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CASE REPORT ARTICLE

ORTHODONTIC EXTRUSION: AN AESTHETIC AND PROPRIOCEPTIVE ALTERNATIVE TO IMPLANT– AN INTERDISCIPLINARY CASE REPORT.

Justin Jolly¹, Sajith Sudevan², Vaishnavi Gowda³, Joshil D T² and Junu Henry³.

1. MDS- Post Graduate Student, Department of Orthodontics, Coorg Institute of Dental Sciences, Coorg, Karnataka, India.
2. MDS- Post Graduate Student, Department of Endodontics, Coorg Institute of Dental Sciences, Coorg, Karnataka, India.
3. MDS- Post Graduate Student, Department of Prosthodontics, Coorg Institute of Dental Sciences, Coorg, Karnataka, India.

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Abstract

Case report describes a multidisciplinary approach using orthodontic forced eruption to facilitate prosthetic restoration of a maxillary permanent lateral incisor with poor restorability. On examination, patient had a root stump in the region of 12. We decided to treat the patient by orthodontic extrusion followed by endodontic post and crown as patient was not willing for extraction of 12 followed by prosthetic implant. The case was treated in a much easier way without the help of brackets and wire components. At 2 weeks, there was a clear radiolucent area filled with immature bone, osteoid and a normal periodontal ligament. Temporary anchorage device allowed the clinician to rehabilitate the smile easily and conveniently without extensive prosthodontic restorative work.

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Introduction:-

Replacing the maxillary incisor remains the most challenging procedure in implant dentistry. Factors impacting success include the amount of available bone, the type of soft tissue, correct positioning of the implant, the provisional restoration, the design and material of the implant abutment, and the final restoration.^{1,2,3}

Treatment approaches with mini-implants can be considered standard today in modern orthodontic practices because they treat conditions that are difficult to correct with conventional mechanics.^{4,5} The purpose of this case report was to analyze the changes when forced eruption is used for endodontic post and crown development. Restoration after orthodontic eruption may present a more conservative treatment choice in all patients compared with the prosthetic restoration after extraction.

Case Report

A 50 year old female patient reported to the department of orthodontics with a chief complaint of spacing in the upper right front tooth region. On examination, patient had a root stump in the region of 12 (Figure 1). It was decided to treat the patient by orthodontic extrusion followed by endodontic post and crown as patient was not willing for extraction of 12 followed by prosthetic implant. The case was treated in a much easier way without the help of brackets and wire components.

Corresponding Author:-Justin Jolly.

Address:-MDS- Post Graduate Student, Department of Orthodontics, Coorg Institute of Dental Sciences, Coorg, Karnataka, India.



Figure 1:-Pre-treatment photographs

We treated the tooth endodontically first and performed orthodontic root extrusion with a mini-implant (1.6*0.8 mm) prior to prosthetic rehabilitation. A hook was fabricated using 18 gauge stainless steel wire for cementing into the root to facilitate a solid attachment (Figure 2,3).



Figure 2:-J hook placement by removing adequate amount of RC material

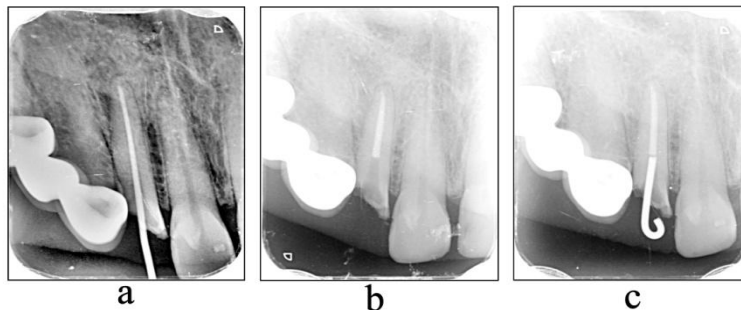


Figure 3:-Root canal treatment and attachment hook cementation

Approximately 3–4 mm of extrusion of the tooth was obtained within 6 weeks (Figure 5,6). A fiber post was then inserted into the root canal, and final restoration was completed with an all-ceramic crown (Figure 7). Follow-up 18 months after treatment revealed good periodontal health, esthetics and normal function.

