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Comparison of Compressive Strength and Polishability of Beautifil II LS and Competitive Materials

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## Experimental Design:

MATERIALS:

Composite: *Beautifil II LS* (Shofu Dental Corp.), *Filtek Supreme Ultra* (3M), *TPH Spectra Universal Composite Restorative HV* (Dentsply Sirona), *Tetric EvoCeram* (Ivoclar Vivadent, Inc.), *Admira Fusion* (VOCO)

Polishing Systems: *Super-Snap X-Treme* (Shofu Dental Corp.), *Super-Snap Mini Kit* (Shofu Dental Corp.), *OneGloss PS* (Shofu Dental Corp.)

TESTS:

Compressive Strength (n=5): 4 mm diameter x 8 mm cylinder specimens were cured in a Teflon split mold with 40 seconds of exposure per side and the flash removed with 600 grit SiC paper. They were tested after each set of specimens has been stored in deionized water for 24 hours at 37 °C using an Instron 5866 universal test machine with a 1 mm/min crosshead speed.

Polishing and Gloss: The composites (n=3 per polishing system and time point) were cured in a mold (20 mm in diameter, 2.5 mm thick) with a Mylar strip covering both sides with overlapping 20 seconds of light exposure with a >1000 mW/cm2 CLU and stored for 24 hours in 37°C DI water. The specimens were uniformly finished with 320 grit SiC paper and the gloss measured to ensure a consistent starting gloss. The center 10 mm diameter portion was polished for 15, and 30 seconds according to manufacturer's instructions and then the gloss measured over a 2 mm x 2 mm area using a small area glossmeter at 60° (Novo-Curve, Rhopoint Instruments), with 3 measurements taken every 120° of orientation per time point. Mean values and standard deviations of gloss were determined at each time point to compare differences in gloss vs time.
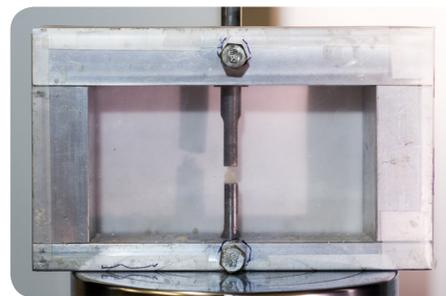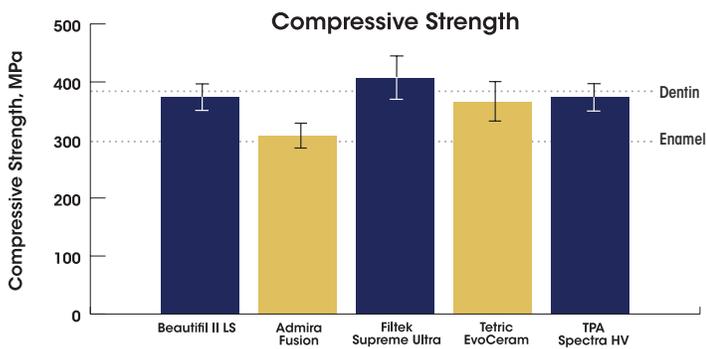
Measuring compressive strength in the Instron 5866.

Minimum compressive strengths for posterior composites to resist occlusal loading are often suggested to be above the compressive strength of dentin, which is approximately 300 MPa. Many products designed for posterior use exceed this value and closely approximate enamel compressive strength which is around 387 MPa.

