## Orthognathic Surgery

### Preface: Orthognathic Surgery
Daniel B. Spagnoli, Brian B. Farrell, and Myron R. Tucker

Orthodontic Preparation for Orthognathic Surgery
Brent E. Larson

Orthodontic preparation is critical to the success of orthognathic surgery. Recognition and correction of existing dental compensations allows full correction of skeletal discrepancies. Presurgical orthodontic goals are important to define at the start of treatment and may not always include complete arch leveling or space closure, or ideal interdigitation. Orthodontic preparation dictates the skeletal movements that are possible at the time of surgery. Different malocclusion types have characteristic dental compensations that can be identified and described. Proper planning, monitoring, and communication between surgeon and orthodontist are critical to avoid potential pitfalls in the orthodontic preparation.

Virtual Surgical Planning in Orthognathic Surgery
Brian B. Farrell, Peter B. Franco, and Myron R. Tucker

Computer-aided surgical simulation has greatly enhanced the efficiency and accuracy of orthognathic surgery for correction of dentofacial deformities. Virtual surgical planning (VSP) improves the efficiency of the presurgical work-up and provides an opportunity to illustrate the multidimensional correction at the dental and skeletal level. VSP provides preoperative insight into the surgical intervention and the fabrication of cutting jigs/guides and templates can help decrease intraoperative surgical inaccuracies. VSP is rapidly becoming the standard of care for surgical treatment planning of dentofacial deformities.

Timing of Three-Dimensional Virtual Treatment Planning of Orthognathic Surgery: A Prospective Single-Surgeon Evaluation on 350 Consecutive Cases
Gwen R.J. Swennen

The purpose of this article is to evaluate the timing for three-dimensional (3D) virtual treatment planning of orthognathic surgery in the daily clinical routine. A total of 350 consecutive patients were included in this study. All patients were scanned following the standardized “Triple CBCT Scan Protocol” in centric relation. Integrated 3D virtual planning and actual surgery were performed by the same surgeon in all patients. Although clinically acceptable, still software improvements especially toward 3D virtual occlusal definition are mandatory to make 3D virtual planning of orthognathic surgery less time-consuming and more user-friendly to the clinician.

Mandibular Surgery: Technologic and Technical Improvements
Alan S. Herford, Dale E. Stringer, and Rahul Tandon

The ability of surgeons to use advanced techniques can significantly improve both surgical outcome and patient satisfaction. Surgical evolution in mandibular orthognathic surgery is no exception, because advancements have aided both surgical planning and technique. It is important for clinicians to be aware of the historical
progression of improvements in this technique and appreciate the technologic advancements as they are happening. Computer-driven surgical planning is becoming increasingly popular, providing surgeons and patients with the ability to adjust to intraoperative and postoperative variations. By using these capabilities, clinicians are now able to give patients the best possible outcomes.

Maxillary Orthognathic Surgery
Richard E. Bauer III and Mark W. Ochs

Maxillary surgery to correct dentofacial deformity has been practiced for almost 100 years. Significant advances have made maxillary surgery a safe and efficient means of correcting midface deformities. Anesthetic techniques, specifically hypotensive anesthesia, have allowed for safer working conditions. Landmark studies have proven manipulation and segmentalization of the maxilla is safe and allowed this surgery to become a mainstay in corrective jaw surgery. This article provides an overview of surgical techniques and considerations as they pertain to maxillary surgery for orthognathic surgery. Segmental surgery, openbite closure, vertical excess, grafting, and a technology update are discussed.

Surgical Assistance for Rapid Orthodontic Treatment and Temporary Skeletal Anchorage
Maxwell D. Finn

In surgically-assisted osteogenic orthodontics, multiple modalities are combined to shorten treatment time and to accomplish results that cannot be achieved with orthodontics alone. There is a significant reduction in cost to the patient, especially when there is a lack of insurance coverage for orthognathic techniques. Surgeons are able to work in the comfortable environment of their own offices. Decreased cost, recovery time, and treatment time, and an in-office environment all increase patient acceptance and allow surgeons to provide treatment to patients who might otherwise have no options.

