ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 9, Issue, 07, pp.54125-54128, July, 2017

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

MARBURG DOUBLE CROWN SYSTEM: A NOVEL APPROACH TO COMPROMISED DENTITON

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ARTICLE INFO

Article History:
Received 20th April, 2017
Received in revised form
06th May, 2017
Accepted 25th June, 2017
Published online 26th July, 2017

Key words:

Telescopic hybrid denture,
Metal copings,
Tenso friction.

ABSTRACT

The concept of preventive prosthodontics deals with the preservation of remaining teeth and decreasing the rate of existing alveolar bone resorption. It also highlights the importance of any procedure that can delay or eliminate future prosthodontic problems. In fabrication of complete denture the rules of preventive prosthodontics were violated as the remaining teeth were extracted and the rate of bone resorption is not declined. In an order to achieve measures of preventive prosthodontics telescopic dentures are an effective treatment modality. Double crowns system used in this type of prosthesis provides retention, stability and support with preservation of remaining teeth. Retention offered by these double crown systems is higher when compared with conventional clasp system as these double crowns are retained by friction between the two crowns. The following case report utilizes this concept of Tensofriction between the double crowns for rehabilitation of worn out dentition.

Citation: Sumeet Sharma. 2017. "Marburg double crown system: A case report", *International Journal of Current Research*, 9, (07), 54125-54128.

INTRODUCTION

Telescopic copings were first described by Starr in 1886 as retainers for removable partial dentures (RPD) (Gungor, 2004). Double crown system also known as Marburg double crown system, conus crown, double crown, crown and sleeve coping (CSC), or as Konuskrone, a German term that described a cone shaped design consists usage of a primary full-coverage coping or male telescopic portion which is luted to the prepared tooth with a secondary casting or female telescopic portion, which is a part of the denture framework and is connected by means of interfacial surface tension over the primary coping (Weaver, 1989 and Langer, 1981). The inner coping defends the prepared abutment tooth from decay (Tushar Vitthalrao Bhagat, 2015) where as the outer coping is fitted over the inner coping to form a securely attached unit and it provides retention and stability to the prosthesis, by tenso-friction mechanism (Singh, 2012). The term telescopic dentures or crowns were used as these systems of double crowns, which can be fitted into each other shows resemblance with the collapsible optical telescope (Wenz, 1998). Telescope crowns used in removable partial dentures reduce the destructive horizontal and rotational occlusal forces by directing them more axially and less traumatically than other retainers.

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There are three types of double crown system based on their different retention mechanisms (Vijay Prakash, 2008).

- Double crowns with parallel milled surfaces - retention by friction.
- Double crowns with conical inner crown - retention by 'wedging effect'.
- Double crown with clearance fit, is also called hybrid telescope or hybrid double crown retained with help of additional attachment or functional molded borders.

Yair Langer and Anselm Langer in 2000 (Yair Langer and Anselm Langer, 2000), fabricated lower detachable telescopic dentures with inner telescopic copings which can be cemented as individual tooth removable telescopic prosthesis, which included 8 outer telescopic crowns and 3 pontics was then cemented to the inner copings. Aditi patel and his colleagues in 2014 (Aditi Patel, 2014), made mandibular telescopic overlay denture with telescopic coping and crown on the third molars. Crown is fabricated along with cast partial frame work that extends anteriorly on to the ridge above with acrylic teeth are set along with acrylic denture base. Dogu Omur Dede (Dogu Ömür Dede, 2015) and his colleagues in 2015 designed telescopic crowns and overdenture prosthesis for the lower jaw and implant supported fixed partial denture. Four primary copings, two on each side were made and then secondary copings were made along with individual cast frame work without joining the frame work with the remaining copings, later acrylic teeth are set along with acrylic denture base.

Case presentation

This clinical report utilizes double crown system with parallel milled surfaces for fabricating a telescopic hybrid denture on mandibular arch, while maxillary arch is rehabilitated using fixed prosthesis of metal ceramic crowns. A 45 year old male patient reported with a chief complaint of missing teeth causing inability to masticate food and difficulty in speech. He wanted replacement of missing teeth so that the function can be restored. On examination the following findings were seen — the teeth were periodontally sound, with no evidence of clinical mobility. There was sufficient interarch space for the copings, the denture base and the teeth arrangement. Multiple missing teeth in relation to 18, 17, 16, 26, 27, 28, 38, 35, 34, 32, 31, 41, 42, 44 and there is generalized mild attrition. Pre treatment clinical examination was performed which included a thorough medical and dental history, radiographic evaluation. The clinical findings were suggested to be appropriate for fabrication of a mandibular telescopic denture using shortened dental arch concept. Before proceeding with the rehabilitation of the mandibular arch, the maxillary arch was restored with multiple metal ceramic restorations for establishing occlusal plane and maintaining existing vertical dimension. In mandibular arch intentional root canal treatment was carried out for the abutments except 37 and prepared with a heavy chamfer finish line for the primary coping.

