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**Avaliação clínica de restaurações ocluso-proximais de resina composta
associadas a fibras de polietileno em molares decíduos:
um ensaio clínico randomizado**

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um ensaio clínico randomizado**

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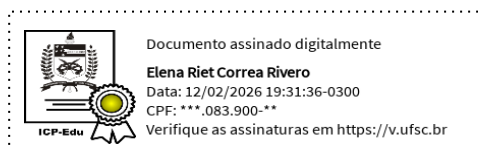
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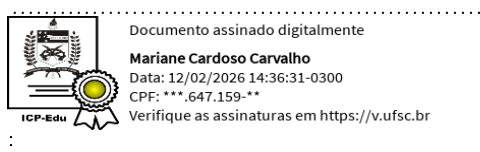
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Certificamos que esta é a versão original e final do trabalho de conclusão que foi julgado adequado para obtenção do título de doutor em Odontologia.



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Prof^a. Dr^a. Mariane Cardoso
Orientadora

Florianópolis, 2026.

"Dedico este trabalho aos meus pais, Orlando e Sônia, pelo constante apoio e incentivo aos meus estudos e à carreira acadêmica tão sonhada."

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*“Há tempo para tudo no propósito de Deus, meu irmão.
Não se esqueça, não.” (Kátia de Tróia)*

RESUMO

A utilização de restaurações em dentes decíduos é uma prática clínica rotineira na odontopediatria. No entanto, ainda há necessidade de investigar alternativas que melhorem a qualidade desses procedimentos. O uso de fibras de polietileno (Ribbond®) associadas à resina composta tem demonstrado um aumento na taxa de sucesso de restaurações principalmente em estudos laboratoriais. Este ensaio clínico randomizado, paralelo, duplo-cego e com duração de 12 meses teve como objetivo comparar as taxas de sucesso de restaurações ocluso-proximais de resina composta associadas a fibra de polietileno (RC + FP) com as de restaurações convencionais de resina composta (RC) em molares decíduos. Um total de 60 crianças com idades entre 5 e 10 anos receberam restaurações diretas ocluso-proximais utilizando RC + FP ou apenas RC, com 30 restaurações por grupo. As restaurações foram avaliadas no início do estudo e após 3, 6 e 12 meses, de acordo com os critérios da Federação Dentária Internacional (FDI). Dados adicionais foram coletados referentes às características dos participantes, dentes restaurados e tempo de trabalho clínico. A estimativa de sobrevida de Kaplan-Meier para a taxa de sucesso/fratura foi realizada. A análise de regressão de Cox foi utilizada para avaliar as associações com o sucesso clínico, e o teste t independente foi utilizado para comparar o tempo de trabalho clínico ($\alpha = 0,05$). A maioria dos participantes eram do sexo masculino (58,3%), com média de idade de 7,5 anos ($\pm 1,24$). Após 12 meses, 53 restaurações foram avaliadas. Sete restaurações falharam (quatro no grupo CR + PF e três no grupo CR). As taxas de sucesso foram de 85,7% para o grupo CR + PF e 88,0% para o grupo CR, sem diferença estatisticamente significativa entre eles ($p > 0,05$). Todos os outros parâmetros do FDI indicaram que as restaurações eram clinicamente aceitáveis. O tempo médio do procedimento foi de 30,67 minutos no grupo CR + PF e 25,23 minutos no grupo CR. A análise de regressão de Cox mostrou que a idade teve um efeito significativo no sucesso clínico ($p < 0,05$), e o teste t revelou uma diferença significativa no tempo clínico entre os grupos ($p < 0,05$). Após 12 meses, não houve diferença significativa no desempenho clínico das restaurações ocluso-proximais com ou sem associação de fibra de polietileno. No entanto, o uso de fibra de polietileno aumentou significativamente o tempo de trabalho clínico.

Palavras-chave: fibra de polietileno; restauração dental; dente decíduo.

ABSTRACT

The use of restorations in primary teeth is a routine clinical practice in pediatric dentistry. However, there is still a need to investigate alternatives that improve the quality of these procedures. The use of polyethylene fibers (Ribbond®) associated with composite resin has shown increased restoration success rates, mainly in laboratory studies. This 12-month randomized, parallel, double-blind clinical trial aimed to compare the success rates of occluso-proximal composite resin restorations associated with polyethylene fiber (CR + PF) with those of conventional composite resin restorations (CR) in primary molars. A total of 60 children aged 5 to 10 years received direct occluso-proximal restorations using CR + PF or CR alone, with 30 restorations per group. Restorations were evaluated at baseline and after 3, 6, and 12 months according to the Fédération Dentaire Internationale (FDI) criteria. Additional data regarding participant characteristics, restored teeth, and clinical working time were collected. Kaplan–Meier survival analysis was performed to estimate success/fracture rates. Cox regression analysis was used to assess associations with clinical success, and the independent t-test was used to compare clinical working time ($\alpha = 0.05$). Most participants were male (58.3%), with a mean age of 7.5 years (± 1.24). After 12 months, 53 restorations were evaluated. Seven restorations failed (four in the CR + PF group and three in the CR group). Success rates were 85.7% for the CR + PF group and 88.0% for the CR group, with no statistically significant difference between them ($p > 0.05$). All other FDI parameters indicated that the restorations were clinically acceptable. The mean procedure time was 30.67 minutes in the CR + PF group and 25.23 minutes in the CR group. Cox regression analysis showed that age had a significant effect on clinical success ($p < 0.05$), and the t-test revealed a significant difference in clinical working time between groups ($p < 0.05$). After 12 months, no significant difference was observed in the clinical performance of occluso-proximal restorations with or without the association of polyethylene fiber. However, the use of polyethylene fiber significantly increased clinical working time.

Keywords: polyethylene fiber; dental restoration; primary tooth.

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LISTA DE ABREVIATURAS E SIGLAS

GBD	Global Burden of Disease
UHMWPE	Polietileno de ultra-alto peso molecular
FDI	Federação Dentária Internacional
UFSC	Universidade Federal de Santa Catarina
WoS-CC	Web of Science – Core Collection

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1 CONTEXTUALIZAÇÃO

A cárie dentária é considerada um dos problemas dentários mais prevalentes que afeta a dentição decídua e permanente de crianças, exibindo uma elevada prevalência (Kazeminia et al., 2020). Segundo o Global Burden of Disease, Injuries, and Risk Factors Study a cárie dentária não tratada em dentes decíduos ocupou o primeiro lugar entre as doenças mais prevalentes entre escolares, permanecendo com taxa de prevalência constante entre 1990 a 2021 (GBD, 2025). Dessa forma, as restaurações dentárias, ou suas substituições, configuram os procedimentos mais realizados pelos cirurgiões-dentistas (Franzon et al., 2015).

Diversos materiais restauradores são empregados na reabilitação de dentes decíduos acometidos por lesões cariosas, sendo a resina composta um dos mais utilizados, especialmente em áreas que demandam maior resistência mecânica e em regiões estéticas (Amend et al., 2022; Dhar et al., 2015). No entanto, apesar de sua ampla aplicação, estudos ainda relatam taxas anuais consideráveis de falha em restaurações realizadas com esse material na dentição decídua, particularmente em cavidades ocluso-proximais (Amend et al., 2022). Diante desse cenário, torna-se evidente a necessidade de estratégias complementares que contribuam para aumentar a longevidade das restaurações em resina composta, sobretudo em cavidades extensas e submetidas a maior estresse funcional.

Diversas estratégias têm sido propostas para aprimorar a qualidade dos procedimentos adesivos diretos na dentição permanente (Sfeikos et al., 2022; Agrawal et al., 2012). Entre essas abordagens, destaca-se o uso de fibras de polietileno, que têm demonstrado resultados promissores em estudos pré-clínicos por atuarem na redução da contração de polimerização e, consequentemente, na melhora da adesão das restaurações. Essas fibras contribuem para o aumento da resistência à flexão das restaurações compostas e promovem uma distribuição mais eficiente das forças mastigatórias (Xu e Farris, 2007). Além de suas propriedades mecânicas favoráveis, apresentam boa estética clínica. Estruturalmente, são compostas por cadeias poliméricas altamente alinhadas, com baixo módulo de densidade, o que lhes confere elevada resistência ao impacto (Xu e Farris, 2007). Assim, o uso de fibras de polietileno representa uma alternativa viável para potencializar o desempenho dos

materiais restauradores, favorecendo uma distribuição uniforme de tensões, menor contração de polimerização entre o material e a estrutura dental, além de excelente durabilidade mecânica (Hasija et al., 2020).

As fibras de polietileno são constituídas pelo polietileno de ultra-alto peso molecular (UHMWPE) que é um tipo especial de polietileno que se diferencia do polietileno de alta densidade principalmente pelo maior peso molecular e pelo comprimento superior de suas cadeias poliméricas (Bracco et al., 2017; Sobieraj and Rimnac, 2009). Suas propriedades não dependem apenas da massa molecular, mas estão fortemente relacionadas à sua microestrutura. Trata-se de um polímero semicristalino composto por regiões cristalinas e amorfas, interligadas por uma fase intermediária denominada trans interfacial (Bracco et al., 2017). O desempenho do UHMWPE é determinado pela interação entre essas fases, incluindo o grau de cristalinidade, o número de ligações cruzadas, os emaranhamentos moleculares e a disposição dos cristalitos. Como resultado dessa estrutura, o material apresenta elevada resistência ao desgaste, excelente tenacidade, grande durabilidade e boa biocompatibilidade (Hussain et al., 2020).

Na odontologia, as fibras de polietileno têm sido amplamente utilizadas devido as suas propriedades mecânicas e estéticas. Esse material tem sido empregado principalmente para reforço de estruturas dentárias, restauradoras e protéticas (Soto-Cadena et al., 2023). No entanto, devido a sua versatilidade esse material foi empregada em várias aplicações ao longo dos anos desde a sua introdução na prática clínica odontológica. Apesar de diferentes empresas terem investido na fabricação de fibras de polietileno para uso odontológico, o Ribbond® ganhou uma maior popularidade e é a marca mais utilizada e conhecida (Fernandes et al., 2025; Carneiro Júnior et al., 2018; Bijelic-Donova et al., 2025; Ladizesky et al., 1992; Carlos and Harrison, 1997; Reis et al., 2024).

Uma revisão narrativa da literatura analisou criticamente os diversos protocolos de odontologia restauradora biomimética, destacando entre os temas abordados o uso de fibras de polietileno como estratégia para potencializar o desempenho mecânico das restaurações (Reis et al., 2024). A revisão evidenciou a escassez de evidências clínicas robustas sobre o tema, apontando que apenas dois estudos clínicos disponíveis na literatura investigaram a utilização dessas fibras com

essa finalidade. Ambos demonstraram que a incorporação de fibras de polietileno nas restaurações não promoveu diferença estatisticamente significativa na longevidade clínica (Metwaly et al., 2024; Mohamed et al., 2025). No entanto, vale ressaltar que esses estudos foram realizados exclusivamente em dentes permanentes, o que, somado ao número limitado de publicações, restringe a solidez das evidências atuais e reforça a necessidade de novas investigações, especialmente voltadas à dentição decídua, na qual ainda não há estudos clínicos que explorem essa abordagem.

Dessa maneira, o objetivo do presente estudo foi avaliar clinicamente, após 12 meses, a qualidade das restaurações ocluso-proximais de resina composta associada as fibras de polietileno em molares decíduos. A hipótese nula do estudo é que não seriam identificadas diferenças no desempenho restaurador após 12 meses e a hipótese alternativa é que seriam identificadas diferenças no desempenho restaurador após 12 meses.

