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MAXILLARY TELESCOPIC OVERDENTURE AND MANDIBULAR BAR OVERDENTURE

Dr.Rajeev Singh
Professor & PG Guide , Department of Prosthodontics, D.Y. Patil Deemed to be University School of Dentistry, Navi Mumbai

Dr. Rubina Tabassum
Professor & PG Guide, Department of Prosthodontics, D.Y. Patil Deemed to be University School of Dentistry, Navi Mumbai

Dr. Ankita Chitnis
Lecturer, Department of Prosthodontics, D.Y. Patil Deemed to be University School of Dentistry, Navi Mumbai

Dr.Simran Moorjani
PostGraduate Student, Department of Prosthodontics, D.Y. Patil Deemed to be University School of Dentistry, Navi Mumbai

Dr. Harsheeta Motwani
PostGraduate Student, Department of Prosthodontics, D.Y. Patil Deemed to be University School of Dentistry, Navi Mumbai

Dr. Simral Mathews
PostGraduate Student, Department of Prosthodontics, D.Y. Patil Deemed to be University School of Dentistry, Navi Mumbai

The goal of the article is to understand the importance of saving remaining natural teeth and fabricating telescopic dentures which also prevents residual ridge resorption and is an alternative for complete denture fabrication. Telescopic overdentures or double crowns were introduced in the 20 th century and have been an integral part of removable prosthodontics since then. Overdentures have many advantages like better stability, retention, prevents residual ridge resorption, etc. Telescopic overdentures show good retention, stability, improved chewing efficacy and comfort of the patient.
Keywords: Telescopic, overdenture, double crown, primary coping, secondary coping.

INTRODUCTION-

Teeth are most commonly lost due to caries, periodontal disease or trauma[1]. It is important to preserve what is already present, hence, preservation of the remaining natural teeth is of utmost importance. When few teeth are remaining, the treatment plan could be implants, conventional fixed prosthesis or tooth or tissue supported dentures.[2] Implants are often expensive and depending on the quality of bone may or may not require bone grafting. Dentures often are unsatisfactory because of the lack of retention or soft tissue coverage. In some cases, there are not enough abutments to support a fixed prosthesis.Telescopic dentures, thus help to overcome all these challenges and is thus an excellent alternative.[3] According

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to GPT, a telescopic denture is also called as an overdenture, which is defined as any removable dental prosthesis that covers and rests on one or more of the remaining natural teeth, on the roots of the natural teeth, and/or on the dental implants.[4] Miller (1958), one of the first dentists to use overdentures, stated that the maxillae and mandible were designed to house teeth and not to support artificial dentures. He believed that no support for occlusal forces was as adequate as the roots of natural teeth[5] The concept of telescopic crown was derived from the optical microscope which works on the principle of movement between two parallel cylinders.In telescopic dentures, there is a primary and secondary coping. The primary coping is cemented to the abutments and the secondary copings are attached to the prosthesis that fit on the primary coping. [5] They transfer forces along the long axes of the abutment and thus prevent dislodgement of the denture as well as retention and support . It is also called overlay denture, overlay prosthesis and superimposed prosthesis.[6] Telescopic crowns were introduced in the 20th century. They are also known as double crowns, a crown and sleeve coping or Konuskrone, a German term that described a cone shaped design. [2]

CASE REPORT:

A 57 year old female patient reported to the Department of Prosthodontics, Crown and Bridge,Dr D.Y. Patil University , School of Dentistry, Navi Mumbai with a chief complaint of replacement of missing teeth and difficulty in eating(FIG 1).

On intraoral examination only 22,23,24,25, 33,34,42 and 43 were present. No mobility of the teeth was seen. The edentulous area had a favourable ridge with well keratinized mucosa that was firmly attached(FIG 2).Radiographic examination of the teeth revealed that all the teeth present had good bone support.

Prosthetic Management-

All the treatment options were discussed with the patient including implants, fixed partial dentures and conventional removable prosthesis. The patient was interested in preserving the remaining natural teeth and desired minimal tissue coverage from the prosthesis. After careful consideration of all the factors involved it was deemed advisable to go for a Maxillary Telescopic Overdenture and Mandibular bar Overdenture.

Primary impressions of the maxillary and mandibular arch were made with irreversible hydrocolloid impression material (Zhermack Tropicalgin). Diagnostic casts were then poured in Type IIIGypsum (Kalabhai Kalrock).

