Critically Appraised Topic (CAT)

Project Team:
2A-1
Project Team Participants:
D3/4: Brett Barton **D2: Kaory Gomez-Calzada** **D2 Alternate: Garrett Jones** **D1: Benjamin Vilensky** **Group Leader: Dr. Pelz** **Specialist: Dr. Shane**
Clinical Question:
How does patient noncompliance with oral hygiene affect treatment of partial edentulism?
PICO Format:
P:
Patients seeking dental treatment
I:
Noncompliance with oral hygiene instruction
C:
Compliance with oral hygiene instruction
O:
Treatment options
PICO Formatted Question:
For patients seeking dental treatment, how does noncompliance with oral hygiene instruction compared to compliance with oral hygiene instruction affect treatment options?
Clinical Bottom Line:
Research suggests that noncompliance with oral hygiene (such as frequency of toothbrushing) may increase the risk of caries compared to those who more frequently practice oral hygiene. It is also shown in the research that patients who wear an RPD are at a higher risk of caries than those who do not wear an RPD.
Date(s) of Search:
9/2/2020 and 9/3/2020
Database(s) Used:
Pubmed.gov
Search Strategy/Keywords:
Studies containing information on the association of caries with oral hygiene compliance (toothbrushing) and caries with removable partial denture **Keywords: Compliance, caries, removable partial denture, oral hygiene**

MESH terms used:

Search 1: Caries, toothbrushing

Search 2: Caries, removable partial denture

Article(s) Cited:

1. **Effect of Toothbrushing Frequency on Incidence and Increment of Dental Caries: A Systematic Review and Meta-Analysis**

- **Kumar S, Tadakamadla J, Johnson NW. Effect of Toothbrushing Frequency on Incidence and Increment of Dental Caries: A Systematic Review and Meta-Analysis. J Dent Res. 2016;95(11):1230-1236. doi:10.1177/0022034516655315**

2. **Caries incidence following restoration of shortened lower dental arches in a randomized controlled trial**

- **Jepson NJ, Moynihan PJ, Kelly PJ, Watson GW, Thomason JM. Caries incidence following restoration of shortened lower dental arches in a randomized controlled trial. Br Dent J. 2001;191(3):140-144. doi:10.1038/sj.bdj.4801122**

Study Design(s):

1. Systematic Review and Meta-Analysis (Kumar)
2. Randomized Controlled Trial (Jepson)

Reason for Article Selection:

1. This article (Kumar) was chosen because it evaluates how frequency of toothbrushing affects caries rate. As a systematic review and meta-analysis, this study provides strong evidence that can be applied to this case and is related to both the clinical and PICO question.
2. This article (Jepson) was chosen because as a randomized controlled trial (RCT), it presents a high level of evidence about the effect of wearing an RPD and increased caries rate. The article helps provide evidence to answer the clinical and PICO question.

Article(s) Synopsis:

1. The aim of this study (Kumar) was to determine how frequency of toothbrushing affects incidence of caries through performing a systematic review and meta-analysis. 5,494 articles were retrieved from Medline, Embase, Cinahl, and Cochrane databases, 74 of those were reviewed in full, and 33 total were eligible for this review (25 eligible for quantitative synthesis). Studies were selected based on study design, sample size, dental caries outcome and diagnostic criteria. Almost all of the studies were from high-income countries (except for 4 studies from Brazil and 1 study from China). Most of the studies diagnosed a carious lesion only when it was cavitated and follow up periods ranged from 11 months to 15 years. The study found that infrequent brushers, compared to frequent brushers, demonstrated a higher incidence of carious lesions (OR 1.50; 95% confidence interval [CI]: 1.34, 1.69). When evaluating increment

of carious lesions, brushing <2 times/day significantly caused an increment of carious lesions compared with >2 times/day brushing (standardized mean difference [SMD] 0.34; 95% CI: 0.18 to 0.49). Overall, the study found that individuals who state that they brush their teeth infrequently are at greater risk for the incidence or increment of new carious lesions than those brushing more frequently.

2. This Randomized Controlled Trial (RCT) (Jepson) aimed to determine the caries incidence of a conventional removable partial denture vs bilateral cantilever resin-bonded bridges (RBBs) when restoring a shortened lower dental arch. The patient population consisted of 25 males and 35 females with a median age of 67. The patients were randomly placed in a denture treatment group and a bridge treatment group with 30 patients in each group. Exams were completed at 3 months, 1 year, and 2 years after prosthesis insertion. For the bridge group, with the 165 remaining natural teeth, there were 11 new carious lesions and 1 tooth fracture after 2 years. For the denture group, with the 156 remaining natural teeth, there were 51 new or recurrent carious lesions and 3 tooth fractures. The difference between the 2 groups was found to be highly significant ($P < 0.01$). When looking at which teeth the caries were found on, there was a 14% incidence on non-abutment teeth and 9% incidence on abutment teeth for the bridge group. For the denture group, there was a caries incidence of 14% for non-abutment teeth and 60% incidence for abutment teeth. The article ultimately determined that compared to a resin-bonded bridge, wearing an RPD has a significantly greater incidence of new and recurrent caries.

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):

The evidence shows that patients who are noncompliant with oral hygiene (toothbrushing) are at a higher risk of carious lesions compared to those who more frequently practice oral hygiene. Patients who wear an RPD also appear to be at a higher risk of caries compared to those who do not wear an RPD. Based on this evidence, for a patient who is non-compliant with oral hygiene, an RPD would not be indicated as a definitive treatment option to replace edentulous areas as noncompliance with oral hygiene as well as the RPD would greatly increase the risk of caries to the remaining dentition. Managing noncompliance with oral hygiene should be a priority for the practitioner.

Based on the evidence, for this case, it would be advised to recommend restorations for all carious surfaces and to reinforce oral hygiene instruction and education, as well as utilizing motivational interviewing for oral hygiene compliance. Compliance with oral hygiene is necessary before an RPD can be considered to treat the patient's partial edentulism. Due to financial constraints, the patient will have difficulty affording the restorations and alternative treatment for carious lesions, such as placement of SDF or edentulation and complete denture may be necessary in the future.