

“A Novel Approach to Determine the Aesthetic Inclination of Cast Post Core – Case Report”.

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ABSTRACT

Cast dowel core is a type of foundation restoration that is used in teeth, which are grossly destroyed and cannot support a crown. Besides, an important feature of cast dowel core is that it can be used to correct a malaligned / malpositioned / rotated tooth, by changing the angle that the core forms with its respective post within the root. Fabrication of cast core in such cases is subjective and often requires clinical adjustments. A female patient reported to us for correction of her grossly decayed dentition that also involved severely proclined (labial) incisors. Full mouth rehabilitation was indicated with correction of anterior guidance. A new method has been described that allows the practitioner to transfer verified esthetics of temporary crowns from patient to the laboratory. The patient was highly satisfied with the outcome of the occlusal changes and her complete oral rehabilitation.

Keywords: Endodontic, dowel, full mouth rehabilitation, metal ceramic crown, occlusion

INTRODUCTION

A cast post core foundation restoration in its versatility offers the clinician and the patient ultra-flexibility of correcting a malaligned tooth and when multiple anterior teeth are restored with such restorative option, it offers therapeutic option of correcting anterior guidance which is one of the hallmarks of physiological functioning of the stomatognathic system. Dynamicity of an appropriate anterior guidance in natural occlusion lies in its ability to direct and then distribute the horizontal detrimental forces towards more suitable anterior teeth especially canines. In its physiological form, the canines should disclude the posterior teeth in any/all protrusive movement following which the remaining incisors should participate by dissipating harmful forces. Among all incisor teeth, the central incisors being more suitable for distribution of forces are deprived of this role in cases of labial proclination. Labially proclined incisors also affect functions like esthetics and phonetics beside one's self-image.

Orthodontics is generally the first consideration when the patient presents with such teeth. [1], [2] Duration of orthodontic treatment, economic feasibility in relation to patient's urgency, availability of treatment at patients preferred time and cases contraindicated for orthodontic treatment makes orthodontic option impracticable for many patients. [3], [4] In such cases, prosthodontic option using a custom made cast post core is the only option. Custom cast post and core allows morphological changes of restoration that is independent of root inclination within certain limits. The angle that the core forms with its respective cast post is subjective, which often puts the clinician in an embarrassing situation. Such a lacunae, has to be corrected often with non-scientific means like reducing the cast metal on the patient, which in turn weakens the cemented post and wastes clinical time. Determining correct core inclination with respect to the esthetics of the definitive crown is a clinical procedure for which the laboratory personal cannot be relied upon. There is no procedure mentioned in the literature that allows the clinician to transfer the necessary information to the laboratory technician. This case report of full mouth rehabilitation describes an innovative clinical procedure utilizing putty index that allows clinician to guide the laboratory technician regarding the inclination and the height of cast core.

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CASE REPORT

An unmarried female patient in her late thirties reported to Comprehensive care clinic, College of dentistry, with chief complaint of excessive display of her front upper teeth that had turned black over a period of time. Patient's family, medical, social, drug and other related history were non-contributory. Dental history included tooth brushing without following any schedule. The patient's diet included regular use of fast food and soft drinks rather than home-made food. Extra oral examination showed incompetent lips (dry and cracked), proclined maxillary incisors with an excessive display during normal speech, clicking and deviation of the mandible upon opening and closing of the mouth. Intra oral examination revealed grossly carious teeth with mandibular anteriors spared [Figure 1a-f]. Generalised bleeding on probing, plaque and periodontal pockets in the range of 1 to 3 mm were negative features of periodontal status.



Figure 1: Intra oral view of maxillary and mandibular dentition (a-f) and Orthopantomograph (g)

Maxillary incisors showed proclination labially with increased proximal spaces [Figure 1c, d]. Prognostically significant findings included root stumps (15,36) [Figure 1g], 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 labial and buccal surfaces. Full mouth intra oral peri-apical radiographs and an orthopantomograph were done to assist in osseo diagnosis [Figure 1g]. Diagnostic preventive measure included superficial removal of carious tooth substance which further revealed asymptomatic irreversible pulpitis (12,17,22,24), asymptomatic irreversible pulpitis with symptomatic apical periodontitis (11,14,21,25), and a necrotic pulp (27). Mandibular left second molar was indicated for extraction, thus making mandibular arch a Kennedy class 2 partial edentulous situation. Temporary restorations were

placed following which 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. Orthodontic consultation was done, but was negated by the patient due to prolonged waiting, long duration of treatment and financial constraints.

