

# Natural Tooth Wear Opposing to Different Prosthetic Crown Materials

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Tooth wear is considered a complex process occurring due to chemical, mechanical, and biological factors, which cause function and esthetic problems. Tooth wear is an inevitable procedure, and it occurs when antagonist natural tooth and/or restorations slide over each other.<sup>1</sup> Preferably, the resistance to wear for the restorative materials should be closer to the enamel. There seems to be a difference in the wear properties of the prosthetic materials opposing the natural tooth. This makes the masticatory movements more complex, leads to wear of the natural tooth, and influences the stomatognathic system. This causes reduction in vertical dimension, sensitivity of tooth, and compromises esthetics and mastication.<sup>2</sup>

*In vitro* studies were done utilizing wear simulators so that adequate oral environment could be simulated during experimental process. Lal et al.<sup>3</sup> did an *in vitro* study to find the wear of natural tooth opposing zirconia, polymer-infiltrated ceramic network, and resin nanoceramics specimens. They found maximum wear of natural tooth with zirconia specimens. Dense ceramic such as zirconia has the tendency of brittle chipping, and this causes more wear of the natural tooth. Ghaffari et al.<sup>4</sup> in their systematic review of *in vitro* studies evaluated the natural tooth wear with zirconia and feldspathic crowns. They found contrary results, with zirconia causing less wear of antagonist tooth compared to feldspathic porcelain. Polished restoration seems to cause less wear of enamel than glazed restorations. Compared to conventional zirconia, monolithic zirconia causes less enamel wear. Zirconia has fine grain particles compared to feldspathic porcelains, which resulted in a smooth and monotonic surface. On the other hand, feldspathic porcelain has rough surface due to microfractures on its surface, which occur due to its low fracture toughness. This surface roughness causes enamel abrasion.

Branco et al.<sup>5</sup> in their review found that considering ceramics restorations, the wear of antagonist tooth depends on their toughness and surface finish. They found abrasion as the main cause for wear at occlusal interface due to the rough surface of the material, whether it is less toughened ceramic or composite. Metallic restorations cause less wear of enamel compared to other materials due to their low hardness and high ductility.

Mundhe et al.<sup>2</sup> did a clinical study to compare the enamel wear after 1 year antagonist to natural dentition, metal ceramic, and zirconia crowns. The enamel wear was significantly higher antagonist to metal ceramic crown compared to zirconia crown and natural tooth. Wear seems to occur due to microfracture and not with plastic deformation when ceramic restoration slides against enamel or antagonist ceramic crown.<sup>6</sup> They also used polished zirconia crowns and found less wear compared to glazed feldspathic porcelain crowns. Tang et al.<sup>7</sup> in another

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*in vivo* study evaluated the wear of the monolithic zirconia (Yttria-stabilized tetragonal zirconia polycrystals) crown on the enamel. They observed that monolithic zirconia crown causes wear of the opposing teeth. The wear with monolithic zirconia is more compared to natural tooth, and it increases with time. The wear is mainly due to fatigue and abrasion.

The antagonist restoration does cause the wear of the natural dentition. The tooth wear seems to be more with metal ceramic crowns and least with metal crowns. One of the main reasons for tooth wear is abrasion. Polished ceramic restorations cause less abrasion compared to glazed restorations. There are many *in vitro* studies conducted to evaluate the natural tooth wear, but the clinical studies on this topic are scarce. More clinical studies including randomized controlled trials are needed on this topic to address this issue better so that clinicians have a clear guideline to select the restoration antagonist for natural tooth.

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## REFERENCES

1. Mahalick JA, Knap FJ, Weiter EJ. Occusal wear in prosthodontics. *J Am Dent Assoc* 1971;82(1):154–159. DOI: 10.14219/jada.archive.1971.0018
2. Mundhe K, Jain V, Pruthi G, et al. Clinical study to evaluate the wear of natural enamel antagonist to zirconia and metal ceramic crowns. *J Prosthet Dent* 2015;114(3):358–363. DOI: 10.1016/j.prosdent.2015.03.001
3. Lal QM, Musani S, Madanshetty P, et al. A comparative evaluation of the wear of natural tooth opposing three different CAD-CAM ceramics: an *in vitro* study. *Int J Prosthodont Restor Dent* 2023;13(1):12–16. DOI: 10.5005/jp-journals-10019-1392

4. Ghaffari T, Rad FH, Goftari A, et al. Natural teeth wear opposite to glazed and polished ceramic crowns: a systematic review. *Dent Res J (Isfahan)* 2022;19:108.
5. Branco AC, Colaço R, Figueiredo-Pina CG, et al. A state-of-the-art review on the wear of the occlusal surfaces of natural teeth and prosthetic crowns. *Materials (Basel)* 2020;13(16):3525. DOI: 10.3390/ma13163525
6. DeLong R. Intra-oral restorative materials wear: rethinking the current approaches: how to measure wear. *Dent Mater* 2006;22(8):702–711. DOI: 10.1016/j.dental.2006.02.003
7. Tang Z, Zhao X, Wang H. Quantitative analysis on the wear of monolithic zirconia crowns on antagonist teeth. *BMC Oral Health* 2021;21(1):94. DOI: 10.1186/s12903-021-01452-z