

Orthognathic Surgery as Treatment Choice for TMJ Disorder: A Case Report

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1. Introduction

Temporomandibular disorders is a collective term used to describe a number of related disorders affecting the temporomandibular joints, masticatory muscles, and associated structures, all of which have common symptoms such as pain and limited mouth opening.(1)General practitioners will sometimes see patients who present with either persistent or recurrent chronic facial pain. Having eliminated the possibility of headache or ear or sinus problems, the next step is to consider the possibility of temporomandibular joint pain and dysfunction, particularly if the pain is accompanied by clicking jaw joints and limited mouth opening. As dentists, abnormal dentoskeletal occlusion, para functional habits (eg, bruxism), stress, anxiety,trauma, systemic factors like hormonal imbalances,or autoimmune disease must be examine thoroughly as they are some of theknown causes of TMD and was described in the literature.(2)

According to the American Academy of Orofacial Pain, temporomandibular disorders (TMD) are defined as a collective term embracing a number of clinical problems that involve the masticatory muscles, the temporomandibular joint and associated structures, or both.(3) This definition has evolved as a multifactorial disease and stated clearly as a complex disease. The derangement of the joint develops slowly because there is a lot of factors that plays different role for the joint to change.

Evidence from the numerous epidemiologic studies on the occurrence of temporomandibular disorders in the general population provide that there are a number of consistent findings. Firstly, signs of temporomandibular disorders appear in about 60–70% of the general population and yet only about one in four people with signs are actually aware of or report any symptoms.(4)TMD symptomshave a predilection for woman and age groupbetween 20 to 40's.(5)

Some study suggested an elevationof estrogen level in female patients and hormonalinfluences as one of the causes of TMD,however this hypothesis has not been substantiated.(6,7)Severe problems are also much more common among female in clinical populations than male, and the ratio between women and men who seeks treatment for TMJ disorder is 8:1.(8)

Dentofacial Deformity (DFD) is derived from many factors including genetic predisposition, environmental exposure, childhood facial trauma or infection, cyst ortumor, parafunctional habit causing developmental malocclusion, unilateral condylar hyperplasia, mandibularhypoplasia, prior surgical procedures, or temporomandibularjoint disorder (TMD). (9) Depend on the severity of the deformity, treatment choice to correct the alteration are varies. When the deformity has altered the shape of the jaw and caused jaw deformities, the patient required orthognathic surgery because it is often coexist with TMJ disease. Although esthetic and psychosocialfactors may be the primary motivation for some patientswho seek orthognathic surgery, it is often thecorrection of the functional disability that determinessuccess or failure in this type of treatment.(10)

2. Case Report

A twenty year old male patient came to HasanSadikin teaching hospital with chief complaint of continuous mild pain and clicking sound on both of his TMJ when he was eating. The clicking sound has been going on for about five years, but the pain develops recently since 2 years ago. The patient never complaint for any pain on the tooth or any swelling as well as any history of trauma. From clinical examination he develops a class III malocclusion with overjet -2 mm and overbite -3mm. From cephalometric analysis we found SNA=90°, SNB=95,5° and ANB=-5,5°. It concludes skeletal involvement in class III malocclusion with bimaxillaryprognation.



Figure 1: Pre-Treatment Extra – oral Photographs



Figure 2: Pre-Treatment Intra-Oral Photographs

The patient has undergone orthodontic treatment for a year to level and align both maxillary and mandibular arch. The treatment was suggested by an orthodontic specialist as a preparation for orthognathic surgery. Then he was prepared for orthognathic surgery with Le Fort I and bilateral sagittal split osteotomy (BSSO). Incision was made intra orally to minimize the scar and enhance healing. Then a maxillary advancement and mandibular set back was performed. The position was held in place using mini plate after optimum occlusion was achieved. Before fixation on the mandibular was placed, condyles were positioned in the closed position. In the post-surgical phase settlingastics were used to settle the occlusion.



Figure 3: Pre-treatment Lateral Cephalogram

Post-treatment evaluation showed an improvement in the prognathic profile. Positive 1 mm overjet is achieved and patient malocclusion has changed to class I Angle. The patient's complaint on clicking and pain on TMJ are relieved. The result was observed for three weeks.



Figure 6: Post-Surgical treatment photographs showing improvement in the prognathic profile



Figure 7: Post-Surgical treatment photographs showing improvement in occlusion

3. Discussion

Temporomandibular joint is the junction site of the mandibular condyle to skull base or glenoid fossa of the temporal bone. A disc separates the two bones.(11)Disc shape is determined by condyle morphology and mandibular fossa. The disc may become displaced or destroyed via degenerative forces. In the posterior part, the disc is attached to a loose connective tissue of nerve and vessels named retrodiscal tissue. In the superior posterior part, it is attached to a connective tissue full of elastic bands named superior retrodiscal layer or bilaminar zone.(12)This tissue connects the disc to the tympanic bone posteriorly. Below this, there is the inferior retrodiscal layer which connects the inferior border of the posterior edge of the disc to the posterior part of condyle joint surface. Inferior disc layer and superior retrodiscal tissue are made of collagen and elastic fibers, respectively. Anteriorly to the disc, superior and inferior adhesions of it connect to the capsular ligament. Internal surfaces of superior and inferior spaces are lined with special endothelial cells which secrete synovial fluid.(11–13)The fluid functions are molecular transport and metabolism also for lubrication of joint surfaces; the fluid is secreted on the joint surfaces under pressure and results in friction reduction.

