

Denture-related oral mucosal lesions among removable denture wearers referred to clinics of Kerman, Iran

Shahrzad Taheri DDS, MSc¹, Molook Torabi-Parizi DDS, MSc²,
Marzieh Karimi-Afshar DDS, MSc³, Jahangir Haghani DDS, MSc⁴, Ali Taheri DDS, MSc⁵

Original Article

Abstract

BACKGROUND AND AIM: Since increasing the proportion of elderly in the world, so oral lesions related to removable denture-wearing are an important issue. The aim of this study was to evaluate the prevalence of denture-related oral mucosal lesions (DMLs) in removable denture wearers referred to clinics of Kerman, Iran.

METHODS: This cross-sectional study was conducted on 350 removable denture wearer, with mean age 58.52 ± 10.78 years old, that had been selected by multistage clustering sample from individuals who referred to Kerman clinics. The data were obtained by a checklist consist of demographic characteristics (sex, age, and educational level) self-reported daily denture hygiene frequency, age of prosthesis and clinical examination. Data were analyzed in SPSS using chi-square and t-tests. P value was considered at 5% significant level.

RESULTS: The results showed 71.8% of the denture wearers had denture related mucosal lesions. The most common lesion was denture stomatitis 36.6% followed by traumatic ulcer 26.5% and angular cheilitis 8.7%. There were significant differences between night wearing denture and age of prosthesis and denture-related mucosal lesions ($P < 0.001$).

CONCLUSION: The finding of this study showed the prevalence of denture-related mucosal lesions is common. Dentists should be instruct the patients for removing the denture at night and routine follow-up visits.

KEYWORDS: Removable Denture; Oral; Denture-related Lesion; Stomatitis; Traumatic Ulcer; Angular Cheilitis

Citation: Taheri S, Torabi-Parizi M, Karimi-Afshar M, Haghani J, Taheri A. **Denture-related oral mucosal lesions among removable denture wearers referred to clinics of Kerman, Iran.** J Oral Health Oral Epidemiol 2016; 5(2): 78-83.

Life expectancy is increasing in the world and the proportion of elderly is also increasing, so the number of elderly who need denture has increased.¹ Iran's population is about 74 millions. The elderly people were 3.9% of the whole population in 1965 and had reached 5.1% by 2006. It is expected that the portion of population over 65 years in Iran will increase to 20-25% by 2050.² Good oral health is essential for maintaining general health, especially among the elderly population.³ It is shown that replacement removable dentures

have a positive effect on individuals' oral health.⁴

Conditions, such as denture stomatitis, traumatic ulcer, and angular cheilitis, have been reported in denture wearer.⁵

Denture stomatitis is an inflammatory process of oral mucosa, occur beneath of a removable denture. Association between denture stomatitis and oral Candida infection, poor denture hygiene, night wearing denture,⁶ endothelial dysfunction,⁷ and vitamin A deficiency, cigarette smoking⁸ have been reported.

1- Assistant Professor, Department of Prosthodontics, School of Dentistry, Kerman University of Medical Sciences, Kerman, Iran

2- Associate Professor, Oral and Dental Diseases Research Center AND Kerman Social Determinants on Oral Health Research Center AND Department of Pathology, School of Dentistry, Kerman University of Medical Sciences, Kerman, Iran

3- Assistant Professor, Department of Orthodontics, School of Dentistry, Kerman University of Medical Sciences, Kerman, Iran

4- Associate Professor, Department of Oral Maxillofacial Radiology, School of Dentistry, Kerman University of Medical Sciences, Kerman, Iran

5- Assistant Professor, Department of Oral Pathology, School of Dentistry, Kerman University of Medical Sciences, Kerman, Iran

Correspondence to: Marzieh Karimi-Afshar, DDS, MS

Email: marzieh.afshar89@gmail.com

It is also shown denture plaque, *Candida* infection, poor denture retention, and mechanical trauma are associated with DMLs.⁹

Pentenero et al.¹⁰ showed prevalence of oral mucosal lesions were greater in denture wearer. Denture stomatitis was the most common oral lesions in Venezuelan aged populations.¹¹ DMLs among Brazilian farmers were 50% and the most common lesions were denture stomatitis.⁹ Dundar and Ilhan¹² showed 40.7% of patients older than 60 years had lesions due to dentures.

