



Our Research is Your Success...

June
2009

Published in:

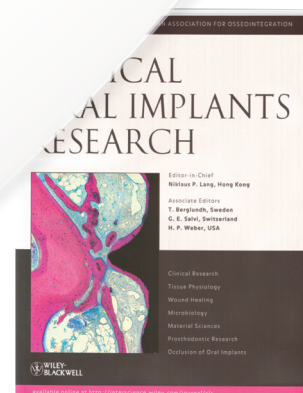
CLINICAL
ORAL IMPLANTS
RESEARCH

”

Accuracy of a computerized tomography-guided template-assisted implant placement system: an in vitro study”*

Jacob Horwitz, Otman Zuabi, Eli E. Machtei

*Horwitz J, Zuabi O, Machtei EE. Accuracy of a computerized tomography-guided template-assisted implant placement system: an in vitro study. Clin. Oral Impl. Res. xx, 2009; 000-000. doi: 10.1111/j.1600-0501.2009.01748.x



¹Jacob Horwitz

²Otman Zuabi

³Eli E. Machtei

“Accuracy of a computerized tomography-guided template-assisted implant placement system: an in vitro study”

ABSTRACT.

Objectives

To evaluate the accuracy of computer-assisted 3D planning and implant insertion using computerized tomography (CT).

Materials and methods

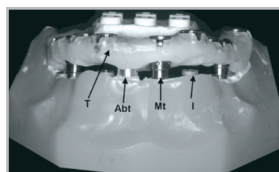
Nine implants were planned on pre-operative CTs of six resin models, which were acquired with radiographic templates, using a planning software (E implants). Each resin model contained three pre-existing control implants (C implants). Radiographic templates were converted into operative guides containing 4.8-mm-diameter titanium sleeves. A single set of insertable sleeves was used for consecutively drilling the six models, followed by implant insertion through the guide sleeves. Models were further divided into group A (the first three models) and group B (the last three models). Postoperative CTs were used to compare implant positions with pre-operative planned positions. Statistical analysis included the Mann–Whitney U test for E and C implants and the Wilcoxon's signed ranks test for groups A and B.

Results

The mean apex depth deviations for E and C implants [$0.49\text{mm} \pm 0.36$ standard deviation (SD) and $0.32\text{mm} \pm 0.21$ SD, respectively], and the mean apex radial deviations [$0.63\text{mm} \pm 0.38$ SD and $0.49\text{mm} \pm 0.17$ SD, respectively] were similar ($P > 0.05$). The mean angulation deviations for E and C implants were $2.17 \pm 1.06^\circ\text{SD}$ and $1.33 \pm 0.69^\circ\text{SD}$, $P < 0.05$. E implant deviations of all the parameters in group A were significantly smaller than E implant deviations in group B.

Conclusions

Computer-assisted implant planning and insertion provides good accuracy. Deviations are mainly related to system and reproducibility errors. Multiple use of drills and titanium sleeves significantly reduces system accuracy.



A resin jaw model showing the surgical template in place with three implants still connected to implant mounts. T, surgical template; Abt, one of three abutments used for template anchorage; Mt, implant mount; I, inserted implant.

Authors' affiliations

¹Jacob Horwitz, ²Otman Zuabi, ³Eli E. Machtei School of Graduate Dentistry, Department of Periodontology, Rambam Health Care Campus, Haifa, Israel

¹Jacob Horwitz, ²Eli E. Machtei, Faculty of Medicine, Technion, Haifa, Israel

Department of Periodontology
Rambam HCC School of Graduate Dentistry
Faculty of Medicine - Technion, I.I.T.
Haifa, Israel