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Case Report

OVERDENTURES: REVIVING THE RELINQUISHED CONCEPT FOR ORAL REHABILITATION

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ABSTRACT

The tooth supported overdenture is a better alternative for a treatment option to conventional dentures since the proprioception is maintained and it improves stability and retention.

Overdenture supported by natural teeth is one of the best preventive prosthodontic treatments available for the near edentulous condition. Despite recent developments in dental implantology, the conservative approach of root preservation is still valid. Greater emphasis must be given on proper case selection, diagnosis, and treatment planning. By preserving the submerged root or teeth for overdenture, alveolar bone resorption can be reduced considerably.

INTRODUCTION

An ounce of prevention is worth a pound of cure. Preventive prosthodontics basically works on the principle as given by Devan that "Perpetual preservation of what remains of the human masticatory apparatus is more important rather than meticulous replacement of what is lost". Overdenture is a treatment modality of preventive prosthodontic treatment.[1] Loss of teeth not only causes an adverse effect on the functional and esthetic efficacy, but also has a big impact on the person's psychological and social well-being. The transition from dentulous to edentulous state creates a number of challenges for the patient as well as the doctor. Overdentures are prostheses which are fabricated over the existing teeth or roots or implants. The concept of conventional tooth-retained overdentures is accessible, easy, convenient and an inexpensive treatment compared to implant overdentures. Overdenture preserves the periodontal sensory mechanisms that chaperones & monitors gnathodynamic functions.

The introduction of overdentures in prosthodontics can be traced back more than 100 years. The concept of overdentures was presented at the World Dental Congress in 1861 by Butler, Roberts and Hays who presented case histories of 12 years.[2] Morrow et al and Lord and Teel described simplified techniques of overdenture treatments.[3,4]

Overdentures have diverse positive attributes like they decrease the pressure on soft-tissue and transmit it to the underlying bone, which increases the ridge integrity, stability and patient comfort. Overdentures have greater retention and stability when compared with the conventional complete dentures, which greatly improves their masticatory efficiency. Presence of teeth provides a

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psychological and emotional impact on the person's mind of having natural teeth in his mouth, which adds to his/her personal confidence.[4]

The tooth supported overdenture achieves three key goals. First, it maintains the abutment teeth as part of the residual ridge, which in turn provides more support than a conventional complete denture. Second, when the teeth are retained, the alveolar bone's structural integrity is maintained as it supports and holds the abutment teeth, therefore there is decrease in the rate of resorption of alveolar bone. However, loss of teeth initiates the bone resorption process. Third, with the preservation of the teeth, there is also the preservation of the periodontal membrane and this in turn preserves the proprioceptive impulses. When the patient wears the denture, he is cognizant and has the sensitive ability to be aware of occlusal contacts. The patient will also will be able to control the forces of occlusion as he used to do with his natural teeth.[5,6]

Overdenture treatment include the need for inevitable treatment, which requires additional time and increases costs.[7] This requires simplification of the techniques so that it can be affordable for everyone. Keeping in mind, increased root caries rate in the elderly and oral hygiene habits of most overdenture wearers, placing protective copings on root abutments, when economically feasible, is the preferred method of treatment. Moreover, it will be an ideal and beneficial way to solve the psychological and economic concerns of patients by providing overdentures as a substitute to the implant supported dentures.

The present article describes a procedure where the preformed attachments were used with simplified technique and method.

Case Report-1

A 65-Year-old female patient reported to the Department of Prosthodontics with the chief complaint of multiple missing teeth, inability to chew food along with poor facial appearance. The patient was thoroughly screened according to the protocol that took into account her general health. While recording the case history no relevant medical history was reported by the patient. Extra oral examination showed loss of lip support with minute reduction of vertical height. On intra oral examination, square shaped maxillary and U-shaped mandibular partially edentulous arches were seen with adequate ridge height and width. Teeth present were 13,14,15,23,27,34,35,37,42,43,46,47. Generalized supra-eruption was present along with mesial migration of 42,43. Proximal caries were seen with 13,14,23,27,34,37. Deep occlusal caries were present with 46,47. Abrasion was reported with 13,14,15,23,34,43,46. There was furcation involvement with 46,47. Grade II mobility was present with 42. Mucosa was firm and resilient with no signs of inflammation.

