Abstract  PURPOSE:

To investigate the effect of high frequency ultrasonic agitation on the microtensile bond strengths of different self-etching adhesives.

MATERIALS AND METHODS:

Thirty-six human molars were wet ground occlusally until dentin was exposed. The one-step self-etching adhesives Clearfil S3 Bond, G-Bond, and Futurabond NR were tested in this study. In the control groups, bonding procedures were performed according to the manufacturers' instructions. In the experimental groups, bonding materials were applied with a 1 MHz therapeutic ultrasonic device on the dentin surfaces. The composite crown was built up incrementally to a height of 5 mm. Each tooth was serially sectioned into rectangular beams, and the specimens were subjected to microtensile testing. Failure modes were observed under a stereomicroscope and classified. Randomly selected specimens from each group were observed with SEM.

RESULTS:

Two-factor ANOVA indicated that both the adhesive system and the ultrasonic agitation effect influenced bond strength (p < 0.05). The bond strength of G-Bond adhesive to dentin was higher after ultrasonic agitation (p < 0.05), whereas ultrasonic agitation of Futurabond and S3 Bond did not affect bond strength values (p > 0.05). Failure after the test was commonly due to adhesive failure in the dentin.

CONCLUSION:

High-frequency ultrasonic agitation of self-etching adhesives during their application may enhance their bonding performance.