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CE credits: 15,5

GIORGIO FIORELLI

8 ONLINE LESSONS

BIOMECHANICS FUNDAMENTALS OF ORTHODONTIC THERAPY

COURSE DESCRIPTION

Online course in biomechanics for all orthodontists.
Lecturer - **Giorgio Fiorelli** - the founder of modern biomechanics, doctor and master of orthodontics at the University of Siena, Italy.

This course is a complete guide to achieving sustainable long-term results when working with biomechanics.

The first 4 lessons are devoted to the basic principles of biomechanics, without which it is impossible to start orthodontic treatment of a patient. The next 4 lessons are based on clinical applications of biomechanics.

The training is suitable for both novice orthodontists and more experienced doctors. After all, knowledge of biomechanics is the key to your success in treating patients.

ON THE COURSE YOU WILL IMPROVE THE FOLLOWING SKILLS:

- Application of cantilevers
- Application of the bracket system
- Biomechanics in orthodontics
- Moving teeth
- Changing the angulation of teeth
- Treatment with microimplants

Course recommended for: Orthodontist, General dentist

Time: 16 h 30 min

ONLINE LESSONS PROGRAM

lesson 1

TREATMENT PLANNING AND MECHANICS DESIGN

- Biomechanics in orthodontics;
- The main tasks in planning orthodontic treatment;
- Basic principles of mechanics;
- Static and static analysis of the system;
- Mechanical forces: the principle of operation in teeth movement;
- Static equilibrium: basic provisions;
- The law of transmissibility;
- Activating and deactivating forces;
- Bending and tensile forces;
- Characteristics of rigid and hard bodies;
- Center of the mass and center of gravity;
- The center of resistance of an individual tooth and a group of teeth;
- Apical migration of the center of resistance;
- Moment of force: trends in rotation and translation;
- Localization of the center of resistance;
- The phenomenon of jamming when moving teeth;
- The use of cantilevers: advantages.

duration: 2 h 10 min

lesson 2

TEETH MOVEMENT PREDICTION. FORCE SYSTEMS

- Force and components producing forces;
- Mathematics in orthodontics:

    - Angle of application of force, line of action of force, point of application of force,
    - Calculations in 2D and 3D coordinate systems,
    - Horizontal and vertical force components,
    - Summing up the effects of two forces: rules,
    - Calculation of the angle of the force vector;
- An example of calculating forces when moving a molar;
- Analysis of dental movement by calculating vectors;
- The tendency to rotation: prerequisites;
- The couple of forces: definition and calculation;
- Creating a moment of force in the braces;
- Dental movement: the relationship between movement and the force system;
- Qualitative analysis of the purity of forces;
- The concept of the center of resistance;
- Types of dental movement: translation, pure rotation, central rotation;
- Method of calculating the geometric center of rotation;
- Calculation of the distance between the center of resistance and the center of rotation.

duration: 1 h 52 min

lesson 3

TORQUE. POSITIONING OF BRACES

- Torque in orthodontics;
- Design of orthodontic treatment;
- Equivalent force systems: fundamentals of the concept;
- The system of forces on braces and determining appliances;
- Forces applied to the body movement of the tooth;
- The single force concept;
- The couple of forces concept: the main provisions;
- Static equilibrium in orthodontic biomechanics;

- Arch activation and deactivation forces;
- Deactivating force systems;
- Forecasting the position of the rotation center;
- Selection of the microimplant position: mechanical aspects;
- Determination of the need to use anchorage: mathematical calculation;
- Occlusal forces as part of the anchorage;
- Requirements for anchorage elements;
- Asymmetric expansion of the jaws: application of differentiated forces.

duration: 2 h 4 min

lesson 4

ANCHORAGE. TOOLS FOR EFFECTIVE TREATMENT

- The role of occlusion in anchorage;
- Creation of an artificial occlusal surface: methodology and clinical recommendations;
- Lower incisors as anchorage;
- Equilibrium: problems of the system of forces;
- Statically defined mechanics;
- Single-point contact with ligature: pros and cons;
- Line of action concept: cantilevers;
- Straightening the position of molars: mechanics;
- Indications for the use of cantilevers;
- Mechanics of extrusion and straightening and the position of the canine;
- Extrusion and straightening of the molar position;
- Creating the reverse direction of the moment;
- Advantages of cantilevers.

