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Telescopic Overdenture an approach to Preventive Prosthodontics: A Case Report

Abstract

Presence of healthy periodontal ligament helps to maintain alveolar ridge morphology and alveolar bone exists as a support for teeth. Hence approach of treatment or treatment planning in prosthodontics is always directed towards retaining as many teeth as possible. It is the overdenture, a complete or partial denture prosthesis constructed over existing teeth or root structure. This case is an approach to save the present teeth as well as to overcome some of the disadvantages that occur in conventional overdentures. It is also a simple technique in which there is no requirement for expensive and extensive attachments.

Key Words

Overdenture; thimble coping; outer crown; inner crown

Dubey PK[1], Sethuraman Rajesh[2], Vaishno D[3]

[1]Consultant Prosthodontist, The Dental Evolution, Varanasi, Uttar Pradesh, India
[2]Professor, Department of Prosthodontics, KM Shah Dental College, Vadodara, Gujarat, India
[3]Consultant Prosthodontist, Junagarh, Gujarat, India

INTRODUCTION

Preventive prosthodontics emphasizes the importance of any procedure that can delay or eliminate future prosthodontics problems. The overdenture is a logical method for the dentist to use in preventive prosthodontics.[1] The loss of teeth, especially mandibular teeth, frequently leads to resorption of bone, decline in patient's neuromuscular function, and decrease in proprioceptive response.[3] Presence of healthy periodontal ligament helps to maintain alveolar ridge morphology and alveolar bone exists as a support for teeth. Hence approach of treatment or treatment planning in prosthodontics is always directed towards retaining as many teeth as possible.[5]

The Rationale of Telescopic Denture

The overdenture, a complete or partial denture prosthesis constructed over existing teeth or root structure, is not a new concept in technical approach to prosthodontic problems.[1,2] For several decades, these most useful restorations have maintained their prominence in the prosthodontist's armamentarium. The versatility offered by this approach allows optimum utilization of scattered or irregularly positioned natural abutments, while leaving the degree of retention and support obtained in the hands of the operator. The apparent simplicity and attraction of the approach is obvious but the thimble coping must occupy appreciable vertical and buccolingual space. Furthermore, the contours of the outer aspects of the thimble effectively determine the path of insertion of the denture. Other design requirements are the need to cover the thimble with an adequate thickness of denture base material to prevent breakages, while at the same time providing an acceptable appearance.[2]

The factors contributing for the retention and stability of telescopic dentures

Space considerations normally dictate devitalization of anterior abutments. Nowadays it is appreciated that not just anterior teeth but premolar abutments as well may require devitalization together with the occasional molar where vertical space is restricted. The retention obtained for the overdenture will vary inversely with the taper of the coping, while the adaptation of the denture base to the coping will influence stability as well. Even copings of minimal taper (approximately 5 degrees) require a height of about 4 mm if significant retention is to be provided so that careful space and alignment assessment is essential.[2] Preparation of the abutment teeth is a task that is all too easily underestimated. There is a common misconception that as the inner coping will be produced in the laboratory, misalignments of preparations can be accommodated at this point. This overlooks the vital aspect of bulk.[4] Abutments for telescopic prostheses will be covered by two layers of metal while facial surfaces may require facings as well. All this requires extensive preparation and planning, as a poorly executed abutment preparation is one of the most common mistakes to make. The results of such errors are thin inner copings that become perforated after a period

of use, together with a bulky and unsightly removable prosthesis.[4] Occlusal reduction of 2-3mm is the minimal requirement, while this type of reduction in the axial walls is more difficult to achieve. Nevertheless, inadequate abutment preparation is one of the more common errors made and leads to a bulky prosthesis or failure of castings. The problem becomes accentuated when one or more of the abutments is inclined. It can now be understood why diagnostic casts are invaluable in planning this approach. If in doubt, an alginate impression can be made of the outlined preparations. Surveying the cast of this impression will speedily illustrate further reductions or modifications required.[4]

Other Considerations

In surveying the master cast, the soft tissue contours need to be taken into account, as these will influence the path of insertion of the denture and, indirectly the preparation of the teeth. Although height and size of the inner coping must influence retention, the principal factor for retention appears to be its taper, assuming that the outer casting is accurately adapted.[4] The literature demonstrates ample evidence of the marked reduction in retention that occurs once the taper increases beyond about 6 degrees. Indeed, if the convergence angle of the axial walls is 6 degrees or less, a significant amount of retention can be provided. Unfortunately, truly parallel sided copings are difficult to produce and almost impossible for the patient to use, as finding the correct path of insertion when inserting the removable prosthesis would require a remarkable degree of tactile discrimination. If virtually parallel sided copings to the coping can be produced, then a chamfer is required at the occlusal edge to facilitate insertion of the removable section. The chamfer will also prevent the prosthesis jamming during efforts at re-insertion. Such mishaps are likely to speed up wear of the copings and might result in damage to the removable section as well. Generally speaking, anterior and premolar teeth will need to be devitalized to allow for the tooth reduction required, while some molar abutments can be left vital. Where extensive secondary dentine has been deposited, it may be tempting not to root fill anterior abutments: in fact, it may be virtually impossible to do so in some instances.[4] Support is naturally a key factor in the design. The operator is enabled to vary load distribution between teeth and mucosa by means of base extension, coping design and impression techniques. Isolated abutments can also be employed and, in the event of tooth loss, additions can be made to the restoration.[4] Jaw relation recording methods are no different from other overdentures but the consequences of error are greater, particularly if both layers of metal work have been completed before the error is discovered.[4] The removable section of the prosthesis requires equal care in its planning. Since it is removable, it requires sufficient strength to withstand handling by the patient and the inevitable minor mishaps that occur. The outer crowns require connection to each other by the major connector or another rigid component. These outer crowns cannot simply be buried in acrylic resin, due to processing changes that occur.[4]

