Bonding to Deproteinized Enamel and Dentin of AI Mouse Models
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Objectives: Patients with amelogenesis imperfecta (AI) show varying degrees of success with bonded resin restorations. Mouse models have been developed to mimic different forms of AI. This study compared the effect of deproteinization of enamel and dentin with NaOCl on shear bond strength (SBS) in mouse incisors mimicking two different AI variants using a self-etching adhesive (SE). Materials and Methods: Mandibular incisors were dissected from four-week old wild-type (WT), amelogenin null (AmelxKO) and matrix-metalloproteinase-20 null (Mmp20KO) mice (n=24/group). The facial surfaces of incisors were polished flat with 800-grit SiC paper and composite inlay sticks (1.0 mm X 0.4 mm) were bonded to enamel surfaces with SE (Clearfil SE Bond, Kuraray), with or without 5% NaOCl pretreatment for one minute. For the dentin bond strength, the enamel surfaces of samples were ground and the composite inlay sticks were bonded with the SE to flat dentin surfaces. SBS was measured using a micro-shear tester with a crosshead speed of 0.5 mm/min. Data were analyzed using 2-way ANOVA. Results: SBS of AmelxKO teeth was similar in dentin and enamel, however, SBS in MMP20KO was higher in dentin. Treatment of AmelxKO, Mmp20KO and WT enamel surfaces with NaOCl did not significantly improve enamel bond strength (p>0.05), although SBS of SE was slightly increased for WT and AmelxKO and slightly decreased for Mmp20KO. Conclusions: We have developed a novel system for testing SBS in mouse incisors with AI variants. NaOCl pretreatment did not improve SBS of SE to AI-affected enamel surfaces. Clinical Significance: In certain types of AI, enamel deproteinization may not be an effective method for improving bonding performance and in some cases dentin bonding may be a better option.