These complex and delicate anatomy of the joint may be damaged or altered because of multifactor that results in TMD. Factors that increase the risk of temporomandibular disorders are called “*Predisposing factors*” and those causing the onset of temporomandibular disorders are called “*Initiating factors*” and factors that interfere with healing or enhance the progression of temporomandibular disorder

are called “*Perpetuating factors*”.(14)In some instances a single factor may serve one or all of these roles. The successful management of temporomandibular disorders is dependent on identifying and controlling the contributing factors which include occlusal abnormalities, orthodontic treatment, bruxism and orthopedic instability, macrotrauma and microtrauma, factors like poor health and nutrition, joint laxity and exogenous estrogen.(15)

Occlusion is the first and probably the most discussed etiologic factor of temporomandibular disorders.(16) The role of occlusion in the development of temporomandibular joint disorders is controversial. Today its role is widely considered as contributing by initiating, perpetuating or predisposing of temporomandibular joint disorders. (17)

Initiating factors lead to the onset of the symptoms and are related primarily to trauma or adverse loading of the masticatory system. In the perpetuating factors the following may be included:

- Behavioral factors (grinding, clenching and abnormal head posture)
- Social factors (could effect perception and influence of learned response to pain)
- Emotional factors (depression and anxiety)
- Cognitive factors (negative thoughts and attitudes which can make resolution of the illness more difficult).

Predisposing factors are pathophysiologic, psychological or structural processes that alter the masticatory system sufficiently to increase the risk of development of temporomandibular disorders. Some studies have correlated

certain types of malocclusion (class III, deep bites, and open bites) with the prevalence of TMD. (18) Contrastingly, multiple other studies have reported that TMD are more prevalent in patients with class II skeletal malocclusion. (19, 20) 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.

Orthognathic surgery are performed to improve patient's occlusion and there hoped to relieved any discomfort that caused by malocclusion. Some studies shows that sixty-five patients, 35 TMD and 30 non-TMD, have been analyzed after undergoing orthognathic surgery. Twenty two of thirty five patients (63%) in the TMD group had complete resolution of the TMD symptoms and had to be reclassified as non-TMD postoperatively. (21) This relevant to case that provided in this study. Resolution was achieved after the patient's occlusion is fixed. The majority of TMD patients achieve good relief of symptoms with a conservative model of noninvasive management. de Leeuw et al. concluded that nonsurgical treatment is as effective as surgical treatment over the long term. They urged the use of nonsurgical treatment to reduce the symptoms and allow the process to be more tolerable for the patient. (22) But in some cases, especially skeletal involvement are considered, surgical approach might be the only option to treat TMD. In this case, a severe class III malocclusion with skeletal problem are presented. Therefore, surgical approach is selected as treatment choice.

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. There is still controversy as to the ideal management of patients with preexisting TMD who require orthognathic surgery for correction of dentofacial deformity. (10) Karabouta and Martis evaluated the TMJ in 280 patients who underwent bilateral sagittal split osteotomy (BSSO) for the correction of various dentofacial deformities. These investigators reported that the TMD incidence improved from 40.8% preoperatively to 11.1% postoperatively, but there were new TMD symptoms after surgery in 3.7% of previously asymptomatic patients. (23) Many other reports shows that orthognathic surgery made improvement in TMD symptoms. Although there are also some reports that shows orthognathic surgery causes further deleterious effect on the temporomandibular joints. Most of these study present a small number of patients and caused condylar resorption. Other drawbacks of these studies are retrospective design, and lack of postoperative MRI findings to document anatomic disc position.

4. Conclusion

Surgical intervention in the treatment of Class III malocclusion is indicated in those instances in which the deformity cannot be satisfactorily treated orthodontically and in those instances in which the deformity is the result of an uncontrollable physiologic or external traumatic reaction. It is contraindicated in those patients whose physical status will not allow such a procedure and in the patient who is not extremely interested in necessary correction. In our patient

the combined orthodontics and the surgical approach helps in the appreciable changes in the patient profile and occlusion. Also the patient achieved satisfactory result as the procedure are performed. This study also reveal that patient with TMD who undergo orthognathic surgery have an improvement in pain-related symptoms as well as jaw function after surgery. Patients undergoing orthognathic surgery should have a thorough temporomandibular joint exam before and after surgery. The purpose of this study is to promote more evidence-based clinical management of such patients in the future.

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