

Single Maxillary Complete Denture - Meeting the Challenge - A Clinical Case Report

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Abstract

The edentulous state of the oral cavity is equivalent to the absence of any other body part with specific morphological and psychological sequelae. This case presents a patient with an edentulous maxillary arch opposing a dentate mandibular arch. The dentist has a difficult mission in evaluating the biomechanical differences in the supporting tissues for the two arches and applying the appropriate procedures to produce and maintain the conditions necessary for long-term treatment success. The dental literature evidences suggest that the maxillary arch exhibits earlier tooth loss due to various factors and that the mandibular anterior teeth are preserved the longest, so this case focuses on the oral condition in which the maxillary arch is edentulous and opposed by a natural and partially restored mandibular dentition. The main problem is that there are important qualitative and quantitative differences between natural tooth and complete denture support. The natural dentition is capable of specialized responses to occlusal demands that preserve its function, whereas the residual ridge is not and it will respond in a variable way depending on age, sex and racial category. Therefore, the replacement of the missing maxillary dentition must provide an optimum distribution of the occlusal forces in order to minimize the negative effects in the compromised edentulous arch.

Key Words

Single denture; stability; retention; occlusal plane; Amalgam stops; Mesh work

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INTRODUCTION

Single complete denture construction against natural dentition is a very challenging task for the dentist due to certain drawbacks like frequent prosthesis fracture, dislodgement, difficulty to obtain occlusal balance, and achieve satisfactory esthetics (due to fixed position of the natural teeth).^[1] The dental treatment's long-term goal in prosthodontics is to preserve the remaining structures. This goal is impossible to achieve without understanding the occlusal biomechanics that allows us to obtain a physiological occlusion: acceptable interocclusal distance, stable jaw rela-

tionship with bilateral tooth contacts in centric relation, stable tooth quadrant relationships with axially directed forces, multidirectional freedom of tooth contact throughout a small range (within 2 mm) of mandibular movements.^[1] Unfortunately, when only one arch is edentulous, tooth position in the dentate arch may preclude such objectives being reached and the unfavorable force distribution may cause adverse tissue changes that are going to compromise optimum function. It is therefore critical to identify these problems and to correct them as soon as possible; viz, arch relationship or occlusal plane discrepancies, jaw relationship



Fig. 1a: Intraoral Maxillary View



Fig. 1b: Intraoral Mandibular View

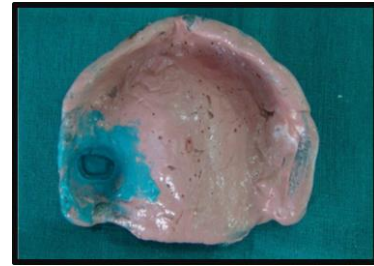


Fig. 2: Final Impression



Fig. 3: Facebow Transfer



Fig. 4: Teeth Setting



Fig. 5: Packing with Mesh Work



Fig. 6: Final Denture with Amalgam Stops



Fig. 7: Postoperative Intraoral Maxillary View



Fig. 8: Postoperative Intraoral Frontal View



Fig. 9: Postoperative Intraoral Left Lateral View



Fig. 10: Post-operative Intraoral Right Lateral View



Fig. 11: Postoperative Frontal View

extremes, excessively displaceable denture-bearing tissue. Because of the presence of longstanding uncontrolled occlusal forces, important changes in the denture foundation can occur, as the accelerated loss of the bone and the excessively displaceable tissue, which comes with the problem of the differential support capability to the same load. The forces of occlusion are resisted by the mucoperiosteum which allows some movement of the denture base by its resiliency. If the tissue changes allow excessive displacement, the movement of the denture under load will be greater with resultant dislodgement.^[2] The opposing arch's condition of an irregular occlusal plane also predisposes the denture to dislodgement. After the loss of the maxillary teeth and in the absence of the

prosthetic treatment, the opposing dentition tends to tilt and extrude compared to a normal relationship which results in an unfavorable force distribution. The teeth that are most prominent in the vertical plane should be subjected to selective grinding in order to ensure that a sufficient number of teeth will be in contact with the artificial ones in the same time.^[3] Because of the pressures exerted by the mandibular remaining teeth, the alveolar maxillary ridge is extremely resilient and mobile (flabby ridge) due to the replacement of the bone by fibrous tissue. This is a consequence of the excessive load of the edentulous ridge and of the unstable occlusal conditions. This ridge will provide poor support for the future complete denture, but it may still provide some retention due to its resilient state.

