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"Modifying A Precision Attachment Intra Radicular Retainer In Treatment of Overdenture"

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Abstract
Overdenture is a term that has implications as a means of preventive Prosthodontic care. Its application in prosthetic dentistry has been so impressive that even implants are placed so that an overdenture can be fabricated in a completely edentulous patient. The use of two implant-supported overdenture has been considered as a basic standard of care in completely edentulous patients. We present a case of an elderly male patient whose maxillary remaining teeth (four) had supra erupted, undergone recession, and had developed root caries. Intentional endodontic treatment was done, which was followed by a custom-made precision fit coping that was fabricated using an indirect technique. The copings were cemented, and the overdenture was retained using a plastic retentive element that was aligned within the denture.

Keywords — *complete denture, coping, endodontic, immediate overdenture, implant*

I. INTRODUCTION

The importance of retaining natural teeth within the alveolar bone has given rise to treatment options of overdentures supported by dental implants. Retention of the tooth has been considered valuable by various authors across various times. [1] So-called overdentures are basically preventive dentistry in the field of Prosthodontics that challenges dentist to preserve natural teeth. [2] Such cases usually present with multiple natural teeth still present in the oral cavity, and it is the ability of the dentist to identify which teeth should be retained and which can be extracted. Convenience sought by a prosthodontist always compromises prosthodontic care and should be avoided at all costs. [3] Overdentures that are supported by natural teeth retain all the advantages that periodontal ligament proprioceptors provide naturally. [4,5] Among them, the most tempting are the preservation of residual bone, increased masticatory performance, psychological well being and directional sensitivity. [6,7]

Clinical decision-making in selecting the number and the quality of which teeth should be retained has been reviewed in the literature. Retaining of the natural tooth/teeth/roots is an essential key for concepts of overdentures, and the periodontal evaluation by periodontist has been suggested as necessary since the importance of periodontium around the retained teeth (especially the level of attached gingiva) is key for long term survival of retained teeth. [8]

While the use of precision attachment in its totality has been done by many, there are few or no reports of customizing prefabricated precision attachments. This article presents a case wherein the issue was those remaining natural teeth had supra erupted while having undergone gingival recession, also with evidence of root caries in all teeth. The case was restored with a precision retained custom cast attachment with the plastic retentive element.

Case report

An elderly male patient aged 64 years reported to the postgraduate wing of the Department of Prosthodontics with a chief complaint of inability to eat daily food since last 8 months. His main issue was that he had no opposing teeth, so he could not chew. Medical history revealed that he was diabetic but under control, while his social and drug history was non-contributory. Intraoral examination revealed a completely edentulous mandibular residual alveolar ridge (RAR) while a Kennedy class 1 modification 1 partial edentulous situation in the maxillary arch with remaining natural teeth supra erupted and having root caries (Fig 1A). Other clinical findings, both extra and intraorally, were within the normal limits. After radiographic and vitality testing, a clinical diagnosis was made based on which a treatment plan was formulated. The treatment plans/options presented to the patient included implant-supported mandibular overdenture opposing tooth-supported maxillary overdenture, a mandibular single complete denture opposing maxillary tooth-supported complete denture, or a non-conservative option (extraction followed by conventional complete dentures for both arches). Due to financial constraints, the patient consented to a mandibular single complete denture that would oppose a tooth-supported maxillary overdenture. The need for endodontic treatment and coping was decided as per the method described in recent literature. [9] It was decided that the maxillary teeth would be endodontically treated, followed by reduction till the

level of the alveolar ridge over which a custom-made precision fit (ball type) coping would be cemented to retain an overdenture (Fig 1B). Treatment was initiated by the removal of caries and oral prophylaxis, followed by intentional endodontic treatment of remaining natural teeth. Prosthodontic treatment started by removing the gutta-percha from root canals and then making a putty reline impression of the root spaces after preparing respective post space in each tooth (Fig 1C). A cast was poured, and wax patterns were fabricated (Fig 1D), following which they were cast into base metal alloy (nickel-chromium). The root canals were temporarily restored till casting was ready. Respective copings of each tooth, once ready, were cemented using zinc phosphate cement followed by another putty reline impression of cement copings (Fig 2A, B). Regular clinical procedures for the fabrication of maxillary overdenture were carried. On the day of denture delivery, the retentive elements (plastic) were placed on the maxillary copings (Fig 2C), followed by relief within maxillary overdenture and locking of retentive plastic elements within the maxillary overdenture (Fig 2D). The patient was educated thoroughly about the maintenance of the complete denture, especially how to use and clean it. The patient was then put on a follow-up protocol (1 day, 1 week, 1 month, 3 months, and yearly). During subsequent visits, the patient claimed to be highly satisfied with the outcome of the complete denture prosthesis.