2 OBJETIVOS

Objetivo Geral:

- Avaliar clinicamente, após 12 meses, a qualidade das restaurações ocluso-proximais de resina composta associada as fibras de polietileno em molares decíduos através de um ensaio clínico randomizado por meio dos critérios da Federação Dentária Internacional (FDI).

Objetivos Específicos:

- Mensurar o tempo clínico dos procedimentos em minutos;
- Avaliar possíveis fatores que influenciam a longevidade das restaurações;
- Realizar uma revisão bibliométrica e altmétrica sobre o desempenho das pesquisas e alcance das publicações sobre o uso das fibras de polietileno na odontologia ao longo dos anos.

3 ARTIGO I

O seguinte manuscrito foi redigido de acordo com as normas da revista científica Journal of Prosthetic Dentistry, a qual será submetido.

Clinical Applications of Polyethylene Fibers in Dentistry (1988 – 2025): A Metrics-Based Analysis

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RESEARCH AND EDUCATION

Clinical Applications of Polyethylene Fibers in Dentistry: A Metrics-Based Analysis

ABSTRACT

Statement of problem. Polyethylene fibers stand out in dentistry due to their favorable mechanical and esthetic properties.

Purpose. Through a bibliometric and altmetric review, the publication profile and the social interest in the use of polyethylene fibers in dentistry were assessed.

Material and methods. In October 2025, a search was performed in the Web of Science database. The main characteristics of the retrieved publications were extracted and analyzed, with emphasis on the clinical use and applications of this material. Social attention was evaluated in the Dimensions database using altmetric indicators. Collaboration networks were measured using VOSviewer, and the correlation between citation counts and other variables was determined using Spearman's test. Trend analysis was conducted in Microsoft Excel.

Results. The selected studies were published between 1988 and 2025 (n=203). The *Journal of Prosthetic Dentistry* accounted for the largest number of publications (n=18). Most studies were laboratory-based (n=150), and the most investigated clinical applications were the use of polyethylene fibers for dental restorations (n=101), intracanal posts (n=32), and fixed prosthesis reinforcement (n=26). The majority of studies focused on adult populations (n=190). Turkey (n=51) was the leading country in publication output, and Asia was the most

represented continent (n=113). Limited social attention (n = 14) was observed, mainly from readers on Mendeley and users of X and Facebook. VOSviewer indicated collaboration networks among authors. The trend analysis revealed current interest in the use of this material for dental restorations, intracanal posts, and bone reconstruction.

Conclusions. A consistent number of publications was observed over the 37-year period. The studies were predominantly laboratory-based, mainly evaluating the use of polyethylene fibers in dental restorations for adult populations. The clinical applications of this material have undergone several modifications over the years, serving primarily as reinforcement for restorative materials and dental structures. A shortage of clinical studies was identified.

CLINICAL IMPLICATIONS

Polyethylene fibers are clinically used to reinforce dental materials and procedures, increasing strength and reducing fractures while maintaining good aesthetics and adhesion. A metrics-based review may encourage clinical design improvement.

Polyethylene fibers are composed of ultra-high-molecular-weight polyethylene (UHMWPE), a special type of polyethylene that differs from high-density polyethylene mainly in its higher molecular weight and the greater length of its polymer chains.^{1,2} The properties of UHMWPE depend not only on molecular mass but are also strongly related to its microstructure. It is a semicrystalline polymer consisting of crystalline and amorphous regions interconnected by an intermediate phase known as the trans interfacial region.¹ The performance of UHMWPE is determined by the interaction among these phases, including the degree of crystallinity, the number of cross-links, molecular entanglements, and the

arrangement of crystallites. As a result of this structure, the material exhibits high wear resistance, excellent toughness, long durability, and good biocompatibility.³

In dentistry, polyethylene fibers have been widely used because of their mechanical strength and esthetic properties. This material has primarily been applied for the reinforcement of dental, restorative, and prosthetic structures.⁴ However, due to its versatility, polyethylene fiber has been employed in several applications since its introduction into dental clinical practice. Although different manufacturers have developed polyethylene fibers for dental use, Ribbond® has gained greater popularity and remains the most used and recognized brand.⁵⁻¹⁰ Given the multiple clinical applications of this material and the long research history supporting its use in dentistry, there is a clear need for a study that maps the scientific literature on polyethylene fibers, identifies publication trends, and guides future research.

Metric-based reviews have emerged as important methodological tools capable of gathering and analyzing large volumes of data, providing an overview of the scientific history, current state, and research gaps.¹¹⁻¹⁵ Bibliometric reviews analyze the profile of scientific publications, whereas altmetric reviews assess the social attention related to these publications. Together, these analyses yield valuable insights into a specific topic.¹⁶⁻¹⁹ Considering the importance of this study design and the scarcity of such analyses on the use of polyethylene fibers in dentistry, the objective of the present study was to conduct a metric-based review to identify the main characteristics of publications and the level of social interest regarding the use of this material in dental clinical practice. The study hypothesis is that different characteristics will be identified among studies addressing the use of polyethylene fibers in dentistry.

MATERIALS AND METHODS

The present study is a literature review with a bibliometric and altmetric design. The study was conducted following the Guideline for Conducting Metric-Based Reviews in Dentistry (METRICS).²⁰ Since the research analyzed data from previously published primary studies, ethical approval was not required.

Initially, a research protocol outlining all methodological steps was developed and registered on the Open Science Framework (OSF) (Project DOI: 10.17605/OSF.IO/YSMPA). The search strategy was designed based on keywords and terms related to the topic combined with Boolean operators: (UHMWPE OR "Polyethylene fiber*" OR Ribbond OR Splint-It OR "Connect Fiber" OR "DVA Fibers" OR Ribbond).

The search was performed in the Web of Science – Core Collection (WoS-CC) database. Titles and abstracts were screened, and full texts were reviewed when necessary. Article selection in WoS-CC was conducted independently by 2 researchers (AOR and LMA); disagreements were resolved by consulting a third reviewer (MC). Studies evaluating the use of polyethylene fibers in dentistry were included regardless of year, location, or language of publication. Conference abstracts and editorials were excluded.

Data from the selected studies were tabulated in Microsoft Excel 2010 (Microsoft Corp.) and categorized according to: year of publication, number of citations, citation density, access type (open or closed), funding agency, study design, topic (age group and clinical application), journal, Journal Citation Reports (2024) impact factor, country, continent, institution (based on corresponding author), and keywords.

Collaboration networks among authors and keywords were generated using VOSviewer (Visualization of Similarities Viewer, version 1.6.17.0).²¹ In the network visualizations, larger circles represent authors or keywords with higher occurrence, and lines

connecting circles indicate collaboration strength; thicker lines and same-colored clusters represent stronger associations.

The social performance and online visibility of publications on polyethylene fibers in dentistry were assessed using the Dimensions database (Dimensions.ai). Altmetric data were retrieved by two independent researchers (AOR and LMA) on the same day as the WoS-CC search, using the same strategy. Articles were ranked in descending order according to their Altmetric Attention Score (AAS). Titles, abstracts, and full texts were screened when necessary, and studies without AAS or unrelated to polyethylene fibers were excluded.

In addition to descriptive analysis, statistical tests were performed to assess correlations between the number of citations, year of publication, and journal impact factor. The Kolmogorov–Smirnov test was used to assess data normality. Depending on distribution, either Pearson’s or Spearman’s correlation tests were applied (IBM SPSS Statistics for Windows, v24.0; IBM Corp.) ($\alpha = .05$). Correlation strength was interpreted according to Mukaka.²² To evaluate temporal trends, data were grouped and analyzed by publication period using Microsoft Excel 2010 (Microsoft Corp.).

RESULTS

The initial WoS-CC search retrieved 51,168 documents. Since polyethylene fibers are used in various scientific fields, the dataset was refined using the WoS-CC category filter “Dentistry, Oral Surgery & Medicine”, resulting in 364 studies. After applying inclusion and exclusion criteria, 203 studies were selected for analysis (Fig. 1).

Two studies were the most cited, each with 184 citations.^{23,24} Twenty-six studies received ≥ 50 citations. The article with the highest citation density achieved 14 citations per year.²⁵ Table 1 lists the 10 most-cited studies. As the data were not normally distributed,

Spearman's correlation was used, showing a very weak positive correlation between WoS-CC citation count and 2024 journal impact factor ($\rho=.260$; $P<.05$), and a moderate negative correlation between citation count and year of publication ($\rho=-.680$; $P<.05$).

The earliest WoS-CC articles reporting the use of polyethylene fibers in dentistry were published in 1988,^{26,27} whereas the most recent were from 2025 ($n=17$). A steady increase in publications was observed over 37 years (Fig. 2). About one-third of the studies were open access ($n=66$; 32.5%). Only a small proportion received funding ($n=40$; 19.7%). Regarding study design, most were laboratory-based ($n=150$), followed by case reports ($n=21$), clinical trials ($n=12$), observational studies ($n=10$), systematic reviews ($n=8$), and literature reviews ($n=2$).

Most studies focused on adult populations ($n=190$), with few involving children ($n=9$) or adolescents ($n=2$); 1 included children and adolescents, and another included children and adults. Concerning clinical applications, the majority investigated the use of polyethylene fibers in direct restorations ($n=101$), intracanal posts ($n=32$), and fixed prosthesis reinforcement ($n=26$), followed by denture base reinforcement ($n=22$), bone reconstruction ($n=8$), post-orthodontic retainers ($n=5$), post-trauma splints ($n=3$), space maintainers ($n=2$), orthodontic bracket fabrication ($n=1$), and fragment reattachment ($n=1$) (Fig. 3). 2 studies addressed multiple applications.

A total of 65 dental journals published articles on polyethylene fibers. The Journal of Prosthetic Dentistry had the highest number of publications ($n=18$), followed by Dental Materials ($n=15$) and Operative Dentistry ($n=13$) (Table 2). According to the 2024 Impact Factor, the top journals were International Endodontic Journal ($n=5$; IF=7.1), Dental Materials ($n=15$; IF=6.3), and Journal of Dental Research ($n=1$; IF=5.9).

Publications originated from 33 countries, led by Turkey (n=51), India (n=26), and the USA (n=16). The most represented continent was Asia (n=113), followed by Europe (n=45) and Anglo-American countries (n=18) (Fig. 4). A total of 684 authors contributed to the selected publications. The most prolific authors were Belli S (14 papers), Eskitascioglu G (10), and Ladizesky NH and Chow TW (8 each) (Table 3; Fig. 5). The most productive institution was Selcuk University (n = 15), followed by Dicle University and The University of Hong Kong (n=7 each) (Table 4).

A wide range of 439 different keywords was identified. The most frequent were “fracture resistance” (24 occurrences), “Ribbond” (18), and “polyethylene fiber” (15). Keywords with at least three occurrences are presented in Figure 6.

Table 5 summarizes publication characteristics over time, showing a progressive growth trend. Early studies focused on denture base reinforcement, whereas tooth restorations became the most investigated application over time. In recent years, studies on bone reconstruction have emerged. Turkey consistently showed the highest research activity. Journals in prosthodontics, restorative dentistry, and dental materials were predominant.

According to Dimensions, 14 studies received altmetric attention. Overall, most engagement came from Mendeley readers and users of X (Twitter) and Facebook. The article with the highest altmetric score was “Fracture resistance of endodontically treated teeth restored with composite posts”,²⁸ which achieved an Altmetric Attention Score (AAS) of 5, with attention from News (1) and Mendeley (243). Details are shown in Table 6.

