

Part I

The medical Definition of Dentistry and Orthodontics

The dentition and its function, the Centrepiece of Craniomandibular Dysfunction, CMD:

„Originally it was estimated that over 20% of the average population have symptoms relating to the temporomandibular apparatus at one time or another. This percentage now has increased to over 50%, since more and more symptoms are being connected with this craniomandibular, or temporomandibular, area.“

[D.H. Morgan et al., - [1982, Textbook : Diseases of the Temporomandibular Apparatus, a multidisciplinary Approach]

„25 - 40 per cent of the 6 to 18-teen years old orthodontic patients are affected by hidden or latent inflammation of the TMJ.

[DZW 48/04 , Official doctrine of the German Board of Dentistry, DGZMK, Prof. Dr. Meyer :]

Symptoms of Craniomandibular Dysfunction, CMD:

General Symptoms

Dizziness, Visual disorders, Nausea, Vomiting Blackouts, Loss of consciousness, Staggering gait, Uncertainty of heights, Diminished hearing, Ear noises, Sensitivity to noise, Ear blocking

TMJ Symptoms

Crepitus, Pain, Limited movement, Excessive movement

Neuralgia

Facial pain, Head pain, Ear pain, Neck pain

[H.T. Kelly, D.J. Goodfriend in Morgan et al.]

„The vicious deteriorative biochemical pain-spasm-pain cycle “

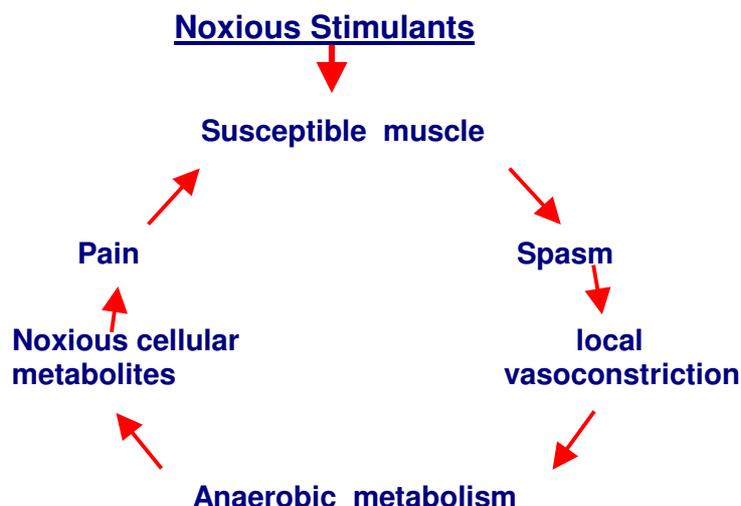


Fig. 1 The vicious deteriorative biochemical pain-spasm-pain cycle [Eric Paul Shaber]
[Diseases of the temporomandibular apparatus, a multidisciplinary approach, Morgan et al. Mosby 1982,296]

Functional Diseases of Head and Shoulders – a New Discipline

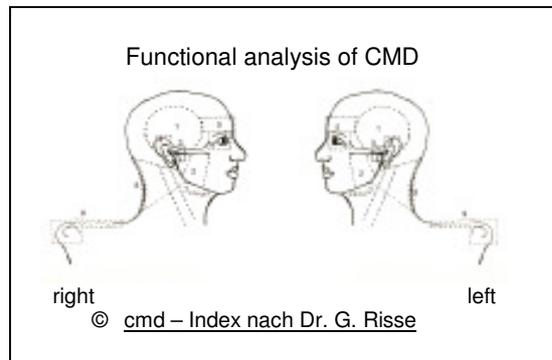


Fig. 2: Cranio Mandibular Dysfunction, CMD – diagnostic form

In short:

CMD means a new and extended Definition of Dentistry and Orthodontics, the CMD – Orthodontics, a new Discipline:

- In future „Migraine“ will be treated too by means of CMD- orthodontics / dentistry by establishing a functional occlusion and functional muscle activities.
- Pain of the head and shoulders and the spine are in the responsibility of the dentist and orthodontist too.
- The new extended medical definition of dentistry and orthodontics addresses about 50% of the general population.
- Education, diagnosis and treatment procedures need to be adjusted to this interdisciplinary challenge.
- Omission of a clinical functional analysis means a pitfall for malpractice.
- A Functional analysis of head and shoulders is a necessary precondition of any dental / orthodontic treatment

Background of the complexity and variability of CMD - Symptoms

The background of the complexity and variability of CMD-Symptoms is the Bio-Cybernetic feed-back-system of the masticatory organ, defined by G.H. Schumacher, **Fig. 3**