Discussion

A clinical rehabilitation of a partially edentulous patient who had four maxillary teeth remaining has been described in this case report. The unique thing about the case is despite the teeth being supra erupted and had root caries, a properly functional overdenture was fabricated and delivered to the patient. After a follow-up to one year, there have not been any untoward complications in the case. There are different types of overdentures that can be utilized when natural teeth are present as an abutment. Generally, they utilize coping or no coping while having or not having done endodontic treatment. [10,11] It is the significant biological advantages of the overdentures that have seen them being practiced even with the advent of implants since branemarks instituted a process of osseointegration in 1965. [12] Normally, the patients present mostly with multiple teeth that are not in good clinical condition. Such situations demand the clinician to decide as to which teeth he would like to retain and which he would like to extract. Mostly and commonly, the amount of remaining natural alveolar bone around the roots provides a clue and an aid to decide. [13] It has been stated that basic differences in indications of the immediate denture, overdenture, and immediate denture fall within a thin line and need to be understood clinically to identify the line of treatment in such cases. [14]

One of the difficulties that were faced in this case was to determine which type of retention would be effective in the maxillary overdenture since the teeth were supra erupted and had undergone gingival recession. This led to the encroachment of the teeth within the restorative space. To accommodate space for mandibular teeth, it was, therefore, important to have the endodontic treatment done so that the level of the crown would be adjusted to the level of alveolar bone. Selecting the precision attachment was based on the factors mentioned in the literature. [15,16] Since the teeth were supra erupted, the length of the post within the root canal was compromised, which is why they use of precision attachment that would be attached as intra radicular coping was decided. Since maxillary denture was fabricated as a tooth-supported overdenture, efforts were made to convince the patient to have a mandibular implant-supported overdenture. [12] The patient was also educated about the value of implant-supported overdenture for the mandibular arch, but due to financial reasons, the patient rejected the option. Since this case was done in an academic institute, where it has been reported that patients tend to go for implant overdentures since treatments are free (academic set up) or subsidized. [17] It may not be the case in all academic institutes for which further studies should be conducted.

Conclusion

A tooth-supported overdentures retained by a precision modified intra radicular cast coping is an excellent alternative in cases where supra eruption, root caries, and gingival recession are observed in remaining natural teeth.

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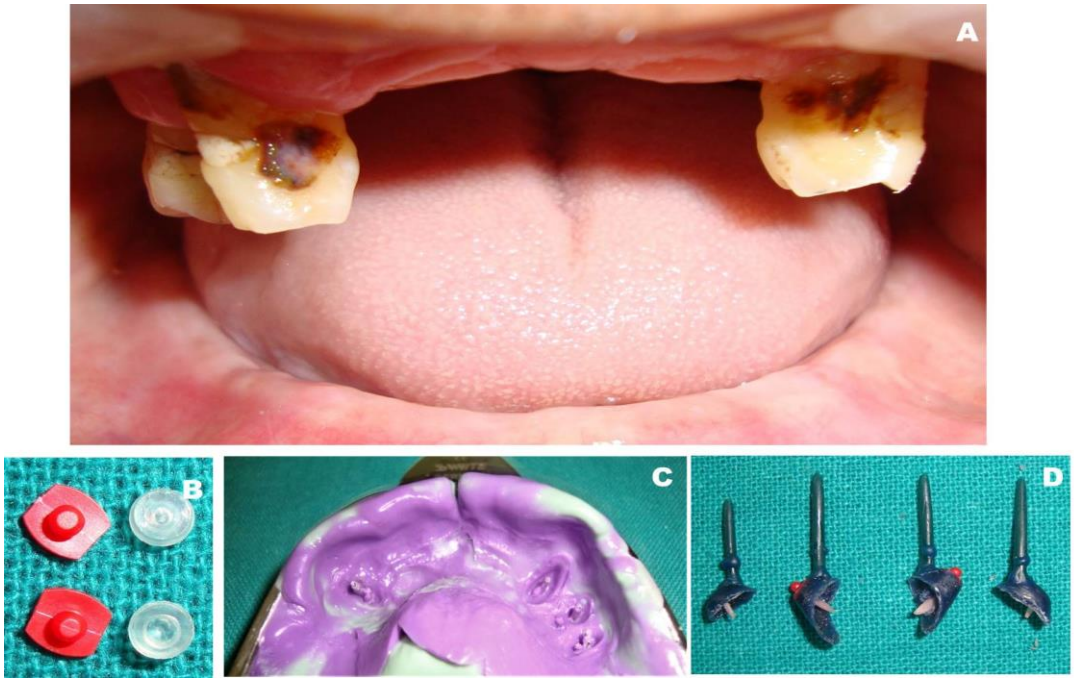

