Critically Appraised Topic (CAT)

Project Team:
8A-1
Project Team Participants:
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Clinical Question:
How does the endontic status of a tooth affect periodontal regeneration?
PICO Format:
P:
Patients with previously treated teeth needing periodontal regenerative surgery
I:
Endodontically treated teeth
C:
Non-endodontically treated teeth
O:
Improved probing depths and clinical attachment loss
PICO Formatted Question:
In patients with previously treated teeth does endo affect the outcome of periodontal regenerative surgery when compared to nonendontically treated teeth when looking at probing depths and clinical attachment loss?
Clinical Bottom Line:
▪ **There does not seem to be any statistically significant evidence that RCT treatment has an impact on the success of periodontal regenerative surgery.** ▪ **There does seem to be some statistically significant evidence that periodontal regenerative surgery can improve the success of root canal treated teeth.** ▪ **Periodontal regeneration techniques can improve the prognosis of hopeless teeth and provide another treatment option for clinicians, rather than just extracting the tooth, regardless of vitality status.**
Date(s) of Search:
11/08/2020, 11/14/2020
Database(s) Used:
PubMed
Search Strategy/Keywords:
Periodontal disease, vertical defects, periodontal regeneration, root canal therapy, clinical attachment loss, probing depths
MESH terms used:
Bone regeneration **Periodontal regeneration** **Periodontal surgery**

Root Canal Therapy
Tooth, Nonvital
Periodontal Attachment Loss
Periodontal Pocket

Article(s) Cited:

1. **De Sanctis, M. Goracci, C. Zucchelli, G. Long-term effect on tooth vitality on regeneration therapy in deep periodontal bony defects: a retrospective study. Int J Periodontics Restorative Dent 2013;33:151–157. doi: 10.11607/prd.1461**
2. **Tsesis I, Rosen E, Tamse A, Taschieri S, Del Fabbro M. Effect of guided tissue regeneration on the outcome of surgical endodontic treatment: a systematic review and meta-analysis. J Endod. 2011 Aug;37(8):1039-45. doi: 10.1016/j.joen.2011.05.016. PMID: 21763891.**
3. **Cortellini P, Stalpers G, Mollo A, Tonetti MS. Periodontal regeneration versus extraction and prosthetic replacement of teeth severely compromised by attachment loss to the apex: 5-year results of an ongoing randomized clinical trial. J Clin Periodontol. 2011 Oct;38(10):915-24. doi: 10.1111/j.1600-051X.2011.01768.x. Epub 2011 Jul 21. PMID: 21777268.**

Study Design(s):

1. A retrospective study (2b)
2. A systematic review and meta-analysis (1a)
3. A randomized clinical trial (1b)

Reason for Article Selection:

1. This article evaluated a number of periodontal therapies and their affect on tooth vitality 7-18 years post-treatment. There was no statistically significant evidence that aggressive perio treatment would cause loss of tooth vitality. Our patient does have a RCT treated tooth but evaluation of vital teeth helps establish a good comparison.
2. This article evaluate if there is a statistically significant effect of GTR on endodontically treated teeth. Although the results were not statistically significant, there was a generally positive trend towards using GTR when endodontically treating teeth. If anything, it could potentially help better the prognosis of the tooth in question.
3. This article seems to be the most relevant article to our clinical and PICO question. It assesses the success of periodontal regeneration in both vital and non-vital teeth. The vitality of the teeth did not have an impact on the success of the periodontal surgery.