Temporary denture bases and occlusal rims were fabricated for the maxillary and mandibular arch. The occlusal rims are used to determine the vertical dimension of occlusion and occlusal plane, prior to tooth preparation. The vertical dimension is 12mm, hence, telescopic overdenture was chosen.

In the maxillary and mandibular arch,tooth preparation was done with post space preparation to 7mm to receive the primary copings with radicular extensions as the crown height was less than 4mm and were filled with Glass Ionomer cement and submerged as it was periodontally compromised(FIG 3). The occlusal rims acted as a guide for tooth preparation. After preparation of the abutments, an impression was made using

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polyvinyl siloxane elastomeric impression material(putty and light body)(Zhermack Zetaplus) using two step technique(FIG 4).Primary copings were fabricated in cobalt-chromium alloy (Deloro Stellite Company) and was fabricated on the master cast. The fit of the copings were evaluated in the patient's mouth, copings splinted with a bar were fabricated and then cemented using glass ionomer cement(GC Gold Label Glass Ionomer Luting and Lining Cement)(FIG 5).

Fabrication of the mandibular metal framework was done on the master cast followed by border moulding and secondary impression(FIG 6). The metal framework consisted of the secondary copings which were then tried and evaluated in the patient's mouth.

Maxillomandibular relation was recorded with wax occlusal rims on temporary denture bases fabricated on the maxillary and mandibular metal framework and mounted(FIG 7,8).

Acrylic teeth arrangement was completed and try-in was done(FIG 9). After evaluating phonetics,occlusion and esthetics, the final processing of the prosthesis was done.

The prosthesis was polished and assessed for retention and stability in the patient's mouth(FIG 10).Occlusion was assessed(FIG 11).

Post placement instructions were given and recall was done after 24 hours,1 week and 1 month. The patient was pleased with the esthetics, phonetics and was able to chew efficiently. The patient was instructed to attend recall visits every 6 months.

DISCUSSION-

A telescopic overdenture was chosen as a favourable treatment option as it provides minimal tissue coverage and better distribution of forces. Considering the age of the patient and cost factor, telescopic overdentures were chosen as an acceptable treatment option as opposed to implants, conventional fixed partial dentures and conventional removable prosthesis. Owal et al found that 25% of RPDs fabricated were discarded during the first year because of unacceptable retention and stability of the prosthesis.[7] This lack of retention and stability occurs because the residual alveolar ridge undergoes resorption in all directions following tooth loss. [8] This resorption is rapid, progressive and irreversible especially immediately after extraction and it has been observed and documented in literature.[3] It has also been observed that bone is maintained around remaining natural teeth and implants. Since overdenture prosthesis helps to preserve the remaining natural teeth, it also helps to maintain the alveolar ridge.[2] Robert J. Krum conducted a study to determine the amount of vertical residual bone loss in the anterior part of the maxillae and mandible in two groups of patients: One with maxillary and mandibular overdentures and the other group with complete maxillary and mandibular conventional dentures. It was concluded that patients treated with maxillary and mandibular overdentures demonstrated less vertical alveolar bone reduction than patients with complete maxillary and mandibular conventional dentures.[3] Longitudinal follow-up studies of 5-10 years report that conical crown-retained partial dentures have a lower failure rate compared to those retained with clasps or precision attachments.[8] Teeth which are not ideal to serve as abutments for a fixed partial denture prosthesis can be used for overdentures. The help in tensile stimulation of the oblique periodontal fibres which leads to

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more bundle bone deposition. Telescopic prosthesis are indicated for patients with multiple abutments distributed bilaterally along the dental arch.

The abutment teeth provide additional support to that supplied by the residual ridges. Stability is enhanced by the vertical component of the retained tooth/root. Proprioception through the periodontal fibres, gives a sense of touch and pressure, which is less with conventional complete dentures.[9]

The double crown systems are differentiated from each other by their different retention mechanisms. There are three different types of double crown systems which are, telescopic crowns which achieves retention using friction, and conical crowns or tapered telescope crowns which have friction only when they are completely seated by using a "wedging effect." The double crown with a clearance fit (also referred to as a hybrid telescope or a hybrid double crown) shows no friction or wedging during its insertion or removal. Here retention is achieved using additional attachments.