Singh et al.¹³ reported that denture stomatitis is the most common DMLs followed by burning mouth syndrome, superimposed infection, and angular cheilitis.¹³ Denture stomatitis and traumatic ulcers were reported in 35.8 and 29.0% of patients, respectively, in Turkey by Baran and Nalcaci.¹ Jainkittivong et al.¹⁴ found 45.0% of the patients with denture mucosal lesions and the most common DMLs were traumatic ulcer (19.5%) and denture stomatitis (18.1%). The prevalence of denture stomatitis in Greece' denture users reported high.¹⁵ The three most common lesions in an old population in Spain were angular cheilitis (34%), traumatic ulcers (15%), and denture stomatitis (14%), respectively.⁵ In Jafarian et al.¹⁶ study in Hamadan, 78.7% of denture wearer had at least one type of denture-related oral mucosal.

Since the differences between the prevalence of DMLs in different studies¹⁷ and there is not similar study in Kerman, Iran, the aim of this study was to study the prevalence of DMLs in removable denture wearers referred to clinics of Kerman.

Methods

This cross-sectional study was conducted on 384 participants (counted based on sample size formula) with removable dentures attending to private and government clinics in Kerman with multistage sampling method. City divided into five area: North, South, East, West, and Central. Then from each area two clinics selected (about 40 participants in each clinic). Researcher

attended 3 times a week in the morning and afternoon shifts to the selected clinics, participants were selected accidentally among patients who attended to clinic. Sampling continued until reaching the sample size. Finally, data analyzed on 350 samples. Data were obtained from a checklist consisting of demographic characteristics (age, sex, educational level, kind of prosthesis, age of prosthesis, night wearing, daily frequency of denture cleaning), and clinical examination. The clinical examination was done by a last year dental student who was trained about oral mucosal lesions. Denture wearers were divided into complete denture wearer and partial removable denture wearer groups. The age of denture use was categorized into five groups: (1) 1-5 years of use, (2) 5-10 years, (3) 11-15 years, (4) 16-20 years, and (5) greater of 20 years of use.¹⁸ The educational level of participant was divided into four groups: (1) illiterate, (2) below of diploma, (3) diploma, and (4) university. Soft tissue examination was undertaken using a mouth mirror and gauze compresses. Denture stomatitis was defined when the mucosa under the base of denture was shiny erythematous and was diagnosed according to the Newton criteria.^{7,9} Angular cheilitis was defined as erythematous cracks or fissuring at commissure of the lip/s. Traumatic ulcer was defined as a round or oval lesion with well-defined borders in contact with the denture.⁵

Patients who had a history of antifungal therapy in the previous 2 weeks and uncontrolled diabetes based on physician examination, and any systemic diseases that can effect on oral mucosa were excluded. All of the participants provided written informed consent. Data were analyzed in SPSS software (version 18, SPSS Inc., Chicago, IL, USA) using chi-square and t-tests. P value was considered at 5% significant level.

Results

Of the 350 users of dentures, 247 (70.6%) were female and 103 (29.4%) were male with the mean age 58.52 ± 10.78 years old. 274

(70.57%) had complete denture and the length year of using prosthesis over 20 years was 14.0% (Table 1). 55.1% had nocturnal use of their denture. 64.0% cleaning their denture 3 times a day. The prevalence of denture-related oral lesions was 71.8%. The most common lesion was denture stomatitis 36.6% followed by traumatic ulcer 26.5% and angular cheilitis 8.7%. There were no significant differences between type of denture-related oral lesions and sex ($P = 0.820$). There were significant differences between educational level and denture-related lesions ($P < 0.001$). Denture wearer, who had higher education, had lower denture-related lesions. Based on the time-length of denture usage, the patients who have denture-related oral lesions were using dentures statistically significantly longer ($P < 0.001$). There were significant differences between wearing prosthesis at night ($P < 0.001$), frequency of denture cleaning ($P = 0.040$) and denture stomatitis. The type of removable prosthesis (complete or partial

denture) and denture stomatitis had significant difference ($P = 0.030$). Table 2 shows correlation between denture stomatitis, traumatic ulcer and angular cheilitis according to demographic variables and self-report denture cleaning and wearing denture at night.

