INPLASY PROTOCOL

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None declared.

RESISTANCE TO ROOT FRACTURE IN FIBERGLASS POSTS, ANATOMIZED POSTS AND CASTED POSTS IN SINGLE-ROUND TEETH. A SYSTEMATIC REVIEW

Mendieta, J[1]; Vidalon, G[2].

Review question / Objective: **What will be the resistance to root fracture in fiberglass posts vs. anatomical posts and cast posts in single-rooted single-canal teeth? Objective: To evaluate and compare the resistance to fracture in single-rooted teeth with endodontic treatment restored with different intra-radicular posts. Specific objectives:**
1. Determine what factors influence fracture resistance in teeth restored with different intraradicular posts.
2. To determine the influence of the anatomization of the fiberglass post with composite resin, with respect to the resistance to fracture, in single-rooted teeth with a single canal.
3. Evaluate the failure pattern of the anatomization of the fiberglass post using composite resin.

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 27 March 2023 and was last updated on 27 March 2023 (registration number INPLASY202330111).

INTRODUCTION

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resistance to fracture, in single-rooted teeth with a single canal.
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Rationale: The intraradicular post or dowel has the determining function of supporting the nucleus in teeth that lack this structure, which are mostly pieces with endodontic treatment, which are weakened due to carious processes, traumas and pathologies, resulting in the loss of structure. , stability, resistance and support to a future prosthetic crown. To improve these characteristics, there are different posts with a modulus of elasticity similar to that of dentin.
That is why prefabricated fiberglass posts, anatomical and cast posts, play an important role. Different studies show us that fiberglass posts and cast posts are the most conventional for these cases, despite this, there are more and more teeth with extensive internal root anatomy, requiring the clinician to look for relatively new options such as tooth anatomization. fiberglass post, thus avoiding the excessive use of cement during the cementation of the post or the poor fit of a post that is not closely adapted to the root canal, thus avoiding future failures such as fracture or detachment of the intraradicular post. That is why the importance of this systematic review focuses on evaluating and identifying, through the study of the literature, which type of intraradicular post has the highest rates of resistance to fracture in single-rooted teeth with a single canal. In order for this research to be a basis for future clinical studies on the subject.

Condition being studied: Dental pieces with endodontic treatment are a challenge for your rehabilitation. The reason for this is the evaluation that the tooth must pass, to indicate whether it is a candidate for treatment with an intraradicular post or not, some of the indications being pieces with a minimum of 3 mm coronary remnant, teeth exposed to light forces. or moderate and individual restorations 1. Likewise, there are factors to take into consideration to avoid future failure of these treatments. The most determining factors are; the type of tooth, the function and the thickness of the residual tooth structure, in addition to the length and diameter of the prefabricated post . It has been documented that root fracture is the third cause of tooth loss and this occurs more frequently in endodontically treated teeth that present mesio-occluso-distal (mod) cavities, cavities without marginal ridges, absence of pericervical dentin, and pulp chamber roof . In addition, the result of a meta-analysis shows that fracture Root fracture occurs more frequently in teeth endodontically treated with cast posts, its main failures being oblique, vertical and horizontal fractures in the middle third of the root.
That is why the conservative preparation of the endodontic access cavity is of significant importance to reduce the probability of fracture and cusp rigidity of teeth.
Intraradicular posts are used to restore endodontically treated pieces, their main functions being support and connection between the coronal restoration, root structure and distribution of occlusal loads. These are classified according to their material; metal, zirconium, carbon fiber and fiberglass . Fiber posts regulate the discrepancy of elasticity, having 18 gpa compared to that of dentin which is 20 gpa. That is why in the literature we find that fiberglass posts have a lower incidence of fracture compared to metal posts, due to their ability to distribute stresses uniformly. A prospective clinical study showed that, despite the types of posts used, coronal restorations with substantial dentin height appeared to have significantly higher survival rates than those with minimal dentin height 98% vs 93%. Likewise, it is documented that root canal treated anterior teeth which are restored with posts and crowns have a fracture percentage 3 times higher than posterior teeth. Upper premolars being one of the most frequent . It is taken for granted that the posts do not reinforce the root structure, and that their function goes directed to the anchorage with the crown, despite this, it is important to mention that

the intraradicular post generates a more homogeneous distribution of stresses.
Studies have been published analyzing the performance of fiberglass posts in anterior and posterior teeth. However, it is necessary to carry out studies in pieces with wide canals, which require customization of the post, thus observing the changes in resistance. to the fracture. Therefore, the purpose of this thesis project will be to evaluate the resistance to root fracture in single-rooted teeth with a single canal with different posts through a systematic review.

METHODS

Search strategy: Medline/pubmed, science direct, scopus, embase, gray literature sources (opengrey).

Participant or population: Single-conductor single-rooted teeth.

Intervention: Anatomization of the post with compositeresin.

Comparator: Non-analyzed Posts vs. Cast Posts and Anatomized Posts.

Study designs to be included: The systematic review will be designed to answer the following guiding question, created according to the pico strategy, where the population was single-rooted, single-canal teeth; the intervention was the anatomization of the post with composite resin; the comparison was between the non-anatomized posts vs cast posts and anatomical posts and finally the result is the increase in fracture resistance and decrease in the failure pattern.

Eligibility criteria: Inclusion criteria: • Scientific articles related to the topic whose design is associated with in vitro studies.• Scientific articles published in the period from 2010 to 2022.• Selected articles in English, Portuguese and Spanish.• Studies that include single-rooted teeth from a single canal endodontically treated, restored with different types of posts.• Studies that measure the resistance to fracture through compressive forces applied to the teeth. Exclusion criteria: • Studies with case reports, clinical trials, letters to the editor, and case-control studies.• Studies in which only multi-rooted pieces are included.• Studies that declare a conflict of interest.

Information sources: PubMed is the standard database that is used in the healthcare profession. It has the ability to link to full-text articles, provides advance researching including filtering and special queries and links to related articles.
ScienceDirect is a website which provides large database of scientific and medical research. It contains the world's largest electronic collection of full-text and bibliographic information on science, technology and medicine
Scopus is a large, multidisciplinary database of peer-reviewed literature: scientific journals, books, and conference proceedings. Delivering a comprehensive overview of the world's research output in the fields of science, technology, medicine, social science, and arts and humanities

Main outcome(s): Not reported.

Quality assessment / Risk of bias analysis: The investigation was done according to the prism guide. The results will be examined according to the proposed search strategy. Before this, calibration exercises will be carried out, in which the reviewers will discuss the eligibility criteria and apply them to a sample of 20% of the studies to determine the agreement between examiners. After that, they will eliminate duplicates, followed by filtering by titles, abstracts, inclusion and exclusion criteria to obtain the final articles for the systematic review. Finally, a third reviewer will be requested for the decision to include the articles.

Strategy of data synthesis: For the extraction and management of data from the selected articles, the data extraction will be carried out through the following groups: Author and year, type of sample (dental piece), experimental (anatomized posts vs non-anatomized posts), (non-

anatomized posts vs cast posts), fracture resistance values obtained and conclusions. On the other hand, the researcher and the advisor will carry out the reviews and confirm with the support of a third reviewer that the selected articles will meet the inclusion and exclusion criteria established above.

Subgroup analysis: No subgroup analysis, review in progress.

Sensitivity analysis: No sensitivity analysis, review in process.

Language restriction: Only selected articles in English, Portuguese and Spanish.

Country(ies) involved: Peru.

Keywords: Fracture strengths; endodontically-treated; teeth; endodontic fiber post; endodontic metal post anterior teeth pulpless tooth; fracture resistance; failure.

Contributions of each author:

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