DISCUSSION

The study hypothesis was accepted, as differences and trends were identified among the scientific publications on the use of polyethylene fibers in dentistry indexed in the WoS-

CC database. Polyethylene fibers are strong, translucent structures with a color similar to dental tissues, which favors their esthetic integration. However, despite these advantages, their use in dentistry remains limited. Since their introduction into clinical practice, polyethylene fibers have been applied in a variety of contexts. To illustrate the current scientific scenario and historical evolution of this topic, the present study conducted a comprehensive bibliometric and altmetric analysis. Despite the numerous potential applications of this material, the findings showed a predominance of studies investigating its use in dental restorations for adult populations. Nevertheless, the evidence supporting these applications is primarily derived from laboratory-based studies. Furthermore, a limited level of social engagement was observed, mainly from Mendeley readers and users of X (Twitter) and Facebook.

Academic citations are references used in scientific work to acknowledge the sources from which information was derived.¹⁸ They provide credibility to research by demonstrating that the content is grounded in the literature and allow readers to verify the origin of information.^{17,18} The most cited studies achieved impressive citation counts,^{23,24} likely due to their long publication time, over 20 years, which may have contributed to these high academic metrics. Moreover, both investigated the use of polyethylene fibers in restorative procedures, which have historically been the most extensively explored topics, thus increasing their likelihood of being cited.

The earliest studies, published more than 37 years ago,^{26,27} were laboratory investigations that evaluated the incorporation of polyethylene fibers into denture bases. Polyethylene fibers were initially used in denture bases to reinforce acrylic resins, which presented low fracture resistance. The addition of fibers improved the mechanical strength and flexural resistance of the prosthesis, reducing fracture risk and enhancing durability.⁸

Because the fibers are translucent, they preserved the esthetics of the prosthesis. However, their poor adhesion to acrylic resin compromised long-term performance and predictability, which limited their widespread use.⁹ As shown in the trend analysis (Table 5), this application was among the earliest and most prominent in dentistry during the first decade of research but gradually declined in relevance in subsequent years.

The predominance of laboratory studies represents an important limitation for the scientific evolution of this topic. Although laboratory studies are fundamental in dentistry, their results should not be extrapolated to clinical scenarios without confirmation from well-designed clinical trials.¹⁹ A recent critical review concluded that the reinforcement of composite restorations with polyethylene fibers may be considered a myth, owing to the lack of high-quality clinical evidence, as most findings are derived exclusively from in vitro studies.¹⁰ The present study corroborates this observation, confirming that most available evidence, whether related to restorations or other applications, remains laboratory-based. This emphasizes a critical knowledge gap that should be addressed through future clinical investigations to validate or refute the functional effectiveness of polyethylene fibers in specific dental procedures.

Regarding clinical applications, polyethylene fibers have been predominantly used for reinforcement of dental structures and prosthetic components. Ultra-high-molecular-weight polyethylene exhibits high tensile strength, excellent resistance to wear, fatigue, and impact, and notable biocompatibility.³ This unique combination of strength and lightness makes it suitable for demanding mechanical applications in dentistry. Consequently, it has been employed in denture base reinforcement, fixed partial denture frameworks, pontics, and intracanal posts. Its translucent appearance has also enabled esthetic applications, such as orthodontic bracket fabrication.⁵ Additionally, its flexibility and adaptability have facilitated

its use in splints, space maintainers, and tooth reinforcement. More recently, polyethylene fibers have been explored for bone reconstruction, as they provide mechanical stability, biocompatibility, and ease of adaptation, enabling the stabilization of grafts and structures during bone regeneration.⁶

Greater social interest was observed mainly among Mendeley readers and social media users (X and Facebook). This pattern has also been reported in other altmetric studies.^{11,16} Altmetrics (alternative metrics) measure the online reach and public engagement of scientific publications.¹² The relatively low altmetric performance observed in this review may be attributed to the limited number of high-evidence studies such as clinical trials and systematic reviews. Conducting rigorous studies with well-founded clinical outcomes could enhance both the scientific impact and social visibility of research on polyethylene fibers.

Turkey emerged as the country with the highest number of publications, followed by other Asian nations, making Asia the most productive continent. This trend is consistent with previous bibliometric analyses.^{14,15} The expansion of Turkey's scientific output over recent decades can be attributed to increased investment in research and development, government policies promoting academic productivity, and the growth of universities and graduate programs.¹³ Nonetheless, a geographical gap was identified, as contributions from Oceania were scarce.

This study represents a global bibliometric and altmetric review, encompassing all WoS-CC-indexed publications on polyethylene fibers in dentistry. The combined use of bibliometric and altmetric analyses constitutes a major strength, providing a broad overview of both academic impact and social attention. However, a limitation of the present study is that analyses were based on a single database (WoS-CC). This choice was justified because WoS-CC is the most frequently used source in dental bibliometric research due to its broad

journal coverage and compatibility with analysis tools such as VOSviewer, which accepts data from one source at a time. Previous bibliometric reviews have also reported a similar trend of relying solely on WoS-CC for data extraction in dental research.

CONCLUSIONS

A consistent number of publications on the use of polyethylene fibers in dentistry has been observed over the past 37 years.

1. These studies were predominantly laboratory-based, mostly evaluating the use of polyethylene fibers in dental restorations for adult populations, and were primarily conducted in Turkey.
2. The clinical applications of this material have evolved over time, serving mainly as reinforcement for restorative materials and dental structures.
3. The social interest in this topic was limited, with engagement mainly from Mendeley readers and users of X (Twitter) and Facebook.
4. There is an urgent need for clinical trials, as well as a notable lack of studies originating from Oceania.

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TABLES

Table 1. Top 10 most cited articles on the use of polyethylene fibers in dentistry.

Articles	Study Design	Clinical Application	Citations WoS-CC
Sirimai S, Riis DN, Morgano SM. An in vitro study of the fracture resistance and the incidence of vertical root fracture of pulpless teeth restored with six post-and-core systems. <i>J Prosthet Dent.</i> 1999;81:262-9.	Laboratory	Intraradicular retainer	184
Dyer SR, Lassila LV, Jokinen M, Vallittu PK. Effect of fiber position and orientation on fracture load of fiber-reinforced composite. <i>Dent Mater.</i> 2004;20:947-55.	Laboratory	Dental restoration	184
Uzun G, Hersek N, Tinçer T. Effect of five woven fiber reinforcements on the impact and transverse strength of a denture base resin. <i>J Prosthet Dent.</i> 1999;81:616-20.	Laboratory	Denture base	120
Freilich MA, Karmaker AC, Burstone CJ, Goldberg AJ. Development and clinical applications of a light-polymerized fiber-reinforced composite. <i>J Prosthet Dent.</i> 1998;80:311-8.	Laboratory	Fixed prosthesis reinforcement	107
Narva KK, Lassila LV, Vallittu PK. The static strength and modulus of fiber reinforced denture base polymer. <i>Dent Mater.</i> 2005;21:421-8.	Laboratory	Denture base	98
Ladizesky NH, Cheng YY, Chow TW, Ward IM. Acrylic resin reinforced with chopped high performance polyethylene fiber--properties and denture construction. <i>Dent Mater.</i> 1993;9:128-35.	Laboratory	Denture base	90
Gutteridge DL. The effect of including ultra-high-modulus polyethylene fibre on the impact strength of acrylic resin. <i>Br Dent J.</i> 1988;164:177-80.	Laboratory	Denture base	85
Belli S, Erdemir A, Ozcopur M, Eskitascioglu G. The effect of fibre insertion on fracture resistance of root filled molar teeth with MOD preparations restored with composite. <i>Int Endod J.</i> 2005;38:73-80.	Laboratory	Dental restoration	85
Belli S, Erdemir A, Yildirim C. Reinforcement effect of polyethylene fibre in root-filled teeth: comparison of two restoration techniques. <i>Int Endod J.</i> 2006;39:136-42.	Laboratory	Dental restoration	84
Gutteridge DL. Reinforcement of poly(methyl methacrylate) with ultra-high-modulus polyethylene fibre. <i>J Dent.</i> 1992;20:50-4.	Laboratory	Denture base	83

WoS-CC (Web of Science Core Collection)

Table 2. Major journals that have published on polyethylene fibers in dentistry.

Source Title	Number of Articles	Number of Citations	Impact Factor 2024
Journal of Prosthetic Dentistry	18	903	4.8
Dental Materials	15	773	6.3
Operative Dentistry	13	277	2.2
Journal of Adhesive Dentistry	12	225	2.7
Dental Traumatology	10	201	3.1
Journal of Dentistry	7	256	5.5
Journal of Esthetic and Restorative Dentistry	7	41	4.1

Table 3. Main institutions with the highest number of publications.

Institution	Country	Number of Articles	Number of Citations
Selcuk University	Turkey	15	516
University of Hong Kong	China	7	223
Dicle University	Turkey	7	92
University of Turku	Finland	5	232
University of Birmingham	United Kingdom	3	118
Shiraz University of Medical Science	Iran	3	71
University of Groningen	Netherlands	3	43
Marmara University	Turkey	3	27
Cairo University	Egypt	3	5

Table 4. Top authors with the highest number of publications.

Authors	Number of Articles	Number of Citations	Clinical Investigations
Belli S	14	455	Dental restoration (6) Intraradicular retainer (5) Fixed prosthesis reinforcement (2) Multiple applications (1)
Eskitascioglu G	10	296	Dental restoration (5) Intraradicular retainer (4) Fixed prosthesis reinforcement (1)
Ladizesky NH	8	360	Denture base (8)
Chow TW	8	313	Denture base (8)
Vallittu PK	7	472	Dental restoration (5) Denture base (2)
Lassila L	7	432	Dental restoration (6) Denture base (1)
Ellakwa A	6	121	Dental restoration (4) Fixed prosthesis reinforcement (2)
Ozcan M	5	111	Fixed prosthesis reinforcement (2)

Dental restoration (1)
Intraradicular retainer (1)
Orthodontic retainer (1)

Table 5. Main publishing trends over the years.

Period	1988-1997	1998-2007	2008-2017	2018-2025
Number of Articles	17	40	78	68
Number of Citations	740	1941	1560	368
Study Design	Laboratory (16)	Laboratory (28)	Laboratory (61)	Laboratory (45)
	Case report (1)	Observational (5)	Case report (9)	Case report (7)
		Case report (4)	Clinical trial (5)	Systematic review (7)
Clinical Application	Denture base (14)	Dental restoration (20)	Dental restoration (37)	Dental restoration (42)
	Dental restoration (2)	Fixed prosthesis reinforcement (9)	Intraradicular retainer (14)	Intraradicular retainer (13)
	Fixed prosthesis reinforcement (1)	Intraradicular retainer (5)	Fixed prosthesis reinforcement (12)	Bone reconstruction (6)
Age Range	Adult (17)	Adult (39)	Adult (71)	Adult (63)
		Child (1)	Child (4)	Child (4)
			Adolescent (2)	
Country	China (6)	Turkey (13)	Turkey (24)	Turkey (14)
	USA (5)	USA (7)	India (19)	India (7)
	United Kingdom (5)	Germany (4)	Italy (6)	Iran (7)
Journal	Journal of Prosthetic Dentistry (5)	Journal of Prosthetic Dentistry (9)	Dental Traumatology (7)	BMC Oral Health (6)
	Australian Dental Journal (4)	Dental Materials (7)	Journal of Adhesive Dentistry (6)	Journal of Esthetic and Restorative Dentistry (6)
	Journal of Dentistry (3)	Journal of Adhesive Dentistry (6)	Operative Dentistry (5)	Operative Dentistry (5)
			Dental Materials Journal (5)	

Table 6. Articles with altmetric performance according to Dimensions.

