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Occlusal Considerations In Temporomandibular Joint Functioning And Its Management: A REVIEW

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Abstract:

This review is about aetiology of temporomandibular joint disorders and its effects on occlusion, its interferences with relationship to temporomandibular joint discomfort and need of occlusal adjustment. The focus of this review will be etiological factors causing temporomandibular discomfort and its prosthodontic management for the prevention of same. The scope of prosthodontics has been a boon to serve mankind. Mastication phonation and aesthetics has been a miracle in rehabilitating the patients since a long time. The ultimate health of a patient depends upon his absorption of various nutrients and it depends greatly on the masticatory efficiency and mastication depends upon the occlusion. Temporomandibular joint functioning and occlusion should be in harmony with each other it is otherwise affected by either of them. This topic is reviewed regarding the aetiology and its effect on functioning of temporomandibular joint as it governs the functioning in all the three planes hence, we need to understand the dynamics of its movement and its effect on the occlusal contacts.

Key words: temporomandibular joint, occlusion, interferences.

Introduction:

Temporomandibular disorders (TMD) according to the Guidelines of the American Academy of Orofacial Pain, 'a collective term embracing a number of clinical problems that involve the masticatory musculature, the temporomandibular joints and associated structures, or both.'

Temporomandibular disorder is a cluster of analogue disorders that are characterized by pain and symptoms of dysfunction. Since TMD is no longer considered to be one syndrome with one common aetiology, or as a syndrome with a multifactorial aetiology, the differential diagnosis is of particularly importance.[1]

Many short-term studies have described a reduction of signs and symptoms of Temporomandibular disorders after occlusal adjustment. The restoration of a worn dentition has been advocated in the treatment of Temporomandibular disorders. The mechanical repositioning of displaced disks by means of prosthodontic reconstruction has been proposed; however, these studies usually fail to outline the necessary long-term follow-up and to consider the advantages of this approach over simple clinical methods, including the use of interocclusal appliances or physiotherapy.[2]

Many authors consider occlusal disturbances important in the aetiology of mandibular dysfunction.[3]

"Occlusal adjustment" may refer to a variety of procedures. In this article, occlusal adjustment refers to reshaping of the teeth by precision grinding as described by Dawson. [4]

TMJ disorders are characterized by intra-articular positional and/or structural abnormalities. [6]

Current concepts on aetiology:

Predisposing factors:

Usually systemic, psychological (personality, behaviour) and structural (occlusal features, extensive overbite, loss of molars, open bite, joint laxity) factors are classified in the predisposing group, increasing the risk for TMD. [1]

Initiating factors:

The following are often considered to be direct initiating (or precipitating) aetiological factors: trauma, (micro- and macro-trauma); parafunctional habits; adverse or overloading factors. Perpetuating (or sustaining) factors They are mechanical and muscular stress, and metabolic problems, but mainly behavioural, social, and emotional difficulties [1]

Occlusal interferences:

following occlusal disharmonies as the most severe:

(1) interference with closure, habitual and/or terminal hinge;

(2) excursive interference on the non-working (balancing) side;

(3) steep cuspal inclines on the working side leading to hypofunction. [1]

Artificially inserted occlusal interferences: In order to simulate the ‘classically detrimental occlusal interferences’ small restorations were placed in maximal intercuspal position or on the non-working or working side. The inference remained in place on average for 1–2 weeks and the studies investigated changes in EMG. [1]

Dysfunction and loss of molar support: Loss of molar support has long been considered an important aetiological factor for TMD. It was concluded that the lack of molar support subjected the joint to unfavourable loading, more wear, and more strain. [2]

TMD with denture wearer patients: The vertical dimension of occlusion is an important factor in provoking pain and dysfunction. [2] An increase in the vertical dimension causes temporomandibular disorders (TMD), an elevation induces an increase in the tonicity of elevator muscles, with a possible onset of muscle pain, increased tooth mobility and finally the intrusion of teeth.[7]

Disk displacement/disk interference disorders: Disk displacements are not uncommon in TMD patients. These conditions have been divided into disk displacement with reduction (normalization of the disk–condyle relationships) on opening and disk displacement without reduction (the disk remains displaced anteriorly, with or without limited opening. Splints are fabricated for the jaw in a protruded position with the disk and condyle in a ‘corrected’ or ‘normal’ relationship, the so-called therapeutic position. Clicking sounds of the TMJs are usually considered to be an indication of disk displacement. [2]

