

Extruding And Restoring An Impacted Central Incisor—A Case Report

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Abstract: A patient, 15 year old, female, reported to DY Patil University, School of dentistry, Nerul, Navi-Mumbai. She presented with a chief complaint of missing tooth in upper front region. After radiologic examination, it was found out that 11 was impacted. We completed the orthodontic treatment, but the tooth couldn't be extruded completely. So a crown lengthening procedure was performed and the teeth 11,12 and 22 were restored with laminates and an all ceramic crown for partially extruded 21.

Keywords: impacted tooth, Orthodontic Extrusion, Crown Lengthening, All ceramic restoration, Bonded Porcelain Restoration, Aesthetic Restoration.

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I. Introduction

Impacted teeth are often stumbled upon in the orthodontic practice. The absenteeism of maxillary central incisors even after eruption of adjacent maxillary lateral incisors is abnormal; an impacted central incisor is usually diagnosed accurately based on clinical and radiographic evaluation. Impaction of maxillary permanent incisors is not a frequent case in the dental practice, but its treatment is challenging because of these teeth's importance to facial esthetics. As a general rule, it is pedodontists or general dental practitioners who, during a routine dental examination, discovers and records the existence of an over-retained deciduous tooth.^{[1],[2],[3]} The prevalence of maxillary central incisor impaction ranges from 0.06% to 0.2%.^[4]

Central incisor impaction may result from a number of local and systemic factors.^[5] Over-retained deciduous teeth, supernumerary teeth, or ectopic eruption and crowding are the most common etiological factors for impacted central incisors. Careful planning and interdisciplinary approach are required in the management of impacted central incisor.^[6]

II. Treatment Procedure

The 15 year old patient reported to our college with a chief complaint of a missing central incisor. A Radiographic examination was done, and it was found out that she had an impacted central incisor. An extrusion of this central incisor was initiated along with her deep bite correction. A diode laser and piezo surgery unit was used to expose the impacted tooth. After a period of three years of orthodontic treatment, the central incisor was partially extruded. As there was no progress on the eruption, the orthodontic treatment was stopped, and a cbct report was obtained. The PDL of the impacted tooth was normal, and the vitality tests were positive. The patient lacked enough bone on the palatal aspect and had a missing buccal cortical plate. The patient was given an option of extraction and placing an implant or restoring the remaining natural tooth with an implant. The patient chose the option of restoring the partially erupted tooth with an all ceramic restoration.

A crown lengthening procedure was performed by the perio-dontist to get a good emergence profile and to establish proper gingival zeniths. As the patient had a gingival overgrowth, a stent was fabricated to dictate the Crown Lengthening Procedure. The procedure was carried out using a scalpel, a Diode Laser and a Piezo-surgery unit to trim off the excess bone and establish biological width. Piezosurgery device is a sophisticated ultrasonic device, that can be used for bone surgery in a variety of dental surgical procedures like periodontal surgery, peri-apical surgery, removal of impacted teeth, in implant surgery for facilitating bone ridge expansion, in bone regeneration techniques and inferior dental nerve lateralization and trans-positioning [7]. This device is designed to cut or grind the bone without damaging the adjacent soft tissues. The mechanism of this instrument is mainly based by the "Piezo effect".

Advantages

- i. Micrometric cutting action: Precise incision with no damage to adjacent structures ^[8].
- ii. Selective cutting action: sectioning does not damage the adjacent soft tissue ^[9].
- iii. Cavitation effect: Maximum intra-operative visibility ^[10].
- iv. Surgical stress: The cutting action is less invasive, producing less collateral tissue damage, which results in excellent tissue healing ^[11].
- v. Asepsis: Sterile coolant provides an aseptic environment (free from contamination) ^[12].

