Marginal adaptation of composite resin during scaling with ultrasonic devices: a scanning electron microscopy analysis.

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Background: scaling with ultrasonic devices is a technically demanding procedure. It is known that ultrasound affects filling materials and tooth tissues. Scaling and root planning with ultrasonic devices is a technically demanding procedure. It is known that ultrasound affects filling materials and tooth tissues, causes roughness of composite restorations surfaces. The state of marginal adaptation during this procedure is matter of dispute nowadays. Aim: A laboratory investigation was designed to study the marginal adaptation of composite resin to the enamel under the influence of ultrasonic scaler in vitro. Methods: fifty freshly extracted premolars were randomly divided into two groups. Both group samples had caries cavities of 5^{th} class by Black, filled in standard technique with composite resin. First group samples were presented by teeth (n=30) after the usage of ultrasonic scaler during 1 minute, second group of samples (n=20) was presented by teeth that were not treated with ultrasound. Enamel-resin boundary (1000 x) was studied with scanning electron microscope JSM-639OLV (Jeol, Japan). Microsoft Office 2013 for Windows 8.1 was used for data statistical analysis. Data were described using mean and standard deviations. Student t test was used for statistical analysis. Results: SEM photomicrographs displayed the morphology enamel-resin boundary. SEM views showed absence of adhesive material in the first group samples, the total mean gap formed in-between the enamel and resin was 11,5±0,54μm. The second group samples remained almost perfectly bonded to the resin, lost attachment was observed in one tooth probably as a result of improper adhesive coating. The difference was statistically significant ($p < 0.05$). Conclusions: These results support the hypothesis that ultrasound scaling causes the damage of the enamel-resin boundary that is demonstrated by gap between enamel and composite resin.

Keywords: ultrasonic devices, marginal adaptation, composite resin.