An Alternative Treatment of Occlusal Wear

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Introduction

The use of acrylic resin denture teeth has been criticized because of the rapid occlusal wear that leads to changes in centric occlusion, temporomandibular joint disturbances, loss in chewing efficiency, and loss of vertical dimension of occlusion resulting in denture instability. The extent of wear varies depending on the clinical situation and the amount of time the prosthesis has been in use. Various articles describe the construction of metal occlusal surfaces for the patients having the history of occlusal attrition, bruxism, orofacial tardive dyskinesia, self-induced excessive chewing, and idiopathic parafunctional mandibular movement.

Metal occlusal surface may be indicated,

a. When constructing a denture, that is to be opposed by reconstructed dentition with gold occlusal surfaces.
b. When constructing a complete denture, removable partial denture or overdenture with a functionally generated path concept in which considerable modification of the denture teeth is necessary to place the occlusal surface and core in harmony.
c. To reinforce and strengthen the occlusal surface of the denture.

This article presents a quick, simple, and relatively inexpensive procedure for construction of metal occlusal surfaces on complete dentures.

Case Report

A 72 year old female patient reported to the Department of Prosthodontics in Dr. D.Y. Patil Dental College, Navi Mumbai, Maharashtra, with the chief complaint of decreased chewing efficiency with the continuous use of denture. She wanted a denture in which chewing efficiency is maintained as the time passes but at lowest cost possible. She was bothered only about the functional efficiency of the denture and not about the esthetics. History revealed that the patient was wearing dentures since 7 years, and in that duration she got her denture made thrice due to frequent wearing of the teeth and instability of the dentures. On clinical examination, the patient was found to be complete edentulous with well formed ridges and a Class I ridge relation. Both the ridges were parallel to the occlusal plane. Patient is having mandibular implant supported overdenture since seven years, severe occlusion wear was seen with significant loss of vertical height, causing angular chellitis.

On the basis of clinical examination and history, it was concluded that the frequent attrition of the teeth could either be due to self induced excessive chewing or idiopathic parafunctional mandibular movement, but there was no tenderness or discomfort in areas of the muscles of mastication and temporomandibular joint. Hence it was concluded that the attrition was due to normal wear and tear of the occlusal surfaces. Various treatment options were described to the patient like,

a. Implant supported overdenture with porcelain teeth,
b. Implant supported overdenture with metal occlusal surface,
c. Implant supported fixed prosthesis.

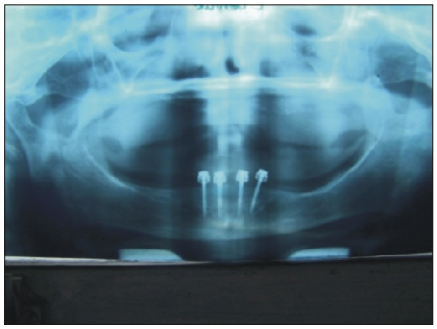
Patient was ready to compromise the esthetics of the denture provided the denture is economical, with the best functional efficiency and had no time constraint. Therefore, the denture with the metal occlusal surface was planned as the patient's all concerns were addressed. In addition, it improves the degree of masticatory ability and prevents the attrition of the teeth.

Pre-Operative Pictures

Angular Chellitis

Decreased Vertical

Occlusion Wear



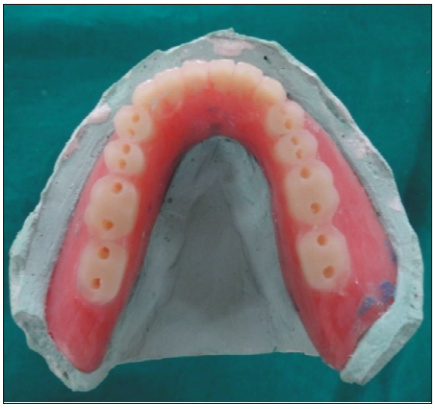
OPG

Procedure

Preliminary impressions were made with an impression compound and poured with dental plaster to obtain primary cast. Custom acrylic resin trays were fabricated and border molding was done with low fusing compound. Final impressions were made using Zinc Oxide Eugenol impression paste for both arches and impressions were poured with Type III dental stone and implant area with pattern resin to obtain master cast. Temporary denture bases and wax rims were made to record face bow transfer and maxillo-mandibular relationship and transfer this relationship to the semi-adjustable articulator (Bio art). Vertical Dimension of Occlusion (VDO) was established by using two methods. In first method, two points were marked - one on the tip of nose and other on an immovable part of chin. To know the vertical dimension at rest position (VDR), the patient was asked to repeat the letter 'M' several times and then the distance between the points was measured. VDO = VDR minus free way space (2- 3mm). Second method was to create at least 1mm of closest speaking space between occlusal rims.