Pre-op:

1. Patient evaluation was done and Case history was recorded.
2. OPG was advised to evaluate crown root ratio of teeth to be retained.
3. Diagnostic impressions were made using irreversible hydrocolloid impression material.
4. Primary cast was poured in Type III dental stone and diagnostic mounting was done on mean value articulator.
5. Depending on location and prognosis, abutment extractions were advised with 14,15,35,42,46,47 and endodontic treatment was advised with 13,23,27,34,37,43. The upper

and lower left second molars were retained as they would help in maintaining the vertical dimension.

6. Treatment plan included endodontic phase, surgical phase and prosthetic phase.
7. Endodontic phase included intentional root canal treatment with 13,23,27,34,37,43.
8. Surgical phase included extractions with 14,15,35,42,46.
9. Prosthetic phase was started 2 months after completion of surgical phase with tentative jaw relation.
10. Diagnostic impressions were made.
11. Casts were poured and denture base was fabricated along with fabrication of the occlusal rims.
12. Orientation jaw relation was recorded.
13. Diagnostic mounting was done on a Semi-adjustable articulator (Hanau wide vue).
14. Depending on patient's chief complaint, Intra-oral condition, patient will, and financial condition.

Intra-operative: An OPG was taken. Abutment preparation were done with 13,23,34,43 upto gingival margin to receive root supported attachment and with 27 and 37 to receive copings.

1. Post space was created using mooser burs (Peeso reamers) and OPG was advised to evaluate the amount of post space prepared.
2. Primary alginate impressions were made after tooth preparation. Cast was poured using type III dental stone. Spacer wax was adapted and custom tray was fabricated using self-cure denture base resin.
3. Post space and tooth preparation impression was recorded using pattern resin and the open end were attached to resin tag which helps in easy in removal of impression post while making complete arch impression.
4. Impression post with resin tag were removed and border moulding was done using low-fusing impression compound. Opening vent was created in the custom tray after completion of border moulding to facilitate the resin tags to extrude out of the tray. Vent holes were made, spacer wax was removed and final impression was made using light body silicone impression material over which pickup impression was made using irreversible hydrocolloid.
5. Beading was done and cast was poured in Type III dental stone (Kalrock, Kalabhai, Mumbai). Master casts were retrieved.
6. Post space was evaluated on the master cast and pattern was fabricated using inlay casting wax or pattern resin for radicular portion and some extension was kept for prefabricated attachment to be placed. Attachments were placed over it and aligned parallel to each other using surveyor. The entire assembly was casted using lost wax technique. Retrieved post with attachment were then sandblasted only on radicular surface by covering attachment with Black cap (Processing cap) provided by manufacturer and then the attachment surface was finished and polished carefully. Attachments were then assessed for fitting on the master cast.

7. A try in was performed for the attachments and then cemented using Type 1 GIC Luting cement (Luting & lining cement, GC Corporation, Tokyo, Japan). Excess cement was removed from marginal area.
8. Post space were blocked on the master cast using wax & denture base was fabricated using shellac base plate over the final cast & occlusal rims were fabricated over it.
9. Jaw relation was recorded. Facebow assembly was attached to maxillary rim and facebow record was transferred on semi-adjustable articulator. Maxillary cast was mounted followed by mandibular cast. Articulator was programmed after protrusive records were made
10. Bilateral balanced occlusion was established while arranging the teeth. Also,patients esthetics and phonetics were considered while arranging anterior teeth.
11. Try in was performed.
12. Dentures were processed by conventional compression moulding technique using heat cure acrylic resin material.
13. Laboratory remounting was done and interferences were removed.
14. Finishing and polishing was done using grit burs with the help of polishing paste and pumice.
15. Dentures were evaluated for occlusal interferences and corrected.