The metal Controversy

In days gone by, there was controversy over using different metals for inner and outer layers of the crowns. The main fears were excessive wear and of galvanic action. While most technicians would agree that working with two layers of type 3 or 4 yellow gold is the ideal way to produce two perfectly adapted surfaces, it is not absolutely essential.[4] Platinised gold can be used for the outer layer if porcelain is to be fused to it, although any flexing would result in cracking of the porcelain. Chrome cobalt alloy can be used; the most difficult yet important aspect is to produce well adapted surfaces. Any high spots are likely to result in wear of the underlying gold coping. Additional retentive features such as plunger type attachments may be incorporated, but the bulk of the attachment system has to be accommodated. The prosthesis has to be designed to allow for spring changing and other maintenance requirements. For a long service life, the essential requirements of the telescopic prosthesis are to provide adequate height of vertical walls (at least 4mm), sufficient bulk of material (never less than 0.7mm for each casting), and a taper of around 6 degrees.

CASE REPORT

A 67 year old male patient named Ramanbhai came to the department of Prosthodontics and Crown and Bridge with the chief complaint of difficulty in chewing. On introral examination the teeth present were 11, 12, 13, 21, 33, 34, 35, 43, 44, and 45. The teeth were firm with severe attrision in relation to 13. Attrision was moderate with rest of the teeth. The edentulous span had favorable ridge with firmly attached keratinized mucosa. Bony undercuts were found in relation to all teeth present. All muscle and frenal attachments were favorable. Mucosa over

Fig. 1: Intra oral examination

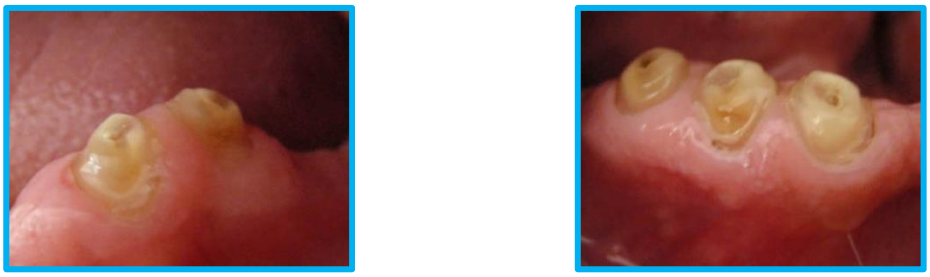

Fig. 2: Endodontic treatment of teeth

Fig. 3: Metal copings / Copings cemented

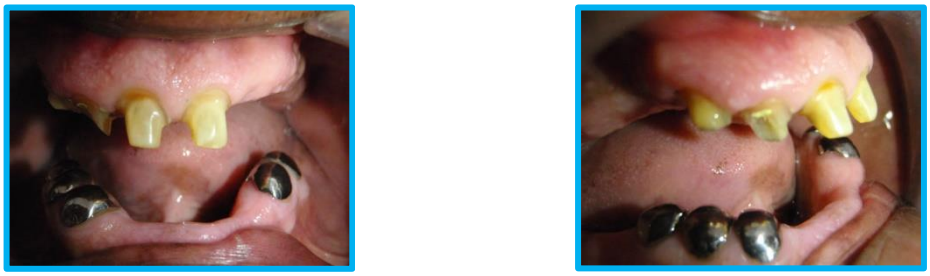

Fig. 4: Preparation of maxillary teeth for thimbles

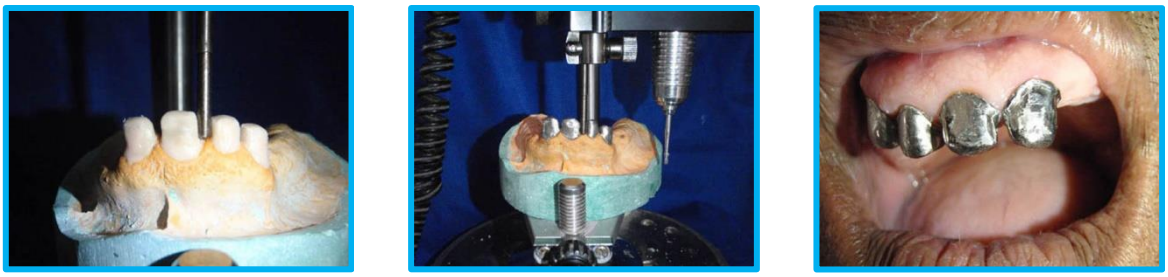

Fig. 5: Thimbles preparation and placement in mouth

cheek and soft palate had no pathoses. Interarch space was madorate. Ridge relation was class I according to angle's classification. On extraoral examination – no facial asymmetry was found. Profile was straight. Nothing significant was found in relation on TMJ examination.