In telescopic overdentures there is a primary coping which is cemented directly onto the natural tooth structure and a secondary coping which is detachable and is rigidly connected to the detachable prosthesis.[3] Copings protect the natural teeth from caries, thermal irritation,chemical irritants, etc and also provide retention and stability of the secondary crown. The secondary crown thus encompasses the primary crown and forms a telescopic unit. Tapering of the coping walls is done which generates compressive interfacial surface tension based on wedging action. The smaller the degree of the taper or the convergence angle, the greater is the frictional retention of the retainer. The average wall taper is 6^0 . The copings are milled to exact configurations of taper angles of the walls with each other to create a common path of insertion for outer telescopic crowns of a retrievable superstructure. In cases with shorter clinical crowns, the walls should be kept parallel or the taper should be reduced (2^0 -5^0)to improve the retention. The taper of the walls of the primary coping can be adjusted to a predetermined angle.[3]

Retention and stability of the denture is related to the number and distribution of the abutments along the arch as well as the taper of the wall of the primary coping. These crowns are an effective means for retaining the RPDs and dentures as they transfer forces along the long axis of the abutment teeth and provide guidance, support and protection from the movements that dislodge the denture.

The primary advantage of a telescopic prosthesis is its retrievability. A telescopic prosthesis is a more versatile alternative for patients because the prosthesis can be repaired without reconstruction of the entire superstructure. Precautions to prevent damage to the denture during cleaning should be given to the patient because distortion of an outer telescopic crown can lead to reduction in the retention of the prosthesis. Telescopic dentures also promote oral hygiene and periodontal health because the abutments are more accessible for oral hygiene.[10,11]

Drawbacks of the telescopic overdentures are as follows:[12]

1. Denture hygiene of a high standard is necessary.
2. Overdentures are more costly than conventional complete dentures

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3. The abutment roots must possess a sufficiently good prognosis.
4. Overdentures are bulkier.
5. The retention and the stability of the telescopic denture are affected if the number of abutments along the dental arch are inadequate.

CONCLUSION-

Although there are increased costs and appointments associated with this technique, telescopic overdentures have proven to be a better alternative as compared to the conventional complete denture. Tooth supported removable overdentures with telescopic crowns provide better retention, stability, support, stable occlusion and proprioception which increases chewing efficiency, phonetics and also provides psychological satisfaction to the patients due to preservation of teeth. It also decreases the rate of residual ridge resorption which minimises the downward and forward settling of the denture. Now even though there is an increased use of implants for overdenture therapy, tooth/root supported telescopic overdenture still is an excellent treatment modality.

FIG 1- Pre-operative Extraoral photograph

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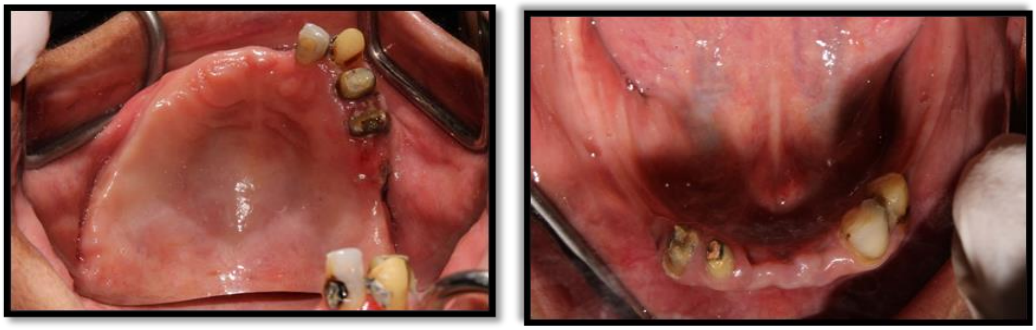

