Rehabilitation of Partially Edentulous Mandibular Ridge with Precision Attachment Retained Overdenture- A Case Report

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Abstract

Prosthetic rehabilitation of a patient with few teeth remaining is very challenging task. Some teeth can be protected in compromised edentulous ridge patients and they can be used as support to the prosthesis. Precision attachments are small interlocking devices which connect prosthesis and abutments that offer a variety of solutions to the challenge of balance between functional stability and cosmetic appeal. Precision Attachment retained overdenture helps in distribution of masticatory forces, minimizes trauma to abutments and soft tissues, improves the aesthetics and retains proprioception. The use of stud attachments improves the retention of the prosthesis, thus allowing the patient to experience better comfort. The following case report discusses the use of resilient stud attachments to retain mandibular partial overdenture.

Keywords: Root supported overdenture; precision attachment retained overdenture and Stud attachment.
Introduction

The basic principle of dentistry is to preserve what remains, so the remaining roots can be preserved and used to aid in providing retention & support for the prosthesis, thus improving denture performance. [1, 2] An overdenture may be defined as a denture the base of which covers one or more prepared roots or implant. [3] Most of patient’s desire prosthesis with good retention, stability and better chewing function. To full fill the desires of such patients, preserving natural teeth and fabricating a bar or stud attachment retained prosthesis is a great prosthodontic alternative. In addition to this precision attachment retained overdentures offer many advantages as preservation of proprioception retardation of alveolar bone resorption, psychological advantage of preserving natural teeth and improved chewing efficiency. [4, 5] Various studies have been undertaken to determine the success of overdentures. Ten years prospective study done by Tylor showed 84% survival of overdenture abutments and 54% of abutment failure was attributed to secondary caries. [6] In a 5-year study the alveolar bone loss in conventional complete denture wearers was reported to be an average of 5.2 mm while it was 0.6 mm in tooth supported overdenture wearers. [7]

The aim of the present article is to describe the use of stud attachments in mandibular tooth supported partial overdenture prosthesis as an aid to attain stability, support and retention.

Case Report

A 45 years old male patient, reported to our Department of Prosthodontics, with a chief complaint of multiple missing teeth and inability to chew the food. His medical history was not significant. After clinical and radiographic examination, the diagnostic casts were studied which showed sufficient interocclusal space to accommodate the precision stud attachments.

Clinical and radiographic examination revealed that remaining teeth were periodontally sound with no mobility, no periapical pathology and periodontal pockets and presence of sufficient inter-arch space for the placement of stud attachments. Teeth # 33 and 43 were selected as abutments for attachments. (Figure 1). Keeping in mind the patient’s desire and presence of sufficient inter-arch space to accommodate the ball attachment, denture base and teeth arrangement, it was decided to fabricate a mandibular stud attachment retained overdenture.

Figure 1: Remaining natural teeth.

Clinical Procedure

The stud attachment used in this clinical case was Access post Overdenture [Essential Dental System (EDS) Access Post Overdenture EZ-Change® attachment system]. (Figure 2). The canals of the abutments were prepared in a sequential manner using three burs supplied with stud attachments (Radicular RC Post) to receive the radicular post, after removing gutta-percha from the canals with peso reamers up to the required length of 10mm (post with base of ball). It
was cemented with Dual cure resin cement (Alcem, FGM, Brazil) after etching with phosphoric acid and application of bonding agent (Figure 3). While cementation, the post should not be pressed directly into the canal otherwise hydrostatic pressure built in the canal prevents the proper flow of the luting cement, resulting in an inferior bonding. The resin cement which extruded was carefully placed around the base of the stud attachment and also cover exposed dentin. It was light cured for 60 seconds. The metal housing was then loaded. The selected retention ring was inserted. A hole was cut in the denture base exactly above each ball abutment with a round carbide bur and it was verified that there was no contact between metal housing and denture base. The properly mixed self-cure acrylic resin was applied over each metal housing as well as inside each window in the denture base. The denture was inserted into the patient’s mouth over the abutment attachment assembly and patient was guided to close into maximum intercuspation lightly but not firmly. If patient is allowed to close firmly, it could cause an improper position of metal housings (female) to the ball attachments (male) which could results in difficulty in insertion and removal of the denture. After the acrylic was set, the denture was removed. The denture was finished, polished and delivered to the patient after occlusal adjustments (Figure 5). To preserve the health of overdenture abutment teeth, the patient was instructed to comply with an oral self-care program that included the use of fluoridated toothpaste, remove plaque effectively and regular check-up every six months.

Figure 2: Stud attachment assembly and root canal preparation drills.

Figure 3: Stud attachment cemented with resin cement.

Figure 4: Intaglio surface of mandibular partial overdenture with nylon retention cap.

Figure 5: Definitive prosthesis in occlusion.
The edentulous state disturbs the integrity of the masticatory system with adverse functional, aesthetic and psychological sequelae. An overdenture diminishes the bone resorption of ridge around the teeth and the adjacent areas, where as maintaining dental proprioception. From a psychological perspective patient’s own acceptance when wearing an overdenture is greater than when compared to traditional complete denture.

The removable attachment retained overdenture could be a better option for patients with few teeth remaining and which is not in an ideally located to support fixed partial denture. The stud attachment was better option for the prosthesis due to its excellent retention and stability, decrease trauma of underlying soft tissues, improved mastication and minimum interference in speech. Presence of root stumps, as proprioceptors present in periodontal ligaments, provide protection from accidental injurious on over closure of the jaws and also decrease alveolar bone resorption. Bar attachment prosthesis is unaesthetic due to the bulkier denture base and as compared to stud attachments requires more amount of inter-occlusal space. The abutment selection also plays a vital role in the prognosis of overdentures. Amongst anteriors and canines are the most important proprioceptive organs, the shape and strategic position and the larger periodontal attachment area make them ideal abutments.

Retained roots primarily help in retention and positional orientation of the prosthesis.

Careful preparations of the root canals with corresponding size drills supplied with stud attachment are very important. For the cementation, chemically or dual cured resin luting cement should be used to further resist any dislodgement by the prosthesis. The success of stud attachment retained prosthesis also depends on the evaluation of inter-arch space for the selection of stud attachment, which is one of the critical steps. Sufficient inter-arch space must be present (more than 10mm in one arch) to accommodate ball attachment, metal housing, denture base, space for the arrangement of denture teeth with required inter occlusal gap and closest speaking space. Due to various reasons the use of the attachment retained overdenture is advantageous and hence it should be used. Both retention and parallelism increase the attachment’s longevity and prevent premature failure of the overdenture.

Oral rehabilitation with root supported overdenture is an effective treatment modality and may be indicated as an alternative in patients with systemic disorders or economic reasons that would impair an implant based rehabilitation. The results are excellent if appropriate case selection is done and proper hygiene instructions are followed by the patient.


