Arch Health Invest (2025)14(1):56-62
http://doi.org/10.21270/archi.v14i1.6268

Review Article

Polyether-Ether-Ketone applied in Removable Partial Prosthesis Structures: an Integrative Literature Review

Poliéter-Éter-Cetona Aplicado Em Estruturas de Prótese Parcial Removível: uma Revisão Integrativa da Literatura

Poliéter-Éter-Propanona Aplicado en Estructuras de Prótesis Parcial Removible: una Revisión Integradora de la Literatura

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Abstract
The CAD-CAM system is an option to favor the manufacture of Removable Partial Dentures (RPDs). Therefore, the objective was to review the literature in an integrative way regarding the application of Poly-ether-ether-ketone (PEEK) to manufacture structures or components for RPD. The literature search took place between May and June 2022, in Pubmed, BVS, Cochrane Library and Science Direct databases, using search strategies for articles published in any language. The terms of the search strategies were based on descriptors, synonyms, terms present in the title, abstract, Keywords. In all databases, articles were identified that could be included in the research and only 05 articles were included for data extraction and analysis, which are 01 *in silico* article, 02 *in vitro* articles and 02 *in vivo* articles. The review findings identify that studies on the use of PEEK in RPD are scarce. As for the adaptation factor of modified retaining clamps and higher connector accuracy, peek showed satisfactory results in relation to the conventional technique with Co-Cr Alloy structure. In addition, PEEK simulated clamps also exert less tension on the pillars compared to Co-Cr alloy clamps. So, PEEK applied to RPD structures presents itself as a promising material due to its favorable performance in terms of adaptation, precision, stress distribution and patient satisfaction. However, studies with a higher degree of scientific evidence are needed to expand the indication of this material in the daily clinic.
Descriptors: Removable Partial Denture; CAD-CAM; Digital Technology.
Resumo
O sistema CAD-CAM surge como opção para favorecer a fabricação de Próteses Parciais Removíveis (PPRs). Por isso, objetivou-se revisar a literatura de forma integrativa quanto a aplicação do Poli-éter-éter-cetona (*Poly-ether-ether-ketone* / PEEK) para fabricação de estruturas ou componentes para PPR. A busca da literatura ocorreu entre os meses de Maio a Junho de 2022, nas bases de dados Pubmed, BVS, Cochrane Library e Science Direct, através de estratégias buscas por artigos publicados em qualquer idioma. Os termos das estratégias de busca foram baseados em descritores, sinônimos, termos presentes em título, resumo, *Keywords*. Em todas as bases de dados foram identificados artigos passíveis de serem incluídos na pesquisa e apenas 05 artigos foram incluídos para extração e análise dos dados, que são 01 artigo *in silico*, 02 artigos *in vitro* e 02 artigos *in vivo*. Os achados da revisão identificam que estudos sobre o uso do PEEK em PPR são escassos. Quanto ao fator de adaptação de grampos de retenção modificados e precisão do conector maior, o PEEK apresentou resultados satisfatórios em relação à técnica convencional com estrutura em Liga Co-Cr. Além disso, os grampos simulados em PEEK também exercem menos tensões nos pilares em comparação com os grampos em Liga de Co-Cr. Portanto, o PEEK aplicado a estruturas de PPRs apresenta-se como um material promissor pelo desempenho favorável quanto à adaptação, precisão, distribuição de estresse e satisfação dos pacientes. Contudo, se fazem necessários estudos com maior grau de evidência científica para ampliar a indicação deste material na clínica diária.
Descritores: Prótese Parcial Removível; CAD-CAM; Tecnologia Digital.
Resumen
El sistema CAD-CAM se presenta como una opción para facilitar la fabricación de Prótesis Parciales Removibles (PPR). Por lo tanto, el objetivo de este estudio fue llevar a cabo una revisión integradora de la literatura sobre la aplicación de Poli-éter-éter-cetona (Poly-ether-ether-ketone / PEEK) en la fabricación de estructuras o componentes para PPR. La búsqueda bibliográfica se realizó entre mayo y junio de 2022 en las bases de datos Pubmed, BVS, Cochrane Library y Science Direct, a través de estrategias de búsqueda de artículos publicados en cualquier idioma. Los términos utilizados en las estrategias de búsqueda se basaron en descriptores, sinónimos, términos presentes en el título, resumen y palabras clave. Se identificaron artículos en todas las bases de datos que podían incluirse en la investigación, y solo se incluyeron 5 artículos para su extracción y análisis de datos, que consistieron en 1 artículo in silico, 2 artículos in vitro y 2 artículos in vivo. Los hallazgos de la revisión indican que los estudios sobre el uso de PEEK en PPR son escasos. En cuanto al factor de adaptación de los retenedores modificados y la precisión del conector mayor, el PEEK mostró resultados satisfactorios en comparación con la técnica convencional con estructuras de aleación Co-Cr. Además, los retenedores simulados en PEEK ejercieron menos tensiones en los pilares en comparación con los retenedores de aleación de Co-Cr. Por lo tanto, el PEEK aplicado a las estructuras de PPR se presenta como un material prometedor debido a su buen desempeño en cuanto a adaptación, precisión, distribución del estrés y satisfacción de los pacientes. Sin embargo, se requieren estudios con un mayor grado de evidencia científica para ampliar la indicación de este material en la práctica clínica.
Descriptores: Prótesis Parcial Removible; CAD-CAM; Tecnología Digital.

