

Malocclusion and TMJ disease- A review of literature.

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ABSTRACT: Temporomandibular disorder (TMD) is defined as a collective term that enfolds a number of clinical problems that involves the masticatory muscles, the temporomandibular joint(TMJ) and the associated structures and forms a prevalent clinical entity afflicting the masticatory muscles. It is of multi-factorial in nature and often requires meticulous examination and treatment planning. The prevalence is higher in older people and ranges from 10% to 70% of the general population. This paper discusses about the malocclusion and temporomandibular disorder.

Keywords: Temporomandibular disorders, malocclusion, chronic pain, masticatory muscles, multifactorial

I. Introduction

Temporomandibular disorders also known as TMD is a very important disorder that is often discussed in dentistry^[1]. Temporomandibular disorder (TMD) is defined as a collective term that enfolds a number of clinical problems that involves the masticatory muscles, the temporomandibular joint(TMJ) and the associated structures and forms a prevalent clinical entity afflicting the masticatory muscles^[2]. It is considered to be a musculo-skeletal disorder as it also the main cause of pain of non dental origin in the oro-facial region including the head,face and related structures^[2]. Although the etiology of the temporomandibular disorder is poorly understood and is said to be multifactorial,it is often concluded that malocclusion is the one of the main causes of the disorder, other causes being parafunctional habits and hyperlaxity of the joint^{[2],[3]}.

The ability to talk freely , chew openly and yawn openly without any restrictions is all due to the presence of a hinge joint on the either side of the face known as the Temporomandibular Joint. It is made of complex structures such as joints,tissues,muscles and vessels. It is a hinge joint that connects the lower jaw to the temporal bone of the skull, which is immediately in front of the ears on each side on the head. The presence of this joint allows the free movement of the jaw during mastication and speech. The presence of muscles that is attached to and surrounding the joint controls the position and movement of the jaw. Grinding or clenching, injury to the jaw, dislocation of the discs and malocclusion are some of the many causes that contribute to the Temporomandibular Disorder(TMD). Temporomandibular disorders occur as a result of problems to the jaw, jaw joint and surrounding facial muscles that control chewing and moving the jaw^[2]. Of all of these factors,occlusion is most often cited as one of the major aetiological factors causing temporomandibular disorders^[2]. Several theories are based on the presumption that there is an association and have justified the use of occlusal appliance therapy , anterior repositioning appliances , occlusal adjustments ,orthodontic and orthognathic treatment^[2].

II. Discussion

The prevalence of Temporomandibular disorders has been reported to be high and most often ranges between 10% to 70% in general population with a greater prevalence in older people^[4]. It has been suggested that malocclusion may play an important role in the development of temporomandibular disorders^[4]. Historically, the earliest report of a connection between occlusion and temporomandibular joint function was suggested by Costen, an otorhinolaryngology surgeon, who hypothesized that changes in occlusion for example deep bite and loss of vertical dimension led to changes in the anatomy of the temporomandibular joint, creating ear symptoms^[2]. He was quoted saying “ The actual source of this group of complaints was confirmed by the marked improvement which followed correction of the overbite, renewal of molar support to take pressure off the condyle and establishment of proper articulation of the condyle within the fossa”^[2]. Although this hypothesis was only based on 11 cases, the dental practioners started treating patients ,who has been diagnosed with ‘Costen Syndrome’ with bite-raising appliances , which appears to be very useful^[2]. Costen Syndrome is a complex of symptoms that includes loss of hearing, dizziness, headache, and a burning sensation of the throat, tongue, and side of the nose; its anatomical and physiological causes are uncertain but was originally believed to be the result of temporomandibular joint syndrome.

From then on, occlusal interferences have been considered as risk factors for TMD^[2].Ramfjord through an electromyographic (EMG) study on 34 patients, stated that “ The most common occlusal factor in bruxism is a discrepancy between centric relation and centric occlusion. Invariably such discrepancy is accompanied by

asynchronous contraction or sustained strain in the temporal and masseter muscles during swallowing^[2]. He then suggested occlusal equilibrium to provide muscular balance and to eliminate bruxism^[2]. The proposed chain of events proposed that interference acts as a cause for bruxism, which may result in overload of the masticatory muscles, tenderness, pain and TMJ clicking^[2].

