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Cooling Profile Following Prosthetic Preparation of 1-Piece Dental Implants”*

Omer Cohen, DMD, PhD; Eran Gabay, DMD, PhD; Eli E. Machtei, DMD

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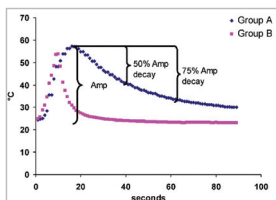
¹Omer Cohen
¹Eran Gabay
¹Eli E. Machtei

“Cooling Profile Following Prosthetic Preparation of 1-Piece Dental Implants”

ABSTRACT.

The aim of this study was to evaluate the effect of water irrigation on heat dissipation kinetics following abutment preparation of 1-piece dental implants. UNO 1-piece dental implants were mounted on Plexiglas apparatus clamping the implant at the collar. T-type thermocouple was attached to the first thread of the implant and recorded thermal changes at 100 millisecond intervals. Implants were prepared using highspeed dental turbine at 400 000 RPM with a coarse diamond bur. Once temperature reached 47°C, abutment preparation was discontinued.

Thirty implants were divided into 2 groups. Group A: Passive cooling without water irrigation. Group B: Cooling with turbine's water spray adjacent to the implant (30 mL/min). The following parameters were measured: T47 (time from peak temperature to 47°C), T50%, T75% (time until the temperature amplitude decayed by 50% and 75%, respectively), dTemp50%/dt decay, and dTemp75%/dt decay (cooling rate measured at 50% and 75% of amplitude decay, respectively). Water spray irrigation significantly reduced T47 (1.37 ± 0.29 seconds vs 19.97 ± 3.06 seconds, $P < 0.0001$), T50% (3.04 ± 0.34 seconds vs 27.37 ± 2.56 seconds, $P < 0.0001$), and T75% (5.71 ± 0.57 seconds vs 57.61 ± 5.47 seconds, $P < 0.0001$). Water spray irrigation also increased cooling capacity ninefold: dTemp50%/dt decay (4.14 ± 0.61 °C/s vs 0.48 ± 0.06 °C/s, $P < 0.0001$), and dTemp75%/dt decay (1.70 ± 0.29 °C/s vs 0.19 ± 0.03 °C/s, $P < 0.0001$). The continuous use of water spray adjacent to the abutment following the cessation of implant preparation might prove beneficial for rapid cooling of the implant.



Typical thermal changes recording. Group A, without water irrigation; group B, with turbine water spray (30 mL/min). Amp indicates thermal amplitude calculated by subtracting baseline temperature from peak temperature; Amp 50% decay and Amp 75% decay, thermal amplitude decay of 50% and 75%, respectively.

Authors' affiliations

¹Department of Periodontology, Rambam Health Care Campus, and Faculty of Medicine-Technion (I.I.T.), Haifa, Israel.