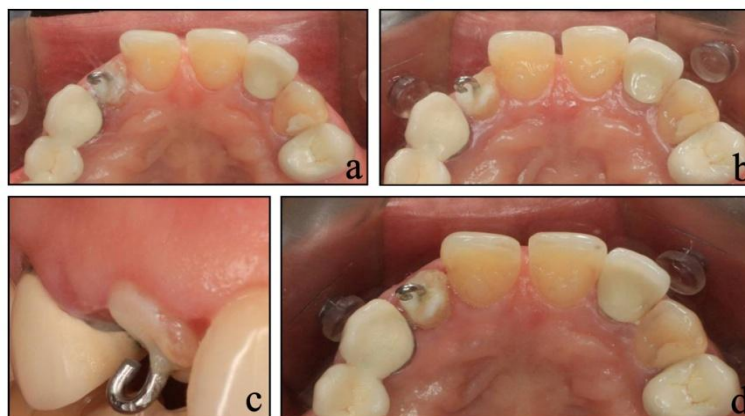


Figure 5:-(a) Extrusion after 1 week, (b) Extrusion after 3 weeks, (c&d) Completion of mini implant extrusion

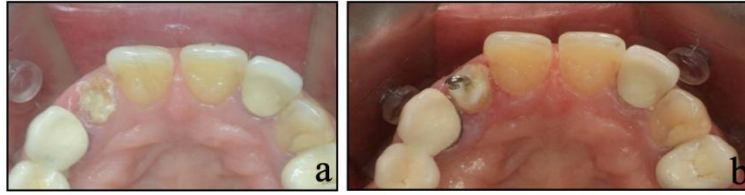


Figure 6:-Before and after forced extrusion



Figure 7:-(a) Post and Crown build up after extrusion, (b) Crown preparation, (c) After all ceramic crown placement

Problem List

1. Root canal treated root stump in relation to 12
2. Unaesthetic appearance
3. Bone loss and gingival loss

Treatment Objectives

1. Replacement of missing crown
2. To achieve an adequate amount of extrusion
3. To achieve extrusion with gain in alveolar bone height and gingival tissue

Treatment options

Orthodontic extrusion

1. Mandibular anchorage using modified lingual arch
2. Australian helical archwire
3. Extrusion using piggy back archwire
4. Magnetic forces
5. Mini implant in the opposing arch

Other Alternatives

Extraction followed by RPD,FPD or prosthetic implant

Discussion:-

This case presents the clinician with a difficult restorative problem and is complicated by the need to maintain the periodontal tissues in good health. The treatment options up to now have usually been limited to extrusion of the remaining root with a conventional orthodontic appliance or extraction with bridge replacement. In this report, a new method of orthodontic extrusion with mini-implant (1.6*0.8 mm) is presented (Figure 4). The roots were

extruded 3 to 4 mm with a force range from 10 to 40 grams during a treatment period of 5 to 6 weeks (Figure 5,6). Good force control at short distances, no friction, and no material fatigue of titanium mini-implants resulted in successful rapid extrusion. No evidence of soft tissue dehiscences, aberrant tooth mobility, or root resorption was found.⁶ Also it was important to achieve an acceptable crown-root ratio for a better prognosis of the post and crown. Crown root ratio, this ratio is a measure of the length of the tooth occlusal to the alveolar crest of bone compared with the length of root embedded in the bone. Optimum crown root ratio for a tooth to be utilized as a abutment is 2:3. A ratio of 1:1 is the minimum ratio that is acceptable for a prospective abutment under normal circumstances. If the occlusion opposing a proposed fixed partial denture is composed of artificial teeth the occlusal force will be diminished with less stress on the abutment teeth.

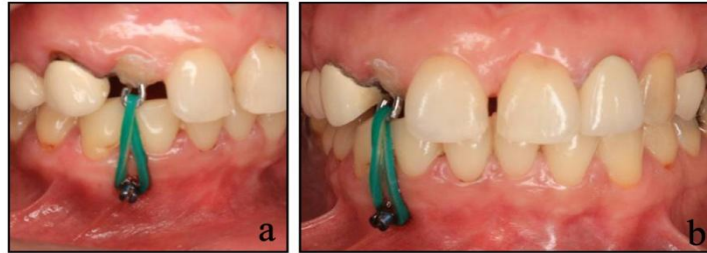


Figure 4:-Mini implant with green elastics

Orthodontic tooth extrusion was able to move the soft tissues when the sulcular attachment apparatus is intact.⁷ Bone formation as the tooth is extruded is dependent on the vector of the movement and the force applied on to the tooth.⁸ The rate of tooth extrusion is effected by the bone-tooth attachment. A tooth that would have been extracted routinely was thus saved and restored through the use of a collaborative approach using mini-implants.

Teeth with a poor restorability was extruded for 6 weeks with the help of an implant in the opposing arch and retained an additional 4 weeks prior to post and core buildup. At 2 weeks, there was a clear radiolucent area filled with immature bone, osteoid and a normal periodontal ligament.



Figure 8:-pre-treatment and post-treatment photograph

Conclusion:-

Extrusion using miniscrew is a conservative treatment modality for root stumps with poor restorability. Temporary anchorage device allows orthodontist to rehabilitate the smile easily and conveniently without extensive prosthodontic restorative work. We could achieve good aesthetic results in just 6 weeks while maintaining proprioceptive sensation.

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