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Glass fiber posts in endodontically treated teeth: when to indicate and when to dispense with them? A literature review

Pinos de fibra de vidro em dentes tratados endodonticamente: quando indicar e quando dispensar? Uma revisão de literatura

Postes de fibra de vidrio en dientes tratados endodónticamente: ¿cuándo indicarlos y cuándo prescindir de ellos? Una revisión de la literatura

Victor Viero | dentistavictorviero@gmail.com | ORCID: 0009-0004-5415-5187
Lara Pandolfi | larapandolfi14@gmail.com

Abstract:
Background: Restoration of endodontically treated teeth requires careful decision-making regarding intraradicular retainers, because routine placement of glass fiber posts is still frequently associated with the idea of strengthening the tooth. Aim: This study aimed to critically review clinical evidence on the situations in which these posts should be indicated or may be omitted. Methods: A structured search was conducted in PubMed using descriptors related to endodontically treated teeth and fiber posts, with filters for human studies published within the previous five years. Eight of 16 initially identified studies were selected and supplemented by four classic publications, totaling 12 studies for narrative synthesis. Results: The evidence indicated that the post does not reinforce the tooth; rather, it provides retention for the core when the remaining coronal structure is insufficient. In teeth with adequate coronal structure, particularly when a ferrule effect and favorable adhesive planning are present, the post may be omitted without a demonstrable clinical disadvantage. Conclusions: Its indication should be individualized according to the remaining tooth structure, ferrule, definitive restoration, root anatomy, and occlusal demands, while prioritizing preservation of dental tissue.
Keywords:
endodontically treated teeth. ferrule effect. glass fiber post. intraradicular retainer. restorative dentistry.

Resumo:
Contexto: A restauração de dentes tratados endodonticamente exige decisão criteriosa quanto ao uso de retentores intrarradiculares, pois a indicação rotineira de pinos de fibra de vidro ainda é frequentemente associada à ideia de reforço dentário. Objetivo: Revisar criticamente as evidências clínicas sobre as situações em que esses pinos devem ser indicados ou podem ser dispensados. Métodos: Realizou-se busca estruturada na PubMed, com descritores relacionados a dentes tratados endodonticamente e pinos de fibra, aplicando filtros para estudos em humanos publicados nos últimos cinco anos. Dos 16 estudos inicialmente identificados, oito foram selecionados e complementados por quatro publicações clássicas, totalizando 12 estudos para síntese narrativa. Resultados: As evidências indicaram que o pino não reforça o dente, mas fornece retenção ao núcleo quando o remanescente coronário é insuficiente. Em dentes com estrutura coronária adequada, especialmente na presença de efeito ferrule e planejamento adesivo favorável, o pino pode ser dispensado sem prejuízo clínico demonstrável. Conclusões: Sua indicação deve ser individualizada, considerando remanescente dentário, ferrule, tipo de restauração, anatomia radicular e demanda oclusal, priorizando a preservação de estrutura dentária.
Palavras-chave:
dentes tratados endodonticamente. efeito ferrule. odontologia restauradora. pino de fibra de vidro. retentor intrarradicular.

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Resumen:
Contexto: La restauración de dientes tratados endodónticamente exige una decisión cuidadosa respecto del uso de retenedores intrarradiculares, pues la indicación rutinaria de postes de fibra de vidrio aún se asocia con frecuencia a la idea de reforzar el diente. Objetivo: Revisar críticamente las evidencias clínicas sobre las situaciones en las que estos postes deben indicarse o pueden omitirse. Métodos: Se realizó una búsqueda estructurada en PubMed, con descriptores relacionados con dientes tratados endodónticamente y postes de fibra, aplicando filtros para estudios en seres humanos publicados en los últimos cinco años. De los 16 estudios identificados inicialmente, ocho fueron seleccionados y complementados con cuatro publicaciones clásicas, totalizando 12 estudios para la síntesis narrativa. Resultados: Las evidencias indicaron que el poste no refuerza el diente, sino que proporciona retención al núcleo cuando el remanente coronario es insuficiente. En dientes con estructura coronaria adecuada, especialmente en presencia del efecto ferrule y una planificación adhesiva favorable, el poste puede omitirse sin un perjuicio clínico demostrable. Conclusiones: Su indicación debe individualizarse, considerando el remanente dentario, el ferrule, el tipo de restauración, la anatomía radicular y la demanda oclusal, y priorizando la preservación de la estructura dentaria.
Palabras clave:
dientes tratados endodónticamente. efecto ferrule. odontología restauradora. poste de fibra de vidrio. retenedor intrarradicular.