16. Dentures were placed intra-orally and spaces for attachments were recorded on intaglio surfaces of denture and the areas were prepared according to marking.
17. Dentures with preparation spaces were evaluated for complete fitting of denture followed by proper occlusion.
18. Standard retention cap was selected and was placed over the attachments. Metal housing was placed over the retention cap. Qu resin, Bredent,UK was mixed and added on spaces created on intaglio surfaces.
19. The denture was fitted on the upper and lower arch simultaneously and the patient was guided to bite firmly in centric relation.
20. After complete setting Qu resin retentive caps were evaluated and excess material was trimmed and finished.

21. Finished denture were then again evaluated inside patient's mouth for vertical and centric jaw relation, occlusion, esthetics and phonetics.
22. Patient was given post-operative instructions during insertion of denture.
23. The patient was recalled after 24 hours for evaluation.
24. Patient was happy, confident after delivery of the prosthesis.

(Pre-Op OPG)

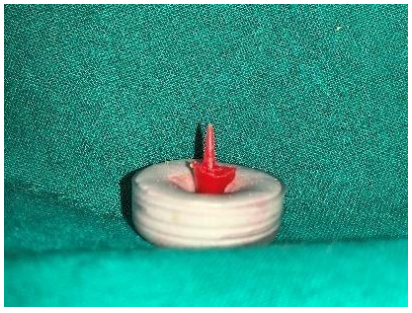
(Front View)

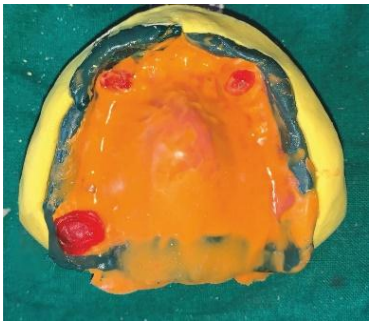
(Mandibular Arch)

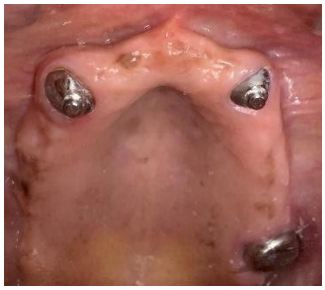
(Right side)

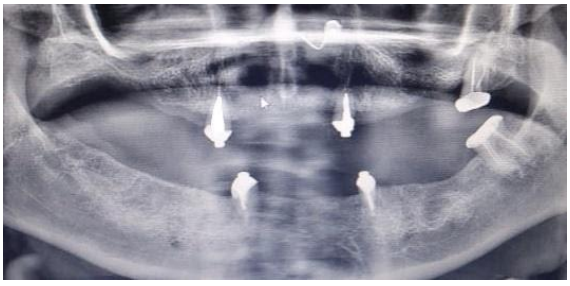
(Left side)

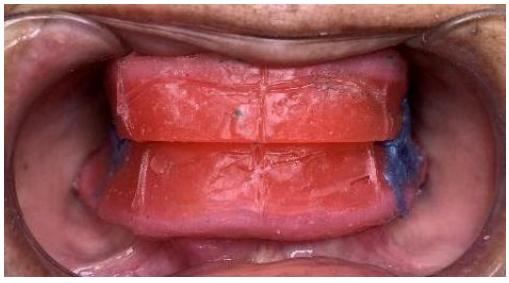
(Maxillary Arch)

