

## Reconstruction of anterior teeth using an aesthetic post-and-core and all-ceramic material. Case report

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### Summary

Modern attitude in today's dentistry in establishing the treatment design is orientated towards prevention, aesthetics and metal-free solutions.

*The purpose* of our survey is to demonstrate that such materials and means to be used to create complete durable physiognomic prosthetic restorations (without metallic infrastructure), are available.

*Material and method.* A 20 year-old patient manifests a severely destroyed superior left central incisive which we reconstructed both in the root and crown areas, without metallic infrastructure, using an aesthetic pivot from Para Post Fiber Lux (Coltene/Whaledent) Kit, adhesively cemented with Para Cem Universal (Coltene/Whaledent); preparation of the coronary area with a rounded border and coverage with an all-ceramic Wieland crown.

The result obtained is a crown-root restoration, which reassesses the shape, color and function in the superior left central incisive. From an aesthetic point of view it shows no differences compared to the right incisive. Even if it lacks the metallic infrastructure, the restoration obtained is resistant.

*Conclusions.* The restoration of teeth with severely destroyed crowns and endodontic treatments is possible with substantial efforts from both the doctor and the patient. We, as practitioners, along with our patients reckon such perfectly aesthetic and functional results as highly satisfactory.

**Key words:** pivot, dual cement, all-ceramic crown.

### Introduction

Modern Dentistry is based on two directions: prevention and aesthetics. Introducing new materials and improved technologies in dental practice has created new opportunities to attain these two goals.

Furthermore, the rising popularity of dental aesthetics leads to a metal-free prosthetics trend [1,2].

The crowns of the anterior teeth in young people and senior citizens as well, are

often affected by cavities, color changes, extended filings, fractures or abrasion [3]. These teeth also require endodontic treatments in most cases [4], ultimately being covered with protective crowns that will give them back the natural shape of the teeth and their function [5].

In severe coronary destruction clinical case, with minimum dental substance remaining above the gum, a reconstruction with pre-made root pivots is recommended, followed by the later reconstruction of the

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crown [6]. For years metal pre-made root pivots were used, which involve major disadvantages: unaesthetic corrosion due to the fact that they shadow the gum borderline and sometimes even the crown itself, and cause allergies. Alternatives to metal pivots are the aesthetic ones [7].

Using direct reinforcement techniques on the remaining root with Para Post Fiber Lux (Coltene/Whaledent) aesthetic pivots and core build-up with dual Para Cem Universal (Coltene/Whaledent) cement, treatment time is downsided to one session, which leads to a positive impact on the patient [8].

### Material and method

We used physiognomic pivots from the Para Post Fiber Lux kit from Coltene/Whaledent and Para Cem Universal cement also from Coltene/Whaledent to secure and reconstruct the crown.

The crown was made of Wieland ceramics.

The Para Post Fiber Lux kit contains:

- 6 conventional sized pivots (3; 4; 4.5; 5; 5.5; 6), color coded;
- 6 drills corresponding to the given pivots;
- the guide for selecting the pivots.

(Figure 1)

Para Cem Universal is dual resin-based cement, used in adhesively securing the root pivot, core build-up and the adhesive cementation of the all-ceramic coverage crown. (Figure 2)

### Clinical case

Patient A.B. male, aged 20, student, reports to the Dental Medicine Faculty's Prosthetics Clinic to undergo a rebuilding of a crown-root unaesthetic restoration of the left central incisive. The clinical examination reveals a color change in the tooth, which also has a large un-adapted, abraded,



Figure 1. Para Post Fiber Lux Kit



Figure 2. Para Cem Universal Kit

opaque composite filing with unaesthetic cervical margins and smile line (Figure 3). The occlusal analysis indicates the presence of an overbite and an overjet. The Rx shows the presence of an endodontic treatment and the presence of 2 Dentatus pivots in the root canal (Figure 4). The periodontal support is favorable with a slight gum inflammation and presence of corrosion marks.

After the clinical and paraclinical examination we set up the following treatment design: reinforcement of the root canal with a Para Post Fiber Lux pivot, core build-up with Para Cem and covering it with an all-ceramic coverage-crown.

Before proceeding, the impressions of the maxilla and mandible arch are taken with alginate for the study models. This is when the color is also taken, using as guide the similar tooth (the right central incisive). It is important to complete this step at the very beginning of the appointment. As treatment progresses during the appointment the teeth will dehydrate and create erroneous reading.

