

# THE ART OF

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# COMPUTER-GUIDED IMPLANTOLOGY

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Edited by

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# FOREWORD

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Innovations in implant dentistry have allowed the profession to progress at a very fast rate. One technique now commonly used for diagnostics in implant therapy is the computed tomography (CT) scan. Although the technology has been available since 1987, the ability to use this radiographic knowledge in a method that integrates the restorative treatment plan with the surgical placement of implants has only recently been standardized to its proper level. Drs Tardieu and Rosenfeld have been true pioneers in the field and have been working for years to improve the use of CT scans for clinical dentistry. I have known them both for over 20 years, and during that time they have been actively involved with this and related technology. It is wonderful to see their collaboration on this fine textbook.

This book is very timely since so many new techniques are now available to the clinician. It is particularly relevant to show how the restorative dentist can now have an important dialogue with the implant surgeon. All too often, the surgeon has paid little attention to the actual desires of the restorative dentist or did not know how to incorporate them into the surgical treatment. Those days should be over, and this book will help the team to better communicate with each other before any surgery is performed. In fact, with the use of surgical guides described in the book, the accuracy of the work performed will now be superior to what is being done today.

The use of guides will greatly benefit the patient as well as the dental team. The work performed should be more accurate with less discomfort than in regular cases. The ability to transfer the desired angle and location of placement of the implants from the working models to the mouth has made this a reality. This textbook allows the reader to proceed step by step in the understanding and implementation of this new and exciting technology. It is no longer only for the most highly trained specialists. Indeed, the clarity of the writing along with the diagrams and case reports in the book will allow all implant teams to improve their ability to design better cases and surgically place implants. This is therefore a timely book with benefits for both restorative and surgical practitioners.

However, the real benefit will be to our patients. The increased precision and speed of treatment, along with reduced discomfort, all add up to a must read for clinicians. I congratulate my two friends on this wonderful work.

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# PREFACE

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This book is the first to introduce a radiographic paradigm shift in implant therapy that provides an accurate method for transferring the patient's prosthetic needs into a resin-based surgical template designed to guide implant placement.

Computed tomography (CT) was introduced to the dental profession in 1987 to facilitate radiographic examination of the jaws and implant treatment planning. It allowed the dental profession for the first time to evaluate anatomic structures and the effects of postextraction resorptive patterns with submillimeter accuracy. Because there was no mechanism for introducing prosthetic information into the CT dataset, however, the value of this technology was limited to diagnostic applications.

In 1999, real-time 2D-3D interactive imaging software was developed, allowing the prosthetic outcome to be transferred to the CT dataset with the use of an appropriate scanning appliance. This technologic breakthrough facilitates a direct link between anatomic interpretation, treatment planning, and precise surgical execution. Through computer-guided implantology, preoperative rather than intraoperative planning drives treatment decisions.

This book has been organized to allow the clinician an opportunity both to survey the field as a broad overview and to implement the critical-thinking skills necessary to navigate the complexities of patient treatment. While the technology in this field will undoubtedly continue to advance, the fundamental principles presented in these 11 chapters will remain the cornerstone of patient care. All of the contributors share a common belief that technology is not a substitute for clinical experience and wise judgment and that the implementation of computer-guided implantology should be predicated on the unique experiences of each clinician and not what is therapeutically fashionable at the moment.

We wish to thank our families for their support and understanding during the extensive period of time we devoted to the completion of this book. We also express our gratitude to the members of our office staff and to dental colleagues who have contributed to the contents of this book through their participation in collaborative patient care. Without their support, this book could not have been written.

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4 | Scanning Appliances and Virtual Teeth



Fig 4-9a Waxup of the teeth to be replaced.



Fig 4-9b Impression of the waxup, occlusal view.



Fig 4-9c The entire teeth volume is filled with the mixture.



Fig 4-9d The mold containing the resin mixture is secured with rubber bands.



Fig 4-9e Excess resin is removed.