1. Introduction

Preserving endodontically treated teeth is one of the main goals of contemporary restorative dentistry. However, although endodontic treatment has high success rates when properly performed, tooth longevity depends directly on the quality of the subsequent restorative rehabilitation (Schwartz; Robbins, 2004; Alshabib et al., 2023). In this context, restorative planning must reestablish function, esthetics, and the coronal seal, reducing the risk of leakage, restorative failures, and dental fractures.

For many years, endodontically treated teeth were believed to be more fragile because of structural changes in dentin resulting from loss of pulp vitality. Classic studies, however, have shown that this greater susceptibility to fracture is mainly related to the loss of tooth structure caused by carious lesions, extensive restorations, and the coronal access itself required for endodontic treatment, rather than to significant changes in the mechanical properties of dentin (Assif; Gorfil, 1994; Schwartz; Robbins, 2004). Thus, preservation of the remaining coronal structure came to be recognized as one of the main factors associated with restorative success in endodontically treated teeth.

In an attempt to restore teeth with significant loss of coronal structure, intraradicular retainers became widely used in clinical practice. Initially represented by cast metal post-and-core systems, these devices evolved with the development of adhesive systems and restorative materials, culminating in the introduction of glass fiber posts. Currently, these retainers offer

important biomechanical and esthetic advantages, including an elastic modulus similar to that of dentin, more favorable stress distribution, a lower incidence of irreparable root fractures, ease of removal during endodontic retreatment, and better esthetic performance in metal-free restorations (Alshabib et al., 2023).

Despite these favorable characteristics, the use of glass fiber posts remains a matter of debate in the literature. For many years, their indication was based on the premise that these devices could mechanically reinforce endodontically treated teeth. However, currently available studies show that the main function of a post is to provide retention for the restorative core when the remaining coronal structure is insufficient, rather than to increase the structural strength of the tooth (Assif; Gorfil, 1994; Schwartz; Robbins, 2004). In addition, recent clinical trials have shown that teeth restored with an adequate amount of remaining coronal structure have similar clinical performance with or without fiber posts, especially when treated with contemporary adhesive rehabilitation (Cagidiaco et al., 2025; Ferrari et al., 2026).

At the same time, factors such as the amount of remaining coronal structure, presence of a ferrule effect, type of definitive restoration, and biomechanical characteristics of the tooth have been identified as more relevant determinants of clinical prognosis than the mere presence of an intraradicular retainer (Sorensen; Engelman, 1990; Skupien; Luz; Pereira-Cenci, 2016; Kim et al., 2022). Although this evidence is widely distributed throughout the literature, most reviews address material properties, restorative techniques, or the biomechanical behavior of posts, while syntheses specifically focused on clinical decision-making regarding their actual need remain limited.

Given the persistent controversy regarding the actual need for glass fiber posts in endodontically treated teeth, this study aimed to critically review recent clinical literature, supplemented by classic reference studies, in order to identify, in light of the available scientific evidence, the clinical situations in which glass fiber posts are indicated, may be omitted, and the factors that should guide this decision, thereby contributing to restorative practice grounded in scientific evidence.

2. Methodology

This study is a literature review conducted through a structured search and critical selection of the available scientific evidence. The methodological strategy was planned according to the principles of transparency and reproducibility recommended by the PRISMA

guidelines for literature reviews, adapted to the narrative design of the present study (Page et al., 2021).

An electronic search was initially performed in the PubMed database (National Library of Medicine), using the indexed descriptors and Boolean operators: ("Endodontically Treated Teeth") AND ("Fiber Post" OR "Post and Core Technique").

The following filters were applied: studies published in the last five years, conducted in humans, available in English, and classified as clinical trials (Clinical Trial and Randomized Controlled Trial), systematic reviews (Systematic Review), or literature reviews (Review).