Table 1. Distribution of socio-demographic parameters

Variable	n (%)	Total number
Sex		
Men	103 (29.4)	350
Female	247 (70.6)	
Educational level		
Illiterate	150 (42.8)	350
Below diploma	130 (26.0)	
Diploma	59 (16.8)	
university	11 (3.1)	
Type of denture		
Complete	247 (70.6)	350
Partial	103 (29.4)	
Age of current denture		
< 5 years	145 (41.4)	350
6-10 years	76 (21.7)	
11-15 years	28 (8.00)	
16-20 years	52 (14.85)	
> 20 years	49 (14.00)	

Table 2. Correlation between demographic variable and frequency of denture cleaning and denture stomatitis, traumatic ulcer and angular cheilitis

Variable	Denture stomatitis	Traumatic ulcer	Angular cheilitis
	n (%)	n (%)	n (%)
Denture			
Complete denture	146 (41.7)	90 (25.6)	58 (16.6)
Partial denture	109 (31.6)	96 (27.4)	3 (0.9)
P	< 0.001	NS	< 0.001
Sex			
Male	146 (41.7)	56 (15.9)	38 (10.8)
Female	104 (31.6)	34 (9.6)	23 (6.7)
P	NS	< 0.001	NS
Age of prosthesis			
< 5 years	121 (34.8)	138 (39.5)	7 (2.1)
6-10 years	152 (43.4)	36 (10.8)	23 (6.6)
11-15 years	175 (50.0)	89 (25.1)	0 (0.0)
16-20 years	71 (20.4)	54 (15.4)	81 (23.1)
> 20 year	257 (73.5)	78 (22.4)	186 (53.1)
P	< 0.001	< 0.001	< 0.001
Use denture at night			
Yes	228 (65.3)	201 (57.6)	184 (52.9)
No	122 (34.7)	149 (42.4)	166 (47.1)
P	< 0.001	NS	NS
Frequency of denture cleaning			
Once a day	159 (45.7)	120 (34.3)	145 (41.5)
Twice a day	114 (32.5)	117 (33.5)	123 (35.3)
3 times a day	77 (21.8)	113 (33.2)	82 (23.2)
P	< 0.001	NS	< 0.001

*Significant, NS: Not significant

Discussion

Access to dental care is improving in the most countries, and many people are able to maintain their natural teeth longer than the past, but there also people who are edentulous and need use denture.

Oral lesions such as denture stomatitis, traumatic ulcers, and angular cheilitis are related to removable denture use.^{14,18} In this study, denture stomatitis was the most common oral lesions related to denture, that is compatible with Baran and Nalcaci,¹ Kossioni¹⁵ studies in Turkey and Greece.

In this study, 36.6% of individuals had denture stomatitis. This finding is similar to Evren et al.,¹⁹ Marchini et al.,²⁰ Baran and Nalcaci¹ who reported prevalence of denture stomatitis 44.8, 42.2 and 35.8 percent respectively, but is lesser than da Silva et al.⁹ who reported 71.4% of denture wearer had denture stomatitis. The range of denture stomatitis is reported between 15.0 and 70.0% in different studies.²¹ Denture stomatitis is a result of local factors, such as ill-fitting dentures and biofilm formation on the prosthetic surface.²²

There were not significant differences between prevalence of DML and sex. In this study, that is similar to Evren et al.¹⁹ This finding is not similar to da Silva et al. study.⁹ Some studies reported DML is more prevalent in women.²³⁻²⁵ This difference may be due to sample size, clinical examination, and type of removable denture.

In this study, the prevalence of traumatic ulcer and angular cheilitis was 26.5 and 8.7%, respectively. In the Martori et al.⁶ study were 15.0 and 34.0%, that is not similar to our study, and da Silva et al.⁹ showed 5.4% traumatic ulcer and 4.4% angular cheilitis, studies have showed a prevalence rate of 10-25%, similar to that found in the present study.^{1,6,12} Traumatic ulcer is associated to non-adapted denture, and resorbed residual ridge, since the age of denture in 14.0% participants in the present study were > 20 years, so this difference is justifiable. Angular cheilitis is associated to decrease the

vertical dimension.⁹

We found 55.1% were wearied their denture at night. de Castellucci Barbosa et al.²⁵ and da Silva et al.⁹ showed that 64.0 and 53.4% of denture wearer and did not remove their prosthesis at night, respectively, that is similar to our study.

