Original Article

Frequency and Location of Traumatic Ulceration Subsequent to The Placement of Complete Denture

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Abstract

Objective: To determine the frequency and common location of traumatic mucosal ulceration caused by a complete denture in an edentulous patient during follow-up visits.

Methodology: A descriptive cross-sectional study was conducted in the Department of Prosthodontics, Sardar Begum Dental College, Peshawar, from August to December 2024. A total of 121 systemically healthy patients aged 45–75 years, requiring conventional maxillary and mandibular complete dentures, were recruited through non-probability consecutive sampling. Complete dentures were fabricated following standard procedures under a prosthodontist's supervision. Patients were recalled on the 1st, 3rd, and 5th days after insertion and subsequently at weekly intervals. At each visit, traumatic ulcerations and their locations were recorded, and necessary denture adjustments were made. Comfort was defined as absence of complaints and ulcerations.

Results: Among 121 patients (mean age 59.1 ± 5.7 years), most were male (65.3%) and urban residents (73.6%). The mean number of visits was 2.88 ± 1.14. Ulcerations occurred most often at the labial frenum (21.5%), maxillary tuberosity (17.4%), and buccal frenum (14.9%), while the lingual frenum/sublingual flange area was least affected (1.7%). Stratification showed no significant association of ulceration with age, gender, or education, but a significant association was found with residence, with urban patients more frequently affected ($p = 0.041$).

Conclusion: Traumatic ulcerations were most common at the labial frenum and maxillary tuberosity, with urban patients more frequently affected. Attention to high-risk areas during denture fabrication and adjustment can improve patient comfort and clinical outcomes.

Keywords: Complete Denture, Denture-Related Stomatitis, Prosthodontics, Ulcer.

Introduction

The objectives of complete denture prosthodontics are to restore the function and esthetics that were provided by the lost natural dentition and the supporting structures.[1,2] After placement of complete dentures, ulcers often appear and causes pain and results in patients' discomfort.[3] Consequently, patients' perception of the treatment provided is significantly reduced,leading to a growing sense of distrust towards the dentist, and patients willingness to adapt to a prosthesis decreases.[4] Various errors result in mucosal injuries including inadequate fitting of denture base, excessive extension of flanges, irregularities in the denture, porosities or tissue undercuts, and the existence of premature occlusal contacts.[5] Failure to correct these problems may lead to patient dissatisfaction and subsequent failure of removable dental prostheses.[6] In fact, patients must continue to visit their dentist long after the initial placement. This may help in ensuring a good clinical outcome. Research conducted in Saudi Arabia revealed that the most traumatic ulceration in maxillary arch were in the vestibular sulcus, between the labial and the buccal frenum, and in the vestibular sulcus between the buccal frenum and the maxillary tuberosity (18.96%). The most frequent region in mandible were in mandibular lingual pouch area (18.75%).[7]

Traumatic ulcerations are a common complication during the initial period of complete denture use.[3] They usually occur due to failure to follow fundamental prosthodontic principles such as achieving accurate border molding, balanced occlusion, proper tissue adaptation, and adequate relief in areas of anatomical undercuts. These factors lead to localized mucosal trauma, discomfort, and reduced patient compliance.[5] Limited studies have been conducted in this region to identify the frequency and common locations of such traumatic ulcerations. Understanding these high-risk sites can assist clinicians in anticipating problem areas, refining clinical and laboratory steps, and providing more precise adjustments. This will not only improve patient comfort and satisfaction but also enhance clinical outcomes, reduce the number of follow-up visits, and serve as a valuable resource in dental education and training.

The primary objective of this study was, therefore, to identify the areas of higher incidence of traumatic mucosal lesions following the insertion of complete dentures in edentulous patients.

Methodology

Study design: Descriptive cross-sectional study

Setting: This study was conducted at Department of Prosthodontics, Sardar Begum Dental College, Peshawar, from 15August ,2024 to 30 December, 2024.

Study duration: 15 August, 2024 to 30 December 2024.