After applying the search criteria, 16 potentially eligible studies were identified. The articles underwent title and abstract screening and were subsequently assessed for relevance to the review question: in which clinical situations is the use of glass fiber posts indicated or may it be omitted in endodontically treated teeth?

Studies that did not directly address the proposed question were excluded, including investigations focused exclusively on comparisons between post materials, retainer diameter, techniques for preparing the intraradicular space, finite element analyses, exclusively laboratory studies, or research whose main focus did not involve the clinical indication for glass fiber posts. Articles whose full text was unavailable for reading and critical analysis were also excluded. After this stage, eight studies considered directly related to the objective of the review remained and constituted the main basis for the synthesis of results.

To complement the scientific foundation and contextualize the evolution of restorative concepts in endodontically treated teeth, four classic studies were also included. They were intentionally selected because of their recognized scientific relevance and contribution to consolidating fundamental concepts widely accepted in the literature, such as the ferrule effect, biomechanical principles of coronal reconstruction, and criteria for the use of intraradicular retainers.

At the end of the selection process, the review comprised 12 scientific articles: eight recent studies obtained through the structured search strategy and four classic publications incorporated to support the conceptual framework and discussion of the findings. Data extraction included information on study design, sample characteristics, objective, main results, conclusions, and clinical implications related to whether glass fiber posts should be indicated in endodontically treated teeth. Results were synthesized narratively, prioritizing critical comparison of the available evidence and its clinical applicability.

3. Results

3.1 Does the glass fiber post reinforce the tooth?

The studies included in this review showed that there is no consistent evidence that glass fiber posts structurally reinforce endodontically treated teeth. Classic works on restorative biomechanics established that the main function of the intraradicular retainer is to provide retention for the restorative core when the amount of remaining coronal structure is insufficient; its purpose is not to increase root resistance to fracture (Assif; Gorfil, 1994; Schwartz; Robbins, 2004).

The most recent randomized clinical trials corroborated this understanding. In anterior teeth with more than 50% remaining coronal structure restored with lithium disilicate crowns, Ferrari et al. (2026) found no significant differences in clinical performance between reconstructions made with glass fiber posts and those made with short fiber-reinforced composites after five years of follow-up. Likewise, Cagidiaco et al. (2025) found that the use of fiber posts did not increase the clinical survival rate of adhesive partial crowns in posterior teeth that retained at least 50% of their coronal structure after nine years of follow-up.

Similar results were observed in the systematic review conducted by Kim et al. (2022), which identified a higher probability of clinical survival in teeth restored with posts compared with teeth without intraradicular retainers. However, the authors emphasize that the clinical decision must consider factors related to the remaining tooth structure, type of restoration, periodontal conditions, and individual characteristics of each case; therefore, a universal indication for post use cannot be established.

Overall, the analyzed studies converge in showing that the glass fiber post should be understood as a resource for retaining the coronal reconstruction, whereas the strength and prognosis of the endodontically treated tooth remain directly related to preservation of the remaining tooth structure and the adopted restorative plan (Assif; Gorfil, 1994; Schwartz; Robbins, 2004; Ferrari et al., 2026; Cagidiaco et al., 2025).

3.2 In which situations is the post indicated?

The analyzed studies showed that the indication for glass fiber posts is directly related to the amount of remaining coronal structure and the need to retain the coronal reconstruction. In general, their use was recommended in teeth with significant structural loss, in which the

remaining tooth structure does not provide sufficient retention for the restorative core or definitive restoration (Assif; Gorfil, 1994; Schwartz; Robbins, 2004; Alshabib et al., 2023).

The clinical trials included in this review reinforced that post use should be based on the clinical characteristics of each case, especially in teeth with extensive coronal destruction undergoing indirect rehabilitation. In these cases, the intraradicular retainer was used to provide stability to the restorative core and favor retention of the definitive restoration, without its indication being considered routine for all endodontically treated teeth (Galdino-Santos et al., 2026; Ferrari et al., 2026).

