

Custom Made Telescopic Crowns for Reinforcement of Single Maxillary Tooth Supported Overdenture- A Case Report

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Abstract

Overdenture is one of the preventive prosthodontic treatment which uses the remaining teeth or root or implant as support. The retained teeth or root prevents alveolar bone resorption, better load transmission, proprioception and achieve better stability of denture with emphasis on psychological aspect of not being completely edentulous. Different types of overdenture attachment is available based on the clinical condition. Telescopic crown supported overdenture consists of primary coping cemented on abutment and secondary coping (telescopic) attached to denture. This technique is effective because the secondary copings used transfer forces along the long axes of the abutment teeth, providing support and resistance from the movements that dislodge the denture.

Keywords: Overdentures, Secondary Crown, Telescopic Crown, Denture Reinforcement

Introduction

Preventive prosthodontics features on the importance of any procedure that can delay or eliminate future prosthodontic problems. As M.M. Devan stated “Perpetual preservation of what remains is more important than the meticulous replacement of what is missing”, Overdenture follows the preventive treatment. According to glossary of prosthodontic terms (GPT 9) “overdenture is any removable dental prosthesis that covers and rests on one or more remaining natural teeth, the roots of natural teeth, and/or dental implants; a dental prosthesis that covers and is partially supported by natural teeth, natural tooth roots, and/or dental implants”.

Overdentures can be tooth supported or implant supported. The remaining natural teeth or root which is periodontally weak can support, stabilize and retain the complete denture [1]. When fabricating an overdenture, mechanical retainers like attachments can be used as a substructure or

metal used to cover the remaining roots (telescopic crowns, short coping, long coping)[2].

Since 20th century, telescopic crowns (double crowns or crown and sleeve copings) were used as retainers in overdentures. It consists of an inner primary telescopic coping cemented to the abutment and a harmonious secondary (telescopic) coping embedded into a removable prosthesis. The telescopic unit over the primary copings aids in the anchorage of the remaining dentition and reinforcement of denture[3].

The advantages of using natural teeth or root as abutments in overdenture are:

(1) preservation of residual ridge and soft tissues; (2) the denture exhibits better horizontal stability especially when several teeth are used for support; (3) increased support during functional loading results in an improvement in masticatory performance; (4) natural teeth which are not feasible as abutments for conventional restorations are worth retaining for use as supporting elements to complete dentures; (5) patient acceptance is excellent; (6) preservation of proprioceptive response ; (7) harmony of arch form is maintained [4].

Certain drawbacks are caries susceptibility of abutment teeth, overcontoured flanges due to bony undercuts adjacent to overlaid teeth, affects esthetics due to overcontoured or fore shortened flanges, periodontal breakdown of overlaid teeth, expensive in case of attachments, requires maintenance of dentures. These factors can jeopardise the success of overdentures if not addressed properly.

Case Report

A 62 year old male patient referred to the department of prosthodontics with the chief complaint of loosening followed by fracture line in the midline of upper denture. He was a upper denture wearer since 6 months with complaint of repeated fracture of maxillary denture. On

intra oral examination, teeth 11,21,22,23 with small metal coping over it. On lower arch, teeth present were 32,33,34,35,36,37,38,43,46,47. Two metal ceramic bridge units were present, one connecting 34,35,36,37,38 and other extending from 33 to 47 (fig 1). Abutment teeth in maxillary arch was periodontally and endodontically good with no abnormal clinical signs. Maxillary edentulous ridge was U shaped, moderately resorbed with overlying firmly attached keratinised mucosa. On radiographic examination, endodontic treatment was done in 11,21,22,23,43,32,33,35 and intra-radicular post with small metal coping was present in maxillary teeth (fig2). No other pathology was detected in radiograph. On examining the old denture, a fracture line extending from labial frenum to palatal part along the midline. The retention and stability was compromised with occlusal wear of the teeth.

Prosthodontic Management

Most common causes of fracture of single denture opposing natural and / or fixed partial denture are (1) improperly contoured mandibular occlusal plane, (2) high frenum attachments, (3) occlusal scheme, (4) various occlusal forces, (5) the denture foundation, and (6) denture base thickness⁴.

In this case, the treatment was planned for fabrication of secondary custom metal copings over abutment which will be attached to maxillary denture to increase the retention, stability, support and for reinforcement, after patient's consideration and concern. Proper occlusal scheme was incorporated.

Steps

1. Primary impression of the maxillary and mandibular arch were made with impression compound (fig 3) and irreversible hydrocolloid respectively in the stock trays.

