Immediate implant placement and restoration – a new level of precision

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Patients increasingly seek shorter and less invasive treatments that minimise physical and psychological limitations. This finding was confirmed by current studies and forward-looking analyses,[1] indicating a growing demand for efficient immediate implantological and restorative solutions. Extensive information are now accessible online, so today's patients are much more aware of existing implant placement and restoration options. In this article, dentists Markus Sperlich and Mathias Sperlich discuss the immediate implantological treatment concept.

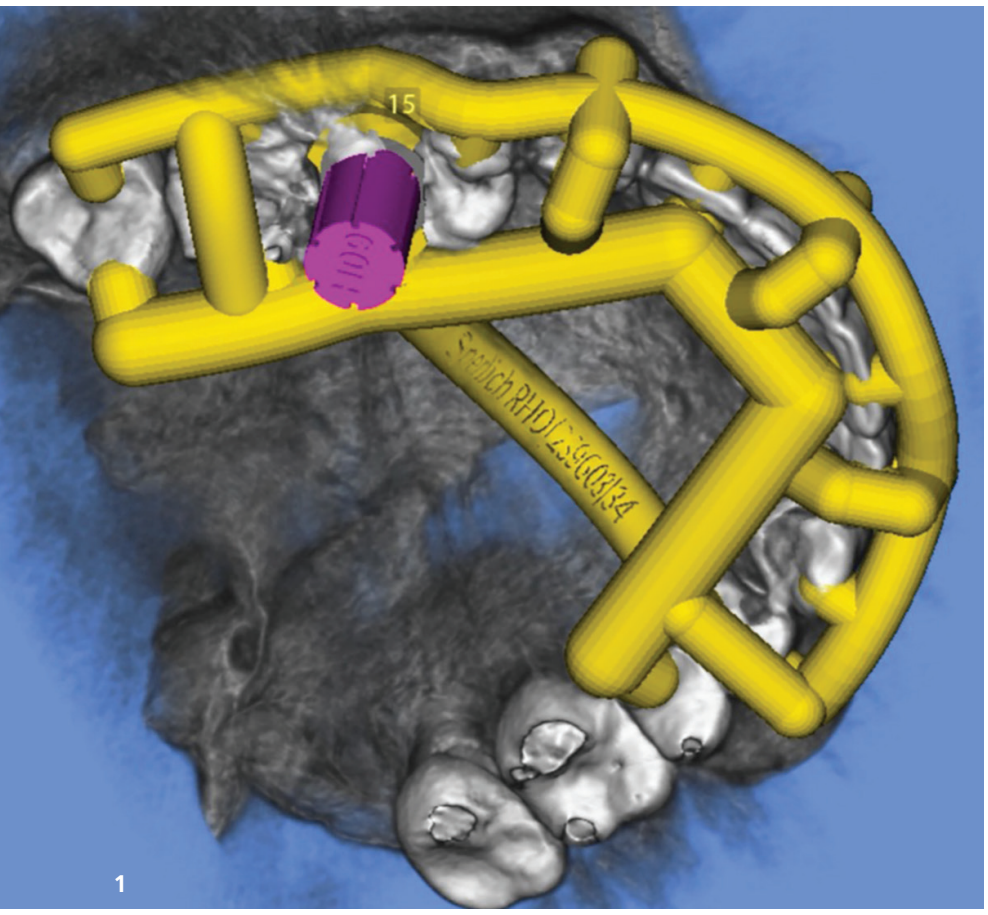

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Fig. 1: Three-dimensional implant planning in SMOP Swissmeda.

