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Case Report

Telescopic retainers for removable partial dentures

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ARTICLE INFO

Article history:

Received 7 January 2015

Accepted 1 May 2015

Available online 29 June 2015

Keywords:

Telescopic retainer

Telescopic crown

Frictional retention

precision or semi-precision attachments. Telescopic retainers are an effective means for retaining the removable partial dentures and dentures. They transfer forces along the long axis of the abutment teeth and provide guidance, support and protection from the movements that dislodge the denture. Telescopic retainer provides excellent retention, support and splinting action between abutment teeth and therefore an excellent alternative to traditional fixed and removable prostheses. This is also an ideal treatment option in patients where rehabilitation using dental implants are not feasible due to compromised medical condition. In situations where there are multiple telescopic crowns, the superstructure acts as a rigid splint interlocking the primary and secondary components to act as a functional unit.^{1,2}

Introduction

Telescopic prosthesis is a double crown system. The procedure involves covering the remaining teeth which are used as abutments with inner copings followed by outer crowns as part of the removable partial denture. Root canal treated teeth can be used as abutments for removable and fixed partial dentures depending on the root condition. Endodontically treated teeth need to fulfill certain criteria to be considered as an abutment for removable or fixed prosthesis. These include 1. No evidence of any periodontal disease, 2. Adequate crown root ratio, 3. Well obturated canals without any peri-apical pathology and 4. Sufficient crown height without undesirable angulations. These teeth can also be used as abutments for crowns or as a telescopic retainer provided proper design and technique is followed. Telescopic prosthesis similar to removable partial dentures are generally tooth and tissue supported and the retentive mechanisms include clasps,

Case report

A 40 year old male patient reported with a chief complaint of missing right upper teeth since two years. Medical and dental history revealed that the patient had lost 11, 12, and 13 due to trauma two years back [Fig. 1]. Subsequently he reported to a dentist, who performed root canal treatment on 21, 22 and placed implants in relation to the missing teeth. Implants failed within six months due to recurrent infections and were explanted. The patient was diagnosed with diabetes recently and was on antidiabetic therapy.

A thorough clinical and radiological evaluation was carried out. Examination of 21 and 22 revealed well-obturated root canals without any pathology. There was severe bone resorption in the region of missing 11, 12 & 13 (Seibert's class III). The bone support around 21 & 22 were also not favorable for using them as an abutment for fixed partial dentures. Various treatment options like fixed partial dentures and

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Fig. 1 – Pre-op view.

implants were considered. Considering the long span and previous history of failure with implants, a treatment plan of a cast partial denture with telescopic retainers on 21, 22 was offered to the patient. Diagnostic casts were obtained and after surveying, designing was done. For the cast partial denture, the preferred design was a double palatal strap major connector with occlusal rest seats on 16, 17, 26, 27 and embrasure clasps.

21 & 22 were prepared with a shoulder finish line. Walls of the preparation were kept nearly parallel or within the accepted range of 2–5° to improve the retention. Upper and lower Impressions were made using putty-wash technique with elastomeric impression material (3M, Germany), poured with Type IV dental stone (Kalabhai, India) and casts retrieved. A coping of base metal alloy (Wironit, Bego Germany) of 0.5 mm thickness was fabricated following manufacturers instructions to act as telescopic retainer and fixed to 21 and 22 with glass ionomer luting cement (Fuji 1, GC Japan) [Fig. 2]. Occlusal rest seats were prepared on 16, 17, 26 & 27 (distal occlusal rests on 16 & 26, mesial occlusal rests on 17 & 27) and impression made with elastomeric impression material. Master cast was retrieved and cast partial framework was fabricated with Co–Cr alloy (Wironit, Bego Germany) following manufacturer's instructions and extending the framework over 21 & 22 [Fig. 3]. The RPD framework was evaluated for fit and retention. Porcelain (Vita, Germany) build up was done for 11, 12, 13, 21, 22 region and the ridge defect was covered using gingival porcelain following manufacturer's instructions and fulfilling esthetic requirements. Bisque trial was done and contours verified and telescopic

Fig. 2 – Telescopic crowns on 21 & 22.

Fig. 3 – Cast partial denture framework with telescopic retainers for 21 & 22.

portion was inserted after glazing and polishing in the subsequent appointment [Fig. 4]. Occlusion was checked thoroughly both in centric and lateral excursions. It was ensured that there was no interferences. Patient was instructed regarding the insertion and removal of the prosthesis, care of the prosthesis and oral hygiene maintenance protocols.

There was considerable improvement in esthetics and function after the insertion of prosthesis. The patient was scheduled for follow-up visits every three months and he reported no complaints during the 2 years of follow-up.

Discussion

The various treatment options for rehabilitation of partially edentulous arches are tooth supported fixed partial dentures, implant supported removable/fixed prosthesis, cast partial dentures with intra-coronal or extra-coronal retainers and telescopic prosthesis. Telescopic restorative option is time tested and a viable treatment option in partially edentulous patients. There is enough scientific evidence to support the routine use telescopic prosthesis.^{3–5} The Glossary of Prosthodontic Terms defines a telescopic crown as an artificial crown constructed to fit over a coping (framework). The

Fig. 4 – Telescopic retained cast partial denture in situ.

coping can be another crown, a bar, or any other suitable rigid support for the dental prosthesis.⁶

In the case presented here telescopic denture has proven to be the best treatment option considering the long edentulous span, unfavorable abutments for FPD and past history of failure with implants. The amount of retention can be altered depending on the clinical situation by modifying the design. The cross sectional configuration, taper angle and surface area in contact determine the quality and quantity of inter-surface friction which ultimately controls the amount of retention. The resistance to movements is provided by the rigid retainers with cylindrical or conical primary copings and precise fit of this with the secondary restoration. The tapered configuration of the contacting walls generates a compressive intersurface tension. The tension should be sufficiently strong enough to sustain the prosthesis in its place. An increase in the tapering of the coping walls reduces the retention between the copings. The smaller the degree of the taper, the greater is the frictional retention of the retainer. In case of the abutments with short clinical height, the walls should be kept parallel or the taper of the wall should be reduced ($2-5^\circ$) to improve the retention. The taper of the walls of the primary coping can be adjusted to a predetermined angle, according to the special requirements of each patient.

The main advantage of telescope retainers is that they transmit occlusal forces in a favorable direction. They transmit the occlusal forces in the direction of the long axes of the supporting teeth. Reduction of lateral stress on abutments by using telescopic retainers has been well documented.⁷ The other advantages include, 1. In case of failure of one abutment, the prosthesis can be easily repaired with acrylic resin by fabricating the secondary crown again into a Pontic, 2. Efficient home care by removing the overprosthesis. Copings can be easily cleaned due to the good accessibility around their gingival margins once the overprosthesis is removed. They also protect the supporting teeth against dental caries and any other irritation.⁸⁻¹⁰

The main drawbacks of this treatment procedure are that it requires a highly competent professional and skilled technician. The clinical and laboratory procedures are highly technique sensitive. The success of the prosthesis depends on the precision with which the coping and telescopic retainer is made. The retention also may be compromised after prolonged usage. Over the past years, we have seen remarkable advances in the rehabilitation of partially and completely

edentulous patients. We now recognize that proper oral hygiene and the ability to maintain high level of oral hygiene are the most significant aspect for prevention of periodontal disease and dental caries. Although an often unnoticed technique, the use of telescopic retainers for removable partial dentures has been largely underutilized despite it being an excellent treatment option as it facilitates access for cleaning by the patient and/or dental surgeon and helps to retain questionable teeth longer.

Conflicts of interest

All authors have none to declare.

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