There was significant difference between use of denture at night and DML. Kossioni¹⁵ concluded the most important factor for denture stomatitis was continuous use of denture. Martori et al.⁶ showed the patients who wore their denture at night, had higher incidence of stomatitis than those who did not. Navabi et al.¹⁷ also showed denture wearing at night and age of denture were major factors for denture stomatitis.

We found significant difference between educational level and DML. This finding is similar to Marchini et al.²⁰ may be due to individual with higher educational level have better job situation and better convenience to dental services.

In this study, significant differences between the DML and the age of denture. This finding is similar to da Silva et al.⁹ and Ercalik-Yalcinkaya and Ozcan²⁶ and Mandali et al.²⁷ that showed denture age had significant impact on frequency of DML. Emami et al.²⁸ showed wearing the dentures at night can reduce the protective effect of saliva, and good oxygenation of the mucosa, so microbiological aggression cannot remove from oral cavity.

In this study, there were significant differences between type of prosthesis and denture-related lesions. Patients who had partial removable denture had lower lesions. In agreement with some studies have reported that there is a greater prevalence of lesions among complete removable denture wearer,^{14,21} since this type of denture covers a greater area of oral mucosa than partial removable denture and, therefore, a greater chance of plaque retention as well as mechanical injury is expected.

Conclusion

The most factor for denture related oral

mucosa lesions were using the denture at night, age of prosthesis, and educational level. Dentists can help to prevent DML through making high quality denture and train the patients about methods and materials for denture cleaning and maintaining the prosthesis. Dentists should be instruct the patients for removing the denture at night and routine follow-up visits.

Limitations

Although the research has reached its aims, there were some limitations.

First: This study was conducted only on patients who were attending to Kerman clinics. Therefore to generalize the results, the study should have involved more participants at different level.

Second: The lesions that were studied in

the present study were limited to a group of lesions that examiner was train about their diagnosis. Therefore for further study, all of denture related lesions should be mentioned.

Third: Demographic variables such as age of denture were collected based on patients' reports, because lack of patients records, therefore to better data interpretation for further study, data should be gathered from patients records.

Conflict of Interests

Authors have no conflict of interest.

Acknowledgments

This study was supported by Kerman University of Medical Sciences, with the ethical code of k/90/104.

