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SULL FOR RESEARCE	Original Research Paper	Medical Science			
International	A Clinical Study on the Response of Patients to the Reduced Palatal Coverage of Complete Dentures				
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ABSTRACT Ama and r patient	xillary complete denture has the problem of extensive tissue coverage, alte educed temperature perception. The aim of the study was to evaluate th nts comfort and retention of the prosthesis. In the present study, the palat	ered taste sensation, reduced oral volume he effect of reduced palatal coverage on al coverage was reduced in two different			
ways.					
1. U shaped palatal border.					
2. The palatal covera	. The palatal coverage reduced in the centre of the palate.				
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They were tried in six patients each and the reduction was limited to about twenty percent only. The retention and patients response to the denture were evaluated using specially designed machine and questionnaires soon after delivery and at fortnight interval. The results were subjected to statistical analysis and was found significant. The perception of taste temperature and speech was superior with reduced palatal coverage dentures. Such dentures can be used successfully by patients with extreme gag reflex or inoperable tori and by patients who cannot afford the highly sophisticated and expensive treatment like Dental Implants.

KEYWORDS : reduced palatal coverage, maxillary denture, denture retention

INTRODUCTION

Rehabilitation of completely edentulous state is achieved successfully by the fabrication of complete denture. When compared to any other artificial organs used in human body, complete dentures have received a high degree of success .But maxillary complete dentures always have problems such as excessive tissue coverage, altered taste and temperature sensations and reduction in oral volume. These can be minimized to a certain extent by reducing the coverage of the palate. Very often this is not attempted for fear of loss of retention. Palate less complete denture is an alternative denture for upper edentulous patients in case of gagging, large palatal torus and restoring the lost taste perception. Palate less complete denture will restore the lost good tastes, comfort and normal physiology of tissue to edentulous mouth and a good alternative to full palatal coverage dentures [1]. The anatomy and neuromuscular control of the tissues in and around the denture bearing area helps in the retention of the complete maxillary denture even if the palatal coverage is reduced. Reduction of palatal coverage reduced gagging tendency [2]. Palate less dentures in U shape was more comfortable and effective like conventional dentures with complete palatal coverage [3]. The aims of the study were to evaluate the effect of reduction of palatal coverage to twenty percent of total area over denture retention and to compare and evaluate the subjective response of denture wearers to dentures with conventional palatal coverage and reduced palatal coverage.

MATERIALS AND METHODS

The study was aimed at evaluating the effect of reduced palatal coverage on denture retention and also to evaluate the patient's response to such denture.

Selection of patients

Twelve edentulous patients were selected from among the patients of the Department of Prosthodontics, Govt Dental College, Thiruvananthapuram. The patients included both males and females of age ranging from 40-60yrs. Each patients was screened for general and oral health. For ease of description, the patients were grouped as follows:

Group 1

Subgroup A: Dentures with U shaped Palatal coverage.

Subgroup B: Dentures of 'Subgroup A' after restoration of the palate.

Group 11

Subgroup A: Dentures reduced in the centre of the palate or denture with a Circular palatal defect.

Subgroup B: Dentures of 'Subgroup A' after restoration of the palate.

Instrument to check retention

- The instrument consisted of two parts,
- The instrument proper to test retention.
- The assembly to fix the instrument to the dental chair.

The Instrument proper - It consist of metal a box which had a graduated scale of 6.5 cm long, a rotating handle for applying load, a lever arm of length 26cm with a hook to be attached to the denture for testing retention and a metallic needle which moves through the scale .The scale is graduated for a maximum force of 20,000gm and the graduation is such that a minimum of 250gmscan be read on the scale.

The assembly to fix the instrument on to the dental chair - It consist of two vertical support which is fixed to both the arms of the dental chair by means of bolts and nut. The vertical supports are connected through slot holes to a horizontal support. The instrument for testing retention is then fixed on to the horizontal support. The instrument can be moved antero-posteriorly or vertically up by means of screws or threaded rod.

Procedure - Conventional denture was fabricated for each patient .Special care was taken to record the posterior palatal seal area in the final impression stage .The palatal coverage of six maxillary dentures was reduced in U shape (Group 1 A) (**Figure 1**) .The reduced area was about twenty percent of the total fitting surface .The anterior border of the removed area was placed 22mm away from the incisive papil-

la and laterally the border was placed 8mm away from the median raphae on each side.