Altmetric Attention Score	Articles	Mentioned by
7	Newman MP, et al. Fracture resistance of endodontically treated teeth restored with composite posts. J Prosthet Dent. 2003;89:360-7.	News (1) Mendeley (243)
5	Kalha AS. Orthodontic retention to have and to hold. Evid Based Dent. 2016;17:105-106.	X (7) Mendeley (48)
3	Soto-Cadena SL, et al. Effect of short fiber-reinforced composite combined with polyethylene fibers on fracture resistance of endodontically treated premolars. J Prosthet Dent. 2023;129:598.e1-598.e10.	X (3) Mendeley (76)
2	Abidrahamani A, et al. Can fiber placement influence the fracture resistance of endodontically treated teeth with indirect partial ceramic restorations? A systematic review and meta-analysis. J Prosthet Dent. 2025;134:1005-1017.	Facebook (1) X (2) Mendeley (16)
1	Hiremath H, et al. Use of ribbond and panavia F cement in reattaching fractured tooth fragments of vital maxillary anterior teeth. Contemp Clin Dent. 2012;3:478-80.	Facebook (4) Mendeley (18)
1	Memarpour M, Shafiei F. Restoration of primary anterior teeth using intracanal polyethylene fibers and composite: an in vivo study. J Adhes Dent. 2013;15:85-91.	Facebook (1) Mendeley (86)
1	Ramírez-Gómez JF, et al. Effect of polyethylene fiber orientation on fracture resistance of endodontically treated premolars. J Prosthet Dent. 2024;131:92.e1-92.e8.	Facebook (1) Mendeley (32)
1	Agrawal VS, et al. Comparative evaluation of microleakage of silorane-based composite and nanohybrid composite with or without polyethylene fiber inserts in class II restorations: an in vitro study. Oper Dent. 2012;37:E1-7.	Facebook (1) Mendeley (59)
1	Mangoush E, et al. Comparative evaluation between glass and polyethylene fiber reinforced composites: A review of the current literature. J Clin Exp Dent. 2017;9:e1408-e1417.	X (1) Mendeley (108)
1	Hshad ME, et al. Influence of Different Restoration Techniques on Fracture Resistance of Root-filled Teeth: In Vitro Investigation. Oper Dent. 2018;43:162-169.	X (1) Mendeley (104)
1	Ramesh P, et al. Efficacy of Ribbond and a fibre post on the fracture resistance of reattached maxillary central incisors with two fracture patterns: a comparative in vitro study. Dent Traumatol. 2016; 32:110-5.	X (1) Mendeley (76)
1	Mortazavi V, et al. Fracture resistance of structurally compromised and normal endodontically treated teeth restored with different post systems: An in vitro study. Dent Res J (Isfahan). 2012;9:185-91.	Facebook (1) Mendeley (55)
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Mendeley (32) |
|---|---|-------------------------------|

Figures

Figure 1- Flowchart of the study selection process in the Web of Science database.

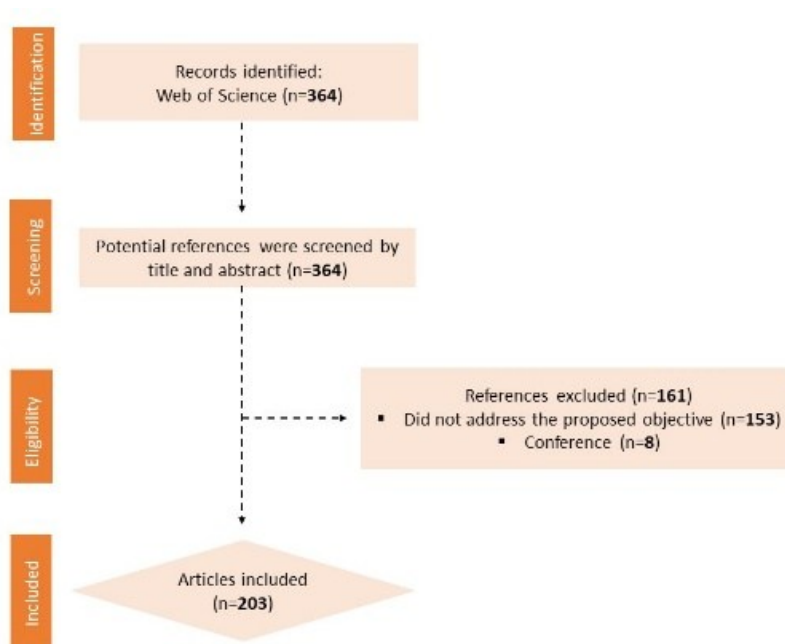


Figure 2- Distribution of publication volume over the years. The dotted line indicates an increasing trend in the number of publications.



Figure 3- Main characteristics of clinical applications of polyethylene fibers in dentistry.

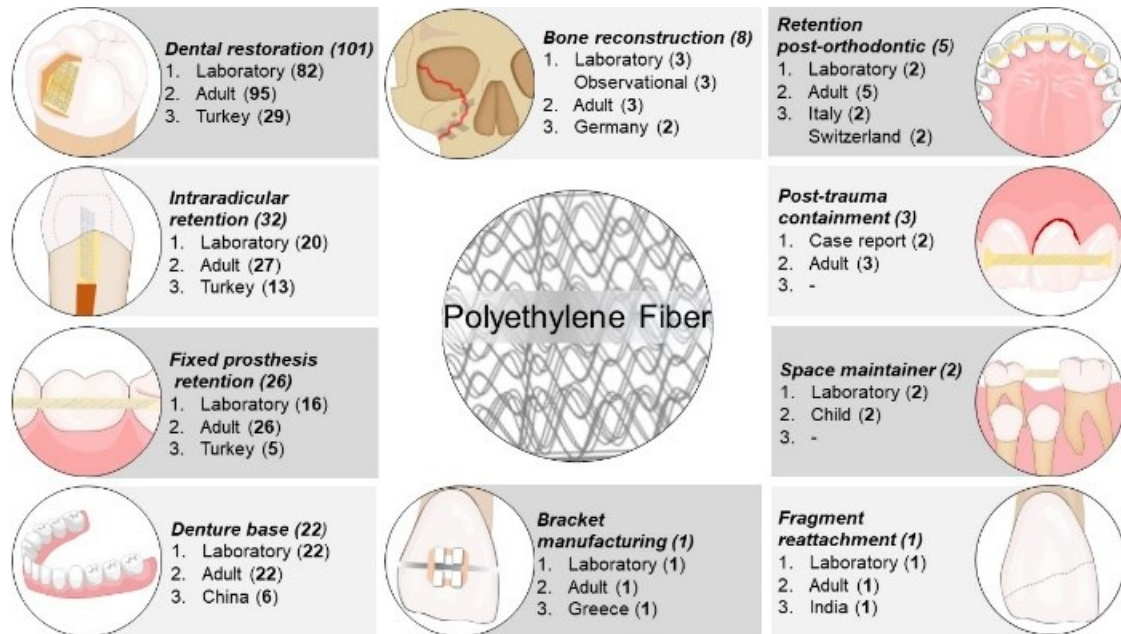


Figure 4- Worldwide distribution of publications on the use of polyethylene fibers in dentistry. Each continent is represented by a different color.

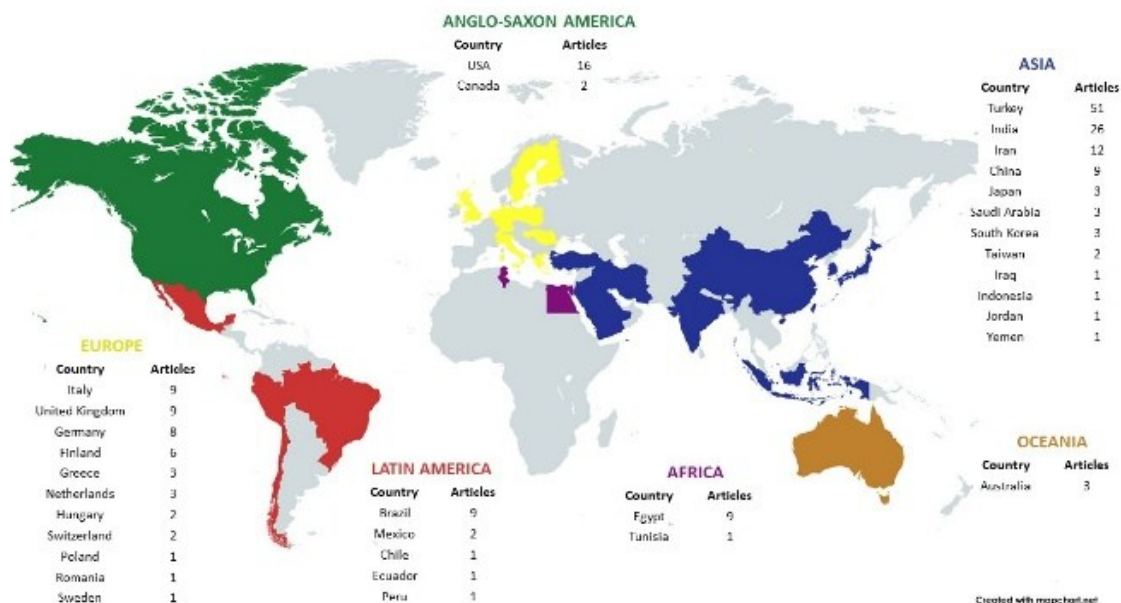
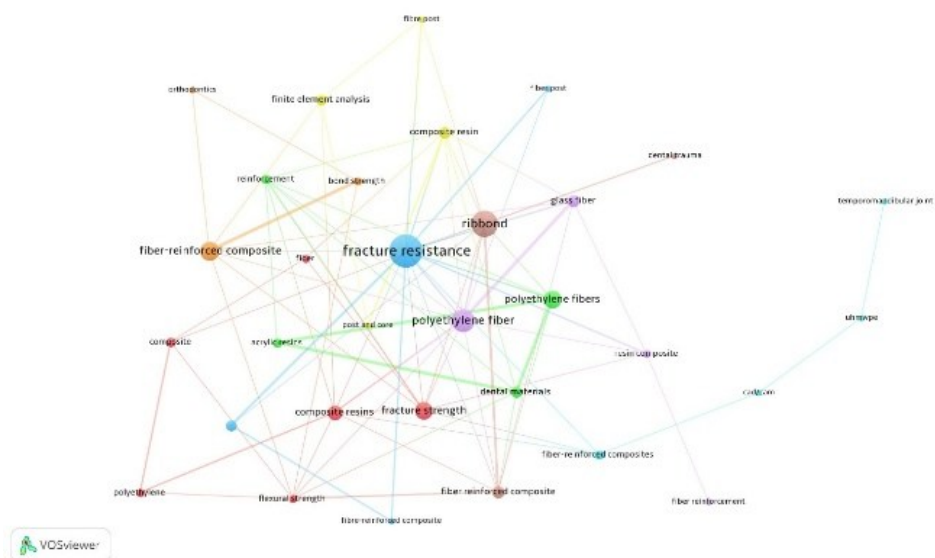


Figure 5- Most prominent authors in publications on the use of polyethylene fibers in dentistry and interaction between groups. Older authors are associated with the color blue, and more recent ones with red.

Figure 6- Main keywords associated with the study. The terms corresponding to the largest circles are the most common, and the line connecting the circles indicates the collaboration of the terms in the same study.



4 ARTIGO II

O seguinte manuscrito foi redigido de acordo com as normas da revista científica Journal of Dentistry, a qual será submetido.

Clinical performance of occluso-proximal composite resin restorations associated with polyethylene fibers in primary molars: a randomized clinical trial

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ABSTRACT

Objective: This 12-month, double-blind, parallel, randomized clinical trial aimed to compare the success rates of occluso-proximal composite resin restorations reinforced with polyethylene fiber (CR + PF; Ribbond®) to those of conventional composite resin restorations (CR) in primary molars.

