Overdenture: A Way of Preventive Prosthodontics

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ABSTRACT:
When situation arises with few remaining natural teeth, Prosthodontists are posed with dilemma for treatment options. In such cases, overdenture therapy has been proven to be advantageous. Bearing in mind the philosophy of Preventive Prosthodontics, overdenture therapy has long term advantage, by preserving the proprioception and thereby residual alveolar ridge. This clinical report describes the Prosthodontic rehabilitation a patient with few remaining natural teeth by using stud attachment retained maxillary overdenture and telescopic mandibular overdenture for added advantages like better retention, stability, support and psychological benefits.

Key words: Overdenture, Preventive Prosthodontics, Stud attachment, Telescopic overdenture

INTRODUCTION:
Preventive prosthodontics emphasizes the importance of any procedure that can delay or eliminate future problems. Retention of teeth, roots of one or more teeth for overdenture offers the patient a lot of advantages like better retention, stability, proprioception, support, maintenance of alveolar bone and psychological aspect of retaining teeth. The use of tooth-supported overdenture is a common form of treatment. There are two physiologic tenets related to overdenture therapy: the first concerns the continued preservation of alveolar bone around the retained teeth¹ while the second relates to the continuing presence of periodontal sensory mechanisms² that guide and monitor gnathodynamic functions.

Removable dentures attached by means of telescopic anchors are regarded to be a good clinical solution which gives an opportunity to decrease destructive rotational and horizontal occlusal forces by directing them more axially.³ It can also increase the stability of abutment teeth with periodontal disorders and protect them from pathologic migration, and thus, may enhance the functional effect of the prosthetic treatment.

Different attachment systems are used to retain overdenture: bars with clips, studs and magnets has been reported as viable treatment options. Studs due to their simple application have gained a wide popularity in clinical practice. It has been shown that solitary non splinted attachments are less technique sensitive, and easier to clean than bars.⁴ The patient satisfaction with overdentures depends on multiple factors like patient preferences, chewing comfort, phonetics and esthetics.
This clinical report describes the prosthodontic management of a patient with few remaining natural teeth by using stud attachment retained maxillary overdenture and telescopic mandibular overdenture.

Case report:
Fifty five years old female patient reported to Department of Prosthodontics Nair Hospital Dental College with complain of difficulty in chewing. Extraoral examination showed squarish face form and straight profile and there were no pathologic findings seen.

Intraoral examination showed:
- Teeth remaining 13, 23, 33, 34, 35, 43, 44 and 45
- Abrasion with 13, 23, 34, 44 and 45 with moderate attrition
- Grade I mobile 34, 44 with grade I gingival recession
- Grade II mobile 33 and 43 with grade II gingival recession
- Grade I gingival recession with 13 and 23

The edentulous span had favourable ridge with firmly attached keratinized mucosa. Clinical and Radiographic examination revealed abutment teeth 33 and 43 were periodontally weak. [Fig.2] Patient wanted restoration of his dentition with minimal intervention. Diagnostic casts were prepared using irreversible hydrocolloid impressions. Casts were mounted on articulator using centric relation record and inter ridge distance was assessed.

Provisional Treatment options:
1. Fixed restoration in anterior region and distal extension cast partial denture
2. Implant supported prosthesis
3. Overdenture with or without attachment

During the following visit, treatment options were discussed with the patient, including extraction of 33 and 43; endodontic therapy of remaining teeth and fixed restoration in maxillary anterior; either cast partial or implant supported prosthesis with respect to both arches; an overdenture with or without attachments. To retain a bridge or crown and a partial denture would place unfavourable stresses that may lead to their early loss. After considering invasiveness, amount of time and financial aspect, it was decided to have, stud retained prosthesis in maxillary arch and telescopic overdenture in mandibular arch.

Treatment Plan:
Teeth arrangement was done on diagnostic mounting to assess amount of space available for attachment.
1. Preprosthetic phase:
   - Extraction of 33, 43
   - Oral prophylaxis.
   - Endodontic treatment of 13, 23, 34, 35, 44, 45.
2. Prosthetic phase:
   Maxillary arch: Abutment teeth 13 and 23 were prepared to receive stud attachment- ball and socket type (Access post- EDS system). Teeth were reduced at the gingival level and post space was prepared using drills provided by the manufacturer. Then posts were tried. [Fig.5] After clinical and radiographic evaluation for correct positioning, posts were cemented using resin cement. [Fig.6]
   Mandibular arch: Abutment teeth 34, 35, 44, and 45 were prepared to receive primary copings and impression was made using putty and light bodied addition silicon. Then cast was fabricated and wax patterns for primary copings were fabricated keeping in mind that they are parallel to each other. Wax patterns were invested, cast with cobalt-chromium alloy, finished and modified using a paralleling cutting device; castings were polished, tried in patient mouth and cemented [Fig.8]

   A putty and light bodied addition silicon impression with the primary coping in place was made for the fabrication of secondary copings and framework. Stone models were poured and the cast duplicated with Agar. Secondary copings and framework were waxed up on the refractory cast and casted in cobalt chromium alloy. Secondary coping with framework was tried in patient's mouth for fit, retention and stability. [Fig.9] Retention of the denture was finally provided by the friction between the parallel surfaces of the primary and secondary copings.

