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Corrective Prosthodontics – Curating Semi Functional Anterior Guidance in Full Mouth Rehabilitation: Case Report

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Abstract

While a malaligned disk between respective bones is a potent risk for structural deterioration of a joint, malaligned teeth pose a constant esthetic and psychological trauma to a person. Age, social status, economic and time feasibility besides urgency of treatment limit orthodontic correction of malaligned teeth. Cast dowel core and crown offers useful solution to such clinical situations. This clinical report presents a case of full mouth occlusal rehabilitation that includes correction of a semi functional anterior guidance using cast post with realigned cores and crowns while instituting proper esthetics, phonetics and psychological comfort.

Keywords: overjet and overbite, cast post core, dowel, occlusion, dynaesthetic.

Introduction

Besides aesthetically unacceptable, proclined maxillary incisors create an occlusal imbalance by not participating in stress distribution during protrusion and lateral excursion thereby concentrating horizontal stress on the canines. Excessive overjet also affects phonetics especially labiodental and bilabial sounds besides allowing the opposing incisors to supraerupt thus impairing esthetics and phonetics further. Presence of malpositioned teeth in existing occlusion itself suggests that everything may not be right in that particular occlusion.¹ For such conditions orthodontic correction is the first line of treatment,² however, some cases where age, existing dental condition, economic and time feasibility limit

orthodontic correction, corrective prosthodontics can be accomplished by use of custom cast post with realigned core that then allows placement of a crown that is functionally correct. Cast alloys have high modulus of elasticity,³ and have been associated with disadvantages like loss of post retention,^{4,5} root fractures⁶ risk of corrosion,⁷ but they still provide the only mean of corrective prosthodontics for malaligned, malpositioned or rotated teeth if orthodontic correction cannot be done. This article through the prism of a case report presents a full mouth rehabilitation case that had a series of corrective cast post core crown to correct malaligned teeth. Designing of such cores has also been discussed.

Case report

A female patient, in her mid-thirties reported to comprehensive care clinics at College of dentistry, Jazan University, with chief complaint of severely bad looking natural teeth which she wanted to be improved. Her marital status was single and was occupied at home. Patient's family, medical, social, drug and other related history were non-contributory except her careless attitude. Dental history included infrequent use of tooth brush and tooth paste. Patient's dietary history revealed use of ready to eat food more frequently than home-made food. Extra oral examination revealed incompetent lips (dry and cracked) (Fig.1A) and visible proclined maxillary central and lateral incisors (Fig.1B). Bleeding on probing, plaque and periodontal pockets in the range of 1 to 3 mm were negative features of intra oral periodontal examination. Examination of the natural dentition revealed root stumps (15,36) (Fig.1C,D), grossly carious dentition (11,12,14, 16,17,21,22,24, 25,26,27,28,31,32,41,42,43,45 and 47) that involved even facial/palatal surfaces (Fig. 1E,F,G).



Figure 1: Preoperative facial and oral condition

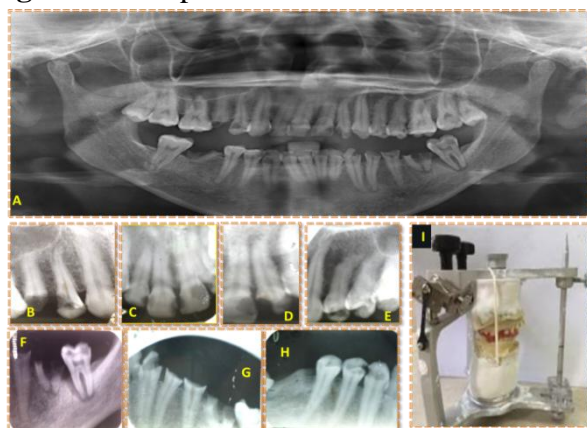


Figure 2 Diagnostic radiographs and mounted casts

Full mouth intra oral periapical radiographs, Orthopantomograph and mounted diagnostic casts assisted diagnosis (Fig. 2A-H). After superficial removal of caries, endodontic diagnosis revealed asymptomatic irreversible pulpitis (12,17,22,24), asymptomatic irreversible pulpitis with symptomatic apical periodontitis (11,14,21,25), and a necrotic pulp (27). Patient also had a severe localized periodontitis with endodontic involvement in relation to tooth number 37 which was indicated for extraction.

