

## Orthodontic Movement of Tooth for the Correction of Occlusion Prior to Prosthetic Treatment- A Case Report

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Post treatment stability of the abutment tooth and satisfactory occlusal adjustment ensure the durability of a replaced missing tooth with a conventional fixed tooth prosthesis that often require involvement of multi disciplinary management approach. This article presents a clinical condition where an abutment tooth was managed with short duration of orthodontic therapy to ensure a better post-treatment occlusal relationship with opposite counterpart of the jaw. The new occlusion was satisfactory for the patient and the occlusal relationship was considered as excellent.

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### Introduction

**A**dult patients with missing teeth often present with a reduced vertical dimension, skeletal malocclusion, and some degree of temporomandibular disorder (TMD), which often require the collaboration of multiple dental specialists for the effective treatment of such complex cases.<sup>1</sup> Orthodontic movement of tooth usually become necessary when tooth is rotated medially or distally tilted or shifted extruded or intruded to enhance the relationship with the adjacent tooth before starting a prosthetic treatment. A combination of dental problems such as missing teeth, proclination of teeth and occlusal problems cannot be satisfactorily treated by prosthodontic approach alone.<sup>2</sup> Efforts to treat the patient as a whole using a multidisciplinary approach will provide more satisfactory results.<sup>3-4</sup> Analysis of the occlusion should be an integral part of the assessment of a post orthodontic dentition, which requires an assessment of the complex interrelationships of the teeth, jaw muscles and temporomandibular joints.<sup>5</sup> The objective

of the occlusal examination is to determine to what extent the patient's occlusion differs from the ideal. Special attention is given to initial contact, tooth alignment, eccentric contacts, and jaw maneuverability. Occlusal adjustment may be needed to promote long term positional stability of the teeth and reduce or eliminate para-functional activities. The stability of an individual tooth depends on balance of forces exerted on that tooth by the adjacent and opposing teeth and supporting tissues and by the soft tissues of the lips, cheeks, and tongue. When a single tooth is not replaced, this balance is upset. The consequence may be supra-occlusion of the opposing tooth or teeth, tilting of the adjacent teeth, and loss of proximal contact. Although simple replacement of the missing tooth at the late stage may prevent further disruption, it may be insufficient to return the dentition to full health. Extended treatment plans, including orthodontic repositioning and additional cast restorations may be needed to compensate for the lack of treatment at the time of tooth removal.

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Establishment of a functional occlusion is one of the primary goals of orthodontics. A common assumption is that adults with untreated malocclusion will have a greater prevalence and severity of periodontal disease. Several investigators have found a correlation between crowding or malalignment of teeth and the amount of plaque, gingivitis and loss of attachment.<sup>6</sup>

In an ideal occlusal arrangement, the load exerted on the dentition should be distributed optimally. Occlusal contact has been shown to influence muscle activity during mastication. Horizontal forces on any teeth should be avoided or at least minimized, and loading should be predominantly parallel to the long axes of the teeth. This is facilitated when tips of the centric cusps are located centrally over the roots and loading of the teeth occurs in the fossae of the occlusal surfaces rather than on the marginal ridges.<sup>5</sup> We managed an abutment tooth with short duration of orthodontic therapy to ensure a better post-treatment occlusal relationship with opposite counterpart of the jaw which is presented here.

### Case Report

A male of 56 years from Rangpur reported to Multi-specialty Dental Care, Banani, Dhaka, with the complaints of toothache on the lower right side for last six months. Pain was dull in nature. On clinical examination there was grossly carious lower right 1<sup>st</sup> molar tooth with vertical fracture involving the fraction and MOD (Mesio-Occluso-Distal) caries of that tooth. The right lower 1<sup>st</sup> premolar all ready fitted with a fixed prosthesis done. The left lower 1<sup>st</sup> molar was missing. The left upper 1<sup>st</sup> molar was extruded on the missing tooth's space of its counterpart. The left upper 2<sup>nd</sup> molar was treated endodontically one year back. The patient showed the features of crowding of both upper and lower teeth in anterior and posterior segment.



A



B

Figure 1. Pre-prosthetic lower occlusal view (A) and right lateral view (B) show orthodontic correction of lower right 2<sup>nd</sup> premolar tooth's position with elastic power chain.

On radiological examination it was evident that the right lower 1<sup>st</sup> molar could not be saved by endodontic procedure. So it was planed extracted and replaced with a fixed prosthesis on the right lower quadrant to enhance his masticatory function. As right lower 2<sup>nd</sup> premolar and 2<sup>nd</sup> molar will be considered as the abutments for fixed prosthesis, so they were examined clinically and radiologically. The right lower 2<sup>nd</sup> premolar was found to be lingually tilted and slightly rotated that will not be able to establish an effective occlusion with the opposite counterpart. Patient was advised for pre prosthetic Orthodontic treatment to establish the abutment support and then go for prosthetic replacement.