Methodology: A total of 60 children aged 5-10 years received occluso-proximal restorations using either CR + PF or conventional direct CR, with 30 restorations per group. The restorations were evaluated at baseline and after 3, 6, and 12 months of clinical service according to the FDI World Dental Federation criteria. Additional data were collected regarding participant characteristics, restored teeth, and clinical working time. Statistical analyses included Kaplan–Meier survival estimation for success/fracture rate. Cox regression analysis was used to assess associations with clinical success, and the independent t-test was compare clinical working time ($\alpha = 0.05$).

Results: After 12 months, 53 restorations were evaluated. Seven restorations failed (four for CR + PF group and three for CR group). The success rates were 85.7% for CR + PF group and 88.0% for the CR group, with no statistically significant difference between them ($p > 0.05$). All other FDI parameters indicated that the restorations were clinically acceptable. The mean procedure time was 30.67 minutes in the CR + PF group and 25.23 minutes in the CR group. Cox regression analysis showed that age had a significant effect on clinical success ($p < 0.05$), and the t-test revealed a significant difference in clinical time between groups ($p < 0.05$).

Conclusions: After 12 months, there was no significant difference in the clinical performance of occluso-proximal restorations with or without polyethylene fiber reinforcement. However, the use of fiber significantly increased the clinical working time.

Clinical Significance: Polyethylene fibers are frequently used to increase the longevity of direct composite resin restorations. However, it has been observed that their use does not influence restorative success.

Keywords: Dental restorations; Tooth Deciduous; Ribbond; Polyethylene fiber; Clinical trial.

1. Introduction

Dental caries is considered one of the most prevalent oral health problems, affecting both the primary and permanent dentition of children (46,2% and 53,8%) [1]. According to the Global Burden of Disease, Injuries, and Risk Factors Study, untreated dental caries in primary teeth ranked first among the most prevalent diseases in school-aged children, maintaining a consistent prevalence rate from 1990 to 2021 [2]. Consequently, dental restorations, or their replacements, remain among the most frequently performed procedures by dental professionals [3].

A range of restorative materials are employed in the rehabilitation of primary teeth compromised by carious lesions. Composite resin is among the most commonly utilised materials, particularly in regions where enhanced mechanical strength is necessary and in areas where aesthetics are of primary concern [4,5]. Despite its widespread application, several studies still report considerable annual failure rates of composite resin restorations in primary teeth, especially in occluso-proximal cavities [4]. This scenario highlights the need for complementary strategies aimed at improving the longevity of composite restorations, particularly in extensive cavities subjected to increased functional stress.

Several strategies have been proposed to enhance the quality of direct adhesive procedures in the permanent dentition [6,7]. Among these, the use of polyethylene fibers stands out. These fibers have shown promising results in preclinical studies by helping reduce polymerization shrinkage, thereby improving restoration adhesion. Polyethylene fibers enhance the flexural strength of composite restorations and promote a more efficient distribution of masticatory forces [8]. In addition to favorable mechanical properties, they also exhibit good clinical esthetics. Structurally, polyethylene fibers are composed of highly aligned polymer chains with a low-density modulus, providing high impact resistance [8]. Thus, the use of polyethylene fibers represents a viable alternative to improve the performance of restorative

materials by promoting uniform stress distribution, reducing polymerization shrinkage between the material and tooth structure, and enhancing mechanical durability [9].

A narrative literature review critically analyzed biomimetic restorative dentistry protocols, highlighting the use of polyethylene fibers as a strategy to improve the mechanical performance of restorations [10]. The review revealed a lack of robust clinical evidence, pointing out that only two clinical studies have investigated the use of polyethylene fibers for this purpose. Both studies reported that incorporating polyethylene fibers into restorations did not result in statistically significant differences in clinical longevity [11,12]. Furthermore, it is important to highlight that the existing research has only been conducted exclusively on permanent teeth, and the small number of published studies restricts the strength of current evidence. This underscores the necessity for further research, particularly targeting primary dentition, where clinical investigations using this approach have not yet been reported.

Therefore, the aim of the present study was to clinically assess the 12-month longevity of occluso-proximal composite resin restorations associated with polyethylene fibers in primary molars compared to those without fibers. The null hypothesis of the study was that there would be no differences in restorative performance after 12 months.

2. Materials and Methods

2.1 Ethical Approval, Protocol Registration and Open Science

The study protocol was approved by local university's Scientific Review Committee and Human Research Participant Protection Committee (approval number: 75233323.4.0000.0121), following the ethical principles outlined in the Declaration of Helsinki. The study protocol was registered in the Brazilian Clinical Trials Registry (ReBEC), under the identification number RBR-105rqvph: <https://ensaiosclinicos.gov.br/rg/RBR-105rqvph>. Registered on August 2024.

When this study was initiated, the CONSORT 2025 guidelines [13], had not been published, and therefore, the statistical analysis plan was not pre-registered in a public repository. Nevertheless, the analytical approach employed adhered to methodologies reported in previous studies of the same research group, ensuring transparency and minimizing the risk of selective outcome reporting.

The trial is reported as closely as possible in accordance with the CONSORT 2025 guidelines [13,14], given that the study began prior to CONSORT update. All deidentified data from this study, including individual participant data and a data dictionary, will be available upon reasonable request after publication. To request access, please contact the corresponding author.

2.2 Trial Settings, Locations of Data Collection, and Recruitment

This was a prospective, longitudinal, double-blind, randomized clinical trial with two parallel groups. The test group received composite resin restorations associated with polyethylene fiber, while the control group received conventional composite resin restorations without fiber. The study was conducted at the postgraduate dental clinic of the Federal University of Santa Catarina (UFSC) between August and October 2024. Follow-up assessments were performed at 3, 6, and 12 months.

All participants were recruited during screening sessions held at the UFSC postgraduate dental clinic, which included a brief medical history and clinical examination. Patients were selected from the treatment list of the university's Supervised Internship in Pediatric and Adolescent Dentistry. All participants and their legal guardians were informed about the objectives of the study. Children who agreed to participate signed an informed assent form, while their guardians signed an informed consent form.

2.3 Eligibility Criteria

All participants were evaluated by two experienced examiners using standard dental diagnostic tools (dental mirror, explorer, and periodontal probe) to determine their eligibility to the study protocol. A total of 60 children were selected based on the following criteria: they were between 5 and 10 years of age, of either sex, with or without prior dental experience, and without systemic conditions according to guardian reports, classified as ASA I or II. Eligible participants presented at least one primary molar (upper or lower) with an occluso-proximal carious lesion involving the inner half of the dentin and requiring restorative treatment. Children were excluded if they presented with acute pain; odontogenic infections accompanied by systemic signs or symptoms; urgent dental conditions; endodontic involvement such as abscess or fistula; pulp exposure; allergy to any substances used in the study (such as anesthetics or

rubber dam components); history of asthma; root resorption greater than one-third; or any neurological disorders.

2.4 Characteristics of Dental Cavities

Teeth were required to be in occlusion with their antagonists and to present occluso-proximal carious lesions (mesial or distal surfaces) involving the inner half of the dentin, with at least 2 mm in depth and width. First or second primary molars located in either the upper or lower arch were included. The dimensions of only the smaller cavities were measured with a millimeter periodontal probe (PCP-UNC 15, Golgran®, São Caetano do Sul, SP, Brazil) to confirm the minimum width required (2 mm).

2.5 Sample Size estimation

The success rate for occluso-proximal composite restorations in primary teeth has been reported to be around 90% [3]. Based on this rate, a sample size calculation considering a superiority hypothesis indicated the need for 54 participants (27 per group). To account for potential dropouts, 30 restorations were performed in each group, increasing the sample size by 10% and ensuring a robust and reliable dataset for analysis.

2.6 Randomization

Randomization was performed using Microsoft Excel® 2010 (Microsoft, Redmond, WA, USA). Group assignments were documented on cards and placed in opaque, sequentially numbered envelopes. These envelopes were opened exclusively on the day of the restorative procedure, ensuring allocation concealment and minimising selection bias. In cases where more than one molar required treatment in the same participant, second molars were prioritized due to their longer success time in the oral cavity compared to first molars. If more than one first or second molar required treatment, the following quadrant order was adopted: upper right, upper left, lower left, and lower right.

2.7 Blinding

This was a double-blind trial in which both the participants and the evaluators responsible for follow-up assessments were blinded to group allocation. However, due to the

clinical distinction in the use of polyethylene fiber in the test group, blinding of the operator was not feasible.

2.8 Interventions: Restorative Procedure

All restorative procedures were performed by a single operator with experience in pediatric dentistry and direct restorations.

Both Groups

Initially, for both the test and control groups, a full-mouth dental prophylaxis was performed using a prophylactic paste (Odahcam/Dentsply Sirona®, North Carolina, USA) and a Robinson brush at low speed. Color selection of the tooth was then carried out to determine the appropriate composite resin. Local anesthesia was administered using 2% lidocaine with 1:100,000 epinephrine. Intrapapillary injection was performed in the tooth requiring placement of the rubber dam clamp, while infiltrative technique was used for the tooth selected for restoration.

A digital stopwatch was started prior to the placement of the rubber dam, which included at least one adjacent tooth to the one with the carious lesion. Cavity access was achieved using conventional-grit diamond burs (1012, 1013, or 1014) at high speed. Carious tissue removal was performed using carbide burs (sizes 3, 4, or 5) at low speed for the lateral walls, and a manual excavator for the pulpal floor, according to selective removal to firm dentine.

A total-etch technique was performed using 37% phosphoric acid (Condac 37, FGM®, Joinville, SC, Brazil) for 15 seconds on enamel and 7 seconds on dentin. The surface was rinsed for 20 seconds and gently dried with an air stream and sterile cotton. The adhesive system (OptiBond FL, Kerr Corporation®, Orange, CA, USA) was applied in two steps. First, the primer was actively applied using a Microbrush® applicator for 15 seconds, followed by the application of the adhesive, which was then light-cured for 20 seconds using a LED curing unit (Radii-cal, SDI Limited®, Victoria, Australia).

At this stage, the allocation envelope was opened, and the participant's group assignment was revealed.

Control Group

In the control group, cavities were restored solely with composite resin (Filtek Z350 XT, Solventum®, St. Paul, MN, USA) applied in oblique increments of up to 2 mm, with each increment being light-cured individually for 20 seconds. After completing the restoration, the rubber dam was removed, the stopwatch was stopped, and the total operating time was recorded. Occlusion was verified using articulating paper and finishing and polishing were performed using abrasive points of different grits, a silicon carbide brush, and a felt disc with diamond polishing paste.

Experimental Group

In the test group, after light-curing the adhesive, a thin layer of composite resin was applied to the pulpal wall, onto which a 2 mm wide polyethylene fiber (Ribbond, Ribbond Inc®, Seattle, WA, USA) was placed. This fiber had been previously impregnated with adhesive for 5 minutes. After placement, the fiber was gently pressed into the uncured composite to achieve thorough integration within the fiber mesh, followed by light curing for 20 seconds. The cavity was then restored conventionally, following the same protocol used in the control group. The clinical sequence for the test group is illustrated in Figure 1. The materials used in the restorative procedure are listed in Table 1.

2.9 Outcomes and Data Collection Methods

Clinical Evaluation

Restorations were evaluated at baseline and at 3, 6, and 12 months using the World Dental Federation (FDI) criteria [15], which comprise 14 assessment domains. The criteria include three categories of parameters: esthetic, functional, and biological. However, since the same restorative material was used in both groups, the esthetic parameter was not considered in the analysis. For the functional evaluation, five criteria were assessed: material fracture and success (considered primary outcome), marginal adaptation, proximal contact, anatomical form and contour, and occlusion and wear. For the biological evaluation, three criteria were assessed: secondary caries at the restoration margin, defects in hard dental tissues at the restoration margin, and postoperative hypersensitivity.

