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The denture hygiene, denture stomatitis and role of dental hygienist

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Abstract: *Objectives:* Denture induced stomatitis (DIS) affects a large number of denture wearer patients, particularly elderly people. The purpose of this study was to determine the prevalence of DIS among a sample of denture wearers attending a teaching hospital, in relation to denture hygiene level and method, age, gender, objective and subjective severity of the lesion. *Materials and methods:* A total of 71 denture wearers were systemically interviewed and clinically examined by the same operator of their oral mucosal health and the denture hygiene practice. A questionnaire, including 20 questions was used in this study. *Results:* The results showed an incidence of DIS in both arches of 62% with no difference between the maxillary and mandibular arches. Denture hygiene within patients was good by 21.1%, of the sample, fair by 43.6% and poor by 35.2%. Another finding proved the incidence of DIS to be higher (Rev-1 + Rev-2) in elderly patients and a significant association was found between the presence of DIS and denture hygiene habits and sleeping with dentures ($P < 0.05$), with no differences related to gender. *Conclusions:* Results indicated that the predisposing factors to DIS are associated with the method of denture hygiene methods and use of denture while sleeping. *Clinical significance:* Dentists and dental hygienists should bear the responsibility by routinely providing post-placement denture hygiene instructions to educate and motivate the patient.

Key words: dental hygienist; denture; hygiene; stomatitis

Introduction

Denture induced stomatitis (DIS) is a common inflammatory condition that affects denture wearers. it usually manifests itself

as an erythematous, oedematous mucosa underlying and confined to the area covered by a complete maxillary denture (1). It can also be found under maxillary partial dentures, but only rarely beneath mandibular dentures (2). Symptoms are rare; varies from a mild burning sensation which is sometimes reported to very rarely as dysphagia (1). A classification of DIS by Newton (3) suggested three types: a localized simple inflammation, sometimes described as 'pinpoint hyperaemia', which manifests as discrete focal areas of inflammation in the palate (type I); a generalized erythema involving the whole area covered by the denture (type II) and a papillary hyperplasia of the palate (type III).

Classically, the aetiology of DIS (4) includes denture trauma, poor oral/denture hygiene, wearing the denture day and night, fungal infection and hypersensitivity to denture base materials. However, the evidence for the aetiology of DIS is inconclusive but study showed that 70% of individuals with clinical signs of denture stomatitis exhibit fungal growth, and this condition most likely result from yeast colonization of the oral mucosa, combined with bacterial colonization (5). The denture itself is obviously an aetiological factor, as without it the condition would not arise.

Provisional diagnosis of denture stomatitis is based on clinical signs and symptoms, as erythema and oedema of the mucosa underlying the denture and confined to the area covered by the denture (6). Although DIS is usually asymptomatic and patients often are unaware of this condition.

The aim of this study was to determine the incidence of DIS among a sample of denture wearers in a teaching hospital and its relationship with denture hygiene practice, age and gender of the patient.

Materials and methods

A questionnaire including 20 (Appendix) questions was prepared and pretested on 10 patients that were not included in the sample study. Seventy-one patients wearing removable complete and/or removable partial dentures attending the College of Dentistry at King Saud University from 1st January till 31st March, 2006 were interviewed and examined by the same clinician (Rev-1).

The multiple choice questionnaire was divided in four parts: patient demographic data and general health condition, objective and subjective problems in relation to the prosthesis, denture hygiene practice and signs and symptoms of DIS. The type of denture stomatitis was classified according to Newton's classification. Newton's types I and II were further classified into mild, moderate and severe.

Descriptive statistics indicating the frequency distribution and percentages of data were computed. Chi-squared test was used to test if relation exists between the prevalence of DIS, denture hygiene level and method and patient's age and gender (Rev-1 + Rev-2). The level of significance was set to $\alpha = 0.05$.

Results

A total of 71 patients, 62% male ($n = 44$) and 38% female ($n = 27$) were examined. DIS ($n = 39$) occurred in 56.8% of maxillary arch and 51.8% of mandibular arch (Table 1). The mean age of patients was 58.8 years. Age distribution is given in Table 2, and shows DIS more frequently in 60- to 70-year-old females and 50- to 60-year-old males. However, chi-squared statistical test did not show significant difference in DIS incidence as related to age or gender of the patients ($P > 0.05$).

With regard to denture type, 48 patients wore complete dentures (DIS in 56.25% of the cases) and 23 wore removable partial dentures (DIS in 52.17%). Distribution of DIS types according to the classification suggested by Newton is given in Fig. 1 (Rev-1).

The methods of cleaning dentures included washing the dentures, using tooth brushes and soaking the denture in sodium hypochlorite (Fig. 2) (Rev-1). Chi-squared test showed that a significant association between the presence of DIS and denture hygiene habits and sleeping with dentures ($P < 0.05$) irrespective of denture age and hygiene methods. Furthermore, the statistical test revealed that relationship between the incidence of DIS and denture hygiene practice and DIS and sleeping with dentures was statistically significant ($P < 0.05$).

