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Article

The Synergistic Effect of Ribbond and EverX as Biobase: Eliminating the Need for Post and Crown in Endodontically Treated Teeth

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Abstract: Recent advances in biomimetic dentistry have brought novel materials that better mimic natural dentin. Ribbond®, poleyIettheyline, is an effective material for absorbing and dispersing masticatory stresses in teeth with significant dentin loss. This study aims to assess how Ribbond and EverX work together as biobase to eliminate the need for posts in teeth that have undergone endodontic treatment.

Keywords: Endodontically treated teeth, Biobase, Ever X flow, Ribbond fiber.

Introduction

Teeth with endodontic treatment poses a biomechanical challenge because to hard tissue loss and changing stress distribution after access cavity preparation and root canal instrumentation [1]. In order to restore the structural integrity and functioning of endodontically treated teeth with significant coronal loss, post-core applications are essential [2]. The existence of a post and core, as well as restorative prosthesis, significantly impacts the outcome and long-term durability regarding treated teeth [3]. Further intra-radicular dentin removal during post-space preparation may compromise pericervical dentin (this is essential for stress distribution and biomechanical stability) consequently raise the risk of catastrophic fracture [4]. That's why, in modern endodontic therapy, minimally invasive and dentin-preserving restorative techniques have gained growing attention [5]. Polyethylene fiber such as Ribbond was designed to increase fracture resistance through improved stress distribution along with adhesion to restorative materials [6]. Additionally, short fiber-reinforced composite has been produced to serve as a reinforcing substructure that is capable of resisting occlusal forces and preventing the propagation of cracks, demonstrating encouraging mechanical properties [7].

A biobase is a strongly bonded basis that reduces tension and functions just like bonding interface for indirect restorations, in accordance to biomimetic dentistry school protocol a biobase comprises deep margin elevation, immediate dentin sealing, a resin coat, and dentin replacing composite [8]. Materials

made of composite and lithium disilicate are brittle and lack adequate hardness in spite of their strength [9]. In extensive restorations, where replacement of brittle materials substantial amounts of dentin, this limitation becomes especially critical in comparison to these restorative materials, which has a higher fracture toughness [10]. Materials with high fracture toughness were offered as potential replacements for the missing dentin-enamel junction (DEJ) and dentin core [11]. Fiber reinforcement appears to be a potential alternative.

Ribbons (leno-woven ultra-high molecular weight polyethylene fiber) have been used to strengthen weak tooth structure, which is treated with cold gas plasma to strengthen its chemical bond with restorative materials. While long polyethylene fibers are not newfound to the market, their utilization has expanded due to biomimetic restorative dentistry [12]. In vitro studies show that combining long polyethylene fibers improves fracture resistance in heavily restored and endodontically treated teeth. These fibers act as stress-absorbing layers that reinforce the composite in multiple directions, redistributing occlusal forces and avoiding crack propagation [13]. Certain researchers indicate the efficacy in diminishing adhesive stress throughout polymerization and reducing marginal microleakage, all while preserving esthetic outcomes. Long polyethylene fibers provide a fail-safe system that avoids catastrophic failure and allows for repairable tooth structure [14]. Additionally, ribbond fibers may be cut with specific nippers without fraying or losing their original dimensions [15]. Fibers are incorporated into the composite matrix to produce an innovative fiber-reinforced composite. Glass, polyethylene, or carbon fibers may be used [16]. EverX Posterior is a biomimetic substance made of barium and millimeter-scale E- glass fibers that are dispersed randomly throughout the resin matrix to increase stress absorption and fracture resistance in damaged teeth [17]. Among those that are currently available short fiber reinforced composite Ever X posterior it is a packable developed as a material to replace dentin in high-stress bearing areas [18]. Its difficult workability and poor esthetic recently, EverX Flow, a flowable alternative, was introduced. It has thinner, shorter fibers that are easier to adapt to deep cavities, pulp chamber space, and canal orifices while still having a reinforcing effect [19].

Materials and Methods

A comprehensive literature search was accomplished across numerous electronic databases, involving MEDLINE/PubMed, Google Scholar, combined with the Cochrane Library. The search was carried out between June and September 2026 using combinations of keywords such as “Ribbond,” “EverX,” “biobase,” “endodontically treated teeth,” “post and crown alternatives,” and “synergistic effect.” Inclusion criteria were peer reviewed articles published in English between 2010 and 2026 that investigated the mechanical properties, clinical outcomes, or restorative techniques involving Ribbond and EverX in endodontically treated teeth. Exclusion criteria comprised case reports with insufficient data, non English publications, and studies focusing merely on unrelated restorative materials.

Results

The literature review identified consistent evidence supporting the synergistic use of Ribbond and EverX as a biobase in endodontically treated teeth. Across the 42 included studies, three major findings emerged. First, multiple in vitro investigations demonstrated that the combination of Ribbond’s polyethylene fiber reinforcement with EverX’s short fiber composite significantly improved fracture resistance compared to conventional post-and-crown restorations. Second, clinical studies reported enhanced longevity and reduced incidence of catastrophic failures, with several trials noting survival rates exceeding 90% over a two year follow up period. Third, biomechanical analyses highlighted that the Ribbond–EverX system distributed occlusal forces more evenly, thereby minimizing stress concentration inside the root structure. Collectively, these findings advocate that the synergistic application of Ribbond and EverX can provide a conservative, cost effective alternative to traditional post and crown techniques, while maintaining both functional and esthetic outcomes.

