at these public health clinics. They were informed about the research project and gave their consent in writing. This study was approved by the Federal University of Bahia Ethics Commission. The questionnaire (Fig. 1) was based on a similar one used in another study⁴⁰. The data were analysed using EpiInfo version 6 software (Center for Disease Control and Prevention, Atlanta, GA, USA). The chi-squared test was used for statistical analysis, with a significance level of 5%.

Results

A total of 150 subjects were selected, 121 of whom (80.7%) were female and 29 (19.3%) male. The age range was 30–96 years, with a mean age of 67.34 years, with 46.7% of the patients between 60 and 70 years of age (Fig. 2). All patients had used complete dentures for at least 1 year and 78% had used them for five or more.

Data analysis showed that 96 of the 150 subjects (64%) normally slept with their prostheses (Fig. 3). When asked about removing their prosthesis for a given period of time each day, it was observed that only 54% removed their prosthesis at some point during the day. Among this group of 69 patients, 87% had used their prosthesis for more than 5 years. There was no statistically significant difference between those who removed their prosthesis at some time during the day and kept it immersed in water (46.7%) and those who did not remove it ($\chi^2 = 0.62$, $p = 0.43$) (Table 1).

1. Age: _____

2. Gender: _____

3. How long have you been using this prosthesis?

1 year or less 1-5 years More than 5 years

4. Do you sleep with your prosthesis? Yes No

4.1. Do you remove your prosthesis at some point during the day?

Yes No

4.2. Where is your prosthesis placed when it is out of your mouth?

5. Do you clean your prosthesis daily?

Yes No

5.1. How many times a day do you clean it?

Once a day Twice a day Three times a day Over three times a day

6. How do you clean it? Using only:

Water Toothpaste Soap Toothbrush

Others: _____

7. Do you use any disinfecting substance to help clean your prosthesis?

Yes No

Which: _____

8. Do you feel that your prosthesis restricts what you can eat? Yes No

9. Do you need assistance adapting your prosthesis?

Yes No

What kind: _____

10. How long could a patient use a complete denture prosthesis?

5 years or less 5-10 years

More than 10 years It depends on patient care

Figure 1 Questionnaire.

When asked about how often they cleaned their complete dentures (Fig. 4), a substantial proportion of the subjects (62.6%) reported cleaning their prostheses three or more times per day. The most common cleaning methods were toothbrush (94.0%) and toothpaste (88.7%), while 8% used soap instead of toothpaste (Fig. 5).

Only 25 (16.8%) of the subjects used disinfecting substances (Fig. 5). In this group, it was found that 92% of these substances were products that con-

tained sodium hypochlorite ($\chi^2 = 35.28$, $p < 0.000$). In the 70 patients, aged 70 years or older, 65 (92.9%) did not use any disinfecting substance ($\chi^2 = 102.86$, $p < 0.000$). It was observed that none of those interviewed had any knowledge of alkaline peroxides. Fifty-six (37.3%) subjects reported having difficulty in chewing some foods and 76.8% of this group had used the same prosthesis for 5 years or more ($\chi^2 = 32.14$, $p < 0.000$) (Fig. 6). Only two (1.3%) of the study patients said

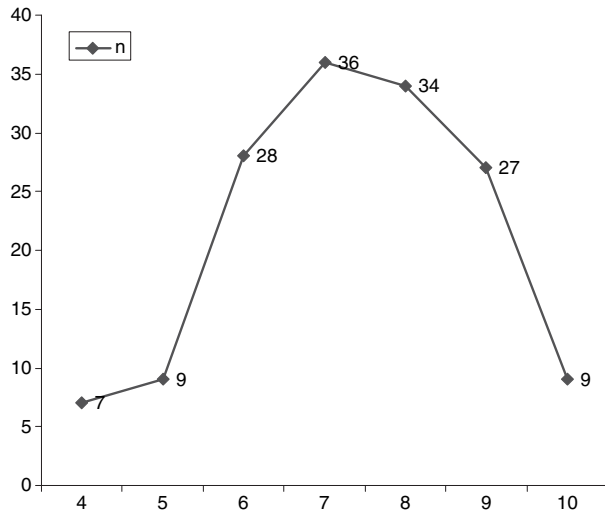


Figure 2 Sample study age distribution.

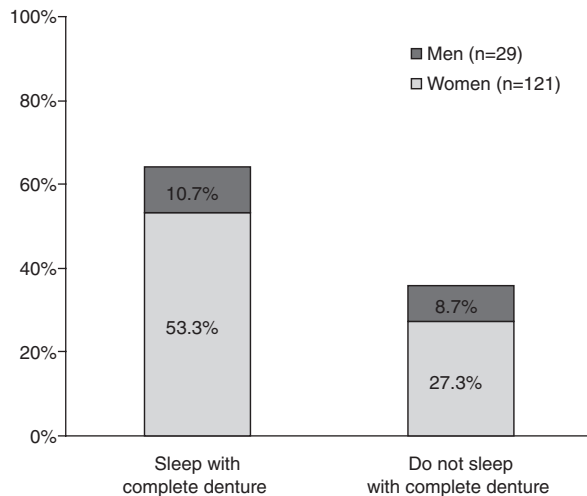


Figure 3 Male and female subjects who normally sleep with their prostheses.

they used an adhesive to aid in prosthesis retention.