All variables were categorized according to FDI scoring by two experienced examiners as follow: score 1 (very good clinically), 2 (clinically good), 3 (clinically adequate/satisfactory),

4 (clinically unsatisfactory but repairable), and 5 (clinically unsatisfactory, requiring replacement). The examiners were unaware of the previous scores given in earlier follow-up visits.

Demographic data such as gender and age of the participants were collected through anamnesis. Additionally, information regarding the restored tooth, including molar type (first or second) and arch location (maxillary or mandibular), was recorded.

Clinical time was measured using a digital stopwatch, which was started before the placement of the rubber dam and stopped after its removal. The total operative time was recorded in minutes.

2.10 Training, Calibration, and Pilot Study

The first stage of training for the operator, examiner, and assistants involved theoretical sessions in which all clinical procedures were discussed. Calibration for the FDI evaluation criteria was then performed ($Kappa > 0.7$) using clinical photographs. A pilot study involving 10 patients was conducted to evaluate the clinical workflow and the applicability of the forms and scales. If there were no changes, these patients were included in the final sample.

2.11 Statistical Analysis

The statistical analyses followed the intention-to-treat [16]. Descriptive statistics were used to describe the distribution of the scores of the FDI criteria. A statistical analysis was performed with Kaplan–Meier estimation analysis for success/fracture rate. The log-rank test was used to compare the survival distributions of these restorations (pre-set at 5%). Cohen’s kappa statistics were used to test inter-examiner agreement. In all statistical tests, the significance level was pre-set at 5%.

The primary outcome of this study was defined according to the FDI criteria. Restoration failure was considered when the restoration was classified as “clinically poor” according to the FDI system at any of the 12-month evaluations.

Data tabulation was performed using a spreadsheet (Excel®, Microsoft Office 365), and descriptive analysis was conducted. For the initial analysis, SPSS software (version 21.0, IBM Corp., Armonk, NY, USA) was used. To determine differences in operative time between groups, the Shapiro-Wilk normality test was first applied. Subsequently, the independent t-test was used to assess statistical differences between the groups.

Kaplan–Meier survival analysis was used to estimate hazard ratios (HRs) and 95% confidence intervals (CIs) for restoration success over time and to identify differences in longevity between the groups. To identify associations between independent variables and the primary outcome, Cox proportional hazards regression was performed. The variables included in the analysis were age, sex, tooth type (first or second molar), arch location (maxillary or mandibular), and treatment group. Univariate models were fitted, and variables with $p < 0.20$ were included in the multivariate model. Variables with $p \geq 0.05$ were excluded from the final model. Hazard ratios (HRs) and 95% confidence intervals (95% CIs) were reported.

3. Results

A total of 200 patients were initially evaluated, from which 140 were excluded for not meeting the inclusion criteria. Thus, 60 participants were included in the study (Figure 2). Among the included participants, 35 were boys and 25 were girls. One restoration was performed per participant, totaling 60 restorations, with 30 allocated to each group (test group and control group). The participants' ages ranged from 5 to 10 years (mean age: 7.5 ± 1.24 years). Most restorations were performed on second primary molars (51.6%) and on maxillary teeth (68.3%). Table 2 presents the main characteristics of the study participants.

Four participants (Composite Resin = 2 / Polyethylene Fiber + Composite Resin = 2) did not return for the 3-month follow-up. At the 12-month recall, three participants failed to return (Composite Resin = 3). The reason for dropout was the inability to contact the caregivers, despite attempts using both the primary and alternative phone numbers provided.

Regarding the clinical time required to complete the restorative procedures, the test group required an average of 30.67 minutes (± 7.1), while the control group required an average of 25.23 minutes (± 10.1). According to the independent t-test, a statistically significant difference was observed between the groups, with the test group showing a longer mean time ($t(58) = -2.405$; $p < 0.05$).

Based on the FDI criteria, after 3 months no restorations were classified as "clinically poor." After 6 months, five restorations were categorized as "clinically poor" (Composite Resin = 3 / Polyethylene Fiber + Composite Resin = 2). After 12 months, seven restorations were deemed "clinically poor" (Composite Resin = 3 / Polyethylene Fiber + Composite Resin = 4). Therefore, the overall 12-month success rate was 85.72% for the test group (Polyethylene Fiber + Composite Resin) and 88.00% for the control group (Composite Resin). However, at both the

6-month (Composite Resin = 3 / Polyethylene Fiber + Resin = 4) and 12-month (Composite Resin = 6 / Polyethylene Fiber + Resin = 6) follow-ups, some restorations, although still clinically acceptable, required minor interventions such as finishing, polishing, or small repairs (Table 3). Figure 3 illustrates clinical images of some restorations at the 12-month follow-up for both groups.

The Kaplan–Meier survival curves indicated no statistically significant difference in the success rate between the test and control groups according to the Log Rank test ($p > 0.05$) (Figure 4).

The Cox regression models assessing the independent variables associated with restoration failure are presented in Table 4. In the univariate analysis, age and tooth type (first or second molar) demonstrated p-values less than 0.20. Consequently, these two variables were incorporated into the multivariate model, in which only age remained statistically significant ($p < 0.05$). This result suggests that for each additional year of age, the risk of failure is reduced by approximately 38%.

4. Discussion

Dental restorations are among the most performed procedures in caries-affected primary dentition [17]. Therefore, the search for clinical alternatives that can enhance the longevity of these treatments remains necessary. Polyethylene fibers have been used to improve the success rate of restorative procedures in permanent dentition [6], but their use in clinical investigations involving primary teeth has not yet been explored. Hence, the aim of the present study was to evaluate the 12-month longevity of occluso-proximal restorations using composite resin reinforced with polyethylene fibers in primary molars. After a 12-month follow-up, the findings of this study indicated no significant difference in the longevity of occluso-proximal restorations in primary molars when polyethylene fiber-reinforced composite resin was compared with composite resin alone. Thus, the null hypothesis was accepted.

Polyethylene fibers have been applied in dentistry for various purposes since their introduction to the dental market in 1992 [18]. One such application is to improve the longevity of restorative procedures. According to the literature, these fibers may be used in two distinct ways to enhance the durability of dental restorations. When applied to the surrounding cavity walls, the fibers provide reinforcement and increase the fracture resistance of the restorative material. When placed on the cavity floor, they are believed to improve the adhesive interface

between the restorative material and dental substrate [9]. However, most of these findings are derived from in vitro studies. In vitro studies are the foundation of science and excellent hypothesis generators, but only well-designed clinical trials can make recommendations with clinical application [10]. In the current randomized clinical trial, the use of polyethylene fibers on the cavity floor showed similar performance to restorations with composite resin alone. This leads us to believe that the direct technique without this trim could be sufficient and is consistent with previous literature [11,12,19].

The use of polyethylene fibers at the bottom of the cavity significantly reduces the presence of voids under bulk-fill composite resin restorations [20]. The fiber-reinforced layer acted as a stress-absorbing base, protecting the adhesive interface in deep dentin. Further laboratorial studies have also demonstrated that polyethylene fiber reduces polymerization shrinkage at the hybrid layer, which may enhance the mechanical performance of restorations [21,22].

Laboratory studies play a critical role in dentistry, allowing for isolated and reproducible evaluation of materials, techniques, and equipment. These studies contribute to the development and refinement of clinical procedures based on scientific evidence. However, their limitations include an inability to precisely replicate the complex conditions of the oral cavity, such as biological variability, saliva, masticatory forces, and patient behavior, limiting the generalizability of the results to clinical practice [23]. Therefore, clinical trials are essential to validate the hypotheses generated by laboratory studies [10]. While laboratory evidence supports the use of polyethylene fibers in restorative procedures, clinical studies are crucial to confirm their effectiveness in real-world scenarios.

The FDI criteria, developed by the FDI World Dental Federation, is a standardized system for the clinical evaluation of both direct and indirect dental restorations. It provides a comprehensive assessment divided into three main categories: esthetic, functional, and biological parameters [15]. Compared to older evaluation systems, the FDI criteria is considered more modern, complete, and effective for use in both clinical research and dental practice, enabling early diagnosis of restoration failures and supporting more accurate clinical decision-making [15]. The percentage of studies using the FDI criteria increased from 4.5% in 2010 to 50.0% in 2016 [24]. A recent bibliometric review assessing the profile of clinical trials on universal adhesives in dentistry found that the FDI criteria was the most used system to evaluate

restoration performance and longevity [25]. Thus, given its popularity and reliability, the FDI criteria was selected for assessing restoration quality in the present study.

We should emphasize that this study had a relatively short follow-up period. However, it is important to contextualize that, although the American Dental Association (ADA) recommends a minimum period of 18 months for the clinical evaluation of restorative materials, especially in permanent teeth, studies involving primary teeth have particularities that justify shorter periods. The high rate of fractures and restoration losses in primary teeth, frequently reported in the literature, means that even short-term results have significant clinical relevance. Thus, observing any distinct behavior (whether positive or negative) already represents an important advance in understanding the performance of these materials in this context. Furthermore, it is worth highlighting that this is the first study to investigate this type of procedure specifically in primary teeth, which reinforces its innovative and contributive nature to pediatric clinical practice. Logically, this will not prevent the longitudinal monitoring of these participants, even with the concern of tooth exfoliation over the years.

A laboratory study conducted to compare fracture resistance in restored primary and permanent molars using different materials, including polyethylene fiber, fiber-reinforced composite, fiber-reinforced flowable composite, and bulk-fill flowable composite, applied polyethylene fibers with the objective of reinforcing the dental restoration. However, the study concluded that polyethylene fiber was less effective compared to other materials and required a more time-consuming application procedure [26]. In line with this observation, the current clinical study found a statistically significant difference in operative time, with procedures involving polyethylene fiber requiring more time than without. This extended duration can be attributed to the need for measuring, cutting, and pre-soaking the fiber in dentin adhesive prior to placement.

Short appointment durations are essential in pediatric dentistry to ensure the child's positive adaptation to the dental environment, respecting their limited attention span and reducing anxiety and fear [27]. Shorter procedures promote cooperation, prevent fatigue, and enable a gradual approach, fostering a positive experience and contributing to treatment success and the establishment of trust between the child, parents, and the dental professional. It is generally recognized that longer procedures are associated with behavioral deterioration in children [27,28]. However, treatments lasting up to 30 minutes may not significantly influence

child behavior [29]. Therefore, considering that the average treatment time with polyethylene fiber was 30 minutes, this procedure may not negatively impact pediatric patient behavior.

In addition to being an extra step during the restorative procedure, the use of polyethylene fiber increases the overall treatment cost due to its additional expense. According to Metwaly et al. [30], composite resin restorations reinforced with polyethylene fibers require greater clinician expertise, increased patient cooperation, longer chair time, and higher costs.

Polyethylene fibers have several applications in pediatric dentistry for primary dentition. In addition to being used to reinforce restorations, they can also be used in the manufacture of space maintainers and post-traumatic splints. However, the main disadvantage of this material is its high cost. In addition to its high price, limitations regarding the long-term performance of procedures involving polyethylene fibers have been reported, mainly in laboratory evidence, due to a lack of clinical studies [19,26,31].

This study represents the first randomized clinical trial to evaluate the performance of polyethylene fibers in enhancing the longevity of occluso-proximal restorations in primary teeth. In addition to the clear need for clinical investigations of this methodology in primary dentition, there is also a scarcity of evidence regarding its application in permanent dentition [10]. Therefore, the innovative nature of this analysis represents a significant strength of the present study. The impossibility of operator blinding due to the different restorative techniques employed is another limitation. Nevertheless, evaluator blinding was maintained, ensuring transparency and reliability in outcome assessment. Furthermore, performing only occluso-proximal restorations, as well as using only one adhesive strategy and only one type of composite resin and adhesive system, also constitute limitations.

