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### RESEARCH ARTICLE

#### REHABILITATION OF SEVERELY RESORBED RESIDUAL RIDGES USING LIGHT WEIGHT COMPLETE DENTURE-A CLINICAL CASE SERIES.

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#### Abstract

Rehabilitation of severely resorbed residual ridges possesses many challenges in front of a prosthodontist. As not only retention, stability and support are compromised because of resorbed ridges, but the increase in interridge distance leads to increased bulk and weight of the prosthesis which further compromises the retention of maxillary complete denture. Also, increased weight leads to heavier masticatory pressure which aids in further resorption of the residual ridges. To break this vicious cycle, weight of the maxillary complete denture should be reduced. This article describes a series of clinical case using simple techniques to reduce the weight of the maxillary complete denture.

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#### Introduction:-

The first aim of any complete denture therapy is preservation of the remaining hard and soft tissues followed by rehabilitation of the mastication, speech and aesthetics. In cases of resorbed residual ridges, there is decreased amount of supporting tissues which decreases the retention, stability and support available for the complete dentures. Also, presence of increased interridge distance leads to increased bulk of the prosthesis which in turn, increases weight of the dentures. In case of maxillary denture, this increased weight further decreases retention of the denture due to action of the gravity. Also, increased weight leads to the increase in the amount of masticatory forces on the compromised residual ridges which cause further resorption. This vicious cycle can be broken by decreasing the weight of the dentures.

Numerous methods and materials have been used to fabricate a light weight denture (Chaturvedi S, 2012). These methods include using a solid three dimensional spacer,including dental stone (Ackermen, 1955), cellophane

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wrapped asbestos (Worley & Kniejski, 1983), silicone putty (Holt, 1981) or modelling clay (DaBreo, 1990) during laboratory processing to exclude denture base material from the planned hollow cavity of the prosthesis. Holt (1981) processed a shim of indexed acrylic resin over the residual ridge and used a spacer which was then removed and the two halves were luted with autopolymerized acrylic resin.

Fattore et al (1988) used a variation of the double flask technique for obturator fabrication by adding heat polymerized acrylic resin over the definitive cast and processing a minimal thickness of acrylic resin around the teeth using different drag. Both portions of resin were attached using a heat polymerized resin.

O'Sullivan et al (2004) used a clear matrix of the trial denture base, 2mm heat polymerized acrylic shim and silicone putty to fabricate hollow maxillary denture.

This article describes a series of 3 case reports of completely edentulous patient with severely resorbed maxillary and mandibular ridges, managed by rehabilitating with hollow (2 cases) and light weight (1 case) complete dentures.

#### **Case report 1:-**

A 60 year old male patient reported to the Department of Prosthodontics, Crown and Bridge, JSS Dental College and Hospital, a constituent college of JSS University, Mysuru for prosthetic rehabilitation of maxillary and mandibular edentulous ridges. Patient's medical history was not significant. Past dental history revealed that patient was a denture wearer since 7 to 8 years, and the maxillary denture was loose. Intraoral examination revealed severely resorbed maxillary and mandibular edentulous ridges with increased interridge distance. Treatment options were discussed with the patient and fabrication of hollow maxillary complete denture and conventional mandibular denture was planned after getting patient's consent.

Primary impressions were made using impression compound. Border moulding was done using low fusing compound and final impressions were made using zinc-oxide eugenol paste. Jaw relations were recorded, teeth selection done and trial dentures were fabricated. Try-in was done and trial dentures were evaluated for border extent, retention, stability, support, occlusion, esthetics and speech. Patient's approval was taken for the trial dentures.

After try-in, mandibular denture was processed in the conventional manner. Maxillary denture was processed in the conventional manner till the dewaxing stage. After dewaxing, sufficient quantity of heat-cured acrylic (DPI heat cure) was mixed in a ceramic jar according to the manufacturer's instructions. When it reached dough stage, the mix was divided and 2 sheets were formed. One sheet was adapted to the mould and salt crystals were placed in the trench formed (Figure 1). Then, second sheet was used to cover it and borders were merged (Agarwal H et al, 2012). The flask was closed and the denture was processed using conventional manner. After processing, deflasking was done carefully to avoid any damage to the denture. The denture was finished and polished. 2 holes were made in the thickest palatal region to aid in removal of the salt crystals. The hollow cavity was flushed with water using a high pressure syringe through the holes to aid in removal of any residual salt.

After making sure that all the salt crystals have been removed, the hollow cavity was dried using compressed air and the holes were sealed using autopolymerizing resin (DPI cold cure). The hollow cavity seal was verified by immersing the denture in water, and confirmed by absence of air bubbles.

The dentures were delivered to the patient and instructions regarding care, hygiene and maintenance were given. After 1 year follow-up, patient was satisfied with the dentures and exhibited no problems.

#### **Case report 2:-**

A 56 year old female patient reported to the Department of Prosthodontics, Crown and Bridge, JSS Dental College and Hospital, a constituent college of JSS University, Mysuru for prosthetic rehabilitation of maxillary and mandibular edentulous ridges. Patient's medical history was not significant. Past dental history revealed that patient was a denture wearer since 2 to 3 years, and both the dentures were loose. Intraoral examination revealed resorbed maxillary and mandibular edentulous ridges with increased interridge distance. Treatment options were discussed with the patient and fabrication of hollow maxillary complete denture and conventional mandibular denture was planned after getting patient's consent.

Primary impressions were made using impression compound. Border moulding was done using low fusing compound and final impressions were made using zinc-oxide eugenol paste. Jaw relations were recorded, teeth selection done and trial dentures were fabricated. Try-in was done and trial dentures were evaluated for border extent, retention, stability, support, occlusion, esthetics and speech. Patient's approval was taken for the trial dentures.

