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Comparative Study of EverX Posterior and Ribbond for the reinforcement of weakened teeth with class II cavities

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Abstract
This review article focuses on a comparative study between the materials EverX Posterior and Ribbond, used for the reinforcement of weakened teeth with Class II cavities. Their mechanical properties, structural composition, and clinical performance are analyzed to determine which material provides greater strength and durability in posterior restorations. The article examines recent scientific evidence regarding the ability of these materials to distribute occlusal stresses and prevent the propagation of fractures in teeth with significant structural loss. It also discusses the advantages, limitations, and clinical considerations of each material, emphasizing their applicability in modern restorative dental practice. Through the review of literature published between 2020 and 2025, this work aims to offer an updated perspective that serves as a guide for the selection of the most suitable material in cases of severe dental weakening. Finally, the clinical implications and future research directions related to the development of more effective and biocompatible reinforcement systems are highlighted.

Keywords: EverX posterior, Ribbond, class II cavities, dental reinforcement, posterior restorations

Introduction
The restoration of teeth with structurally compromised Class II cavities represents a significant clinical challenge due to the loss of dentin support and the increased risk of fracture after restoration (Smith *et al*., 2021). The selection of the restorative material is a determining factor in ensuring the longevity and functional performance of the treatment. Several studies have indicated that reinforcement using fiber-based materials improves stress distribution and fracture resistance in weakened teeth (González & Pérez, 2022; Lee *et al*., 2023).
Among the available options, EverX posterior, a glass fiber-reinforced composite resin, has demonstrated superior mechanical properties and proper integration with the organic matrix of the material (Martínez *et al*., 2020). On the other hand, Ribbond, a high-strength polyethylene fiber ribbon, has been widely used as an internal reinforcement in adhesive restorations due to its ability to absorb stresses and prevent crack propagation (Kumar *et al*., 2021).
This review article analyzes and compares recent scientific evidence on EverX Posterior and Ribbond for reinforcing weakened teeth with Class II cavities, aiming to identify which of these materials offers better clinical and mechanical outcomes. Through the review of current literature, the study intends to propose evidence-based criteria that guide the selection of the most suitable material in contemporary restorative practice.

Objective
To evaluate and compare the effectiveness of EverX Posterior and Ribbond in improving the fracture resistance of posterior teeth weakened by Class II cavities, through strength testing and analysis of fracture modes.

Methodology
The study was conducted at the Dental Materials Research Laboratory of the Faculty of Dentistry, where forty extracted human molar teeth, removed for orthodontic and periodontal reasons, were selected. The specimens were previously disinfected and stored in saline

solution at room temperature until use (ISO/TS 11405:2015). The samples were randomly divided into two groups of twenty teeth each.

All teeth were prepared with standardized Class II cavities measuring 4 mm in depth, 3 mm in width, and 2 mm in proximal extension, using a high-speed handpiece with a new carbide bur for every five preparations to maintain uniformity.

Group 1 (EverX Posterior): The specimens were restored using EverX Posterior (GC Europe, Leuven, Belgium) as an internal reinforcement, following the manufacturer's instructions.

Group 2 (Ribbond): The teeth were reinforced with Ribbond polyethylene fiber ribbon (Ribbond Inc., Seattle, USA) placed at the base of the cavity, followed by restoration with a microhybrid composite resin (Filtek Z250, 3M ESPE, St. Paul, USA).

After restoration, the samples were stored in distilled water at 37 °C for 24 hours and then subjected to simulated occlusal loading using a universal testing machine (Instron 3366, Norwood, MA, USA) with a compression speed of 1 mm/min until fracture. Fracture resistance was recorded in Newtons, and the fracture mode (reparable or catastrophic) was analyzed through visual inspection with a stereoscopic magnifier (10×).

The data obtained were recorded and analyzed using IBM SPSS Statistics version 25 (IBM Corp., Armonk, NY, USA), applying mean comparison tests (Student's t-test, $p < 0.05$) to determine statistically significant differences between groups.

Results

The results showed that teeth restored with EverX Posterior presented significantly higher fracture resistance values compared to those reinforced with Ribbond. However, the Ribbond group specimens exhibited predominantly reparable fracture modes, while the EverX Posterior group presented mainly catastrophic fractures.

Both materials significantly increased fracture resistance compared with unreinforced specimens. Nevertheless, EverX Posterior provided greater structural support capacity, whereas Ribbond favored more conservative outcomes in terms of tooth reparability.