CASE REPORT

A 65 year old male reported to the out-patient Department of Prosthodontics with a chief complaint of inability to chew. Intraoral examination revealed completely edentulous maxillary ridge and opposing partially dentulous mandibular arch. Mucosa was normal and the opposing teeth required minor alterations. Saliva was of medium consistency and patient was co-operative and philosophical. Thorough examination of the oral cavity, and radiographic assessment were done. An acceptable level of oral hygiene was stressed and maintenance instructions were given for both the edentulous arch and the remaining natural teeth (Fig. 1a & Fig. 1b).

Treatment Procedure

After all prerequisite procedures were completed; the impressions of both the arches were made. A custom tray was fabricated over the maxillary preliminary cast, border moulding was performed, and a final impression was made with zinc oxide eugenol impression paste (Fig. 2). The mandibular occlusal plane was equilibrated by selective cusp grinding. After this, the casts were trimmed and indexed. An autopolymerizing acrylic resin temporary record base was constructed on the maxillary cast. A modeling wax occlusion rim was made on the temporary record base. The rim was corrected to give the desired lip support and adjusted to establish the desired vertical dimension of occlusion. Phonetic tests, determination of the existence of adequate interocclusal distance, and esthetics were used as guides in determining the vertical dimension of occlusion. Face Bow transfer and jaw relations were then verified and secured in a semi-adjustable articulator for teeth arrangement (Fig. 3). Teeth were arranged in centric relation and subsequently the centric relation records were verified. The anterior teeth were arranged provisionally for esthetics. The eccentric relation records were made and the condylar elements of the articulator were programmed. Posterior teeth were rearranged to satisfy the requirements of balanced occlusion. Adjustments in the artificial teeth were incorporated in preference to making natural teeth. Though a perfect balanced occlusion is impossible to achieve in such cases with involvement of natural teeth, a maximum effort was made to get an occlusion which was as close to balanced occlusion (Fig. 4). A trial of waxed up maxillary denture was made followed by acrylization of complete denture, during with a mesh work is placed over palate area so that midline fracture not occur due to opposing

natural dentition (Fig. 5). After finishing and polishing of the complete denture cavities were made in the occlusal surface of the premolar and first molar artificial teeth and filled and condensed with silver amalgam (Fig. 6). After initial set, the amalgam were lightly burnished and carved against the opposing mandibular occlusal surfaces, by moving the incisal pin of the articulator, in all excursive movements. The denture was seated in the mouth. On the first recall, after 24hrs the occlusal contacts were verified milled and then the amalgam surfaces were lightly polished, taking care not to denture the occlusal anatomy (Fig. 7, Fig. 8, Fig. 9 and Fig. 10). The patient was monitored on regular recall, for a period of six month during which he reported great satisfaction with esthetics, function and comfort (Fig. 11).

DISCUSSION

A maxillary single complete denture against a mandibular arch with natural teeth poses the following challenges:

- a) Stability of the maxillary single denture.
- b) Frequent episodes of midline fracture of the denture.
- c) Early wear out of the artificial teeth.

Oana C. Andrei *et al.*,^[3] proposed equilibration of the opposing occlusal plane in order to achieve a favourable artificial occlusal plane and also to reduce the leverage forces on the denture. Pravin Kumar *et al.*,^[2] proposed incorporation of amalgam stops in the artificial occlusal teeth surfaces to improve the were resistance. Snehal R. Upadhyay *et al.*,^[5] proposed resurfacing of the occlusal surfaces of the maxillary denture with cast gold alloy occlusal surfaces, again with a view to improve were resistance. Farmer JB,^[4] proposed reported incorporation of a metal mesh in the palatal aspect of the maxillary denture during processing to fortify against leverage forces on the midpalate. Dhiman RK *et al.*,^[1] reported use of a cast gold alloy base for the maxillary denture to improve fracture resistance and also to improve the thermal perception.

CONCLUSION

The single maxillary denture is a complex prosthesis that requires a complete understanding of the basics of denture occlusion. The basic principles of retention, stability and support should not to be taken for granted, and steps must be completed so that all components are working in harmony for success of the maxillary denture. The upper single denture can be functionally successful because of a

large denture-bearing area offering stability. The tongue can develop habits for even more added stability. If the denture is made following the correct prosthodontic principles and the patient offers a good collaboration. Finally, we planned and fabricated a complete maxillary denture that provided comfort, function, stability, retention and aesthetics. The single denture treatment requires the same chair time as that needed for the construction of two complete dentures and it is more demanding for both the dentist and the dental technician. The most visible adverse sequelae of single denture treatment are the wearing of the natural teeth and denture fracture. Both are prevented in this case, the first one by using acrylic artificial teeth and the second one by using a casted metal reinforcement. The patient was very happy with the new denture.

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