INTRODUCTION

The conventional processing for the manufacture of the structure in removable partial prosthesis (RPD), through the conventional process by the technique of lost wax, presents itself as a challenge that directly reaches the daily clinic. Due to this processing it takes a long time, besides being complex and subject to some errors. Therefore,

alternatives are sought through digital processing to manufacture RPD structures[1,2].

Alternatively, the Computer-Aided Design (Computer-Aided Manufacturing / CAD-CAM) system is available, capable of reducing the number of clinical and laboratory sessions, in addition to reducing these possible failures of conventional processing[1-3]. As research has shown, RPDs manufactured by CAD-CAM technologies have characteristics similar to or superior to prostheses manufactured by the lost wax technique[3,4]. When reviewing the literature, it also confirms that RPDs can be made by a completely digital workflow[3].

From this perspective of the digital workflow, poly-ether-ether-ketone (Poly-ether-ether-ketone / PEEK) has become an excellent option for replacing metal components of the structure in RPD, due to the possibility of producing metal-free prostheses[5-7]. PEEK because it is a thermoplastic polymer of high strength, aesthetic and non-allergic[5] has some advantages in relation to metal alloys, such as being able to be milled in CAD-CAM and thus provide the manufacture of the totally digital structure with the aid of intraoral scanners. Thus, it is possible to greatly reduce the sequence of activity in the prosthesis laboratory[8], besides showing good results regarding the adjustment of the structure, compared to The League of Co-Cr[1]. However, scientific evidence of the use of PEEK in RPD structure is still restricted to the dental community, which lacks results to broaden the indication of this material. Therefore, based on the above, the objective was to review the literature in an integrative way regarding the application of Poly-ether-ether-ketone to manufacture structures or components for

MATERIAL AND METHOD

- *Guide question*

The guide question for the following study was: "Do RPD structures or components manufactured in PEEK perform better than conventional metal structures or components?"

- *Method*

The Integrative Literature Review summarizes the available research on the theme to be addressed and directs the practice based on scientific knowledge, with the structuring of research based on the PICO strategy. The PICO strategy of this review was directed by the following elements: Population partially edentulous patients with prosthetic need; RPD intervention with PEEK structure, Conventional RPD Control and the RPD "Outcome" manufactured with PEEK presents better performance than the RPD made conventionally.

