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Varun Mehra

3rd yr Post Graduate Student,
Department of Orthodontics and
Dentofacial Orthopedics,
Subharti Dental College, Meerut,
Uttar Pradesh, India

Amit Khara

Associate Professor, Department
of Orthodontics and Dentofacial
Orthopedics, Subharti Dental
College, Meerut, Uttar Pradesh,
India

Pradeep Raghav

Professor and Head, Department
of Orthodontics and Dentofacial
Orthopedics, Subharti Dental
College, Meerut, Uttar Pradesh,
India

Mohit yadav

3rd yr Post Graduate Student,
Department of Orthodontics and
Dentofacial Orthopedics,
Subharti Dental College, Meerut,
Uttar Pradesh, India

Corresponding Author:

Varun Mehra

3rd yr Post Graduate Student,
Department of Orthodontics and
Dentofacial Orthopedics,
Subharti Dental College, Meerut,
Uttar Pradesh, India

Ortho-prostho interdisciplinary approach to improve esthetics in anterior region: A case report

Varun Mehra, Amit Khara, Pradeep Raghav and Mohit yadav

Abstract

The increased awareness of esthetics in dental treatment has challenged dentistry to look dental esthetics in a more organized and systematic manner. Today dental professionals should have a clear understanding of Esthetic Principles to reach patients satisfaction level which cannot be achieved by formerly independent disciplines of Orthodontics, Prosthodontics, Endodontics, Periodontics or Maxillofacial Surgery alone. To provide the highest level of dental treatment to each patient various disciplines of dentistry should be used together. Therefore in the present case report we emphasize on the use of interdisciplinary approach using ortho-prostho dental treatment to provide maximum esthetic results to our patient.

Keywords: Interdisciplinary approach, short clinical crown, anterior cross-bite, lower incisor extraction

Introduction

Patients seeking esthetic dental treatment today desire to enhance their appearance for an improved quality of life and better self-esteem. To achieve overall esthetic smile interdisciplinary treatment approach plays a very important part that offers a more comprehensive approach to diagnosis and treatment planning as well as better treatment outcomes.^[1]

Adjunctive orthodontic treatment involves tooth movement designed to enhance the success of other dental procedures necessary for the control of disease and to restore function. If existing tooth positions make it impossible or difficult to insert dental restorations, then orthodontic treatment should become part of the treatment plan.^[2]

The interrelationship between orthodontics and prosthodontics often resembles symbiosis.^[3] This case report shows the interdisciplinary involvement of orthodontics and prosthodontics to restore the esthetics and function, due to traumatic fracture of the upper central incisors.

Case Report

An 18 year old male patient reported to us with a chief complaint of unesthetic smile due to lost crown structure of upper front teeth. He gave a history of root canal treatment of both upper central incisors, whose crown structure had been lost due to trauma 6 years back. He also reported repeated dislodgement of the upper central incisors crowns.

On extraoral examination, he had a mildly convex profile, mesoprosopic facial form, competent lips and normal nasolabial angle. Intraoral examination revealed Angle's Class I molar and canine relation bilaterally and anterior crossbite with respect to upper and lower central incisors. There was 2/3rd loss of crown structure of upper central incisors and the remaining 1/3rd crown structure was discolored (fig.1). On radiographic examination patient had a class I skeletal pattern with average mandibular plane angle (fig. 2)

Further examination revealed loss of continuity of the smile arc due to fractured maxillary central incisors. The golden proportion, height-width ratio, and gingival height, shape and contour were also evaluated for the patient (fig. 3). Carey's analysis revealed 4.5mm crowding in the lower arch.

Especially keeping the micro and mini esthetics in mind, fixed mechanotherapy with lower single incisor extraction and prosthetic rehabilitation for upper central incisors was planned for the patient. Before bonding, a fiber post and composite core with temporary crown fabrication for upper central incisors was done (fig.4). Lower left central incisor was extracted.

Upper and lower arches were bonded with 0.018" MBT bracket slot. After leveling and alignment, additional palatal root torque was given on upper central incisors on 0.016x0.022" stainless steel wire resulted in 5° proclination to achieve positive overjet and the lower incisor extraction space was utilized in decrowding the lower anteriors. (fig. 5) & (fig. 6)

After debonding, the upper central incisors were prepared for permanent crowns. Subgingival crown preparation was done and IPS e.max crowns were cemented after proper shade matching protocol. At the end of treatment, Class I molar and canine relation was maintained bilaterally and positive overjet was achieved. (fig.7)

Discussion

The coordination of macroesthetics (the face), miniesthetics (the smile), and microesthetics (the dental esthetic component) offers a complete approach to esthetic treatment planning. Orthodontists can enhance their work by using principles of cosmetic dentistry to provide a superior esthetic outcome. [1]

To achieve excellence in restorative dental procedures especially in the anterior dentition, it is required that both clinician and ceramist be intimately familiar with the basic principles of natural dental esthetics. To help the clinicians provide the best esthetic results, mathematic theorems such as the "golden proportion" [4, 5] and the "golden percentage" [6] have been proposed. However, Lombardi stated that strict application of the golden proportion proved to be too rigid for dentistry. In addition, the tooth height, crown width/length ratios, transition line angles, and other changes in tooth form are likely to influence the perception of symmetry, dominance, and proportion. Among these parameters, measurements of width/length ratios of normal clinical crowns seem to be the most stable reference. [7]

Therefore, when treatment planning is done in the anterior dentition, it seems appropriate to start by defining the adequate incisal edge length. [7] So, the cervicoincisal height of the upper central incisors was determined taking canines and lateral incisors as reference.

