GEOTAR Manufacturing LLC

LEONARDO

AUGMENTED REALITY DENTAL SIMULATOR

MULTI-TASK DENTAL SIMULATOR

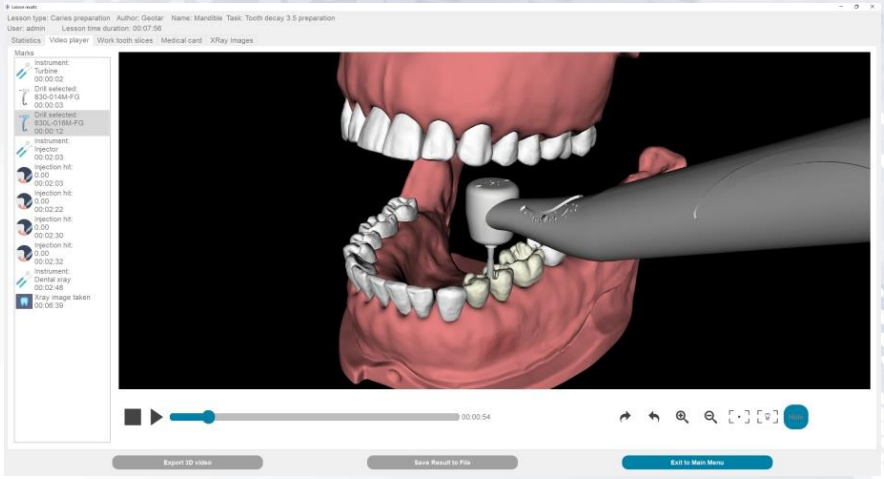
- It is more than just manual skills and cavity preparation
- It is more than just objective assessment of a separate skill
- It is a multi task AR simulator assessing clinical competencies integrated in a realistic environment with accurate 3D visualization

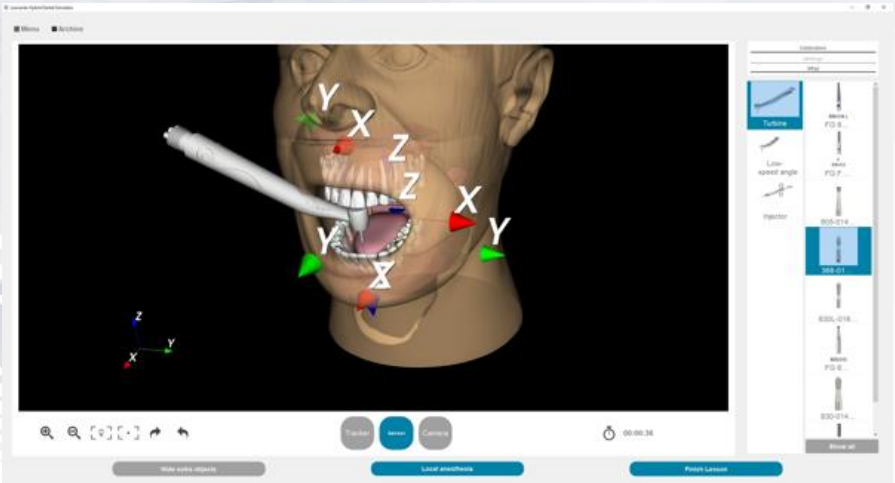
REALISTIC ENVIRONMENT & MULTIDISCIPLINARY DEVICE

- Used tools are real HP and Typodont without any trackers
- No more heavy trackers attached to dental tools
- Simple and real automated calibration
- Integration with major brand of Typodont selected by the dental institution
- No more issue with smooth tracking system
- Cavity preparation procedures designed by dental instructors and integrated easily in the simulator
- Radiography Module
- Anesthesiology Module
- More in development (Hygiene Module)

