VOXEL-MAN Dental is a new kind of dental simulator, based on virtual reality technology. Students are working on simulated patient cases with a look and feel close to a real procedure, training both their manual dexterity and problem solving skills. With its striking new features, VOXEL-MAN Dental greatly improves quality and cost-effectiveness in pre-clinical training.

Dental Training, Next Level.
Dental Training

At present, pre-clinical dental training is mostly based on drilling resin teeth. Unfortunately, these are made all of one material, making it impossible for a dental student to develop a realistic feel for the different dental tissues. Also, these teeth usually have no pathologies, such that training is limited to standard preparations. Even worse, there are no ways for an objective assessment of the student’s skills and progress.

See and Feel the Difference

In VOXEL-MAN Dental, teeth and instruments are modeled in high resolution inside a computer and visualized on a 3D screen. The dental handpiece is represented by a force feedback device which can be moved in three dimensions and provides a very life-like sense of touch. With VOXEL-MAN Dental, you can actually feel the subtle differences between enamel, dentin, pulp, or carious tissue. Instruments provided include a selection of high and low speed burs of different shapes which are controlled by a foot pedal, as well as a dental mirror. At any time, teeth may be inspected from all sides, magnified as desired, and even shown as cross-sectional images. The high resolution tooth models have been derived from real teeth by microtomography.

Problem-Based Training

VOXEL-MAN Dental is fully integrated with a dental curriculum. The dental models include carious lesions at various locations, such as mesial, occlusal, and distal tooth decay. Students thus work on realistic cases, including development of a treatment plan and removal of caries, long before they see their first real patient. This approach provides a major step ahead, from prescribed standard preparations to problem-based training, bridging the gap between theory and practice. All procedures can be practiced as often as needed, with no costs for disposable parts. As all students undergo standardized training procedures, results are comparable.
Automatic Skills Assessment

As a step further, VOXEL-MAN Dental also includes an automatic skills assessment. Both process and result of a student preparation can be evaluated automatically and objectively, based on predefined standards such as a reference preparation of a cavity or a crown. Hence, students get an immediate feedback on their work, progress over time can be monitored, and instructors have more time for actually teaching their students.

The automatic skills assessment also allows for a great deal of additional self study, reducing the demand for supervision.

Set your own Standards

VOXEL-MAN Dental is not limited to pre-defined training cases, but contains an authoring system which allows an instructor to define his own tasks. All it takes is to write a short task description and perform a master preparation. After this, students can select these tasks just like the pre-defined training cases, and get an automatic skills assessment based on the reference preparation.
**Benefits**

- Training of both manual dexterity and problem solving skills
- Cavity preparation
- Carious lesions
- Automatic recording and administration of training results
- Objective evaluation of student performance (skills assessment)
- Pre- and self-defined tasks
- Problem-based training
- Self-study facilities
- Reduced need for supervision
- No disposable parts
- No need for water, pressurized air, disinfectant, etc.

**Features**

- 3D display with 3D glasses
- Industry-leading image quality
- High resolution tooth models derived from real teeth by microtomography
- Drilling with realistic force feedback (patent pending)
- Additional cross-sectional images
- High and low speed burs with matching haptics and sound
- Dental mirror
- Foot pedal
- Online updates provide the latest features

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**About VOXEL-MAN**

VOXEL-MAN is a pioneer in medical simulation technology. VOXEL-MAN Tempo, a simulator for drilling access to the middle ear, is the market leader in ENT surgery. VOXEL-MAN Dental is developed in cooperation with the Dept. of Restorative and Preventive Dentistry and the Dept. of Department of Oral and Maxillofacial Surgery, University Medical Center Hamburg-Eppendorf.

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