C



D



E

Figure 2. Post-treatment intra-oral Occlusal view (C), intra oral right lateral view (D), and right lateral view (E) of the cast shows occlusal relationship with a more better stable condition

Extraction of the lower right 1<sup>st</sup> molar tooth was done on the first visited. Subsequent recall visit was given after three weeks interval when lower right 2<sup>nd</sup> molar tooth were fitted with an orthodontic molar band and a bracket & lingual hook was placed on the lower right 2<sup>nd</sup> premolar tooth for the orthodontic correction of that tooth (fig. 1- A & B). After successful orthodontic management of that tooth on next four month with recall

activation visit on every three weeks satisfactory occlusal adjustment were achieved in relation to opposite counterpart of that tooth. Then prosthetic replacement of the missing teeth was considered. Since one abutment tooth (lower right 2<sup>nd</sup> premolar) was not endodontically treated, a more conservative tooth preparation was planned. Only minimum tooth reduction was done on the buccal surface of that tooth. Necessary amount of tooth structure was reduced from the lingual surface. The tooth preparation was done with the emphasis on not over reducing the lingual surface. Supra-gingival margin was prepared for both the abutments. A definitive treatment was provided with the construction of three unit fixed prosthesis [fig. 2 - C, D & E]. The patient was satisfied as restoration of the masticatory function was done. After six month post treatment follow-up satisfactory occlusion was observed [fig. 2- E) as same before and no complain of temporomandibular dysfunction (TMD) was reviled.

### Discussion

Mal-alignment results from different factors which are heredity, congenital defects (e.g. cleft lip and palate), cerebral palsy, torticollis, cleido-cranial dysostosis, congenital syphilis; environmental factors like pre and postnatal influence, predisposing metabolic climate and disease and also for the dietary causes include nutritional deficiency abnormal pressure habits include finger sucking, lip and tongue pressure, psychogenic or idiopathic functional aberrations or acquired reason like posture, accidents or trauma.<sup>7</sup> Any of such malocclusion needs to be treated by prosthetic means; pre-prosthetic orthodontic measures are often an integral part of comprehensive oral rehabilitation and occlusion.<sup>8</sup> The necessity for an interdisciplinary approach to treatments of routine dental problems has been recognized for a long time.<sup>9</sup>

In this presented case, before prosthetic replacement of the edentulous space with fixed partial denture, preparation of abutment tooth with fixed orthodontic treatment was done to facilitate the final occlusal adjustment and minimal tooth reduction for prosthetic preparation, thereby making the abutment teeth more stable. Though replacing the edentulous area with dental implant could be a more modern option but due to more financial expanse, patients prefer to replace his edentulous space with conventional fixed partial denture of which he called bridge prosthesis.<sup>10</sup>

Result of malocclusion mainly causes esthetic problem and identified early in the life, but at the late stage it causes functional problem and seldom impairs prosthetic replacements.<sup>6</sup> Development of malocclusion starts with mixed and permanent dentition. As the tendency of migration of tooth persists throughout the life, there are chances of development of malocclusion in late stage also but type differs.<sup>11</sup>

Malocclusion mainly affects dental health and psychosocial well being of a person. Caries, periodontitis, trauma to the anterior teeth, impaired speech and masticatory function, impacted tooth and temporomandibular joint dysfunction syndrome are the results of malocclusion. Research has shown that an unattractive dento-facial appearance does have a negative effect on the expectation of employers.<sup>12</sup> Treatment demand is high in female and higher socio-economic groups. The potential risk of treatment is root resorption, loss of periodontal support, decalcification, soft tissue damage and TMJDS.<sup>11,12</sup> Most commonly used treatment modality of elderly patient is relief from any trauma caused by malocclusion and aid in multidisciplinary approach of restoration of lost tooth. Sometimes orthodontic correction is overlooked which causes difficult path of

insertion for prosthetic devices and hampers normal transmission of masticatory forces along the long axis of abutment teeth.

Full arch engagement of brackets and bands would ensure better comfort and better alignment of tooth, but segmental retraction approach was performed as patient's resident in another town and frequent recall visit was not manageable for him. As segmental orthodontic management done, proper anchorage management system was not enforced, so chance of anchorage loss of right lower 1<sup>st</sup> molar also considered. Though efficient distal movement was possible in the lingually inclined tooth, comparatively buccal movement was of lesser degree. In this case, complete functional rehabilitation of the patient included up righting and buccal movement of tooth. Although most patients can benefit functionally and aesthetically from orthodontic therapy or with prosthodontic management, but the outcome of inter-disciplinary approach was satisfactory restoration of both occlusal function and esthetics.<sup>13</sup>

#### *Conclusion*

Orthodontics can be used to facilitate treatment modality in many ways. It is the most conservative treatment for remodeling the dental appearance and smile. The case presented here-in has replicated the treatment outcomes of orthodontic therapy. The benefits include correction of tooth position and dimension that result in improved function and aesthetics. A multi-disciplinary approach can provide more satisfactory occlusion.

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