Discussion

The incidence of DIS among complete denture wearers has been shown to be 25–65% depending upon the type of sample population chosen by various researchers (7). In surveys using

Table 1. **Descriptive statistics regarding distribution by gender, location, type of denture and DIS**

	Upper		Lower		
	Total	Partial	Total	Partial	Total
Male total	20	9	11	4	44
Male DIS	11	5	6	2	24
Female total	10	5	7	5	27
Female DIS	6	3	4	2	15

Table 2. **Age distribution of patients with Denture related oral lesions**

Age (years)	Frequency (%)	DIS (%)
≤50	15 (21.1)	8 (53.3)
51–65	35 (49.3)	19 (54.3)
≥66	21 (29.6)	12 (57.1)
Total	71 (100)	39 (100)

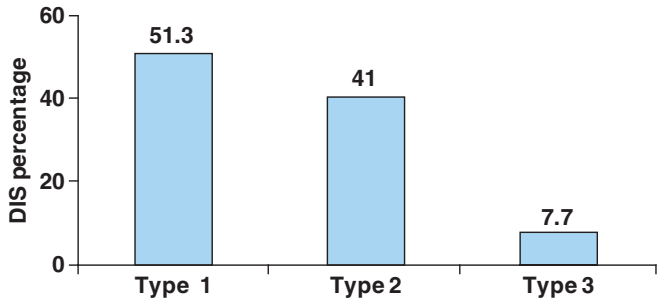

Fig. 1. Type of DIS for maxillary and mandibular arches.

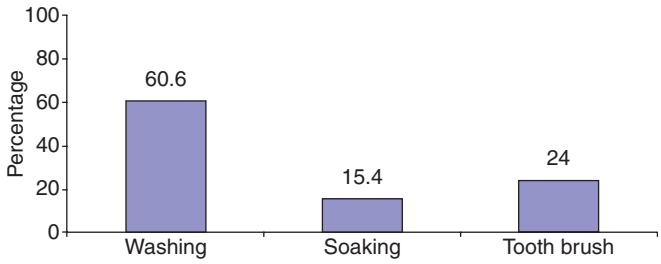

Fig. 2. Distribution of patients regarding cleaning methods.

randomized populations, it reached 50% (8), was more common in women, and increased with age (7).The incidence of DIS has been shown to be higher in individuals with poor oral/denture hygiene (9).

Several studies have indicated that denture age, denture hygiene habits and denture wearing habits are important factors in the development of DIS (1, 3, 10); however, the affect due to social, cultural and dietary differences among the Saudi population is open to speculation.

In this study, the DIS occurred more frequently in complete maxillary denture as compared to mandibular dentures. This may be due to the fact that the mucosal area covered by a maxillary denture is larger (Rev-1) to that covered by a mandibular denture. In type III DIS, a possible factor could be the negative pressure on the tissues covered by complete dentures resulting in papillary hyperplasia (2).

In this study, females in the 6th and 7th decades of life were predominantly affected by DIS. However, these results did not show statistically significance differences based on page or gender, which is accordance with the findings of previous studies (10, 11).

Denture hygiene habits, denture wearing habits (wearing dentures during sleep) and denture cleanliness are factors that showed statistical significance between the prevalence of DIS ($P < 0.05$). Patients with better denture hygiene were less affected by DIS. Dentures will have some effect on their local environment, which may predispose to DIS. However, the denture alone is probably not the cause as not all denture wearers develop DIS. Denture trauma has often been cited as a possible contributory factor and it is true that poorly fitting dentures, those with incorrect jaw relationships or occlusal errors can damage their supporting tissues (12); a recent study showed that implant overdentures could be effective in controlling denture stomatitis by preventing trauma to the oral mucosa (13) (Rev-1 + Rev-2).

The fungal aetiology has been cited in the literature with *Candida albicans* being the yeast most commonly implicated in DIS (5). A majority of studies have shown the presence of *Candida* species in a high percentage of DIS patients (6), who suggested that they were not the aetiological organisms in every case, but other studies have been able to show *Candida* in 100% of cases (10). The results of this study were in agreement with other studies (9–16) that showed correlation between poor oral/denture hygiene and DIS.

In this study the majority of the patients (60.6%) were washing their denture as cleaning method, as they found it the easiest way. Twenty-four per cent used toothbrush with toothpaste as it was a simple method to use and relatively inexpensive, while 15.4% preferred soaking the dentures and 70% used hypochlorite cleanser type which is not a recommended method according to Backenstose and Wells (16). The findings of this study agree with previous surveys showing that denture wearers experience difficulty in satisfactorily cleaning their dentures either because they have never been given instructions or not following instructions (16–18).

Conclusions

Within the limitation of this study, results indicated that the predisposing factors to DIS are associated with the method of denture hygiene and use of denture while sleeping. Dentists and dental hygienists should bear the responsibility by routinely providing post-placement denture hygiene instructions; this regimen should instruct patients to rinse their dentures and their mouths after meals whenever possible, to soak it in a non-bleaching type of cleanser and to avoid wearing their dentures during sleeping (Rev-1). The teamwork (dentists and

dental hygienists) by educating and motivating the patients would improve the quality of life of denture wearing population.

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Appendix

Questionnaire

1. Patient Name: _____
2. File No.: _____
3. Age: _____
4. Gender: _____
5. Date of denture placement: _____
6. Denture retention: (a) Good U/L (b) Poor U/L
7. Problem with denture: U = _____ L = _____
8. Sleeping with denture: (a) Yes (b) No
9. Do you clean your denture? (a) Seldom (b) Sometimes (c) Always
10. Denture hygiene: (a) Good (b) Acceptable (c) Poor
11. How do you clean? (a) Wash (b) Brush with paste (c) Use Denture cleanser
12. Type of cleanser:

    _____
13. Denture adhesive: (a) Yes (b) No
14. Where do you leave your denture? (a) Water (b) Moist (c) Table
15. Denture smell: (a) Mild: U/L (b) Moderate: U/L (c) Strong U/L
16. Residual ridge: (a) Mild (b) Moderate (c) Severe
17. Stomatitis: (a) Mild (b) Moderate (c) Severe
18. Symptoms:
    a) No: U/L
    b) Pain: U/L
    c) Soreness: U/L
    d) Burning sensation: U/L
19. Signs: (a) Granular U/L (b) Smooth U/L (c) Dryness U/L
20. Papillary hyperplasia: (a) Yes U/L (b) No U/L

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