2. On the diagnostic cast, custom autopolymerising resin tray was fabricated with 2mm short of sulcus.
3. Extensions of the tray was checked, border moulding done and final impression was made with light body addition silicone to obtain finer details(fig 4)
4. Definitive cast was poured with Type IV gypsum product. Temporary record base with occlusal rim fabricated of standard dimensions replicating the arch form.
5. A facebow and maxillomandibular relation was recorded with wax occlusal rims on temporary denture bases fabricated on the maxillary master cast. Both the casts with bite were mounted on hanau articulator.
6. Wax pattern for secondary copings was fabricated, casted and tried in patient's mouth(fig 5)
7. Acrylic teeth were arranged according to opposing remaining maxillary teeth, checking the working and non working side contacts on lateral movements.
8. After evaluating the occlusion, phonetics and esthetics , try-in was completed and satisfied by the patient.
9. Processing of maxillary denture with attached secondary metal copings was done in heat cure polymerising resin.
10. After curing and bench cooling, remounting and selective grinding was carried out.
11. Finished and polished maxillary overdenture with metal copings attached was inserted and verified for occlusal interferences, extensions, retention, stability (fig 6). Post insertion check-up was done after 24 hours, 1 week ,6 month (fig 7)and 1 year .The patient was happy and satisfied with the prosthesis (fig 8) and was able to masticate and speak well . The patient was reviewed after one year with no complaints.



Fig1:Intra-oral view of maxillary and mandibular arch



Fig 2: Panoramic radiography of maxillary and mandibular arch



Fig 3: Primary impression of maxillary arch with impression compound



Fig. 4: Final impression with light body elastomeric material

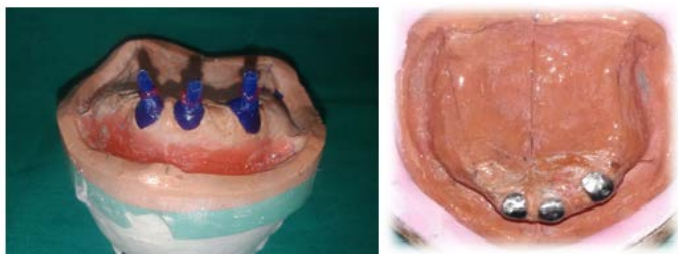


Fig 5: Wax pattern by indirect technique and metal copings placed on the master cast



Fig 6: Intra-oral view of maxillary denture with custom metal coping attached



Fig 7: Intra-oral view of maxillary denture after 6 months follow up



Fig 8: Pre-op and post-op extra oral view

Discussion

- Miller[5] in his study inferred that alveolar bone resorption depends upon three factors, they are: 1. The character of the bone. 2. The health of the individual. 3. The amount of trauma to which the structures are subjected.
- Pacer and Bowman (1975) in their study compared occlusal force perceptions between conventional denture and over denture wearers. They found that the overdenture patient had more typical sensory function, i.e., closer to natural teeth than a complete denture patient in discriminating between occlusal forces which enhances the patient's denture coordination and ability to control the denture in his or her physiologic environment [6].
- Rissin et al.(1978) found that the masticatory efficiency of over-denture wearers was one-third higher than the complete denture wearers.[7]
- Proprioception is maintained in overdenture with the presence of directional sensitivity; dimensional discrimination; canine response and tactile sensitivity[8].
- Various factors for attachment selection for tooth supported overdenture include available buccolingual and inter arch space, the amount of bone support,

condition of opposing dentition, clinical experience, personal preferences, patients motivation and cost. Careful selection of the abutment is important [9].