REAL TIME 3D-VISUALIZATION

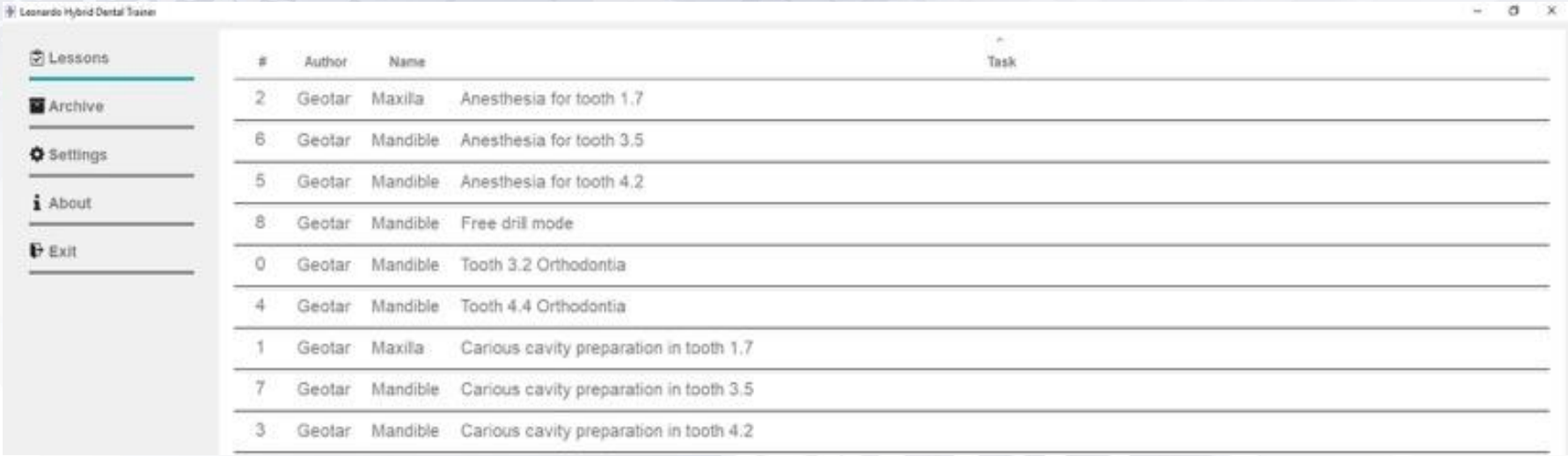
- AR is enabling the user to visualize his Handpiece positioning in real time
- Real time Feedback provided in 3D rendering similar to digital scanning
- Handpiece doesn't need a tracker so the user feels like he works with a regular Handpiece





UNIQUE LIBRARY OF CLINICAL CASES

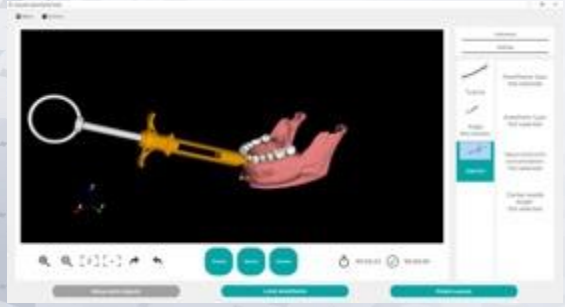
- Cases on anesthesia
- Cases on cariology
- Cases on crown preparation
- Custom Cases from real patients



LESSON MODE

- In a lesson mode a color of the syringe changes from red to green depending on the needle position