The teeth were restored temporarily at this stage and preliminary impressions were made using irreversible hydrocolloid (Jeltrate Alginate, Fast Set; Dentsply Intl, York, Pa) from which diagnostic casts were obtained which were later mounted on a semi adjustable articulator (Whip Mix; Elite Dental Services, Inc, Orlando, Fla) using an arbitrary face bow (Quick Mount Face-Bow; Whip Mix Corp). The articulator was programmed using centric and protrusive interocclusal records and occlusal diagnosis of the existing condition was done (Fig. 2I). The vertical dimensions were maintained by the canine and premolars on the right side. Posterior disclusion was effected by canines which also discluded the teeth during lateral excursions (Fig. 1G). After occlusal diagnosis, various treatment options were discussed including orthodontic correction of maxillary anteriors, which patient refused because of financial and time constraints. Treatment consented by the patient started with extraction of root stumps (15, 36, 37 and 46), an oral hygiene maintenance program for a period of 3 months followed by assessment, excavation of all carious lesions followed by temporary restorations along with their reassessment in phase 1. Phase 2 was dedicated to control disease in which endodontic treatment was done (11,12,14,17,21,22, 24,25,27,33,34,35,43) (Fig. 3A-I) simultaneously and subsequently followed by restorations that included class 1 (18,28), class II (16,26,47), class III (31,32,41,42) and class V (44,45) cavities duly filled by respective indicated materials that ranged from silver amalgam, posterior composite and type 2 glass ionomer cement. This phase also included

gingivectomy and crown lengthening procedures (11,14,21,22,33,34,35) (Fig. 3J-L).

During phase 3, a diagnostic wax up on a semi adjustable articulator was analysed and modified so as to place the palatal inclines of incisors in a position that will allow these inclines to disclude the posterior teeth in protrusion and lateral excursions (Fig. 4A). A multipurpose putty index was prepared on the diagnostic wax up of anterior teeth following which the maxillary incisors were decoronated till the gingival level. For two maxillary lateral incisors, the realignment was accomplished using prefabricated fiber post (Rely X fiber post 3M – ESPE) following which a core was made of composite (Clearfil Photo Core, Kuraray Dental, Japan) (Fig. 4B-E). Maxillary central incisors were decoronated (Fig. 4B, C), prepared for post space and ferrule (Fig. 4C) following which a direct pattern was made using DuraLay Inlay Pattern Resin (Reliance, Illinois, USA) (Fig. 4D). The labial alignment of the core was guided by placing half cut putty index that was prepared on diagnostic wax up in such way so as to leave a clearance of minimum 2mm for the definitive crown. Cast realigned cores for maxillary central incisors were then cemented using Zinc polycarboxylate cement (Poly F Plus; Dentsply DeTrey



Figure 4: Prefabricated and cast dowel core fabrication procedures

GmbH, Konstanz, Germany) (Fig. 4E,F). Cast cores for mandibular teeth (33,34,35) were fabricated using indirect technique after making a putty reline impressions of the post space (Fig. 4G). Heat cure denture base tooth colour acrylic resin (DPI-Heat cure, Dental products of India Ltd, Mumbai, India) was used to fabricate the temporary crowns for maxillary incisors (Fig. 4H). Full mouth rehabilitation of the permanent dentition progressed utilizing Pankey mann schulyer’s principles of occlusal rehabilitation through a quadrant arch technique.