- Denture base fracture around a metal coping is a common clinical occurrence in overdenture practice. A retrospective study of 5 years found that 34% of overdentures showed signs of cracks or fracture of denture bases, mainly around supporting abutment teeth covered with cast copings. 20% of overdentures showed existing acrylic resin base or tooth repair. Copings not only occupy space inside of the denture bases, but may also act as fulcrum of overdenture movement. Thus the overdenture denture bases around copings are generally thin and are susceptible to deformation or fracture [10].
- Longitudinal follow-up studies of 5-10 years prove that conical cast crown-retained partial dentures have a lower failure rate than those retained with clasps or precision attachments [11]. Overdentures with metal copings might successfully address relevant problems of elderly denture wearers who may fear dental implant surgery.
- The adhesive strength of the cylindrical telescopic crowns is based on the friction force, which arises during the movement of the two parallel surfaces of the crowns. These friction effects, come to existence within the contact of metal surfaces(joint area). The magnitude of friction forces depends on the strain developed within the contact area and properties of materials employed. The presence of saliva enhances the adhesive effect and also protects both surfaces of the crowns against excessive material loss [12].
- Tooth supported overdentures with telescopic crowns provide better retention, stability, support, stable occlusion and proprioception which efficiently enhances chewing efficiency and phonetics. It also decreases the rate of residual ridge resorption [13].
- After mid-term periods of follow up of 5 years, found that the survival of overdentures with metal coping restorations on the abutment teeth was satisfactory. However, Complications and aftercare maintenance must not be underestimated [10].
- Long term follow-up analysis on the telescopic removable partial denture (TRPD) found that the estimated survival rate was 97.3% for the TRPDs compared to only 81.8% for those not in follow-up. The survival rate of TRPDs can be improved, if there is a regular follow up programme. So the defects of the dentures can be adjusted before they cause failure of the entire restoration or damages of the abutments to such an extent that extraction is unavoidable [14].
- In pertaining to the case discussed above , the abutment condition was satisfactory so no further modifications was done. Since the major complaint was loss of retention and fracture, so cast metal secondary copings were made in relation to the abutment copings and was fitted to the intaglio surface of the denture during processing. Here the telescopic crown overdenture technique was preferred due to their proven fact of good retention , stability, equal distribution of stresses with reinforcement of denture due to the frictional fit of metal to metal copings. The occlusal interferences in centric and eccentric movements were relieved to alleviate the untoward forces from the fixed mandibular prosthesis. After the follow up of 24 hours,1st week,1,6 and 12 months, patient found to be appeased with good compliance.
- For the preservation of overdenture abutment's health, the patient was instructed for an oral hygiene practice through the use of fluoridated

toothpaste, remove plaque effectively and regular check-ups every six months [15].

Conclusion

Though the tooth supported overdenture requires long term follow up and regular oral hygiene maintenance, overdentures with telescopic crowns yield better retention, stability, support, stable occlusion and proprioception which increases chewing efficiency and phonetics. It also reduces the rate of residual ridge resorption due to conversion of compressive forces into tensile and equal distribution of stresses. Even with the increased practice of implants for overdenture therapy, tooth/root supported telescopic overdenture still remains an efficient treatment modality for its cost effectiveness, better compliance and acceptance by elderly patients.

References

1. Morrow, R., Feldmann, E., Rudd, K. and Trovillion, H., 1969. Tooth-supported complete dentures: An approach to preventive prosthodontics. *The Journal of Prosthetic Dentistry*, 21(5), pp.513-522.
2. Schuh C et al. Five year of tooth supported overdenture as a prosthetic solution for elderly patients : a case series. *Rev Odonto Cienc* 2014; 29(1).
3. Singh, K. & Gupta, N. 2012. Telescopic denture - A treatment modality for minimizing the conventional removable complete denture problems: A case report. *Journal of Clinical and Diagnostic Research*. 6. 1112-1116.
4. Farmer J. Preventive prosthodontics: Maxillary denture fracture. *The Journal of Prosthetic Dentistry*. 1983;50(2):172-175.
5. Miller PA. Complete dentures supported by natural teeth. *Tex Dent J* 1965;83:4-8
6. Pacer RJ, Bowman DC. Occlusal force discrimination by denture patients. *J Prosthet Dent* 1975;33:602-609.
7. Rissin L, House JE, Manly RS, Kapur KK. Clinical comparison of masticatory performance and electromyographic activity of patients with complete dentures, overdentures, and natural teeth. *J Prosthet Dent* 1978;39:508-11.
8. Thayer HH. Overdentures and the periodontium. *Dent Clin North Am* 1980;24:369-77
9. Samra R, Bhide S, Goyal C, Kaur T. Tooth supported overdenture: A concept overshadowed but not yet forgotten!. *Journal of Oral Research and Review*. 2015;7(1):16.
10. Chhabra A, Chhabra N, Jain A, Kabi D. Overdenture Prosthesis with Metal Copings: A Retrospective Analysis of Survival and Prosthodontic Complications. *Journal of Prosthodontics*. 2018;28(8):876-882.
11. Bhagat TV, Walke A. Telescopic partial dentures-concealed technology. *Journal of International Oral Health*. 2015; 7: 143-147.
12. Dąbrowa T, Dobrowolska A, Wieleba W. The role of friction in the mechanism of retaining the partial removable dentures with double crown system. *Acta Bioeng Biomech*. 2013;15(4):43-48.
13. Shruthi, C. & Poojya, R. & Ram, Swati & Anupama,. (2017). Telescopic Overdenture: A Case Report. *International Journal of Biomedical Science : IJBS*. 13. 43-47.
14. Wöstmann B, Balkenhol M, Weber A, Ferger P, Rehmann P. Long-term analysis of telescopic crown retained removable partial dentures: Survival and need for maintenance. *Journal of Dentistry*. 2007;35(12):939-945
15. Ettinger RL, Qian F. Abutment tooth loss in patients with overdentures. *J Am Dent Assoc* 2004;135:739-46