

# Prevalence and Distribution of Denture Induced Oral Mucosal Lesions among patients Managed in Lahore Teaching Hospital

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## ABSTRACT

**Background:** Oral mucosal lesions commonly develop in denture wearers and are abnormal changes in mucosal colour, texture, ulceration, edema and hyperplasia. They greatly affect the quality of a patient's life as they have impact on swallowing, speech and mastication with symptoms of burning, pain and irritation.

**Aim:** To find out prevalence, pattern and distribution of most commonly observed oral mucosal lesions in patients wearing removable dentures and their association with age, gender, denture age, nocturnal use and denture hygiene habits.

**Study design:** A cross sectional; observational study

**Place and duration:** Lahore Medical and Dental College from 3<sup>rd</sup> April till 3<sup>rd</sup> July 2021.

**Methodology:** Hundred partially and completely edentulous patients of both genders were included in the study. The age ranged of the patients was between 30 to 80 years. It was a cross sectional observational study. Non probability purposive sampling was used to select the patients. Patient wearing complete or partial dentures in both arches or single arch for at least three months were included. The clinical examination was carried out and depending on clinical appearance of mucosa the diagnosis of denture induced mucosal lesions was made i.e., denture stomatitis, traumatic ulcers and hyperplasia

**Results:** Out of 100 patients 40.0% had no mucosal lesions associated with dentures whereas 60% patients presented with lesions. Out of all the lesions the most frequently reported lesion was the traumatic ulcer 45%, followed by denture induced hyperplasia 10%. Denture stomatitis was 3% and angular cheilitis was least reported in our patients 2%. 36% patients clean their dentures regularly and 64% patients do not clean their dentures or being irregular. Night wearing of the prosthesis was found in 54% patients whereas 46% never wore dentures while sleeping.

**Conclusion:** The prevalence of oral mucosal lesions with complete or partial removable dentures were 60% reported in our patients and traumatic ulcers were the frequently observed lesion. Furthermore, significant association of all lesions with factors like patient's age, duration of denture use, nocturnal wearing and denture hygiene was found.

**Keywords:** Angular cheilitis, Complete Dentures, Denture Stomatitis, Denture related lesions, Edentulism, Hyperplasia,

## INTRODUCTION

Rehabilitation of patients with complete or partial tooth loss is carried out by fabricating dentures.<sup>1</sup> Besides rehabilitated function of removable dentures, it has commonly seen that denture improper use and cleaning, poor adaptability and mechanical trauma results in oral mucosal changes.<sup>2-4</sup> These mucosal changes that occur under dentures are termed as mucosal lesions.<sup>5</sup> Oral mucosal lesions are defined as abnormal alteration in mucosal colour, texture, swelling or loss of mucosal surface integrity.<sup>5</sup> The lesions could be in the form of ulceration, edema, hyperplasia and hyperemia.<sup>6</sup> They can affect quality of patient life as it has impact on swallowing, speech and mastication with symptoms of burning, pain and irritation.<sup>3,5,6</sup>

Oral pathological lesions like denture stomatitis results from poor denture hygiene, ill-fitting dentures fabrication without registering all the fine details of patient's oral anatomy.<sup>6,7</sup> It is commonly observed in patients using old sets of dentures for more than 5 years as the growth of *Candida albicans* under the denture base causes inflammation of the tissues. Patients with nocturnal dentures use are more prone to develop stomatitis.<sup>7</sup> Similarly unsupervised denture use and lack of periodic recall visits further accentuate bad oral health condition. Similarly Angular cheilitis results from poorly fabricated dentures with reduced vertical height that results in accumulation of saliva in the corners of mouth resulting into cracked and inflamed tissues around the oral commissure.<sup>8</sup> Traumatic ulcers in denture wearers commonly results from over extended denture borders, poor denture finishing and polishing, improper occlusal adjustments. Likewise, hyperplasia has been seen in denture patients due to repeated trauma.<sup>2,5,6</sup>

