Abstract

Classical Orthodontics, New Orthodontics, Bio-Functional Orthodontics, BFO

Contemporary orthodontics or **Classical Orthodontics** is defined by *the technical demand of* Classical Physics and engineering. Mechanical appliances of brackets and wires are defined by the technical demand of the slot / wire relation and consequently by the legislation of Newton action = reaction. *Reactions in Classical Physics are deterministic, dual logic and linear.* Per definition of official textbook theory this background needs huge slots for rigid anchorage (Burstone). For guidance purposes huge/thick wires are the consequence. Wires for direction finding start with the cross-section of .016 x .016, .016 x .022 upwards, for slot-sizes of .018 x .025 upwards towards .022 x .028.
Forces of wires rise by the third to forth power with rising cross-section. A differentiated application of (low) forces with a bracket to bracket distance of 6 mm is hardly possible by these cross-sections of common sizes and by alloys of formable wires like stainless steel. "Modern alloys" of super-elastic wires and "light forces" have the disadvantage of missing sufficient formability and bendability for direction finding. So individual guiding is missing. Particularly this individual guiding is of primary interest concerning angulations of upper molars during growth. Textbook orthodontic define angulations of upper first molars by plus +5° (Andrews). Van der Linden, van Beek, Kim Nanda define angulations of upper molars during growth up to minus -20° degrees. BFO, Risse define angulations of upper first molars age adapted, up to –20° at the age of 10 years, -10° at the age of 14 years and -5° out of growth, in conformity with textbook dates of anatomy. Both disadvantages, missing control of force amount and direction finding cause a lot of problems for individual function, and stability, for achieving a proper treatment result. Unnecessary extractions and parodontal disease as well as craniomandibular dysfunction, "migraine" and tinnitus, easily are the logical consequence.
New Orthodontics or **Bio-Functional Orthodontics** is *defined by the biological demand,* secondary by technical demands, as the brackets and wires are implanted in a biological environment, underlying the legislations of Vitality and Biology, organs and molecules being Functional Self-Organization Systems. Each single movement of a tooth is the result of complex activities of self organizing systems. This means: *Orthodontic reactions are not deterministic, not dual logic and not linear.* Despite of the non-linear reactions, or even more because of that, the demand for the technical equipment (wire and mech. system) underlies the legislation of practicability, meaning control of force amount and control of individual direction finding by the practitioner.
In combining wires with slots (brackets) and teeth by differential methods and differential diameters, clearance, qualities, elasticity, the practitioner is constructing a highly invasive machine, being implanted. Its energy by mech. tension is performing work and is activating biological systems. By this, individual direction finding occurs.
As low sized wires of stainless steel (ss) fulfil the most demands for formability, elasticity and "light forces" at the actual stage of development, the logical consequence for equilibration and guidance is to adapted the slot size to reduced cross-sections of wires by reduction of slot-sizes of brackets. By this, low sized systems with light forces and flexible impulses (force x time) are available, being under the control of the practitioner. Age adapted and individual direction finding is possible. By this the demand of the biological environment for stimulation of cells by means of low forces and flexible impulses is performed too and the demand of the practitioner for easy control and individual handling of a wire will be realistic.

Last but not least, it has to be underlined, that the differential connection of a wire within certain slots define a new system, loaded with energy by tension. To create differential systems, a new science of mechanical structure-engineering and system design is developed for individual tooth angulations and individual stimulation of cells and organs within the discipline of Bio-Functional Orthodontics, BFO.

New developments

- Structure-design

Beside these deficits of classical orthodontics, New Orthodontics creates a new science of mechanical structure science, diagnosis and treatment goals for individuals for individual function and tooth-angulations combined with the factor time, timing, age.

- Anatomy

Tooth angulations, especially for upper molars, in contemporary orthodontics are in opposition to official textbook definitions in Anatomy and are in strong opposition to age adapted angulations, a.a.a., easily causing a lot of mismanagements.

- International outlook

The Council on Education, COE, USA 2003 for orthodontics defines a turnaround in orthodontics, supporting the science and theory of Bio-Functional Orthodontics, BFO.
COE: "Biological solutions to biological problems is emerging as a new paradigm in dentistry and medicine, including orthodontics".