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Experimental traumatic debonding of orthodontic brackets

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ABSTRACT

This study was designed to gather information on enamel damage concomitant with traumatic debonding of orthodontic brackets. Seventy-eight extracted premolars passed an inspection for defects and were bonded with metal or ceramic brackets. The samples were debonded by one of six methods: (1) conventional clinical debonding, (2) shear force applied slowly and directly onto the bracket, (3) slow shear force applied to an archwire between two brackets, (4 and 5) shear force rapidly applied to the bracket or archwire, or (6) rapid compression (impact) force applied to the face of the bracket. The teeth were microscopically inspected following debonding, and 28% were found to have enamel damage. Within the sample groups, the percentage of damaged samples ranged from 0 to 80%. While the sample sizes were insufficient to generate statistically significant results, there was evidence of the following: (1) Accidental debonding by rapidly applied forces presents a relatively high risk of enamel damage. (2) Ceramic brackets, because of their fragility, may offer some protection by shattering and thus dispersing a rapidly applied force. (3) Direct impact forces may be less dangerous than rapidly applied shearing forces.

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