5. Conclusion

The use of polyethylene fibers in combination with composite resin for occluso-proximal cavities in primary teeth did not demonstrate superior longevity compared to the use of composite resin alone. Additionally, a longer clinical time was required for procedures involving polyethylene fibers. The success rate of the restorative treatment was significantly associated with patient age, indicating that increased age was correlated with a higher success rate of the restorations.

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TABLES

Table 1- Description of products used in the restorative procedure.

Material	Product/Manufacturer	Composition	Application Mode
Phosphoric Acid 37%	Condac 37, FGM, Joinville, SC, Brasil	Phosphoric acid-based gel 37%.	Application for 15 seconds on enamel and 7 seconds on dentin, washed with water for 20 seconds and dried gently without drying.
Dentin Adhesive	OptiBond FL, Kerr Corporation, Orange, CA, EUA	Primer with ethanol, water, HEMA and hydrophilic monomers, and adhesive with Bis-GMA, hydrophobic monomers and silica filler at ~48% by weight.	Application of the primer with the aid of a microbrush for 15 seconds on the dentin, then the adhesive was applied throughout the cavity.
Composite Resin	Filtek Z350 XT, Solventum, St. Paul, MN, EUA	Organic matrix (Bis-GMA, UDMA, TEGDMA, PEGDMA, Bis-EMA) and inorganic silica/zirconia fillers (~78.5 wt%), with 100% nanoparticulate particles (<100 nm).	Insertion of increments of up to 2 mm obliquely into the cavity and photopolymerization for 20 seconds of each increment.
Polyethylene Fiber	Ribbon, Ribbon Inc., Seattle, WA, EUA	Plasma-treated ultra-rigid ultra-high molecular weight polyethylene fibers woven into a patented leno weave	The fiber was cut with specific scissors according to the size of the cavity back wall, positioned and pressed over the first increment of composite resin.

Table 2- General characteristics of participants and teeth included in the study.

Characteristics of Research Subjects	Number of subjects	
	CR +PF (n = 30)	CR (n = 30)
Gender Distribution		
Male	18 (60 %)	17 (56.6 %)
Female	12 (40 %)	13 (43.4 %)
Age distribution (Years)		
5	0 (0.0 %)	4 (13.4 %)
6	6 (20 %)	1 (3.4 %)
7	13 (43.4 %)	8 (26.6 %)
8	4 (13.3 %)	9 (30 %)
9	7 (23.3 %)	6 (20 %)
10	0 (0.0 %)	2 (6.6 %)
Characteristics of occluso-proximal lesions	Number of lesions	
	CR+PF (n = 30)	CR (n = 30)

Tooth distribution		
First Molar	14 (46.6 %)	8 (26.6 %)
Second Molar	16 (53.4%)	22 (73.4%)
Arc distribution		
Maxillary	19 (63.4 %)	20 (66.6 %)
Mandibular	11 (36.6 %)	10 (33.4 %)
Surface		
Distal	16 (53.4 %)	15 (50 %)
Mesial	14 (46.6 %)	15 (50 %)

Table 3. Number of evaluated restorations for each experimental group (*) classified according to the World Dental Federation (FDI) criteria.

FDI Criteria	Scores*	Baseline		3 months		6 months		12 months	
		CR+PF	CR	CR+PF	CR	CR+PF	CR	CR+PF	CR
		(n = 30)	(n = 30)	(n = 28)	(n = 28)	(n = 28)	(n = 28)	(n = 28)	(n = 25)
Fracture of material and retention	VG	30	30	28	28	25	26	24	22
	GO	0	0	0	0	0	0	0	0
	SA	0	0	0	0	0	0	0	0
	UN	0	0	0	0	0	0	0	0
	PO	0	0	0	0	3	2	4	3
Marginal adaptation	VG	30	30	26	26	25	25	22	21
	GO	0	0	2	2	3	3	6	4
	SA	0	0	0	0	0	0	0	0
	UN	0	0	0	0	0	0	0	0
	PO	0	0	0	0	0	0	0	0
Proximal contact	VG	30	30	28	28	28	28	28	25
	GO	0	0	0	0	0	0	0	0
	SA	0	0	0	0	0	0	0	0
	UN	0	0	0	0	0	0	0	0
	PO	0	0	0	0	0	0	0	0
Anatomical form and contour	VG	30	30	28	28	27	28	28	23
	GO	0	0	0	0	0	0	0	0
	SA	0	0	0	0	1	0	0	2
	UN	0	0	0	0	0	0	0	0
	PO	0	0	0	0	0	0	0	0
	VG	30	30	28	28	28	28	28	25

Occlusion and wear	GO	0	0	0	0	0	0	0	0
	SA	0	0	0	0	0	0	0	0
	UN	0	0	0	0	0	0	0	0
	PO	0	0	0	0	0	0	0	0
Secondary caries at the restoration margin	VG	30	30	28	28	28	28	28	25
	GO	0	0	0	0	0	0	0	0
	SA	0	0	0	0	0	0	0	0
	UN	0	0	0	0	0	0	0	0
	PO	0	0	0	0	0	0	0	0
Defects in hard dental tissues at the restoration margin	VG	30	30	28	28	28	28	28	25
	GO	0	0	0	0	0	0	0	0
	SA	0	0	0	0	0	0	0	0
	UN	0	0	0	0	0	0	0	0
	PO	0	0	0	0	0	0	0	0
Postoperative sensitivity	VG	30	30	28	28	28	28	28	25
	GO	0	0	0	0	0	0	0	0
	SA	0	0	0	0	0	0	0	0
	UN	0	0	0	0	0	0	0	0
	PO	0	0	0	0	0	0	0	0

(*) VG = Clinically very good; GO = Clinically good; SA = Clinically sufficient / satisfactory; UN = Clinically unsatisfactory; PO = Clinically poor. CR: Composite Resin; PF: Polyethylene Fiber.

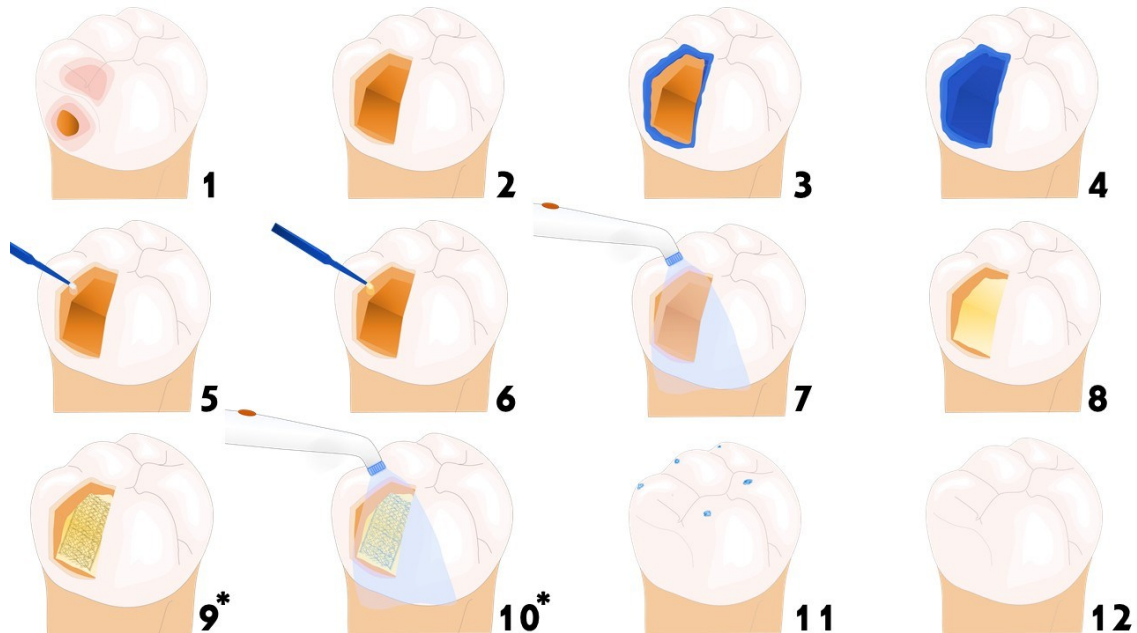
Table 4- Cox Regression Models in Relation to Restoration Survival.

	Univariate			Multivariate		
	HR	95%CI	P*	HR	95%CI	P*
Age	0.587	0.36 – 0.93	0.024	0.619	0.38 – 0.99	0.048
Gender						
Male	1			NI		
Female	0.523	0.16 – 1.64	0.268			
Treatment						
CR	1			NI		
CR + FP	0.757	0.24 – 2.38	0.635			
Tooth						
First Molar	1			1		
Second Molar	0.438	0.13 – 1.45	0.178	0.594	0.17 – 2.04	0.409
Arcade						
Superior	1			NI		
Inferior	1.955	0.63 – 6.06	0.245			

HR: Hazard Ratio; 95%CI: 95% Confidence Interval; NI: Not Included; CR: Composite Resin; PF: Polyethylene Fiber

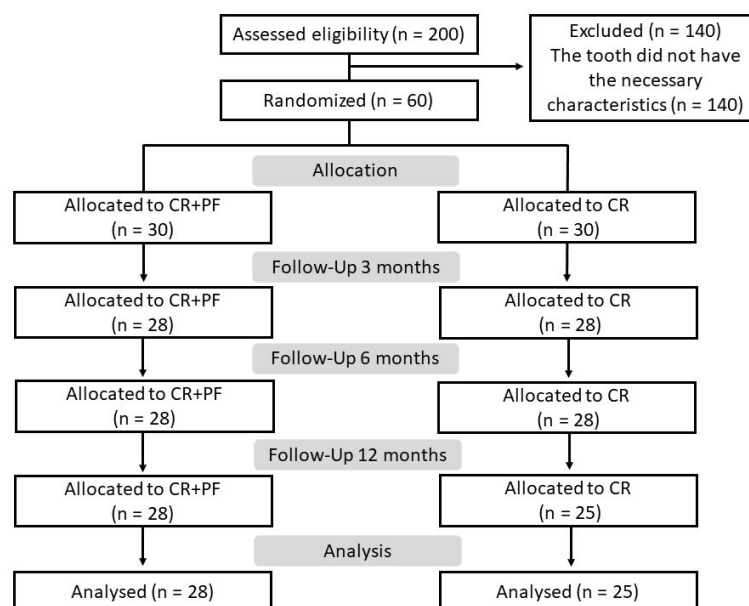
FIGURES

Figure 1- Clinical sequence of restorative procedures.



1: Initial evaluation of the tooth with carious lesion; 2: Removal of carious tissue; 3: Acid etching of enamel; 4: Acid etching of dentin; 5: Application of primer; 6: Application of adhesive; 7: Photopolymerization of the adhesive system; 8: Insertion of the first resin increment; 9: Application of polyethylene fiber on the resin; 10: Photoactivation of the first resin increment with the polyethylene fiber; 11: Occlusal adjustment; 12: Final appearance after finishing and immediate polishing.*Only performed in the test group.

Figure 2- Flowchart of the participant selection and monitoring process.



CR: Composite Resin; PF: Polyethylene Fiber

Figure 3- Images of some clinical procedures after 12 months in both groups.

