Aim: Craniofacial dysfunction is an expression of the dysfunctional masticatory system. It may have diverse risk factors, like occlusal interferences, including traumatic amalgam fillings and other fillings. The article aims to present three cases of craniofacial dysfunction generated by occlusal interferences.

Methodology: Three patients with different forms of craniofacial dysfunction were referred to dentist for evaluation and treatment.

Results: Occlusal interferences were identified as the main risk factor for uncoordinated hyperactive muscles and for craniofacial dysfunction diagnosed in three cases presented. After occlusal correction, muscular dysfunction disappeared.

Conclusions: In case of reasonable suspicion of craniofacial dysfunction, an estimate for the detailed clinical and possibly instrumental diagnostics and optionally (grinding teeth guard/bite splint) pre-treatment must be done. Only after pre-treatment definitive treatments can be planned and carried out.

Keywords: craniofacial dysfunction, occlusal interferences, masticatory function
Typical primary damages in the masticatory system, which can be caused by occlusion and / or hyperactive muscles, are wear facets, tooth and filling fractures, pseudopulpitis, periodontal overloading, that can cause increased tooth mobility and progressive bone loss, hypersensitive tooth necks, and wedge-shaped defects (Fig. 7). Masticatory Disorders are primarily caused by occlusal discrepancies, when this area of the periodontal ligament (10-20 microns) significantly exceeded or undercuts (Utz, 1986). The Japanese Kobayashi (1988) created the basis of experimental investigations shown in sleep laboratories, that premature contacts to occlusal restorations grew in the order of 100 micrometers, and lead to : 10 times increase of the periodontal tactility, increased muscle activity, bruxism, insomnia, increased adrenaline, sleep apnea, TMJ disorders & reduced performance. Kordaß et al. (2009) were able to prove functional MRI that Masticatory Disorders led to an increased metabolism in areas of the brain. Lotzmann (1994) found in a diagnostic-therapeutic-oriented dental follow-up of patients that were previously diagnosed with “neuralgia” by neurologists, that in up to 50 percent of cases, occlusion disorders were the main cause of the neuralgieformen disorders. Graber (1995) demonstrated that the psycho-emotional stressors can be the decisive gains of dysfunctional-related diseases of the stomatognathic system. In fact, clinical experience confirms, that existing occlusual trauma comes after the occurrence of stress to symptoms of illness. In other words, clenching and grinding can especially lead to head and facial pain, if the occlusion is not in harmony, because the muscular hyperactivity is thus intensified. Bernhardt et al. (2005) found significant correlations between a high incidence of headache in approximately 4200 subjects in an epidemiological study (SHIP), that suffered from tension in the masticatory muscles. In conclusion, the authors found that a clarification
Figure 5. Information from the region of the teeth, e.g., consistency and position of a bolus, go through afferent nerves (aff. N.) to the central nervous system. After appropriate coordination (eff. N.) the muscles are controlled from there via efferent nerves, so that the masticatory function can proceed undisturbed.

Figure 6. As the occlusal interference may give contradictory signals from the area of the teeth to the central nervous system that can no longer be well-coordinated there. There is a malfunction in the chewing system that may develop in a very different way in different individuals.

Occlusal interferences
tilted, elongated teeth
defective restorations, incl. Orthodontics
unserved gaps

Psycho-emotional stress
“gnash your teeth”
“grit your teeth …”
“show your teeth …”

Hyperactive muscle
grinding, bruxism
tension
neuromuscular incoordination
craniomandibular dysfunction

Risk factor for
wear facets, fractures,
pseudopulpitis
periodontal overloading
hypersensitive tooth necks,
<wedge-shaped defects
head and facial pain, migraine
tinnitus, vertigo
TMJ, cervical spine and spinal problems

Other risk factors
(general medicine, and others)
of frequent head pain within the interdisciplinary diagnostic must also include an investigation of the dental causes.

The same applies to the tinnitus, as very recent studies show. In summary it can be stated that craniomandibular dysfunction (CMD) can be used as an expression of the dysfunctional masticatory system. It may have diverse risk factors which may, in part, have to be classified to be far outside the scope of our art (Fig. 7). From the perspective of dentistry, when diagnostics and therapy of CMD-based diseases are concerned you will have to think primarily of occlusal interferences, including traumatic amalgam fillings and other fillings (Fig. 8).

**Clinical patient cases**

**First case**
This patient had for some time twitching activities periodically occurring on both sides in the masseter muscles, that he deliberately could not control.
General medical and neurological examinations were unsuccessful and ultimately relaxation therapies were recommended. A mere-chance-conversation lead to an inspection that showed a single occlusal risk factor: distinct wear facets on an amalgam filling at a lower molar. At the same consultation this filling was corrected by grinding using magnifying spectacles and using 10-micron thin occlusal foil. These fissures were so engrossed and moved that the maximum intercuspation and all eccentric movements were possible (Fig. 9, 10, 11). Spontaneously releasing the patient, he would now have an even bite together, and he felt much more relaxed. The muscle irritations were now no longer on.

Second Case
This patient came to our clinic because of restricted mouth opening of about 25 mm interincisal distance (IID). As a risk factor, an amalgam filling was found on an upper molar, which had a massive abrasion facet. The amalgam filling was remodeled according to the natural model. The patient was spontaneously changed to a pleasant-fit-feeling. Because of photo documentation the session took a total of about 45 minutes. In the end, the patient was able to achieve an opening of 38 mm IID, which was apparently due to a spontaneous relaxation of the muscles. Within a few days they then reached an unrestricted mouth opening of about 40 millimeters IID (Fig. 12, 13). Third case
This patient was referred by a neurologist due to severe tension headaches of unknown origin. It had to be clarified whether dental risk factors may be identified that could causally contribute to this disease. In clinical occlusion diagnostics centric and eccentric premature contacts were found on a ceramic restoration in a mandibular molar. Immediately after correction the patient showed a balanced-fit-feeling of all the teeth of the maxilla.
and mandible (Fig. 14, 15). After a few days, the headache was gone.

Summary and outlook

From the perspective of dentistry, occlusal interferences are the main risk factor for uncoordinated hyperactive muscles and thus also for CMD. In severe malocclusion, which cannot be immediately eliminated for various reasons, for example infraocclusions, the initial occlusion is performed on the basis of a corresponding point registration with occlusion aids. Only after successful treatment of CMD, which is accompanied usually by achieving a physiological centric, definitive occlusal and / or restorations and orthodontics can be planned and carried out.

An initial, relatively reliable, short clinical function and occlusion diagnosis to exclude CMD is the condensed clinical report (Fig. 16).

Bibliography