Mechanical Properties and Radiopacity of Glass Ionomer Restoratives
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Objectives: The objective of this study was to evaluate the mechanical properties and radiopacity of three different glass-ionomer restoratives (GIRs).

Materials and Methods: Three commercially available GIRs (ChemFil Rock, Dentsply Caulk; Ionofil Molar AC/Quick, Voco; and Equia Fil, GC) were tested in this study. Bar-shaped samples for flexural strength/three-point bending (n=10 per GIR) and cylindrical samples for compressive strength tests (n=10 per GIR) were prepared from each of the GIRs. Following distilled water storage for 7 days, flexural and compressive strengths of the samples were measured using a universal testing device with a load cell of 50 kg and a crosshead speed of 1 mm/min. Fragments of the three-point bending test were used to determine Vickers hardness (load 200 g, dwell time 30 s). For radiopacity evaluation, 10 standard disc specimens (5 mm x 1 mm) were prepared from each of the GIRs and radiographs were taken together with 1-mm-thick tooth slices and an aluminum (Al) stepwedge using Dürr Vistascan Mini digital imaging system (Dürr Dental). The data were analyzed statistically using one-way ANOVA and Tukey HSD tests (p<0.05).

Results: Statistically significant differences were observed between the mean flexural strength, compressive strength, and Vickers hardness values among the test materials. ChemFil Rock revealed the highest flexural strength but the lowest compressive strength and microhardness values. The highest mean compressive strength and radiopacity values were obtained with Ionofil Molar AC/Quick. Equia Fil showed the highest Vickers hardness values. Conclusions: Among the GIRs tested, ChemFil Rock was superior in flexural strength, Ionofil Molar AC/Quick in compressive strength and radiopacity, and Equia Fil in microhardness. Clinical Significance: None of the test GIRs showed outstanding properties in all performed tests. They were each advantageous in different mechanical aspects.