

Review Article

Interdisciplinary Dentistry & Occlusion Medicine

A new approach in tmj (tmd) treatment

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Introduction

Since the ENT-specialist Costen introduced his definition of tmd (temporomandibular disorders or craniomandibular dysfunction = CMD) in the 1920`ties the nightmare of most dentists started. Symptoms like occlusion issues, headaches, facial pain, or ear noises after implementing new crowns or more complicated prosthodontic works in patients started to occur especially after high-speed devices were invented and getting used in daily dental treatments.

While the percentage of affection is still around 70% in the population the percentage of those who are acutely suffering severely from temporomandibular disorders increased in Germany from 7-13% in the first decade of the 2000s to 20% within the last few years (Gesellschaft für Zahngesundheit, Funktion und Ästhetik, 2019). Till the early 1970`s the correlation between occlusion and this kind of symptoms was not very well known especially between occlusion and body posture.

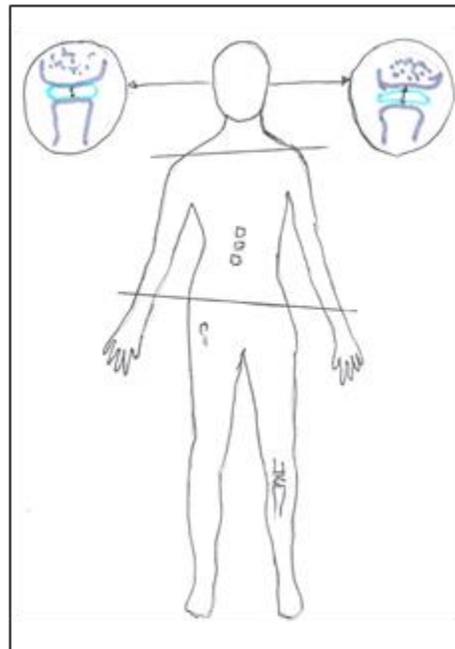
In this essay, it is a purpose to give an overview of a systematic treatment guideline.

Interdisciplinary dentistry & occlusion medicine

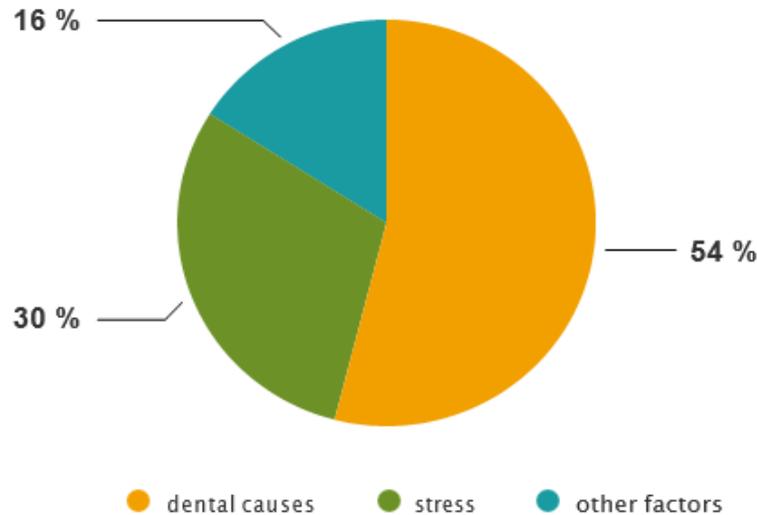
Temporomandibular disorders, temporomandibular joint disorder, stomatognathic system disorders, myopathical disease, craniofacial pain disorders or craniomandibular dysfunction... They are all synonyms to describe the complex occurrence of a disbalance in the stomatognathic system with a cascade of chain reactions.

Why interdisciplinary dentistry?

The answer is obvious: The impacts of this loss of balance have impacts in many areas and function circles of the body! Starting with the neuromuscular system, skeletal system and body posture, otorhinolaryngological system, gastrointestinal system and even in the endocrinological system



Scheme1: The effect of asymmetry of the temporomandibular joint in the spine and posture



Scheme 2: Predominant factors of craniomandibular dysfunction

The influence of malocclusion and neck problems is immense. Hansson et al. discovered that 85% of the neck pain and spasm issues are initiated by a malocclusion. Also, it is an evidence based fact that 30% of tinnitus cases relate to problems with the masticatory system. Lotzmann et al. published 1996 research that 50% of the diagnosis “trigeminal neuralgia” from a neurologist in Germany is false as the main cause was rather a craniomandibular dysfunction. Dentists should be aware of the complexity of this disease that the symptoms are not always mainly located in the masticatory system and that there is a variety of overlaps in other medical disciplines. As Raveendranathan described in the last issue of this journal about *Neuromuscular Dentistry* many patients are visiting different types of specialists without any positive outcome because tmd is not diagnosed.

This type of patient is mostly getting lost in the corner of “psychosomatic cases”: They have pain and symptoms but no one can find any reason nor advise a causal therapy... This can cause psychological or psychic problems! There are many more examples that can be figured out but the main point is: The dentists need support from other medical professionals such as physiotherapists, ENT specialists, orthopaedists, etc. depending on the case and the symptoms which occurred. This is the reason for the interdisciplinary approach.

Even though that is accepted that 54% of the etiological factors are dentally originated (**scheme 2**) it is still a big controversy discussion going on between dental scientists if the

malocclusion is a cause of craniomandibular dysfunction or not. But the fact is that even if a malocclusion could be present in a well working function stomagnathical system if the neuromuscular system is in balance and the adaption and compensation mechanisms are intact! One other (big) point is for sure: There are no cases of tmd where the occlusion is not compromised!

How should the treatment of craniomandibular dysfunctions have to be?

It should be as simple as possible with:

1. a systematical treatment protocol
2. a predictable treatment success!

