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Management of Patients with Concomitant Dentofacial Deformity and TMD- A Review

[1]Dr. Anirban Shome, Consultant Orthodontist, Kolkata, India.

[2]Dr.Divya Chadda, Fellow, Department of Oral and Maxillofacial Surgery, ALMAS Hospital, Kottakkal, Kerala, India.

[3]Dr. Seema Rathi, Consultant Prosthodontist, Kolkata, India.

[4]Dr.Abhisek Chowdhury, Consultant Prosthodontist, Kolkata, India.

[5]Dr. Kirti Parashar, Consultant Prosthodontist, Roorkee, Uttarakhand, India.

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Corresponding Author: Dr. Divya Chadda, Fellow, Department of Oral and Maxillofacial Surgery, ALMAS Hospital, Kottakkal, Kerala, India.

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Abstract

The correction of Dentofacial deformities by orthognathic surgery is well known. But, orthogenetic surgery in patients with temporomandibular disorders has always been controversial. This article is aimed at unveiling the various aspects of the controversy.

Introduction

Costen, in 1934, first recognised signs and symptoms of Temporomandibular Disorders (TMD)[1]. The terms like Temporomandibular Joint Dysfunction Syndrome[2], facial arthromyalgia[3], Costner's Syndrome, pain dysfunction syndrome[4] were used interchangeably for this entity in literature. However, American Association of Orofacial Pain (AAOP) defined TMD as 'a collective term embracing a number of clinical problems that involve the masticator musculature, the temporomandibular joint and associated structures, or both'[5]. The diagnosis and management of TMD has always been a challenge due to its mutifactorial nature.

Dentofacial Deformity and Tmd

The patients with Dentofacial deformity are universally treated by Orthographic Surgery. The association of these patients with TMD is in two ways: presence of TMD symptoms pre-operatively or development of TMD symptoms in an asymptomatic patient after surgery. Numerous studies show that first category of patients may experience improvement[6-8]or worsening of TMD symptoms after surgery. So, it becomes vital to formulate a proper treatment planning and treatment modifications in such patients. Due to this variable relationship of Orthographic Surgery and TMD, it is advisable to treat a Dentofacial deformity and TMD as separate entitites.

Timing of Surgery

Most advocate that recognition of TMD in the patients with skeletal malocclusions should be performed before the planned orthognathic surgery to treat both the problems effectively. In contrast some favour concomitant surgery. The concomitant surgery may have several advantages like, single surgery and general an aesthesia; decrease in overall treatment duration; balancing of TMJs, neuromuscular structures, jaws and occlusion; etc[9]. The disadvantage of concomitant surgery may be higher risk of postoperative malocclusion owing to the vulnerability of condyle-fossa relationship after surgery[10].

Goals of Orthographic Surgery in Tmd Patient

The surgeon must recognize the patients with a high risk of development of TMD or worsening of the symptoms after Orthognathic surgery. This will help to minimize the risk of post-surgical relapse and post-operative malocclusion as well. Thus, the goals of orthognathic surgery on the TMJ patient include identification of TMD symptoms (using work-up for TMD), treatment of TMD symptoms and correction of Dentofacial deformity with surgical considerations to minimize risk of relapse and post-operative TMD symptoms[11].

Work-Up For Tmd

TMD is a collection of multiple varied signs and symptoms like pain, joint noise, limited mouth opening and others. Approximately 50% of the patients undergoing orthognathic treatment complain of atleast one of these symptoms[12]. Thus, a detailed work-up for TMD should be performed by the surgeon.

The first step of the workup is a proper history of the patient, which should be obtained by the surgeon using a questionnaire. The chief complaint and a thorough symptom description should be evaluated.

History must be followed by physical examination. Firstly, inspection of the mandibular range of motion should be performed. Pain-free mouth opening and pain, both should be noted. The origin of pain should be established by loading of the joints. Inspection should be followed by palpation to detect intracapsular pain. Otoscopic examination may also be done to rule out ear pain.

