

# The effect of an Er,Cr:YSGG laser on the micro-shear bond strength of composite to the enamel and dentin of human permanent teeth

Zahra Jaber Ansari & Reza Fekrazad & Saideh Feizi & Farnaz Younessian & Katayoun AM Kalhori & Norbert Gutknecht

Received: 30 November 2010 / Accepted: 29 June 2011  
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**Abstract** The bond strength of resin composite to Er,Cr:YSGG laser-irradiated enamel and dentin has been evaluated in only a few studies. Therefore, we measured and compared the micro-shear bond strength of composite restorations to enamel and dentin using two different cavity-preparation tools and conditioning methods. One hundred and seventy-five caries-free human third molars were sectioned longitudinally into two different thicknesses and randomly assigned to seven subgroups ( $n = 25$ ). Enamel groups included laser-cut without etching (LO), laser-cut

and laser-etched (LL), laser-cut and acid-etched (LA), bur-cut and laser-etched (BL1), and bur-cut and acid-etched (BA1-comparison group). Dentinal groups included bur-cut and laser-etched (BL2) and bur-cut and acid-etched (BA2-comparison group). The specimens were bonded by Single Bond and Tygon tubes and were restored with Z100 composite. Failure patterns were evaluated using a stereomicroscope, and a shear bond test was performed at 0.5 mm/min. The mean shear bond strength values (MPa) for the LO, LL, LA, BL1 and BA1 enamel groups were 23.14, 23.77, 23.51, 19.30, and 28.99, respectively, whereas for the BL and BA dentinal groups, these values were 22.44 and 26.15, respectively. In enamel specimens, BA1 and LL groups presented the highest shear bond strength values, and the bur-cut and laser-etched (BL1) group showed the lowest values. In the laser-etched groups, bond strength values for bur-cut surfaces were significantly higher than those for laser-cut surfaces. Moreover, there was a significant difference between the BL2 and BA2 dentinal groups. The results of this study indicate that re-etching with acid phosphoric would be recommended if an Er,Cr:YSGG laser is used for tooth preparation or surface treatment.

Z. Jaber Ansari  
Iran Center for Dental Research, Dental School of Shahid Beheshti University of Medical Sciences,  
Tehran, Iran

R. Fekrazad (✉)  
Dental Department, AJA University of Medical Sciences,  
Tehran, Iran  
e-mail: dr\_rfekrazad@yahoo.com

S. Feizi  
Department of Restorative Dentistry, School of Dentistry,  
Shahid Beheshti University of Medical Sciences,  
Tehran, Iran

F. Younessian  
Dental School, Shahid Beheshti University of Medical Sciences,  
Tehran, Iran

R. Fekrazad · K. A. Kalhori  
Laser Research Center of Dentistry,  
Tehran University of Medical Sciences,  
Tehran, Iran

N. Gutknecht  
University of Aachen Medical Faculty,  
Clinic of Conservative Dentistry,  
Aachen, Germany

**Keywords** Er,Cr:YSGG · Shear bond strength · Composite