The implantological treatment concept of immediate implant placement and restoration is a favourable option that preserves the patients' biological and physiological environment to the maximum extent possible. This approach can significantly shorten overall treatment times and lower the cost.[2] The procedure is atraumatic, reduces healing times, and allows for rapid rehabilitation. This helps patients achieve a better oral health-related quality of life. Physiologically, this treatment concept can significantly reduce the dimensional changes of the marginal bone walls that occur when teeth are extracted.[3,4]

Immediate implant placement – a clinical case series

In a case series, 20 non-salvageable teeth were immediately replaced with implants (Straumann BLX), which were then immediately restored with preoperatively fabricated CAD/CAM crowns. Three-dimensional preoperative implant planning was performed in all cases, using the SMOP Swissmeda planning system (Fig. 1) to determine the ideal prosthetically guided implant position for immediate restoration. The surgical guide was designed and the dimensions for the prosthetic superstructure was defined based on the abutment geometry. The STL data of the prospective implant position were generated by the SMOP three-dimensional implant planning system and imported directly into CAD software (exocad with high evidence; Fig. 2). Based on the data, the matching restoration was CAM-fabricated preoperatively based on the exocad design. In all cases of this series, transocclusally screw-retained acrylic single crowns were fabricated preoperatively.

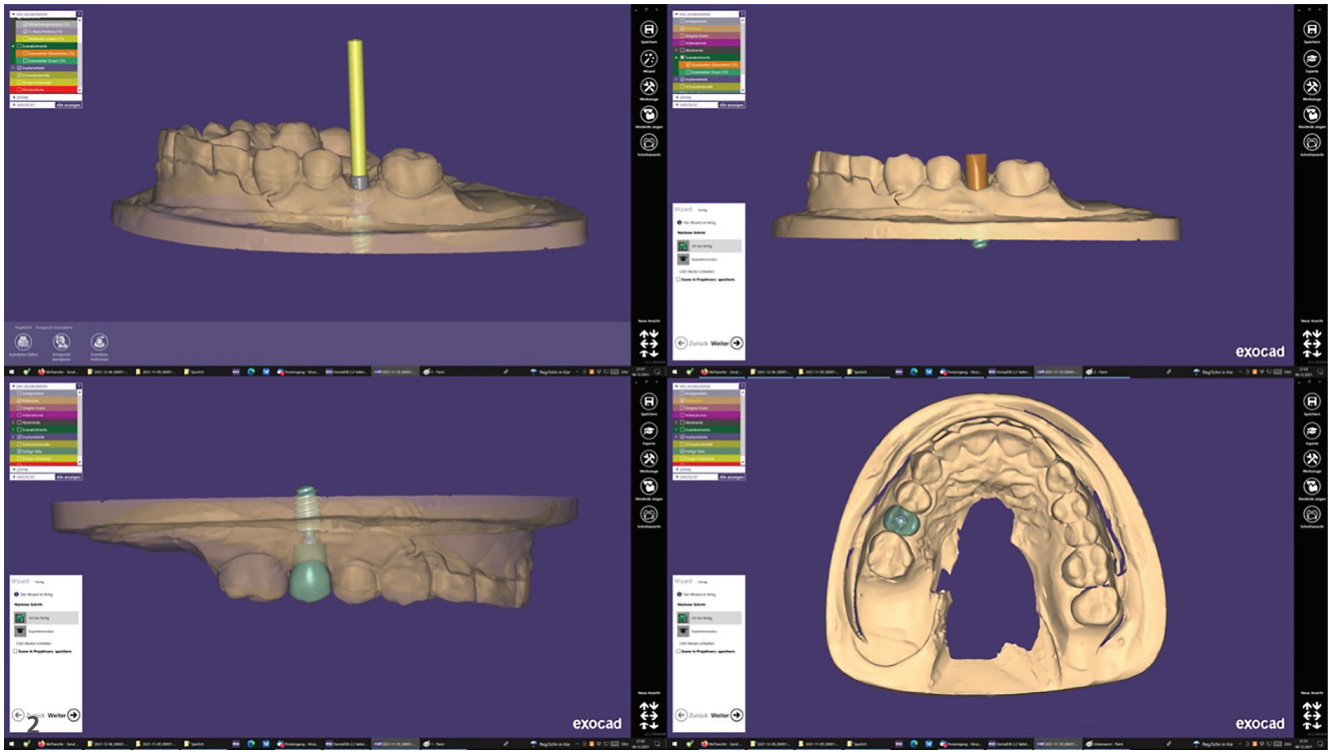


Fig. 2: Designing the preoperatively fabricated restoration in exocad.