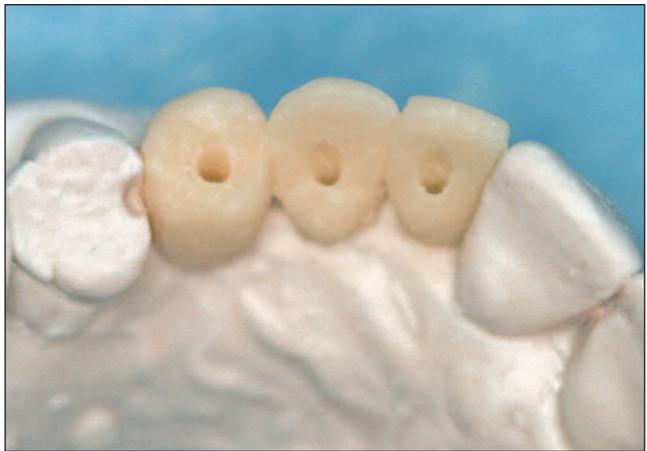
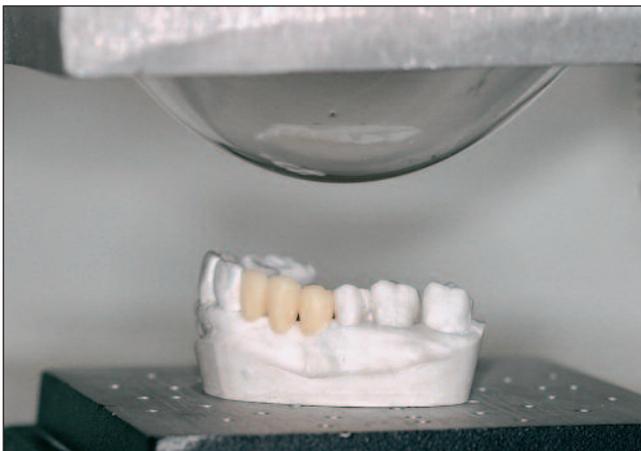


Fig 4-9f Holes are drilled through the teeth.



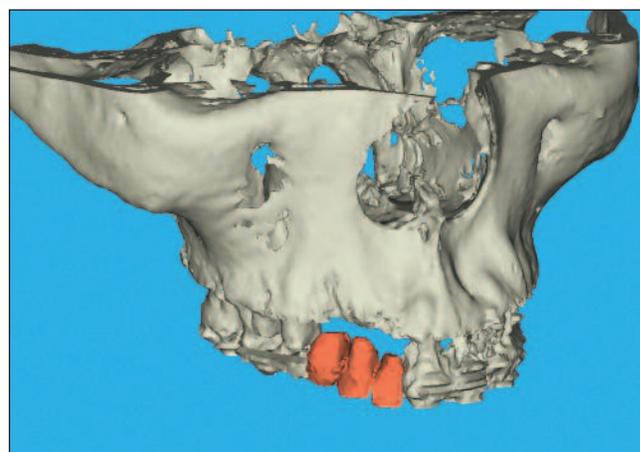
**Fig 4-9g** Thermoplastic plate that has been heated in the vacuum machine.



**Fig 4-9h** Thermoplastic plate, adapted over the plaster cast.



**Fig 4-9i** ScannoGuide, occlusal view.



**Fig 4-9j** 3D representation of the ScannoGuide and bone.

### *Appearance of the appliance in the CT images*

The scanning appliance is viewed as for edentulous cases. Because of the radiopacity of the appliance, the teeth can be clearly visualized in the 3D reconstruction (Fig 4-9j).

## Virtual Teeth

The Virtual Tooth feature allows 2D and 3D imaging of the planned definitive restoration without the use of a scanning appliance (Fig 4-10a).

Virtual teeth are placed on the patient's jaw by (1) opening the Virtual Tooth tool; (2) selecting the teeth to be replaced; and (3) adjusting the height, length, and curve of the teeth (Figs 4-10b to 4-10f).