

Case report

## Removable partial denture with molar uprighting spring: An innovative hybrid appliance

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### Abstract

**Patient:** A 45-year-old female patient with need of fixed replacement of her missing teeth which were lost long time before. Posterior teeth were severally tipped bilaterally in the edentulous space. Hybrid removable partial denture with molar uprighting spring was fabricated for molar uprighting on both side tilted molars. After 3 month and 15 days of treatment with hybrid appliance the molar abutment were uprighted for fabrication of fixed partial dentures.

**Discussion:** The objective in molar uprighting is ideal positioning of the molar which will eventually become an abutment tooth for a fixed prosthesis. The ideal position will provide an optimal periodontal environment for the molar. The prosthodontic advantages of molar uprighting via distal tipping include an improved line-of-draw if a FPD is being constructed. Concept of designing of appliances was based on our basic knowledge of forces for uprighting the tooth along with maintaining the function during the treatment period. Another advantage of this appliance was that it prevented supra eruption of opposing teeth during the period when the molar was being uprighted.

**Conclusion:** Uprighting of tilted molar is extremely beneficial for long term success of fixed denture prosthesis by using hybrid appliances in very short period of treatment without hampering the function of the patient during the treatment period which is very economical as well.

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### 1. Introduction

Masticatory system is the functional unit of the body [1] which works under complex neuromuscular control for its function like chewing, swallowing and speaking. Proper function causes the proper trituration of food as a result of which the digestive process starts in the oral cavity itself. During its function, teeth and alveolar bone are constantly being subjected to deleterious forces. Nature has provided such equilibrium that by complex anatomy of roots and periodontal ligament these forces are being well tolerated by the tooth itself and the alveolar bone.

In the process of aging, some teeth are lost due to caries, periodontal disease or other reasons which create an imbalance

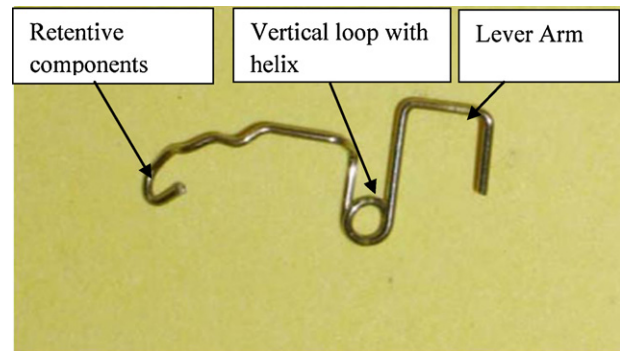
in the equilibrium and the integrity of masticatory system is lost. When these missing teeth are not replaced properly for a long time they have a tendency to migrate towards the empty space in an attempt to fill the space. The tooth distal to the extraction site will drift mesially into the space [1]. Nearly 98% of posterior teeth tilt mesially when subjected to occlusal forces [2]. This result in dispersal of stresses around the apices of teeth in the alveolar bone in a manner which is quite different from the stress patterns produced in the alveolar bone by loading of normal teeth. As a result of tilting and drifting of teeth, stresses are being concentrated in some areas which lead to resorption of bone in that area causing weakened periodontal support of teeth while planning the fixed prosthodontic therapy. The drifting and changes in mesiodistal angulations of teeth in extraction space is a common problem which affects the occlusion. In such patients with severe changes in mesiodistal angulations, it is very difficult to fabricate prosthesis (removable or fixed partial dentures) even after using surveyors. If prosthesis is fabricated in such conditions, it may not be able

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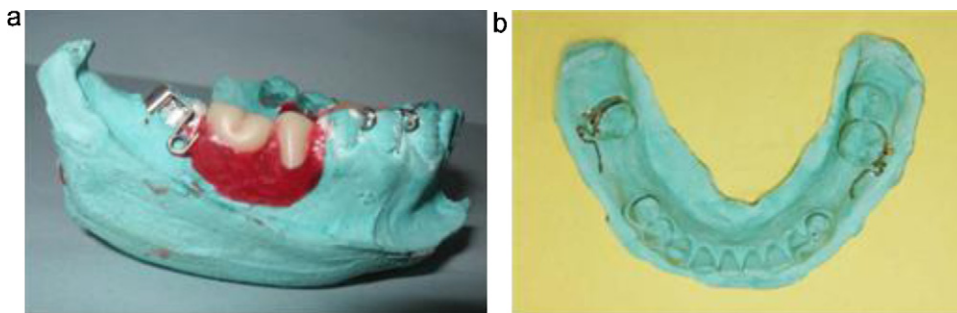
E-mail address: [drjit123@rediffmail.com](mailto:drjit123@rediffmail.com) (J. Rao).



**Fig. 1.** Model showing wire bending for appliance (bands are placed with buccal tubes welded along long axis of molar).



**Fig. 2.** Uprighting spring made up of 0.45 mm (18 mil) stainless steel wire.



**Fig. 3.** (a) and (b) Steps of fabrication of appliance.

to achieve proper chewing force or it may affect the abutment teeth adversely.

If the tilting is severe more extensive corrective measures are called for. The treatment of choice is uprighting of molar by orthodontic treatment [3]. Uprighting is best accomplished by the use of a fixed appliance [4].

The over-all objective in molar uprighting is ideal positioning of the molar which will eventually become an abutment tooth for a fixed prosthesis. The ideal position will provide an optimal periodontal environment for the molar [5].

This case report describes the concept to design an appliance using our basic knowledge of forces for uprighting the severely tilted bilateral molar abutment. Fabrication of this design is easy, convenient as well as very cheap and can be planned at any age without hampering masticatory function during the course of treatment.

## 2. Case report

A 45-years old female reported to the department of prosthodontics with need of fixed replacement of her missing teeth which were lost longtime before. Intra oral examination revealed that patient had missing mandibular teeth on right side 46, 47 and left side 35, 36. Mandibular molars 37, 38, 48 were severally tipped in the edentulous space on both sides. After discussion, molar uprighting was planned for both side tilted molars which were to be used as abutments for fixed partial denture. Patient was not willing for expensive fixed orthodontic treatment so a hybrid removable partial denture with molar

uprighting spring was fabricated. After 3 months and 15 days of treatment with hybrid appliance the molar abutment were uprighted for fabrication of fixed partial dentures on both side of the mandibular arch.

## 3. Clinical innovation

Patient came to our department for replacement of bilaterally missing teeth 35, 36, 46, 47 in the mandibular arch due to difficulty in chewing and mastication. Dental history revealed that patient had missing teeth from around 8 years for which she did not receive any prosthetic treatment. Intraoral examination indicated distal abutment drifted mesially into the edentulous space. Orthopantomogram (OPG) was taken to measure the degree of tilt. When calculated the degree of tilt was  $38^\circ$  on the right side and  $42^\circ$  on the left side making it a contraindication as fixed partial dentures are not indicated for more than a tilt of  $25^\circ$  [3]. Tylman stated that mandibular molars that are tipped beyond  $24^\circ$  should not generally be used for fixed partial denture abutments [5].

Molar uprighting takes around to 1–1<sup>1/2</sup> years for the tilted teeth to straighten and serve as an abutment for fixed partial denture. The treatment cost with fixed orthodontic treatment was too much that the patient was unable to afford. This prompted us to design an innovative cost effective device that can help in molar uprighting as well as patient's need of chewing and mastication. So we decided to design a hybrid removable partial denture with springs to upright the molars simultaneously on both side as well as to solve the masticatory problem of the

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