Original Article

A Cross-Sectional Survey to Assess the Response of the Soft Tissues in Patients Rehabilitated with Complete Dentures

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Abstract

Lesion of the oral mucosa associated with wearing of removable dentures may represent with acute or chronic reactions. Few oral carcinomatous lesions have possible association with the wearing of the denture. The purpose of the study is to elicit the response of the oral soft tissues in patients rehabilitated with complete removable prosthesis. This study aims to evaluate the soft tissue response in patients aged 50-70 years rehabilitated with complete denture, with post insertion check-up period of 1-3 weeks.

Keywords: Geriatric patients, Removable complete denture, Soft tissue response, Survey.

Introduction

Placement of a removable prosthesis in the oral cavity may produce profound change of the oral soft tissues that likely to have an adverse effect on the integrity of the tissues. Soft tissues reactions could result from a mechanical irritation by the dentures, an accumulation of microbial plaque on the dentures or occasionally a toxic or allergic reaction to constituents of the denture materials[1]. Mucosal inflammation in denture wearer occurs in various forms like local and generalized. Acute and chronic inflammatory condition of the oral mucosa can be classified on the basis of their respective etiological factors. The consequence and conditions that can be associated with mucosal inflammation can be a direct sequelae of denture wearers such as, denture stomatitis also called as inflammatory papillary hyperplasia or chronic atrophic candidiasis, traumatic ulcers, epulis fissuratum also called as inflammatory fibrous hyperplasia ,denture injury tumour or denture epulius and oral cancers etc,. The purpose of the study is to elicit the response of the oral soft tissues in patients rehabilitated with complete removable prosthesis.

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Aim of the Survey

The aim of this study were to evaluate the soft tissue response in patients aged 50-70 years rehabilitated with complete denture, with post insertion check-up period of 1-3 weeks.

Objectives

1. Test to find out if gender is independent with respect to duration of the lesion
2. Test to find out if gender is independent with respect to effect of the lesion
3. Test to find out if gender is independent with respect to nature of the lesion

Several lesions are found to be more frequent in females than in males .This high frequency of lesions among females is not well understood. It has been suggested that it may be due to the fact that female patients wear their dentures more often and perhaps for longer duration of time for aesthetic purpose. The objective of this research was to study the prevalence of denture induced lesion. Almost 80 percent of the cases reported in this study were males. This does not reflect the true percentage of male patients with denture; it may be due to either cultural or personal reasons as female patients prefer to be treated by consulting their female doctors rather than out of turn doctors posted in outpatient department for post insertion problems. More over female patients turning up for post insertion appointments are less due overburden of issues in taking care of their families.

Methodology

The study population comprised of a random sample of total of 30 elderly male and female patients with age group between 50-70 years from semi urban area who had visited the hospital for first time to rehabilitate their edentulous mouth with complete denture prosthesis and post insertion check-up done for period of 1-3 weeks. Systemic and medical conditions were similar, these patients were seen to have lifestyle associated medical conditions such as diabetes and hypertension which were under control and no other significant medical issues were seen. Informed consents were taken from the patients prior to the treatment. Statistical analysis was done on lesion affect which was divided in to reversible and irreversible reaction. Analysis was also done on the nature of the lesion which was divided into localized, localized with pain and generalized form. Dental examinations were performed in the clinics in well illuminated set up and following WHO methodology. Instruments for oral examination: plane mouth mirrors; metallic periodontal probes (Community Periodontal Index (CPI) probe) that conform to WHO specification, i.e., 0.5 mm ball tip; a black band between 3.5 and 5.5 mm and rings at 8.5 and 11.5 mm from the ball tip; and several pairs of tweezers; containers one for used instruments and one for disinfecting or sterilizing instruments and concentrated disinfecting solution in sufficient quantity; rubber gloves; wash basin for either water and soap or disinfectant solution; cloth or paper hand towels; and gauze. Generally, a minimum of 30 mouth mirrors and 30 periodontal probes per examiner should be provided, as this will permit some instruments to be sterilized while the others are being used. Used instruments should be placed in disinfectant solution, then washed and drained well before sterilization.