Anterior teeth were restored first with individual PFM crowns and conventional five unit PFM fixed partial denture. Maxillary metal ceramic crowns were cemented with zinc phosphate cement (Fig. 5A,B) with modified anterior guidance that was steep to effect a mutually protected occlusion. For mandibular posterior teeth, three surveyed crowns were given to accommodate the components of cast partial denture (Fig. 5 C, D, E). The patient was instructed for home care maintenance regarding fixed partial denture and cast partial denture and was put on a regular follow up protocol that accommodated multiple disciplines. With new realigned maxillary anteriors and entire natural dentition rehabilitated, the patient reported vast improvement in her appearance, phonetics and masticatory efficiency (Fig. 6A, B, C). The patient was satisfied with the results and complied well after treatment with regular follow up visits. After one year, the patient continued to be satisfied with her treatment (Fig. 6D).

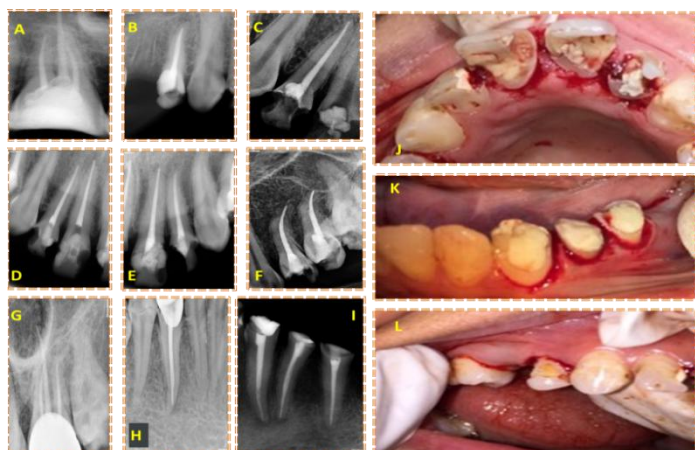


Figure 3: Endodontic treatment and crown lengthening procedures



Figure 5: Completed full mouth rehabilitation with corrected anterior guidance (compared with pre prosthetic rehabilitation)



Figure 6: Follow up (one year)

Discussion

Although orthodontic correction of malaligned teeth should always be the first line of treatment, the patient in this case did not opt for such treatment as patient had to wait for a long time before such treatment would be initiated while patient could not afford the treatment in private. Patients existing dental condition was also not conducive for conventional orthodontic treatment and would have taken more time than the patient had anticipated. Among prosthodontics options, a custom cast post and core is preferred for changing the mesiodistal or labiopatalal inclination of a proclined tooth rather than a prefabricated post and core. In this case prefabricated posts were used for maxillary lateral incisors because the root inclination of each lateral incisor permitted conservative tooth preparation and

well supported core.^{8,9} The choice of custom cast dowel core also was feasible for this patient due to presence of non-circular and irregularly shaped canals. In such cases a cast post provides better geometric adaptation to elliptical canals with minimal tooth structure removal.¹⁰

The decision to use cast dowel core for realigning crown of a natural teeth is a tricky one and should be cautiously progressed. A poorly designed restoration can lead to failure that may range from periodontal breakdown to even root fracture. Specific cast dowel core plan also included enameloplasty of the supra erupted mandibular incisal plane, which allowed incorporation of steep incisal plane, reduced paranormal forces, coordinated occlusal contacts in the anterior region and minimised creating unequal distribution of forces. Crown inclination analysis was done using a cephalometric radiograph which gave a rough idea about the amount of critical reduction on both labial and palatal side. Besides these two factors the structure and cross section of the root and gingival architecture was also considered to achieve favourable results.

Summary and Conclusion

Custom cast dowel core is a unique prosthodontic option for malaligned, malpositioned and rotated teeth. Within limits as decided by each individual case, it is an excellent alternative for patients who cannot undergo orthodontic correction for any reason. Certain areas that need further exploration are the post space design, long term periodontal health and durability of such treatments.

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