

Case Report

MANAGEMENT OF FRACTURED TOOTH WITH EDELWEISS POST AND CORE FOLLOWED BY LITHIUM DISILICATE CROWN – CASE SERIES'

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ABSTRACT

Rehabilitation of anterior endodontically treated tooth is a challenging task. Moreover esthetic and functional correction is mandatory. However wide variety of post systems are available for restoring the lost tooth structure but clinical decision of which one has to be used constitutes a challenge to practitioner. When dental aesthetics is of primary concern, the selection of the underlying restorative material becomes an important factor to consider. Newer post systems are available with post and core and monobloc concept to enhance strength and also reduce chair side time. All-ceramic crowns offer a highly aesthetic outcome in anterior region restorations. The purpose of this paper is to present esthetic and functional rehabilitation of mutilated tooth using edelweiss post and core system with lithium disilicate crown.

Keywords: Endodontically treated tooth, Edelweiss post and core system, Monobloc, laser sintered.

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INTRODUCTION

Functional rehabilitation along with esthetics is mandatory for anterior endodontically treated tooth. Translucency and fluorescence, in a tooth, is not possible with metal post. Post and core are essential for longevity of restoration. Cast metal post and cores are widely used for restoring endodontically treated teeth with extensive loss of coronal tooth structure and to retain metal-ceramic crowns. However, rigid post system like cast metal alloy post may lead to catastrophic failure due to high modulus of elasticity.^[1] Newer aesthetic post and core system offers biocompatibility, reinforcement of remaining root, prosthesis retention along with improved optical properties.^[2] Although material science has evolved, but failure rate can be observed, because of lack of strong bonding between composite resins for core material and prefabricated post.^[3] To overcome all issues regarding improved biocompatibility, tensile strength, fatigue resistance, shear stress, modulus of elasticity and distribution of forces which affect the tooth root, edelweiss post system (edelweiss dentistry products gmbh, Austria) can be used. It is a unique, single-piece, high-strength customizable composite post and core system. This makes treatment easier, simpler and more predictable. It is

composed of barium glass, strontium and zinc oxide which are embedded in resins. Sintered crystal leads to monobloc which leads to perfect mechanics within the material without wedging effect. It is translucent and has improved adhesion with root dentine.^[4] This case report presents the possibility of carrying out the post & core placement together with the fixed prosthesis in less time, which makes it cost effective too.

CASE REPORT 1

Patient reported with a chief complaint of broken tooth in her right upper front region of mouth since 2 months. She had a history of root canal treatment in relation to 11, one year back. On clinical examination, only labial wall was present (**Fig 1a&b**). On radiographic examination, the root canal treatment was satisfactory and periapical changes were not evident. Restoration using edelweiss post and core system followed by all ceramic fixed prosthesis was advised. First, coronal gutta percha was removed using peeso reamer no.2 (1.40 mm, Largo Peeso reamer, Dentsply Maillefer) followed by post space preparation by the drill which was provided with Edelweiss post and core system (Edelweiss dentistry products gmbh, Austria) (**fig 1c**). The fit of the post was checked first (**fig 1d and e**). Etching of post space

was done for 15 seconds (**fig 2a**). It was rinsed, dried and bonding agent was applied for 20 seconds (**fig 2b**). Bonding agent was applied on Post and core for 30 seconds (Veener bond, dental adhesive, Edelweiss dentistry products gmbh, Austria) (**Fig 2c**). Post & core cementation was done using dual core adhesive cement (Calibra universal dual core, Dentsply Sirona) and polymerized for 60 seconds (**2d and e**). Tooth preparation was done and impression was taken using elastomeric impression material (Dentsply aquasil soft putty and Light body, Dentsply Caulk) (**fig 3a**). IPS e max Lithium disilicate crown was fabricated and placement was done using Calibra self-adhesive resin cement (Dentsply Sirona) (**fig 3b and c**). One year follow up was satisfactory (**fig 3d**).

CASE REPORT 2

A patient reported with a chief complaint of broken tooth in upper front region of mouth since 1 year. He had a history of trauma, 2 years back. On clinical examination, fracture in respect to 21, only cervical third was present (**fig 4a**). On radiographic examination, periapical changes were evident (**fig 4b**). Diagnosis of Ellis type IV fracture was made and root canal treatment followed by edelweiss post and core system & all ceramic fixed prosthesis was advised. First, access opening was modified & working length was established. Biomechanical preparation was done till 80 no. k file (M access, Dentsply maillefer, Switzerland). Irrigation was performed using 17% EDTA, 3% sodium hypochlorite solution & normal saline. Calcium hydroxide (Avue cal, dental avenue Pvt. Ltd, India) dressing was given. After 21 days, calcium hydroxide dressing was removed. Master cone radiograph was taken. The canal was dried with absorbent paper point (Dentsply maillefer, Switzerland). Obturation was done using sectional obturation technique. Post space preparation was done with drill. The fit of post was checked (**fig 4c**). Canal was etched for 15 sec; rinsed, dried and bonding agent was applied for 20 seconds. Bonding agent was applied on edelweiss post and core for 30 seconds (Veener bond, dental adhesive, Edelweiss dentistry products gmbh, Austria). Post & core cementation was done (Calibra universal dual core, Dentsply Sirona) and polymerized for 60 seconds (**Fig 4d**). Tooth preparation was done (**fig 4e**) and impression was taken (Dentsply aquasil soft putty and Light body, Dentsply Caulk) (**fig 4f**). IPS e max Lithium disilicate crown was cemented. (Calibra, Dentsply Sirona, U.S.A) (**fig 4g**).