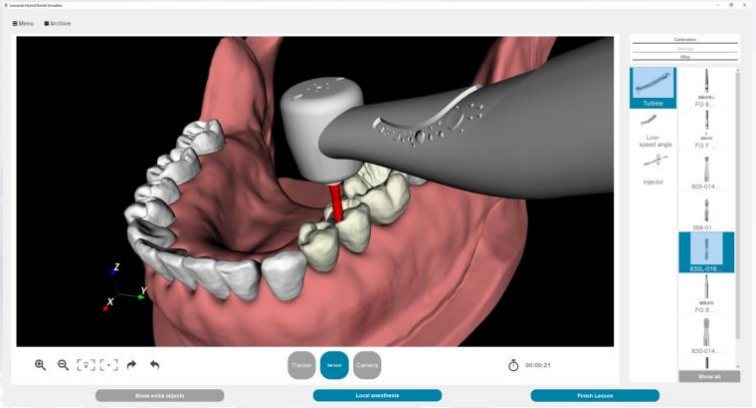
Incorrect



Nearly correct

Correct

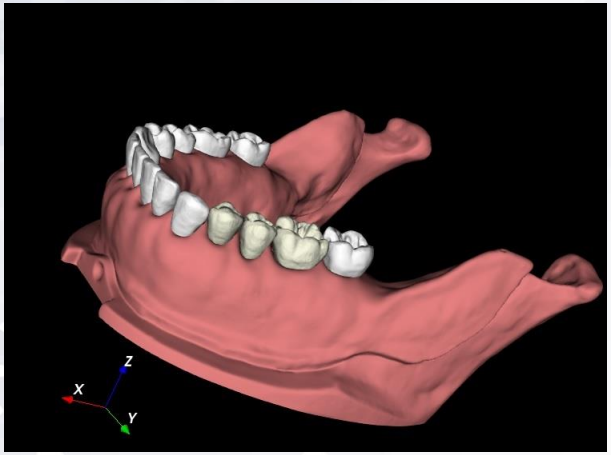
- The gum is colored in 2 shades of grey for the injection



- The correct/incorrect angle of the bur is indicated by green or red color

EXAMINATION MODE

- A color of the syringe doesn`t change depending on the needle position
- The gum isn`t colored in shades of grey for the injection
- The correct/incorrect angle of the bur is not indicated by any color
- The teacher sets an exam`s duration

