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DENTAL SCIENCE
Case Report

Endodontic Prosthodontic Rehabilitation of an Over Erupted and Protruded Anterior Tooth

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Abstract

Background: Recent trends put esthetic rehabilitation as a demanding treatment in order to correct malpositioned anterior dentition. This is enhanced by the patient's background, especially careers that require prime appearance for the public. Esthetic and functional rehabilitation can be done successfully on such case by various treatment approaches. Orthodontic therapy is the most conservative treatment option for such cases but the patient rejected it due to various reasons like long treatment time, financial constraints, and appearance during the therapy, and relapse after the treatment. Alternatively, endodontic approach combined with the prosthodontics provides a quick, reliable and economic treatment option with no chances of relapse.

Purpose: To describe that even though there are many treatment alternatives and procedures, esthetic rehabilitation on overerupted and protruded anterior dentition using endodontic treatment, cast posts and all ceramic crowns, can improve patient's appearance.

Case: This article presents a case report on esthetic rehabilitation of over erupted and protruded anterior tooth #11. Treatment was done due to patient's refusal in receiving orthodontic treatment. The patient requested esthetic rehabilitation as an expectation for faster and instant esthetic result.

Case management: Endodontic treatment was done to the involved dentition prior to the final restoration. Cast posts and porcelain fused to metal crown was used as final restoration to correct the overerupted and protruded anterior tooth.

Conclusion: Esthetic rehabilitation can be done successfully on overerupted and protruded anterior dentition. Instant result could be achieved by this treatment. This is supported by the fact that dentists should be aware of not only choosing the right treatment and materials but also patient's expectations and conditions.

Keywords: *Single visit obturation; Protruded tooth; Over erupted tooth; Post with angled core and porcelain fused to metal restoration*

Introduction

Aesthetics and pain are the main causes of letting the patient to seek treatment. The increasing demand for esthetics has encouraged the practitioners to develop new methods and techniques [1]. Orthodontic therapy is the most conservative treatment option for overerupted and protruded anterior teeth. However, it may be rejected by the patient because of longer treatment time, financial constraints and appearance during the therapy and relapse after the treatment [2,3].

Alternatively, endodontic approach combined with the prosthodontics provides a quick, reliable and economic treatment option with no chances of relapse [4,5]. Such treatment modality involves endodontic treatment followed by crowns with regard that endodontic treatment has high success rate [6,7]. In some cases, in order to correct malpositioned teeth to be in the right alignment requires decapi-

tation of partial or all of tooth crown and restore it with indirect post, core and crown restoration. Regarding this, endodontic treatments are needed to be performed over the involved dentition, although these teeth are normally intact and in vital condition. Therefore, several important considerations in determining the post-endodontic restorations are needed and based on the protection and conservation of the remaining tooth structure to reduce pressure over teeth in restorative aspect, esthetic condition, inclination, and to achieve the natural tooth morphology [6]. Aesthetic post and core, and all ceramic crowns are indicated in the anterior teeth for better esthetics [8]. However, for financial reasons, metal cast post and core, and porcelain fused to metal crowns can be done. Considering esthetic, the best material of choice taking into consideration the cost factor for matching the natural state of a complex human dentition as in indirect anterior restoration is porcelain fused to metal crown for the highly desirable properties in color stability, translucency, light transmission, and biocompatibility [9-11].

The primary purpose of a post is to retain a core in a tooth with extensive loss of coronal tooth structure. If an endodontically treated anterior tooth is to receive a crown, a post often is indicated [12]. When the angle of the core must be changed in relation to the post, prefabricated posts should not be bent; therefore the custom cast post best fulfills this requirement [13].

Since there are many different philosophies and technologies that can be applied to esthetic rehabilitation cases, dentists must enrich themselves with thorough understanding about recent technologies and materials, and with that would come a greater ease in providing esthetic services with satisfactory results for the patients [14].

This case report describes the aesthetic rehabilitation of maxillary anterior overerupted and protruded teeth in no time using the combined endodontic prosthodontics approach.

Materials and Methods

A female patient 45 years old referred from the screening clinic, complaining from inability to incise, aesthetic, and psychological problems resulting from severely protruded and over erupted tooth # 11. During the treatment planning session, she rejected the orthodontic treatment since she wanted an immediate treatment. Hence, the alternative plane included endodontic treatment of tooth # 11 Figure 1 (labial view) & Figure 2 (mirror image for the palatal view)], followed by post and core along with full crown coverage. An informed consent of the patient was obtained before beginning of the procedure for the treatment. Endodontic treatment using single visit obturation technique was done to the tooth in question. Posthole preparation was performed following the standard procedures. An old head strome file (Union Broach) was fitted into the root canal so that it extended to the full depth of the prepared canal. The file was removed from the canal, and the canal was lightly lubricated with separating medium (Duralay, Relience Dental Manufacturing Co.). After posthole preparation, the injection technique was used to rapidly generate direct post and core patterns with cold cure acrylic resin. Cold cure resin (Duralay resin, Relience Dental Manufacturing Co) was mixed to a low-viscosity consistency. The acrylic resin was loaded into a needle tube that was inserted into Mark Speed Slot Syringe (Centrix). The acrylic resin was injected into the canal; beginning at the apical end of the canal and moving incisally as the resin was extruded from the syringe. The fitted file as wetted with monomer liquid and inserted into the acrylic resin in the canal and the remaining resin in the needle tube was extruded from the syringe to form the core portion of the pattern. The core portion was shaped with a plastic instrument while it was still in the doughy stage. The acrylic resin was not allowed to fully polymerize within the canal. The resin pattern was loosened and reseated several times while it was still elastic (rubber like) but was not removed entirely from the canal.