Article(s) Synopsis:

1. The goal of this retrospective study was to determine whether periodontal treatments like aggressive root planning and periodontal regeneration impact tooth vitality. This study included a total of 137 patients. 54 were treated between 1992-97, 48 were treated between 1997-2000, and 35 were treated between 2000-03. All

of the patients were recalled in 2010 to re-evaluate the clinical parameters of pocket depths, recession, and clinical attachment levels (CAL). A PA radiograph and vitality testing were also taken. A number of statistical tests like one-way analysis of variance (ANOVA), chi-square analysis, and a Fisher exact test were performed. ANOVA and chi-square evaluated the significance among the periodontal regeneration techniques used and the clinical parameters. The Fisher exact test evaluated the significance of loss of tooth vitality in relation to the treatment. The results showed that there was no significant risk to the vitality of the teeth being treated with "aggressive" periodontal surgery. The results also showed that the Enamel Matrix Derivative (EMD) was the technique with the most CAL gain (5.36 +/- 0.7 mm), while guided tissue regeneration (GTR) had the least (4.90 +/- 1.0 mm). Overall, this article did not recommend "preventative" RCT treatment before periodontal regeneration surgery, as there is no evidence to support doing so. RCT treatment is only recommended if there are other indications present.

2. The goal of this systematic review and meta-analysis study was to evaluate if there was any statistically significant effect of guided tissue regeneration (GTR) when endodontically treating teeth. There were originally 191 articles that were eligible for use in this study based on the title and abstracts but after all of the inclusion and exclusion criteria were applied, only 5 articles could be used. Creating uniform parameters was desired, which is why so few studies could be included. Hopefully this study can be followed up on and more data can be collected in the future. From the 5 previous studies, radiographic and clinical evidence was evaluated and statistical analysis was performed using both tooth and patient as analysis units. Meta-analysis was performed with the Mantel-Haenszel method and found that there was a positive trend in regards to use of GTR compared to the control, however the results were not statistically significant. Forest plots graphed the difference in outcomes for the treatment groups. Fisher exact test evaluated the effect of the variables (lesion size, lesion type, etc.) on the outcomes and found that through and through lesions were better off than 4-wall defects, small periapical lesions were better off than large lesions, and a resorbable membrane was better than a non-resorbable membrane, but both were better than no membrane at all. Despite the positive outcomes, none of this data was statistically significant either. Overall, GTR could be helpful in improving the outcome of bone regeneration after endo surgery, but without statistically significant evidence, it would not necessarily be recommended without the patient knowing all of the possible outcomes (both positive and negative).
3. The goal of this randomized clinical trial was to evaluate periodontal regeneration in both vital and non-vital teeth in comparison to the control group (extraction of hopeless teeth and replaced by a fixed prosthesis). There were 50 patients that participated. Each had generalized severe periodontitis and at least one hopeless tooth. The control group had their hopeless tooth extracted and replaced with a fixed

prosthesis. The test group underwent regenerative therapy (vitality of the tooth did not matter). 100% of the control group had successful treatment outcomes at the 1 and 5-year recall appointments. 92% (23/25) of the test group demonstrated critical clinical improvements in clinical attachment levels, pocket depths, radiographic bone gain, and tooth mobility at the 1 and 5-year recall appointments. Only 2 teeth failed and were extracted at the 1-year recall appointment. There was little to no difference between the 1-year and 5-year appointments. Overall, extraction does not have to be the only treatment option for a hopeless tooth. Regenerative therapy can even be an option for severely compromised teeth with intra-bony defects to or beyond the root apex, and in vital or non-vital teeth. If the patient is motivated to save their tooth, regenerative therapy is a great option to prolong the life of the tooth and improve the prognosis.

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):

After conducting this research, there does not seem to be any evidence that supports the idea that endodontically treated teeth impacts the success of periodontal regenerative surgery. Periodontal regenerative surgery, as shown in the third article, can be a great alternative to extracting a tooth with a less than favorable prognosis. It was shown to be successful even in teeth that were severely periodontally compromised and deemed as

hopeless. There was no statistical evidence that tooth vitality effected the positive outcome. Our patient may need their tooth endodontically re-treated and the evidence in the articles would support following up with GTR to help heal the PARL and bony defects, while also reducing pocket depths and increasing clinical attachment levels. The questionable prognosis of the patient's tooth might even improve after re-treatment and GTR.