

عنوان مقاله:

Effects of Adding TiO₂ Nanoparticles on Flexural Strength and Hardness of Two New Commercial Flowable Dental Composites

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نویسندگان:

Fatemeh Koohpeima - *Department of Operative Dentistry, Biomaterial Research Center, School of Dentistry, Shiraz University of Medical Sciences, Shiraz, Iran*

Mohammad Javad Mokhtari - *Department of Biology, Zarghan Branch, Islamic Azad University, Zarghan, Iran*

Sajjad Khaksabz - *Department of Operative Dentistry, Biomaterial Research Center, School of Dentistry, Shiraz University of Medical Sciences, Shiraz, Iran*

خلاصه مقاله:

Introduction The present study aimed to investigate the effect of adding TiO₂ nanoparticles on the flexural strength and hardness of two dental composites. **Methods:** TiO₂ nanoparticles were prepared and added to two flowable dental composites (Beautifil Flow Plus and Clearfil AP-X Flow) at 0, 0.2, 0.5, and 1% (w/w) which was confirmed by SEM and TEM analysis. Mixing was manually performed using Lentulo Spiral Paste Carrier. The specimens were divided into 8 groups of 10 according to the type of composites and different concentrations of TiO₂ nanoparticles. Bar-shaped specimens (2×2×25 mm) were fabricated in a half-split stainless steel mold and cured for 40 s by an LED curing system. Flexural strength was evaluated using a universal testing machine. Surface microhardness was also measured by the Vickers microhardness tester. **Results:** For the two tested composites, flexural strength increased by 0.5% TiO₂ nanoparticles concentration. The flexural strength of Clearfil AP-X Flow combined with 0.2, 0.5 and 1% TiO₂ nanoparticles were 112.54±12.87 ($P>0.05$), 114.62±8.14 ($P>0.05$), and 99.92±6.23 ($P<0.05$), respectively. Also, for Beautifil Flow combined with 0.2, 0.5 and 1% TiO₂ nanoparticles were, 92.21±4.26 ($P<0.05$), 94.05±5.36 ($P<0.05$) and 74.17±9.43 ($P<0.05$), respectively. **Conclusion:** Adding TiO₂ nanoparticles to Clearfil AP-X Flow composite decreased the hardness; however, adding TiO₂ nanoparticles by 1% concentration increased the surface hardness of Beautifil Flow and reached its maximum value. Also, TiO₂ nanoparticles at very low concentrations enhance the flexural strength of dental flowable composites.

کلمات کلیدی:

flowable composite, Nanoparticles, surface hardness, Titanium dioxide

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