- *Elegibility Criteria*

The following databases were adopted for the search for literature: Virtual Health Library (VHL) https://bvsalud.org/; PubMED https://pubmed.ncbi.nlm.nih.gov/, Cochrane Library https://www.cochranelibrary.com/ and Science Direct https://www.sciencedirect.com/. The research was based on articles published in any language and was carried out between May and June 2022. Table 1 presents the search strategy for the databases. The terms of the search strategy were based on descriptors, synonyms, terms present in title, abstract, Keywords. In Pubmed, filters were added for research: classical studies, observational study, clinical trial, randomized controlled trial. In Science Direct, the filters were: research articles, subarea of Medicine and Dentistry. For VHL and Cochrane Library no filters were added. The searches were carried out on 05/20/2022 at PubMED; 05/23/2022 at the VHL and Cochrane Library, finally Science Direct on 05/24/2022. A manual search was conducted in Science Direct and Google Scholar on 06/15/2022, in order to complement the research findings.

Database	Search Strategy
Pubmed	((("Removable Partially Denture") AND ("PEEK" OR "Poly(etheretherketone)" OR "Polyetheretherketone")) OR ("Frameworks" OR "CAD-CAM Framework" OR "Fabrication Framework") NOT ("implant"))
BVS	(("Removable Partially Denture" or "Removable Partial Denture frameworks") AND ("PEEK" OR "Poly(etheretherketone)" OR "Polyetheretherketone"))
Cochrane Library	(("Removable Partially Denture" or "Removable Partial Denture frameworks") AND ("PEEK" OR "Poly(etheretherketone)" OR "Polyetheretherketone"))
Science Direct	(("Removable Partially Denture") AND ("PEEK" OR "Poly(etheretherketone) OR "Poly-etheretherketone) AND (Removable Partially Denture Frameworks" OR "CAD-CAM Framework" OR "Fabrication Framework" OR "Framework"))

Frame 1: Database and Search Strategy adopted in the research. Source: Research Data

The inclusion criteria were in vivo, in vitro or in silico research articles, which evaluated the PEEK applied to the structure and components of the RPD in comparison with the conventional RPD with metallic structure. Exclusion criteria were studies that addressed only metal structures of RPD, unconventional RPD, studies on other modalities of prosthesis, research on other dental areas, literature reviews, systematic reviews, meta-analysis, clinical case, opinion articles, studies that do not compare conventional RPD and RPD with PEEK, medical research and research not available in databases.

- *Study selection*

The titles and abstracts of all papers were analyzed by two reviewers (GTSL and VMGF). All studies that met the inclusion criteria were selected for reading the full text and included for data extraction, while the reasons for exclusion were recorded.

- Data extraction and analysis

The data of the selected articles were extracted by the reviewers and were included in standardized Tables and Graphs in order to sumarizar the data. The research findings were collected based on the results on peek performance as a structure or component of RPD. The level of scientific evidence of the articles included for the research was based on the classification of the "Oxford Centre for Evidence-based Medicine" described by Demathé et al.[9]

RESULTS

Articles that could be included in the research were identified in all databases. As for the articles screened (12 articles), 01 article was obtained in PubMED, 02 articles in the VHL, 07 articles in the Cochrane Library and 02 articles in Science Direct. Thus, 355 articles were excluded, due to research on digital or conventional RPD that address only metal structures (18 articles), Unconventional RPD (02 articles), studies on other prosthesis modalities (53 articles), research on other dental or medical areas (277 articles), literature reviews (01 article) and studies that do not compare conventional RPD and RPD with PEEK (04 articles). Regarding the duplicate articles, there was only 01 article between PubMED and Cochrane Library. Thus, 11 articles were selected to read the full text to evaluate eligibility. Of the selected articles, only 05 articles were included through PubMED (01 article), Science Direct (01 article) and manual search (03 articles). During searches in the VHL and Cochrane Library, no article met the determined inclusion criteria. The flowchart present in Figure 1 presents the stages of the selection of articles. Table 1 shows the degree of evidence of the articles included for review and Tables 2, 3, 4 show the summary of the collected data.

In the in vitro study by Arnold et al.[2], the lowest adaptation values, i.e. direct milling with PEEK (MId) and the highest values for the prototyping groups (indirect PR 323 ±188 mm horizontal and 112 ±60 mm vertical; Direct PR 365 ±205 mm horizontal and 363 ±133 mm vertical). On the other, the adaptation values for the Lost Wax Technique were higher than the use of PEEK (LWT 133 ±59 mm horizontal and 74 ±25 mm vertical). For vertical adaptation, the direct PR group showed a statistically significant difference in relation to the> other groups (P <0.001) and the other comparations were not statistically significant. Regarding horizontal adaptation, no statistical difference was identified between the LWT Group and the indirect MI/direct MI groups (P>0.05).

