ANATOMICAL POST: A SIMPLE AND SAFE ALTERNATIVE

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Palavras-chave: Técnica para Retentor Intrarradicular. Pinos Dentários. Estética Dentária. Relato de caso.

RESUMO

Objetivo: Descrever um caso clínico de confecção do pino anatômico para suporte e retenção de restauração indireta em dente anterior. **Relato do Caso**: Paciente feminina, 72 anos, compareceu ao consultório queixando-se que a coroa do dente 22 havia "soltado". Realizou-se exame clínico e radiográfico do elemento 22, que apresentou conduto radicular bastante amplo, deslocamento total do conjunto núcleo/coroa e tratamento endodôntico satisfatório. O planejamento restaurador para essa paciente incluiu a confecção de pino anatômico, com pino de fibra de vidro Exato #2(Angelus, Brasil) reembasado com resina composta Bulk One (3M, EUA), utilizando o cimento resinoso autoadesivo U200 (3M, EUA). Foi realizada a reconstrução da porção coronária do pino também com resina composta do tipo Bulk. Realizou-se, na mesma sessão de atendimento, o preparo para coroa total e restauração provisória utilizando dente de estoque e resina-acrílica autopolimerizável. Em sessões seguintes foi realizada a moldagem e cimentação da coroa total em cerâmica pura. **Conclusão**: A utilização de pinos anatômicos com resina composta representa uma alternativa tecnicamente viável, de fácil aplicabilidade, com baixo custo e em única sessão, para reabilitação de dentes tratados endodonticamente com conduto radicular onde os pinos em fibra pré-fabricados convencionais não apresentam boa adaptação.

Keywords: Post and Core Technique. Dental Posts. Esthetics Dental. Case Report.

ABSTRACT

Objective: To describe a clinical case that called for an anatomical post to be made to support and retain an indirect restoration in the anterior tooth. **Case report**: A 72-year-old female patient came to the office complaining that the crown of tooth 22 had come loose. A clinical and radiographic examination of element 22 was performed, and showed a very broad root canal, total displacement of the cast metal crown-core set, and satisfactory endodontic treatment. The restorative planning for this patient included the making of an anatomical post from Exacto # 2 fiberglass post (Angelus, Brazil), and refilling it with Bulk One composite resin (3M, USA), using self-adhesive resin cement U200 (3M, USA). The reconstruction of the coronary portion of the post was also performed with the same composite resin (Bulk One 3M, USA). The preparation for full crown and temporary restoration was performed in the same session, using self-curing acrylic resin. The all-ceramic crown was molded and cemented in subsequent sessions. **Conclusion**: The use of anatomical posts with composite resin represents a technically viable alternative for rehabilitating endodontically treated teeth with wide root canals, in cases where conventional prefabricated fiber posts cannot be adapted easily. The advantages that stand out are that these posts can be applied easily, at low cost, and in a single session.

Submitted: December 08, 2021
Modification: March 16, 2022
Accepted: April 20, 2022

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INTRODUCTION

Rehabilitation of an endodontically treated tooth can still represent a major challenge for clinicians.[1] This is because endodontically treated teeth undergo great loss of coronary structure, and generally need intraradicular retainers to receive and retain the coronal restorative material.[1,2] Intraradicular posts serve to improve retention and provide longevity to the restorations.[1] This type of retainer is a clinical alternative for reconstructing endodontically treated teeth with severe coronal destruction. It provides stability and retention, and minimizes the risk of fracture and displacement of the restoration.[2,3]

Fiberglass posts are well-suited restorative products for distribution on the market, because their physical and mechanical properties are similar to those of the tooth structure, especially their modulus of elasticity, compared with metal posts. Moreover, these posts form a single body with the remaining tooth, thereby providing a lower incidence of fracture.[3-5] They are aesthetic, and adhere easily to the tooth structure, when used in conjunction with adhesive systems and resin cements.[3]

It is not uncommon to come across extremely wide and weakened root canals. In this case, the preparation of the root canal to receive this intraradicular post should be performed very carefully to avoid unnecessary wear that could further weaken the remaining structure.[2,6] Preserving intraradicular dentin is crucial to achieve optimum biomechanical behavior of the tooth.[6] If there is inadequate adaptation of the post, the cementation line will be thick, and affect retention, which is the basic reason for choosing this type of retainer.[7]

Therefore, the post cannot perform its function of effective retention, unless it adapts snugly to the walls of the root canal.[8] Among the techniques used for large and weakened canals, the anatomical post technique stands out for its simple, low-cost, and single session clinical application.

This technique consists of repositioning the fiber post in the root canal with an adhesive system and composite resin. It was developed to improve the adaptation of the post to the root canal, and provide favorable conditions for retention. The more well-adapted the post is to the root walls, the better the adhesive and resin properties will benefit the remaining tooth. These properties include increased retention and increased fracture resistance.[9]

The objective of this case report was to describe the clinical technique of making an anatomical post that ensures greater longevity of the restorative treatment.