Clinical workflow

To begin, the affected teeth were extracted atraumatically (Fig. 3), followed by alveolar management and immediate placement of a suitable implant (Fig. 4). If an insertion torque greater than 35 Ncm was achieved, the implant was then immediately restored with a transocclusally screw-retained crown, which had been fabricated preoperatively. Prerequisites for this surgical procedure include an intact post-extraction socket, healthy soft-tissue conditions, and the absence of inflammation, as well as patient compliance.[5]

Three-dimensional planning is essential to performing the workflow described.[6–8] Only template-guided insertion allows the implant to be surgically placed so that the vertical height and rotational orientation of the internal connection matches the digital design. For this purpose, the TorcFit connection of the Straumann BLX implant has to be exactly reproduced surgically. The H07/H09/H11 insertion tools (Figs. 5 & 6) specially developed at our practice define the stop height on the sleeve canal of the surgical template as well as the correct vertical implant position, angulation and rotational alignment of the TorcFit's internal connection (Fig. 7) by way of a positioning marker. This procedure avoids subsequent adjustments of the immediate restoration. It eliminates manual and

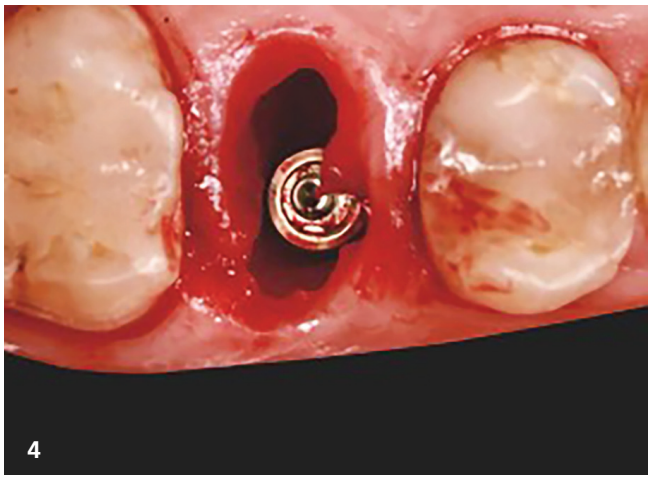
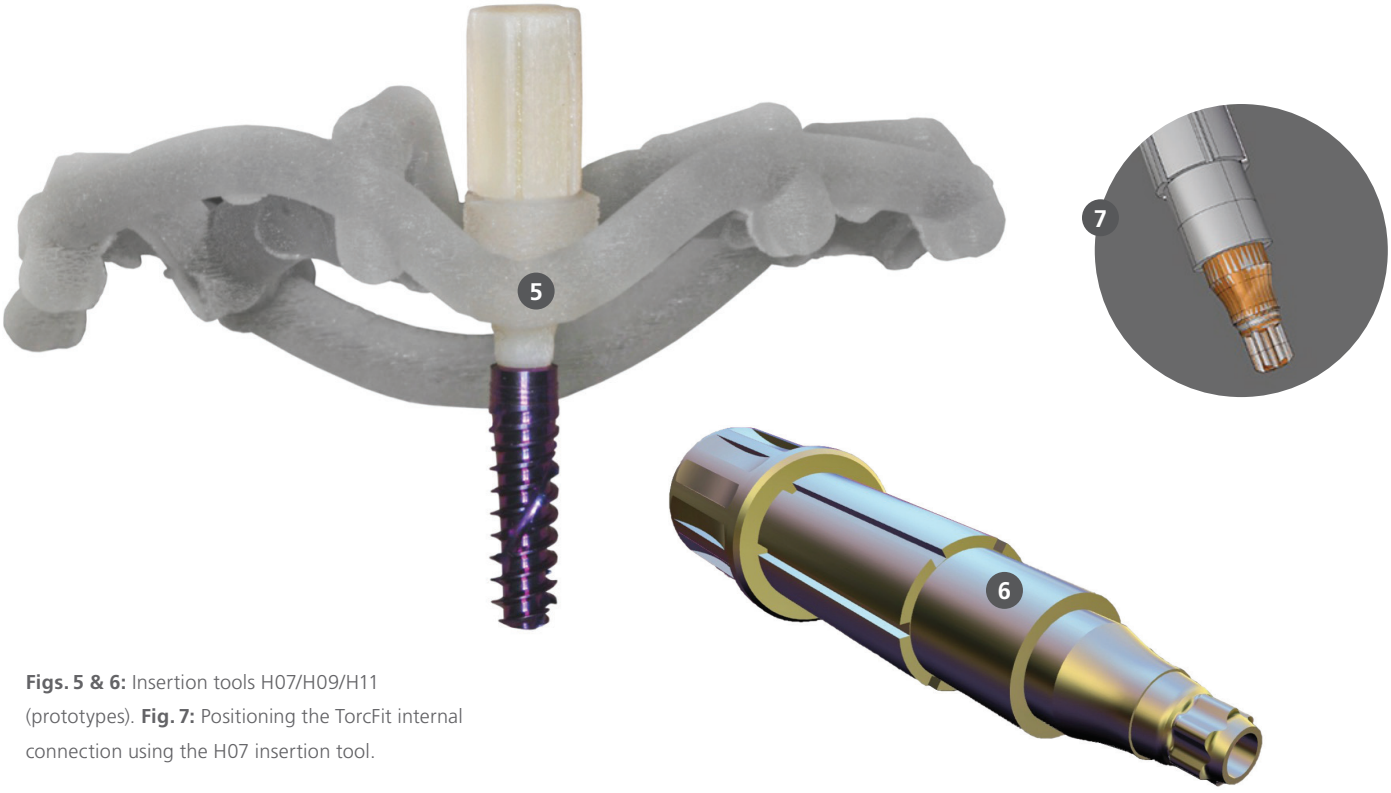


