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Review Article

Utilizing Laser Technology for Debonding of Orthodontic Ceramic Brackets: A Literature Review

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Abstract

Ceramic brackets have become increasingly popular and are now widely used in orthodontic treatment because of their less noticeable and aesthetically pleasing appearance. However, conventional debonding of ceramic brackets can result in enamel cracks, bracket breakage and discomfort to patients from shear and torsional forces. Laser-assisted debonding of ceramic brackets had been evidenced in several studies to search for the laser irradiation for bracket debonding which could reduce shear bond strength and debonding time without a significant increase in intra-pulpal temperature, bonding failure, or enamel damage. Consequently, laser-assisted debonding emerges as an efficient technique, reducing patient discomfort while maintaining safety by minimizing enamel surface impact and intra-pulpal temperature elevation. This review article aimed to compile and consider the types of lasers used in ceramic bracket debonding, including diode laser, Nd:YAG laser, Er,Cr:YSGG laser, Er:YAG laser, and CO_2 laser, along with their specific settings and various testing conditions. Additionally, the variables investigated, including adhesive remnant index, shear bond strength, intra-pulpal temperature, and enamel damage were described.

Keywords: ceramic bracket, debonding, laser in dentistry, orthodontic bracket