Regarding the length of time the study subjects believed they could use their prostheses (Fig. 7), it

was observed that 44% (almost half the sample) thought that complete dentures could be used for 10 years or more. In the sample, 78% reported having their prostheses for more than 5 years.

Discussion

The present study revealed that 64% of subjects slept with their prostheses and the remainder did not remove it at any point during the day, except for cleaning, which could be a primary cause of injury. The continuous use of complete dentures is found more frequently in patients with denture stomatitis²³, which in this study corresponded to 61% of the sample. This situation was aggravated by the fact that, of the complete dentures that were not removed, 87% had been used for over 5 years.

In the population studied, 98% stated that they cleaned their prostheses daily. These results agree with Marchini *et al.*⁴¹ (98.7% of a sample of 236) and Nevalainen *et al.*¹¹ (96% of a sample of 161 patients), but are higher than those found by Hoad-Reddick²¹ who showed that only 79% of a sample of 233 patients cleaned their complete dentures. Grant *et al.*³⁰ demonstrated that there is a strong correlation between unsatisfactory cleaning and the prevalence of *Candida*.

Regarding the frequency of prosthesis cleaning, it was found that 62.7% cleaned their complete dentures three or more times daily, which is considered satisfactory. This frequency was higher than that presented by Ozcan *et al.*³⁷ in which 45.7% of a sample of 70 individuals reported cleaning their prostheses more than once a day. However, according to Nevalainen *et al.*¹¹, this frequency would not necessarily indicate efficient cleaning, mainly because 46.7% of the sample studied were 80 years of age or older, with commonplace limitations such as a reduction in visual acuity and manual dexterity¹². When asked about their cleaning regimen, it was observed that the most commonly used methods were toothpaste and a

Table 1 Amount and percentage of patients who remove their prosthesis at some point during the day and form of storage by gender.

Gender	Prosthesis removal		Place prosthesis is kept when out of mouth						
	Yes	No	Glass with Cepacol	Cloth	Paper	Glass of water	Plastic bag	In the open	Unspecified
Male	19 (12.7)	10 (6.7)	1 (1.2)	–	–	16 (19.8)	1 (1.2)	1 (1.2)	–
Female	62 (41.3)	59 (39.3)	–	1 (1.2)	3 (3.7)	54 (66.7)	2 (2.5)	1 (1.2)	1 (1.2)
Total	81 (54.0)	69 (46.0)	1 (1.2)	1 (1.2)	3 (3.7)	70 (86.5)	3 (3.7)	2 (2.4)	1 (1.2)

Values are expressed as n (%).

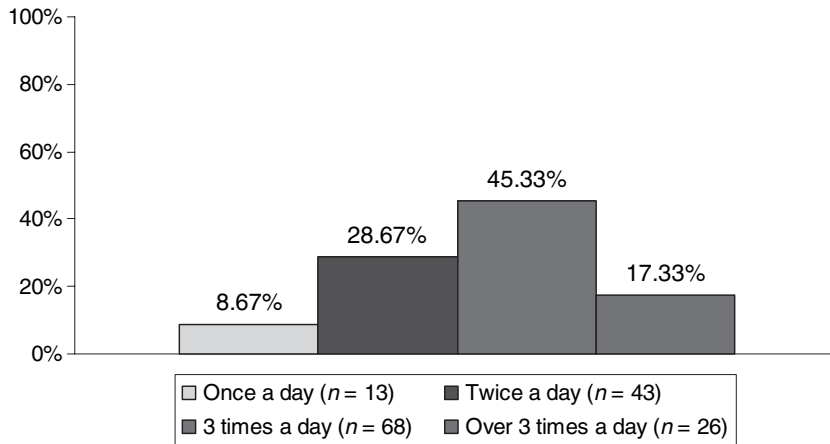


Figure 4 Frequency of complete denture cleaning.

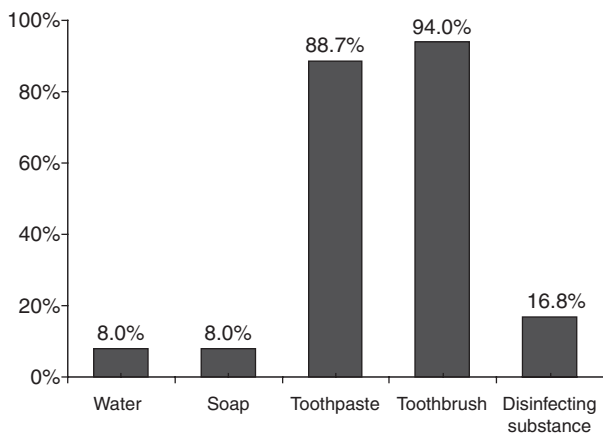


Figure 5 Overview of sample cleaning methods used by the study sample ($n = 150$).