Before bonding, the upper central incisors were restored with fiber posts as they offer the best esthetics. The white or tooth colored dowel prevents the "shine-through" effect that occurs with metal dowels and improves the translucency and appearance of all-ceramic crowns. Fiber posts are also more flexible than metal posts, require less dentin removal and have lower susceptibility to root fracture. [8]

Lower left central incisor was extracted as there was crowding of 4.5mm. After bonding, the crowding was spontaneously relieved in the lower arch. Additional palatal root torque was added to the upper incisors to correct the crossbite and eliminate the possibility of lower incisors hitting the palatal surface of upper incisors, causing repeated dislodgement of upper central incisors crowns.

When the clinical crowns of teeth are dimensionally inadequate, an esthetic and biologically acceptable restoration of these dental units is difficult. While restoring a short clinical crown, the clinician may attempt to gain length by placing a subgingival margin. However, deep subgingival margins that encroach upon the biologic width jeopardize the periodontal tissue and are therefore not desirable. [9] Hence, taking care of the biologic width, subgingival crown preparation was done for the upper central incisors followed by cementation of IPS e.max crowns.

Other treatment options could have been surgical crown lengthening or orthodontic eruption of the fractured teeth. Surgical crown lengthening of single anterior teeth causes uneven gingival contour, which is esthetically displeasing, and orthodontic eruption may lead to unfavourable crown-to-root ratio and teeth may also exhibit mobility after this procedure due to reduced bone support. Hence, these were ruled out. [9]

The case was finished with Class I molar and canine relation and a consonant smile arc, without disturbing the gingival zenith and achieving proper crown height/width ratio.



Fig 1: Pre-Treatment Photographs

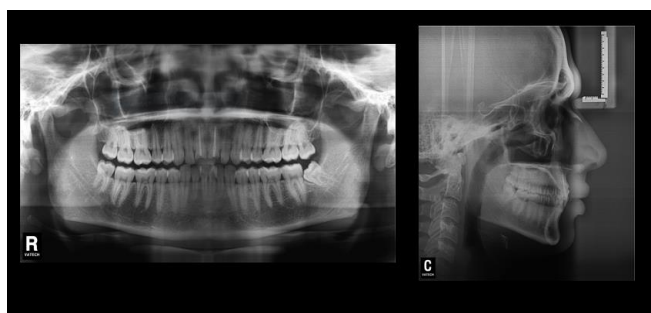


Fig 2: Pre-Treatment OPG & Lateral Cephalogram



Fig 3: Micro-esthetic Examination

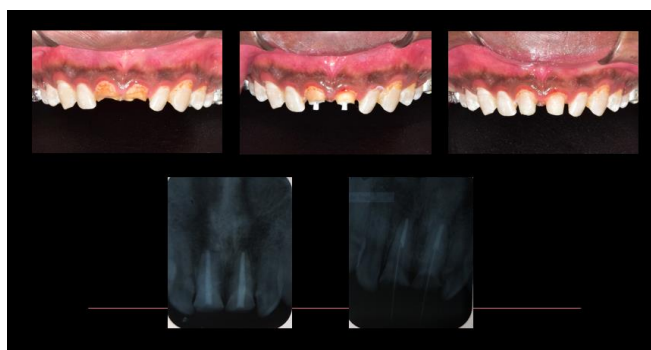


Fig 4: Post & Core Build-Up



Fig 5: Extraction Space Utilized In Decrowding

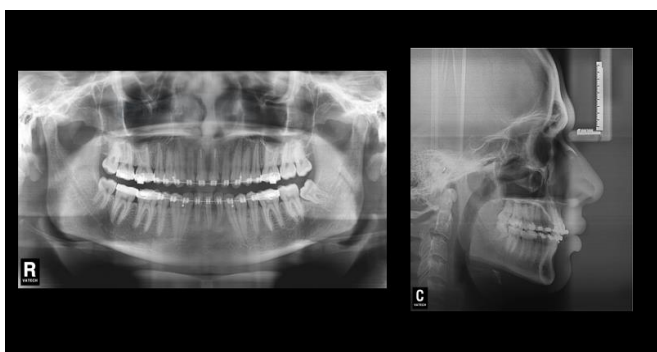


Fig 6: Post-Treatment OPG & Lateral Cephalogram



Fig 7: Post-Treatment Photographs

Conclusion

Orthodontic treatment as an adjunct to prosthodontic and restorative dentistry can significantly enhance a favorable result. The case presented here shows only one of the treatment options available to the dentist. If patients are to be provided with the highest level of care, collaboration with other specialities is necessary.

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