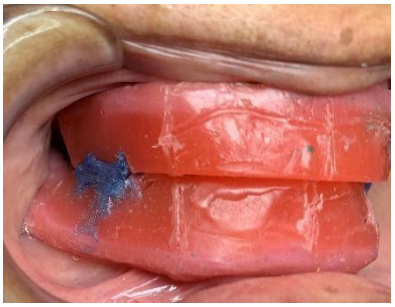


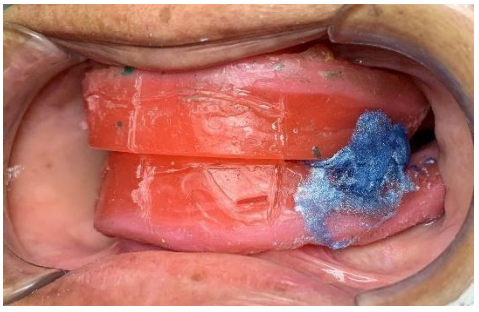












Discussion

This report describes a case of complete oral rehabilitation using an overdenture. An alternative impression technique was used for post space or radicular space.[8] It was proposed by Schuch C et al in 2013. It maintains both the precision of direct impressions and the parallelism between the attachments obtained with an indirect impression when fabricating a root-supported overdenture.

Keeping in mind the age of the patient and the expenses of the treatment, implant supported prosthesis was kept out of treatment option for the patient. A telescopic denture was chosen as a favourable treatment option as it overcomes many of the problems posed by conventional complete dentures like progressive bone loss, lower stability and retention, loss of periodontal proprioception and low masticatory efficiency. It also provides minimal tissue coverage and better distribution of forces.[9]

Two most crucial factors for the success of the overdenture are proper selection of the patient and establishing careful mode of treatment that will satisfy both the patient and the dentist.

Crum and Rooney, graphically demonstrated in 5 years study an average loss of 0.6 mm of vertical bone in the anterior part of the mandible of overdenture patients through cephalometric radiographs as opposed to 5.2 mm loss in complete denture patients. In case of overdenture prosthesis, proprioception is maintained, along with

presence of directional sensitivity; dimensional discrimination and tactile sensitivity.[10]

Rissin et al. in 1978 compared masticatory performance in patients with natural dentition, complete denture and overdenture. They found that the overdenture patients had a chewing efficiency one-third higher than the complete denture patients.[11]

There are relatively few studies on the survival of tooth and root supported overdentures, but those available have demonstrated a wide range of survival rates, from very good to relatively poor results, and a great need for prosthetic maintenance. The support provided by the abutment teeth is a boon to the residual alveolar ridges. Stability and support are enhanced by the vertical vector component of the teeth retained in the alveolar ridge.

A major assumption of tooth supported overdenture treatment is to transfer occlusal forces along the long axis of the supporting tooth, to minimise the horizontal torque and to allow for a more optimum situation for periodontal ligament.

Attachment retained overdenture has become an integral part of prosthodontic treatment as an alternative to conventional dentures to overcome the problems of retention associated with it. The attachment system supposedly plays an active role in prosthesis success rates, but demands maintenance and recall to prevent complications. There have been reports of movement in different directions, resulting in damage and wear. Bearing this in mind, it is important that these complications be recorded when analysing prosthesis maintenance during follow-ups.[12]

Conclusion:

The tooth supported overdenture is a better alternative for a treatment option to conventional dentures since the proprioception is maintained and it improves stability and retention.

Overdenture supported by natural teeth is one of the best preventive prosthodontic treatments available for the near edentulous condition. Despite recent developments in dental implantology, the conservative approach of root preservation is still valid. Greater emphasis must be given on proper case selection, diagnosis, and treatment planning. By preserving the submerged root or teeth for overdenture, alveolar bone resorption can be reduced considerably.

Overdentures thus become an alternative treatment for patients advised for near total extraction. Oral hygiene instructions must be given to the patient and thorough reinforcement of the same has to be done. Follow up should be done regularly so as to maintain the vertical height of the alveolar bone and also prevent any detrimental effects occurring beforehand.

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