

Orthognathic Surgery in the Presence of Temporomandibular Dysfunction: What Happens Next?



Mohammed Nadershah, BDS, MSc^{a,b},
Pushkar Mehra, BDS, DMD^{b,*}

KEYWORDS

- Orthognathic surgery • Internal derangement • Temporomandibular dysfunction
- Temporomandibular joint

KEY POINTS

- Temporomandibular joints (TMJs) must be thoroughly evaluated before and after orthognathic surgery using universally accepted criteria.
- TMJs must be stable for predictable orthognathic surgery outcomes. Proposed methods for stabilizing the joints include nonsurgical management (splints, pharmaceutical therapy) or surgery (disk repositioning or joint replacement).
- Orthognathic surgery can result in improvement, no change, or deterioration of preexisting temporomandibular dysfunction signs and symptoms.
- Both sagittal split and intraoral vertical ramus osteotomies are acceptable techniques for mandibular setback in patients with TMJ dysfunction.
- Avoiding prolonged maxillomandibular fixation after orthognathic surgery should decrease the incidence of postoperative mandibular hypomobility.
- Counterclockwise rotation of the maxillomandibular complex and large mandibular advancements increase stress and loading of the TMJ and should be used with caution in patients with preexisting internal derangement.

INTRODUCTION

It is essential to define temporomandibular dysfunction (TMD) before discussing its relationship with orthognathic surgery. There are many definitions of TMD in the literature, which adds to the complexity of this topic. Luther¹ defined TMD as the variety of signs and symptoms assigned to the temporomandibular joint (TMJ) and its related structures. These signs and symptoms

include joint noises (clicking and popping), tenderness of the muscles of mastication, headaches, TMJ pain, facial and neck pain, limitation of mouth opening, jaw locking, wear of dentition, parafunctional habits (clenching and grinding), and otalgia. The need for a standardized index was first addressed by Helkimo, who developed a clinical index to quantify the severity of TMD.^{1,2} In 1992, the research diagnostic criteria (RDC) for TMD

^a Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, King Abdul Aziz University, PO Box 80200, Jeddah 21589, Saudi Arabia; ^b Department of Oral and Maxillofacial Surgery, Boston University Henry M. Goldman School of Dental Medicine, 100 East Newton Street, Suite G-407, Boston, MA 02118, USA

* Corresponding author.

E-mail address: pmehra@bu.edu

index was introduced, with the hope of establishing a common ground for clinical research. It was based on physical findings (axis 1) and psychosocial assessment (axis 2).³ The RDC/TMD was further revised in 2010, and a second version was proposed.⁴⁻⁶ Recently, a diagnostic criteria (DC) for TMD tool has been recommended for use in both clinical and laboratory research.⁷

Internal derangement (ID) includes clinical or radiologic disk displacement, and it is often associated with pain in the TMJ or its surrounding tissues, functional limitations of the mandible, or clicking in the joint during motion. The cause of TMJ ID remains unclear, but it is likely multifactorial. Abnormal dentoskeletal occlusion, parafunctional habits (eg, bruxism), stress, anxiety, trauma, systemic factors like hormonal imbalances, or autoimmune disease are some of the known likely causes described in the literature. Wilkes described a commonly cited classification for the stages of ID based on the clinical, radiographic, and anatomic disk-fossa relations.⁸ However, there are no controlled prospective studies relating detailed analysis of TMJ-related clinical symptoms and orthognathic surgery with appropriate radiologic correlation, specifically through MRI.

Jaw deformities requiring orthognathic surgery often coexist with TMJ disease. Unrecognized or untreated TMJ diseases are one of the primary factors leading to postsurgical complications, resulting in poor-quality and unpredicted unfavorable outcomes. Although esthetic and psychosocial factors may be the primary motivation for some patients who seek orthognathic surgery, it is often the correction of the functional disability that determines success or failure in this type of treatment. Most research and publications evaluating the relationship between orthognathic surgery and TMD have used nebulous definitions of TMD instead of universally accepted ones.⁹

DOES MALOCCLUSION CAUSE TEMPOROMANDIBULAR DYSFUNCTION?

The cause of TMD remains unknown, but it is thought to be multifactorial. There are many conflicting data in the literature as to whether malocclusion contributes to TMD.⁹ McNamara and colleagues¹⁰ reported that malocclusion is suggested to play only a minor role in the development of TMD. These investigators estimated that approximately 10% to 20% of TMD is related to occlusal factors; however, it is clearly not a simple cause-and-effect relation. Other possible causes of TMD include trauma, habits, psychological factors, stress, bruxism, and systemic factors.⁹ Proffit

and colleagues¹¹ reported that the prevalence of TMD in the general population is 5% to 30%, whereas it is higher among people with moderate malocclusion (50%–75%), but these investigators concluded that it is unlikely that occlusal patterns are the only causative factor of TMD. Some studies have correlated certain types of malocclusion (class III, deep bites, and open bites) with the prevalence of TMD.^{12,13} Contrastingly, multiple other studies have reported that TMD and TMJ ID are more prevalent in patients with class II skeletal malocclusion.¹⁴⁻¹⁷ Moreover, orthodontic treatment relation to the development of TMD is also controversial, with studies suggesting both improvement and worsening of TMD after orthodontic treatment.¹⁸⁻²⁰ In our personal experience, although both class II and III patients often complain of some TMJ signs and symptoms (eg, pain, clicking, locking, headaches), most patients presenting with significant functional disability are those with mandibular retrognathism with or without open bites. It is not uncommon to see class III patients with asymptomatic TMJ clicking or mild TMJ dysfunction; in contrast, the high-angle, class II patients often complain of more significant symptoms.

Summary

The literature reports a significant variation in prevalence of TMD in patients with skeletal malocclusion. Many studies report higher incidence of TMD in patients with retrognathic mandibles; these patients usually have steep occlusal and mandibular planes (high angle). Other studies report higher incidence in class III patients, most of whom have flat occlusal but steep, high mandibular planes (low angle). This finding is likely a reflection of the multifactorial causes of TMJ disease. In our experience, we have noticed a higher incidence of TMD in patients with retrognathic mandibles and in those with steep occlusal planes, as mentioned earlier. Even so, most of the published literature in TMD incidence is limited by small sample sizes and selection bias.

WHAT IS THE EFFECT OF ORTHOGNATHIC SURGERY ON TEMPOROMANDIBULAR DYSFUNCTION?

The literature studying the effect of orthognathic surgery in patients with preexisting TMD is similarly inconclusive because of lack of consistency in methods and measured outcomes.⁹ There is still controversy as to the ideal management of patients with preexisting ID of the TMJ who require orthognathic surgery for correction of dentofacial deformity.

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