The next step should be radiological examination. The panoramic radiograph, computed tomography and cone-beam computed tomography may be used to screen the mandibular condyles and surrounding area for any abnormality. Serial imaging and their superimposition may help to evaluate active growth or resorption. Magnetic resonance imaging allows for soft tissue evaluation of the joint. Furthermore, a technetium 99 bone scan helps in detection of bone activity.

In some patients with suspected systemic disease process, Laboratory testing is advised.

Treatment of Tmd Symptoms

Once the diagnosis is established, the patient must be treated appropriately. Due to a mulfactorial nature of TMD, the symptom specific treatment has to be advocated for desired outcome. The treatment measures can be reversible and irreversible. First line of treatment is use of reversible measures, which includes, Patient Education, Medications, Physical Therapy and Occlusal Splint Therapy. Medications include Non steroidal anti inflammatory drugs (anti-RA meds), Antidepressants, Muscle relaxants. Physical Therapy may include Passive stretching, Ultrasound, Spray and stretch, ROM exercises and Transcutaneous electrical nerve stimulation. Occlusal Splint/ Occlusal Device/ Orthotics is any removable artificial occlusal surface used for diagnosis or therapy affecting the relationship of the mandible to the maxillae.

It may be used for occlusalstabilization, for treatment of TMJ disorders, or to prevent wear of the dentition.

If the reversible measures fail to treat, irreversible measures are advisable. The irreversible treatment options include, Arthrocentesis, Trigger Point Injections, Arthroscopy, Botox and Open Arthroplasty.

Orthographic Surgery Considerations

After the treatment of TMD, the correction of Dentofacial deformity may be done. The surgical plan should be postulated with special considerations in order to minimize risk of relapse and post-operative TMD symptoms. A surgeon must be well versed with the jaw relationships which are more likely to develop post-operative condylar resorption and TMD.

Tmj Remodeling

TMJ remodeling has 2 types, functional and dysfunctional[13-16]. Functional remodeling is the morphologic change in articular surfaces of TMJ which does not lead to significant changes of occlusion or the joint. Dysfunctional remodeling is the morphologic change which causes a loss of condylar-ramus height leading to further malocclusion. Dysfunctional remodeling, also termed as condylar resorption, may be because of reasons like trauma, or may be idiopathic (termed *idiopathic condylar resorption*). The reported predisposing factors for condylar resorption may include; systemic diseases (like scleroderma, rheumatoid arthritis, etc.), TMJ dysfunction, being a young woman[17-18]. Thus, such patients should be prescribed targeted pharmacotherapy. Occlusal splints may help in patients with TMJ dysfunction by limiting the joint loading and determination of cessation of active resorption. Condylar resorption being active in teenage, surgery should be avoided during this age.

Surgical Procedures

The patients with skeletal Class III malocclusion may be treated by bilateral sagittal split osteotomy setback surgery (BSSO) or intraoral vertical ramus osteotomy (IVRO). It has been observed that 75% ofpatients treated by IVRO show improvement in TMD and no asymptomaticpatients develop TMD, but only 40%of patients undergoing BSSO showed improvementin TMD symptoms and 8% of asymptomatic patients develop new symptoms. On the contrary, prolonged period of maxillomandibular fixation and condylar sag in cases of IVRO, may lead to limited mouth opening and malocclusion respectively.

The common bijaw combination procedures in skeletal Class II patients may increase mechanical loading of joints leading to relapse. Thus, it is advised to modify the treatment in high risk patients. Also, in cases of bimaxillary surgery cases, avoid large mandibular advancements to avoid excessive loading of the joint and further relapse[19]. It has been reported in literature that incidence of condylar resorptionafter surgery performed only on the maxilla for correction of class II open bite was less than that after bimaxillary osteotomies[20].

The mode of fixation also should be considered in such cases. In cases of BSSO, it has been observed that bicortical fixation produces excessive forces on the TMJ and condylar torquing, thus, monocortical fixation is recommended[21]. The relapse is observed upto 3 years.

Conclusion

The orthognathic surgery in patients with TMD has been a topic of debate in the literature. Most favour the treatment of TMD first followed by correction of Dentofacial deformity with considerable surgical modifications.

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