Treatment consented by the patient included extraction of root stumps (15, 36, 37 and 46), an oral hygiene maintenance program for a period of 3 months, excavation of all carious lesions followed by temporary restorations, endodontic treatment for (11,12,14,17,21,22,24,25,27,33,34,35,43) [Figure 2a-f] followed by permanent restorations that included class I (18,28), class II (16,26,47), class III (31,32,41,42) and class V (44,45) cavities, gingivectomy and crown lengthening procedures (11,14,21,22,33,34,35) [Figure 2g-i]. A diagnostic wax up on a semi adjustable articulator was analysed and accordingly 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 [Figure 2j]. A putty index was prepared over the wax up after addition of some wax on the incisal inclines.

The index would be used for two purposes to prepare a temporary and would also assist the laboratory technician to give the required inclination to the core wax pattern. The preparatory prosthetic phase started with decoronation of maxillary incisors till a level about 2 mm above the free gingival margin to accommodate the preparation of ferrule for post core [Figure 3a, b]. For one maxillary lateral incisor, the realignment was accomplished using



Figure 2: Endodontic and crown lengthening procedures



Figure 3: Fabrication of cast post core with direct and indirect technique (a-j). Realigned temporary (k)

Prefabricated fiber post (Rely X fiber post 3M – ESPE) and a combination of direct and indirect method of post core fabrication was clinically followed for maxillary anteriors and mandibular posteriors [Figure 3c-j]. Cast post cores were prepared in the laboratory and verified on the patient by using a half cut putty index [Figure 3f]. The putty index that would be used for verification was prepared on the temporary acrylic resin crowns after developing and verifying esthetics on the patient. With refined temporary crowns, that also included the new anterior guidance, a customised anterior guide index was prepared and transferred for fabrication of definitive restorations.

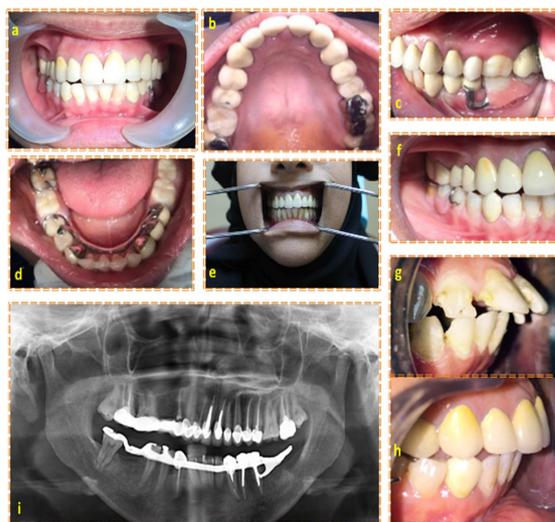


Figure 4: Definitive restorations cemented with realigned crowns (a-f). Prerestorative crown inclination and post restorative crown compared (g,h). Post restorative OPG (i)

After cementation of the cast core crowns, full mouth rehabilitation of the permanent dentition was done by restoring the maxillary anterior segment first at a new anterior guidance where the maxillary

incisors would also share the forces during protrusion [Figure 4a,b]. All definitive restorations were placed based on the principles of Pankey Mann Schulyer philosophy while following Dawson's quadrant arch approach.^[5,6] Maxillary posteriors were restored with a combination of fixed partial denture and individual metal ceramic crowns while mandibular.

Arch was restored with multiple surveyed metal ceramic crowns and a cast partial denture [Figure 4c-f].

The patient received instructions for home care 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, the patient had a better appearance with improved lip competency [Figure 4 g,h]. The patient was highly 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 [Figure 4j].

DISCUSSION

Correction of malaligned teeth with cast post core crowns seems to be an undermined treatment option, as very less attempts of such treatment are mentioned in the scientific literature. Nevertheless, while doing such cases one should consider factors like the type of the tooth, its root structure, the inclination of the crown, supraeruption, surrounding bone, gingival architecture, aesthetics and more importantly their present and future role in the respective occlusion.^[7,8] Custom made cast post core are unique in changing the inclination of malaligned natural teeth and provide a better geometric adaptation to root canals including noncircular or irregular shape canals,^[9,11] require minimal tooth structure removal and are made of alloys with high modulus of elasticity.^[12]

While fabricating the wax pattern for any restoration, the laboratory technician has to rely on the remaining surrounding tooth structure present on the working cast to decide the contours of the wax pattern. The cast post core being a single unit, the angle of which originates from the root, it becomes difficult for the technician to gauge as to what should be the new angle of the cast core. Typically, the clinician adjusts the core inclination by reducing it on the labial surface in the patient according to desired aesthetics. This not only is cumbersome to the patient (especially if the post has been cemented) but besides non-scientific it also results in wastage of clinical time and resources. Fabrication of the putty index after verifying aesthetics and phonetics on the temporary crowns allows technician to decide the inclination of the core after leaving a space of 2mm for the final crown.

CONCLUSION

The use of cast dowel core as a substitute treatment option for those patients who cannot undergo orthodontic treatment can be routinely done with excellent results. The technique described to find the esthetic inclination of the cast core is inexpensive, saves clinical time and accurate.

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