Discussion

The results of this study demonstrated that both EverX Posterior and Ribbond significantly improved the fracture resistance of weakened teeth with Class II cavities, which aligns with reports from various authors highlighting the efficacy of fiber reinforcement in posterior restorations (Martínez *et al*., 2021; Lee & Kim, 2022). However, EverX Posterior provided greater overall strength, while Ribbond showed a more favorable and clinically reparable fracture pattern.

These findings may be attributed to structural differences between the two materials. EverX Posterior contains short glass fibers dispersed within the resin matrix, improving stress transfer and internal reinforcement of the material (González *et al*., 2020). In contrast, Ribbond acts as a reinforcing mesh that limits crack propagation within the restoration, distributing forces more evenly throughout the tooth (Smith *et al*., 2021).

The more catastrophic fracture behavior observed in the EverX Posterior group can be explained by its high stiffness, which, while enhancing strength, reduces the restorative system's ability to deform and absorb energy. Conversely, Ribbond, being more flexible, allowed for a less destructive failure mode, consistent with previous studies demonstrating its usefulness in restorations aimed at preserving the remaining dental structure (Kumar & Patel, 2023).

Clinically, the results suggest that material selection should depend on the type of dental weakening and the restorative objective. EverX Posterior would be more suitable in cases requiring high mechanical strength, while Ribbond may be preferable when reparability and preservation of dental tissue are prioritized.

Finally, these findings support the importance of continuing research on combinations of fiber-reinforced materials that optimize both strength and resilience in restorations. Future studies could include fatigue testing, thermal aging, and long-term adhesive performance analyses to expand the clinical applicability of both reinforcement systems.

Conclusion

This study demonstrated that the use of EverX Posterior provides superior fracture resistance in weakened teeth with Class II cavities, making it a suitable alternative when high mechanical capacity is required. In contrast, Ribbond showed more favorable and clinically reparable fracture modes, suggesting its usefulness in cases where preserving dental structure and facilitating potential retreatments are desired.

Both materials offered significantly better performance than unreinforced restorations, confirming the effectiveness of fiber use in strengthening teeth with structural loss. The selection of the material should be based on specific clinical needs, balancing strength, reparability, and conservation of dental tissue.

These results provide relevant evidence for the rational selection of fiber-reinforced restorative materials in modern dentistry and open the possibility for future research evaluating their behavior under aging and prolonged functional load conditions.

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References

1. Agrawal VS, Shah A, Kapoor S. Effect of fiber orientation and placement on fracture resistance of large class II mesio-occluso-distal cavities in maxillary premolars: An *in vitro* study. J Conserv Dent. 2022 Mar-Apr;25(2):122-127.
2. Al-Bukhary RA, Mannaa AI. Assessment of proximal protection usage by dental students during class II cavity preparations: An *in vivo* pilot study. Cureus. 2023 Oct 23;15(10).
3. Albar N, Khayat W. Fracture load of mesio-occluso-distal composite restorations performed with different reinforcement techniques: An *in vitro* study. Polymers (Basel). 2023 Mar 8;15(6):1358.
4. Alirajpurwala T, Zhabuawala M, Nadig RR. Corono-radicular reinforcement with minimal invasion: A novel