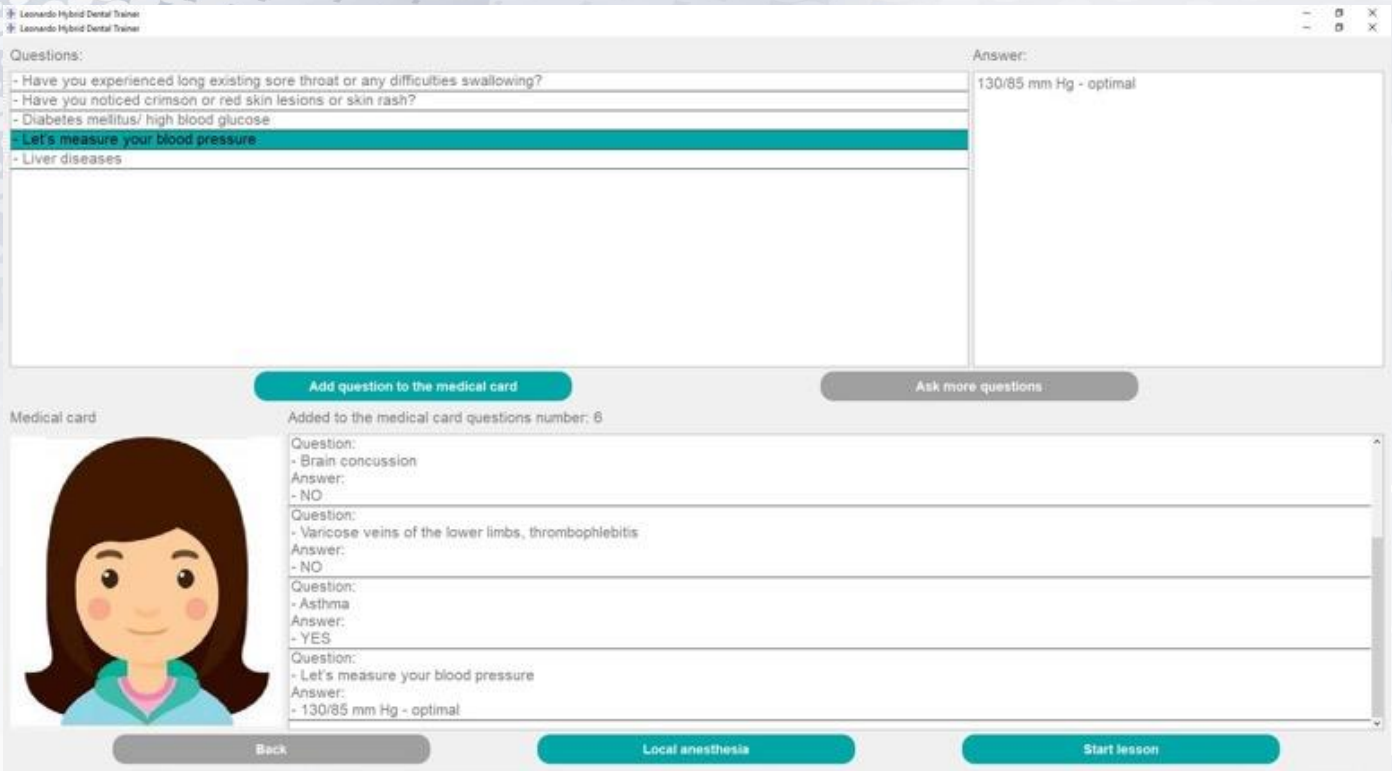


LOCAL ANESTHESIA MODULE

- Available as a separate module or as a part of a Preparation case
- Each case contains a detailed description (complaints, patient history, data for an objective examination of oral cavity, X-rays, videos etc.)

PATIENT MANAGEMENT CASES

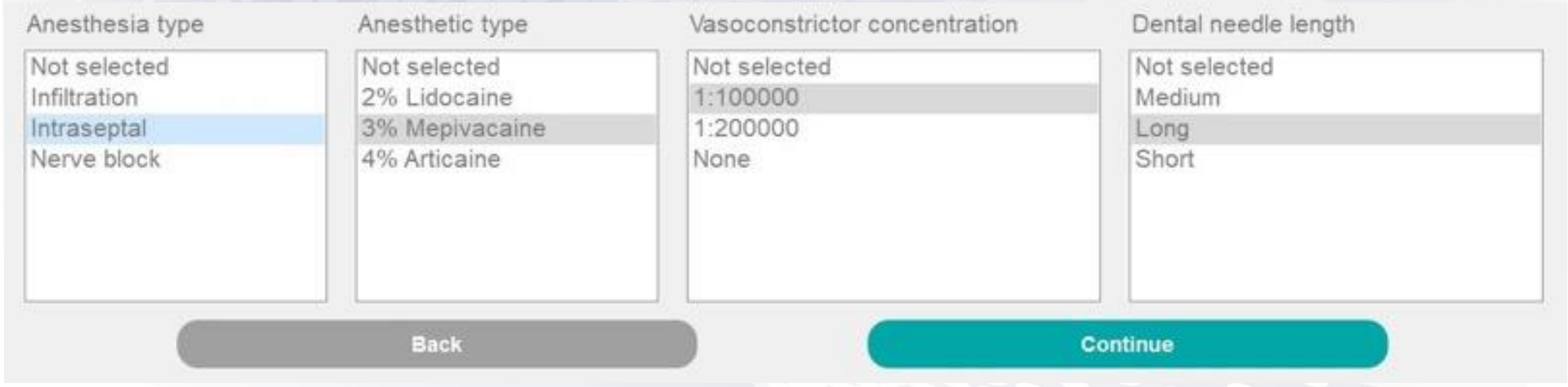
Student`s operation with a patient: collecting a medical history, choosing the right anesthetic and correcting the vasoconstrictor`s concentration based on a patient history. Then a procedure can be performed



ANESTHESIA SELECTION

According to the current case and patient's answers a student has to select:

- **Anesthesia type**
- **Anesthetic type**
- **Vasoconstrictor concentration**
- **Length of the needle**