The old composite filling is removed followed by the Dentatus pivots, including the corrosion affected blackened dentine. The canal is cleaned. (*Figures 5 and 6*)

The guide from the Para Post kit serves for choosing the right pivot (by superimposing the guide over the Rx of the tooth to be reconstructed). (*Figures 7 and 8*)

According to the pivot chosen we use the correspondent drill (that has the same color as the pivot - 5.5 purple) for paralleling the pivotal space. This is followed by the removal of all detritus from the canal through irrigation with the water spray. We use a cylindrical diamonded rotating instrument to prepare an anti-rotating cassette. The selected pivot is tested to see if it fits the canal; its head must remain outside the root canal serving to the retention and maintaining of the prepared crown. As through occlusal verification the pivot appears to be too long, it is shortened apically with a carborundum disc. The pivot is cleaned with alcohol and dried. (*Figure 9*)

We begin the adhesive cementation of the chosen pivot, a phase that consists of 3 steps:

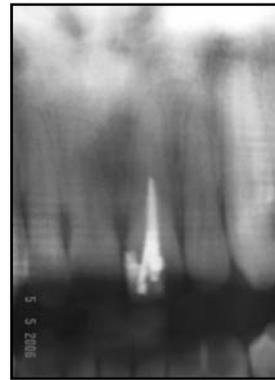
1. The conditioner is applied for 30 seconds; the excess is removed using paper cones and air jet for 2 seconds.
2. The adhesive (prepared from liquids A and B) is applied for 30 seconds; the excess is removed with a paper cone and air jet for 2 seconds.
3. The Para Cem cement is prepared and is placed in the root canal with a Lentullo needle; the pivot is placed in position and pressure is applied for 60 seconds in order to allow the excess cement to outburst; the excess is removed, and light-polymerization is applied for 60 seconds with Acta by Satelec. (*Figure 10*)

To reconstruct the crown preparation the same Para Cem cement is used. Light-polymerization is applied as many times as needed, the first time from the oral side so that the contraction force that appears during polymerization will attract the material on the remaining dental substance and on the pivot, instead of removing it. The crown is prepared with a rounded cervical border, with a 1.5 mm labio-incisal reduction and ~ 0.7 mm of the oral side in the anterior zone, to allow the technician to create a sufficient width for the future ceramic crown in order to obtain the desired aesthetic effect. The margins of the future crown will be placed slightly below the gum line. A Retracto (Roeko) impregnated retraction wire is applied in the gum groove so that the impression will record all the marginal details (*Figure 11*). We took an impression of the prosthetic area with additional silicone. A temporary crown is made through the direct method from DentalonPlus (Heraeus Kulzer) according to an impression made with putty silicone, it is adapted and cemented on the prepared crown with eugenol-free Temp Bond (Kerr) temporary cement, this being the final phase of the session (*Figure 12*).

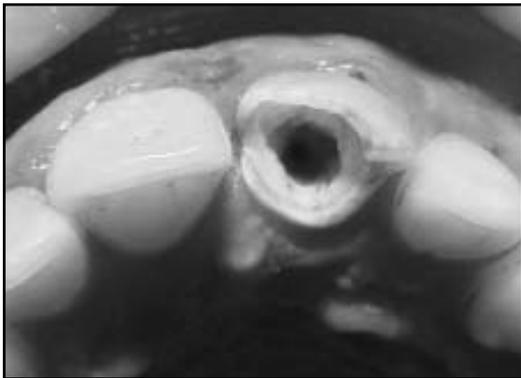
The impressions are sent to the laboratory along with all the information concerning the construction of the crown from Wieland pressed ceramics.