The prevalence of denture related oral lesions varies in different countries and they are 10.8% to 62% in range.<sup>7,8</sup> 10.8% Chinese population with denture induced lesions have been reported. 7.50% Brazilian prevalence was documented whereas 59.4% prevalence of mucosal lesions in India was seen where denture stomatitis was the commonest lesion.<sup>9,10</sup> Dundar and lihan reported 40.7% in 60 years older patient with lesion.<sup>11</sup> Traumatic ulcers 29% and denture stomatitis 35.8% in Turkish patients have been reported.<sup>12</sup> In studies most common denture induced mucosal lesions about 45% had been seen; were ulcers accounts for 19.5% and denture stomatitis 18.1% respectively.<sup>13</sup> In Spain three most prevalent lesions reported were denture stomatitis 14%, 15% of traumatic ulcer and 34% of angular cheilitis.<sup>14</sup>

The oral mucosa that is in contact with the dentures can undergo such changes; while dentures being used in certain period and resultant lesions slowly progress to advance stages thus requiring complex treatment and more patient compliance.<sup>4,6</sup> The post insertion denture's care, follow up visits and periodic replacements of prosthesis after certain time has its importance.<sup>14</sup>

Since there were differences reported in various prevalent studies in different regions and countries and we encountered no such studies in our region that is clinical based and reports the prevalence and factors responsible for denture related mucosal lesions. In our clinical setup many patients report with mucosal lesions on daily basis and their cure not only demands frequent recall visits but also add workload on clinics and added expense. By knowing the frequency and distribution of the lesions we can highlight the factors responsible for their occurrence in our region and can undergo better treatment planning and focused on counselling the patients about the importance of regular recall visits, cleaning of dentures, regular maintenance and periodic replacement of the dentures.

The purpose of the current study was to find out prevalence, pattern and distribution of most commonly observed oral mucosal

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lesions in patients wearing removable dentures and their association with age, gender, denture age, nocturnal use and denture hygiene habits.

## METHODOLOGY

A total of 100 partially and completely edentulous patients of both genders were selected from Prosthodontic department of Lahore Medical and Dental College in three months period, 3<sup>rd</sup> April to 3<sup>rd</sup> July 2021. It was a cross sectional observational study. Non probability purposive sampling was used to select the patients. The age ranged of the patients was 30 to 80 years. Sample size was estimated from the previous study on prevalence of denture related mucosal lesions. Patient wearing complete or partial dentures in both arches or single arch for at least three months were included. Only dentures made up of polymethylmethacrylate were included. Patients with newly inserted dentures less than 3 months wear were not included. Patients with terminal illnesses, a recent history of use of antifungals were excluded. Those patients who were not ready to give informed consent were also not included in the study. Informed consent was taken and ethical approval letter was taken from institutional Dental Ethical Committee. Demographic data like age, gender type of prosthesis (complete or partial dentures), age of the denture, nocturnal denture use, denture cleaning was recorded.

The history taking and clinical examination was carried out by a team of experienced Prosthodontist along with an oral pathologist. All the patients were examined and diagnosed by the same team to avoid bias in data collection. Detailed history about the age of the denture, nocturnal wearing and the denture cleaning habits was taken. Examination was done by using diagnostic instruments (mirror, probe) and by manual palpation. Data collection was done and recorded in examination form. The denture induced lesions i.e.; denture stomatitis, candidiasis, angular cheilitis, traumatic ulcers and denture hyperplasia were examined. The diagnosis of all the lesions was made based on patients' history and clinical characteristics of the lesions. Denture stomatitis was defined as the palatal oral mucosal inflammation, and ulceration if tearing or laceration were evident and it was diagnosed using Newton criteria<sup>8,6</sup>. Candidiasis was seen as creamy white slough under the denture that can be removed by the wet gauze<sup>4</sup>. Angular cheilitis is the inflammation at the corner of the mouth or painful red fissures due to loss of denture vertical dimension<sup>9</sup>. It was diagnosed on the basis of its clinical appearance. Traumatic ulcers were defined as oval or round lesions with well-defined borders in contact with dentures due to extreme pressure<sup>3</sup>. Denture induced hyperplasia was defined as reactive lesion resulting into over grown mucosa due to excessive mucosal overloading and pressure<sup>5</sup>. Prevalence of oral mucosal lesion could be different in different age groups; similarly, the age of denture affects their prevalence. Therefore, the patients were divided into two age groups < 50 and more than 50 years. Age of denture use was divided into 4 groups, 1-5, 6-10, 11-15, >15 years.

