

Validation of a template guided treatment accuracy (NobelGuide®). A CT-based study with a novel validation software tool.

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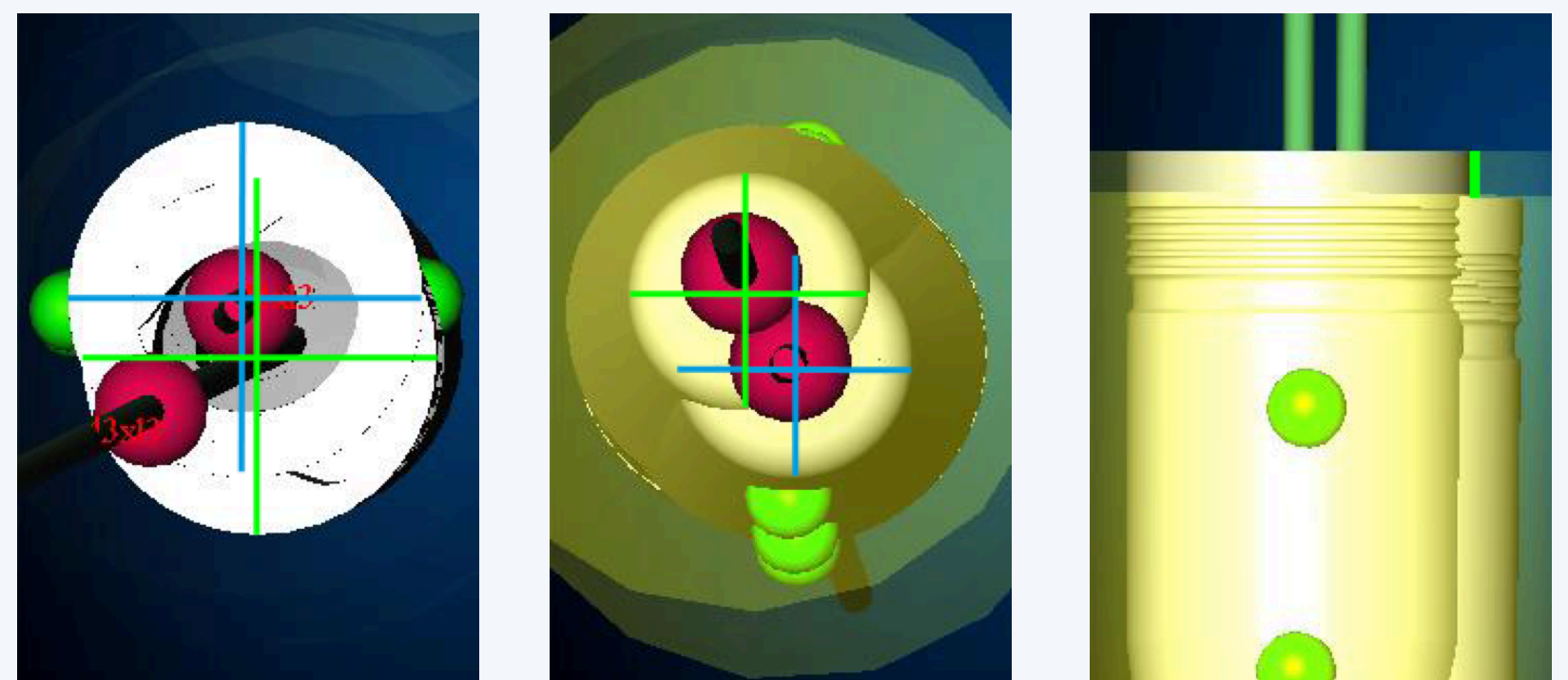
Topic: Implant and guided surgery

Background and Aim

Precise planning is a basic requirement for clinical success in implant dentistry¹. A major challenge of every complex implant supported prosthetic restoration is the optimized connection of prosthetical and surgical planning. The surgeon has to transfer the preoperative planning into the 3-dimensional surgical field³. Treatment concepts for restorative-driven implant surgery were developed to enable sophisticated guided implant placement without any complications^{1,4}. The purpose of this study was the evaluation of the absolute deviations in a clinical treatment situation to assess the possible impact on the treatment safety of computer assisted, template guided implantology.

Methods and Materials

After approval of the study protocol by the Ethics Commission of the Medical University Vienna 18 patients were included (m:f = 10:8, mean age 58 years, range 36 – 77 years). All patients were treated at the Department of Oral Surgery, Bernhard Gottlieb-University Clinic of Dentistry Vienna. After computer aided planning (Procera® Software, Nobel Biocare, Sweden) all surgical procedures were performed by two experienced surgeons with the NobelGuide® treatment concept (NobelBiocare®, Sweden). Postoperative high-resolution multislice CT-scans (Tomoscan SR-6000, Philips Medical systems, Eindhoven, The Netherlands) were performed using the same preoperative settings. For the fusion of the preoperative and postoperative CT-scans the "Triple Scan Technique" (patient + radiographic guide CT / radiographic guide CT / postoperative patient + radiographic guide CT) was applied. On the basis of the merged CT-scans the deviations between the virtually planned and the actually placed implants were measured to assess the treatment safety.



Measurements of the linear deviations along the x-, y- and z-axis on implant shoulder and apex

Results

All patients underwent an uneventful one-stage implant surgery and were provided with healing abutments during conventional healing times of two months (lower jaw) and three months (upper jaw). 86 implants (NobelReplace™ Tapered Groovy) were placed in 6 partially (maxilla:mandibula = 2:4) and 12 fully edentulous (maxilla:mandibula = 9:3) patients (in total maxilla:mandibula = 11:7). Of the 86 tapered implants 62 implants had a regular diameter (4,3 mm), 18 implants a narrow diameter (3,5 mm) and 6 implants a wide platform (5 mm). One implant failed 3 weeks after surgery during unloaded healing.

Platz für Bilder
Ergebnisse aus Excel oder Tabellen, Diagramme

Conclusions

The computer aided NobelGuide® template enables guided flapless implant surgery. The study outcome of the NobelGuide® concept demonstrates high accuracy required for transferring complex preoperative planning into surgical reality. As all measured maximum deviations are within the system's safety distances the NobelGuide® concept is provided with the required treatment safety for broad clinical application.

References

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