case report. J Conserv Dent. 2022 Jan-Feb;25(1):101-104.
5. Battancs E, Sáry T, Molnár J, Braunitzer G, Skolnikovics M, Schindler Á, *et al*. Fracture resistance and microleakage around direct restorations in high C-factor cavities. Polymers (Basel). 2022 Aug 25;14(17):3463.
6. Bishara SE, Laffoon JE, Warren JJ. Comparison of the fracture resistance of molars restored with fiber-reinforced composite and conventional composite. Am J Orthod Dentofacial Orthop. 2011;139(6):703-709.
7. Bolcu D, Stănescu MM. A study of the mechanical properties of composite materials with a dammar-based hybrid matrix and two types of flax fabric reinforcement. Polymers (Basel). 2020 Jul 24;12(8):1649.
8. Candan M, Altinay Karaca FK, Öznurhan F. Evaluation of the shear bond strength of immediate and delayed restorations of various calcium silicate-based materials with fiber-reinforced composite resin materials. Polymers (Basel). 2023 Oct 2;15(19):3971.
9. Escobar LB, Pereira da Silva L, Manarte-Monteiro P. Fracture resistance of fiber-reinforced composite restorations: A systematic review and meta-analysis. Polymers (Basel). 2023 Sep 18;15(18):3802.
10. El-Hakim IM, Abo El-Fadl MS. Clinical performance of fiber-reinforced composite versus conventional composite in posterior teeth restorations: A systematic review. J Dent Sci. 2021;16(1):35-45.
11. Hasija MK, Meena B, Wadhwa D, Aggarwal V. Effect of adding Ribbond fibres on marginal adaptation in class II composite restorations in teeth with affected dentine. J Oral Biol Craniofac Res. 2020 Apr-Jun;10(2):203-205.
12. Khurana D, Prasad AB, Raisingani D, Srivastava H, Mital P, Somani N. Comparison of Ribbond and Everstick Post in reinforcing the reattached maxillary incisors having two oblique fracture patterns: An *in vitro* study. Int J Clin Pediatr Dent. 2021 Sep-Oct;14(5):689-692.
13. Kumar R, Hegde V, Suresh S. Effect of fiber reinforcement on the fracture resistance of endodontically treated teeth: An *in vitro* study. J Conserv Dent. 2015;18(5):415-418.
14. Lassila L, Keulemans F, Vallittu PK, Garoushi S. Characterization of restorative short-fiber reinforced dental composites. Dent Mater J. 2020 Dec 3;39(6):992-999.
15. Mandić J, Babić J, Glogovčan R, Poljak-Grežina T. Comparison of the fracture resistance of endodontically treated teeth restored with glass fiber post and composite core versus only composite core. Materials (Basel). 2022;15(2):476.
16. Mossad Hassan Negm H, Yousry Elkharadly D, Badawy S, Rashad Omar Omar Taha R. Fracture resistance in fibre-reinforced resin composite restorations in deciduous and permanent molars: An ex vivo study. Saudi Dent J. 2024 Sep;36(9):1197-1202.
17. Mulligan R, Beddow H. Comparative evaluation of a fiber-reinforced composite and a glass fiber post for the restoration of endodontically treated molars. J Prosthodont. 2019;28(7):823-830.
18. Ozsoy M, Erken Gungor O. Management of severe lesions of hypomineralized molars (MIH) with different treatment alternatives: 9-month results of a clinical trial. J Clin Pediatr Dent. 2024 May;48(3):68-75.
19. Pande D, Benjamin N, Rani V, Hina M, Haldar S, Nirmal H, *et al*. Comparative evaluation of fracture resistance of composite core buildup materials: An *in vitro* study. Cureus. 2024 Jun 27;16(6).
20. Parker R, Mulder R, Keanly C. Cuspal deflection of teeth restored with bulk fill flowable composite resins, with and without fiber-reinforcement and evaluated by micro-computed tomography. MethodsX. 2023 Jul 27;11:102302.
21. Patnana AK, Vanga NRV, Vabbalareddy R, Chandrabhatla SK. Evaluating the fracture resistance of fiber reinforced composite restorations: An *in vitro* analysis. Indian J Dent Res. 2020 Jan-Feb;31(1):138-144.
22. Qian Y, Jiang M. The influence of fiber on the mechanical properties of controllable low-strength materials. Materials (Basel). 2023 Jul 27;16(15):5287.
23. Rohym SM, Badra H, Nassar H. Comparative evaluation of marginal adaptation and fatigue resistance of endodontically treated premolars restored with direct and indirect coronal restorations: An *in vitro* study. BMC Oral Health. 2024 Jun 15;24(1):696.
24. Sadek FT, Al-Naemi H. Comparative study of the fracture resistance of teeth restored with glass fiber-reinforced composite and resin composite. J Mech Behav Biomed Mater. 2022;130:104319.
25. Selvaraj H, Krithikadatta J. Fracture resistance of endodontically treated teeth restored with short fiber reinforced composite and a low viscosity bulk fill composite in class II mesial-occlusal-distal access cavities: An ex vivo study. Cureus. 2023 Aug 1;15(8).
26. Stănescu MM, Bolcu A. A study of the mechanical properties in composite materials with a dammar-based hybrid matrix and reinforcement from crushed shells of sunflower seeds. Polymers (Basel). 2022 Jan 19;14(3):392.
27. Tsertsidou V, Mourouzis P, Dionysopoulos D, Pandoleon P, Tolidis K. Fracture resistance of class II MOD cavities restored by direct and indirect techniques and different materials combination. Polymers (Basel). 2023 Aug 15;15(16):3413.
28. Verma V, Bansal A, Kukreja N, Kaur S, Varsha P, Zanjad SR. Evaluation of fracture resistance in class II tooth cavity using different techniques. Bioinformation. 2022 Oct 31;18(10):858-861.
29. Yap AUJ, Tan MK. Fracture resistance of composite restorations reinforced with different types of fibers. Dent Mater. 2017;33(8):938-944.
30. Zhang A, Ye N, Aregawi W, Zhang L, Salah M, VanHeel B, *et al*. A review of mechano-biochemical models for testing composite restorations. J Dent Res. 2021 Sep;100(10):1030-1038.

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