- Bio-Cybernetic Feedback-System of the masticatory organ with sensors, receptor-systems (F) in the Parodontium, in the muscles and in the Temporomandibular joints for navigating functional coordination.
- (R) Central regulation system to control coordination

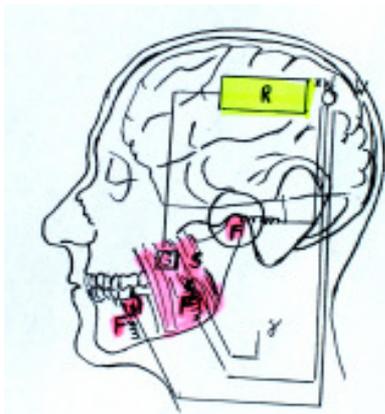


Fig. 3: Bio-Cybernetic Feedback-System of the crano-mandibular system [G.H. Schumacher, "Die Funktionelle Anatomie", Hüthig Verlag 1985, Basics of Bio-Functional Orthodontics, BFO].

- R - central regulator- station
- F - sensors, receptor-systems (ends of nerves in parodontium of teeth, TMJ, muscles)
- G - the adjusting regulator G is the force produced by the chewing muscles
- S - the distance covered by the muscle contraction
- X - is the magnitude of regulation-order
- W - the set point (Sollwert) of the order, given by the brain,
- X_w - the standard deviation,
- Y - the magnitude of regulation
- γ - the setting of sensitiveness

Continuous occlusal dysfunction cause direct stress for: Parodontium, muscles, TMJ and regulation system

Mechanical reaction versus bio-cybernetic-feed-back, Biofunctionality,

- the 1st basic mistake in contemporary orthodontics
- in science and applied orthodontics - Change in Paradigm -

individual feedback to outside world ← Biological System / Body

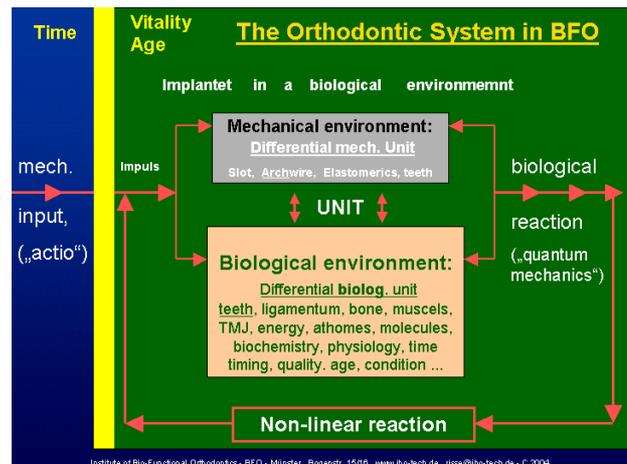
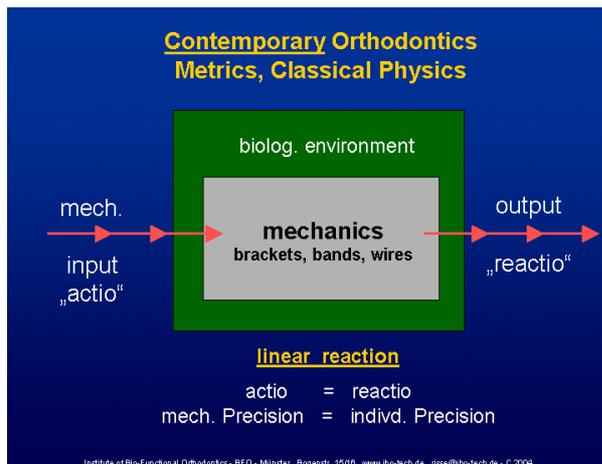


Fig. 4: linear, bivalent, yes or no –reaction / Evidence in Classical Mechanics on the level of quantity / forces, Newton [G. Risse]

Fig.5: non linear, reaction / evidence, in Biology, feed-back reaction on the level of quality of impulses / System Theory [G. Risse]

Fig. 4 / 5 Two qualities of action and reaction

Fig. 4: Plain linear, bivalent mechanical reaction, without Feed-back:

in Classical Mechanics and Theory in general orthodontics, a ancient level of the “Mechanical Determinism of late 19th century

Fig. 5: Reaction of Biological Systems - with Feed- back: Complex systemic reactions. The differential

reaction of biological systems are more correlated with the quality of the “actio”, less with metrics, and is not reversible. [Theory of Bio Functional Orthodontics, BFO / System Theory on the level of System Theory and Quantum Mechanics of W. Heisenberg, Physics and Pilosophy, 1958]

Yellow line in Fig. 5: Change of dimensions of “Time”: - time-age border, the transition between non-vitality towards vitality – a new world and combination of: time, age, mass, vitality, space, action and legislation, a “biologic quantum mechanics”: “actio” may turn from the reaction “motion” towards the reaction “pain” with no motion.