In the second set of six dentures palatal coverage was reduced in such a way, that the central region is removed maintaining the posterior palatal seal area (Group 11 A) (**Figure 2**). Here also the area removed was restricted to twenty percent .The anterior border of the reduced area was placed 20mm away from the incisive papilla and laterally 10 mm away from the median raphae.

A hook was attached to the geometric centre of each denture for connecting to the retention checking device. Dentures were placed in the mouth and the retention was evaluated by applying dislodging force to the hook placed at geometric centre of the denture.

Procedure for checking retention - The patient was seated upright in the dental chair with the Frankfort Horizontal Plane parallel to the floor so that the palate or maxilla assumes a position parallel to the lever arm of the instrument .This enables dislodging force to be applied at right angles to the base a condition necessary for proper evaluation of denture retention .To achieve standard position the head was fastened to the chair using a leather head band (Figure 3). The dentures kept in water was positioned in the patient's mouth and was allowed to remain inside the mouth for two minutes to facilitate the formation of a continuous intact film of saliva. Then the connecting hook at the base is connected to the hook in the retention checking machine .Parallelism was maintained throughout the period of application of force. Force was applied till the denture base was dislodged. The reading on the instrument scale was noted in each case. The experiment was repeated six times for each patient in the same appointment .The experiment was repeated at the interval of 2 weeks for a periods of 12 weeks. The experiment was done with patients using U shaped palatal coverage (Group 1 A) as well as with patients using dentures reduced in the central region (Group 11 A). Then the experiments were repeated after restoring the palatal coverage for another period of 12 weeks at an interval 2weeks. The response of the patient was also noted using questionnaires immediately after insertion of the denture and at 2 week intervals for a period of 12 weeks.



Figure 1





Figure3

RESULTS

Two different types of reduced palatal coverage dentures were fabricated. Later these dentures were converted to normal dentures with full palatal coverage .For ease of description these dentures were classified as follows:

Group 1

Subgroup A: Dentures with U shaped posterior border.

Subgroup B: Dentures of 'Subgroup A' after restoration of the palate.

Group 11

Subgroup A: Dentures with a circular palatal perforation and posterior palatal seal area maintained

Subgroup B: Dentures of group 'Subgroup A' after restoration of the palate.

Table 1 shows mean and SD of retention obtained at different intervals for all the four groups of dentures. In all the four groups the retention values enhanced at the end of the first fort night. Later the retention value remained constant. There was reduction in retention in all the dentures with reduced palatal coverage. 'Group1 A' retention values were higher than that of 'Group 11 A' retention values. Subgroup B retention values of both Group1 and Group11 are higher than that of Subgroup A values. Group1 B and Group11 B values did not show significant difference.

The data thus obtained was subjected to statistical analysis to see whether there is statistical difference between the different techniques and different time intervals. The Student't' test was used. Since all the four groups were having high mean values, it was found to have high significance (p < 0.001)

DURA- TION	BEFORE RESTORATION TYPEIA TYPEIIA		AFTER RESTORATION TYPE 1 B TYPE I I B	
IMMEDI- ATELY	4986.7 ±373.8	4125+_93.2	5722.22+_234.1	5673.54+_118.92
2 WEEKS	5069.42 ± 331.1	4250+_250	5851.38+_234.1	5626.49+_99.86
4 WEEKS	5069.42 ±331.1	4250+_250	5851.38+_234.1	5626.49+_99.86
6 WEEKS	5069.42 ±331.1	4250+_250	5851.38+_234.1	5626.49+_99.86
8 WEEKS	5069.42+_331.1	4250+_250	5851.38+_234.1	5626.49+_99.86
10 WEEKS	5069.42+_331.1	4250+_250	5851.38+_234.1	5626.49+_99.86
12 WEEKS	5069.42+_331.1	4250+_250	5851.38+_234.1	5626.49+_99.86

Patient response was also evaluated. The entire group had problem with retention in the beginning, but after a fortnight they got adjusted or the retention improved. Patients response to taste, speech and temperature perception was good for all patients of subgroup 'A' of both the groups .But subgroup 'B' of both the groups reported a reduction in taste, speech and temperature sensation .

