

Orthodontics & Temporomandibular Disorders : A Review

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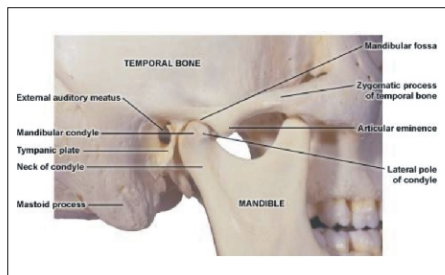
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Abstract: Temporomandibular disorders (TMD) relate to discomfort of the temporomandibular joint (TMJ). The disorder is multifactorial with a degree of psychogenic influence varying throughout an individual's life with phases of symptoms affecting the quality of life. In an attempt to treat this complex group of disorders many treatment modalities have been identified some of which are also considered in other Cochrane reviews. This article mainly reviews some of the studies carried out to show the relation between orthodontic treatment and temporomandibular disorders also some of the treatment options in treating tmj disorders has been discussed

Introduction

The temporomandibular joint (TMJ) is the joint between the lower jaw and the base of the skull. TMJ disorders (TMD) refer to a group of disorders with symptoms that include pain, clicking, grating in the jaw joint and/or problems with chewing or opening the jaw. This condition can be known by a variety of conditions including craniomandibular disorders (CMD) and is a frequent cause of facial pain problems.



Temporomandibular disorders (TMD) are a collection of pathologic and functional conditions affecting the temporomandibular joint (TMJ) and the muscles of mastication as well as contiguous tissue components

Etiology of Temporomandibular Disorders

- Trauma.
- Occlusal Condition

- Psychosocial Factors.
- Systemic Factors.
- Etiology In Relation To Orthodontic Treatment Planning And Execution.Of mandibular Disorders

Etiology in relation to orthodontic treatment planning

- General Statistics
- First Premolar Extractions
- Head Gear And Class II Elastics
- Herbst Appliance-
- Reverse pull head gear and Class III Elastics
- Midline Switch / Cross Elastics
- Overbite And Anterior Axial Inclination
- Retention Phase

TMD patients frequently experience the following: (1) painful symptoms such as headaches, facial pain, pain in the jaw joints or on jaw movement, ear pain, and neck pain; (2) dysfunctional signs such as limited jaw movement, jaw deviations, clicking, jaw locks, and dislocation; (3) dental destruction, traumatic occlusion, and wear of the dentition; and (4) parafunctional habits such as clenching and grinding

Discussion

According to Graber's study on 347 TMD patients

- 53% had Class II malocclusions
- High incidence of Class III malocclusions with anterior displacements & cross bite
- Most had a deep bite and horizontal growth pattern.
- 68% had abnormal perioral muscle function.
- 21% showed tongue dysfunction.

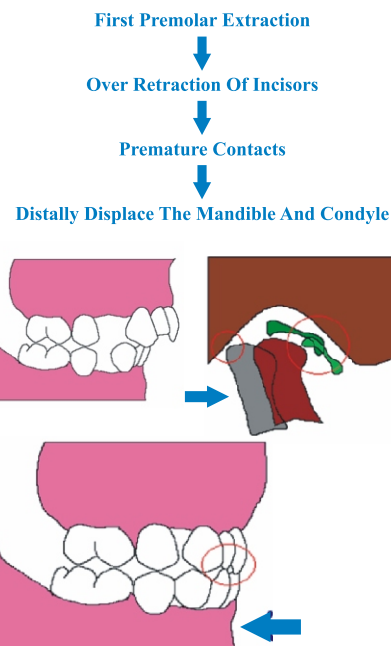
First Premolar Extractions And Tempo Mandibular Disorders

- Larsson and Rönnerman studied 23 Swedish adolescent patients who had been treated orthodontically 10 years previously 18 with fixed appliances and 5 with functional appliances (activators).

They concluded that extensive orthodontic treatment could be performed

without fear of creating complications of TMD

- Janson and Hasund studied 60 patients who were an average of 5 years out of retention. These patients presented with Class II, division 1, malocclusions and they were treated as adolescents. Thirty of the patients were treated with the extraction of first premolars and 30 were treated on a nonextraction basis. These authors also concluded that there was not a significant risk of developing TMD when undergoing orthodontic treatment with or without premolar extraction.
- Dibbets and Van der Weele stated: "It is evident that over a 15 year period there exists no relationship at all between the choice of not to extract or to extract or to extract either first premolars or any other teeth and the registration of pain, limitation of mouth opening, crepitation, and radiological signs.



