Critically Appraised Topic (CAT)

Project Team:
2B-5
Project Team Participants:
D4- Vonte Jackson D3- Theresa Kim Vu D2- Margaret Miller D1- Emily Krieger
Clinical Question:
Are the success and failure rates of fiber post and cores similar to the success and failure rates of custom metal post and cores?
PICO Format:
P:
Root canal therapy patients
I:
Custom metal post and cores
C:
fiber post and cores
O:
Success and failure rate
PICO Formatted Question:
Among root canal patients,how does the success and failure rates for custom metal post cores compare to resin post and cores?
Clinical Bottom Line:
How does the success and failure rates for custom metal post cores compare to resin post and cores?
Date(s) of Search:
10/06/20 and 10/13/20
Database(s) Used:
Google Scholar, PubMed
Search Strategy/Keywords:
fiber post and core vs metal post and core success and failure rate, fiber post vs metal post,
MESH terms used:
fiber post and core, fiber post, metal post and core, metal post, resin post and core, resin post, success and failure rate, success rate, failure rate, success, failure
Article(s) Cited:
1. Sarkis-Onofre, Rafael et al. “Cast metal vs. glass fibre posts: a randomized controlled trial with up to 3 years of follow up.” Journal of dentistry vol. 42,5 (2014): 582-7. doi:10.1016/j.jdent.2014.02.003

2. Uthappa R, Mod D, Kharod P, Pavitra S, Ganiger K, Kharod H. Comparative evaluation of the metal post and fiber post in the restoration of the endodontically treated teeth. J Dent Res Rev 2015;2:73-7

3. Wang, Xiaodong et al. "Evaluation of fiber posts vs metal posts for restoring severely damaged endodontically treated teeth: a systematic review and meta-analysis." Quintessence international (Berlin, Germany : 1985) vol. 50,1 (2019): 8-20. doi:10.3290/j.qi.a41499

Study Design(s):

1. In this article, the study design was a randomized controlled trial where fifty four participants and seventy two teeth had received a single metal-ceramic crown with either a glass-fibre or cast-metal post. The participants were evaluated during a follow-up period of up to three years and analyzed using Kaplan-Meier statistics. The study was created to compare the survival of glass fibre and cast metal posts in endodontically treated teeth with no remaining coronal wall.

2. The study design of this article was an individual cohort study that compared the success rate of metal post and fiber post in endodontically treated teeth. Forty teeth were included in the study and half of them were treated with a metal post while the other half received a fiber post. Patients were recalled after six months and results were compared using student's t test with the help of IBM SPSS Statistics.

3. The study design of this article was a systematic review and meta-analysis that screened through online and gray literatures up to January 2018. Only randomized controlled trials with follow-up of at least three years were included in the meta-analysis. After articles were selected, the quality of the studies were assessed using the Cochrane Collaboration's tool. The strength of evidence was assessed using the Grading of Recommendations, Assessment, Development and Evaluations system.

Reason for Article Selection:

1. This article was selected due to it comparing fiber and metal posts which is what my PICO question asked. This article was also published in 2014 which is fairly recent. The article was also chosen because the study design is a randomized controlled trial which is the second highest level of evidence.

2. Although this study is an individual cohort study and does not contain that much evidence, the article was still selected because it contained the information needed to answer the PICO and clinical question. There also didn't appear to be any bias in the study.

3. This article was selected due to it being a systematic review and meta-analysis and providing high-quality evidence. This article was also published in 2019, so the data is recent.

With the high-quality evidence provided by this study, the PICO and clinical question were answered.

Article(s) Synopsis:

1. The article was a randomized control trial that studied the survival of glass fibre and cast metal posts in endodontically treated teeth with no remaining coronal wall. Fifty-four participants and seventy-two teeth were restored with either a glass-fibre or cast-metal post. After following up for three years, the survival rates of glass fibre and cast metal posts were similar.

2. This article was an individual cohort study where twenty endodontically treated teeth were given a metal post while another twenty were given a fiber post. A six month recall was performed and researchers found that fiber post had lesser chances of failures compared to a metal post. However, researchers acknowledged that their study was small and that their results should be supported by a larger scale study.

3. The article was a systematic review and meta-analysis that screened through literature up to January 2018. The analysis selected studies that were only randomized controlled trials with a follow-up of at least three years. Of all the literature, four studies were selected for the study. Using the Grading of Recommendations, Assessment, Development and Evaluations system, there was high quality of evidence to conclude that fiber posts have a significantly higher survival rate than metal posts. There was also moderate quality of evidence to support that there was no difference between the two for success rate.

Levels of Evidence: (For Therapy/Prevention, Etiology/Harm)

See http://www.cebm.net/index.aspx?o=1025

☐ **1a** – Clinical Practice Guideline, Meta-Analysis, Systematic Review of Randomized Control Trials (RCTs)
☐ **1b** – Individual RCT
☐ **2a** – Systematic Review of Cohort Studies
☐ **2b** – Individual Cohort Study
☐ **3** – Cross-sectional Studies, Ecologic Studies, "Outcomes" Research
☐ **4a** – Systematic Review of Case Control Studies
☐ **4b** – Individual Case Control Study
☐ **5** – Case Series, Case Reports
☐ **6** – Expert Opinion without explicit critical appraisal, Narrative Review
☐ **7** – Animal Research
☐ **8** – In Vitro Research

Strength of Recommendation Taxonomy (SORT) For Guidelines and Systematic Reviews
See article **J Evid Base Dent Pract 2007;147-150**
☐ **A** – Consistent, good quality patient oriented evidence

☐ **B** – Inconsistent or limited quality patient oriented evidence

☐ **C** – Consensus, disease oriented evidence, usual practice, expert opinion, or case series for studies of diagnosis, treatment, prevention, or screening

Conclusion(s):

From my research, it is concluded that fiber post and cores have a higher success and lower failure rate than metal post and cores. This may be due to the fact that metal posts have a higher elastic modulus and transfer functional stresses to dentin, which has a lower elastic modulus. This stress results in endodontic and restorative failures. Fiber posts on the other hand, have a similar elastic modulus as dentin and this allows for uniform stress distribution and less failure.

Even though my research supports that fiber posts have a high success and lower failure rate compared to metal posts, I do think that the evidence is inconsistent. In the study by Rafael Sarkis-Onofre et al., it was concluded that both posts showed similar clinical performance in teeth with no remaining coronal wall after 3 years. I think there are many factors that affect the success and failure rates of posts that need to be accounted for. Although the systematic and meta-analysis by Xiaodong Wang et al. does provide the highest quality evidence, only four literatures met the selection criteria and were included in the study. Therefore, I think more studies need to be performed over longer periods of time before a consistent conclusion can be made.