DISCUSSION

Complete dentures has a high rate of success among the artificial prostheses used in the human body. Even though the complete denture rehabilitates both function and esthetics it has certain inadequacies such as excessive tissue coverage. The coverage of the maxillary denture reduces the perception of taste, temperature and touch. Maximum coverage is always given merely to enhance retention.

The factors affecting retention contributes to denture retention in varying degree, but there is disagreement regarding the relative importance of each. Some consider adhesion as the overriding determinant. Proponents of the mucostatic theory give little or no emphasis on the role of atmospheric pressure or border seal in retention. The denture retention is due to the adhesion and cohesion resulting from the intimate tissue contact of the denture base at rest .The atmospheric pressure together with intimate tissue contact and peripheral seal are considered to be the most critical retentive factors. U shaped palate less denture with proper tissue contact and tooth arrangement will give proper retention for the denture ^[1, 3]. In the present study the palatal coverage was reduced in two different forms, U shape and central region reduced in a circular form with the posterior palatal seal area maintained and in both the cases the reduction was limited to twenty percent of the total area of coverage. The study was conducted in two phases. The retention and patient response was noted immediately after insertion and at two weeks interval for a period of twelve weeks. Then the palatal portion was restored and the experiment was repeated .The results proved that the retention values were reduced on reduction of the palatal coverage but the tissue adaptation atmospheric pressure and the neuromuscular control can effectively counteract the dislodging forces generated during function [4]. In the present study the palatal region of the dentures were reduced to 20% in two different forms, U shape and central defect maintaining the posterior palatal seal area of the palate .The U shaped offered more retention than the dentures with central defects .The subjective evaluation proved that a reduction in the palatal coverage improved the acceptability of the denture.

A considerable number of edentulous people have experience gagging which is a highly complex phenomenon. The causes of gagging are multifactorial. Patients show considerable variation in their ability to withstand tactile sensation. Tactile stimulation of the oral tissue inevitably occurs when executing various dental procedures. The biomechanical aspects of the dental prosthesis such as over extension or improper polish may cause gagging sensation even in non gagging patients. The dorsal surface of the posterior one third of the tongue is the most sensitive region in the entire oral cavity [5] .The posterior palatal border can initiate a stimulatory mechanism which can eventually result into gagging. The presence of a foreign body identified by the oral sensation can initiate gagging but if the size of the prosthesis and the coverage is reduced the gagging can be controlled. Training dentures having 'U' shaped palatal coverage causes less interference for tongue and reduce gag reflex ^[6]. In the present study the denture borders were reduced thus reducing a possible irritating factor. Hence the acceptability was increased and the tendency of gagging was reduced.

The taste sensation was also found to be increased with reduced palatal coverage dentures. The occurrence of scattered taste buds in the soft palate was evidenced by light microscopy ^[7]. Taste buds were clinically detected in the central part of the hard and soft palate boundary ^[8]. The taste threshold on the hard palate was very high compared to those on the tongue and older subjects had higher threshold than younger subjects ^[9]. The subjective evaluation recorded in the present study consistently proved that a reduction in the palatal coverage improved the acceptability of the denture. All the patients appreciated an increase in the taste perception especially the patients with U shaped palatal coverage dentures.

Speech is usually hampered with conventional dentures but such complaints were not recorded with the dentures having reduced palatal coverage. Thus reduction in the palatal coverage of maxillary dentures is advantageous to the patient in achieving a high degree of sensory perception, perfection in speech and adaptability. Maxillary dentures with reduced palatal coverage can be a solution to the many problems normally encountered with conventional dentures. Graph 1 (Bar diagram showing the mean values of retention before and after restoration of the palate – Group 1)



Graph 2 (Bar diagram showing the mean values of retention before and after restoration of the palate – Group II)

SUMMARY AND CONCLUSION

Extensive coverage of palate has long been identified as a major disadvantage of maxillary dentures. But attempts to reduce the palatal coverage were not usually done for fear of lack of retention. In the present study, the palatal coverage was reduced in two different forms, by giving 'U' shaped palatal border and by doing centrally located reduction. In both the cases, the reduction was limited to twenty percent of the total area of the denture bearing area. The retention and patient response were noted at two weeks interval for a period of twelve weeks.

U shaped palatal coverage was proved to be highly acceptable by the patients .Reduction in the palatal coverage did not affect the service ability of the denture ,though the retention values were less when compared to that of conventional coverage ,U shaped palatal coverage is proved to be with superior perception of taste and temperature.

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