What You Should Know About Temporomandibular Joint Dysfunctions If You're Carrying Out Orthodontics

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Abstract

The correlation between orthodontic treatment and temporomandibular joint dysfunction (TMD) is vague. Previous studies in this field tend to be either opinion or case reports, and most had conflicting conclusions. The aim of this article is to review the current evidence regarding the correlation of TMD, malocclusion and orthodontic treatment and lastly the orthodontic roles in the management of TMD.

Introduction

The possibility of a link between TMD and orthodontics was provoked in 1987 after the court ruling on the case of Brimm vs. Malloy. In this case, the jury awarded almost $1 million U.S. to a patient who had developed symptoms of TMD after orthodontic treatment.[1] The reasoning behind this judgment was that the patient had not received appropriate management when TMD symptoms first began during orthodontic treatment and that there had been inadequate pretreatment documentation of the patient's TMD status. Moreover, there was a lack of evidence around the orthodontics and TMD correlation.[2] Consequently, the orthodontist was blamed for causing the patient's TMD.

Evidence about the relationships among TMD and orthodontic treatment, occlusal interferences and malocclusion

Correlation among occlusal interference, malocclusion and TMD: There is some evidence regarding the association between TMD and anterior open bite (AOB), excess overjet, posterior crossbite and deep overbite.[3-5] Magnusson and Enbom found that the signs and symptoms of TMD are twice as high in a group of subjects with artificially induced nonworking side interferences compared with controls.[6] On the other hand, Sadowsky and BeGole concluded that nonworking side contacts are common and not related to the development of TMD.[7] Moreover, Proffit[8] found that 5–30 percent of individuals had TMD, yet 50–75 percent had at least a moderate malocclusion. Luther[9] showed a weak association among TMD, AOB, Class III malocclusion, crossbite and nonworking-side contacts.

Orthodontic treatment as a treatment option for TMD: A few studies suggest that orthodontic treatment causes the periodontal ligament to become temporarily painful, which might reduce bruxism habits and TMD symptoms.[8,10,11] On the other hand, Egermark et al. in their 20-year follow-up studies found that orthodontic treatment in childhood does not reduce the risk of developing TMD in adulthood.[12, 13]

Orthodontic treatment as a causative factor for TMD: Roth[14] thought that condylar position could be altered with the aid of some orthodontic mechanics such as the use of heavy intermaxillary elastics, headgear or chin cap treatments, which might lead to TMDs. Luecke and Johnston[15] investigated Roth's claims and found that orthodontic treatment does not force the condyle distally; in fact, it moves temporarily forwards by 0.7mm (in 70 percent). Similarly, Kircos et al.[16] found that there was no evidence that the TMJ disc position can be altered by

orthodontics, nor was there a correlation between disc position, clicking and TMD.

It was proposed that tooth extraction for orthodontic purposes and orthognathic treatment could force the condyle distally and trap the disc anteriorly,[17] but recent evidence showed that the frequency of TMD symptoms is similar in the cohort treated with or without extraction.[18-20] The latest Cochrane review by Luther et al.[21] concluded that there is insufficient research data to make any claim of a relationship between active orthodontic intervention and TMD.

Orthodontic management of patients presenting signs and symptoms of TMD before or who develop them during treatment

The available evidence suggests that orthodontic treatment does not *cause* TMD; it could be present or appear during treatment, however, and therefore certain protocols should be followed.

During the pretreatment phase, a comprehensive assessment of the TMJ should be noted, and updated at 6-month intervals.[22] If a patient already has TMD, then he should be informed that orthodontic treatment has no influence on its progression.

If the TMD is severe and acute, it is better not to commence orthodontic treatment until the condition is stabilised using a conservative treatment under supervision of a specialist.[23,24] This is important because patients who suffer from TMD may develop reversible abnormal path of closure and mandibular position which is misleading for orthodontic diagnosis.[25]

If a patient develops signs and symptoms of TMD during treatment, then a number of steps can be taken. Initially it is important to reassure the patient that TMD is not necessarily a progressive problem and for many, symptoms spontaneously improve over time.

Table 1: Specific treatment approaches for TMD

Treatment approach	Example
Patient education and self-care [27,28]	Habit awareness and modification
Home physiotherapy programme [29,30,31]	• Massage and exercise therapy • Short-wave diathermy therapy • Ultrasound therapy • Laser therapy
Cognitive behavioural intervention [28,32]	• Stress management • Counselling • Hypnosis
Pharmacology	• Non-Steroidal Anti-inflammatory Drugs (NSAID) [33] • Benzodiazepines [34] • Corticosteroids [35] • Hypnotics/Anxiolytics/Tricyclic antidepressants [36]
Splint therapy [37-39]	• Soft splints • Localised occlusal interference splint • Anterior bite plane • Anterior repositioning splint • Stabilisation splint
Occlusal equilibration [27]	Removal of nonworking side contacts by selective grinding. However, there are contradictory findings in terms of the effectiveness of occlusal adjustment in the management or prevention of TMD. [40,41]
TMJ surgery	1. Closed surgical procedures [42] • Arthocentesis • Arthroscopy 2. Open surgery [27] • Diskoplasty • Disk repositioning and repair • Arthroplasty including high condylectomy, diskectomy (meniscectomy) with or without replacement. [27,43]

An explanation of the relationship with stress is also useful supplied with some practical advice about topics such as resting the joint, soft diet, analgesics, and application of heat pack to relax muscles.

The orthodontist can modify the treatment by reducing forces of orthodontic headgear, removing or lightening intermaxillary elastics and eliminating occlusal interferences by using a bite plane.[24]

As a last resort, if symptoms continue, treatment can be suspended and patient should be referred to specialist for specific treatment approaches (Table 1, p. 37). The role of the orthodontist should continue postoperatively by monitoring the patient throughout retention phase.[26]

Conclusion

Orthodontists should be familiar with pathophysiology of TMJ-related disorders, latest evidence and guidelines. The British Orthodontic Society advice sheet with regard to management of patients with TMJ problems is highly recommended. A thorough assessment and record keeping are mandatory before and during orthodontic treatment. ■

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