CASE REPORT

A 72-year-old female patient came to the dental office reporting that the crown of dental element 22 had come loose (Figure 1). A clinical examination revealed a very wide root canal, and total displacement of the fused metal crown-core set (Figure 2). Radiographic examination showed satisfactory endodontic treatment. The restorative planning for this patient included making an anatomical post to provide provisional restoration and a full crown. An anatomical post was chosen due to the configuration of the root canal: wide canal and ovoid shape.

Absolute isolation was performed, allowing good visualization of the operative field, asepsis, and adequate humidity control conditions to work with adhesive materials. The walls of the root canal were shaped with Largo 3 and 4 burs for better adaptation and modeling of the anatomical post. Afterwards, Exacto #2 fiberglass post (Angelus, Londrina, PR, Brazil) was selected (Figure 3). The root canal was modeled by isolating it previously with a water-soluble lubricant (K-Med Gel, Cimed, São Paulo, SP, Brazil), using a disposable brush.

The fiberglass post received an initial adhesive treatment consisting of swabbing it with 70% alcohol, followed by first applying silane (Angelus, Londrina, PR, Brazil), and then the Single Bond Universal adhesive system (3M, Saint Paul, MN, USA) (Figure 3). Next, a small amount of Bulk One A1 composite resin (3M, Saint Paul, MN, USA) was inserted into the root canal, filling it completely. The fiberglass post was then inserted into the composite resin mass of the root canal in a centralized position (Figure 3). Initial photoactivation was performed for 30 seconds with LED light (Radii-Cal, Bayswater, VIC, Australia). Then post-composite resin set was removed from the canal and photoactivated for an additional 30 seconds on each face of the anatomical post (Figure 4). The anatomical post was reinserted to make sure the adaptation was adequate, and to check its insertion position.

The surface treatment of the anatomical post consisted of swabbing with 70% alcohol, drying and applying silane. Then, the root canal was washed with water jets and dried with absorbent paper cones to ensure the dentin was moist (not dehydrated), and hence suitable to receive the self-adhesive resin cementing agent (U200, 3M, Saint Paul, MN, USA). The cement was inserted into the root canal with a lenticular tip. A small portion of the cement was also applied onto the tip of the post, which was then inserted into the root canal using light digital pressure (Figure 5). Excess cement was removed using disposable brushes (Aplik, Angelus, Londrina, PR, Brazil), followed by photoactivation of the cement for 30 seconds. Reconstruction of the coronal portion of the post was performed, also with Bulk One composite resin (Figure 6).

The preparation for a full crown, and the provisional restoration were completed in the same session, using an acrylic resin denture tooth, and self-curing acrylic resin. The all-ceramic full crown was modeled and cemented in subsequent sessions. Contact adjustments and disocclusion checks were performed (Figure 7).