Alterations in occlusion such as malocclusions, crossbite, open-bite, occlusal interferences, prominent overjet and overbite, crowding and missing teeth have been identified in different studies as triggering factors^[4]. There appears to be, weak association between occlusal factors and TMD and in the other hand of the studies, which was published in the literature are of a cross sectional studies have shown few firm results can be concluded regarding the cause and effect relationship^[4].

Donald Selligman and Andrew Pullinger, of the University of California are probably the authors who have shown the greatest hardship in studying the relationship between TMD and occlusion^[3]. As published in their study in the year 2000, a comparison was made of a group of women with internal derangement of the temporomandibular joint versus women who were asymptomatic control^[3]. The subjects with disc displacement were mainly characterized by unilateral posterior crossbite and long displacement of centric relation to the position of maximum intercuspitation^[3]. The authors later concluded that occlusal alterations may be a cofactor in the identification of patients with TMD and that some differences in occlusion may be the result rather than an etiology of TMD^[3].

The study results which was published by Donald Selligman and Andrew Pullinger was partially refuted by Hirsh et.al, who after studying a total of 3033 subjects concluded that greater or lesser overjet or overbite even at extreme values does not constitute a risk factor for the presence of joint sounds, such as reciprocal clicks and crepitation^[3].

In other work published by Magnusson et.al which involved the follow-up of 402 patients over a period of 20 years, has concluded that occlusal factors are weakly associated with temporomandibular disorder, although forced laterality between centric relation and maximum intercuspitation, and unilateral crossbite deserves due attention as a possible risk factors in the appearance of temporomandibular disorder^[3]. Interference and an increase in the activity of the masticatory muscles in patients who are occlusally hypervigilant has been hypothesized to lead to pain and dysfunction^[2]. Occlusal hypervigilance is a perceptual habit that involves the subjects amplification of a different sensation and not just the ones that are painful^[2]. If attention is focused habitually on sensation of a particular type, the degree of amplification increases and becomes autonomous, according to this hypothesis^[2].

Among other malocclusions, posterior crossbite which is transversal occlusal discrepancy is thought to have a much stronger impact on the proper functioning on the masticatory system^[2]. Several problems has been associated with unilateral posterior crossbite^[2]. It has been suggested that differed morphological relationship between upper and lower dentition may cause a difference between right and the left side of condyle glenoid fossa complex and in height of the condyle and the ramus resulting in uneven growth of the mandible^[2]. Secondly, it has been hypothesized that crossbite is a compensatory curve in the visceral cranium for transmission of the asymmetry from the body to the skull^[2]. This hypothesis states that, the whole body posture and disorders in functions such as swallowing and chewing is influenced by the dental occlusion can be transmitted to the distal musculature along the so-called 'muscle chains'^[2]. This in turn causes the alteration of the disc-condyle relationship, which is responsible for disc displacement and TMJ clicking^[2].

In the view of the information provided by the literature and studies, the precise role of occlusion in TMJ pathology does not seem to be clearly defined^[2]. The proof linking the malocclusion to the Temporomandibular disorder should have several criteria as suggested by Hill in 1965^[2]. First and foremost, the effects should follow the cause, whereby in literature and studies, it is shown to be the opposite, for example muscle pain causes a change in occlusion^[2]. Furthermore in case of evidence, the scientific literature should be consistent^[2]. But this does not apply to Temporomandibular disorders^[2]. The publications from 1995 to 2009 states that there increasing numbers of studies that reduce the importance of the role of occlusal factors in the aetiology of TMD^[2].

III. Conclusion

In such cases, the biological possibility is not satisfied because the cause-effect relationship is not on par with the current knowledge of the mechanism of the disease^[2]. It is a multifactorial disorder that requires in depth knowledge and research^[3]. Although there are management of the disease both surgically and therapeutically and it is always advised that prevention at an earlier stage is always better. It can be concluded that dental occlusion is currently a declining factor, although it can be considered an important cofactor.

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