Figure 2: a) Etchant application, b) Bonding agent applied, c) Application of direct veneer bonding on post, d) Curing, e) Post cementation radiograph

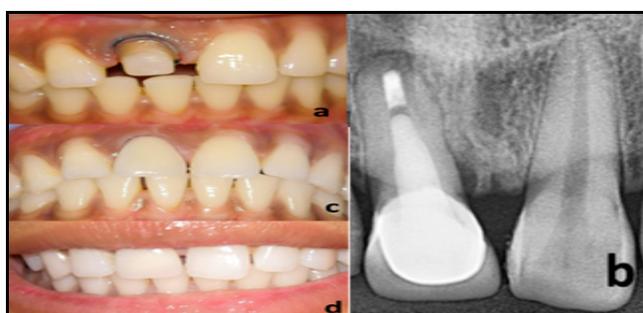


Figure 3: a) Tooth preparation photograph, b) Crown cementation radiograph, c) Crown cementation photograph, d) Follow up photo graph



Figure 1: a) Preoperative clinical Photograph, b) Preoperative Radiograph, c) Post Space Preparation Radiograph, d) Post placement radiograph, e) Post placement photograph



Figure 4: a) Preoperative photograph, b) Preoperative radiograph, c) Post placement radiograph, d) Post cementation radiograph, e) Tooth preparation photograph, f) Impression photograph, g) Crown cementation photograph

DISCUSSION

The choice of appropriate post and core restorations is often complicated and should be guided by knowledge of their physical properties, indications, advantages and disadvantages, as well as the amount of coronal structure missing and aesthetic requirements.^[5-8] Higher modulus of elasticity of crown wall and rigidity of metal post and core provides retention and stability to crown restoration. But catastrophic vertical failure may occur if load exceeded the limit of resistance of the root.^[9] Especially; the placement of a fiber-reinforced composite post is required under conditions of extensive coronal destruction. For direct buildup of the coronal tooth structure, many types of resin composite materials have been proposed.^[10,11] According to some authors the fiber posts root fractures are rare compared with metallic posts because of uninterrupted bonding at all interfaces and adhesive integration between five components of the fiber reinforced composite resin system (denture surface, luting cement, fiber post, core build-up, and crown).^[12-16]

However, there are also some reported disadvantages of these restorations such as: volumetric contraction during and after the process of polymerization, resulting in stress concentration at the adhesive interface which may lead to debonding or fracture.^[17, 18]

The latest generation of adhesive systems provides acid etching to remove the smear layer and demineralize root dentin, so that available surface area of dentin increases. The infiltration of resin monomers permits hybrid layer formation and creates resin tags with adhesive lateral branches, thus creating micro mechanical retention. However, long term Randomized Control Studies would be desirable.^[9, 12-18]

The availability of new laser sintered, prefabricated, aesthetic edelweiss post and core has created the need for a systematic evaluation of their physical properties and clinical performance. As per manufacturer, these posts have a conical shape for perfect post space adaptation. The translucency of the post allows uninterrupted light transmission for complete polymerization even at the most apical portion of the post. It's specifically designed to mimic the natural tooth form for better retention of the final clinical crowns. The adhesive bonding further contributes to avoiding the wedging effect by providing a single monobloc between the adhesive layer and the composite post refabricated post and core. Flexural modulus is 20 GPa like Dentin (15 – 20 GPa). Edelweiss post drill allows inward progression of drill flutes designed to allow debris out of the canal with improved metallurgy. Solid center core maintains centrality within the canal and allows for ideal post fit. Additional stepped cutting tip enhances cutting and shaping of post space.^[4] Various all ceramic restoration are available but IPS e. max CAD was selected due to long term clinical success, less laboratory steps in addition to good bonding characteristics.^[19]

CONCLUSION

Selection of suitable post and core system is challenging. Moreover, it's a viable choice when there is little or no coronal tooth structure but indications, advantages, disadvantage, esthetics as well as the amount and quality of remaining tooth structure should be considered before selection of particular post and core system. Edelweiss post and core system can be chosen as an alternative with all-ceramic restorations for promising result.

Although cast metallic posts has its own advantages but edelweiss post and core with all ceramic prosthesis should be preferred when hard tissue loss is a prime concern along with esthetics.

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