Research Paper

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Management of Partially Edentulous Arches Using Metal Strengthened Overdenture

Medical Science

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ABSTRACT

Preventive Prosthodontics emphasizes the importance of measures that can delay or eliminate the future Prosthodontic problems. The overdenture is a logical method for the dentist to use in Preventive Prosthodontics. This case report discusses the merits of using selectively retained roots and abutments to minimize alveolar ridge resorption underneath the complete dentures and use of metal mess to minimize fracture of maxillary complete denture.

Introduction

The stability and retention of complete dentures are prime concern in the success of denture. The resorption of basal bone coupled with a decline in the patient's neuromuscular function and decrease in the proprioceptive response resulting from the loss of teeth, eventually leads to failures of the denture. The obvious way to prevent denture problems is to save the natural dentition, but many patients have what appear to be terminal dental conditions. It is at this point that we should consider possible methods of saving roots and fabricating "overdentures".[1, 2] The fracture of acrylic resin denture bases is a common problem in prosthodontics. The ratio of maxillary to mandibular denture base fractures is 2:1 and mostly occurs as midline fractures.[3] This clinical report discusses the merits of using selectively retained roots and abutments to minimize alveolar ridge resorption underneath the complete dentures and use of metal mess to minimize fracture of maxillary complete denture.

Case Report

A 45-year-old woman reported with the chief complaint of missing teeth and fractured maxillary denture. Intraoral examination revealed partially edentulous mandibular and maxillary arch. In the maxillary arch, the only tooth present was right canine. In the mandibular arch, left first molar and right second premolar and first molar were missing. Existing teeth were periodontally sound, with slight gingival recession in the anterior mandibular arch. (Fig 1)

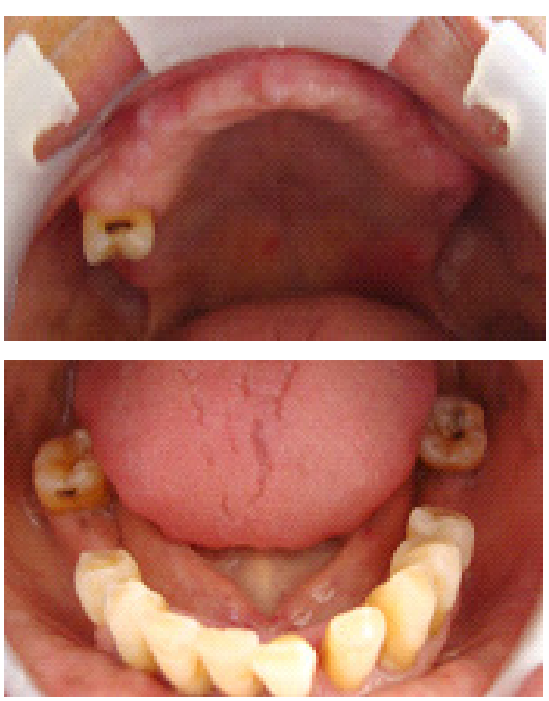

Figure 1. Intraoral preoperative view of maxillary and mandibular arch.

The treatment options with fixed and removable prosthesis were discussed with the patient and an overdenture with double coping in maxillary arch with a metal mesh and conventional removable partial denture in mandibular arch was planned. An informed consent was obtained from the patient.

Clinical Procedure

Diagnostic impressions were made for the maxillary and mandibular arch using irreversible hydrocolloid. Then diagnostic mounting was done that revealed adequate inter arch space. The treatment plan was divided into two phases, Phase 1: Fabrication and cementation of the coping and Phase 2: Prosthodontic rehabilitation.

Fabrication of the metal coping

The maxillary canine was endodontically treated. Dome shape preparation with chamfer finish line was done for the coping. Impressions were made and casting was done after die fabrication and fabrication of wax pattern. Coping was fabricated, polished and cemented using Glass ionomer luting agent. (Fig 2)

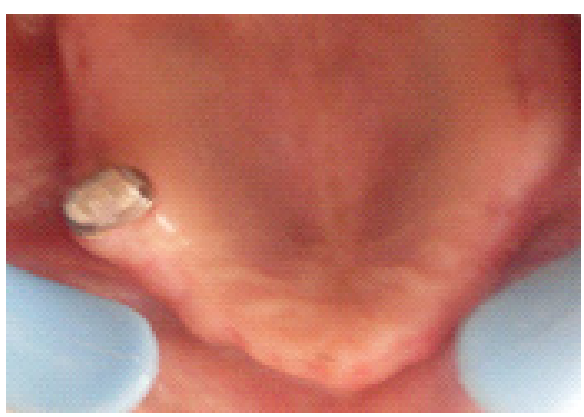

Figure 2. Metal coping cemented on prepared tooth.

