Critically Appraised Topic (CAT)

Project Team:

1A-2

Project Team Participants:

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Clinical Question:

What is the effectiveness and survivability of ceramic onlays as a treatment option in teeth requiring cuspal coverage?

PICO Format:

P:

Patients that require cuspal coverage restorations

I:

Ceramic onlays, specifically lithium disilicate

C:

Full coverage crowns

O:

Restoration survivability

PICO Formatted Question:

In patients with teeth that require cuspal coverage restorations, do ceramic onlays, specifically lithium disilicate, have a comparable survivability to full coverage crowns?

Clinical Bottom Line:

Randomised controlled studies on the subject are limited or even non existant. Overall, Survival rates of onlays are high. Failures that were noted in ceramic onalys were mostly due to ceramic fractures. Not one ceramic material was superior over another. Onlay survival rates compared to single crowns.

Date(s) of Search:

9/15/20

9/24/20

Database(s) Used:

Google Scholar

PubMed

Search Strategy/Keywords:

- **Focused on lithium disilicate restorations, more specifically onlays and crowns. Searched ceramics if lithium disilicate was too specific, and focused on articles regarding longevity/survival rates.**

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MESH terms used:
"onlay", "crowns", "longevity", "survival", "Lithium Disilicate restorations" , "ceramic", "full coverage crown", "partial coverage crown"
Article(s) Cited:

- **Article 1: Vagropoulou GI;Klifopoulou GL;Vlahou SG;Hirayama H;Michalakis K; "Complications and Survival Rates of Inlays and Onlays vs Complete Coverage Restorations: A Systematic Review and Analysis of Studies." Journal of Oral Rehabilitation. 2018 Nov;45(11)903-920.**

- **Article 2: Sulaiman TA, Delgado AJ, Donovan TE. Survival rate of lithium disilicate restorations at 4 years: A retrospective study. J Prosthet Dent. 2015 Sep;114 (3) 364-6**
- **Article 3: : Abduo J, Sambrook RJ. Longevity of ceramic onlays: A systematic review. J Esthet Restor Dent. 2018 May;30 (3): 193-215**

Study Design(s):
Article 1: Systematic Review
Article 2: Retrospective Study
Article 3: Systematic Review
Reason for Article Selection:
Article 1: Addressed clinical question by comparing onlays to crowns. Article 2: Specfiically focused on lithium disilcate (IPS e.max) onlays and crowns. Article 3: A higher level of evidence, focusing on ceramics with lithium disilcate onalys included.
Article(s) Synopsis:

- **Article 1: Electronic search was conducted to find articles published between 1980 and 2017. 9 studies were selected and grouped into: inlay, onlay, inlay/onlay and crown. Aim was to determine if different types of restorations had different complications and their survival rates at 5 years. Mean survival for onalys was 93.5% and crowns was 95.38%. Main biological complication was caries, and main technical complications was ceramic fracture. Survival rates of both crowns and onlays are very high.**

- **Article 2: Over 45 months, restorations from 2 commercial laboratories were collected. Categorized by monolithic or layered, and complete coverage crowns, fixed dental prostheses, e.max veneers, and inlay/onlay. Total of 21,340 restorations. IPS e.max crowns had a failure rate of .91% (106 of 11,603 failed). IPS e.max onlays had a**

failure rate of 1.01% (11 failed of 1,093 placed). Conclusions was that IPS e.max restorations do not experience a high rate of failure.

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- **Article 3: Total of 21 studies were included. They were gathered from an electronic search. Focused on medium term survival (2-5 years) and long term (greater than 5 years). Overall, most common cause of failure amongst ceramics was fracture, followed by debonding and caries. Overall, at 2-5 years, ceramics had a survival rate of 91%-100%. More than 5 years, survival ranged from 71%-98.5%. Not one ceramic restoration material performed better than another. Onlays have acceptable survival rates.**

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
X **2a** – Systematic Review of Cohort Studies
X **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
X **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):

Based on these studies, evidence was consistent amongst the three regarding onlay survival rate, however, since the quality was limited, the decision is sometimes left to personal preference. I would advise my D4 to place an onlay due to the fact that the patient in question is not a bruxer, it is placed on a premolar, and it will conserve the tooth while

providing cuspal coverage. The survival rate is high for onalys. However, I would be aware of the risk of ceramic fracture and take all necessary steps to avoid or decrease the risk of that happening.

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