As the resin had polymerized, the pattern had been removed and examined for undercuts, voids, accuracy and stability. The core can be roughly shaped in the hand with green stones and coarse garnet discs. The preparation for the final restoration is completed with the dowel-core pattern in place. It is desirable to complete reduction and contouring in resin, because it is both difficult and time-consuming to shape the metal after the dowel core has been cast. The finished post core pattern was smoothed with fine sandpaper discs and a Burlew wheel (JF Jelenko, Armonk, NY) while still on the tooth (Figure 3). The resulting post pattern with angled core (Figure 4) was sprued, invested, and cast following the standard procedures and cemented in place (Figure 5). Porcelain fused to metal crown was constructed, cemented in place, correcting the protrusion [Figure 6 (labial view) and Figure 7 (mirror image for the palatal view)], and all complaints

of the patient has been eliminated in a very short time. Follow up was performed every 6 months for two years after correcting the problem and the patient was very happy and very satisfied with his appearance without any complications.

Figure 1: *Protruded &overerupted tooth #11 (Labial view).*

Figure 2: *Protruded & overerupted tooth #11 (mirror image for Palatal view).*

Figure 3: *Finished post core pattern on tooth # 11 (labial view).*

Figure 4: *Post with angled core pattern.*

Figure 5: *Cemented cast post and core (labial view).*

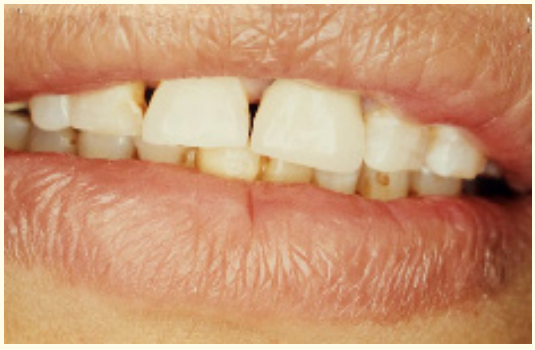

Figure 6: *Porcelain fused to metal crown cemented in place on tooth # 11 (labial view).*

Figure 7: *Porcelain fused to metal crown cemented in place on tooth #11 (mirror image for the palatal view).*

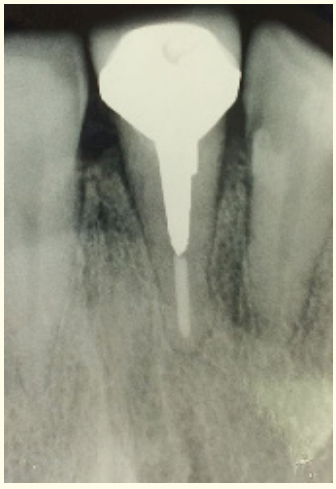

Figure 8: *X-ray of the finished case.*

Discussion

Endodontists have been treating patients in one-appointment visits for some time. At one time, reported that nonsurgical one-visit treatment was part of their program [15]. Single visit root canal obturation was performed to the protruded tooth in order to reduce clinic time especially the tooth was vital. In the current work this protocol was used to shorten the time for correcting the tooth in question.

The quick fabrication and exact fitting of custom-made posts is the aim of fixed prosthodontic clinicians. Fabricating the resin pattern *in vivo* by the bead-brush technique [16] may lose time and effort for the dentist. The injection technique, instead of the bead-brush technique, was used to make pattern for the post and core because it is not time consuming [17,18].

Also the bead-brush technique is numerous setting reactions of the acrylic resin that occurring simultaneously. As a result, different portions of the post and core pattern are in slurry, stringy, doughy, and rubbery stages of polymerization process. Patterns may be locked into undetected undercuts because the coronal portion appears to be elastic, while the apical portion has passed the elastic stage of polymerization process. The injection technique eliminated the problems associated with the multiple setting reactions of the bead-brush technique because the resin was mixed, loaded into a needle tube and syringe, and injected to form the post and the core

portion of the pattern. The preparation for the final restoration is completed with the dowel-core resin pattern in place. It is desirable to complete reduction and contouring in resin, because it is both difficult and time-consuming to shape the metal after the dowel core has been cast [19].

During abutment preparation, gross labial reduction was performed to allow the crown to be fabricated in proper alignment. The core portion was done with palatal angulation to correct the protrusion and still expecting favorable stresses to the tooth in question. This could be supported on the basis of the observations, of a three dimensional Finite Element Analysis (FEA) to access stress pattern in different implant abutment angulations. In this FEA it is concluded that though the compressive and tensile stresses generated through axial and oblique loading increase as the abutment angulation increases yet they are within the tolerance limits of the bone. However, care should be taken while planning a restoration so as to minimize the oblique component of force [20]. The treated tooth was followed up for two years and remained in the correct relationship with its neighboring and opposing teeth. The patient was highly satisfied with the results obtained.

Conclusion

A simple, quick and alternative method to orthodontic treatment for correcting over erupted and protruded tooth was presented. Prosthodontists and event general practitioners can utilize this technique to manage cases with similar malocclusions.

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