References

1. Baran I, Nalcaci R. Self-reported denture hygiene habits and oral tissue conditions of complete denture wearers. *Arch Gerontol Geriatr* 2009; 49(2): 237-41.
2. Mir AP. Need for geriatric dentistry training programs in Iran. *J Dent Educ* 2013; 77(1): 113-7.
3. Berkey D, Berg R. Geriatric oral health issues in the United States. *Int Dent J* 2001; 51(3 Suppl): 254-64.
4. Montero J, Lopez JF, Galindo MP, Vicente P, Bravo M. Impact of prosthodontic status on oral wellbeing: a cross-sectional cohort study. *J Oral Rehabil* 2009; 36(8): 592-600.
5. Preshaw PM, Walls AW, Jakubovics NS, Moynihan PJ, Jepson NJ, Loewy Z. Association of removable partial denture use with oral and systemic health. *J Dent* 2011; 39(11): 711-9.
6. Martori E, Ayuso-Montero R, Martinez-Gomis J, Vinas M, Peraire M. Risk factors for denture-related oral mucosal lesions in a geriatric population. *J Prosthet Dent* 2014; 111(4): 273-9.
7. Maciag J, Osmenda G, Nowakowski D, Wilk G, Maciag A, Mikolajczyk T, et al. Denture-related stomatitis is associated with endothelial dysfunction. *BioMed Research International* 2014; 2014: 9.
8. Shulman JD, Rivera-Hidalgo F, Beach MM. Risk factors associated with denture stomatitis in the United States. *J Oral Pathol Med* 2005; 34(6): 340-6.
9. da Silva HF, Martins-Filho PR, Piva MR. Denture-related oral mucosal lesions among farmers in a semi-arid Northeastern Region of Brazil. *Med Oral Patol Oral Cir Bucal* 2011; 16(6): e740-e744.
10. Pentenero M, Broccoletti R, Carbone M, Conrotto D, Gandolfo S. The prevalence of oral mucosal lesions in adults from the Turin area. *Oral Dis* 2008; 14(4): 356-66.
11. Mujica V, Rivera H, Carrero M. Prevalence of oral soft tissue lesions in an elderly Venezuelan population. *Med Oral Patol Oral Cir Bucal* 2008; 13(5): E270-E274.
12. Dundar N, Ilhan KB. Oral mucosal conditions and risk factors among elderly in a Turkish school of dentistry. *Gerontology* 2007; 53(3): 165-72.
13. Singh H, Sharma S, Singh S, Wazir N, Raina R. Problems faced by complete denture-wearing elderly people living in Jammu district. *J Clin Diagn Res* 2014; 8(12): ZC25-ZC27.
14. Jainkittivong A, Aneksuk V, Langlais RP. Oral mucosal lesions in denture wearers. *Gerodontology* 2010; 27(1): 26-32.
15. Kossioni AE. The prevalence of denture stomatitis and its predisposing conditions in an older Greek population. *Gerodontology* 2011; 28(2): 85-90.
16. Jafarian M, Taheri D, Sarkarat F, Shahrokhi M. Prevalence and e iology of soft tissue damages caused by removable denture. *J Dent Sch Shahid Beheshti Univ Med Sci* 2002; 20(2): 177-84. [In Persian].
17. Navabi N, Gholamhoseinian A, Baghaei B, Hashemipour MA. Risk factors associated with denture stomatitis in healthy subjects attending a dental school in southeast Iran. *Sultan Qaboos Univ Med J* 2013; 13(4): 574-80.

18. Peltola P, Vehkalahti MM, Wuolijoki-Saaristo K. Oral health and treatment needs of the long-term hospitalised elderly. *Gerodontology* 2004; 21(2): 93-9.
19. Evren BA, Uludamar A, Iseri U, Ozkan YK. The association between socioeconomic status, oral hygiene practice, denture stomatitis and oral status in elderly people living different residential homes. *Arch Gerontol Geriatr* 2011; 53(3): 252-7.
20. Marchini L, Tamashiro E, Nascimento DF, Cunha VP. Self-reported denture hygiene of a sample of edentulous attendees at a University dental clinic and the relationship to the condition of the oral tissues. *Gerodontology* 2004; 21(4): 226-8.
21. Coelho CM, Sousa YT, Dare AM. Denture-related oral mucosal lesions in a Brazilian school of dentistry. *J Oral Rehabil* 2004; 31(2): 135-9.
22. Puri G, Berzins DW, Dhuru VB, Raj PA, Rambhia SK, Dhir G, et al. Effect of phosphate group addition on the properties of denture base resins. *J Prosthet Dent* 2008; 100(4): 302-8.
23. Gendreau L, Loewy ZG. Epidemiology and etiology of denture stomatitis. *J Prosthodont* 2011; 20(4): 251-60.
24. Macedo FL, Dias Almeida J, Guimaraes Cabral LA. Study of denture-induced fibrous hyperplasia cases diagnosed from 1979 to 2001. *Quintessence Int* 2005; 36(10): 825-9.
25. de Castellucci Barbosa L, Ferreira MR, de Carvalho Calabrich CF, Viana AC, de Lemos MC, Lauria RA. Edentulous patients' knowledge of dental hygiene and care of prostheses. *Gerodontology* 2008; 25(2): 99-106.
26. Ercalik-Yalcinkaya S, Ozcan M. Association between oral mucosal lesions and hygiene habits in a population of removable prosthesis wearers. *J Prosthodont* 2015; 24(4): 271-8.
27. Mandali G, Sener ID, Turker SB, Ulgen H. Factors affecting the distribution and prevalence of oral mucosal lesions in complete denture wearers. *Gerodontology* 2011; 28(2): 97-103.
28. Emami E, de Grandmont P, Rompre PH, Barbeau J, Pan S, Feine JS. Favoring trauma as an etiological factor in denture stomatitis. *J Dent Res* 2008; 87(5): 440-4.