

## Temporomandibular Joint Disorders and Orthodontics - A Review of Literature

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### ABSTRACT

The relationship between the temporomandibular joint and orthodontic treatment has always been a topic of discussion amongst dental health care professionals. Prevalence studies show the occurrence of temporomandibular disorders in young adult and teenaged of which 30% of the population undergo orthodontic treatment during this phase. Therefore, there have been conflicting opinions if the orthodontic treatment causes any form of temporomandibular dysfunction; or treating the temporomandibular dysfunction via orthodontic treatments. To better understand these conflicting opinions a need arises to have extensive studies encompassing all factors that establish a proper association between temporomandibular disorders and orthodontic treatment.

**Keywords:**

Temporomandibular joint disorders, temporomandibular joint, orthodontics, orthodontic treatment

### 1. Introduction

Temporomandibular joint (TMJ) is the articular joint connecting the condyle mandibular and the mandibular fossa of the temporal bone. TMJ is a complex synovial compound with complex functions. It has an articular disc that completely separates the compacted space into separate upper and lower compartments. TMJ is a hinge sliding joint with a hinge action(rotation) and a sliding action(translation). Morphological changes may alter joint biomechanics and/ or produce joint sounds such as clicking or crepitation.

Temporomandibular disorders (TMD) are a collection of dental and medical conditions affecting TMJ and / or associated structures such as skeletal muscle, and the tissues of the affected tissues. Since all the muscles related with manducate can be affected by the disease, the pain is often felt away from the limb, hence the name Craniomandibular Disorder. <sup>1</sup>

The symptoms of the disorder may affect the quality of an individual's life and have a psychogenic impact on an individual. It is believed that the pain caused in TMD is like that of lower back pain.

**Table 1-** TMJ disorders can be classified as <sup>2,3</sup> :-

Articular disorders <ul style="list-style-type: none"> <li>● Congenital or developmental disorders</li> <li>● Condylar hyperplasia</li> <li>● First and second branchial arch disorders</li> <li>● Idiopathic condylar resorption</li> </ul> Degenerative joint disorders <ul style="list-style-type: none"> <li>● Inflammatory :- capsulitis, synovitis, polyarthrides(rheumatoid arthritis, psoriacarthritis, ankylosing spondylitis, reiter syndrome, gout)</li> </ul>	Masticatory muscle disorder <ul style="list-style-type: none"> <li>● Local myalgia</li> <li>● Myofascial pain disorder</li> <li>● Myofibrotic contracture</li> <li>● Myositis</li> <li>● Myospasm</li> </ul> Neoplasia
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<ul style="list-style-type: none"> <li>● Non inflammatory: osteoarthritis</li> <li>Disk derangement disorders                         <ul style="list-style-type: none"> <li>● Displacement with reduction</li> <li>● Displacement without reduction</li> <li>● Perforation</li> </ul> </li> <li>Infection</li> <li>Neoplasia</li> <li>Temporomandibular hypertrophy                         <ul style="list-style-type: none"> <li>● Dislocation</li> <li>● Joint laxity</li> <li>● Subluxation</li> </ul> </li> <li>Temporomandibular hypomobility                         <ul style="list-style-type: none"> <li>● Ankylosis: true ankylosis or pseudo ankylosis</li> <li>● Postradiation fibrosis</li> <li>● Trismus</li> </ul> </li> <li>Trauma                         <ul style="list-style-type: none"> <li>● Contusion</li> <li>● Fracture</li> <li>● Intracapsular hemorrhage</li> </ul> </li> </ul>	
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The result of health quality can be how emotional and community-based factors interact with information transform in the central nervous system to impact health.

Previous studies have reported that about 32% of people report at least one of the symptoms of TMD including walking pain, tingling, other joint sounds, difficulty opening, muscle fatigue, jaw stiffness, and about 75% at least one sign of joint dysfunction, combined sounds, the gentleness of beating. Significantly, all studies show, with one exception, that women are more affected than men. This may be due to the difference in thresholds of pain perception in the two genders.<sup>4</sup>

The etiology and pathophysiology of TMD is not well understood. After cases include dental treatment as the cause of TMD in orthodontics patient in the 1980s, there were extensive studies performed by the orthodontic health care professionals. The various studies performed (from 1995-2010) concluded that occlusion was considered as a cofactor and refuted or reduced the importance of occlusal factors in the diagnosis of TMD. Other etiologic factors such as *multicausal include genetic, developmental, physiologic, traumatic, pathologic, environmental and behavioral factors are considered more important.*<sup>5</sup>

### Occlusion and TMD

**McNamara, Seligman and Okeson** has written 8 contradictory inferences the importance of occlusion as an etiologic factor: -<sup>6,7</sup>

- 1) Signs and symptoms of TMD occur in healthy people.
- 2) The signs and symptoms of TMD increase with age, especially during teen age. Therefore, TMD arising between dental treatment may not be related to orthodontic treatment.
- 3) Orthodontic treatment around puberty does not increase or decrease the risk of developing TMD later in life.