Fig. 1. Frontal view

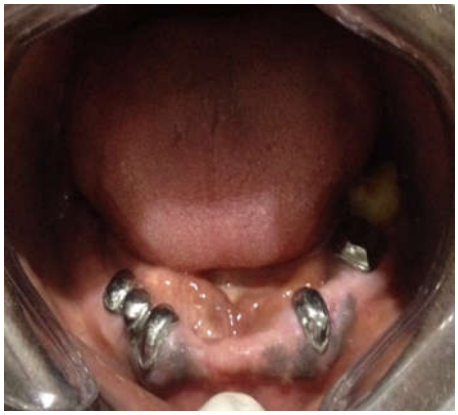

Fig. 2. Cemented primary copings

The abutments were prepared with tapered walls (2-5 degree) except 37. After the preparation of the abutments, the impression was made using poly vinyl siloxane impression material. The impression was poured in type 4 dental stone to obtain the cast, on which the primary copings were fabricated. The primary copings were milled to achieve accurate parallelism among the abutments.

Fig. 3. Telescopic metal ceramic crowns with pontics

Fig. 4. Pick up impression of the telescopic framework

Fig. 5. Telescopic Metal Ceramic Crowns with Pontics (Intra Oral)

The primary copings were also prepared to accommodate a chamfer finish line over which the secondary copings could sustain. The fit of the primary coping was evaluated in the patient's mouth and they were cemented with the help of Type 1 glass Ionomer cement. A pick up impression of the primary copings was made to obtain a cast. Over this cast, a metal framework connecting all the abutment teeth with pontics in 35, 34, 32, 31, 41 and 42 was fabricated and tried in the patient's mouth. Another pick up impression was made with irreversible hydrocolloid impression material to obtain a cast. Maxillo mandibular records were obtained with the record

bases and the occlusion rims and these were transferred to a semi adjustable articulator.

Fig. 6. Maxillary metal ceramic restoration

Fig. 7. Maximum Intercuspation

Fig. 8. Completed mandibular telescopic dentures

Fig. 9. Final prosthesis in maximum intercuspation

At the established vertical dimension, the telescopic fenestrated denture with metal ceramic bridge framework and denture base was fabricated. The fit was evaluated and necessary occlusal corrections were done in the patient's mouth. The patient was scheduled for follow-up visits and reported with no further complaints.

DISCUSSION

Total or partial edentulism leads to impairment of oral function, facial appearance and psychological conditions[12]. The prosthetic consideration for treatment of an edentulous patient is a complex situation, as several treatment options should be developed to solve this problem[11]. Fabrication of complete denture results in the removal of remaining teeth, offers less retention and more amount of bone loss. While rehabilitating with removable prosthesis although preservation of the remaining teeth is achieved it needs periodontally strong teeth. To overcome these conditions, telescopic dentures can be considered as a cost effective treatment modality with uncompromised patient satisfaction. Fabrication of telescopic denture was made by using double crowns in the present case. The advantages of these double crowns are (i) provides good retention as these double crowns exhibit constant friction between the parallel-sided surfaces of the inner and outer crowns during the entire process of insertion and removal. The friction force, arising when the secondary part is moving against the primary part of the latch, is called the slide friction (Tomasz Dabrowa, 2011). (ii) facilitate fabrication of metal ceramic or metal crowns or bridges that can with stand the occlusal forces and transmits less forces to underlying bone whereby helps in the decrease in degree of bone resorption and (iii) these system of telescopic denture looks more over like a fixed partial denture which exhibit better esthetics. Moreover in previous studies these double crown systems were used in fabrication of tooth supported telescopic denture, where as in the present case both tooth and tissue supported hybrid telescopic denture were fabricated. As hybrid prosthesis uses support from both tooth and surrounding tissues the forces are transmitted over a larger area which leads to decrease in the force absorbed per unit area leads to decrease in the bone resorption.

When the surfaces of telescopes cooperate, the polished surface of internal crown comes in contact with internal surface of metal-ceramic external crown. The actual contact area is a sum of contact surfaces within micro irregularities of materials, which undergo plastic strain, according to the pressure occurring in the contact area. As the friction surfaces approach the molecular level, strong adhesive interactions arise. The presence of saliva, which enhances the adhesive effect, has an additional positive influence, as it protects both surfaces of the crowns against excessive material loss and tooth from heat liberated from frictional force (Tomasz Dabrowa, 2011). The amount of inter surface friction depends on the configuration of the taper angle and the area of the surface contact (Mayank shah, 2013). The clinical factors that are to be considered in the fabrication of telescopic denture are interarch space, number of abutment teeth, position of abutment teeth, periodontal status of the abutment teeth and vitality of the abutment teeth. The interarch distance should be $\geq$ 10 mm above the prepared teeth, in order to have sufficient space for the copings, denture base, teeth placement and adequate freeway space. For fabrication of hybrid telescopic prosthesis fabricated in the present case there should be at least two healthy abutment in each sextant and they should be evenly distributed for better stress distribution and for