FIG 2-Pre-operative Intraoral photographs

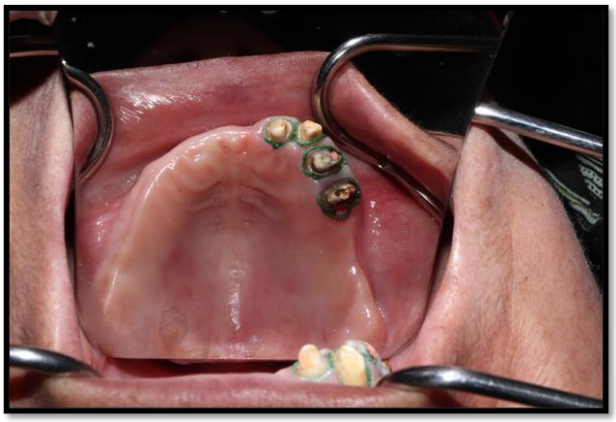

FIG 3- Tooth Preparation

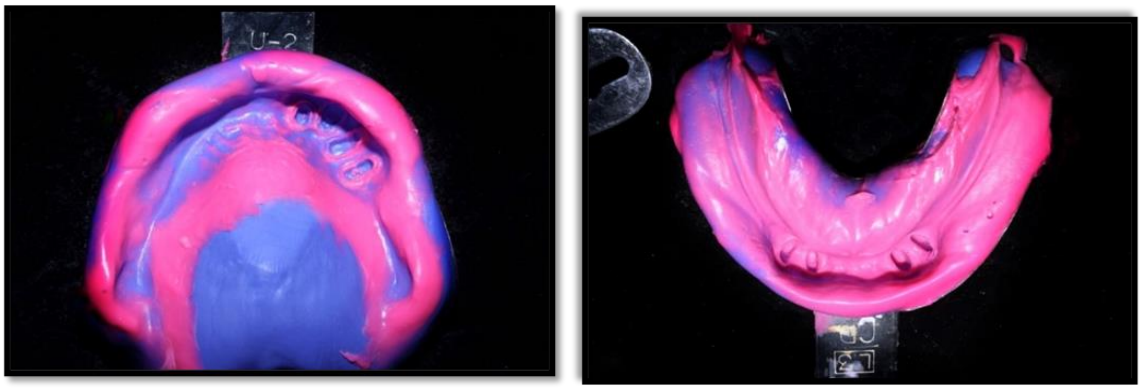

FIG 4-Impression after tooth Preparation

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FIG 5-Primary Copings Cemented