In addition to the amount of remaining coronal structure, the literature identified other factors that influence clinical decision-making, such as the type of planned restoration, the position of the tooth in the arch, the anatomical characteristics of the root, and the biomechanical demands arising from occlusal function. Thus, the studies converge in showing that post indication must be individualized, simultaneously considering the structural conditions of the tooth and the proposed restorative plan (Schwartz; Robbins, 2004; Alshabib et al., 2023; Kim et al., 2022).

3.3 In which situations is the post unnecessary?

The analyzed studies showed that a glass fiber post may be omitted when there is sufficient remaining coronal structure to ensure adequate retention of the reconstruction and definitive restoration. In these cases, preservation of the remaining tooth structure proved more relevant to clinical success than routine use of an intraradicular retainer (Assif; Gorfil, 1994; Schwartz; Robbins, 2004).

In the randomized clinical trial conducted by Cagidiaco et al. (2025), posterior teeth restored with lithium disilicate partial crowns and retaining at least 50% of their coronal structure showed no significant differences in survival rate after nine years when restored with or without glass fiber posts. These results suggest that, when adequate tooth structure remains, post use provides no additional clinical benefit.

Similar results were observed by Ferrari et al. (2026), who evaluated anterior teeth restored with full lithium disilicate crowns. After five years of follow-up, no significant differences were found between teeth reconstructed with fiber posts and those restored with short fiber-reinforced composites, provided that more than 50% of the coronal structure remained.

Furthermore, recent systematic reviews indicated that conservative restorative approaches, such as adhesive partial crowns, ceramic veneers, and endocrowns, may provide satisfactory clinical performance in endodontically treated teeth when tooth structure is adequately preserved and the restoration is judiciously indicated. Under these conditions, post use is no longer a routine procedure and instead depends on the retentive needs of each clinical case (Lin et al., 2025; Mously et al., 2025).

3.4 Factors that modify prognosis

The included studies showed that the prognosis of endodontically treated teeth does not depend exclusively on the use of a glass fiber post but is influenced by multiple clinical and restorative factors. The most frequently reported aspects include the amount of remaining coronal structure, presence of a ferrule effect, type of definitive restoration, tooth location, and the biomechanical conditions to which the tooth is subjected (Schwartz; Robbins, 2004; Alshabib et al., 2023).

Preservation of remaining tooth structure was identified as one of the main factors associated with restorative longevity. The most recent clinical trials showed that teeth with approximately 50% remaining coronal structure had high survival rates regardless of fiber post use, provided that they were properly restored (Cagidiaco et al., 2025; Ferrari et al., 2026).

Another widely reported factor was the ferrule effect. Both classic studies and the meta-analysis by Skupien, Luz, and Pereira-Cenci (2016) demonstrated an association between the presence of a circumferential coronal remnant and greater fracture resistance, as well as better clinical performance of restorations. Similarly, Sorensen and Engelman (1990) observed increased fracture resistance in teeth with remaining coronal structure above the cervical margin of the restoration.

The studies also identified an influence of the type of definitive restoration and tooth location. Adhesive indirect restorations, full crowns, and partial crowns showed satisfactory clinical performance when indicated according to the structural characteristics of the remnant. In addition, factors such as tooth location, intensity of occlusal loads, and parafunctional habits were frequently considered during restorative planning and associated with the clinical prognosis of treatments (Galdino-Santos et al., 2026; Cagidiaco et al., 2025; Ferrari et al., 2026).

3.5 Main clinical failures

The main clinical failures reported by the included studies comprised post debonding, loss of restoration retention, restorative fractures, and root fractures. Overall, these complications occurred infrequently in clinical trials with long-term follow-up and were observed mainly in teeth with extensive coronal destruction or subjected to high functional demands (Ferrari et al., 2026; Cagidiaco et al., 2025).

In the clinical trial conducted by Galdino-Santos et al. (2026), direct composite resin restorations had more failures than metal-ceramic crowns, although most of these events were classified as repairable. Conversely, failures observed in crowns occurred less frequently but had greater potential to be irreparable.

The systematic review by Kim et al. (2022) reported that complications associated with post-retained restorations include debonding of the intraradicular retainer, loss of restoration retention, root fractures, recurrent caries, and periapical changes. The authors also observed that the occurrence of these events is related to factors such as post type, cement used, root canal configuration, type of definitive restoration, and the clinical characteristics of each case (Kim et al., 2022; Oulghazi; El Yamani; Morchad, 2024).

