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Introduction

It is with great pleasure and gratitude to our many contributors that we present this updated Second Edition of the textbook *Craniofacial Reconstructive and Corrective Bone Surgery* after its first publication in 2002 with Professor Dr. Med. Joachim Prein and Dr. Alex M. Greenberg as the founding editors. The original edition of the book was provided as an advanced textbook on craniomaxillofacial surgery and internal fixation techniques. Internal fixation first developed by orthopedic surgeons allowed solutions to previously difficult bone surgery problems was later adopted by maxillofacial surgeons. Internal fixation by itself became an intensely studied, researched and clinically investigated aspect of craniomaxillofacial surgery. With numerous groups continuing to advocate the benefits of internal fixation, the field of craniomaxillofacial surgery has evolved, whereby the fixation methods themselves contribute less to the innovation. Nonetheless, innovative developments rely on the foundations of internal fixation as a basis. Recently, as a result of new 3D digital technologies and rapid manufacturing, a paradigm shift has occurred which is beginning to change the algorithms of selected surgical procedures such as bone reconstruction fol-

lowing tumor resection and the repair of traumatic injuries. In the past, an osteotomy or repositioning of bone would be followed by manual plate selection, adaptation and fixation, while today in many cases as a result of preoperative Virtual Surgical Planning (VSP), the use of cutting and positioning guides with prebent plates determine the results of a procedure. These technologies provide reduced planning and operating time, decreased complications, and will make manual plate adaptation much less necessary.

Other important developments in biological materials, genetics, tissue engineering, digital technologies, 3-D printing, and medical modeling have provided innovations in the field of craniomaxillofacial surgery. For surgical procedures perhaps the most influential and innovative have been intraoperative imaging, the application of radiographic and optical imaging scanning data merge techniques for 3D digital computer-aided planning procedures, and rapid manufacturing and printing.

Craniofacial surgeons are practicing in a much different environment today than in the past with respect to resources, practice settings and medical legal constraints. Basic research continues to progress with the ultimate goal of developing new clinical applications. Examples of that in this text book would include new biological material such as genetically engineered BMP, scaffolding, and advanced resorbable materials. Stem cell research allows the reconstruction of patients defects without the disfiguring effects of harvesting the patient's own tissues for transfer with microvascular or avascular techniques. Allotransplantation of tissues now allows the previously unimagined reconstruction of severe facial deformities from traumatic injury such as burns, war, and self inflicted gunshot injuries. We see a future rich in innovation based on the foundations of biological research, stem cell advances, better understanding of the immune system and allotransplantation, digital technologies, as well as the continued development of surgical hardware devices and implants for the continued advancement of Craniomaxillofacial Surgery.

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