

ORTHODONTIC TREATMENT COMBINED WITH ORTHOGNATHIC SURGERY: CLINICAL EXPERIENCES AND OUTCOMES

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Abstract. Orthognathic surgery combined with orthodontic treatment has become a cornerstone in the management of complex dentofacial deformities. This integrated approach addresses both skeletal discrepancies and dental malocclusion, resulting in improved functional occlusion, facial aesthetics, and overall oral health. Clinical experiences indicate that pre-surgical orthodontic preparation, precise surgical planning, and post-surgical orthodontic finishing are critical to achieving optimal outcomes. Evidence from recent clinical studies demonstrates significant improvements in occlusal stability, patient satisfaction, and long-term skeletal and periodontal health. Early assessment of periodontal status, careful force application during orthodontic treatment, and close interdisciplinary collaboration between surgeons and orthodontists are essential to minimize complications. This study highlights the clinical relevance of combining orthodontic and orthognathic interventions to enhance treatment predictability, functional efficiency, and aesthetic results.

Keywords: Orthognathic surgery, Orthodontic treatment, Dentofacial deformities, Clinical outcomes, Occlusal stability, Periodontal health, Interdisciplinary care, Surgical-orthodontic planning.

Relevance

Dentofacial deformities affect masticatory function, speech, aesthetics, and psychological well-being. Conventional orthodontic treatment alone may fail to address skeletal discrepancies, leading to suboptimal functional and aesthetic outcomes. Combining orthognathic surgery with orthodontics provides a comprehensive solution, improving occlusal stability, facial symmetry, and long-term oral health. Clinically, this integrated approach allows for correction of severe malocclusion while minimizing risks to periodontal tissues and enhancing post-treatment stability. The clinical relevance of this combined treatment lies in its ability to deliver functional, aesthetic, and psychosocial benefits, making it a standard in modern dental practice.

Main part

Pre-surgical orthodontic preparation is a critical phase in combined orthodontic-orthognathic treatment. Its main goal is to align and decompensate teeth in relation to skeletal bases. Clinical experience shows that proper leveling and alignment allow accurate surgical movements and minimize post-operative complications. Patients undergo thorough periodontal assessment, including evaluation of gingival inflammation and alveolar bone levels. Fixed appliances or clear aligners are selected based on periodontal health. Customized archwires and controlled forces are applied to ensure safe tooth movement. Patient education regarding oral hygiene and regular professional prophylaxis is emphasized. Decompensation of anterior teeth facilitates precise skeletal repositioning. Posterior segments are stabilized to maintain occlusal reference points. Radiographic evaluation guides treatment planning and surgical simulation. Interdisciplinary collaboration begins at this stage to establish a coordinated approach. Patients with periodontal disease receive scaling and root planing to optimize tissue health. Monitoring

tooth movement and periodontal status ensures early detection of complications. Pre-surgical preparation typically lasts several months. Effective preparation sets the foundation for successful surgery and post-surgical finishing.

Orthognathic surgery corrects skeletal discrepancies that cannot be managed with orthodontics alone. Common procedures include bilateral sagittal split osteotomy (BSSO), Le Fort I osteotomy, and genioplasty. BSSO addresses mandibular retrusion or prognathism, while Le Fort I corrects maxillary deficiencies. Precise surgical execution preserves periodontal structures and alveolar bone. Pre-operative planning uses 3D imaging, cephalometrics, and model surgery. Rigid fixation plates stabilize jaw position and reduce relapse. Soft tissue management ensures optimal healing and preserves gingival architecture. Surgical goals are coordinated with orthodontic objectives to achieve functional occlusion and facial aesthetics. Patients with healthy periodontium generally show predictable healing. Post-operative care includes monitoring occlusion, pain management, and oral hygiene guidance. Early jaw mobilization is applied selectively to maintain function. Interdisciplinary communication monitors tissue response and adjusts orthodontic forces.

Post-surgical orthodontic finishing fine-tunes occlusion and dental alignment. Minor adjustments include interdigitation, overbite, and midline corrections. Light, controlled orthodontic forces prevent trauma to healing tissues. Regular monitoring of gingival health and alveolar bone is essential. Brackets, archwires, and elastics are adjusted based on occlusal relationships and skeletal stability. Radiographic evaluation ensures proper tooth positioning relative to skeletal bases. Patient compliance with oral hygiene and follow-up visits influences outcomes. Professional prophylaxis maintains tissue health and prevents inflammation. Post-surgical orthodontics usually lasts several months, depending on complexity. Minor occlusal interferences are corrected to improve function and prevent relapse. Soft tissue adaptation, including gingival contouring, is addressed. Pre-surgical preparation and periodontal health accelerate post-surgical adjustments. Complications such as delayed tooth movement are minimized through monitoring. Successful finishing improves functional occlusion and facial aesthetics. This phase integrates orthodontic precision with surgical outcomes.

Maintaining periodontal health throughout combined treatment is crucial. Initial assessment includes probing depths, gingival indices, and alveolar bone evaluation. Patients with inflammation receive scaling, root planing, and oral hygiene instruction. Periodontal monitoring continues during pre-surgical, surgical, and post-surgical phases. Orthodontic forces are adjusted to minimize attachment loss and alveolar bone resorption. Professional prophylaxis is performed regularly to reduce plaque around brackets and surgical sites. Interdisciplinary collaboration ensures periodontal considerations guide treatment planning. Clinical studies show periodontal stability improves occlusal precision and skeletal outcomes. Well-maintained tissues support faster tooth movement and reduce complications. Strategies include mechanical plaque control and antimicrobial agents. Patient motivation and compliance are key for successful outcomes.

Patients undergoing combined orthodontic-orthognathic treatment show significant improvements in occlusion, jaw alignment, and facial aesthetics. Measurements of overbite, overjet, and midline alignment demonstrate consistent correction. Radiographs indicate stable alveolar bone and minimal periodontal compromise. Functional outcomes, including mastication

and speech, are improved. Patient-reported satisfaction is high for facial symmetry, dental alignment, and overall quality of life. Interdisciplinary collaboration allows timely interventions for complications. Pre-surgical preparation, surgical precision, and post-surgical finishing contribute to predictable outcomes. Optimized periodontal health accelerates recovery and ensures long-term retention. Evidence-based strategies enhance functional and aesthetic goals. Regular follow-ups monitor stability and periodontal condition.

Conclusion

Combined orthodontic and orthognathic treatment represents a highly effective and comprehensive approach for managing complex dentofacial deformities. Clinical experiences demonstrate that pre-surgical orthodontic preparation, precise surgical intervention, and post-surgical orthodontic finishing are essential to achieve optimal functional occlusion, facial aesthetics, and long-term skeletal stability. Regular periodontal assessment and management throughout the treatment process ensure tissue preservation and minimize complications. Interdisciplinary collaboration between orthodontists, oral surgeons, and periodontists enhances predictability, patient safety, and treatment outcomes. Patient education, oral hygiene, and compliance are critical factors in maintaining periodontal health and achieving successful results. Evidence from clinical studies indicates high levels of patient satisfaction, improved masticatory function, and aesthetic enhancement following combined therapy.

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