**Statistical analysis:** Descriptive statistics were expressed as frequency and percentages and were calculated for age, gender, type of denture, night wearing, denture cleaning, age of denture. Correlation between demographic variables (patient age, gender, denture age, denture cleaning, nocturnal denture use) and

mucosal lesions was found using Chi Square (Fisher exact test). Data was analyzed in SPSS vr 20, p value was considered significant at 5% significant level.

## RESULTS

A total of hundred patients who used removable denture prosthesis were selected. 45(45%) patients reported were males whereas n= 55(55.0%) were female patients. The age ranged from 30 to 80 years and average age was 58 years±SD 12.29. The most frequent age group presented was the age group more than 50 years; 70(70%) (Table I). Out of 100 patients 40(40%) had no mucosal lesions associated with dentures whereas 60(60%) patients presented with lesions (Table I). Regarding the prosthesis type; the complete denture was the most commonly observed prosthesis type out of which 31(31%) patients used only mandibular complete denture, 19(19%) used maxillary complete denture, whereas 9(9%) had dentures in both arches. Partial denture prosthesis was frequently observed in mandibular arch 21(21%) and 13(13%) in maxillary whereas 6(6%) partial dentures were observed in both arches.

Out of all the lesions the most frequently reported lesion was the traumatic ulcer 45(45%), followed by denture induced hyperplasia 10(10%). Denture stomatitis was 3(3%) and angular cheilitis was least reported in our patients 2(2%). About denture hygiene it was seen that 36(36%) patients clean their dentures regularly and 64(64%) patients do not clean their dentures or being irregular, Table I. Night wearing of the prosthesis was found in 54(54%) patients whereas 46(46%) never wear dentures while sleeping, Table I. Regarding age of the dentures, maximum patients were using their dentures for 6 to 10 years 52(52%) and 6(6%) were using dentures for more than 15 years. We found significant difference when evaluating frequency distribution associated with lesion and age of the patients and reported that lesions were more common in age group above 50 years 70(70%) p .005 (Table II). We didn't find significant difference in gender p>0.05. Correlation of oral mucosal lesions with nocturnal use of dentures, age of prosthesis, cleaning of dentures was significant p<0.05 (Table 2).

Table I: Frequency distribution of sociodemographic variables (n=100)

Variable	n
<b>Gender</b>	
Male	45(45%)
Female	55(55%)
<b>Age (years)</b>	
> 50	30(30%)
<50	70(70%)
<b>Denture cleaning</b>	
Yes	36(36%)
No	64(64%)
<b>Denture Age (years)</b>	
<5	25(25%)
6-10	52(52%)
11-15	17(17%)
>15	6(6%)
<b>Nocturnal denture use</b>	
Yes	54(54%)
No	46(46%)

Table II: Correlation between lesions and demographic variables (n=100)

Demographics	No lesion	Traumatic ulcer	Denture stomatitis	Hyperplasia	Angular cheilitis	P value
<b>Age</b>						
<50 years	19(63.3%)	10(33.3%)	0(0.0%)	0	13.3%	.005
>50 years	21(30%)	35(50%)	3(4.3%)	10(14.3%)	1(1.4%)	
<b>Gender</b>						
Male	20(44.4%)	19(42.2%)	1(2.2%)	3(6.7%)	2(4.4%)	.432
Female	20(36.4%)	26(47.3%)	2(3.6%)	7(12.7%)	0	
<b>Nocturnal denture use</b>						
Yes	8(14.8%)	37(68.5%)	0(0.0%)	7(13%)	2(3.7%)	.000
No	32(69.6%)	8(17.4%)	3(6.5%)	3(6.5%)	0	
<b>Denture cleaning</b>						
Yes	34(94.4%)	1(2.8%)	1(2.8%)	0(0.0%)	0(0.0%)	.000
No	6(9.4%)	44(68.8%)	2(3.1%)	10(15.6%)	2(3.1%)	
<b>Denture age</b>						
<5	20(80%)	5(20%)	0	0(0.0%)	0(0.0%)	.000
6-10	18(34.6%)	27(51.9%)	3(5.8%)	4(7.7%)	0(0.0%)	
11-15	2(11.8%)	9(52.9%)	0	4(23.5%)	2(11.8%)	
>15	0	4(66.7%)	0	2(33.3%)	0(0.0%)	

