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Niraja Jaiswal
Department of Prosthodontics,
Govt. Dental College and
Hospital, P'D Mello Road,
CST, Mumbai, Maharashtra,
India

Jyoti Tembhurne
Department of Prosthodontics,
Govt. Dental College and
Hospital, P'D Mello Road,
CST, Mumbai, Maharashtra,
India

Arti Gangurde
Department of Prosthodontics,
Govt. Dental College and
Hospital, P'D Mello Road,
CST, Mumbai, Maharashtra,
India

Manish Chauhan
Department of Prosthodontics,
Govt. Dental College and
Hospital, P'D Mello Road,
CST, Mumbai, Maharashtra,
India

Corresponding Author:
Niraja Jaiswal
Department of Prosthodontics,
Govt. Dental College and
Hospital, P'D Mello Road,
CST, Mumbai, Maharashtra,
India

Conservative management of tilted abutment: A case report

Niraja Jaiswal, Jyoti Tembhurne, Arti Gangurde and Manish Chauhan

Abstract

A common problem that occurs with some frequency is the mandibular molar abutment that has tilted mesially into the space formerly occupied by the lost natural teeth anterior to it. It is impossible to prepare the abutment teeth for a fixed partial denture along the long axes of the respective teeth and achieve common path of insertion. Management of tilted teeth can be done either orthodontically or by prosthetic means. This case report describes the use of proximal half-crown as a retainer of choice on tilted mandibular second molar to restore function and esthetic with fixed partial denture.

Keywords: Tilted abutment, questionable abutment, proximal half crown, tilted molar

1. Introduction

The most common questionable abutment observed by the dentist is the tilted tooth^[1], which is to be considered as a prospective abutment for the fixed prosthesis. It has been suggested that the long axis of the prospective abutments should converge by no more than 25 to 30 degrees^[2]. When the distal abutment is severely tilted, it is nearly impossible to prepare the mesial wall parallel to the anterior abutment without endangering the pulp. The most common reason for tilted teeth is the adjacent and opposing edentulous spaces which lead to mesial migration of the distal tooth^[3]. Such teeth cause food impaction, improper maintenance of oral hygiene, dental caries, periodontal problem and unstable occlusion^[4]. Therefore it is advisable to initiate the treatment as early as possible to maintain arch integrity and a stable occlusion.

If the problem is slight, it can be remedied by restoring or recontouring the mesial surface of tilted abutment. If the tilting is severe, it is impossible to prepare abutment teeth for a fixed partial denture along the long axis of the respective teeth and achieve common path of insertion. In such situations more extensive corrective measures are called for^[5]. The treatment of choice is the orthodontic uprighting of the abutment tooth^[6]. The other treatment measures for tilted abutment include proximal half crown, telescopic crown and the use of non-rigid connector. Of these, proximal half-crown is the simplest and conservative treatment modality which can be used as a retainer on distal abutment^[7]. This preparation design is simply a three quarter crown that has been rotated 90 degrees so that the distal rather than the buccal surface is left intact. This retainer can be used only if the distal surface is unblemished and the patient has a low caries index. This clinical report describes the use of proximal half-crown as a retainer of choice on distal abutment for restoring missing mandibular molar.

2. Clinical report

A 40 year old male patient reported with the chief complaint of missing lower left back tooth. Intraoral examination revealed missing 36 (Fig 1). The mesial abutment (35) was caries free, periodontally sound and vertically aligned. However, the distal abutment (37) was drifted mesially with reduction in the horizontal edentulous space. The tooth was periodontally well-supported. Intraoral periapical radiograph revealed adequate bone support and a mesially tilted second molar (Fig 2).



Fig 1: Preoperative view in occlusion



Fig 4: Final impression



Fig 2: Diagnostic IOPA

Out of the several treatment options presented, the patient opted for a fixed dental prosthesis with a mesial half retainer on 37, due to time and financial constraints. Diagnostic impressions were made in irreversible hydrocolloid (Tropicalgin, Zhermack), and interocclusal record was registered. Diagnostic mounting was done followed by mock preparation and diagnostic wax-up to evaluate the occlusion. A putty index of the wax-up was made to aid in fabrication of a provisional prosthesis. Preparation for a full veneer metal ceramic retainer on 35 and full metal mesial half-crown on 37 was done (Fig 3). The mesial surface of 37 was kept parallel to the path of insertion of the mesial abutment preparation. Clearance of 1.5 mm on functional distobuccal cusp and 1 mm on nonfunctional distolingual cusp was obtained from occlusal reduction that terminated at the distal marginal ridge, with little reduction of the mesial cusps. Grooves paralleling the mesial surface were placed in the buccal and lingual axial walls. An occlusal offset was placed to strengthen the disto-occlusal margin. A countersink in the distal channel was placed to resist mesial displacement of the retainer.