In the in vitro and in silico study by Peng et al.[5], the staples (simulated retention arm) in PEEK provided sufficient retentive force for clinical use. Although, the load values supported by the Co-Cr Alloy clamps are significantly higher (P <0.05) than the values supported by the PEEK clamps. After the clinical simulation tests of the useful life of the materials under study, there was no significant difference in the long term of the deformation of the two materials (P = 0.11). As for the concentration of tension, this it was more localized at the base of the specimens and as for the stress values, these varied according to the dimensions of the clamps, i.e., if the dimension plus the load absorption.

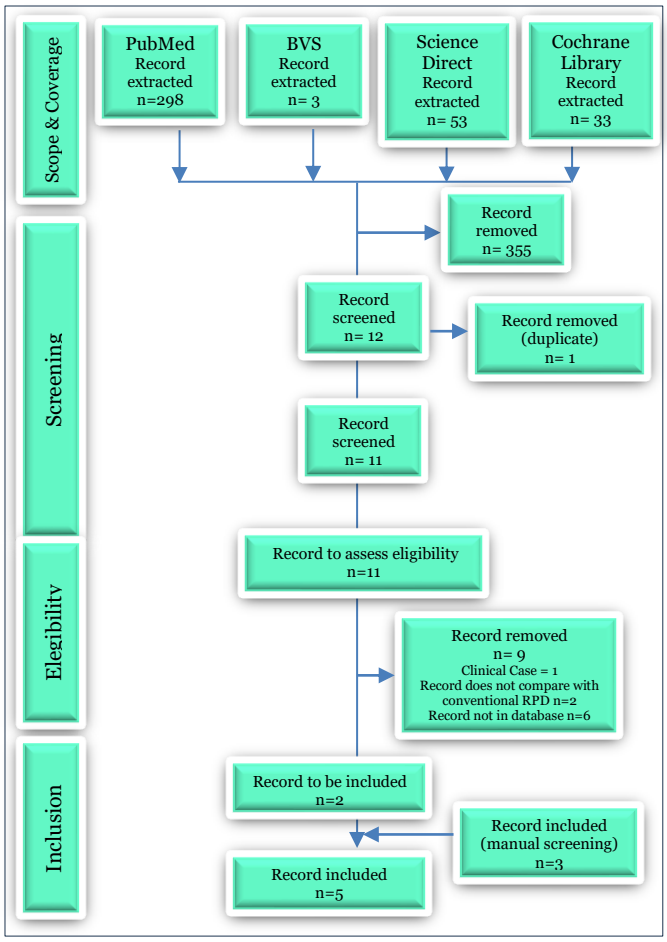

Figure 1: Flowchart of the selection steps of the articles to be reviewed (Source: Research Data)

For Tribst et al.[10], simple circumferential clamps showed greater stress on their structure and potentially greater damage to dental enamel, when made with rigid (metallic) materials and with greater retention (0.75 mm). PEEK may not be a material of choice for staples, due to the maximum stress occurring in the removal of these in high amounts of retention, generating risk of failure of the material. Although the values of enamel tension and clamp for PEEK are lower than Co-Cr Alloy, Polyamide has been shown to be a better alternative for patients allergic to metals and in cases of high aesthetic requirement to rigid metal clamps. Due to Polyamide reduce the damage to enamel, even with a retention of 0.75 mm.

Clinically, Ali et al.[6] observed that over time no statistical differences were identified between PEEK and Co-Cr Alloy as a material for structure in relation to the impact on oral health (P = 0.87) of patients. The findings were also confirmed in relation to periodontal indices, bleeding index (P = 0.476) and plaque index (P = 0.967), preference among prostheses (P=0.491) and MDSQ satisfaction findings (P = 0.368).

