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Michael R. Markiewicz, Veerasathpurush Allareddy, and Michael Miloro

Digital Workflow for Combined Orthodontics and Orthognathic Surgery  1
Mohammed H. Elnagar, Sharon Aronovich, and Budi Kusnoto

This article provides an overview of the digital workflow process for Combined orthodontics and Orthognathic surgery treatment starting from data acquisition (3-dimensional scanning, cone-beam computed tomography), data preparation, processing and creation of a three-dimensional virtual augmented model of the head. Establishing a Proper Diagnosis and Quantification of the Dentofacial Deformity using 3D diagnostic model. Furthermore, performance of 3-dimensional Virtual orthognathic surgical treatment, and the construction of a surgical splint (via 3-dimensional printing) to allow transfer of the treatment plan to the actual patient during surgery.

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Veerasathpurush Allareddy, Jennifer Caplin, Michael R. Markiewicz, and Daniel J. Meara

Impacted teeth occur in a significant number of patients. Their management requires coordinated efforts of orthodontists and oral and maxillofacial surgeons. Specifically, optimal results require a prompt orthodontic diagnosis and treatment plan with execution of either closed or open exposure of impacted teeth by the oral and maxillofacial surgeon. Failure to consider orthodontic mechanics and proper surgical technique can lead to suboptimal results. Thus, orthodontist/oral and maxillofacial surgeon communication is essential for success and patient education and shared decision-making is mandatory before initiating treatment.

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Jason P. Jones, Mohammed H. Elnagar, and Daniel E. Perez

As orthodontic treatment has advanced in complexity and in frequency, more recent techniques, using temporary skeletal anchorage, were developed to help correct more severe occlusal and dentofacial discrepancies that were treated with orthognathic surgery alone previously. These techniques have allowed the orthodontist to move teeth against a rigid fixation, allowing for more focused movements of teeth and for orthopedic growth modification. These types of treatments using rigid fixation have allowed for greater interaction between the orthodontist and the oral and maxillofacial surgeon, and have vastly enhanced the treatment planning for the orthodontist in today’s society.

Interceptive Dentofacial Orthopedics (Growth Modification)  39
Jennifer Caplin, Michael D. Han, Michael Miloro, Veerasathpurush Allareddy, and Michael R. Markiewicz

Although all dentofacial deformities involve deviation of skeletal and dental units that require correction, the timing and method of treatment can vary considerably.
Growth is a key consideration when managing dentofacial deformities, because it has a direct impact on the timing and method of management. Some deformities may be intercepted and managed during growth, whereas others can only be definitively managed after cessation of growth. This article focuses on clinical considerations of growth in managing dentofacial deformities, and discusses methods of growth evaluation and interceptive orthodontic management strategies in different types of dentofacial deformities.

Surgical/Orthodontic Correction of Transverse Maxillary Discrepancies

Johan P. Reyneke and Richard Scott Conley

The transverse dimension is a critical component of comprehensive treatment in orthognathic surgery. Several treatment approaches exist and the team must consider the patient’s needs, desires, and limitations when working to correct the malocclusion. Treatment approaches may include only orthodontic expansion or rapid palatal orthodontic expansion; however, in adults, the orthodontist may require surgical assistance to expand the bony maxilla. Segmental maxillary expansion may be indicated in severe transverse deficiencies of the maxillary arch or dentofacial deformity patients also requiring vertical and sagittal corrections. The various treatment options, advantages, and disadvantages, and indications for each surgical approach are discussed.

Orthognathic Surgery and Orthodontics: Inadequate Planning Leading to Complications or Unfavorable Results

Katherine P. Klein, Leonard B. Kaban, and Mohamed I. Masoud

Complications in orthognathic surgery are commonly a result of inadequate preoperative planning and communication between the surgeon and orthodontist. Unfavorable outcomes can often be avoided when overall treatment goals along with a surgical and orthodontic plan are developed and agreed upon by the orthodontist, surgeon, and patient before the start of active tooth movement or any surgical procedures. Continuous evaluation of the patient’s progress throughout treatment and subsequent communication between the surgeon and orthodontist are recommended to prevent frequent errors, such as inadequate dental decompensation, poor appliance selection or management, and occasional contraindicated orthodontic elastic traction or tooth movements.

