

Do Zirconia Crowns Result in Greater Enamel Wear: A Clinically Appraised Topic



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Clinical Problem

Challenge: Balance between durability and esthetics when providing crowns (Gou et al., 2019).

Possible Solution: Zirconia crowns that are free of metal, biocompatible, and esthetically-driven.

Clinical Question

In adults patients receiving tooth implant treatment, to what extent do zirconia crowns affect the rate of enamel wear on antagonist teeth over 1 year compared with that produced by natural teeth?

Evidence Search

("Zirconium"[MeSH Terms] OR "zirconia"[All Fields]) AND ("Tooth Wear"[Mesh] OR "wear" [All Fields])

Search Date: October 17th, 2022

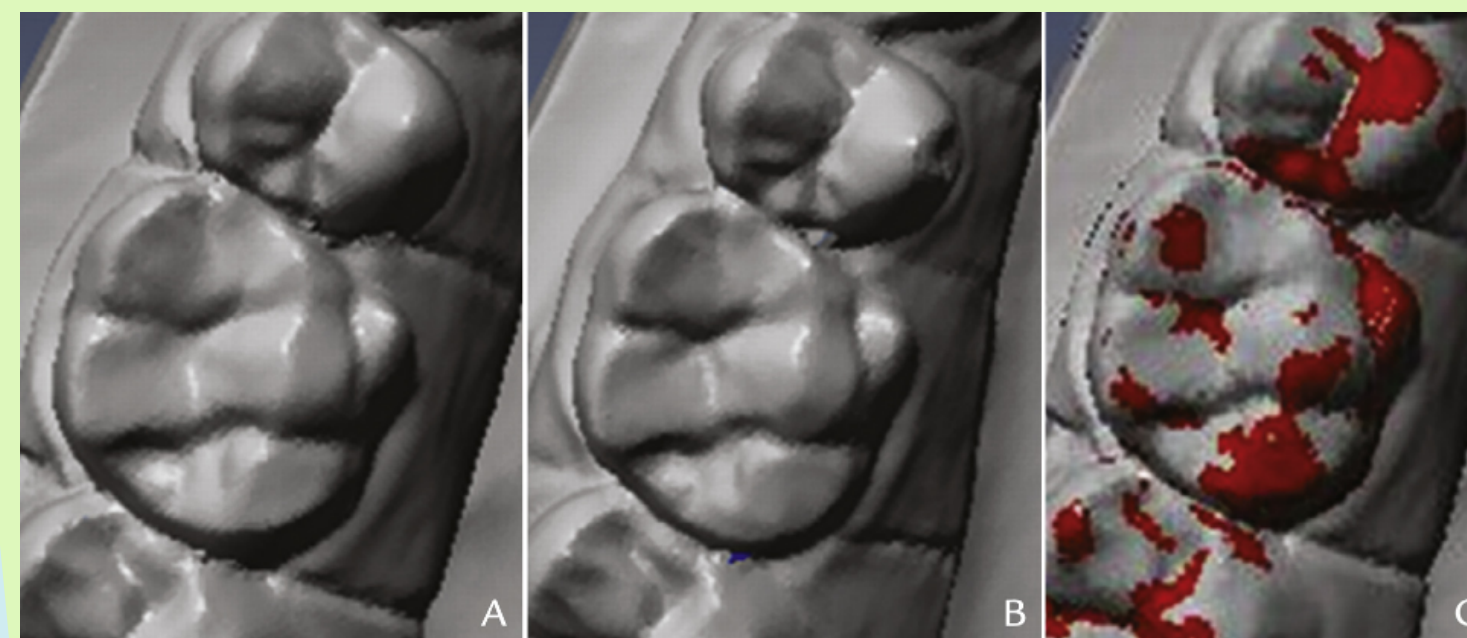
PubMed yield: 16 evidence sources

Additional Search: Epistemonikos and TRIP databases; ADA EBD website

Article Selected: Solá-Ruiz, et al., 2020 Systematic Review and Meta-Analysis (7 RCTs and 1 cohort study)

Clinical Bottom Line

- No definitive conclusion; more studies needed.
- Lack of comparison with natural tooth wear limits interpretation of the results.
- Limited evidence suggests that zirconia crowns may cause greater wear of enamel on antagonist teeth than natural enamel.



A, Natural enamel of maxillary premolar and first molar B, Natural enamel of maxillary premolar and first molar opposing zirconia crown after 1 year. C, Superimposed image of A & B, Red areas represent enamel wear on buccal and lingual cusps after 1 year of function (Mundhe et al., 2015)

Results

- **Mean Maximum Wear of Antagonist Tooth to MZC (1-2 years follow-up):** 95.45 μ m (95% CI 79.57–111.33).
- **Mean Maximum Wear of Antagonist Tooth to MZC per month:** 6.13 μ m (95% CI 3.99 to 8.27).
- Lack of data on natural tooth wear (comparison group).

Mundhe et al., 2015:

- MD, molars (tooth wear of antagonist teeth to MZC vs natural tooth wear, 1 year follow-up) = 91.9 μ m, $p < 0.001$.
- The results are clinically meaningful (threshold: 29.0 μ m).
- No CI 95% reported.

Strengths & Limitations

Strengths

- Pubmed, Cochrane, Scopus, Embase, WOS and grey literature.
- Two independent reviewers; no time and language restrictions.
- PRISMA diagram.
- Newcastle-Ottawa Quality Evaluation Scale.
- PEDro scale.
- Summary table
- I^2 to assess statistical heterogeneity.
- Meta-analysis and meta-regression applied.
- No external funding or conflict of interest.

Limitations

- Lack of studies comparing the tooth wear because of MZC vs natural tooth wear.
- MeSH terms and key words combination was not appropriately used.
- Unclear if arbitrator involved.
- Small sample sizes.
- High degree of clinical and statistical heterogeneity among the included studies.
- Risk factors and comorbidities of study population not clearly defined.
- Distribution of the results in the studies is asymmetrical, thereby suggesting a publication bias.

Clinical Applicability

- No mention of possible comorbidities and parafunctional habits.
- Lack of studies included comparing tooth wear and natural tooth wear.
- Thus, it is not possible to clearly answer the clinical question, more research is needed.

REFERENCES:

1. Gou, M., Chen, H., et al, (2019). Antagonist enamel wear of tooth-supported monolithic zirconia posterior crowns in vivo: A systematic review. *The Journal of prosthetic dentistry*, 121(4), 598-603.
2. Solá-Ruiz, M. F., et al, (2020). Wear in antagonist teeth produced by monolithic zirconia crowns: a systematic review and meta-analysis. *Journal of Clinical Medicine*, 9(4), 997.
3. Mundhe, K., et al, (2015). Clinical study to evaluate the wear of natural enamel antagonist to zirconia and metal ceramic crowns. *The Journal of prosthetic dentistry*, 114(3), 358-363.
4. <https://www.bsrd.org.uk/Guidelines.aspx>

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