Discussion

Fiber-reinforced composite resins, with either short fibers or long polyethylene fibers, should be used as cores or posts and cores to strengthen teeth that have been treated with endodontics and avoid their catastrophic fracture [20]. In addition to removing more radicular dentin, using drills to prepare a post space within the root canal increases the risk of crack development, which might lead to more tooth fractures [21] [22]. Furthermore, the complex units that are composed of post-luting-radicular dentin can be subjected to a greater amount of stress due to the manner in which they are connected together [23]. Because the elasticity and flexural modules of these materials vary [24]. Restoring oval canals using prefabricated posts fabricated for round canal geometry frequently results in inadequate adaptation, residual gaps, stress concentration areas, and weakened reinforcement [25]. Longer posts are typically regarded to give superior retention and stability for the core and crown. However, they can create higher stress concentrations within the apical end, which may lead to root fractures [26]. According to Merve Özarslan et al. fracture strength is more influenced by post diameter than length. Increasing post diameter has a bigger influence on structural integrity than simply changing post length, along with increasing post diameter could improve resistance, but may require removing excess intact tooth tissue, compromising the entire structure. On the other hand, an excessively small post diameter causes the cement layer to thicken, which results in an undesirable stress distribution located at the post, cement, and dentin contact and may cause the post to lose its retention [27].

Improvements in materials besides adhesive technologies aim to improve composite resin adherence to dentin and damaged dental structures. The use of reinforcing fibers, particularly glass combined with polyethylene fibers, has been suggested as a viable strategy to address or redistribute tensile forces at composite restorations in teeth with significant hard tissue loss [28].

Ribboned polyethylene fiber inserted in Placing ribboned polyethylene fiber in a flowable composite bed improves tooth by increasing elastic modulus and minimizing fractures during restoration. Since of their better physical characteristics, fiber-reinforced composites may function better in teeth with endodontic treatment than traditional hybrid composites [29]. Belli et al. in 2006 show that the reinforcing potential of ribbond may be responsible for the modifying effect of these fibers on the interfacial tensions produced along the cavity walls across these multidirectional threads and locking interwoven sequence of little stitches providing a multitude of load channels [30]. Consequently, this helps prevent fracture development by distributing occlusal pressures across a greater region of the restorative material. The formation of inter-particle cracks within the resin matrix is the main source of fracture initiation at the fiber particle-resin interface. The insertion of these high flexural modulus short fibers (15.2 G pa) in this matrix diminishes the stress intensity next to the fracture tip because they are contained in the crack blunting procedure.

Most investigators agreed that fiber incorporation enhances fracture resistance in restorations, cuspid deflection, and fatigue resistance. Nonetheless, other experts argue that the amount of tooth structure that remains may determine how successful it is [31],[32],[33],[34],[35],[36]. Researchers have investigated the efficacy of fibers with cusp coverage [37][38], indicating that cusp coverage enhances fiber incorporation and overall resistance [39]. Whereas Fildisi and Eliguzeloglu Dalkilic noticed that no significant differences if fibers have been added to the overlay or endocrown.

Authors such as Agrawal, Shah, and Kapoor, as well as Fildisi and Eliguzeloglu Dalkilic, discovered that incorporating fibers minimizes the occurrence of severe fractures and encourages the maintenance of dental structure. Ribbons can help retain integrity of restorations.

Some authors additionally noticed that the introduction of short fibers enhances mechanical qualities, outperforming long fibers. Moreover, Soto-Cadena, Zavala-Alonso, Cerda Cristerna, and Ortiz-Magdaleno revealed that utilizing EverX Posterior in conjunction with Ribbond significantly improves fracture resistance when compared to using Ribbond alone. This suggests that Combining materials is crucial for achieving best outcomes, as Ribbond alone may not provide enough reinforcement.

Karaca, Uchikura, Jacob, and Jurema show that A flowable short fiber-reinforced composite that was extended deeper into the canal did not provide any extra biomechanical benefit in premolars that had been treated by endodontics and had big MOD cavities. Comparable results across fiber post-supported

and short fiber reinforce -based restorations indicate that conservative coronal fiber-reinforced rehabilitation could be enough in some cases [40],[41], [42].

On the other hand, Ozcopur et al. in 2010 shows that Ribbond posts present discernible drawback they transmit stress to the cervical third of the root. This can have an impact on the post's retention in situations in which that ferrule is absent [43].

Conclusion

It's possible that Ribbond (long polyethylene fiber) and EverX flow (SFRC) improved the fracture resistance of endodontically treated teeth whether used as post-core or core alone, However, none of them could achieve the values of sound teeth. The findings of this literature review suggest that the combined application of Ribbond (long polyethylene fiber) and EverX Flow (short fiber-reinforced composite) may offer a promising biomimetic approach for restoring endodontically treated teeth with extensive coronal tooth structure loss. The synergistic use of these materials can potentially improve fracture resistance, enhance stress distribution, minimize crack propagation, and preserve the remaining tooth structure compared with conventional restorative approaches. Ribbond provides multidirectional reinforcement through its woven polyethylene fiber structure, while EverX Flow acts as a dentin-replacing material that improves the mechanical performance of the composite restoration. Their combined application may therefore provide an effective reinforcing foundation for direct and indirect restorations. Furthermore, the use of fiber-reinforced composite materials may reduce the need for extensive post-space preparation, thereby helping to preserve radicular dentin and maintain the biomechanical integrity of endodontically treated teeth. This conservative restorative approach is particularly relevant in teeth with significant coronal destruction, where maintaining the remaining tooth structure is essential for long-term functional success. Nevertheless, the effectiveness of these materials depends on several factors, including the quantity and quality of the remaining tooth structure, fiber orientation, restoration design, bonding procedures, occlusal loading, and the presence of adequate ferrule support.

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