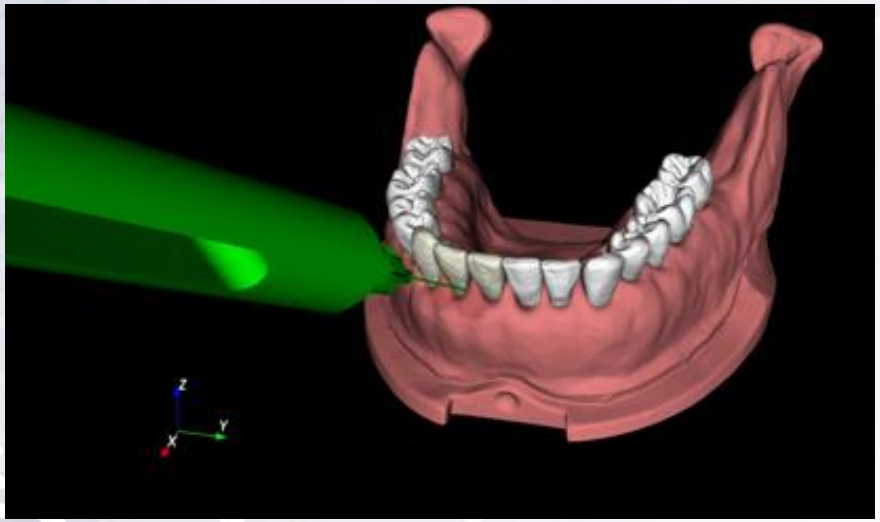


INJECTION

- There is an area for each case for making a correct injection on a virtual model using a real syringe and needle relevant to the procedure and medical history

SW tracks:

- Injection site
- Injection speed
- Injected anesthetic volume
- Number of attempts



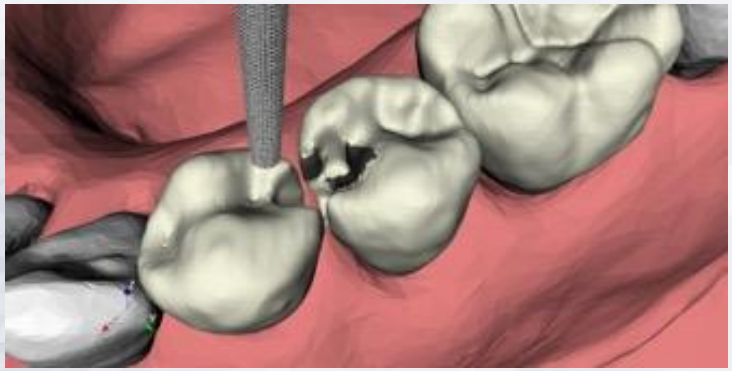
OPERATIVE DENTISTRY

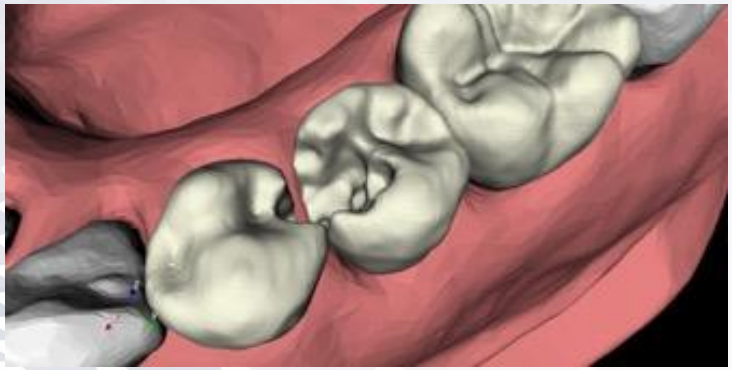
- Cases are based on a conservative preparation
- Each model contains a simulated cavity to remove
- Each case contains local anesthesia
- Burs added at the user discretion and not imposed by SW

CARIOLOGY ASSESSMENT

At the end of the session a student will get a detailed report on a clinical criteria of preparation:

- Deleted carious tissue (%)
- Healthy tissue damaged (%)
- Pulp damage (%)
- Soft tissue damage
- Neighbour teeth damage
- Retention
- Outline shape





ANESTHESIOLOGY ASSESSMENT

Detailed report on local anesthesia:

- Anesthesia type
- Anesthetic type
- Vasoconstrictor concentration
- Dental needle length
- Injected Volume
- Speed of injection

