



Corrective Jaw Surgery: Technological Advancements and Evolving Landscape

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Description

Corrective jaw surgery, also known as orthognathic surgery, is a specialized field within oral and maxillofacial surgery that addresses severe jaw discrepancies and facial deformities. This manuscript provides an in-depth examination of corrective jaw surgery, exploring its indications, surgical techniques, preoperative considerations, and postoperative outcomes. The multidisciplinary nature of this intervention, involving collaboration between oral surgeons, orthodontists, and other healthcare professionals, is emphasized. Additionally, the manuscript discusses technological advancements and the evolving landscape of corrective jaw surgery. Corrective jaw surgery represents a transformative intervention for individuals with significant jaw discrepancies, malocclusions, and facial asymmetries. While orthodontic treatments address dental misalignments, corrective jaw surgery tackles underlying skeletal issues to achieve optimal functional and aesthetic outcomes. This manuscript aims to provide a comprehensive review of corrective jaw surgery, delving into its historical context, modern indications, surgical techniques, and the collaborative approach required for success.

Indications for corrective jaw surgery

Skeletal discrepancies: Corrective jaw surgery is primarily indicated for the correction of significant skeletal discrepancies, including mandibular prognathism, retrognathism, open bite, and cross bite. The decision for surgery is often based on the severity of the malocclusion and the impact on facial aesthetics and function.

Facial asymmetry: Patients with facial asymmetry resulting from jaw discrepancies may benefit from corrective jaw surgery. The procedure aims to achieve facial balance and harmony by repositioning the jaws and associated structures.

Obstructive Sleep Apnea (OSA): Corrective jaw surgery may be considered in cases of obstructive sleep apnea when the anatomical structures contribute to airway obstruction. Advancements in surgical techniques have expanded the role of orthognathic surgery in addressing OSA.

Temporomandibular Joint (TJ) disorders: Severe malocclusions and jaw discrepancies can contribute to TMJ disorders. Corrective jaw

surgery can alleviate TMJ symptoms by optimizing jaw alignment and function.

Preoperative considerations

Multidisciplinary evaluation: Corrective jaw surgery necessitates collaboration between oral and maxillofacial surgeons, orthodontists, and sometimes other specialists such as speech therapists or sleep medicine experts. A comprehensive evaluation includes clinical assessments, radiographic imaging, and detailed treatment planning.

Orthodontic preparation: Orthodontic treatment often precedes corrective jaw surgery to align the teeth and establish proper occlusion. Collaborative planning between the oral surgeon and orthodontist is crucial for achieving optimal results.

Patient education: Informed consent and comprehensive patient education are essential components of the preoperative process. Patients should have a clear understanding of the surgical procedure, expected outcomes, and the postoperative recovery period.

Surgical techniques

Maxillary osteotomies: LeFort I osteotomy is a common procedure for repositioning the upper jaw, addressing issues such as maxillary excess or deficiency. Advancements in surgical techniques, including the use of resorbable fixation, contribute to improved stability and reduced recovery time.

Mandibular osteotomies: Bilateral Sagittal Split Osteotomy (BSSO) and vertical ramus osteotomy are techniques employed for repositioning the lower jaw. Precise planning and execution are critical to achieving optimal functional and aesthetic outcomes.

Genioplasty: Genioplasty, or chin surgery, may be performed concurrently to enhance facial balance. Advancements in 3D imaging and virtual surgical planning enhance the precision of genioplasty procedures.

Virtual Surgical Planning (VSP): VSP involves the use of Computer-Aided Design (CAD) to plan the surgery virtually before the actual procedure. This technology allows for meticulous preoperative planning, reducing surgical time and improving accuracy.

Postoperative care and outcomes

Recovery period: Postoperative care involves a monitored recovery period, with patients gradually transitioning from a liquid to a soft diet. Pain management and oral hygiene are crucial during the initial weeks following surgery.

Orthodontic follow-up: Orthodontic adjustments continue postoperatively to fine-tune occlusion and ensure long-term stability. Close collaboration between the oral surgeon and orthodontist is maintained throughout the recovery phase.

Long-term stability: Corrective jaw surgery aims for stable, long-term results. Advances in surgical techniques and materials contribute to improved stability and predictability of outcomes.

Technological advancements

3D Printing: Three-dimensional printing technology is increasingly utilized in corrective jaw surgery for the fabrication of

surgical guides and custom implants. This enhances precision and allows for personalized treatment approaches.

Virtual Reality (VR) and Augmented Reality (AR): VR and AR technologies are emerging tools for preoperative planning and intraoperative guidance. Surgeons can visualize and interact with virtual models, improving spatial understanding and decision-making.

The landscape of corrective jaw surgery continues to evolve, with ongoing research and technological innovations shaping the field. Future directions include further integration of digital technologies, advancements in minimally invasive techniques, and an expanded role in addressing complex craniofacial anomalies.

Conclusion

Corrective jaw surgery represents a transformative intervention for individuals with significant jaw discrepancies, offering not only functional improvements but also profound aesthetic benefits. This comprehensive review has explored the indications, preoperative considerations, surgical techniques, and postoperative outcomes of corrective jaw surgery. As technology continues to advance and interdisciplinary collaboration becomes more refined, the future of corrective jaw surgery holds promise for even more precise, personalized, and patient-centric interventions. This manuscript serves as a guide for clinicians, researchers, and educators, fostering a deeper understanding of this complex and impactful surgical intervention.