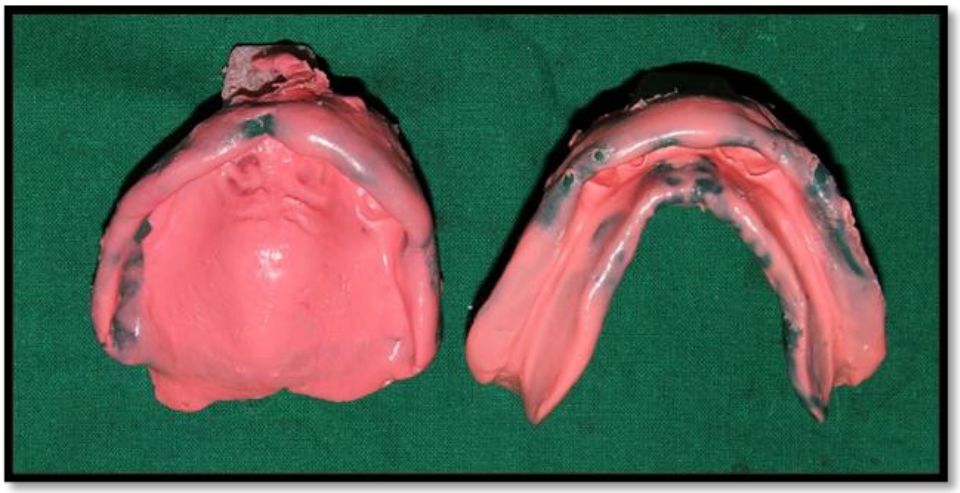

FIG 6-Final Impression

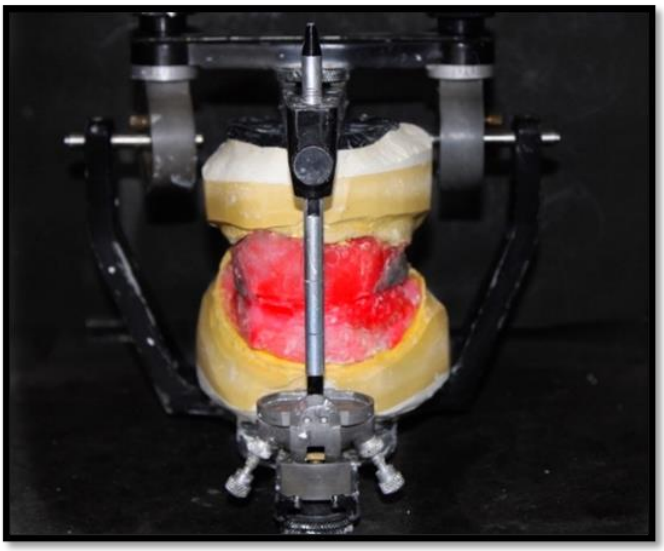

FIG 7-Facebow Record and Mounting

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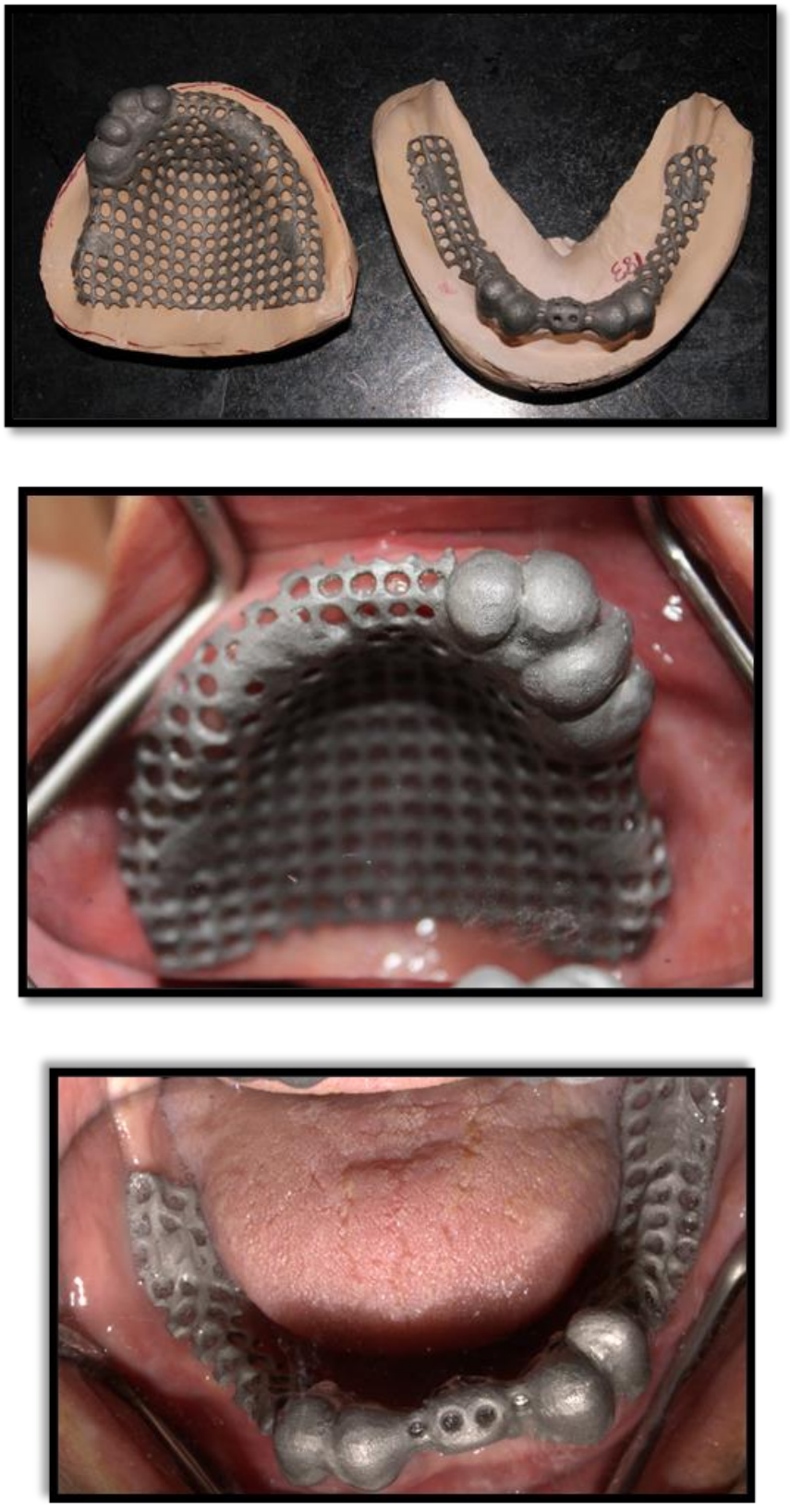

FIG 8-Upper and lower secondary copings with framework trial

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FIG 9-Lower PFM crowns cemented and trial setting done

FIG 10-Final Prosthesis

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FIG 11- Before and After

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