Prosthesis fabrication

Following custom tray were fabricated using self cured acrylic resins, border molding for maxillary arch was done using the low fusing green-stick impression compound while the border molding for mandibular arch were done using putty silicone impression material. Secondary impression for maxillary arch was made using zinc oxide euginol paste while the secondary impression for mandibular arch was made using medium body additional silicone impression material. Then another coping to be incorporated in the denture was made using wax pattern with inlay casting wax. Record base was fabricated over this coping. Then occlusal wax rims were prepared and master casts were mounted on a semiadjustable articulator. Teeth arrangement and try-in were carried out. The maxillary and mandibular dentures were processed using the conventional methods of denture processing with a metal mess placed on the maxillary denture. The intaglio surface of maxillary denture near canine

region was relieved using carbide burs to incorporate female component of the coping. This was then incorporated in the intaglio surface of the denture base. (Fig 3)

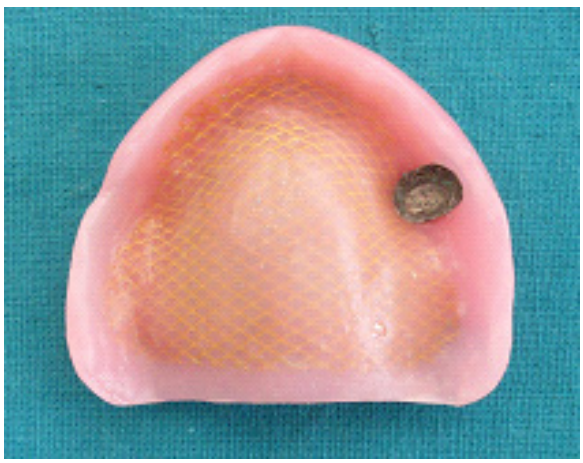

Figure 3. Intaglio surface of maxillary denture base with embedded metal mesh.

The finished and polished dentures were inserted in the patient's mouth and post operative instructions were given to the patient.

Discussion

The use of natural teeth to support, stabilize and retain complete dentures has been reported by Brill [4], Miller [5] and Dolder [6]. As the sensory input from the periodontal receptors is one of the major determinants of masticatory function, and roots of the teeth offer more discrete discriminatory input than the oral mucosa. Manly and associates observed that complete denture wearers had considerably less sensitivity than patients who still had natural teeth.[7] Therefore, retention of natural teeth for an overdenture preserves some of the sensory input from the periodontal receptors, which is more precise than that obtained from the oral mucosa. In the past extraction of entire dentition with complete denture replacement used to be promoted as an inexpensive and permanent solution for oral health care which lead to problem of advanced ridge resorption. Clinical experience and documented research proved the merits of retaining natural teeth to serve as abutment under complete denture. The technique was successfully incorporated into management of patient with partial or terminal dentitions, especially when complete denture seemed a likely therapeutic option.

Another problem overcome in this clinical case was midline fracture of maxillary denture using metal mess. In the researches indicating stress distribution in upper complete dentures, it was shown that the stresses concentrate on the palatal region. In addition, it was pointed out that the stresses started from the zero in palatal surface of central incisors and reached maximum in mesialis of premolars, and was reduced to the zero again in distal of the second molars. The wire meshwork used as reinforcement material was placed in the region where the stresses became dense, placed in such a way that it would be stiff in middle line to prevent fracture.[8]

Conclusion

The conservative approach of root preservation is valid treatment philosophy. In order to achieve successful overdenture rehabilitation, the dentists must be careful during case selection, abutment preparation and a periodic follow-up. The stainless steel mesh reinforcement significantly improves the fracture resistance of the acrylic denture base resin.

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