***Figure 1**: Appearance initially and after absolute isolation of the operative field.*



***Figure 2**: Initial x-ray.*



***Figure 3**: Prefabricated post unadapted to the root canal after insertion in the composite resin mass.*

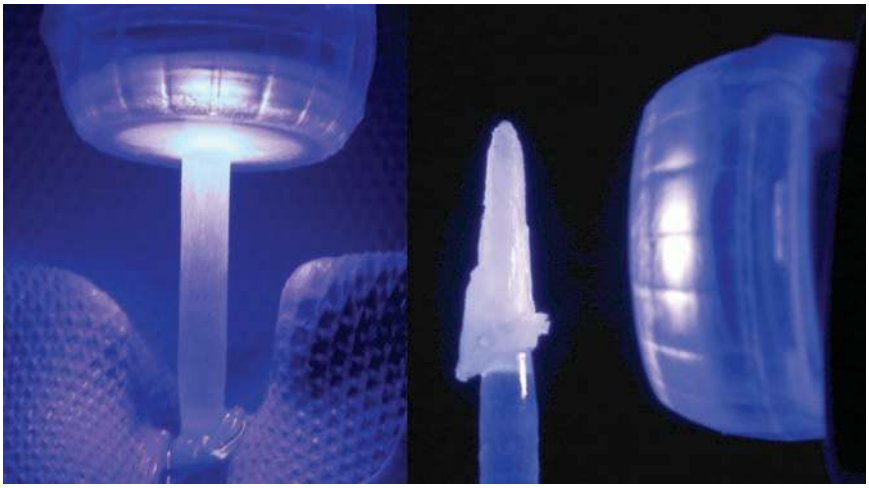


***Figure 4**: Light-curing of the anatomical post and final appearance.*



***Figure 5**: Adaptation of the anatomical post to the root canal during cementation phase.*



***Figure 6**: Bulk One composite resin-filled core.*

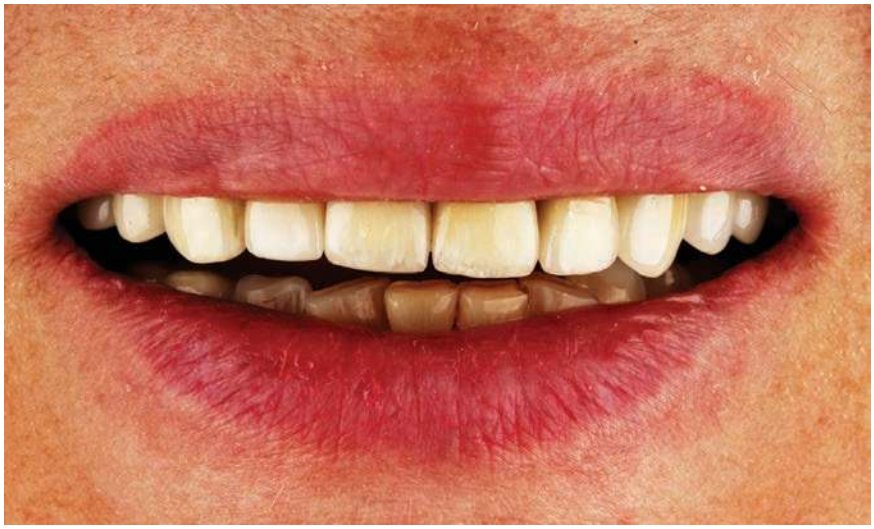


***Figure 7**: Final appearance of the completed crown.*

DISCUSSION

Fiberglass posts offer advantages such as satisfactory biomechanical performance, with stability and biocompatibility, resistance to fatigue and corrosion, and an excellent aesthetic result. They also have high adherence to cementing systems, thus ensuring greater retention of the adhesive material to the restorative work.[2,3,5,10]

However, teeth have unique anatomical characteristics, and may present root canals that are ovoid in shape, with increased conicity and expulsion, or that even have overly enlarged canal lumen, from causes such as endodontic treatment. The placement of the posts should be planned, in order to ensure the long-term success of the treatment; therefore, the root anatomy is considered a determinant in choosing the retainer post to be used.[11]

This great anatomical diversity, and clinical situations similar to the case described in this study have made the technique of relining the fiberglass retainer with composite resin an excellent option to eliminate maladaptation between the post and the inner wall of the root canal, as described in the clinical situations herein. This technique allows modeling of the root canal, creating an individualized retainer, improving its adaptation, and providing a better mechanical interlock between the restorative assembly and the root dentin.[11-12] This reduces the cementation line, which in turn minimizes possible failure by displacement, and assures improvement of the entire system.[11,13]

The technique is a simple procedure that is capable of improving mechanical retention, and that contributes significantly to treatment longevity. There is evidence in the literature that relined posts promote higher survival and clinical success rates than posts relined with composite resin.[14] The advancement of CAD-CAM technology has led to the development of milled posts as a valid alternative to restoring endodontically treated teeth that have oval or wide root canals. However, it is important to emphasize that this method of producing posts still has high operating costs, compared to the anatomical post technique.[15] Thus, the alternative of rebonding the fiber post in the root canal with an adhesive system and composite resin seems to be more viable, since it can be performed in a single clinical session, and costs less, compared with the milled post technique.

Currently, the alternative of using root retainers has been discussed, regardless of factors such as the amount of remaining tooth. The rationale is that adhesive materials alone inserted at the entrance of the canal could provide sufficient retention. According to the vast literature on this subject, the use of root posts does indeed increase the retention of the core filling or the future restoration.[1,2,8,16]

In regard to ensuring the final strength of a tooth with or without the use of a post, what is most important is that the functions of the affected tooth be restored using a conservative approach in all the stages of treatment. It is decisive to know how to select the correct material and technique, always bearing in mind that no restorative material can replace the missing tooth structure to the full extent.[17] The anatomical post technique complies with these criteria of preserving a healthy tooth structure, and avoids removal or wearing of the intraradicular dentin, to ultimately enable better adaptation of the post, and very significant survival rates.[11,18] Finally, the presence of ferrules constitutes the most important factor regarding fatigue resistance.[3,19,20]

In sum, we can state that anatomical post technique is indicated mainly for wide root canals with little coronal

remnant. Rebasing the post with composite resin forms a more favorable biomechanical complex, and reduces the possibility of displacement, hence allowing greater clinical longevity. Use of this post with composite resin represents a technically feasible alternative that can be easily applied, given that it uses materials available in the office, has a low cost, and can be done in a single session. It is indicated for the rehabilitation of endodontically treated teeth with a wide root canal, in cases when a conventional prefabricated fiber post does not present good adaptation to the internal walls of the root canal.

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