Sample size:

With 95% confidence, assumed prevalence 18.96%, and an absolute margin of error of 7%, sample size obtained was 120.46, which was rounded to 121. The relatively higher margin of error was used in view of feasibility concerns.

Sampling technique: Non-probability consecutive sampling

Inclusion criteria:

1. Aged 45 to 75 years
2. Patients willing to receive maxillary and mandibular conventional complete dentures that are removable.
3. Patients with overall good health.

Exclusion criteria:

1. Previous history of allergy to acrylic resin.
2. Patient who has used complete denture in the past
3. Candida infection
4. Diabetic Patients
5. Uncooperative/Disabled/or psychiatric Patients.

Data Collection Procedure:

Permission was sought from Ethical review committee (No.GU/Ethical Committee/2024/147) and written informed consent was obtained from patients fulfilling inclusion criteria attending outpatient department. Complete dentures were fabricated using methods recommended by Zarb and Bolender, by training medical officers under direct supervision of Prosthodontist. Primary impression was made using impression compound (Decent Composition for impression) and was poured in hard plaster (Kapo Hard CKH- 52). Spacer was adopted on primary cast and custom tray was fabricated using acrylic resin. Border molding was done using Green stick (Decent Green Impression Compound). Definitive impression was made using Metallic Oxide Impression paste (Cavex Outline). After beading and boxing, it was poured using hard plaster (Kapo Hard CKH- 52). Master cast was indexed for future re-articulating. Maxillomandibular relationship was recorded and was mounted in Semi-adjustable articulator. After teeth arrangement, they were checked in patients. After that, the denture processing was done to get definitive prosthesis. Occlusal errors were corrected by laboratory remounting. Dentures were polished and kept in water for 48 hours before insertion in patient's mouth. The intaglio surface was checked using pressure indicating paste and necessary adjustments were made accordingly. All the patients were recalled for follow up examination on the first, third and fifth days after insertion and then after a week interval. At each appointment, the traumatic ulceration and its location were marked and recorded, and an adjustment

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was made in the denture. No complaint from the patient and absence of ulcers was considered as comfort achieved. All the above information was recorded in the proforma.

Data Analysis:

Data were analyzed using SPSS version 22. Mean and standard deviation were calculated for age and number of visits required to achieve comfort. Frequencies and percentages were computed for categorical variables including gender, presence of mucosal ulceration, and its location. Effect modifiers such as age, gender, educational status and Residence were stratified to assess their association with mucosal ulceration. Post-stratification, the Chi-square test was applied, and a p-value of ≤0.05 was considered statistically significant.

Results

This study was conducted on 121 patients at the Department of Prosthodontics, Sardar Begum Dental College & Hospital, Peshawar, to determine the frequency and common location of traumatic mucosal ulceration caused by complete dentures in edentulous patients during follow-up visits.

Demographic characteristics of the study are as shown in table 1.

Mean and SDs for age was 59.12+5.70. Mean and SDs for number of visits was 2.88+1.142. As per complete dentures, 62 (51.2%) patients had maxillary while 59 (48.8%) had mandibular complete dentures.

As per frequencies and percentages for mucosal ulceration, 22 (18.2%) patients were recorded with mucosal ulceration. 26 (21.5%) Patients had ulcer at the site of labial frenum, 18 (14.9%) patients had ulcers in the buccal frenum area, 10 (8.3%) patients had ulcers on the edentulous ridge, 09 (7.4%) patients had them on mylohyoid portion of lingual flange, 06 (5.0%) patients had ulcers in vestibular sulcus between labial and buccal frenum, 17 (14.0%) patients had them in posterior palatal seal area, 21 (17.4%) patients had ulcers in maxillary tuberosity area , 04 (3.3%) patients had them in retromylohoid area, 08 (6.6%) patients had them in retro molar pad area and 02 (1.7%) patients had them in lingual frenum and sublingual flange area.The distribution of ulcers at specific locations intraorally has been mentioned in table 2.

