

## Charisma® Topaz

Wear – Tokyo Medical and Dental University, Japan  
Quantitative wear and wear damage analysis of composite resins in vitro

When selecting a composite one should spotlight also its wear behaviour. This is of particular importance when performing long-lasting large anterior and posterior restorations. Excessive wear of dental materials may cause significant deleterious effects on the biologic, functional, and aesthetic condition of the masticatory system<sup>1</sup>.

The following study by the Tokyo Medical and Dental University investigated the influence of three different media to simulate the food particle abrasion on the wear of different composites. Charisma Topaz demonstrated low wear characteristics under realistic masticatory conditions.

Giving a hand to oral health.



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<sup>1</sup> Mukatash Nimri, EG: Wear mechanisms and wear investigations of dental materials; a review of the literature. Archives of Oral and Dental Research, 2015, 2:3. Retrieved from <http://www.vipoa.org/oraldent>

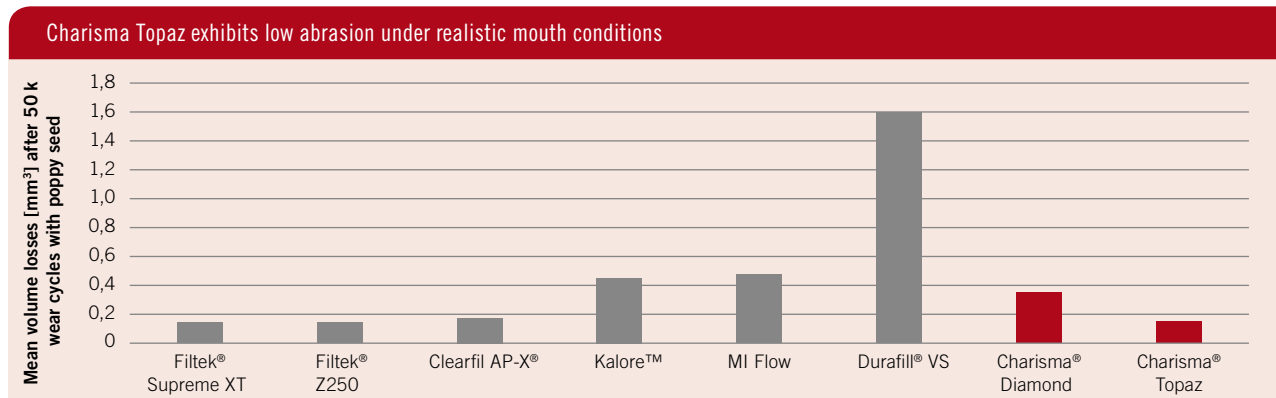
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## Quantitative wear and wear damage analysis of composite resins in vitro

### Methods

Disc-shaped specimens were fabricated from Durafill® VS, Clearfil AP-X®, Filtek® Z250, Filtek® Supreme XT, Kalore™, MI Flow, Charisma® Diamond and Charisma® Topaz and mounted in a ball-on-disc wear testing machine and abraded in water or with the third-body media, poppy seed slurry and polymethyl-methacrylate (PMMA) slurry. Volume loss (n=5) was determined after 50k sliding cycles, and analysed using two-way ANOVA ( $\alpha=0.05$ ). The worn surfaces were examined with SEM.

### Results



No statistical significant differences between materials except Durafill® VS

The two-way ANOVA suggested a significant interaction between composite and wear condition. Durafill® VS, Kalore and MI Flow showed low wear in water. Durafill® VS, Filtek® Z250 and Filtek Supreme XT showed moderate wear with PMMA slurry, whereas Clearfil AP-X®, Kalore™ and MI Flow were deeper abraded. Under the action of poppy seed slurry Durafill® VS proved high volume loss. SEM showed that Filtek® Z250, Filtek® Supreme XT and MI Flow were uniformly abraded in water. Kalore™ and MI Flow with poppy seed were heavily destructed, whereas Charisma® Diamond and Charisma® Topaz appeared very smooth. Kalore™ and MI Flow abraded with PMMA slurry showed many cracks, but Charisma® Topaz remained crack-free and smooth. Charisma® Topaz showed an abrasion of approx. 0.65 mm<sup>3</sup> in water and approx. 2.03 mm<sup>3</sup> with PMMA slurry.

### Conclusion

Volume loss and worn surfaces' morphologies varied with the type of composite and third-body media used. It was concluded that natural grains (poppy seed) as part of the human food in contrast to PMMA beads will be a reasonable approach to simulate clinical wear on occlusal surfaces of posterior composite resin restorations.

### Comment

Three different media were tested in this study: water, PMMA-slurry and poppy seed slurry. Charisma Topaz showed excellent low wear results using poppy seed. The hard shells of poppy seed are representing the most realistic abrasion situation by food particles.

### Source

Koottathape N *et al.*: Quantitative wear and wear damage analysis of composite resins in vitro. J Mech Behav Biomed Mater. 2014, 29:508-16.

The study was abbreviated, summarised and commented and all diagrams and titles have been established by Kulzer. Charisma Diamond and Charisma Topaz are chemically equivalent to the originally evaluated composites.