Figure 1: (A) Intra oral view of maxillary and mandibular arches (B) Precision attachments (C) Final impressions using putty reline technique (D) Wax patterns for intra radicular posts with prefabricated attachments within the wax patterns

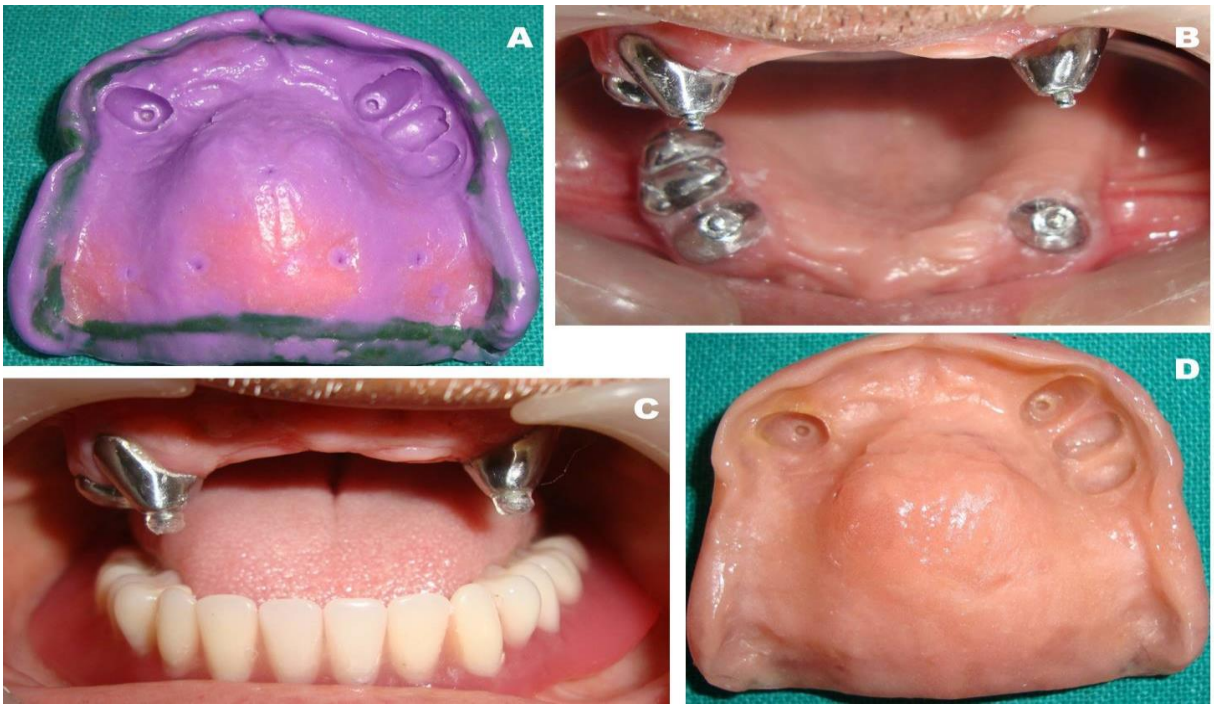

Figure 2: (A) Final impressions (B) Copings of maxillary arch (C) Mandibular complete denture (D)Maxillary overdenture