Temperature Rating Changes During Dental Implant Treatment By Using Infrared Thermography – Preliminary Results

MORAWIEC T.[1], RÓJ R.[2], KOWNACKI P.[1], WRZOŁ M.[1], KASPERSKI J.[2], PALA M.[1] BUBIŁEK-BOGACZ A.[1]

1- Department of Oral Surgery, Chair of Cranio-Maxillo-Facial Surgery, School of Medicine with the Division of Dentistry in Zabrze, Medical University of Silesia in Katowice, Plac Akademicki 17, 41-902 Bytom, Poland
2- Department of Prosthetic Dentistry, Chair of Prosthetics and Dental Materials, School of Medicine with the Division of Dentistry in Zabrze, Medical University of Silesia in Katowice, Plac Akademicki 17, 41-902 Bytom, Poland

Introduction: Infrared thermography technique is still unique, increasingly applied in various fields of medicine and dentistry. It is non-invasive scanning that allows the representation of the body surface thermal distribution, the heat exchange processes between skin tissue, inner tissue, local vasculature, and metabolic activity.

The aim of the study was to capture the thermal images of dentoalveolar region in maxilla during entire dental implant treatment.

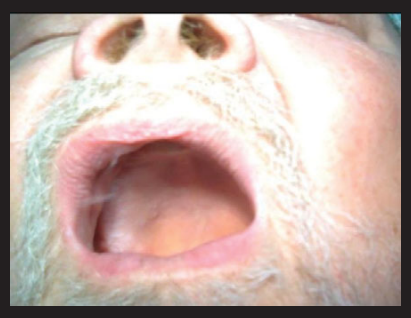

Fig. 1a

Fig. 1b

Fig. 1c

Materials and Method: In one patient the surgical procedure was performed under local anesthesia. In this case it was decided to use the short Camlog Implants (diameter: 3,7 mm; L 7 mm and 13 diameter 4,3mm; L 7 mm) in atrophied maxillary ridge in region 11 and 13. The primary and secondary stability of the implants were measured by ISQ (Ostell). The Thermal image was capture using ThermaCam (Flir T430sc). The at a distance of one meter from the patient`s face, and the images were analyzed using the ResearchIR, a thermal software with version 4.20.2 supported by FLIR T430sc camera (www.flir.com) (Fig. 1b). The software provides the settings for object parameters like emissivity (0.95), reflected apparent temperature (25°C), atmospheric temperature (23°C), relative humidity (50 %), and distance of measure (1 meter). Thermographic images were made: before surgery (Fig.1a, Fig.1c), during anesthesia (Fig 2a. Fig.2b), during incisions, at the time of implant bed preperation (Fig. 3a, Fig. 3b), irrigation of the operative field, final manual positioning of the implant insertion by rachettes (Fig. 4a, Fig. 4b), suturing of the soft tissues (Fig. 5a, Fig. 5b).