Stratification was done which showed no significant association of ulceration with age, gender, or education, but a significant association was found with residence, with urban patients more frequently affected (p = 0.041).

Table 1. Demographic Characteristics of Patients (n = 121)

Variable	Categories	Frequency	Percentage
Age group (years)	45-60	55	45.5
	61-75	66	54.5
Gender	Male	79	65.3
	Female	42	34.7
Residence	Urban	89	73.6
	Rural	32	26.4
Education	Illiterate	66	54.5
	Primary	30	24.8
	Secondary and above	25	20.7

Table 2. Distribution of Ulceration Sites (Ranked) (n = 121)

Ulceration site	Frequency	Percentage
Labial frenum	26	21.5
Maxillary tuberosity	21	17.4
Buccal frenum	18	14.9
Posterior palatal seal area	17	14.0
Edentulous ridge	10	8.3

Mylohyoid portion of lingual flange	9	7.4
Retromolar pad area	8	6.6
Vestibular sulcus (labial/buccal frenum)	6	5.0
Retromylohyoid area	4	3.3
Lingual frenum / Sublingual flange area	2	1.7
Total	121	100.0%

Table 3.

Variable	Categories	Mucosal ulceration Present	Mucosal ulceration Absent	Total	P value
Age group	45–60 years	9 (16.4%)	46 (83.6%)	55 (45.5%)	0.636
	61–75 years	13 (19.7%)	53 (80.3%)	66 (54.5%)	
Gender	Male	17 (21.5%)	62 (78.5%)	79 (65.3%)	0.192
	Female	5 (11.9%)	37 (88.1%)	42 (34.7%)	
Residence	Urban	20 (22.5%)	69 (77.5%)	89 (73.6%)	0.041*
	Rural	2 (6.3%)	30 (93.8%)	32 (26.4%)	
Education	Illiterate	12 (18.2%)	54 (81.8%)	66 (54.5%)	0.202
	Primary and above	8 (26.7%)	22 (73.3%)	30 (24.8 %)	
	Secondary and above	2 (8.0 %)	23 (92.0 %)	25 (20.7%)	

*p < 0.05, statistically significant

Discussion

The present study aimed to identify the most common locations of mucosal ulcers in complete denture patients following denture insertion.This study results align with those of Kivoviks et al[8] who reported 87% of his participantsneeded adjustments at their first post-insertion visits.In our study, all the patients need adjustment after complete denture insertion in their follow up visits.This is in accordance with the study conducted by Jain S et al[9], his sample size was 221 patients and all of them needed adjustment in follow up visits.

In the study of Kivoviks et al[8], vestibular sulcus (41 %) had the highest frequency of injuries. Similarly, in our study, 40 % of mucosal ulcers were found in vestibular region. (21.5% labial frenum, 14.9% buccal frenum and 5% vestibular area between labial and buccal frenum) This may be because many clinicians, due to fear of losing retention, do not trim the denture flanges, leading to overextension.

These findings emphasize the need for careful attention to border molding, final impression taking, denture adaptation, and proper flange extension during the fabrication of dentures.[10] The reduced support and retention of mandibular dentures, owing to a smaller denture-bearing area, present challenges compounded by the presence of the tongue and increased mobility of the mandibular denture.[11] Mucosal injuries can be avoided and patient satisfaction can be achieved by detection of overextended borders by applying pressure indicating paste at the time of placement.[10]

It is important to highlight that prosthesis placement should not mark the end of the interaction between patient and clinician in the treatment of complete denture. Denture adjustments and follow ups are essential clinical phases in denture fabrication and are crucial for ensuring proper patient care.

The majority of ulcerations were found in the areas of limiting structures, emphasizing the significance of proper extension of borders during border molding techniques and checking extension using pressure indicator techniques before denture placement to prevent mucosal injuries and enhance patient comfort.