increased retention and stability of the prosthesis. The path of insertion and the amount of retention of the prosthesis is determined by the contours and the degree of taper of the outer aspect of the primary coping. Minimal taper of 5 degrees and a height of about 4mm are required to achieve a significant amount of retention. Thickness not less than 0.7mm is required for a coping to withstand mechanical load (Langer, 2015). The telescopic dentures fabricated in the present case provide better retention, stability, support esthetics and decreases the rate of residual ridge resorption when compared to that of conventional dentures and also to that of other type of telescopic dentures. As the copings are held in tenso-friction they help to retain the denture in the mouth against various functional and parafunctional forces.

As the denture bases covers wide area it will tends to aid in stability of the denture to horizontal forces. Secondary copings of the denture provide good support by limiting tissue ward movement of the denture. Metal ceramic crowns fabricated in the present case provide good esthetics in comparision to conventional acrylic teeth used in the other types of telescopic denture. Finally, there is a decrease the rate of residual ridge resorption because of proprioception, better stress distribution and the transfer of compressive forces into tensile forces by the periodontal ligament, which effect bone remodelling. Besides many advantages discussed above increased cost, complex laboratory procedures, extensive tooth reduction required, increased number of dental appointments, difficulty in achieving esthetics, retention diminishes after repeated insertion/separation cycles and readjustment of retentive forces is difficult are considered as disadvantages of telescopic dentures.

Summary

Tooth-supported, removable over dentures with telescopic metal ceramic crowns may be considered as a good alternative to conventional telescopic denture with acrylic teeth because they provide good aesthetics besides preservation of bone, providing retention, stability and support to the denture.

REFERENCES

Aditi Patel, Ravi Sureja, Sucheta Bector, J. R. Patel, Rajesh Sethuraman, Naveen Y.G. Telescopic overlay denture- a preventive approach for minimizing the conventional complete denture problems: a case report: *EJDTR*, 2014:3 (1):187-191.

Dogu Ömür Dede, M. Cenk DurmuGlar, Onur FahJn, AyGegül KöroLlu, and Özer EGJsaL. Telescopic Overdenture and Implant Supported Fixed Partial Denture: A Pragmatic Treatment Approach. Case Reports in Dentistry: Volume 2015:1-7.

Gungor MA, Artunç C, Sonugelen M. Parameters affecting retentive force of conus crowns. *J Oral Rehabil*. 2004; 31:271–7.

Langer A. Telescopic retainers for removable partial dentures. *J Prosthet Dent.* 1981; 45:37–43.

Laufer.B.Z & Gross. M. Splinting osseointegrated implants and natural teeth in rehabiltation of partially edentulous patients. Part II: principles and applications. *J Oral Rehabil* 1998 Jan; Vol. 25 (1), pp. 69-80.

Mayank shah. Telescopic denture: A Case Report. *Journal of dental sciences & oral rehabilitation* 2013; july-september, pp. 47-50.

Abraham, P. A., P. Koka, K.Murugesan, and M. Vasanthakumar, "Telescopic overdenture supported by a combination of tooth and an implant: a clinical report," *Journal of Indian Prosthodontist Society,* 2010, vol. 10, no. 4, pp. 230–233.

Singh K, Gupta N. Telescopic denture: A treatment modality for minimizing the conventional removable complete denture problems: A case report. *J Clin Diagn Res* 2012;6:1-5.

Tomasz Dabrowa, Anna Dobrowolska and Wojciech Wieleba. The role of friction in the mechanism of retaining the partial removable dentures with double crown system. Acta of Bioengineering and Biomechanics Vol. 15, No. 4, 2011.

Tushar Vitthalrao Bhagat, Ashwini Nareshchandra Walke. Telescopic Partial Dentures-Concealed Technology. *Journal of International Oral Health* 2015; 7(9):143-147.

Vijay Prakash, Hari Parkash, Ruchi Gupta. Fixed removable prosthesis employing Marburg double crown system. The Journal of Indian Prosthodontic Society. March 2008: Vol 8: Issue 1:59-62.

Weaver JD. Telescopic copings in restorative dentistry. *J Prosthet Dent.* 1989; 61:429–33.

Wenz HJ, Hertrampf K, Lehmann KM. Clinical longevity of removable partial dentures retained by telescopic crowns: Outcome of the double crown with clearance fit. *Int J Prosthodont* 2001; 14(3):207-13.

Wenz HJ, Lehmann KM. A telescopic crown concept for the restoration of the partially edentulous arch: The Marburg double crown system. *Int J Prosthodont.* 1998; 11:541–50.

Yair Langer and Anselm Langer. Tooth-supported telescopic prostheses in compromised dentitions: A clinical report: *Journal of prosthetic dentistry* 2000: volume 84: number 2:129-132.

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