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REVIVING THE ESTHETICS BY COMPREHENSIVE TREATMENT APPROACH FOR MISSING MAXILLARY CENTRAL INCISORS: A CASE REPORT

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ABSTRACT

Maxillary anterior teeth are most prone to be missing either due to trauma, caries or congenital absence which further gets complicated due to drifting of the adjacent teeth in those spaces. These complications in the anterior teeth makes a great impact on the esthetics as well as confidence of an individual. Over the last several decades, dentistry has focused various treatment modalities for replacement of missing teeth by means of space regaining with orthodontic mechanics followed by prosthodontic replacement of missing teeth. This multidisciplinary treatment approach is considered to be best in such cases as it proves to be more functional, aesthetic and satisfactory for a patient in treating any tooth in this esthetic zone.

This case report discusses about the esthetic correction of patient's smile by replacing missing maxillary central incisors by orthodontic space regaining followed by all ceramic bridge restoration.

Keywords: Diastema, orthodontic space correction, missing anterior teeth, esthetic zone, restoration

INTRODUCTION

Modern dentistry is all about aesthetics which basically works on the principle of improving appearance. Due to the morphology and location of anterior teeth they become more susceptible to traumatic injuries. The absence of anterior teeth may lead to inarticulate pronunciation and an unfavorable esthetic appearance that ultimately affects the individual's communication behaviour, self-esteem and professional performance.[1] Whenever an anterior tooth is lost, the clinician should provide its immediate replacement to avoid drift of adjacent teeth in this space creating aesthetic and phonetic difficulties to the patient.[2]

Now, as the missing teeth is in the esthetic zone, it requires an interdisciplinary approach including specialists in orthodontics, prosthodontics, operative dentistry, and periodontics. There are two principal approaches to resolve this problem: 1) Maintenance of the space for future autotransplantation or conventional prosthetic restoration of the missing teeth, 2) Total orthodontic space closure followed by prosthodontic alteration of the shape of lateral incisors. Each of these approaches has its advantages and disadvantages, but prevailing conditions may influence the selection of one approach over the other.

For decision-making between these two options, various factors should be considered while establishing a treatment plan. These factors include the size & shape of the adjascent teeth, age of the patient, profile of the patient, smile line, ridge thickness, existing occlusion. etc. This is to achieve a balanced dentition and optimal esthetic outcomes [3]. Following the orthodontic space correction, the restorative approaches can be divided into two categories (single tooth implant, and tooth supported restorations) where dental implants are the most commonly used to replace missing maxillary incisors once skeletal maturity has been reached. When dental implants are contra-indicated or not desired by the patient then, there are two options available: resin bonded bridge which is a minimally invasive option for replacing missing anteriors and full coverage fixed partial denture.[4]

This case report describes the first treatment option in a patient who presented with missing maxillary central incisors due to trauma; the treatment was completed by regaining lost space by orthodontic tooth movement followed by prosthetic replacement using all ceramic bridge from 12 to 22.

Case Report

A 24-year-old female patient reported to the Department of Prosthodontics with a chief complaint of unpleasant smile because of missing upper front teeth with spacing and wanted to get it corrected. Dental history revealed an episode of trauma in the maxillary anterior region during childhood which resulted in luxation of both maxillary central incisors. Extraoral examination revealed an unpleasant appearance showing spacing in upper anterior teeth. On intraoral clinical evaluation, both maxillary right and left central incisors were missing with mesially drifted lateral incisors resulting in spaces between lateral incisors and canines. In mandibular arch, multiple diastemas were present **(Fig- 1)**. There was no evidence of bruxism or wear facets on the occlusal surfaces. Panoramic radiographic examination revealed sound abutments and adequate crown-root ratio with no residual ridge deficiency **(Fig- 2)**.

Figure 1: Intraoral view

Figure 2: Radiographic evaluation

As the patient desired for filling the space with a tooth/teeth, it was not possible with placing a single central incisor as the space was deficient & the single tooth would fall in the midline of the face which would definitely look unaesthetic. Therefore, a comprehensive treatment was necessary which included orthodontically regaining the space for the rehabilitation of the missing maxillary central incisors restoring both esthetics and function.

On the basis of clinical and radiographic findings, the patient was presented with several treatment options for replacing the missing maxillary incisors which included an implant-supported crown, conventional fixed partial denture, resin-bonded fixed partial denture. The implant-supported crown was rejected because of the alveolar bone deficiency on the buccal aspect due to trauma. However, resin bonded Fixed partial denture was less invasive as compared to conventional Fixed partial denture, the patient was concerned about the esthetic aspect of the metal framework and involvement of almost the entire palatal surface of abutments for placement of retainers. The patient thus opted for conventional Fixed partial denture as this would require less treatment time & resolves the esthetic concern of patient.