- 4) Tooth Removal as part of the dental treatment program does not increase the risk of developing TMD.
- 5) No higher risk of TMD is associated with any type of orthodontic equipment.
- 6) Although stable prevention is the goal of rational orthodontic treatment, failure to achieve proper gnathological closure does not cause the signs and symptoms of TMD.
- 7) There is no way to prevent TMD shown.
- 8) where severe signs and symptoms of TMD are present, simple treatment may reduce them in most patients.

*Winocur* and *Emodi-Perlman*, in their extensive literature search mentioned concerning the occurrence of TMD signs and symptoms in the healthy people otherwise; it may increase with age; hence, TMDs that occur during dental treatment can be accidental and may not be related to the treatment itself.<sup>8</sup>

In the observations by *Katzberg RW et al*, an increase in internal TMJ confusion in non-MRI volunteers who showed an increase in disc stroke in 25 of the Seventy six (33%) volunteers and Seventy Nine patients in 102 (77%) with significant statistically significant differences ( $p < 0.001$ ). No statistical link was noted between the history of previous dental treatment and the internal confusion of TMJ.<sup>9</sup>

#### **Orthodontic extractions and TMD**

In studies regarding the association of TMD and orthodontic extractions an evaluation of 29 *orthodontically treated patients with maxillary and mandibular premolar extractions showed no significant differences in TMD signs and the symptoms.*<sup>10</sup> In a study conducted by *Artun J et al*, in 29 woman patients treated with Class II, Division 1 malocclusion it was considered that the condylar position was far behind the right medial and medial segments in patients treated with the removal of maxillary first premolar.<sup>11</sup> In a study involving 65 females, it was inferred that the orthodontic correction with or without tooth removal did not grow the risk for TMD or aggravate pretreatment indication of TMD.<sup>12</sup>

#### **Malocclusion, without treatment, and TMD**

According to studies conducted by *Helm*, which included a twenty year follow-up using questionnaires to self-report symptoms and signs showed that while most aspects of malocclusion were consistent with patients with TMD there was no strong correlation between them and thus malocclusion tests, on the basis of recognise those at risk of TMD, were inappropriate.<sup>13</sup>

#### **Orthodontic treatment and improvement in the signs of symptoms of TMD**

A previous study by *Henrikson*, which examined young girls being treated, showed that in the treatment group there was a significant reduction in the severity of symptoms after treatment, but that click, a common symptom of TMD, increased both treated, untreated and common groups within 2 years of monitoring.<sup>14,15</sup>

#### **Orthodontic treatment and the development of TMD**

*Peltola* investigated the hypothesis that radiographic condylar findings in treated patients are associated with clinical TMD. The frequency of temporomandibular joint crepitation was higher in treated (27%) subjects than controls (8%). It was suggested that crepitation may be due to osteoarthritis in the present subjects.<sup>16,17</sup> Further, 12-year follow-up study showed that although

radiographic findings worsen with duration, the subjective symptoms and signs did not seem to cause any significant clinical problems to the patients<sup>18</sup>

For the purpose of TMD treatment should be to reduce pain and improve performance. TMD treatment options include validation (supportive education to patient, self-aid and behavioral therapy), physiotherapy (such as ultrasound, acupuncture, wave diathermy laser, temperature tests, and bio-feedback), intraoral therapies (splint therapy), drug therapy (NSAIDs, opiates, muscle relaxants, low-dose anti-depressants), occlusal correction, surgical interventions and combination therapy.<sup>19</sup> Some authors view over-the-counter, 'low-tech' treatments as success rates from aggressive therapies do not produce the best results. symptoms need treatment while some authors' data, estimated that 3.6% to 7% of people need treatment.<sup>7,20,21</sup>

## 2. Conclusion

Temporomandibular joint dysfunction is a multifactorial disease and it's hard to signify a direct association between temporomandibular joint disorders and orthodontics. The literature review suggests an absence of adequate evidence that prove any association of orthodontic treatment in treating TMD or causing it. There haven't been effective studies and researches carried out that give an effective association of TMD with associated tooth extraction in an orthodontic treatment, and type of malocclusion in treated patients or if orthodontic treatment have any influence on the severity and prevalence of TMD. Such lack of data and evidence promotes the requirement of vast studies and researches that point out if orthodontic treatment is associated with temporo-mandibular joint disorders

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