Super-Snap X-Treme

Super-Snap Mini Kit

One Gloss PS
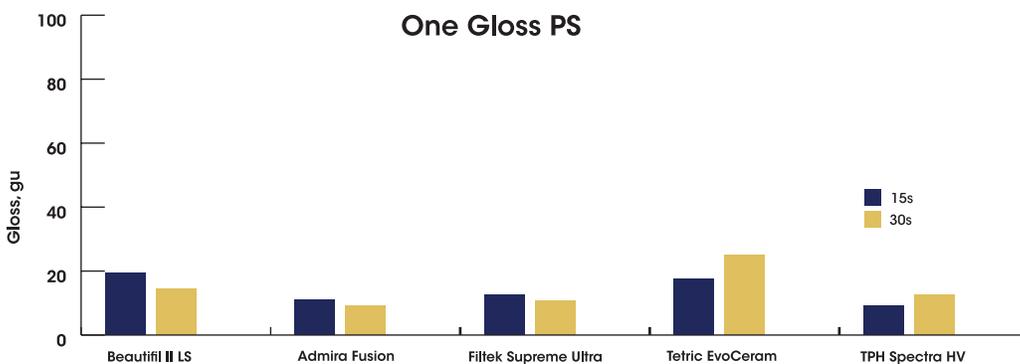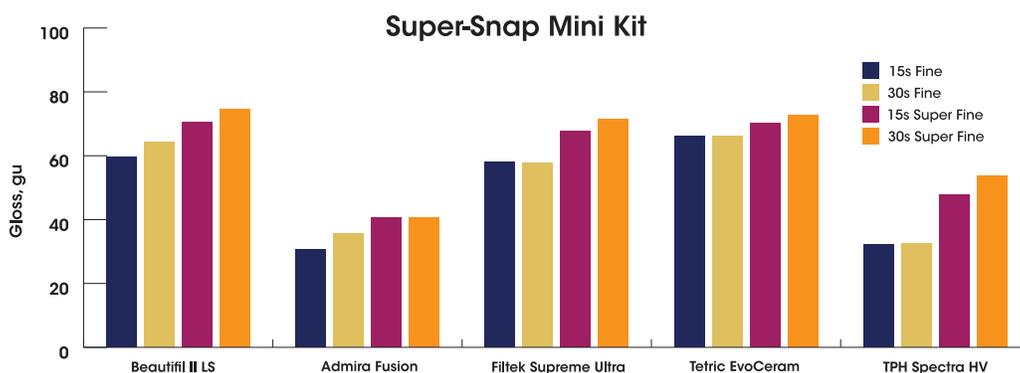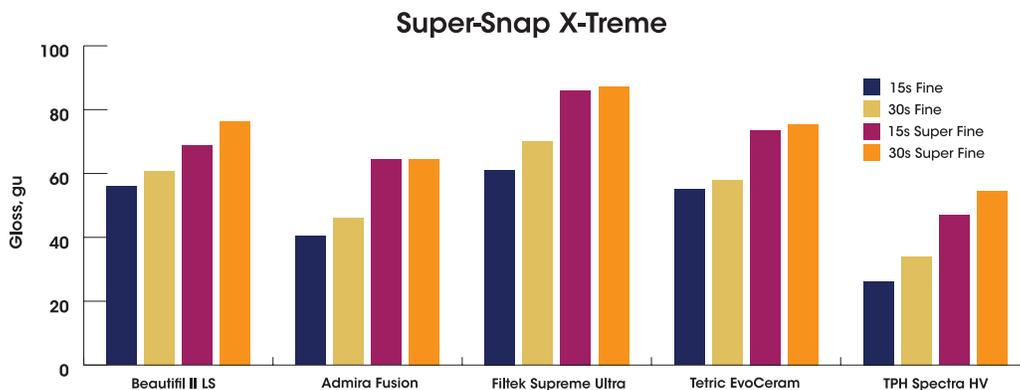
Conclusions:

Beautifil II LS, Filtek Supreme Ultra, Tetric EvoCeram and **TPH Spectra HV** showed excellent compressive strengths more similar to enamel compressive strength with **Admira Fusion** performing at a lower 308 MPa which is similar to dentin compressive strength. With the **Super-Snap Mini Kit, Beautifil II LS, Filtek Supreme Ultra** and **Tetric EvoCeram** achieved similar final polish values, with **TPH Spectra HV** and **Admira Fusion** performing worse. The pattern was seen with the **Super-Snap X-Treme** except a higher value was found for Filtek Supreme Ultra.

Overall, **Beautifil II LS** showed excellent compressive strength and polishability, equivalent or superior to other top universal composites on the market. Universal composites polished with the **Super-Snap X-Treme** demonstrated an above-average sheen within 15 seconds of polishing. The final polish from the 2-step **Super-Snap X-Treme** registered a **15% higher** average gloss value than the 4-step **Super-Snap Mini Kit** and nearly **5 times highe**r than the one-step One Gloss PS.