1) Diagnosis and Treatment Planning

The case was diagnosed as partially edentulous maxillary and mandibular arches. Diagnostic impressions were made. Diagnostic mounting was done to evaluate inter arch space, bony undercuts, alignment of teeth. With this in mind, a telescopic overenture was planned with maxillary arch. For

Fig. 6: metal frame work

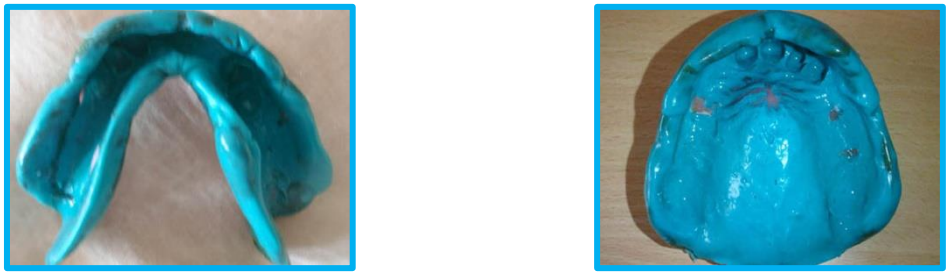

Fig. 7: Final Impression

Fig. 8: Altered cast technique

Fig. 9: Final Try-in

Fig. 9: Denture insertion

mandibular arch overdenture with short copings and post was decided.

2) Endodontic considerations

All teeth were endodontically treated. Root canal was filled with gutta purcha. Amalgam restoration was given as permanent restoration. The patient was evaluated after 2 weeks. After 4 weeks of observation, further prosthodontics treatment was followed.

3) Teeth preparation and cementation of copings

4) *A) Mandibular arch*

Mandibular teeth were reduced with 2-3 mm of teeth above gingival crest. The gutta purcha of 4 mm was removed from the canal, the canal was prepared for post. Direct technique for post impression was used. Self cure acrylic resin was used for making impression of canal, the pattern was cast in nickel chromium alloy, the copings were finished, polished and cemented on teeth.

B) Maxillary arch:

The teeth were prepared to the height of 4 mm. all abutment were prepared with 6-10* of taper. All teeth were kept parallel to each other.

I) Thimble preparation over the the teeth in the maxillary arch

Wax pattern for thimble was made for maxillary abutments. The parallelism of patterns was checked on dental surveyor. The wax patterns were cast in nickel-chromium alloy. The castings were finished and polished and rechecked for parallelism on dental surveyor. The thimbles were cemented on abutments.

5) Preparation of metal framework

An alginate impression of maxillary arch was made. It was poured in type IV stone. All undercuts were blocked and spacer wax was placed on the ridge crest areas. The cast was duplicated in agar. A refractory cast was obtained. On the refractory cast, wax pattern for metal copings were made. To these Copings, the pattern for maxillary metal framework was attached. The whole assembly was invested and

cast in cobalt-chromium alloy. The metal framework was finished and polished. Ceramic build up was done on maxillary copings. The framework with anterior ceramic build up was tried in patient for proper fit anterior reference plane, esthetics and phonetics .

6) Primary impressions (with copings in place)

An alginate impression was made if both maxillary and mandibular arches with copings in place after cementation was made.Impression was poured in type IV stone.

7) Final impression

Mandibular arch: Special tray was made on mandibular primary cast. Border molding was done with low fusing compound and final impression was made in addition silicone light body impression material. Final cast was poured in type III stone.

Maxillary arch:

Special tray was made on metal frame work. Border molding was done with low fusing compound and final impression of edentulous region was made in addition silicone lightbody impression material. The final cast was poured using altered cast technique.

8) Jaw relation, Teeth arrangement and final try-in

Temporary record bases were made on maxillary and mandibular casts. Occlusal rims were fabricated. Jaw records were made in usual manner. The maxillary anterior occlusal plane was kept to the height of plane determined by anterior ceramic crowns. The jaw records were mounted on articulator. Acrylic heat cured cross-linked teeth were arranged. Final trial was made.

9) Processing of denture and Insertion of denture::

The dentures were fabricated using heat cured acrylic resin. Finishing and polishing was done and the dentures were delivered.

CONCLUSION

The telescopic approach still remains a most valuable restorative method. To obtain best results, the operator requires a clear idea of the end result before tooth preparation is begun and the use of mounted diagnostic casts is invaluable

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