

Duplication of Palatal Rugae to Enhance Phonetics in Complete Dentures

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ABSTRACT

Background: Speech is an essential human activity for communication. Phonetics must be considered as an important factor while making complete denture along with mechanics and esthetics. Palatal rugae contours play a very important role in phonetics. Speech can be improved by contouring the palatal surface of maxillary denture to simulate natural palate. The production of palatolingual group of sound involves the contact between the tongue and the palate. Three simple and inexpensive techniques of duplicating the patient's palatal rugae patterns in the denture to enhance speech is described in this article.

Keywords: Palatal rugae, phonetics, carving, tin-foil, putty.

INTRODUCTION

Characterizing complete denture prosthesis to fulfill patient expectation is an aspect of dental science that requires exploration beyond the limits of Prosthodontics¹. The three major factors in complete denture construction are mechanics, esthetics, and phonetics. Definite progress has been made to enhance mechanics and esthetics, but progress in improving phonetics is negligible². Most edentulous patients tend to get adjusted to their speech after a post insertion practice period of several days to several weeks, hence this factor of phonetics is neglected. The resulting faulty speech is tolerated as part of "getting used to" the denture. It not only causes embarrassment to the patient but it also adds to his burden of physiologic adaptation to the denture³.

Palatal rugae, also called plicae palatinae transversae and rugae palatina, refer to the ridges on the anterior part of the palatal mucosa on each side of the median palatal raphe and behind the

incisive papilla. Palatal rugae plays a very important role in phonetics⁴. The production of palato-lingual group of sound involve the contact between tongue and the palate. It has been proved that increase or decrease in the thickness of the denture in the region of palatine rugae alters speech sounds⁵. Allen advocated making the palatal portion as thin as possible is practical. Duplicating the rugae on palatal surface of denture reduces the problems encountered with speech⁶.

This article describes three simple and cost effective techniques for duplication of palatal rugae in maxillary complete denture.

TECHNIQUE 1

The simplest and perhaps the easiest method of duplicating palatal rugae is by carving the rugae pattern on the waxed up trial denture. An ideal protocol for complete denture fabrication is followed till the stage of denture processing. After the try-in procedure, rugae pattern is carved over

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the waxed up maxillary trial denture. Proceed with fabrication of denture in conventional manner. The rugae pattern is duplicated in the denture.

TECHNIQUE 2

This technique involves the use of tin foil for duplication of palatal rugae contour. An ideal protocol for complete denture fabrication is followed till the stage of try-in procedure. Tinfoil is cut to the desired shape and adapted to the rugae area on the master cast or any available cast with prominent rugae. The palatal area of the denture base in which rugae is to be duplicated is made thin. The tinfoil pattern is removed from cast and sealed on to the palatal area of the denture base which is made thin with hot baseplate wax. After that the denture is processed using conventional compression moulding technique, finished and polished.

TECHNIQUE 3

This technique involves the use of putty for the duplication of palatal rugae contour. The rugae pattern is marked on maxillary master cast using permanent marker. After the try-in stage, the record base is made thin in the rugae area until the markings are visible through the resin base plate on the cast. The thickness of the record base should not exceed 2 mm. The same markings of rugae as made on the cast are transferred with the marker on the record base. Using the straight fissure bur the rugae pattern is inscribed on the record base to create roughness that will retain the putty impression material. The base is mixed with the catalyst (Zhermack, Zetaplus, Putty C-silicone impression material) and small threads are made out of the kneaded material and adapted according to the patient's rugae pattern inscribed on the record base. The diameter of the threads can vary according to the variations in the thickness of rugae. During flasking, coring is done with addition curing silicone putty (Uni-sil addition curing -silicone putty) for the perfect imprint of palatal rugae pattern made with condensation silicone.

Following this dewaxing is done, the acrylic base plate along with putty threads is removed and packing is done with heat cure denture base material (Ivoclar vivadent SR-TriplexHot) followed by short curing cycle. The

denture is then finished and polished. The rugae pattern is duplicated in the denture.



Fig 1: Waxed up trial denture with rugae carving

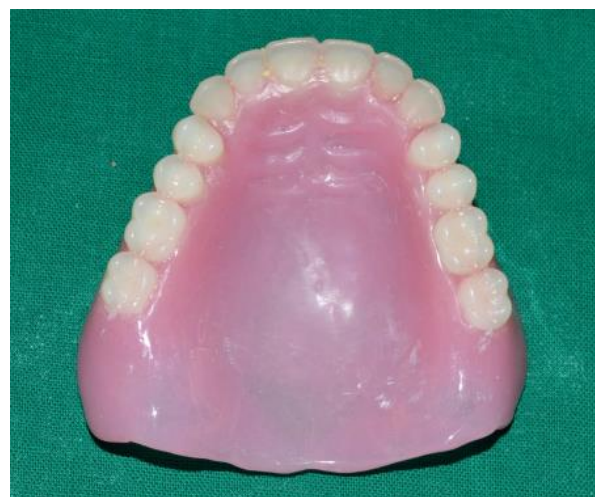


Fig 2: Final denture with rugae duplicated



Fig 3: Tinfoil trimmed and adapted to cast with prominent rugae.



Fig 4: Tinfoil pattern sealed to palatal area of waxed up trial denture.



Fig 5: Rugae duplicated in the final denture.



Fig 6: Palatal rugae marked on the cast.



Fig 7: Rugae seen through the temporary denture base



Fig 8: Palatal rugae inscribed on record base using straight fissure bur.



Fig 9: Condensation silicone used to duplicate rugae pattern.



Fig 10: Coring of the flaked denture done using putty.



Fig 11: Dewaxed denture.



Fig 12: Processed denture with rugae duplicated.

DISCUSSION

Phonetics is one of the most important factor in complete denture construction. However, this factor is neglected due to adaptability of the patient. Completely edentulous patients tend to mispronounce certain sounds, phonation of which depends upon the rugae pattern and palatal contour. Thus, prosthodontists need to create customized rugae pattern and palatal contour in complete denture so as to achieve normal speech and eliminate the waiting and training period after denture insertion ⁷. In the literature, many methods of improving speech have been suggested and evaluated. Snow et al suggested that thickening and contouring the area lingual to the collars of maxillary incisors for speech facilitation ⁸. Pound et al advocated that the entire lingual aspect of maxillary denture should be contoured to simulate the normal palate, if proper phonetics is to be attained. Many authors suggest palatal rugae fabrication to facilitate speech ⁹.

There are many methods of carving palatal rugae on complete denture. In this article, three different methods have been described for the duplication of palatal rugae. The advantages of the described procedures are that they can easily and quickly be accomplished by the dentist or the laboratory technician ¹⁰. The use of self-cure acrylic resin, condensation silicone putty impression material easily duplicates the width and thickness of rugae to an acceptable extent. Putty can be moulded and shaped easily to customize the individual rugae pattern. Once set it is hard enough to withstand the processing procedure without undergoing distortion. Also the addition curing silicone putty does not react with the already set condensation silicone putty. The curing silicone putty helps in perfect duplication of rugae pattern carved. The rugae pattern is inscribed on the denture base with the bur, which helps in mechanical retention of putty. The duplicated rugae pattern does not interfere with speech ¹¹.

CONCLUSION

Restoring patient's speech is an important goal in completed denture construction. Palatal rugae contours plays a very significant role in complete denture phonetics. It lessens the speech problems encountered by patients sensitive to the

changed relationships caused by the introduction of a new prosthesis into the mouth.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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