

Navigation and Augmentation: Enhanced Possibilities for the Application of Guided Surgery

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Beside complete systems for the direct navigation (eg, Robodent, VoNaviX, LapDoc, etc.), recently there have been systems developed that enable the surgeon to insert implants guided by a surgical template, thus like indirect navigation. The positioning of the implants is thereby done by analysing a three-dimensional reconstruction of the bone on the basis of a DICOM data set on a usual computer.¹ Afterwards, either the virtual planning is transferred to a conventional template via a coordinates-table (CoDiagnostiX, Med3D) or a stereolithographical template is fabricated directly out of the virtual data (Simplant, NobelGuide), which is more accurate.²

Depending on the technique used, at least the pilot-drill is guided (CoDiagnostiX, Simplant Surgiguide) or—via a system of sleeves in combination with specially designed burs equipped with a long shank—the whole preparation and even the insertion is guided by the surgical template (Simplant Safe System, NobelGuide). Using NobelGuide the system furthermore allows one to place guided sleeves for so-called anchor pins (Fig. 1), which stabilize the template on the bone.

In view of the increased costs and radiation exposure, even if modern equipment is used, the application of such techniques is not indicated in any case.

The advantage of a higher planning reliability regarding sensitive anatomical structures, as well as the increased patient comfort caused by the reduced time of intervention and a less traumatic

approach can, nevertheless, for patient and surgeon make the procedure favorable. The option to produce a functional prothetic suprastructure on the basis of the planning and the immediate post-op incorporation of it especially opens new concepts in therapy. Immediate loading of dental implants in the meantime is well documented, at least for implants with modern surfaces.^{3,4}

Sinus grafting through the template (Summers Approach)

Such planning techniques are particularly applicable with good hard tissue dimensions and in these cases they really provide minimal invasive surgery. The following case exemplarily demonstrates the transgingival insertion of six implants in the upper jaw via a NobelGuide template (Figs. 2–5).

As immediate loading is an option, which produces additional costs, some patients prefer to wait conventionally for a three-month period of osseointegration. In this case, finally a screw-retained ProCera Implant Bridge^{5,6} was incorporated. Therefore a lab-designed resin frame is scanned, milled out of a titanium block with an accuracy of only 5 µm and faced with composite (Figs. 6, 7). Unfortunately, ideal bone premises are found rather rarely, especially considering the fact, that today the implant position is more and more driven by the prothetic requirements.⁷

In most cases, invasive bone augmentation is unavoidable and, according to the common opin-



Fig. 1

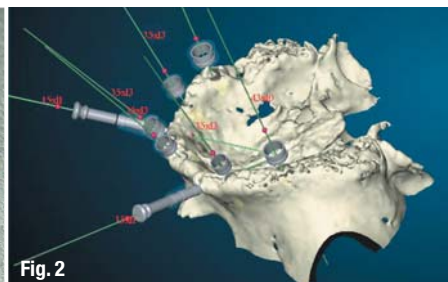


Fig. 2



Fig. 3