Fig 3: Tooth preparation

Gingival retraction was done and final impression was made in polyvinyl siloxane (Exaflex, GC) (Fig 4).

Provisional prosthesis was made using Luxatemp, (DMG) by direct method. The provisional was polished and cemented using non eugenol cement (Tempocem NE, DMG). The final impression was poured in type IV dental stone. Metal trial of the prosthesis was done with special attention to the marginal fit of the proximal half crown (Fig 5). The occlusion was refined in the second molar region.



Fig 5: Metal trial on cast

This was followed by porcelain layering on the mesial coping and the pontic (Fig 6). Occlusion was checked during the bisque trial in centric and eccentric relation. The final prosthesis was glazed and verified in occlusion. The prosthesis was then cemented (Fig 7).



Fig 6: Final prosthesis



Fig 7: Intraoral Post operative view

3. Discussion

Mandibular second molar abutment that has tilted mesially into the space formerly occupied by the first molar is a common finding. Situation is further complicated by the presence of the third molar which usually drifts and tilts mesially along with the second molar. It is impossible to achieve a common path of insertion for a fixed partial denture by conventional preparation of the abutment teeth following their long axes. Since the path of insertion for the fixed partial denture is dictated by the smaller premolar abutment, it is probable that the intended path of insertion should be parallel to the former long axis of the molar abutment before it tilted mesially^[5]. As a result, the mesial surface of the tipped second molar will encroach upon the path of insertion of the fixed partial denture, thereby preventing it from seating completely. If the encroachment is slight, the problem can be corrected by recontouring or restoring the mesial surface of the second molar. If the tilting is severe, more extensive corrective measures are needed.

Orthodontic uprighting of the tilted molar by the use of a fixed appliance is the treatment of choice. In addition to placing the abutment tooth in a better position for preparation and for distribution of forces under occlusal loading, uprighting the molar also helps to eliminate bony defects along the mesial surface of the root. Photoelastic^[8] and finite element^[9] stress analyses have shown that a molar which has tipped mesially will actually exhibit less stress in the alveolar bone, along the mesial surface of its mesial root, with a fixed partial denture than without it. However, there will be an increase in stress along the premolar. Fixed partial denture can still be provided with certain modifications, when orthodontic treatment is not opted for. These include proximal half crown, telescopic crown and use of non-rigid connector.

As telescopic crowns and nongravid connectors both require tooth preparations that are more destructive than normal, the selection of one of these would be influenced by the nature of previous destruction of the prospective abutment teeth.¹⁰ In the present case, the tilted abutment was sound enough so the more conservative and simplest option i.e. proximal half crown was selected as retainer for tilted mandibular second molar. Preparing a tooth with a combined mesial and lingual inclination as an abutment for a routine fixed partial denture can lead to a drastically over tapered preparation. This can be avoided by the use of a conservative restoration like proximal half crown. This preparation is less likely to have a pulpal problem as compared with full coverage crown. Much of the margin is accessible to the dentist for finishing and to the patient for cleaning. The distal surface which is left uncovered must be untouched by caries or decalcification and there must be very low incidence of proximal caries throughout the patient's mouth. The patient must also demonstrate an ability to keep the area exceptionally clean. If there is a severe marginal ridge height discrepancy between the distal of the second molar and the mesial of the third molar, the proximal half-crown is contraindicated.

4. Conclusion

The tilted abutment can be successfully managed by proximal half-crown but the treatment planning option depends upon each unique situation presented. This treatment option involves lesser amount of time, tooth

destruction and cost compared to orthodontic up righting and telescopic crown. This clinical report describes the use of proximal half-crown as a retainer on tilted mandibular second molar to provide adequate function and esthetics with ease of maintaining good periodontal health.

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