Fig. 3: Atraumatic tooth extraction. **Fig. 4:** Immediate implant placement.



Figs. 5 & 6: Insertion tools H07/H09/H11 (prototypes). **Fig. 7:** Positioning the TorcFit internal connection using the H07 insertion tool.

Figs. 5–7: © Formherr Industriedesign Braunschweig

chemical manipulation of the surgical site and allows undisturbed initial healing. The surface of the inserted crowns retains their final polished texture created in the laboratory (Fig. 8), and patients are spared extended additional prosthetic procedures.

The success rate of immediate treatment is equivalent to other approaches.[9] The following parameters are crucial for success:[10] patient selection, bone quality and quantity, implant design, an insertion torque greater than 35 Ncm,[11] H07/H09/H11 insertion tools and, of course, surgical experience. A basic prerequisite for this workflow is digital implant planning, as described above.[7]

Success rates of preoperatively fabricated restorations

In the case series described above, the preoperatively fabricated restorations achieved 95% accuracy of fit, where any added needed intraoperative manipulation of the restoration was counted as a failure. The survival and success rates of the implants were 100% after 18 months (Figs. 9 & 10). The prosthetic success rate of the preoperatively fabricated immediate restorations was 90%. In two cases, the crown detached from its adhesive base during the first six postoperative months. In a review paper, the authors compared the different implant placement and loading protocols.[12] That paper showed that immediate placement in conjunction with immediate loading had a success rate of 98.4%. Conventional

Fig. 8: Preoperatively fabricated CAD/CAM crown 25.