   After cementation of overdenture post in maxillary arch and checking for fit of mandibular framework, the primary impression of the maxillary and mandibular arches were made and overdenture was fabricated following steps of the conventional complete denture. Dentures were evaluated intraorally for retention, stability, support, occlusion and esthetic. [Fig.14] The female attachments of maxillary denture were cured at the chairside using autopolymerising acrylic resin. Due to lack of space slight metal component of mandibular denture was
displaying through acrylic denture base material, [Fig.14] which was mask by Ceramage (SHOFU INC.) for better characterization and evaluated intraorally. [Fig.15]

Postoperative instructions on how to insert the prostheses and on adequate oral hygiene maintenance were provided. Patient was scheduled on periodic recall.

Discussion:

The phenomenon of residual ridge resorption (RRR) following removal of teeth been well observed and documented in literature.5 While the bone loss following the removal of teeth is stated to be rapid, progressive, irreversible and inevitable, it is equally well observed that bone is maintained around standing teeth and implants.6 The teeth which are too weak to support a fixed partial denture and which are considered unsuitable to support a removable partial denture can often at times be usefully conserved and suitably modified to act as abutments for over dentures.

The telescopic overdenture system used in this case in mandibular arch revealed a long lasting usefulness in the prosthetic treatment of the patient with reduced dentition. Similar clinical observations were also described in reports made by other authors.7 It has been observed by many authors that positive results of prosthetic treatment with telescopic dentures in patients with reduced dentition.8 There are many advantages of telescopic crowns like axial load of the tooth and full covering of the abutment (on the contrary to clasps), which may reduce tilting forces with their negative influence on abutment supporting tissues. The axial forces stimulate periodontal tissues and alveolar bone. They also provide indirect splinting influence, easy oral hygiene maintenance and easy ways of repair.9

Since there was metal display of framework through mandibular denture base material, denture characterizing material Ceramage (SHOFU INC.) was used to mask the effect of metal framework.

The stud attachments used in maxillary arch were ball and socket type. They provide good retention as well as support. It has been observed by many authors that patient with ball-socket attachments were more satisfied than patient with magnet attachment and ball-socket systems bore higher axial loads than bar and dip system.10,11,12

Patient was scheduled on a regular recall program- 3 months and 6 months.

As the status of overdenture prosthesis and its benefits to the patient depend solely on the continued retention of the underlying abutments, it becomes obligatory to periodically monitor their health and institute necessary steps to prolong their useful span. Herein lies the importance of periodical recall and review and patient motivation which makes over denture therapy a continued service.

Summary:

Retaining teeth permit the stresses of occlusion to be borne partially by the teeth, thus reducing the abuse, which the alveolar process and the mucoperiosteum undergo when dentures are worn. By reducing the trauma to the mucosal tissues, it is reasonable to expect that resorption of the alveolar process will be lessened.

References:

Figure 1(a) and (b): Preoperative Extraoral photograph

Figure 2(a) and (b): Preoperative OPG

Figure 3(a), (b) and (c): Intraoral photograph after extraction of 33 and 43

Figure 4: OPG after endodontic

Figure 5(a) and (b): Teeth prepared to receive primary copings in mandibular arch

Figure 6(a) and (b): Primary copings on cast and intraorally

Figure 7(a), (b) and (c): Mandibular impression for secondary copings and framework, framework on cast and intraorally
Figure 8(a) and (b): Abutment preparation to receive stud attachment in maxillary arch

Figure 9(a) and (b): Intraoral periapical radiograph to assess post positioning

Figure 10(a) and (b): Maxillary and mandibular definitive impression

Figure 11(a) and (b): Face bow record and centric relation

Figure 12(a) and (b): Mounting and teeth arrangement on semi-adjustable articulator

Figure 13(a), (b) and (c): Wax denture try in

Figure 14(a), (b) and (c): Final denture in situ

Figure 15(a): Final denture in situ after characterization using Ceramage

Figure 16(a): Post operative extraoral photographs