Treatment:

Treatment of the occlusion was for a long time considered to be the most important and most efficient strategy to alleviate the pain and to restore function, most general practitioners continue to treat TMD patients with occlusal adjustment and prosthetic restoration of lost teeth.[1]

Occlusal adjustment: Occlusal adjustment is no longer an elective procedure but a mandatory one for patients requiring restorations and those in treatment for TMJ dysfunctions [1]

Occlusal adjustment is selective adjustment of the occlusal surface of teeth by grinding the enamel so that the maxillary and mandibular teeth fit together (the intercuspal position) harmoniously, eliminating centric interference.[8]

Occlusal adjustments can be made to ensure that when the lower jaw is moved to one side, the teeth on the other side do not touch (non-working side contacts), removing working and non-working side interferences, and that when the lower jaw moves forward, the back teeth do not touch, eliminating protrusive interferences.

Another technique for occlusal adjustment is computer-guided immediate complete anterior guidance development, which has shown some success in treating myofascial pain by decreasing disclusion time to less than 0.4 seconds each excursion.[8]

Occlusal adjustment used for prevention of TMD: three indications where occlusal interferences should be removed:

1. if in an existing occlusion without TMD, restorations are required and some occlusal disharmonies should be removed before the restorative treatment;

2. if extensive reconstructions must be made and centric relation is selected as the jaw reference position, gross interferences between centric relation and centric occlusion must be removed;

3. if successfully treated TMD patients cannot return to pre-existing occlusion without recurrence of symptoms [1]

Patients with syndromes:

Ex. Phantom bite syndrome: They constitute a small, but important, group of patients because they go from one dentist to another and request new occlusal therapy, never becoming cured or satisfied. The treatment can interest from dental restorations by utilizing long-term reversible methods, such as interocclusal appliances [2]

Considering the multiple aetiology of mandibular dysfunction, it is evident that the use of only one method of treatment will not give the best overall results. [3]

Therefore, there are various treatment options: A cause-oriented therapy is possible only if the cause of the symptoms (which may be at a completely different location) is known and can be eliminated by treatment directed specifically toward it. Symptomatic therapy, on the other hand, is applied for a generalized reduction of symptoms, frequently without knowing what the etiological factors are. The concept of symptomatic therapy includes many alternative therapeutic measures. [4]

Elimination of Musculoskeletal Impediments: The components of physical therapy are: cold and heat applications • ultrasound • laser treatment, transcutaneous electric nerve stimulation (TENS) [5]

Manipulative therapy: can be done by mobilizing the joint capsule • stretching the muscles • strengthening weak muscles. [5]

Occlusal Splints: Occlusal splints attempt to create equal contacts of the posterior teeth and to secure the centric or therapeutic mandibular position through maximal intercuspation against the splint. Occlusal treatment is that the occlusion can be altered without making it necessary to then modify the patient's natural dentition irreversibly.

- Relaxation splints: Occlusal devices that are designed primarily to normalize the tonus of the muscles of mastication and at the same time to distribute occlusal forces equally are called relaxation splints. The relaxation splint covers all the anterior and posterior teeth in that arch and provides simultaneous uniform contacts in the premolar and molar regions. [5]