Table 1. Level of scientific evidence of the articles included for the research**.**

Author (Year)	Degree of Recommendation	Level of Evidence
Arnold et al. (2018)	D	5
Ali et al. (2020)	A	1B
Peng et al. (2020)	D	5
Tribst et al. (2020)	D	5
Maraka et al. (2021)	B	2C

Source: Research Data

Table 2. Characteristics of in vitro and/or in silico studies.

Arnold et al. (2018)	
Objetive	Evaluate the adaptation of modified staples manufactured by 4 different CAD-CAM systems and compare these staples with the lost wax technique.
Type of Study	*in vitro*
Structure Materials	Co-Cr League PEEK
Bow/ Kennedy Class	Jaw/ Class III modification 2
Experimental Group	Lwt (Lost Wax Technique) RPi(Indirect rapid prototyping) RPd(Direct rapid prototyping) Thousand (Indirect milling) Mid (Direct milling)
n Sample	n=03 Structures
Factor under study (structure or component)	Adaptation (Modified Retaining Clamps)
Analysis Performed	Microscopy analysis of modified clamps in vertical and horizontal direction
Peng et al. (2020)	
Objetive	Optimization and evaluation of staples with PEEK regarding mechanical properties, replacing the metal components of RPD
Type of Study	*in vitro* *in silico*
Structure Materials	Co-Cr League PEEK
Bow/ Kennedy Class	-
Experimental Group	Group A (Subgroup A1, A2, A3) Group B (Subgroup B1, B2, B3) Group C (Subgroup C1, C2, C3) Group D (Subgroup D1, D2, D3)
n Sample	n=06 Simulated Staples
Factor under study (structure or component)	Displacement and Distribution of Stress (Simulated Clamp Retaining Arm)
Analysis Performed	Constant displacement fatigue tests were performed on peek (0.50 mm) and Co-Cr alloy (0.25 mm) specimens to calculate load and load values deformations after simulation of ten years of clinical use (15,000 cycles)

Source: Research Data

Table 2 (continuation). Characteristics of in vitro and/or in silico studies.

Tribst et al. (2020)	
Objetive	Evaluate the effect of different materials, in relation to retention, under the force of removal and distribution of stress on the support tooth and circumferential clamp.
Type of Study	*in silico*
Structure Materials	Polyamide Polyoxymethylene PEEK Gold League Titanium Alloy Co-Cr League
Bow/ Kennedy Class	-
Experimental Group	Polyamide Polyoxymethylene PEEK Gold League Titanium Alloy Co-Cr League
n Sample	-
Factor under study (structure or component)	Staple material (Simple circumferential clamp
Analysis Performed	Von Mises tension (MPa) in the clamp and enamel (upper molar) Risk of Failure in the clamp and enamel (upper molar)

Source: Research Data

Finally, the study by Maraka et al.[11] shows that there is a difference in the structure accuracy between the two experimental groups, PEEK and Liga Co-Cr. The gaps in the structures of the Co-Cr Alloy, by the technique of lost wax, were greater than those of the structures manufactured from PEEK by the CAD-CAM technique.

Table 3. Characteristics of *in vivo*

Ali et al. (2020)	
Objetive	Investigate differences in RPD structures made in PEEK and Co-Cr Alloy, in terms of OHRQoL, patient preference, periodontal indexes and satisfaction
Structure Materials	Co-Cr League PEEK
Experimental Group	Co-Cr PEEK
n Sample	n=19 patients
Bowl (number of patients)	Mandible (07 patients) Jaw (06 patients) Jaw and Mandible (13 patients)
Kennedy Class (number of patients)	Class I (15 patients) Class II (11 patients) Class III (11 patients) Class IV (02 patients)
Analysis Performed	Oral health impact index (OHIP-20) Patient Satisfaction Questionnaire (MDSQ) Periodontal evaluation (bleeding index,plate index and percentage of periodontal scholarships)

Source: Research Data

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Table 3 (continuation). Characteristics of *in vivo*

Maraka et al. (2021)	
Objetive	Evaluate the accuracy of RPD structures manufactured by CAD-CAM and compare with structures manufactured by conventional method.
Structure Materials	Co-Cr League PEEK
Experimental Group	Co-Cr PEEK
n Sample	n=10 patients
Bowl (number of patients)	Jaw (10 patients)
Kennedy Class (number of patients)	Class I (10 patients)
Analysis Performed	Higher connector accuracy (Weight measurement through silicone copies)

Source: Research Data

Table 4. Detailing the fabrication of the structure or components in PEEK.