duration: 2 h 4 min

lesson 5

STATICALLY DEFINED MECHANICS. BASIC PRINCIPLES

- Statically defined mechanics: force measurement;
- Application of cantilever: mechanics design;
- Absolutely constant units of forces;
- The concept of qualitative constancy;
- Arch selection: rules and recommendations;
- The problem of using circular arcs;
- Configurations and direction of force;
- Activation of cantilevers: technique;
- Combined cantilevers: mechanics;
- Combination of activation in different directions;
- Cantilever support design;
- Two vector mechanics: mathematical justification.

duration: 2 h 8 min

lesson 6

GEOMETRY AND ALIGNMENT

- Statically indeterminate mechanics: characteristic;
- Generation of forces inside the bracket groove;
- 6 geometry options in orthodontics;
- High and low geometry: analysis of forces and vectors;
- Clinical hints when working with continuous arcs;
- Practical application of the force system;
- The concept of chaotic alignment;
- Limits of using chaotic alignment and continuous arch;
- Practical alignment rules;
- Difficulties in correcting the rotation of teeth;
- Alignment by activating the terminal edge.

duration: 1 h 57 min

lesson 7

GEOMETRY AND BENDS

- Indications for bending arch;
- The concept of force in arch bending;
- The technique of creating a stepped bend;
- V-shaped bending: systems of forces and features;
- Technique of applying V-shaped bends: tips;
- Changing the position of the canine with a V-shaped bend: example;
- The concept of α-β activation;
- Opening and closing forces;
- Linear activation;
- Predicting the movement of a tooth or a group of teeth;
- Methods of measuring forces in the α-β system.

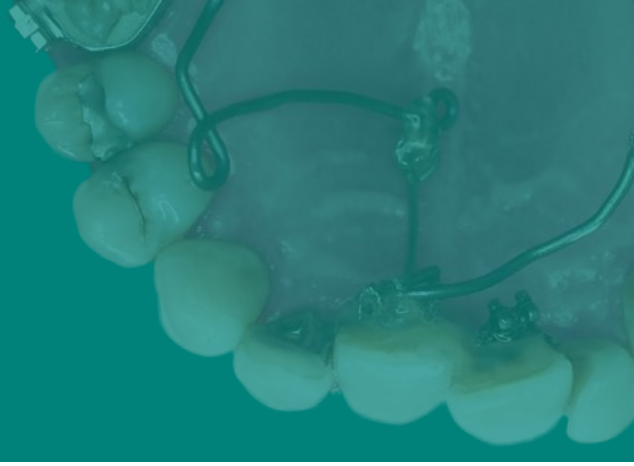
duration: 2 h 14 min

lesson 8

SKELETAL ANCHORAGE. MECHANICS OF WORKING WITH TADS

- Anchorage in orthodontics: definition and meaning;
- The history of screws as a skeletal anchorage;
- TADs: basic principles;
- Biomechanics of screws;
- Indications for the use of skeletal anchorage;
- Position of screws: rules for choosing the optimal position;
- Reasons for the loss of screws;
- Screw design selection: criteria;
- Direct and indirect use of screws;
- Moment of force in the area of the screws: rules;
- Mesio-distal movements using TADs;
- Methods of asymmetric distal movement of an individual tooth and a group of teeth;
- Introduction of posterior teeth: mechanics.

duration: 2 hour



GIORGIO FIORELLI

Obtained his medical, dental, and orthodontic postgraduate degrees at the University of Siena in Italy.

The creator of the software T3do and DMA for Orthodontic treatment planning and mechanics design.

He has co-published with Prof. Birte Melsen the «Biomechanics in Orthodontics» multimedia software.

His main professional interests are orthodontic biomechanics, use of computers within the orthodontic practice (especially related to mechanics design and treatment planning), segmented arch technique and adult orthodontic treatment.

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