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Heat Production During Prosthetic Preparation of a One-Piece Dental Implant ”*

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ABSTRACT.

Purpose

Preparation of a one-piece dental implant abutment is often needed to achieve a proper emergence profile for a definitive restoration. However, this procedure may compromise osseointegration through the production of heat. The aim of this study was to measure heat production during implant abutment preparation with different volumes of water irrigation using a one-piece implant system.

Materials and methods

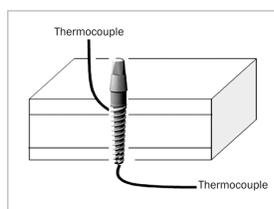
Forty-five one-piece dental implants were used in this study. The implants were divided into three groups according to the water flow rate used during abutment preparation: 30 mL/min (G30), 15 mL/min (G15), and without water irrigation (G0). Thermocouples were positioned at the most coronal and most apical threads. The abutments were prepared using a high-speed dental handpiece. Preparation continued for 120 seconds or until the implant temperature reached 47°C.

Results

The time needed to reach 47°C in the most coronal thread of group G0 was 5.73 ± 1.16 seconds. After the preparation was stopped at 47°C, the temperature continued to increase until reaching a maximum temperature. None of the implants in the water irrigation groups reached 47°C. The time needed to reach maximum temperature was significantly shorter for group G0 than the groups with water irrigation. A strong positive correlation was found between coronal and apical recordings.

Conclusion

Prosthetic preparation of one-piece dental implants without irrigation induced a rapid increase in temperature. Water irrigation reduced heat production during abutment preparation in a dose-dependent manner.



Thermocouples positioned at the most coronal and most apical threads of the implant.



Exposure of the implant abutment and isolation of the implant-acrylic glass complex with rubber dam.

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