Arnold et al. (2018)	
Country	Germany
Trademark	Juvora Dental Disc, PEEK-Optima LT1; Juvora Ltd
Scanning (manufacturer)	Scanner Extraoral (D900 scanner; 3Shape A/S)
Planning Software (CAD)	3Shape-Dental Designer 2013 v2.8.8; 3Shape A/S
Processing	CAD-CAM 5-axis milling-machine: Organical D7C (R+K CAD-CAM Technologie GmbH & Co. KG)
Design of the Structure or Components	Larger connector - full coverage of the palate Retaining clamps modified according to the module of the inlay drawing
Ali et al. (2020)	
Country	United Kingdom
Trademark	Juvora Dental Disc, PEEK-Optima LT1; Juvora Ltd
Scanning (manufacturer)	-
Planning Software (CAD)	-
Processing	CAD-CAM
Design of the Structure or Components	-
Peng et al. (2020)	
Country	Japan
Trademark	VESTAKEEP DC4450 R, Evonik Japan Co., Tokyo, Japão.
Scanning (manufacturer)	-
Planning Software (CAD)	SolidWorks 2013 (Dassault Systèmes SolidWorks, Waltham, MA, USA)
Processing	CAD-CAM (CORiTEC 250I/DRY, imes-icore, Eiterfeld, Germany)
Design of the Structure or Components	Retaining Arm of a Simulated Clamp
Tribst et al. (2020)	
Country	Brazil
Trademark	-
Scanning (manufacturer)	-
Planning Software (CAD)	InEos, Sirona Dental Systems GmbH, Bensheim, Germany
Processing	-
Design of the Structure or Components	Simple circumferential clip
Maraka et al. (2021)	
Country	Syria
Trademark	China / TM-PEEK
Scanning (manufacturer)	Scanner Extraoral (CS. Ultra Pro)
Planning Software (CAD)	Exocad
Processing	CAD-CAM
Design of the Structure or Components	-

Source: Research Data

DISCUSSION

The literature review obtained a small number of articles included and mostly with a low degree of scientific evidence, i.e., in vitro and/or in silico research. The scarcity of the literature is due to the digital manufacturing method of the structure having few studies published to date, or by most studies did not include a control group for comparison[4]. Also, because many articles are not available in the databases. PEEK is a material for promising structure, much laboratory research is being developed and there are still few published clinical studies.

However, PEEK is becoming increasingly popular due to its extensive medical and dental applications[12-14], and in RPD adopted by favoring the aesthetic factor[4,15]. The application of this material is due to elasticity similar to natural bone, resistance to high temperatures, high mechanical performance, lightness, stiffness, robust, because it is compatible with human body fluids and has satisfactory wear properties that help to prolong the service life[12]. According to the properties presented by this polymer, dental research has been developed regarding color change[16], stress distribution[5,10] and adaptation of staples [2], accuracy of the major conector[11], patient satisfaction[6] and clinical case reports[8,15] in RPD.

For the purpose of answering the guide question, it can be affirmed that peek for adaptation of modified staples, distribution of stress in enamel and staple, staple deformation, patient satisfaction and higher connector accuracy presented more favorable results and in some statistically significant studies[5,11] compared to The Co-Cr Alloy. That is, the structures or components of RPD made in PEEK present better performance in the factors studied than conventional metallic structures or components.