Werner Heisenberg, Nobel Prize winner:

"The findings of Quantum Mechanics are a serious warning against the more constrained application of physical concepts in fields not belonging to. The uncritical application of concepts of Classical Physics like chemistry or Biology was a mistake." [Physics and Philosophy 1958, The World Perspective Series, Harper & Brothers]

Richard Feynman, Nobel Prize winner:

"In the world of atoms the mechanical guidelines of 'inertia' and 'forces' are wrong – are the Newton's laws wrong." [The Pleasure of Finding Things Out, Helix Books]

Hans-Peter Dürr, Nobel Prize winner:

"Quantum physics teaches us, that principally nature is not organized by Determinism." [Das neue medizinische Paradigma, Günther S. Hanzl]

The real process of Orthodontic Tooth Movement, OTM, is shown by Fig. 5:

New Orthodontics, Biofunctional Orthodontics, BFO, evolved into a combination of mechanics with molecular-genetic-cellular interventions for OTM in combination with time / age / sequence-relation and feedback. This means a change in paradigms of orthodontics in science and treatments.

Fig.5 explains the scientific background of Biofunctionality. The Institute of Bio-Functional Orthodontics, IBO, founded in 1999/2000, Germany. It was the first Institute for orthodontic Biofunctionality worldwide.

Application of Biofunctionality and feed-back beside BFO:

- **The ministry of scientific affairs** of Bavaria started a campaign for Biofunctionality for nutrition in 2005, supported by 4,6 Mio. Euro, as the ministry declared the science of Biofunctionality to be a central interdisciplinary new discipline for health, pointing the way for future sciences.
- **The leaders conference for chairs and program directors** of graduate orthodontic programs, May 2 during the 103rd AAO Annual Session in Hawaii, American Association of Orthodontics 2003 clearly defined a change in paradigm, confirming the position of BFO:
"Interactions and collaborations with medicine, biochemistry, molecular biology, etc. are now expected of all clinical sciences, including orthodontics: 'Biological solutions to biological problems' is emerging as a new paradigm in dentistry and medicine. Diagnosis, treatment, therapeutics and biomaterials are all becoming 'biological' and gene-based. We are on the verge of shifting or evolving from mechanical (e.g. surgical) to biological solutions for health promotion, risk assessment, diagnostics, treatments, therapeutics, and health-care outcomes." [Slavkin, H.]
- Current concepts in the biology of orthodontic tooth movement. [Masella, R.S., 2006]

The reality in current orthodontic education:

- Up to now orthodontic education continues to persist in out of time theories and even worse, in misunderstandings of "forces" and energy in relation to engineering, bioengineering, biofunctional engineering, navigation of teeth, growth, functional adaptation and treatment.
- Scientific findings and publications on upper out-of-time-level may be misleading and may be not evidence based.
- The slogan "light forces" in orthodontics is similar dangerous and misleading as the slogan "light cigarette" . This slogan in orthodontics lead to complex misunderstandings of the orthodontic appliance and orthodontic treatment procedures, ending in the actual slogan of "One- Phase- Orthodontics", performed by Straight Wire Orthodontics.

[- Risse, G., Quality management III, The definition of legislation in orthodontic tooth movement, J. Orofac. Orthop. 2004; 65:529

- Risse, G., "The Change of Paradigms from Classical Physics to New Physics, from Common Orthodontics to New Orthodontics: Fixed Functional Orthodontics (FFO), Slot-Size .016 x .020, Main lecture, VIIth Scientific Forum, Jakarta, October 26, 2002, J. Orofac. Orthop., No. 1-2 / 2003, p. 36

- Risse, G., "Explanations and consequences resulting from the Main Lecture of the VIIth Scientific Forum October 26, 2002, Jakarta", "Connections of Orthodontics with Quantum Mechanics", J. Orofac. Orthop., N. 1-2 / 2003, p. 44

- Slavkin, H., "AAO Council on Education hosts Department Leaders' Conference", The Bulletin / American Association of Orthodontics, June/July 2003, Vol. 21, No. 4

- Masella, R.S., Meister, M., Current concepts in the biology of orthodontic tooth movement, A.J.O.-D.O. Apr.2006, Vol 129, No. 4, p.458]