Therefore, the complete treatment plan was explained to the patient. As the patient emphasized onto the esthetics particularly, prosthodontic replacement with all ceramic restoration was planned with respect to 12,11,21,22 using CAD/CAM.

Treatment plan was divided into two phases:

A. Orthodontic phase

B. Prosthodontic phase

Orthodontic phase: Aim of the orthodontic phase was to create space for prosthetic replacement of the maxillary central incisors by moving the maxillary lateral incisors distally, simultaneously level and align the lower arch to relieve spacing. The orthodontic treatment was carried out using pre-adjusted 0.022 MBT appliance, a standard bonding procedure was followed. Levelling and alignment was carried out till 19 X 25 SS wire in both maxillary and mandibular arch. The lateral incisors were moved distally with the help of elastomeric chain to provide sufficient space for prosthetic rehabilitation of maxillary centrals. Treatment period lasted for 12 months. **(Fig-3)** When orthodontic treatment objectives were met the case was taken up for prosthetic rehabilitation.

Figure 3: Orthodontic correction done by space reopening in maxillary arch

A. Prosthodontic phase: After the completion of orthodontic treatment, the space regained was evaluated for the placement of two central insicors. The maxillary right and left lateral incisors were prepared with shoulder finish lines. The path of insertion was as paralleled as possible to optimize resistance and retention forms. Equigingival margins were placed for optimal esthetic results **(Fig- 4)**. A four unit temporary prosthesis was luted with a Non-eugenol cement (RelyX Temp NE, 3M ESPE) **(Fig- 5)**. Maxillary and mandibular impressions were made using medium body rubber base impression material (Aquasil Ultra Monophase, Dentsply) and was sent to the laboratory for further process. A Teflon tape barrier technique was used while carrying out the luting procedures to prevent the ingress of cement into the gingival sulcus The impression was digitally scanned and a four unit all ceramic prosthesis was fabricated using CAD-CAM **(Fig- 6a & 6b)**. The prosthesis was then tried and checked properly for fit and occlusion and removing the interferences. The four unit all ceramic prosthesis was then cemented with Resin-Modified GIC (RelyX Luting 2, 3M ESPE) **(Fig- 7)**.

The post-treatment result shows an improved smile with better facial esthetic **(Fig 8)**.

Figure 4: Both lateral incisors prepared with shoulder finish line

Figure 5: Four unit provisional restoration was done

Figure 6a: The impression was then digitally scanned using CAD/CAM software

Figure 6 b: A four unit all ceramic prosthesis was fabricated using CAD-CAM

Figure 7: Final Prosthesis in-situ

Figure 8: Pre-treatment/Post-treatment extraoral photograph

DISCUSSION

Management of patients with missing central incisors by means of space closure followed by modification of the lateral to mimic the central is possible but is an approach fraught with problems. Many of the pitfalls are virtually unavoidable and it can be extremely difficult to produce a satisfactory aesthetic result. Initial space assessment is difficult and there are numerous problems associated with the positioning and modification of lateral incisors. There may be additional periodontal problems. The main disadvantage of orthodontic space closure is the tendency to recreate interdental spaces (space reopening) among the anterior teeth of young patient after the end of treatment. [5]

Therefore, to balance all these factors it is generally preferable to maintain the space by orthodontic space-opening and provide some form of prosthetic replacement. When space opening is indicated, both orthodontist and prosthodontist play a key role in determining and establishing space requirements. Some parameters that can be noted while considering this treatment option are the height and width of the ridge, occlusal context, interdental spacing, treatment time and the patient's openness to treatment alternatives. From all the tooth-supported and implant supported treatment options, a conventional full-coverage fixed bridge is the least conservative but sturdiest of all which exerts control over the occlusion and occlusal forces.[6]. Moreover, considering the prime requirement of patient's appearance the all-ceramic fixed partial denture was planned.

Before a full-coverage fixed bridge is placed the alignment of the anticipated abutment teeth along a common pathway must be verified. From the frontal view, the long axis of the lateral incisor and the labial surface of the canine should be parallel. This allows the prosthodontist to achieve the proper ''line of draw'' when preparing these teeth. Also, from a lateral perspective, the long axis of the canine and the labial surface of the lateral incisor must be parallel for proper tooth preparation. The orthodontist must know how to align these teeth according to the specific restorative requirements for the chosen prosthesis [7].

CONCLUSION

The restoration of a smile is one of the most awarding and gratifying services a dentist can render. The success of each restorative treatment option depends on various factors that needs careful treatment planning with a multidisciplinary approach as the space is present in the esthetic region of the jaw. Replacing the lost central incisors by

regaining the lost space is a big challenge for a clinician. In this case report, the patient was successfully treated by orthodontic space regaining followed by full coverage all ceramic prosthesis.

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