The PEEK regarding the factors "adaptation of modified retaining clamps"[2] and "higher connector accuracy"[11] showed satisfactory results in relation to the conventional technique with Co-Cr alloy structure. In the study by Arnold et al.[2] even in relation to other digital methods of manufacturing the structure. The milling technique presents better adaptation, when compared to digital processing associated with the lost wax technique, which shows irregularities that hindered fitting[2]. These findings in the literature are favorable, because the technique of manufacturing RPD by CAD-CAM system shows great potential for change in the dynamics of the clinic and in the laboratory workflow, that is, migration from analog to digital. The use of CAD-CAM simplifies the manufacture of the structure by eliminating the manual work of the dental technician and limiting it to CAD planning. The findings of the review corroborate with Fueki et al.[3] and Carneiro Pereira et al.[1], the use of CAD-

CAM technology for the manufacture of structures in RPD offer numerous advantages when compared to the traditional method, because it reduces procedures and laboratory time, cad software quality has a clinically acceptable level and the structures manufactured by this technique have high mechanical strength. In addition, it is very common that the structures in Co-Cr Alloy need adjustments, because they are made by a time-consuming and costly technique[4].

Regarding the distribution of stress on the dental staple and enamel, peek presented lower values of stress distribution compared to The Co-Cr Alloy. However, Tribst et al.[10] states that this polymer should not be a material for the choice of staples, due to the maximum stress occurring in the removal of this retainer in high amounts of retention (0.75 mm). This maximum stress is higher than the mechanical resistance of the material, promoting the possible fracture of the clamp. Even though the PEEK (E = 3.74 GPa) has lower modulus of elasticity than the Co-Cr Alloy (E = 220 GPa), the metal clamp shows greater stress on its structure and damage to the dental enamel because it is a more rigid material but remains in position[10].

In contrast to the study by Peng et al.[5], peek simulated clamps exert less tensions on the pillars compared to Co-Cr Alloy clamps, providing adequate retention and meeting aesthetic demands. Therefore, this polymer presents a promising alternative to conventional metal clamps. The retention factor is essential for choosing the material of the retainers in RPD, thus it is necessary to investigate through more robust studies the amount of retention for the use of PEEK.

In the clinical study of Ali et al.[6], no statistical differences were identified between the materials, PEEK and Liga de Co-Cr. Thus, it is confirmed that PEEK and Co-Cr Alloy are equivalent materials for RPD structures. Patients report general satisfaction, comfort, stability, chewing ability, speech ability, aesthetics and ease of cleanliness, according to a clinical case report[15]. Besides not presenting the absence of loss of adaptation between the resin or artificial teeth and the structure for 6 months. That is, peek has potential as a non-metallic material for the manufacture of the RPD structure[8].

Based on the findings of Peng et al.[5], Ali et al. [6] and Maraka et al.[11], it is recommended to use PEEK as a material for structure or component in RPD, and can be applied to the daily clinic. Further studies are needed focusing on some factors, such as how best to adhere peek structure to artificial teeth, such as determining drawings relevant to partial structure, including components such as staples and evaluation of clinical load performance to confirm the long-term success of the structure[17].

The limitations of this review are due to the small number of articles published and not available in the databases, which promote the comparison between PEEK and Co-Cr League for RPD structure. As well as, the prevalence of articles with a low degree of scientific evidence and few clinical studies, which were a pilot study or with a scant number of patients. The diversity of variables in heterogeneous studies and methodologies makes it difficult to sumarize and confront the data. The studies present a poor or absent description of the structure and details of peek use during the digital stage of the study. This scenario disfavors the possibility of reproducing the processing of this material in future studies.

Further research on the use of PEEK in RPD is required in order to clarify to the dental literature on precision, adjustment and veracity of structures, retention of staples on the abutment teeth, alteration of color and roughness, retention of artificial teeth and base material, in addition to longevity through randomized and controlled clinical studies. It is also necessary to investigate the processing conditions regarding the milling or injection of the material, so that possible interferences in the surface, mechanical and adhesive properties of PEEK are observed and how the complexity of the structure design can interfere with the use of this material.

CONCLUSION

The PEEK applied in PPR structures is a promising material for favorable performance regarding adaptation, accuracy, stress distribution and patient satisfaction. However, studies with a higher degree of scientific evidence are needed to expand the indication of this material in the daily clinic.

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CONFLICT OF INTERESTS

The authors declare no conflict of interest.

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Received 21/02/2024
Accepted 22/01/2025