## DISCUSSION

Oral mucosal lesions both acute and chronic results from patient's oral habits, quality and integrity of removable prosthesis, age, gender, traumatic injuries, infectious material under prolonged denture use<sup>15</sup> Prevalence of mucosal lesions have been studied in various parts of the world. 4.9% to 6.4% prevalence of lesions of oral mucosa was ranging globally in general population across various countries<sup>16,17</sup>. The oral mucosal lesions prevalence in our study is 60% which is more than 13.5% reported by Ogunride<sup>18</sup> and coworkers, 45.6% by Pavicic<sup>19</sup> et al. Feng<sup>20</sup> et al reported 10.8% prevalence among Chinese, Amarodia<sup>21</sup> and coworkers found 31.7% in teenagers. Similarly, Toum<sup>5</sup> and coworkers reported 61.8 % Lebanese population with denture induced mucosal lesions. The difference could be due to variations in the studied population characteristics<sup>10</sup>. We reported high prevalence of mucosal lesions in complete denture wearers, (maxillary complete dentures 31%, mandibular complete dentures 19% and 9% patients with complete dentures in both arches). Pavicic<sup>19</sup> et al also found 46.3% complete denture wearers against 40.8% partial denture wearers with mucosal lesions. Similarly, Ogunride<sup>18</sup> found 33.3% prevalence in complete denture and 12.2% in partial denture patients. High prevalence 59.6% was reported by Cheruvathoor<sup>22</sup> and by some other studies<sup>8,22</sup>. The possible explanation of this finding is that complete coverage of oral mucosa by complete dentures result in development of negative pressure, more salivary accumulation, less washing action of saliva and more tissue in contact with the dentures as compare to the partial ones<sup>8</sup>.

Traumatic ulcers resulting from continuous mucosal irritation are one of the common findings seen under ill-fitting prosthesis in prosthodontic patients. We found traumatic ulcers ;45%, the most prevalent lesion caused by dentures followed by hyperplasia 10%. Angular cheilitis was least present in our patients. Similarly, Ogunride<sup>18</sup> and coworker reported traumatic ulcers to be the commonest ones 78.6% followed by hyperplasia 14.3%. This is in contrast with the results of a study carried out by Gaur<sup>10</sup> and coworkers where denture stomatitis was commonest lesion 59.25%. Few studies reported hyperplasia is the main lesion associated with removal dentures<sup>2,11</sup>. Other reported denture stomatitis, followed by hyperplasia and angular cheilitis as the prevalent problems<sup>8,22</sup>. Elisenda<sup>23</sup> and Lidia<sup>24</sup> in different places and different years diagnosed denture stomatitis as the main cause of mucosal lesions. The reason for the disparity in the results may be due to the difference in the characteristics of the studied population.

Night wearing of a removable prosthesis is detrimental to the oral mucosal health as it results in inflammation due to the accumulation of saliva under it. We found significant relationship between nocturnal denture wearing and development of mucosal lesions. In contrast to the results of current study Ogunride<sup>18</sup> and coworkers reported insignificant association between them.