After try-in, mandibular denture was processed in the conventional manner. Maxillary denture was processed in the conventional manner till the dewaxing stage. After dewaxing, small quantity of heat-cured acrylic (DPI heat cure) was mixed in a ceramic jar according to the manufacturer's instructions. When it reached dough stage, it was formed into a sheet and was adapted to the crest of the residual ridge. Dough of Dental Plaster-Pumice and Sugar syrup was made and rolled (Chaturvedi, S., 2012). It was then placed over the heat-cured acrylic (Figure 3). Then, a second mix of heat-cured acrylic in the dough stage was adapted to the counterflask and trial closure was done. Flask was opened and the Dental Plaster-Pumice and Sugar syrup spacer was carved to ensure sufficient thickness of the acrylic.

The flask was closed and the denture was processed using conventional manner. After processing, deflasking was done carefully to avoid any damage to the denture. The denture was finished and polished. 2 holes were made in the thickest palatal region and the denture was immersed in water for 2 days to aid in complete removal of the Dental Plaster-Pumice and Sugar syrup spacer (as it dissolves in water). The hollow cavity was flushed with water using a high pressure syringe through the holes to ensure complete removal.

Then the hollow cavity was dried using compressed air and the holes were sealed using autopolymerizing resin (DPI Cold cure). The hollow cavity seal was verified by immersing the denture in water, and confirmed by absence of air bubbles.

The dentures were delivered to the patient and instructions regarding care, hygiene and maintenance were given. After 1 year follow-up, patient was satisfied with the dentures and exhibited no problems.

### **Case report 3:-**

A 55 year old male patient reported to the Department of Prosthodontics, Crown and Bridge, JSS Dental College and Hospital, a constituent college of JSS University, Mysuru for prosthetic rehabilitation of maxillary and mandibular edentulous ridges. Patient's medical history revealed that he was a known diabetic for 6 years and was under medication. Past dental history revealed that patient was a denture wearer since 5 years, and the maxillary denture was loose. Intraoral examination revealed resorbed maxillary and mandibular edentulous ridges with increased interridge distance. Treatment options were discussed with the patient and fabrication of light-weight maxillary complete denture and conventional mandibular denture was planned after getting patient's consent.

Primary impressions were made using impression compound. Border moulding was done using low fusing compound and final impressions were made using zinc-oxide eugenol paste. Jaw relations were recorded, teeth selection done and trial dentures were fabricated. Try-in was done and trial dentures were evaluated for border extent, retention, stability, support, occlusion, esthetics and speech. Patient's approval was taken for the trial dentures.

After try-in, mandibular denture was processed in the conventional manner. Maxillary denture was processed in the conventional manner till the dewaxing stage. After dewaxing, sufficient quantity of heat-cured acrylic (DPI heat cure) was mixed in a ceramic jar according to the manufacturer's instructions. When it reached dough stage, the mix was divided and 2 sheets were formed. One sheet was adapted to the cast and thermocol was cut and placed over the crest of the ridge (Ahmed N et al, 2014). Then, a second sheet was adapted to the counterflask and trial closure was done. Flask was opened and the thermocol spacer was cut using a Bard Parker blade to ensure sufficient thickness of the acrylic.

The flask was closed and the denture was processed using conventional manner. After processing, deflasking was done carefully to avoid any damage to the denture. The denture was finished and polished and immersed in water overnight.

The dentures were delivered to the patient and instructions regarding care, hygiene and maintenance were given. After 6 months follow-up, patient was satisfied with the dentures and exhibited no problems.



Figure 1:- Lost salt technique



Figure 2:- Dental Plaster-Pumice and Sugarsyrup spacer



Figure 3:-Thermocol spacer

**Discussion:-**

In this case series, different methods were used to decrease the weight of maxillary denture. Lost salt technique and Dental Plaster-Pumice and Sugarsyrup spacer were used to fabricate hollow maxillary dentures and thermocol spacer was used to fabricate the light weight denture. Each method has its own advantages and disadvantages.

Lost salt technique is easy to use, requires least amount of time during packing, and requires little expertise.

However, it has disadvantages as it is difficult to maintain a contour using salt crystals and if acrylic is overpacked, salt crystals will get displaced and will lead to porosities. Also, additional holes have to be created to remove the salt crystals and later sealed using autopolymerizing acrylic resin which has disadvantage of possible marginal leakage along the hole borders.

Dental Plaster-Pumice and Sugarsyrup spacer offers advantage that it is easy to form and carve, and its contour can be easily controlled. However, the denture has to be soaked in water for at least 2 days to ensure complete removal after making escape holes. Also, there is a chance of marginal leakage after it has been sealed using autopolymerizing acrylic resin.

Thermocol spacer offers advantages over hollow dentures as it does not have to be removed after processing and thus does not need any additional procedures before delivery of the dentures. As it is very light in weight compared to acrylic, resultant dentures are light-weight. It has a disadvantage that interaction of the thermocol with the acrylic is not yet studied and thus the safety of any product, if formed, may be questioned.

Other methods of making hollow denture are also described in the literature, but in this case series readily available substances were used using easy techniques to obtain maxillary dentures with reduced weight.

**Conclusion:-**

Reducing the weight of maxillary complete denture is important in preservation of remaining tissues in cases of severely resorbed residual ridges and increased interridge distance. There are many techniques available to achieve this goal, each with its own advantages and disadvantages. The prosthodontist should choose the technique based on individual case, his/her own skill and the scientific data available, keeping in mind that the ultimate goal is the preservation of the remaining hard and soft tissues followed by rehabilitation of the mastication, speech and aesthetics.

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