The findings revealed that the most prevalent sites in this study were the labial frenum (21.5%), followed by the maxillary tuberosity area (17.4%). The results are in contrast with the study of Chaudhary MAG et al[12], in which only 12 % of patients had ulcers on labial frenum and 8.7 % had ulcers on maxillary tuberosity. Ac-

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cording to a study of Tantray and Ali[13], the maxillary ulcerations were commonly seen in labial frenum and posterior palatal seal area. The posterior palatal seal area showed 2nd most common ulceration site whereas, in our study, 14% of the patients show mucosal ulcerations in post dam area which can be attributed to over post damming to gain retention.

These results align with recent literature emphasizing the prevalence of denture-related mucosal lesions. For instance, Tantray and Ali reported that patients frequently experienced discomfort and mucosal ulcers, particularly with mandibular dentures, during the post-insertion period. Similarly, Khan et al[14] found that 76.6% of patients developed traumatic ulcers within 3 to 4 days post-denture insertion, with a higher incidence in mandibular tissues.

The labial frenum's susceptibility to ulceration, as observed in our study, may be attributed to its anatomical prominence and the potential for denture flange overextension, leading to excessive pressure and subsequent mucosal injury. Ulcerations in the maxillary tuberosity and posterior palatal seal areas can result from improper denture adaptation, leading to uneven pressure distribution and tissue trauma. Ensuring accurate denture impressions and appropriate relief in case of undercut in tuberosity region is crucial to minimize such complications. This approach is supported by Yaqoob et al., who emphasized the importance of using pressure-indicating media during denture fabrication to reduce mucosal injuries.[7]

The mean number of follow-up visits in our study to achieve comfort was 2.88, this is in contrast to other studies[5,8] where six follow up visits were required to achieve comfort after insertion of complete dentures. underscoring the necessity for multiple adjustments to achieve optimal denture fit and patient comfort. Regular follow-up allows for timely identification and management of mucosal lesions, thereby enhancing patient satisfaction and oral health outcomes.

The study highlights the significant prevalence of traumatic mucosal ulcerations in edentulous patients following complete denture insertion, with specific anatomical sites being more prone to ulceration. These findings highlight the importance of meticulous denture fabrication, proper patient education, and regular follow-up to identify and address mucosal injuries promptly. It is important to educate the patient before initiating treatment that after the delivery of complete denture, the treatment does not end after delivery, rather patient enters another phase of treatment, that is adjustment phase. Complete denture success can be ensured only after patient has passed through adjustment phase successfully.

The findings of this study should be interpreted in light of certain limitations. First, the sample size of 121 patients, although calculated for feasibility, was relatively small and may not fully represent the broader population of complete denture wearers. Second, important clinical factors such as arch form, ridge morphology, and the degree of ridge resorption—which can significantly influence denture fit and the likelihood of mucosal ulceration—were not considered in the analysis. Future studies with larger, multicenter samples and inclusion of these anatomical variables are recommended to enhance generalizability and provide more comprehensive insights.

Conclusion

Traumatic ulcerations were most frequently observed at the labial frenum and maxillary tuberosity, while the lingual frenum region was least affected. Ulceration showed no significant association with age, gender, or education, but was significantly higher among urban patients. Careful attention to denture extension and occlusion in high-risk areas can minimize complications and improve patient comfort.

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Authors' Contribution Statement

JA contributed to the conception, design, acquisition, analysis, drafting of the manuscript, and critical review of the manuscript. MK contributed to the conception, design, acquisition, interpretation of data, drafting of the manuscript, and final approval of the version to be published. MAC contributed to the acquisition, analysis, interpretation of data, drafting of the manuscript, and critical review of the manuscript. MR contributed to the analysis, interpretation of data, and drafting of the manuscript. MA contributed to the analysis, interpretation of data, and drafting of the manuscript. HIM contributed to the analysis, interpretation of data, and drafting of the manuscript. All authors are accountable for their work and ensure the accuracy and integrity of the study.

Conflict of Interest

Authors declared no conflict on interest

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None

Data Sharing Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.