Orthognathic Surgery and the Temporomandibular Joint Patient
John C. Nale

The role of orthognathic surgery for the correction of dentofacial deformities is widely accepted. However, its role in the treatment of temporomandibular joint disorders (TMD) is quite controversial. TMD symptoms should be treated independently of dentofacial deformities. Understanding that TMD can potentially worsen following orthognathic surgery, it is important to modify the surgical treatment plan to minimize the risk of exacerbation of TMJ pain, dysfunction, and condylar resorption.

Management of Cleft Lip and Palate and Cleft Orthognathic Considerations
Jeffrey N. James, Bernard J. Costello, and Ramon L. Ruiz

Cleft lip and palate are among the most common congenital anomalies in humans. The treatment of this group of patients is best conducted by a multidisciplinary team approach. This article discusses the accepted treatment algorithm and timeline, as well as special considerations for this patient group when performing orthognathic surgery. Patients with cleft lip and palate often present with significantly more technical and challenging procedures, so clinicians should familiarize themselves with these special considerations before attempting to care for these individuals.
Aesthetic Adjuncts with Orthognathic Surgery 573
Waheed V. Mohamed and Jon D. Perenack

Traditional orthognathic surgery aligns the patient’s bony jaws into a desired, more appropriate position but may leave other cosmetic issues unaddressed. Soft tissue deformities may be treated concomitantly with orthognathic surgery, including soft tissue augmentation (fillers), reduction (liposuction), hard tissue augmentation, cosmetic lip procedures, and rhinoplasty. Some cosmetic adjunctive procedures may be performed at a later date after soft tissue edema from orthognathic surgery has resolved to achieve a more predictable outcome. Undesired cosmetic changes may occur months to years after orthognathic surgery and may be addressed by adjunctive cosmetic procedures.

Applications of Navigation for Orthognathic Surgery 587
Samuel L. Bobek

Stereotactic surgical navigation has been used in oral and maxillofacial surgery for orbital reconstruction, reduction of facial fractures, localization of foreign bodies, placement of implants, skull base surgery, tumor removal, temporomandibular joint surgery, and orthognathic surgery. The primary goals in adopting intraoperative navigation into these different surgeries were to define and localize operative anatomy, to localize implant position, and to orient the surgical wound. Navigation can optimize the functional and esthetic outcomes in patients with dentofacial deformities by identifying pertinent anatomic structures, transferring the surgical plan to the patient, and verifying the surgical result. This article discusses the principles of navigation-guided orthognathic surgery.

Complications in Orthognathic Surgery: A Report of 1000 Cases 599
Megan T. Robl, Brian B. Farrell, and Myron R. Tucker

The authors review complications by studying those that occur in the preoperative, intraoperative, and postoperative phases of treatment. One thousand consecutive patients who underwent orthognathic surgery performed by the senior author over a 5-year time period were evaluated. These cases included 337 mandibular osteotomies, 274 maxillary osteotomies, and 389 combined osteotomies. A precise breakdown of the procedures is provided. Reviewing these cases provides a better understanding of the most common complications, management of these situations, and resolution of the complications.

Orthognathic Surgery in the Office Setting 611
Brian B. Farrell and Myron R. Tucker

The delivery of care by oral and maxillofacial surgeons is becoming more challenging because of escalating health care costs and limited reimbursement from insurance providers. The changing health care landscape forces surgical practices to be flexible and adaptive to change in order to remain viable. The delivery of surgical services continues to evolve as care traditionally performed in a hospital environment is now routinely achieved in an outpatient setting. Outpatient facilities can aid in controlling the perioperative costs associated with orthognathic surgery. Safe and efficient orthognathic surgery completed in the office can aid in controlling the escalation of health care costs.

Index 621