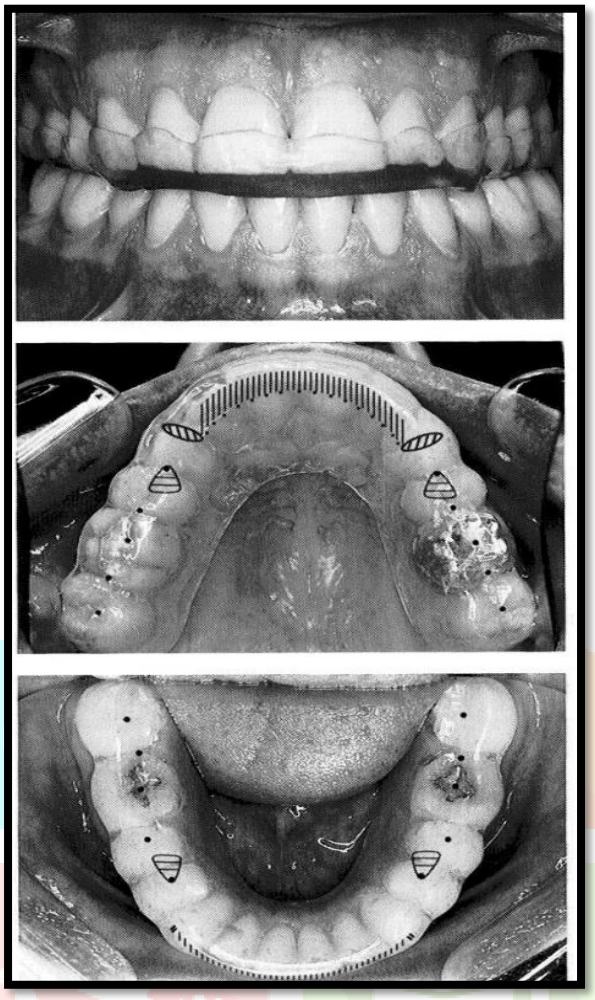

Fig.1 Relaxation splints

- Stabilization splints: The main purpose of the stabilization splint is to secure the relation of maxilla to mandible that the functional therapeutic steps (physical therapy, temporomandibular joint surgery, orthognathic surgery, etc.) brought about and to test the treatment results for a term of at least 4-6 weeks before the definitive restorations are prepared. This is accomplished by providing maximal occlusion. Stabilization splints differ from relaxation splints in that their occlusal indentations are deeper, although in most cases they also provide anterior or canine guidance. They must be worn day and night.[5]

Fig. 2 Occlusal splint to stabilize the mandible

- Decompression splints: The decompression splint is used to treat posteriorly or superiorly compromised temporomandibular joints in which a pronounced constriction of the joint capsule, muscles, and ligaments interferes with the relief of the articular structures that would otherwise be provided by the occlusion. Its design corresponds to that of a relaxation splint with anterior guidance. The actual relief of the compromised joint structures is brought about by appropriate manipulation (inferior traction, translation) to stretch the capsule, muscles, and ligaments. The purpose of the decompression splint is simply to maintain the new inferior or anterior position of the condyles by means of a stable occlusion.[5]

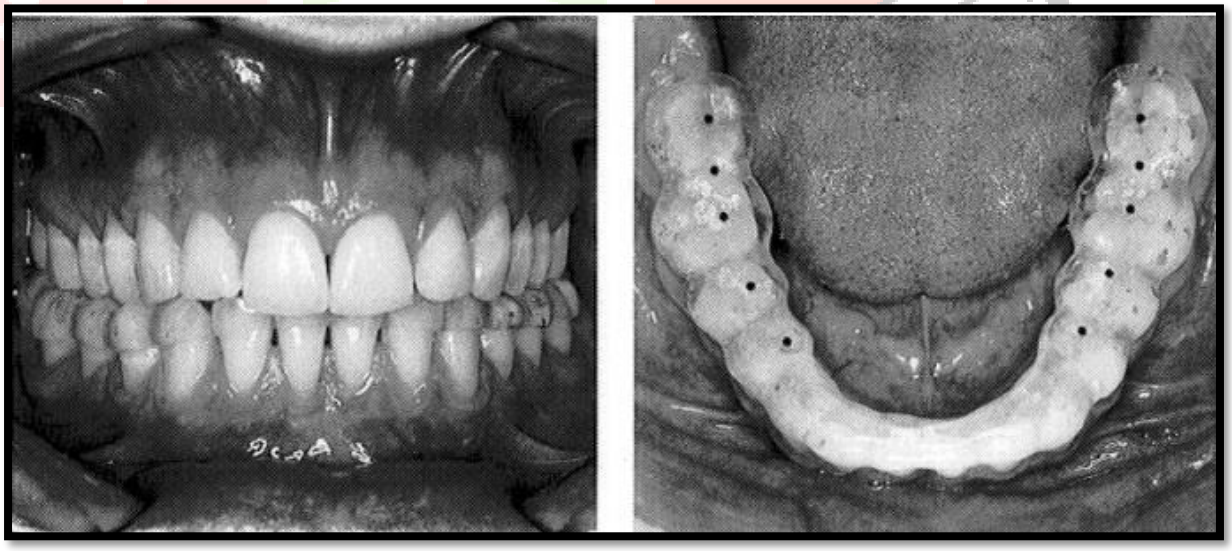

Fig. 3 Decompression splints

- Repositioning splints: A repositioning splint is an occlusal device inserted to reposition a disk that is partially or totally displaced anteriorly when the teeth are in maximal intercuspation. The maximal intercuspation of the repositioning splint is built up in the therapeutic mandibular position.[5]

