

“Placing an implant fixture during ongoing orthodontic treatment”

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Abstract

Orthodontic treatment for correction of malocclusion can be taxing to a patient in terms of the duration of time taken for treatment. Absence of mandibular molars in such cases can result in the relapse of occlusal correction achieved over a period of years. A single implant restoration on the other hand, take their own time for completing osseointegration. We present a case of a young adult who had both mandibular first molars absent and was undergoing orthodontic treatment for correction of malocclusion. A single implant fixture was placed during orthodontic treatment and as soon as the fixed orthodontic appliance was removed, a metal, ceramic single crown was fabricated over the implant fixture. The occlusion was stabilized and the chances of orthodontic relapse were minimized.

Keywords — metal, ceramic, fixed appliance, implant fixture, orthodontic relapse

I. INTRODUCTION

Since the accidental discovery of osseointegration by Branemark in the field of implants,¹ their use in dentistry has revolutionized most of the dental specialty treatments. The course of most of the dental treatments, especially the field of prosthodontics has seen a rewriting of various treatment plans. The scheduling of implant treatment is itself challenging to most of the prosthodontist since the process of osseointegration is independent of both patient and dentist desires. The role of single implants in compromised occlusion is still uncertain, controversial and the subject of considerable debate.²⁻⁶ The aim of most of the orthodontic treatment of teeth is to provide a stable occlusion. The stability of the occlusion is largely dependant on intimate and effective contact between individual teeth. Absence of any tooth within the arch results in the movement of teeth in the direction of least resistance due to which there are high chances of treatment relapse. Both orthodontic and prosthodontic treatment success depends on the existing occlusion.^{7,8} Implant supported restorations require adequate time to osseointegrate within bone (3 to 6 months). Placing an implant in a patient who has undergone orthodontic treatment requires an organized plan of a

multidisciplinary team which is what this article is aimed to provide.

Case report

A young patient aged 29 years was referred to the department of prosthodontics from the department of orthodontics for an opinion regarding the feasibility of a fixed prosthesis, immediately after completion of a long standing orthodontic treatment. The main objective of the referral was stated for the closure of one side mandibular first molar area with a fixed prosthesis that would not allow the migration of the rest of the teeth. The orthodontic treatment was supposed to be completed over a period of three months by removal of the current fixed orthodontic appliance. A diagnostic casts of the patients were made at the referral time and a treatment plan was presented to the orthodontic department and the patient. The first choice of treatment was single implant supported crowns with the next choice being a fixed partial denture in relation to missing first mandibular molars. The patient was more keen to have an implant supported single crown on at least one side while the prosthodontist was a little reluctant since the osseointegration time was a minimum of 4 to 6 months. An oral surgeon and a periodontist were simultaneously consulted and open discussion the treatment option of single implant supported crown was decided. The schedule of first implant surgery was decided to be done within two weeks following which the removal of the orthodontic fixed appliance was deferred by a period of three months (after second stage surgery) and verification of osseointegration.

The respective medical, social and drug history was non relevant for future prosthodontic treatment plans. A detailed extra oral and intra oral examination did not reveal any negative clinical findings. The diagnostic casts obtained previously were used to fabricate a surgical cum radiographic splint which would enhance the proper placement of the implant fixture. A narrow, internal platform, parallel walled endosseous implant (3.5 by 11.5 mm) was placed following which a healing abutment was inserted (3.4 by 4 mm) (Nobel Bio care, Goteborg, Sweden). The patient was put on antibiotic and anti inflammatory drugs for a course of 5 days. The implant was allowed to heal for 4 months following which an

implant abutment (cemented) was placed on the second stage



Figure 1: (A) Implant abutment under fixed orthodontic appliance (B) Oral prophylaxis (C) diagnostic cast with temporary (D) Definitive impression



Figure 2: (A) Metal trial (B) Single metal ceramic crown (C) X ray (D) Follow up

surgery. The abutment was left as such till the orthodontic fixed appliance was removed (Fig 1A). Once the orthodontic fixed appliance was removed a thorough oral prophylaxis was performed (Fig 1B) following which impressions for a temporary crown was fabricated (Fig 1C). The final implant level impression for definitive restoration was made using a closed tray impression technique (Fig 1D). Definitive cast of a soft tissue mouldage and type four dental stone (die stone) was fabricated after abutment preparation, which was later followed by routine clinical and laboratory procedure for fabrication of a metal, ceramic crown restoration using a semi adjustable articulator that was programmed according to the patient interocclusal records. The metal framework was tried in the patient's mouth (Fig 2A), following which ceramic restoration was fused to the metal. The single crown restoration was cemented using a zinc phosphate cement (Fig 2B) and an intra oral periapical radiograph was taken for evaluation of the fit of the crown (Fig 2C). The

patient was followed up regularly and minor occlusal adjustments were made at follow up visit (Fig 2D). The patient was satisfied with the outcome of both orthodontic and prosthodontic results. The patient did not turn up for the restoration of the other side.

Discussion

Restoring an edentulous space during an orthodontic treatment presents difficulties in implant placement that ranges from placement of the incision, tissue reflection, restriction of access and visibility and damage to the orthodontic appliance endangering the results of the ongoing treatment. The decision to place an implant during the ongoing orthodontic treatment was objective by a team of professionals who were primarily motivated by the desire of preventive dentistry. Any treatment post removal of orthodontic treatment would have achieved more or less similar results, but placement of implant in presence of orthodontic appliance was challenging mainly to the oral surgeon. The impact of an ideal occlusion for the longevity of the implant supported single crown cannot be undermined since retentive and supportive capability of such restorations in presence of large occlusal loads are challenged.^{9,10}

Both orthodontics and implant treatments are require long term maintenance and care before considering the treatment as success. It is therefore imperative that the patient is willing and highly motivated to undergo such combination of treatment at the same time. Since orthodontic correction requires a pretty long treatment time, it is possible that the patient chose to reduce his remaining treatment time by undergoing the implant placement earlier. It may be also argued that since the orthodontic fixed appliance therapy is not conducive to maintain oral hygiene, the placement of implants in that environment may not be a wise decision. Very little evidence in the literature exists that has investigated patients' choices of treatment and the timing, he prefers to choose, although most of the patients do force their treatments to be completed at a fast pace.

Conclusion

A patient undergoing multiple dental long standing treatments can be considered for early other treatment provided the patient cooperates in maintaining high standard oral hygiene. Dental implants can be placed early before completion to reduce the treatment time and benefit the patient in terms of repeated frequent treatments and consumption of his valuable time.

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