Dentoalveolar Distraction Osteogenesis for Rapid Maxillary Canine Retraction: An Overview of Technique, Treatment, and Outcomes

Sumit Yadav, Michael R. Markiewicz, and Veerasathpurush Allareddy

Patients and orthodontists seek to reduce treatment time in braces. Rapid canine retraction through dentoalveolar distraction osteogenesis is one of several treatment approaches to reduce treatment in braces. This article provides an overview of technique of dentoalveolar distraction osteogenesis to accomplish rapid canine retraction and associated outcomes. When this treatment protocol is implemented well, rapid canine retraction is achieved predictably with minimal side effects. Although current evidence suggests that adverse sequelae, such as root resorptions and pulp devitalization, are rare, prospective clinical studies that are adequately powered and documenting long-term follow-up of these outcomes are lacking.
Surgery-First Approach in the Orthognathic Patient 89
Flavio A. Uribe and Brian Farrell

The surgery-first approach (SFA) has become a recent alternative to the conventional 3-stage approach to orthognathic surgery. Skeletal anchorage in orthodontics has facilitated the resurgence of this treatment sequence. By eliminating the presurgical phase of orthodontic treatment, patients have immediate resolution to their facial deformity. Treatment duration has been shown to be reduced; the difference with the conventional approach being approximately 5 months. Patient satisfaction with this approach is very high as measured by quality-of-life surveys. This article describes the indications and step-by-step approach of this technique in conjunction with virtual surgical planning.

Idiopathic Condylar Resorption: What Should We Do? 105
Louis G. Mercuri and Chester S. Handelman

Idiopathic condylar resorption (ICR), alternatively called progressive condylar resorption, is an uncommon aggressive form of degenerative disease of the temporo-mandibular joint seen mostly in adolescent and young women. ICR occurring before the completion of growth results in a shorter mandibular condyloid process, ramus and body, compensatory growth at the gonial angle and coronoid process, as well as an increase in anterior facial vertical dimension. Management options discussed include oral appliances, orthodontics, medical management, orthognathic surgery with and without disc repositioning, and alloplastic temporo-mandibular joint replacement.

Interdisciplinary Management of Dentofacial Deformity in Juvenile Idiopathic Arthritis 117
Peter Stoustrup, Thomas Klit Pedersen, Sven Erik Nørholt, Cory M. Resnick, and Shelly Abramowicz

Temporomandibular joint (TMJ) arthritis impacts mandibular growth and development. This can result in skeletal deformity, such as facial asymmetry and/or malocclusion asymmetry. This article reviews the unique properties of TMJ and dentofacial growth and development in the setting of juvenile idiopathic arthritis (JIA). Specific orthopedic/orthodontic and surgical management of children with JIA and TMJ arthritis is discussed. The importance of interdisciplinary collaboration is highlighted.

Comprehensive Post Orthognathic Surgery Orthodontics: Complications, Misconceptions, and Management 135
Larry M. Wolford

Post orthognathic surgery patient management is critical for high-quality and predictable outcomes. Surgeons and orthodontists must have the knowledge and ability to implement postsurgical management protocols and strategies to provide the best care and outcomes possible. This article presents basic concepts, philosophies, treatment protocols, risks, and potential complications associated with postsurgical patient management. Postsurgical orthodontic goals are to maximize the occlusal fit and provide predictable means to retain the occlusion. Aggressive orthodontic mechanics may be required to provide the best occlusal fit. Complications can occur, but early recognition of complications and implementation of corrective tactics should minimize adverse outcomes.
Many of the aesthetic facial procedures can be performed simultaneously at the time of initial orthognathic surgery. Correction of any residual deformities after surgery, such as mandibular notching, malar asymmetry, labiomental crease, and any camouflage treatment, should be performed as a delayed procedure, when the outcome is more predictable. Additionally, these procedures could be used to enhance the orthodontic result, without the need of osteotomies to reposition the bones.