However, in literature strong association between oral lesions and dentures nocturnal use has been seen<sup>25,26</sup>. Continuous negative pressure on the oral tissues under the dentures, accumulation of saliva and poor hygiene is responsible for these problems. It is documented that denture should be replaced periodically as using one for a prolong period without replacement is detrimental to mucosal health. We reported that the prevalence of lesion increases with the increase period of the same denture use and found significant association with the development of the lesions. In contrast Ogunride<sup>18</sup> and coworkers showed opposite findings and stated less frequency of lesions seen in patients who used same denture for prolonged period of time. Another study<sup>6</sup> documented that the denture age has no significant relation with lesions, whereas Kossioni<sup>25</sup> and Naval<sup>26</sup> in their respective studies reported similar results as ours. Similar were reported in a study claiming that that denture deteriorates with long term use and lesion develops as roughened surfaces of the dentures in contact with oral tissues thus accumulate plaque and fungal infections.<sup>27</sup> Furthermore, continuous use of dentures affect mucosa, decrease its mechanical and microbiological resistance<sup>25,26</sup>. Aging of an old prosthesis progressively rise the Candida Albicans and poor hygiene multiplies them thus reported with more lesions<sup>25-27</sup>.

Poor hygiene increases levels of Candida Albican thus resulting in lesions under dentures.<sup>25</sup> We found 64% patients who didn't clean their dentures or being irregular. We also reported significant association between hygiene and oral mucosal lesions. Few other studies have reported the same findings. Mechanical irritation and infection results in lesion<sup>23,24,26</sup>.

In our respected study more (55%) female patients were observed using dentures than males (45%). Likewise, Ogunride<sup>18</sup> and coworkers reported 58.6% males in their respective study. This could be due to the fact that female seek dental treatment more as they are more health and beauty conscious<sup>22</sup>. Furthermore, more female ratio is because hormonal disorders and pathophysiological reasons make them vulnerable to have more dental diseases<sup>2</sup>. However, there are few studies that reported a greater number of males having lesions as compare to females as men are at higher due to risk habits like smoking and drinking<sup>22</sup>. We however found insignificant relationship when genders were compared with lesions.

Factors like age increases lesions of oral mucosa and we found significant association of denture induced oral mucosal lesions with age. Majority of the patients were above 50 years of age i.e.; 70%. Ogunride<sup>18</sup> and coworkers also stated that increasing age results in development of mucosal lesions in denture wearers. Gaur<sup>10</sup> reported oral lesions more in age group >40 years 60.78%, whereas, daSilva<sup>9</sup> 70% patient above 40 years. Predominance in old age was reported in other studies as well<sup>5,28</sup>. 22.8% in old Lebanese<sup>20</sup> population and 61.6% prevalence of denture induced lesions were reported in Thailand<sup>30</sup>. Data obtained by Utama<sup>1</sup> showed that lesions occur in all removable dentures

age from 26 to 80 years. Wide variation found in literature regarding prevalence of lesion in old individual from 2.47 to 98%<sup>31</sup>. This disparity in the results is due to nature of studied population, type of lesion studied. Furthermore, the lack of universally accepted classification system for oral lesions that result in increased discrepancy in result of the study<sup>10</sup>.

In this study most of the denture wearers were found having oral mucosal lesions and poor hygiene, old dentures use, night wearing were the factors responsible. Dentist can help in reducing the development of oral lesions by fabricating high quality dentures, keeping post operative visits in order to browse the areas of dissatisfaction and instruct patients for denture cleaning, removing the dentures at night and routine follow up visits. The limitation of the study is that it was conducted only on patients attending a teaching hospital. Therefore, to generalize the results, the study should have involved more patients at different levels.

## CONCLUSION

The prevalence of oral mucosal lesions with complete or partial removable dentures were 60.0 % reported in our patients and traumatic ulcers were the frequently observed lesion. Furthermore, significant association of all lesions with factors like patient's age, duration of denture use, nocturnal wearing and denture hygiene was found.

**Authors/contribution:** SHAR: Designed research / manuscript final reading/ Data collection, SI: Conceived idea, AZ: Statistical analysis, RA: Data collection, SS: Manuscript writing, NN: Literature review

**Conflict of interest:** Nil

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