4. Discussion

The results of this review show that the contemporary concept of using glass fiber posts in endodontically treated teeth differs substantially from the formerly widespread belief that these devices could mechanically reinforce the tooth. Although this hypothesis was widely accepted for decades, currently available evidence indicates that the main function of the post is to provide retention for the restorative core when the amount of remaining coronal structure is insufficient, with no consistent evidence that its use, in isolation, increases the structural strength of the root (Assif; Gorfil, 1994; Schwartz; Robbins, 2004). This paradigm shift is corroborated by the recent clinical trials included in this review, in which teeth restored with and without posts had similar clinical performance when the remaining coronal structure was adequately preserved (Ferrari et al., 2026; Cagidiaco et al., 2025).

These findings reinforce the importance of preserving the remaining coronal structure during restorative planning. Loss of tooth structure resulting from caries, extensive restorations, or endodontic access itself has a much more significant influence on prognosis than the mere presence of an intraradicular retainer. From this perspective, the philosophy of minimally

invasive dentistry becomes particularly relevant, because maintaining as much sound dentin as possible provides better biomechanical conditions for distributing masticatory stresses and retaining the definitive restoration. Therefore, the decision to use a post should be based on the need to retain the coronal reconstruction rather than on an attempt to increase the tooth's fracture resistance.

Another aspect widely demonstrated in the literature was the influence of the ferrule effect on restorative prognosis. The presence of a circumferential coronal remnant of sufficient height is one of the most important factors for the clinical longevity of endodontically treated teeth, regardless of the use of intraradicular posts. The meta-analysis conducted by Skupien, Luz, and Pereira-Cenci (2016) showed that teeth restored with a ferrule had greater fracture resistance and longer clinical survival than those without this characteristic. These results corroborate the classic findings of Sorensen and Engelman (1990), who had already shown that preserving tooth structure above the cervical margin has a greater influence on fracture resistance than changes in post design or presence. Thus, although the post may contribute to retention of the restorative core, its clinical effectiveness remains directly dependent on favorable structural conditions.

From a clinical standpoint, the evidence gathered in this review indicates that routine use of glass fiber posts after endodontic treatment lacks scientific support. The analyzed studies show that teeth with an adequate amount of remaining coronal structure can be successfully restored through conservative adhesive approaches, including partial crowns, indirect restorations and, in specific situations, endocrowns and veneers, without the mandatory use of intraradicular retainers. Conversely, teeth with extensive coronal loss, insufficient retention for the core, or significant structural compromise tend to benefit from use of the post as a retentive element for reconstruction. Therefore, the indication must always be individualized, simultaneously considering the amount of remaining tooth structure, type of planned restoration, presence of the ferrule effect, anatomical characteristics of the root, and biomechanical demands of each case.

Although the included studies present consistent results regarding the retentive function of glass fiber posts, some limitations should be considered when interpreting this review. The search strategy was performed exclusively in the PubMed database, which may have restricted identification of studies indexed in other bibliographic databases. In addition, selection was limited to the last five years and supplemented only by classic articles considered fundamental to understanding the conceptual evolution of the topic. Despite these limitations, the combination of recent clinical evidence and publications of recognized scientific relevance

made it possible to construct an up-to-date and consistent synthesis regarding the indications for glass fiber posts in endodontically treated teeth.

5. Conclusion

Restoring endodontically treated teeth remains one of the main challenges in restorative dentistry, especially in cases with significant loss of coronal structure. Although glass fiber posts are a widely used alternative because of their biomechanical and esthetic properties, the evidence analyzed in this review shows that their use should not be considered a routine procedure after endodontic treatment. The main function of these retainers is to provide retention for the restorative core when the amount of remaining coronal structure is insufficient, and there is no consistent evidence that they structurally reinforce the tooth.

Therefore, the decision to use glass fiber posts must be individualized and based primarily on the amount of remaining coronal structure, presence of the ferrule effect, need for reconstruction retention, and the proposed restorative plan. Preservation of the remaining tooth structure proved to be the main factor associated with the clinical success of restorations, reinforcing the principles of minimally invasive dentistry and evidence-based decision-making in the rehabilitation of endodontically treated teeth.