There are lots of different approaches to treat patients with craniomandibular disorders following different techniques and equipment but to be scientific acceptable the findings and records have to be repeatable under the same conditions and results are reproducible. Since 1998 I am following the principles of the so-called “Wiener Schule” initiated by Prof. Dr. Rudolf Slavicek from Vienna, Austria, in the 1980s. He was also the first one who founded the postgraduate Master education in the craniomandibular dysfunction at the Private Danube University Krems, Austria which is continuing nowadays as VieSID (Vienna School of Interdisciplinary Dentistry).

Without going into details and giving a quick overview the treatment protocol follows 6 steps:

1. First visit
2. Clinical function analysis
3. Computer-assisted pathway recording
4. Treatment with the therapeutic occlusion splint (TOS)
5. Collateral medical treatments
6. Final (dental corrective) treatment

1. First visit

The first visit is the most important part of the pre-treatment phase. By using a standardized questionnaire, it is possible to get quantitatively valuable information. For the dental and medical history evaluation, Slavicek developed a questionnaire with ten questions that can be answered

with yes or no. If the answer is yes graduation like *mild/not so often*, *medium/often* or *severe/regularly* can be applied so that graduation from 1-3 points is possible. These points which are given for positive results are added up at the end and the average gives the so-called **Occlusal Index**. If the **Occlusal Index** is higher than 1.5 the patient belongs to the tmd high-risk group.

As the second step follows the intraoral inspection with controlling especially the soft tissue like tooth impressions at the inner side of the buccal area and both sides of the tongue, mid-line shift, occlusion type, etc.

The third step is the **TMD Screening** by observing the movements of the mandible, putting vectorial forces to the temporomandibular joints and the record pain occurrence.

Last but not least it is a must to get a radiographic overview by taking a **panoramic x-ray**. These kinds of x-rays make it possible for geometrical analysis to find out if there is a positional asymmetry in the temporomandibular joints!

If the Occlusal Index is higher than 1.5 and a positional asymmetry in the joints more than 1mm is present the probability that the patient is suffering from craniomandibular dysfunction is as high as 94.6%! If an adequate occlusion treatment could be done the probability of success that the present symptoms get milder or disappear is at 94.6%.

2.Clinical function analysis

The clinical function analysis starts with the examination of the skull skeleton and the muscles of the head and the masticatory muscles following a standardized protocol. The Occlusogramm is used to check the contact patterns of the teeth on special wax foils in occlusion (individual contact position=icp), in laterotrusion, in protrusion and bruxing. The Axiogramm is the mechanical recording of the joint movement in protrusion, laterotrusion and opening-closing movement followed by the anatomical face bow registration and bite registration in a (reproducible) reference position (RP). The impression of both jaws with polyether material is the last step in this session to get 3 pairs of casts.

3. Computer-assisted pathway recording

This step is the most important one in the diagnostic work. There are different opinions and methods about the recording of the pathway of the mandibular joints. To find out where the hinge axis of the mandibular joints are located before treatment and why they are located there is the key to successful treatment. My preferred system is a 3d electrical device that allows an exact recording (Condylography) of the hinge axis and joint movements while speaking, chewing, swallowing, free movements and bruxing or other functions in the x-y-z-axis. With the kinematic face bow transfer and a bite registration with a light-curing material this session ends.

The findings of all these steps give piece by piece a great picture as a result: The diagnosis. These results are implemented in the occlusal surface of the therapeutic occlusal splint (TOS) if this is needed in this case. It is also very important to find out which position to choose for the TOS: ICP, RP or a new therapeutic position (TP). The necessary data is recorded and gives a clear and safe guideline.



Scheme 3: Dimensional recording of joint movements and hinge axis

4. Treatment with the occlusal splint (TOS)

Most of the cases require treatment with an occlusal splint as the best choice to start the causal treatment. The most common TOS is made for the mandible. It is my choice because the maxilla is the not moving part. If the therapeutic surface is in the mandible the patient is easier guided into the new position of the mandible and therefore for the mandibular joints.

The advantages of the TOS are:

- Protection of the teeth
- Equalization of force distribution
- Correction of the head posture
- Relaxation of the masticatory muscles
- Relieve of the temporomandibular joints and structures

In the first few months, a follow-up every 2-3 weeks should be done to make adjustments depending on the frequency of physiotherapist treatments and the improvement of the equilibration capacity of the muscles and structures of the patient.

This phase can take 2-4 weeks in simple cases up to 9-12 months depending on which structures and areas are compromised.

5. Collateral medical treatments

The most common liaison treatment is physiotherapy which is sufficient in most cases. But due to the affection of the craniomandibular dysfunction, it can also be necessary to advise osteopathic treatment, chiropractic treatment, orthopaedic treatment, ENT, ophthalmological treatment, neurological treatment, psychological treatment, traditional Chinese medicine and acupuncture, homeopathical treatment and/or complementary and alternative medical treatment. It always depends on the symptoms of the patient.

6. Final (dental corrective) treatment

After the TOS-treatment phase is finished it can be necessary to do corrective treatments if the discrepancy of the ideal position of the mandible is too high from the present (icp) position. In that kind of case, there are 4 options. One treatment option is the prosthodontic treatment for example to increase the vertical dimension and/or provide a trouble-free dynamic and static occlusion. A second option is an orthodontic treatment. A third option is a combination of prosthodontics and orthodontics. The last option is no treatment.

Conclusion

Temporomandibular disorders are complex in many ways: In the distribution and variety of the symptoms and by overlapping of different medical disciplines. The treatment should be initiated and directed by dentists in cooperation with if necessary, with the other medical disciplines.

It is also necessary to follow treatment protocols to provide a desired and predictable outcome.

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