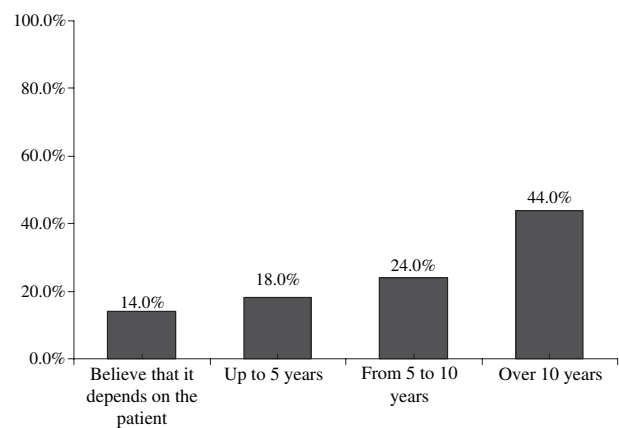


Figure 7 Expected length of complete denture use according to patient opinion.

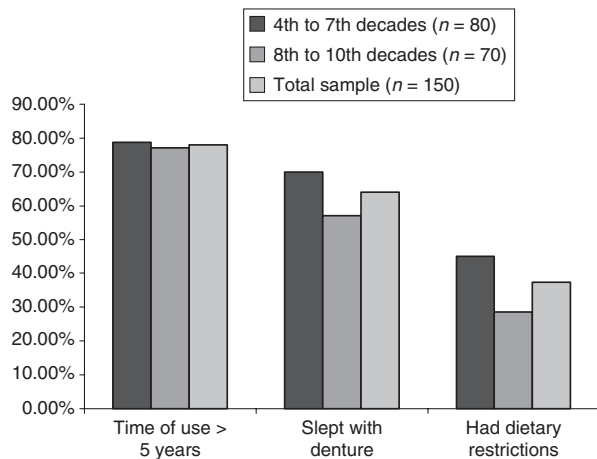


Figure 6 Percentage of time of use >5 years, use of prosthesis overnight and presence of dietary restrictions according to age.

toothbrush, which agrees with the findings of Papas *et al.*³⁵.

In the present study, 8% of those interviewed used only water to clean their prostheses, a result

that differs from that of Ozcan *et al.*³⁷, in which 17.1% of the sample cleaned their prostheses in this manner.

When questioned about the use of disinfecting substances, only 16.8% of the sample studied reported using them. Budtz-Jorgensen⁶ 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. Peltola *et al.*²⁶ 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%). Homemade products are often preferred because they are easy to handle, cheap and effective methods that completely satisfy user needs¹². Prosthesis immersion in chlorhexidine gluconate has been shown to prevent bacterial colonisation and inhibit the development of inflammation²⁷. However, in the sample studied, only one person used chlorhexidine to clean the prosthesis.

Despite their advantages, a total lack of familiarity with regard to alkaline peroxides was observed in the present study and this contrasts with the data from Nevalainen *et al.*¹¹, who stated that, according to American industry estimates, close to 80% of denture wearers use one of these products at least once a week.

In the present study sample, most of the patients had used the same prosthesis for 5 years or more, similar to a study by Coelho *et al.*, where most had used their dentures for 20 years¹⁸. In a study of 480 patients, Ekelund⁴² reported that 75% of a sample of denture users stated they were able to eat all the foods they desired, while 37.3% stated that they did suffer some dietary restrictions because of the prosthesis.

The purpose of denture adhesives is to benefit denture wearers with a more appropriate fit and comfort and improve their chewing ability and confidence³⁷. However, only 1.3% of the patients interviewed used this type of product and Ozcan *et al.*³⁷ evaluated a sample without a single adhesives user. Despite the fact that 8% of his sample of 115 complete denture users had tried adhesives at some time, they discontinued use complaining that adhesives did not significantly improve the fit or chewing ability. The low percentage of patients using adhesives becomes an advantage when it is considered that 44% of the present sample believed it was possible to wear their prostheses for more than 10 years. One of the disadvantages of denture adhesives is the danger of prolonging the length of use of ill-fitting dentures³⁷.

Conclusion

Within the limitations of this study, most of the patients evaluated had little knowledge of complete denture cleaning and maintenance methods. It must be concluded that greater emphasis on hygiene instructions during rehabilitation treatment is necessary. The insertion of a complete denture must be seen as the beginning of a long patient–dentist relationship to maintain healthy oral tissues. This relationship will ensure that the prosthesis does not become a predisposing factor for oral trauma and infections, and will allow complete denture users to wear their prostheses for longer periods of time.

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