

## **An Investigation on Heat Transfer to the Implant-Bone Interface Due to Abutment Preparation with High-Speed Cutting Instruments**

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Excessive heat generation at the implant-bone interface may cause irreversible bone damage and loss of osseointegration. The effect of heat generation in vitro at the implant surface caused by abutment reduction with medium-and extra-fine-grain diamond and tungsten burs in a high-speed dental turbine was examined. Titanium-alloy abutments connected to a titanium-alloy cylindrical implant embedded in an acrylic-resin mandible in a 37 degree C water bath were reduced horizontally and vertically. Temperature changes were recorded via embedded thermocouples at the cervix and apex of the implant surface. Analysis of variance for repeated measures was used to compare seven treatment groups. Thirty seconds of continuous cutting with standard turbine coolant caused a mean temperature increase of 1 degree C with a maximum of 2 degrees C. Similar tungsten cutting caused a water spray for continuous tungsten cutting and had no significant effect, while intermittent cutting for 15-second increments reduced the temperature increase by 75%. Thus, abutment reduction with medium-grit diamonds using intermittent pressure and normal turbine coolant is unlikely to cause an interface-temperature increase sufficient to cause irreversible bone damage and compromise osseointegration. INT J ORAL MAXILLOFAC IMPLANTS 1995;10(2):207-212.