Statistical Analysis

Gender representation in the sample (Fig 1):

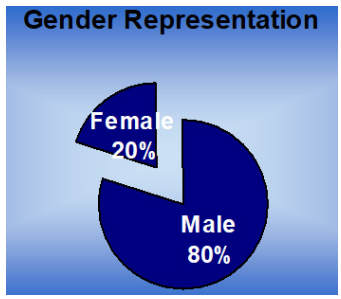

Fig 1: Gender representation in the sample

Duration of Lesion:

Table 1: Distribution of the duration of lesion

	Duration of Lesion			
	6 days	**2 weeks**	**3 weeks**	**Total**
MEN	1	8	3	12
WOMEN	0	2	2	4
Total	1	10	5	16

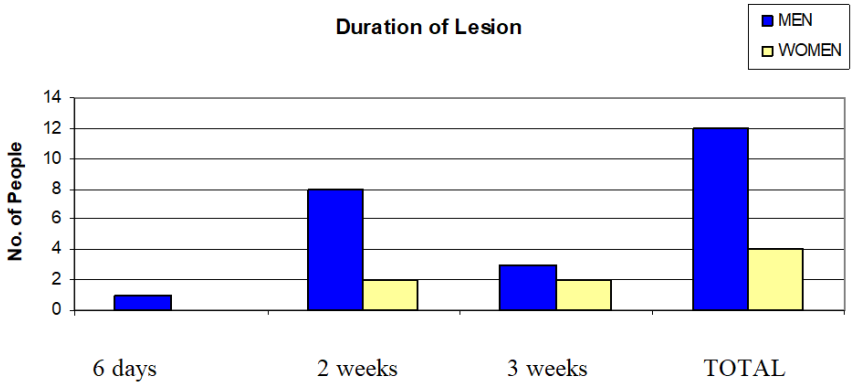

Fig 2: Graphical representation of the duration of lesion

Total number of patients observed clinically for the response of soft tissue rehabilitated with complete dentures - 30

Number of patients affected by the pathological changes in the denture bearing areas - 16

Percentage of patients affected by pathological changes – 53.3%

Test to find out if gender is independent with respect to duration of lesion:

Test Procedure:

Null Hypothesis: H_0 –The two groups i.e. males and females are independent of each other in duration of lesion.

Alternative Hypothesis: H_1 – The two groups i.e. males and females are not independent of each other in duration of lesion.

Level of Significance: $\alpha = 0.05$

Test Statistic: $\chi^2 = \sum (O-E)^2/E$

Where O = Observed frequency and E = Expected frequency.

Critical region: We find the degrees of freedom (d.f) which is computed using the formula (r-1) x (c-1) where r = no. of rows and c = no. of columns. Here d.f=2. The χ^2 value and the 'p value' are computed using the formula stated above. The decision criterion is to reject H_0 in favour of H_1 if $p<0.01$. Otherwise we accept H_0.

Computation: The expected frequencies are as follows

Table 2: statistical computation of the duration of lesion

	Duration of Lesion			
	6 days	**2 weeks**	**3 weeks**	**Total**
MEN	0.750	7.500	3.750	12
WOMEN	0.250	2.500	1.250	4
Total	1	10	5	16

The χ^2 value with 2 d.f = 1.0067

The p value = 0.5866

Inference: Clearly $p>0.05$.

Therefore we accept the null hypothesis and conclude that the two groups viz. male and female are independent of each other with respect to the duration of lesion.

Percentage of number of patents where duration of lesion for 6 days – 6.25%

Percentage of number of patients where duration of lesion for 2 week – 62.25%

Percentage of number of patients where duration of lesion for 3 weeks -31.25%

Lesion effect:

Table 3: Distribution of gender independent effect of the lesion

	Lesion Effect			
	Reversible	**Irreversible**	**No Change**	**Total**
MEN	13	0	11	24
WOMEN	3	0	3	6
Total	16	0	14	30

Test to find out if gender is independent with respect to lesion effect:

Test Procedure:

Null Hypothesis: H_0 –The two groups i.e. males and females are independent of each other in lesion effect.

Alternative Hypothesis: H_1 – The two groups i.e. males and females are not independent of each other in lesion effect.

Level of Significance: $\alpha = 0.05$

Test Statistic: $\chi^2 = \sum (O-E)^2/E$

Where O = Observed frequency and E = Expected frequency. Critical region: We find the degrees of freedom (d.f) which is computed using the formula (r-1) x (c-1) where r = no. of rows and c = no. of columns. Here d.f=1. The χ^2 value and the 'p value' are computed using the formula stated above. The decision criterion is to reject H_0 in favour of H_1 if $p<0.01$. Otherwise we accept H_0.

Computation: The expected frequencies are as follows

Table 4: statistical computation of the effect of the lesion

	Lesion Effect			
	Reversible	**Irreversible**	**No Change**	**Total**
MEN	12.8	0	11.2	24
WOMEN	3.2	0	2.8	6
Total	16	0	14	30

The χ^2 value with 1 d.f = 0.0335

The p value = 0.8548

Inference: Clearly $p>0.05$.

Therefore we accept the null hypothesis and conclude that the two groups viz. male and female are independent of each other with respect to the lesion effect.