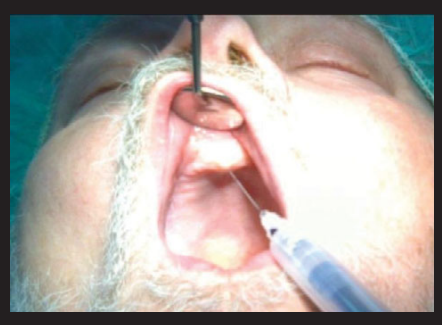

Fig. 2a

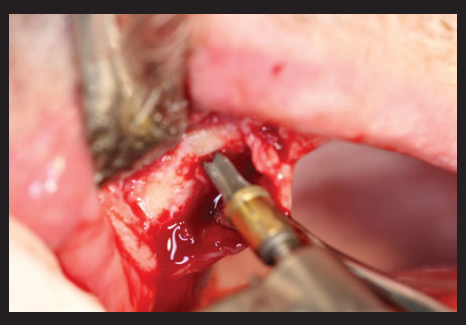

Fig. 3a

Fig. 4a

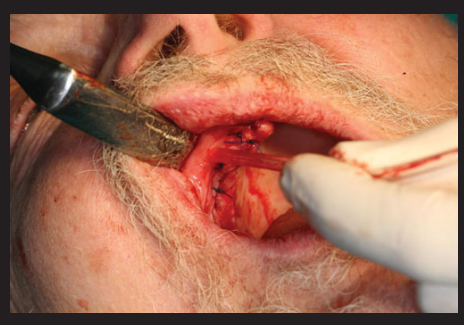

Fig. 5a

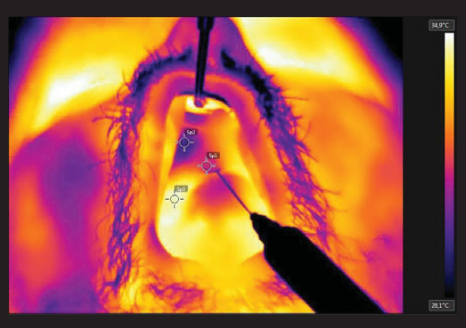

Fig. 2b

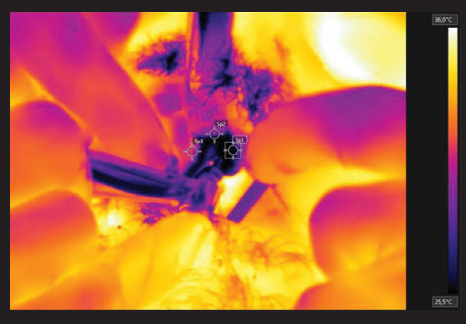

Fig. 3b

Fig. 4b

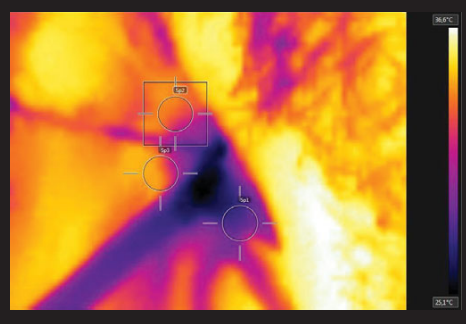

Fig. 5b

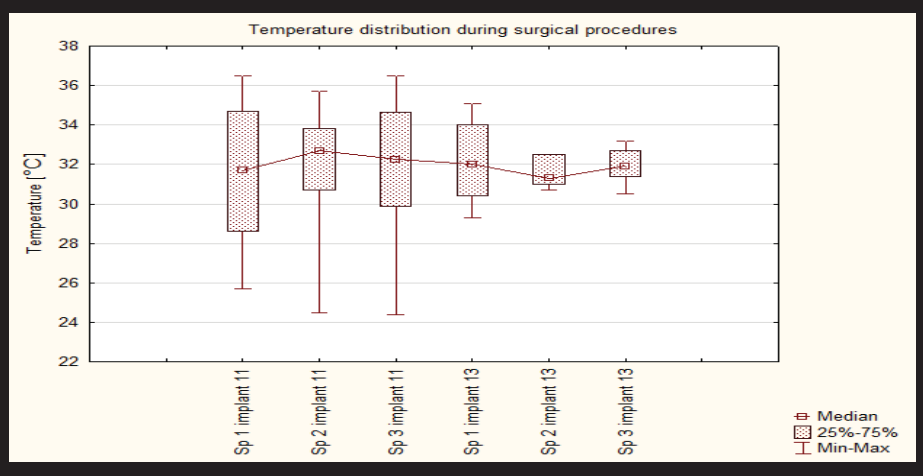

Fig. 6

Conclusion: The temperature during the entire surgical procedures was considerably changed application of the conventional 0,9%NaCl cooling significantly lowers the temperature of the surrounding bone during the implant site preparation (Fig. 6).
Analysis of thermal imaging procedures performed dental implant therapy confirms the legitimacy of the proceedings during the bed bone preparation.