Reverse Pull Head Gear , Class III elastics and Frankel Appliance

- Reverse Pull Head Gear and Class III elastics produce a distal driving force of the mandible and condyle. This would produce a reciprocal forward displacement of the disc and pressure on retrodiscal tissues. It is better to have the patient wear lower or reverse headgear and Class III elastics only during waking hours. Muscle tone (tension) positions the mandible forward. When worn at night, the muscles are relaxed and there is more distal pressure on the condyle because compensating muscle activity is not in play.
- There were several types of appliance systems with treatment commencing in the mixed dentition phase and continuing until growth was complete. These treatment techniques included: a functional appliance, 27 patients further treated with fixed appliances, and three patients treated with a reverse headgear. Gavakos in 1991 evaluated patients with class III malocclusions and found that there was no assessment of the symptoms of TMD prior to commencement of the orthodontic treatment
- Franco in 1992 evaluated Class II Division 1 malocclusions were evaluated with a control group and a Frankel II therapy group (Frankel appliances are a group of appliances that work by changing the environment of the lips and the cheeks and in so doing apply forces to move the teeth). The disc position was assessed using magnetic resonance imaging (MRI) and the outcome was that orthodontic therapy did not affect disc position.

The Herbst appliance

- Pancherz and Pancherz in 1982 studied 20 patients undergoing Herbst treatment. There was a high prevalence of muscle and joint tenderness 45% during treatment which decreased to 15% after treatment and to 10% 1 year after treatment.
- Hansen et al in 1990 did a follow up study on 19 male subjects treated with Herbst 7.5 years earlier. TMJ sounds were detected in 26% and muscle tenderness in 32%. 8% of the condyles were posteriorly displaced.
- Ruf and Pancherz in 1998 did a follow up study on 20 subjects who had undergone Herbst treatment 4 years earlier. They found moderate to severe signs of TMD in 25% of the subjects and mild signs and symptoms in 15% of the patients
- Ruf and Pancherz in 2000 studied 62 patients undergoing Herbst treatment.

They Observed

- All condyles were positioned significantly forwards but returned to the normal position after removal of the appliance. A temporary Capsulitis was present during the course of treatment. Herbst appliance did not have the

potential to cause muscular TMD. Also reduced the prevalence of structural bony changes of the TMJ. It did not induce disc displacement. And resulted in a stable disc position in partial disc displacement. Could not recapture the disc in cases of total disc displacement.

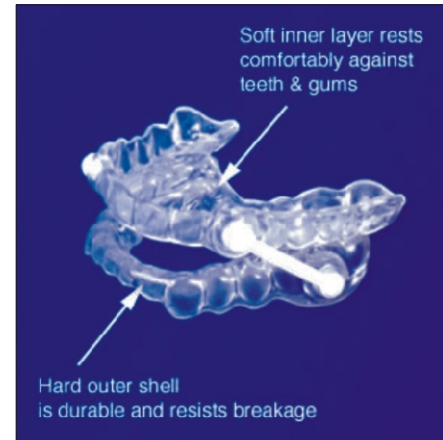
- In a study by Keeling in 1965, 60 participants were treated with a functional appliance, 60 were observed and 60 were treated with headgear and a bite plane. The participants were evaluated for TMD prior to treatment and then assessed by examiners who were blinded to the type of treatment provided to the patient. The data appeared to indicate that age was the most significant factor relating to developing TMD; in addition, participants who began the study with TMD were seven times more likely to have these symptoms at follow-up.
- Egermark in 2003 followed a cohort of patients who had orthodontic care between 1981 and 1983 and laudably followed up the patients 20 years later. The studies used a questionnaire and calculated the Helkimo index for evaluation of TMD. One of the conclusions was that there was no statistically significant difference in the prevalence of TMD with patients who had received orthodontic treatment when compared with those who had not received active orthodontic intervention..

Treatment Modalities

Treatment options for TMD include reassurance (patient education, self care and behaviour therapy), physiotherapy (such as ultrasound, megapulse, acupuncture, short wave diathermy laser, heat exercises, and biofeedback), splint therapy, drug therapy, occlusal adjustment, surgical intervention and combined treatment.

Acupuncture has been a particular treatment modality favoured by List (List 1993) and there are numerous articles in the literature in relation to this topic. It is, however, outside the remit of this review. Certain authors actually consider conservative, 'low tech' treatment as success rates from invasive treatment do not produce a better result (Stohler 1999)

Occlusal adjustment (OA) is the selective adjustment of the biting surface of the teeth by grinding the enamel (outer layer of the tooth) so that the upper and lower teeth fit together (the intercuspal position) harmoniously and is the subject of another Cochrane review (Koh 2003). The summary finding, however, is that there is no consistent data to support this permanent change in the shape of the occlusal surface of the teeth to treat TMD. Cochrane reviews of other treatments (e.g. splint therapy or surgery) are also underway or published (Al-Ani 2004; Guo 2009). It is not clear if malocclusion has a causal role in TMD. However, orthodontic treatment has been used in studies to prevent TMD. There are ethical and clinical implications if orthodontic treatment is found to be ineffective in preventing or initiating TMD.



Conclusion

There is no evidence to support or refute the use of orthodontic treatment for the treatment of temporomandibular disorders (TMD). In addition, there are no data which identify a link between active orthodontic intervention and the causation of TMD. Based on the lack of data, orthodontic treatment cannot be recommended for the treatment or prevention of TMD. Patients attending with symptoms of TMD prior to orthodontic treatment should be counselled appropriately with regard to the possibilities of the progression of the disorder (i.e. it may worsen, stay the same or improve). The apparent random nature of the progression of such a disease process demonstrates the need for clear, unambiguous informed consent.

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