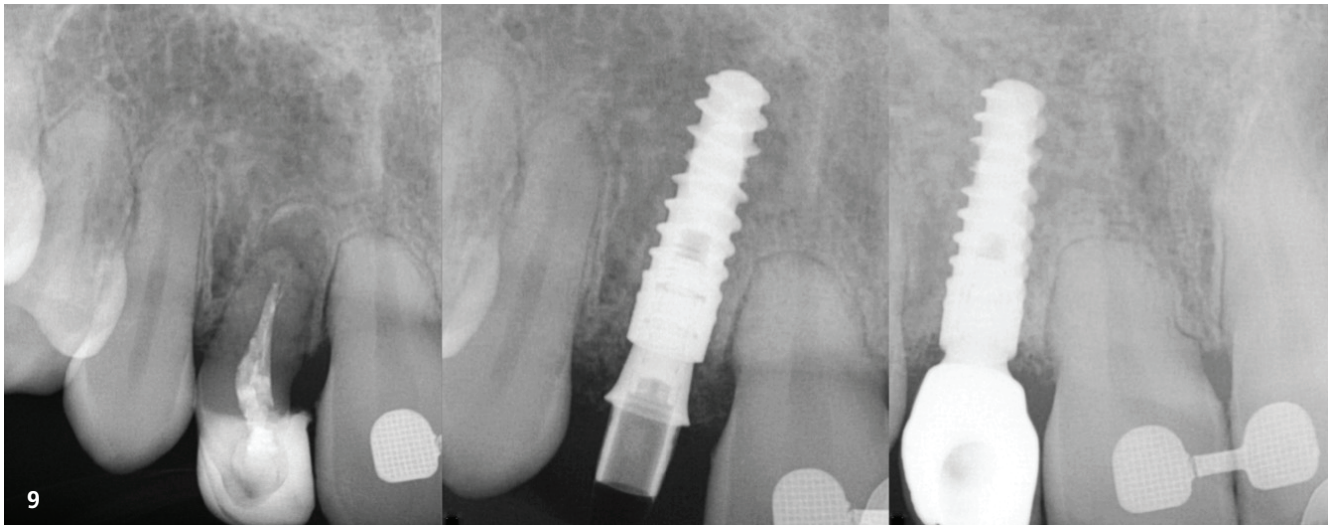


Fig. 9: Radiographs taken at different stages.

protocols of late implant placement combined with conventional loading have a success rate of 97.7%. It should be noted, however, that there was a, sometimes substantial, difference in the level of evidence between the papers included when comparing the individual protocols. Immediate placement data were limited to clinically documented data.

Conclusion

Advantages of the workflow described include maximum patient satisfaction, shorter treatment times and optimum preservation of existing biological structures. Successful implementation is contingent on strict adherence to the listed requirements and on sufficient surgical experience. Further scientific studies with high evidence are needed to confirm and consolidate these results.

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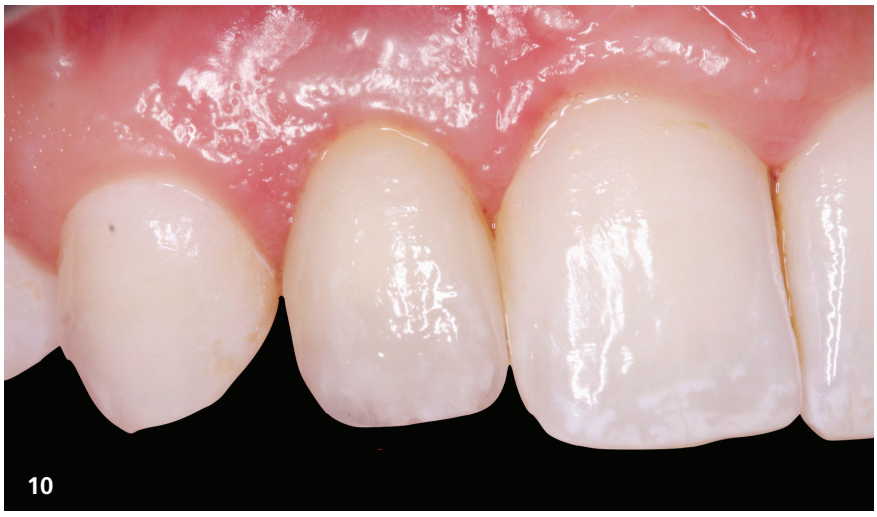

Fig. 10: Clinical follow-up at 18 months.

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Literature