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Risk of pulp damage due to temperature increase during thermodebonding of ceramic brackets

P-G Jost-Brinkmann¹, RJ Radlanski², J Årtun³ and H Loidl⁴

¹Department of Orthodontics and Dentofacial Orthopaedics, Humboldt University, Berlin, Germany,

²Department of Oral Structural Biology, Free University, Berlin, Germany, ³Department of Orthodontics, University of Washington, Seattle, WA, USA, ⁴Private practice, Berlin, Germany

The purpose of this study was to perform *in vitro* measurements of the temperature increase at the enamel-dentine interface during electrothermal removal of ceramic brackets, and to analyse, *in vivo*, whether signs of pulp damage can be observed 4 weeks after the procedure.

In vitro study: a total of 29 caries-free human teeth were cut into buccal and lingual halves. The buccal halves were bonded with ceramic brackets, and miniature thermocouples were placed from the pulpal side into holes drilled to the enamel-dentine interface under the centre of the bracket slot. From the onset of thermodebonding, the temperature increase relative to room temperature was recorded for a period of 43 seconds. The maximum temperature increase at the enamel-dentine interface was 6.9°C.

In vivo study: a total of 12 human premolars scheduled for extraction for orthodontic reasons were bonded with ceramic brackets. Electrothermal debonding was performed the following day. After 4 weeks, the teeth were extracted and prepared for histological examination. Following demineralization, sections were prepared for light microscopic examination. No signs of pulpal inflammation were observed.

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