Percentage of number of patients affected by reversible changes – 53.3%

Nature of Lesion:

Table 5: Distribution of the nature of the lesion

	Nature of Lesion					
	Localized	**Localized + Pain**	**Generalized**	**Nil**	**Normal**	**Total**
MEN	9	1	3	10	1	24
WOMEN	2	1	0	3	0	6
Total	11	2	3	13	1	30

Test to find out if gender is independent with respect to nature of lesion:

Test Procedure:

Null Hypothesis: H_0 –The two groups i.e. males and females are independent of each other with respect to the nature of lesion.

Alternative Hypothesis: H_1 – The two groups i.e. males and females are not independent of each other with respect to the nature of lesion.

Level of Significance: $\alpha = 0.05$

Test Statistic:

$$\chi^2 = \sum (O-E)^2/E$$

Where O = Observed frequency and E = Expected frequency.

Critical region: We find the degrees of freedom (d.f) which is computed using the formula (r-1) x (c-1) where r = no. of rows and c = no. of columns. Here d.f=4. The χ^2 value and the 'p value' are computed using the formula stated above. The decision criterion is to reject H_0 in favor of H_1 if $p<0.01$. Otherwise we accept H_0.

Computation: The expected frequencies are as follows

Table 6: statistical computation of the nature of the lesion

	Nature of Lesion					
	Localized	**Localized+Pain**	**Generalized**	**Nil**	**Normal**	**Total**
MEN	8.8	1.6	2.4	10.4	0.8	24
WOMEN	2.2	0.4	0.6	2.6	0.2	6
Total	11	2	3	13	1	30

The χ^2 value with 4 d.f = 0.3939

The p value = 0.8212

Inference: Clearly $p>0.05$.

Therefore we accept the null hypothesis and conclude that the two groups viz. male and female are independent of each other with respect to the nature of lesion.

Percentage of patients affected by nature of lesion (localized) – 36.6%

Percentage of patients affected by nature of lesion (localized+pain) – 6.6%

Percentage of patients affected by nature of lesion (generalized) --- 10%

Discussion

In randomized populations of denture wearers the prevalence of denture stomatitis has been shown to vary from 25% to 65%. Lesions were more frequently seen in women than in men and the prevalence increased with age[2]. In a study on the prevalence of denture stomatitis, a population of 465 older adults denture wearers chosen at random were examined in their homes, of these 65% were affected by denture stomatitis. The prevalence of angular cheilitis is about 20% in patients with denture stomatitis and less than 10% in denture wearers with clinically healthy oral mucosa. Angularchelitis is seen more frequently in women than in men and the conditions seems to associated with wearing of the denture but not with edentulous state. Denture irritation hyperplasia is a chronic inflammatory tissue reaction to ill-fitting dentures; this condition has been reported 5% to10% of elderly denture wearers. This condition is seen more frequently in women than in men. Traumatic ulcer most commonly develops within 1to2 days after insertion of new dentures. In randomized study, traumatic ulcers were observed in 5% of older adults[3]. Katzetal found there is no evidence that oral cancer may develop due to chronic mechanical or chemical irritation by dentures, however the studies underline the necessity of regular management of the geriatric patient's oral mucosa. Asif alishahhas found in his study that oral lesion due denture wearing was common in female than in male[4]. No significant differences were detected between male and female patient in the number of mucosal injuries in anatomical areas evaluated in maxilla and mandible[5]. Kivoviks reported greater frequency of ulceration due denture wearing among men compared to female patient[6]. He believes dietary factors play a role in development of mucosal injury

Limitation of the study is that almost 80 percent of the cases reported in this study were males, this does not reflect the true and equal distribution of cases based on gender. The implication of this research article on public health professionals is that, an attempt should made to educate complete denture wearers about the importance of periodic examination due to the changing soft tissues for detection of early mucosal

reaction, in order to maintain their oral and denture hygiene at an optimum level. Moreover, to prevent or minimize the extent of the lesion, denture wearers should be recalled regularly for an examination of the edentulous mouth and the dentures. It is important that examination is carried out by a person who has adequate Prosthodontic knowledge. The prevalence of denture induced oral lesion was found to differ significantly from that reported in other studies. However, further studies need to be carried out on a bigger sample size for conclusive results.

Conflict of interest: No conflict of interest

Source of Funding: None

Ethical clearance statement – copy of the certificate has been attached as a separate file. Name: Dr U Krishna kumar – Principle investigator, with reference no: RRDCH/IEC/2023/114 dated 17/08/2023

Conclusion

Within the limitation of this study, it is found that gender is independent with respect to 1) duration of the lesion 2), effect of the lesion 3), nature of the lesion in the patients rehabilitated with complete removable denture. In order to prevent or minimize the extent of the lesion, denture wearers should be recalled for an examination of the oral cavity and the dentures. It is important that the examination is carried out by a person who has adequate knowledge on geriatric Prosthodontics. Various studies also confirm the fact that soft tissues change in contour and thickness following tissue recovery. The success or failure of dentures is dependent on the health and condition of the supporting structures.

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