References

ALSHABIB, A.; ALTHAQAFI, K. A.; ALMOHARIB, H. S.; MIRAH, M.; ALFAWAZ, Y. F.; ALGAMAIAH, H. Dental fiber-post systems: an in-depth review of their evolution, current practice and future directions. Bioengineering, Basel, v. 10, n. 5, p. 551, 2023. DOI: https://doi.org/10.3390/bioengineering10050551.

ASSIF, D.; GORFIL, C. Biomechanical considerations in restoring endodontically treated teeth. The Journal of Prosthetic Dentistry, St. Louis, v. 71, n. 6, p. 565-567, 1994.

CAGIDIACO, E. F.; VERNIANI, G.; PONTORIERO, D. I. K.; SARACUTU, O. I.; MANFREDINI, D.; FERRARI, M. Posterior partial crowns out of lithium disilicate with or without posts: a randomized controlled study at 9 years follow up. Journal of Dentistry, Oxford, v. 161, p. 106005, 2025. DOI: https://doi.org/10.1016/j.jdent.2025.106005.

FERRARI, M.; SARACUTU, O. I.; PONTORIERO, D. I. K.; GASTALDI, G.; VERNIANI, G.; MANFREDINI, D.; FERRARI CAGIDIACO, E. Clinical outcome of fiber post and fiber-reinforced resin composite for the full crowns of anterior endodontically treated teeth: a 5-year randomized clinical trial. Journal of Dentistry, Oxford, v. 173, p. 106850, 2026. DOI: https://doi.org/10.1016/j.jdent.2026.106850.

GALDINO-SANTOS, L.; POLETTO-NETO, V.; LOOMANS, B.; CENCI, M. S.; CHISINI, L. A.; PEREIRA-CENCI, T. Randomized clinical trial comparing the clinical performance of metal-ceramic crowns and direct composite resin retained with glass fiber posts: long-term results after up to 14 years. Dental Materials, New York, v. 42, p. 1120-1132, 2026. DOI: https://doi.org/10.1016/j.dental.2026.02.023.

KIM, S. G. et al. Clinical influence of post placement on the survival of endodontically treated teeth: a systematic review and meta-analysis. Journal of Prosthodontic Research, Tokyo, v. 66, n. 2, p. 207-220, 2022.

LIN, J.; BENNANI, V.; AARTS, J. M.; BRUNTON, P.; RATNAYAKE, J. Factors influencing success rate of ceramic veneers on endodontically treated anterior teeth: a systematic review. The Journal of Prosthetic Dentistry, St. Louis, v. 133, n. 1, p. 62-70, 2025.

MOUSLY, H. A.; NAGUIB, G. H.; ABOUGAZIA, A. O.; ALMABADI, A. A.; QUTUB, O. A.; HAMED, M. T. Anterior endocrowns as an alternative to core crown restorations: a systematic review. International Dental Journal, London, v. 75, p. 59-74, 2025. DOI: https://doi.org/10.1016/j.identj.2024.07.1216.

OULGHAZI, I.; EL YAMANI, A.; MORCHAD, B. Factors influencing vertical radicular fractures in teeth supported by metallic dental core: a scoping review. Clinical, Cosmetic and Investigational Dentistry, Auckland, v. 16, p. 101-114, 2024.

PAGE, M. J. et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ, London, v. 372, p. n71, 2021. DOI: https://doi.org/10.1136/bmj.n71.

SCHWARTZ, R. S.; ROBBINS, J. W. Post placement and restoration of endodontically treated teeth: a literature review. Journal of Endodontics, Baltimore, v. 30, n. 5, p. 289-301, 2004.

SKUPIEN, J. A.; LUZ, M. S.; PEREIRA-CENCI, T. Ferrule effect: a meta-analysis. Journal of Esthetic and Restorative Dentistry, v. 28, n. 4, p. 194-203, 2016. DOI: https://doi.org/10.1177/2380084416636606.

SORENSEN, J. A.; ENGELMAN, M. J. Ferrule design and fracture resistance of endodontically treated teeth. The Journal of Prosthetic Dentistry, St. Louis, v. 63, n. 5, p. 529-536, 1990.