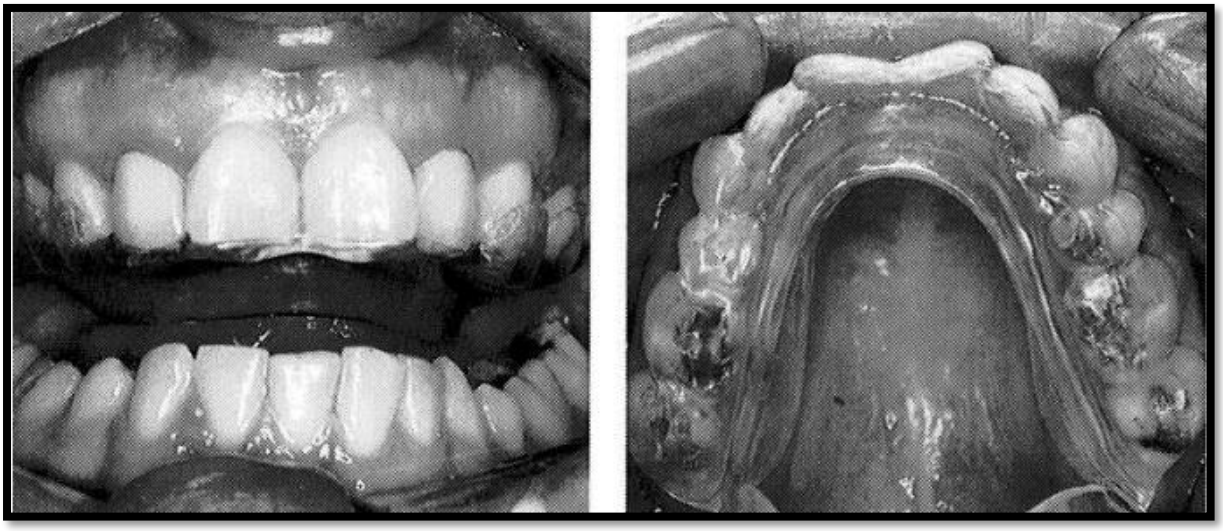

Fig. 4 Repositioning splints

Definitive Modification of the Dynamic Occlusion: Dynamic occlusion is defined as tooth contacts during mandibular movements. With movement, the location, direction, and number of tooth contacts change. One dynamic occlusal scheme cannot apply to all patients because of the complexity of the mandibular movements [5]

Definitive Alteration of the Static Occlusion: is accomplished mainly by a combination of:

• selective grinding

• prosthodontic restorations,

• orthodontic and surgical corrections.[5]

Injections (minimally invasive): Hyaluronic acid as an injectable, large, linear glycosamino-glycan has been studied in other body joints.

Intra-articular injections of corticosteroids are of limited use in other joints of the body. The main limitations of repeated intra-articular steroid injections are the risks of infection and the destruction of articular cartilage. [6]

Invasive Surgical Modalities (Bone and Joint Procedures): arthroplasty, autogenous hemiarthroplasty, osteotomy, osteodistraction. [6]

Discussion and Conclusion:

- Occlusion does not play a major role in the aetiology of TMD; the impact of occlusion is not zero, however, it should be determined in each individual case.[1]
- If occlusal adjustment is performed it should be a limited in nature. Some recent results have indicated that occlusal adjustment in children and adolescents might reduce the later occurrence of TMD signs, and the demand for TMD treatment.[1]
- There is indication that a combination of conservative treatment modalities including counselling, interocclusal appliance and specific physiotherapy will alleviate pain and normalize function in a majority of TMD patients.[2]
- It is obvious that the elimination of occlusal disturbances was the effective treatment because the changes in clinical signs of mandibular dysfunction were independent of the use of splints as an aid to the treatment.[3]
- The realization that occluding teeth, as one of the craniomandibular articulations, have lost their capacity for passive adaptation by means of normal functional wear brings about a new

interpretation of occlusal contact relations. Even if TMDs did not progress at all, they could be a significant health problem if the same persons are repeatedly affected.[4]

- A proper understanding of the biomechanical behaviour of the joint components and biomechanical environment within the TMJ also provides better focus in the search for and selection of mechanically compatible synthetic or regenerative biomaterials for TMJ reconstruction.[6]

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