**Figure 3.** 21 pre-treatment aspect



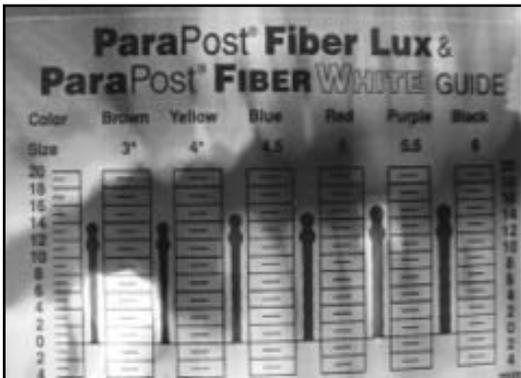
**Figure 4.** Pre-treatment Rx image



**Figure 5.** Intraoral aspect after the removal of Dentatus pivots



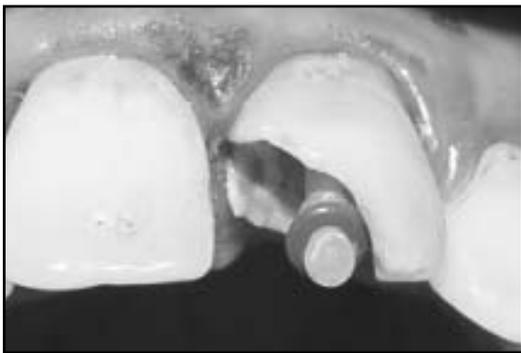
**Figure 6.** Frontal aspect



**Figure 7.** Selection guide



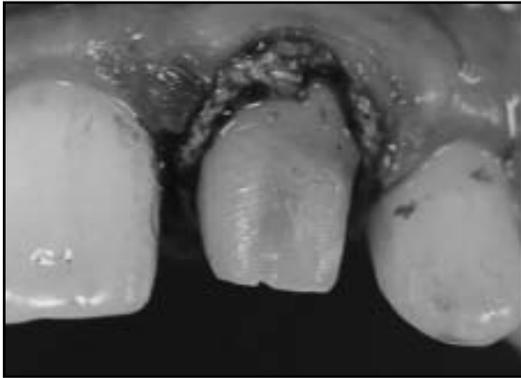
**Figure 8.** Root canal preparation



**Figure 9.** Pivot fitting in the root canal



**Figure 10.** Light-polymerization of the dual cement



**Figure 11.** Dental preparation



**Figure 12.** Temporary crown



**Figure 13.** Permanent crown on the model



**Figure 14.** Permanent crown cemented in the oral cavity

At his next visit, the patient tries on the all-ceramic crown and the entire architecture is checked along with the color shade, marginal adaptation, both static occlusion and dynamic with Double-Check (Swe-Dent) articulation paper. After all these criteria were checked the preparation is cleaned and the crown is permanently cemented with Para Cem according to the same technique previously described (*Figures 13 and 14*).

## Results

The therapeutic solution chosen, through the restorative materials used, has instituted biological harmony with the soft and hard tissues.

The restoration ensures retention, resistance and excellent aesthetics. A balance between the 2 central incisors is created, the ideal aesthetic outcome, harmonious

and pleasant, enhancing patients' smile personality.

## Discussion

The Para Post Fiber Lux has the following advantages:

- offers superior aesthetics, through translucidity;
- reflects the tooth's natural shade;
- reflects natural light, eliminating the risk of shadows;
- light transmission in the cervical area is excellent;
- they provide excellent resistance to compression and flexion (due to the unidirectional fibers in the resin matrix);
- they can be cemented with several cement types: self-curing, light-curing or dual cement; radio-opacity;

- they distribute forces in functional fashion, thus protecting the remaining root dentine;
- the round head is an ideal design for the retention of the composite resins currently used in the reconstruction process, reducing the stress in the preparation as the pivots with angles and pointed margins cause stress areas inside the material leading to microfractures, the final outcome being coronary instability, marginal unadaptation and recurrent cavities;
- the pivot head has anti-rotational flat and double retentions for securing the material of the coronary preparation;
- allows placing with minimum dental sacrifice;
- are easily removable.

Para Cem Universal has the advantage of being dual multifunctional cement that we used in the adhesive cementation of the root pivot, reconstruction of the coronary preparation and the adhesive cementation of the coverage crown. It is highly retentive, thixotropic, easy to use, easy to clean, has

enhanced adhesivity, releases Fluoride. Para Cem is available in 3 colors: A2, B3 and opaque, which conveys it a very good aesthetic effect.

## Conclusions

The prosthetic restoration of endodontically treated teeth using esthetic pivots aims at retaining the material out of which the abutment is made.

The pivots ensure favorable retention form for the core build-up restorative material.

The adhesive resins completely changed the treatment options in severe coronary destruction clinical cases.

Modern materials simulate the natural dental structure properties.

The prosthetic restoration of endodontically treated teeth is possible only if we use quality materials, compatible amongst them. It is fortunate for us as clinicians, and especially patients, that we have predictable materials available for such perfectly aesthetic and functional restorative dentistry.

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