Critically Appraised Topic (CAT)

Project Team:
2A-4
Project Team Participants:
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Clinical Question:
Which crown material is the most esthetic?
PICO Format:
P:
Patients with crowns in the esthetic zone
I:
Translucent Zirconia crowns
C:
Lithium Disilicate crowns
O:
More translucent/esthetic crowns
PICO Formatted Question:
In patients who want esthetic crowns, are translucent zirconia crowns or lithium disilicate crowns more translucent/esthetic?
Clinical Bottom Line:
Although there is contradicting evidence on which crown material is more translucent (and more esthetic), it appears that an increase in translucency often results in a decrease in material strength when comparing materials of the same category. For this reason, crown material should be decided clinically on a case by case basis with all patient factors taken into consideration.
Date(s) of Search:
9/3/2020, 9/7/2020, 9/15/2020
Database(s) Used:
PubMed
Search Strategy/Keywords:
Crowns, Esthetic, Translucency
MESH terms used:
Monolithic Zirconia, Translucency, Lithium Disilicate
Article(s) Cited:
Baldissara, Paolo, et al. "Translucency of IPS E.max and Cubic Zirconia Monolithic Crowns." *The Journal of Prosthetic Dentistry*, vol. 120, no. 2, 2018, pp. 269–275.

Harada, Kosuke, et al. "A Comparative Evaluation of the Translucency of Zirconias and Lithium Disilicate for Monolithic Restorations." *The Journal of Prosthetic Dentistry*, vol. 116, no. 2, 2016, pp. 257–263.

Kwon, Sung Joon, et al. "Comparison of the Mechanical Properties of Translucent Zirconia and Lithium Disilicate." *The Journal of Prosthetic Dentistry*, vol. 120, no. 1, 2018, pp. 132–137.

Study Design(s):

In-Vitro

Reason for Article Selection:

These articles were selected based on the fact that each compare the materials in question in there translucency. Each article demonstrates conclusive evidence in some aspect related to our PICO question. In addition, each of these studies come from credible journals and are very recent in their publication, suggesting up-to-date information that can be applicable in clinical practice today.

Article(s) Synopsis:

Article 1 (Baldissara): The purpose of this study was to evaluate the optical properties of two types of zircona, cubic ultratranslucent zirconia and supertranslucent zirconia, to lithium disilicae glass ceramic in monolithic molar crowns. Translucency was measured using a photoradiometer and by measuring the total transmission of light through the crowns. Both types of zirconia showed significantly higher translucency than the lithium disilicate. UT also demonstrated higher translucency than ST when prepared to the same thickness. However, with increased translucency of zirconia there is a corresponding decrease in strength of the zirconia.

Article 2 (Kosuke): The purpose of this study was to compare the translucency of five types of zirconia (Katana UT, Katana ST, Katana HT, Prettau Anterior, and BruxZir) and one type of lithium disilicate (E.Max Ivoclear Vivadent AG). A spectrophotometer was used to measure the light transmission as a percentage of the total. The lithium disilcate showed a greater translucency than all five zirconias at all preparation thicknesses and this result was statistically significant. Among the five types of zirconias, Katana UT was shown to have the

highest translucency at a thickness of 0.5mm, however, at a thickness of 1.0mm, Katana UT was shown to be equally translucent to Prettau Anterior, and Katana ST.
Article 3 (Kwon): The purpose of this study was to compare the translucency (as well as several other properties) of two different types of zirconia to lithium disilicate (E.Max). The two types of zirconia tested were 5-mol yttria-stabilized zirconia and 3-mol yttria-stabilized zirconia. A spectrophotometer was used to measure light transmission against a black background. The lithium disilicate had the highest translucency of the three and this result was significantly significant. However, Lithium Disilicate was also shown to have a significantly lower flexural strength than both types of zirconia. When comparing the two types of zirconia, the 5-mol yttria-stabilized was shown to have the higher translucency and also demonstrated no meaurable material wear, which could also contribute to increased esthetics over time. However, the flexural strength was less than 3-mol yttria-stabilized zirconia.

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):

There is contradictory evidence when comparing the translucency values of zirconia and lithium disilicate. However, all studies demonstrate that an increase in translucency often results in a decrease in material strength when comparing materials of the same category.

For this reason, crown material should be decided clinically on a case by case basis with all patient factors taken into consideration.