Teeth arrangement was done with cross-linked acrylic teeth and try-in was carried out and dentures were processed. The impression surface of the mandibular denture was trimmed in the region of the implants. The 'o' ball abutments were placed on the implants. The lower denture was checked to see that the abutments were not causing any interference. The trimmed area was then filled with self cure acrylic resin and placed in the patients mouth over the abutments. After the material set. The denture was removed and flash trimmed. Finishing and polishing was done. The occlusal surfaces of the maxillary and mandibular posterior teeth were then reduced by 2mm with the carbide trimming bur so as to create a 4mm interocclusal clearance. The articulator was moved into lateral and protrusive positions to verify the space adequacy. The central portion of the teeth was reduced slightly more than the cusps to gain mechanical retention of the casting.

Maxillary Occlusion Reduction



Mandibular Occlusion Reduction

Then the inlay wax was added on the prepared denture teeth and the occlusal surface of the individual teeth was contoured. Secondary anatomic details were carved and the waxed occlusion was checked in centric, lateral and protrusive positions.

Inlay Pattern

Wax pattern was carefully removed from the teeth and Sprue formers were attached with the wax pattern and these were carefully removed from the acrylic teeth to the undersurfaces of the acrylic resin patterns to reduce the need for extensive finishing and polishing of the occlusal surfaces after casting. Patterns were invested with phosphate bonded investment and the metal casting process was completed using a Ni-Cr alloy. After divesting the castings, the metal occlusal surfaces were recovered and polished. Polished castings were positioned at their respective sites on the denture teeth ensuring that each casting was completely seated. The occlusion was checked in centric, lateral and protrusive positions. The casting were cemented with resin reinforced Glass Ionomer Cement.

Cast Metal Occlusion Surface

During insertion of the complete denture, it was checked for border extension, proper adaptation and occlusion in centric, lateral and protrusive positions. Patient was satisfied with the chewing efficiency and esthetics of the denture. Patient was re-evaluated after every 3 months for 2 years to solve any problem associated with the denture and to know about the functional efficiency of the denture.

Final Denture with Metal Occlusion

Denture in Occlusion

Discussion

Metal or gold occlusal surfaces have been reported to cause minimal wear to opposing occlusal materials. This technique should be considered in cases where the prosthetic occlusion is in contact with enamel, composite resin, porcelain, or a combination of such materials.

Usually metal occlusion dentures leads to basal bone resorption, but in this case as it was implant supported overdenture, more stresses were concentrated on and around implant, thereby preventing basal bone resorption. Patient was advised for maxillary implant overdenture when finance is permit Display of metal is considered to be the main disadvantage of using metal occlusal surface, but the patient was not concerned about the display of the metal because she was more than satisfied with the chewing efficiency of the denture - her main concern. Some author advocates the use of light cure composite resin to duplicate the occlusal surface. Although the composite resin on occlusal surfaces will wear, but the rate of wear is less than that of the most acrylic resin denture teeth.

In alternate treatment options,

a. Implants supported fixed partial denture could not be placed because of high cost, needed surgical intervention and also increased chair side time;
b. Porcelain teeth could be used in relation to the patients comfort, chair side time and is economical, however, but when compared, the wear resistance of metal is negligible and also requires same chair side time, therefore metal occlusal was planned.

Summary And Conclusion

This article has described a technique that uses the custom made occlusal portions as the patterns for casting base metal occlusal surfaces. Acrylic resin is attached to the metal occlusal surfaces via direct resin processing. During recall evaluation, the patient was satisfied with the functional efficiency of the denture and did not report any problem associated with the metal occlusal denture.

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