A healing period of one month was given and after the gingiva had healed completely, tooth preparation was initiated. As the mesiodistal width in 21 area was more, a single crown given on the partially erupted tooth would be either be very broad or the patient would have to settle with some amount of diastema. ^[13] Golden proportion (Lombardi): When viewed from the facial, the width of each anterior tooth is 60% of the width of the adjacent tooth (mathematical ratio being 1.6:1:0.6). It is difficult to apply as patients have different arch form, lip anatomy and facial proportions. Strict adherence to golden proportion calculations limits creativity and this may lead to cosmetic failure. ^[14] These principles are used as a guide rather than a rigid mathematical formula. Most authors recommend creating harmony and balance by eye via proper adjustment and evaluation of provisionals rather than any formula. The factors guiding individual tooth dimensions are as follows. Maxillary central incisor: Centrals are the focal point of an esthetic smile and create the central dominance as described earlier. Approximate length of the central should be 10–11 mm and the width is calculated accordingly so that the ratio falls between 75 and 80%. Maxillary lateral incisor: These are the playful part of the smile. They provide individuality, are never symmetrical and influence gender characterization. ^[15]

So the patient was given an option of veneering 12, 11 and 21 to follow the golden proportions. The patient chose the later option. A chamfer margin was chosen for the lithium disilicate veneers on 11, 12 and 22. A feather edge margin was chosen on the tooth 21, as we had to conserve as much the tooth structure as possible. The tooth was vital to heat and cold vitality test and to the electric pulp tester as well. As the tooth had a healthy pulp, the tooth was not treated endodontically. A two stage addition silicone impression was made using a 000 retraction cord and the prepared teeth were temporized. The veneers were fabricated, and after one week of tooth preparation, the patient was scheduled for bonding the veneers.

The bonding procedure ^[14] was done using variolink veneer cement from Ivoclar. The E-max Lithium Disilicate restorations were acid etched using hydrofluoric acid and a silane coupling agent was applied. A dual cure bonding agent from Multilink kit was used. The tooth was acid etched using 37% phosphoric acid for 15 seconds, and the bonding agent was applied on both the teeth and the etched and silanated surfaces of the restorations. The cement was mixed; a translucent shade of the base paste and a bleach shade of the catalyst paste were chosen and applied. The restorations were cemented and gently tack-cured for 3 seconds each. The excess cement (Flash) was removed and floss was passed in between the cemented restorations. Each tooth was later light cured for 15 seconds. After 24 hours, an impression was made for a night guard, and a soft night guard was prescribed.

Figures and Tables



Fig. 1: Pre-Operative Intraoral and Extraoral



Fig. 2: Orthodontic Extrusion and Post Orthodontic Treatment Procedure



Fig. 3: Crown Lengthening Procedure



Fig. 4: Pesio-electric Surgical Unit used for CLP and Immediate Post CLP



Fig. 5: One Week Post CLP
(Note:- the hefty mesio-distal width between 11 and 22)



Fig. 6: After Tooth Preparation, Before Impression Making



Fig. 7: Immediately After Cementation of Lithium Disilicate Veneers



Fig. 8: One Year Post Bonding of Veneers

III. Conclusion

The successful management of impacted central incisor is a clinical challenge. There is also a risk of periodontal problem after alignment. Hence, the periodontal upkeep is very perilous. Crown Lengthening is a surgical procedure that requires exposure of adequate tooth structure for restorative procedures. Various techniques and methods used for performing Crown Lengthening should be treated in such a way so as to avoid any violation to Biologic Width that can have deleterious effect on periodontium leading to gingival inflammation, loss of attachment and alveolar resorption.

It is vivid from the above discussion that the smile we create should be esthetically appealing and functionally sound too. It is our duty to carefully diagnose, analyze and deliver the best to our patients, taking into account all of the discussed factors. The smile designing done by us has to be as conservative as possible unlike the past. Our aim has to be less reduction of tooth structure and greater esthetics and durability. This simply means that cosmetic dentistry has to be a multispecialty branch, wherein all treatments like orthodontics, periodontics, surgical procedures have to be performed whenever deemed necessary.

The rule of preserving as much as possible was followed meticulously in this case. Throughout the long duration of this case, the patient was comforted and no harm in any was caused to the patient. All the procedures carried out were totally Bio-mimetic in nature, and utmost significance was given in being as conservative as conceivable.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be

reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflicts of interest

There are no conflicts of interest

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