EXPERIMENTAL GROUP (Composite Resin + Polyethylene Fiber)

Clinical evaluation of follow-up after **12 months**

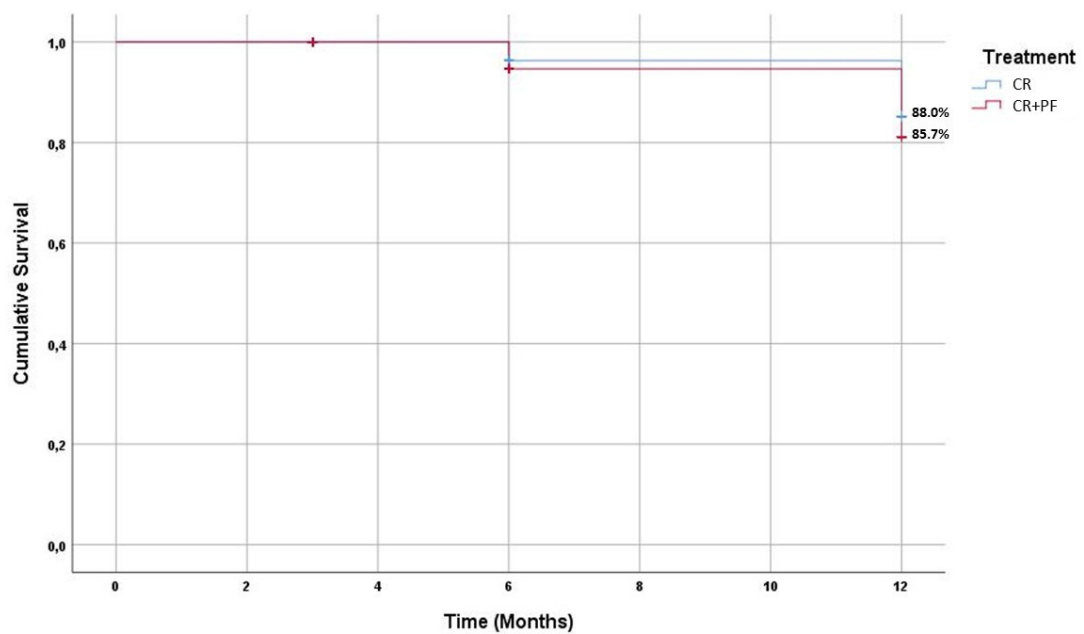


CONTROL GROUP (Composite Resin)

Clinical evaluation of follow-up after **12 months**



Figure 4- Survival curve of procedures in both groups.



CR: Composite Resin; PF: Polyethylene Fiber

5 CONCLUSÃO

O uso de fibras de polietileno em combinação com resina composta para cavidades ocluso-proximais em dentes decíduos não demonstrou maior durabilidade em comparação ao uso de resina composta isoladamente. Além disso, o tempo clínico necessário para os procedimentos que envolveram fibras de polietileno foi maior. A taxa de sucesso do tratamento restaurador esteve significativamente associada à idade do paciente, indicando que o aumento da idade correlacionou-se com uma maior taxa de sucesso das restaurações.

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APÊNDICE A – Desempenho Acadêmico

Apesar da realização da pesquisa vinculada à tese, ressalto algumas outras atividades desenvolvidas e conquistas alcançadas ao longo dessa trajetória acadêmica.

Mobilidade Acadêmica

Realizei **mobilidade acadêmica na Universidade Federal de Goiás (UFG)**, acompanhando o professor **Matheus Perazzo** durante um mês. Esse estágio foi de grande importância para compreender e aplicar análises de **modelos de equações estruturais**, experiência que resultou na escrita de **dois manuscritos** incorporando esse tipo de análise.

Revisões Baseadas em Métricas

Ainda durante o mestrado, participei de um curso sobre **análises bibliométricas** ministrado pelo professor **Paulo Antônio Martins-Junior**, da **Universidade Federal de Minas Gerais (UFMG)**. Por me identificar com esse tipo de estudo, iniciei, junto a outros autores, a elaboração de aproximadamente **100 manuscritos** com esse delineamento, dos quais cerca de **40 já foram publicados ou aceitos em periódicos de grande impacto** no cenário odontológico.

Com o tempo, aprimoramos nossas análises bibliométricas, incorporando também **altmetria** aos estudos.

Diante da ausência de guias para o reporte desse tipo de estudo na odontologia, **elaboramos o guia METRICS, aceito para publicação sem revisão** pela revista *Odontology*. Estabelecemos ainda parcerias locais, nacionais e internacionais para o desenvolvimento de diversas revisões baseadas em métricas. Além do METRICS, **outros dois estudos** com essa abordagem também foram **aceitos sem revisão** (*Journal of Endodontics* e *International Journal of Adhesion and Adhesives*), refletindo o domínio e a qualidade do nosso trabalho.

Artigos Publicados

Atualmente, possuo aproximadamente **70 artigos publicados ou aceitos**, atuando como autor ou coautor, a maioria em revistas internacionais de alto impacto.

Anais de Evento Publicados

Quanto à participação em eventos científicos, publiquei **122 resumos** nos anais da **SBPqO** ao longo de quatro anos, além de cerca de **50** outros resumos apresentados em diferentes **congressos nacionais**.

Participação em Pesquisas

Além da produção de revisões baseadas em métricas, também participei de estudos **laboratoriais, revisões sistemáticas, ensaios clínicos randomizados e estudos observacionais**, o que ampliou minha visão crítica e metodológica.

Contribuí com pesquisas de diversos colegas da pós-graduação (mestrado e doutorado), auxiliando na **elaboração de projetos, condução das pesquisas e redação dos manuscritos**.

Coorientação e Avaliação de TCC

Além disso, **coorientei 13 alunos de TCC** e participei de **mais de 30 bancas examinadoras** (como titular ou suplente) na Universidade Federal de Santa Catarina (UFSC).

Grupos de Estudo

Juntamente com o colega **Lucas Anjos**, criei **dois grupos de estudos** na UFSC voltados a alunos de graduação: o **METRICS** (duas turmas), destinado ao ensino de análises baseadas em métricas, e o **Study Club** (duas turmas), voltado à discussão e escrita de artigos científicos com diferentes delineamentos. Esses grupos resultaram na **publicação de resumos e artigos científicos**, além de proporcionarem um notável **crescimento acadêmico e técnico dos estudantes** participantes (mais de 50 alunos).

Participei do **grupo de revisões sistemáticas** da pós-graduação (ministrado por colegas do doutorado), o que resultou na **publicação de uma revisão como primeiro autor** na *Clinical Oral Investigations* e em outras **duas revisões como coautor**.

Aprovação em Concurso e Atividade Docente

Fui aprovado em concurso público para **professor substituto da UFSC**, função que exerci durante 10 meses, lecionando nas disciplinas de **Interação Comunitária e Dentística Clínica**. Essa foi uma experiência ímpar, que me proporcionou uma compreensão ainda mais profunda sobre o papel docente. Ao término do contrato,

recebi uma **homenagem da turma 22.1**, sendo nomeado “**Amigo da Turma**”, gesto que representou um momento inesquecível de reconhecimento e carinho. Sempre busquei estar próximo dos alunos e promover a troca de conhecimento, o que resultou em uma vivência enriquecedora para ambos os lados.

Fui também convidado a integrar o **corpo docente da Especialização em Odontopediatria do Instituto Gois-Aguiar**, atualmente em sua segunda turma, onde ministro aulas presenciais e on-line, além de **orientar cinco alunas** em seus trabalhos de conclusão de curso.

Ministrei também aulas na **Liga de Odontopediatria**, na **Liga de Periodontia** e no **Grupo de Estudos de Odontopediatria**, ampliando minha experiência docente.

Especialização em Dentística

Concluí minha especialização em **Dentística** em um curso coordenado pelo **professor Baratieri e sua equipe**, experiência extremamente enriquecedora para minha formação profissional e acadêmica.

Premiações

Em 2025, recebi o **Prêmio LAOHA Colgate de Apoio à Pesquisa Clínica da SBPqO** (1º lugar), com minha **pesquisa de doutorado no acompanhamento de seis meses**. **Como coautor**, conquistei **dois prêmios** (1º lugar) no **Congresso OdontoConecta** (UFSC) em 2024, **dois prêmios** (1º e 2º lugar) no **Congresso Científico Catarinense de Odontologia** em 2025, e **2º lugar** na categoria **Pesquisa Científica no ITI Congresso Brasil 2025**.

Escrita de Livro

Atualmente, em parceria com colegas da pós-graduação e professores da UFSC, estou **escrevendo um livro sobre intervenções restauradoras e estéticas em crianças e adolescentes**, com a coautoria de docentes de diversas instituições federais do Brasil, um projeto que reforça o trabalho colaborativo e a disseminação do conhecimento científico.

Revisor de Manuscritos

Fui convidado para **revisar manuscritos** de importantes **revistas nacionais e internacionais**, principalmente em estudos sobre **revisões baseadas em métricas**.

Atendimento Clínico

Participei e realizei ao longo do doutorado **diversos atendimentos clínicos** de pacientes na clínica da pós-graduação da UFSC. Atuando em casos de **dentística e odontopediatria**. Além disso, participo do **projeto de extensão** da odontopediatria que acontece a cada 15 dias na clínica da pós-graduação da UFSC, **atendendo crianças e adolescentes**.

Organização e Participação de Eventos

Por fim, participei da **organização do primeiro OdontoConecta (Congresso Científico da UFSC)**, atuando também como avaliador de trabalhos científicos. Além disso participei como ouvinte de diversos eventos científicos.

ANEXO A – Aprovação do Comitê de ética

UNIVERSIDADE FEDERAL DE
SANTA CATARINA - UFSC



PARECER CONSUBSTANCIADO DO CEP

DADOS DO PROJETO DE PESQUISA

Título da Pesquisa: Avaliação clínica da qualidade de restaurações diretas classe II com resina composta associada ao ribbond em molares decíduos: ensaio clínico randomizado

Pesquisador: MARIANE CARDOSO

Área Temática:

Versão: 2

CAAE: 75233323.4.0000.0121

Instituição Proponente: Universidade Federal de Santa Catarina

Patrocinador Principal: Financiamento Próprio

DADOS DO PARECER

Número do Parecer: 6.675.260

Apresentação do Projeto:

As informações que seguem e as elencadas nos campos "Objetivo da pesquisa" e "Avaliação dos riscos e benefícios" foram retiradas do arquivo PB_INFORMAÇÕES_BÁSICAS_DO_PROJETO_2236163.pdf, de 24/01/2024, preenchido pelos pesquisadores.

Segundo os pesquisadores:

RESUMO

"Restaurar dentes decíduos acometidos por cárie é uma prática comum em odontopediatria. A presença de dentina afetada e a menor quantidade de esmalte podem favorecer a falha desse procedimento. A busca por alternativas que aumentem a qualidade dessas restaurações ainda é necessária. A utilização do ribbond tem melhorado a adesão de restaurações para dentição permanente. Objetivo: Avaliar clinicamente, após dois anos, a qualidade das restaurações ocluso-proxiais de resina composta associada ao ribbond em molares decíduos. Metodologia: Trata-se de um estudo clínico prospectivo randomizado longitudinal, duplo-cego, com dois braços paralelos, realizado em 60 crianças, com idade entre 5 e 10 anos e seus respectivos responsáveis, totalizando 120 participantes. A amostra será distribuída através de randomização aleatória, em dois grupos. Para o grupo controle será realizada restauração direta ocluso-proximal com resina

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Continuação do Parecer: 6.675.260

Declaração de Instituição e Infraestrutura	DECLARACAO_DA_INSTITUICAO.pdf	25/10/2023 21:55:46	MARIANE CARDOSO	Aceito
Folha de Rosto	folhaDeRosto.pdf	25/10/2023 21:55:28	MARIANE CARDOSO	Aceito

Situação do Parecer:

Aprovado

Necessita Apreciação da CONEP:

Não

FLORIANOPOLIS, 28 de Fevereiro de 2024

Assinado por:
Nelson Canzian da Silva
(Coordenador(a))

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