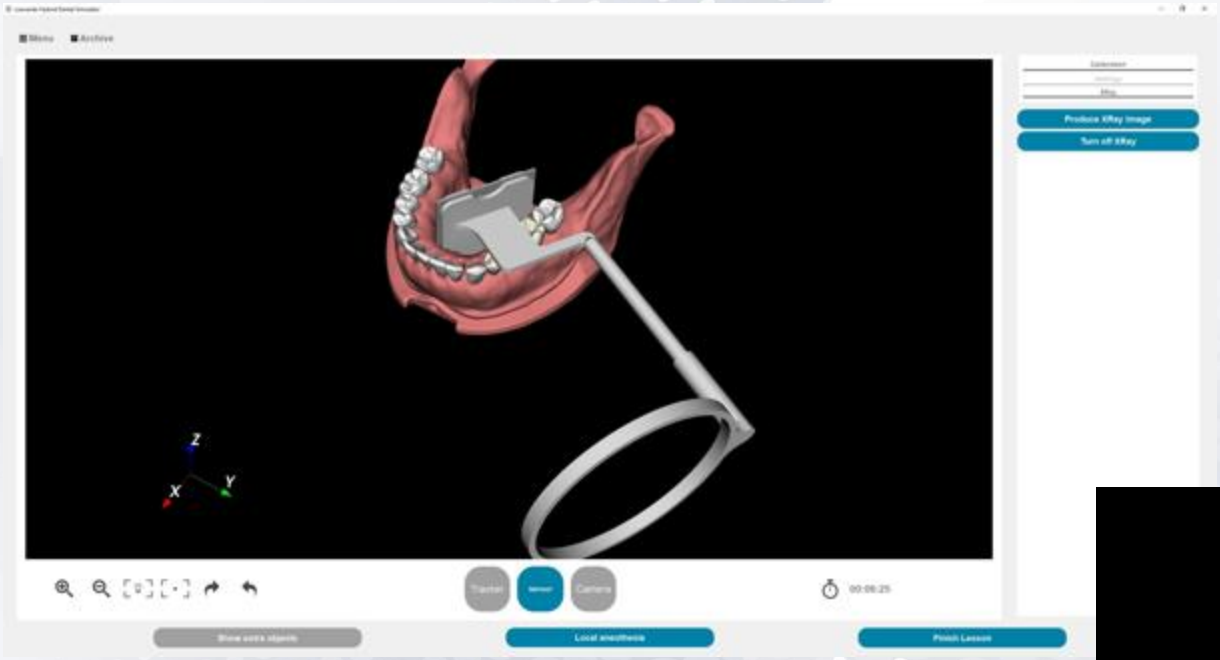
Results

Deleted caries tissue	41.8%
Healthy tissue damage	1.2%
Pulp damage	0.4%
Efficient work time	44.0%
Injection accuracy	100.0%
Soft tissue damage	No
Neighbour teeth damage	No
Injected medicine volume	1.8 ml
Injected medicine speed	19.8 ml/min

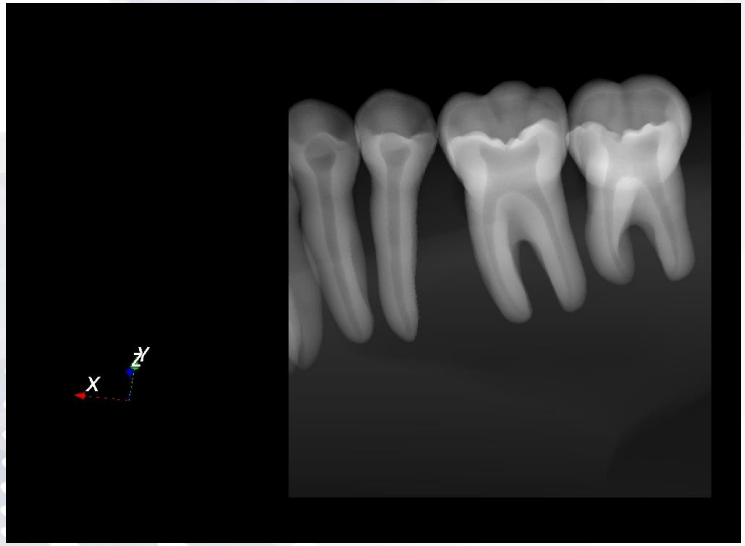
Local anesthesia results

Anesthesia type	Intraseptal	OK
Anesthetic type	3% Mepivacaine	OK
Vasoconstrictor concentration	1:100000	Wrong
Dental needle length	Long	Wrong

RADIOLOGY MODULE



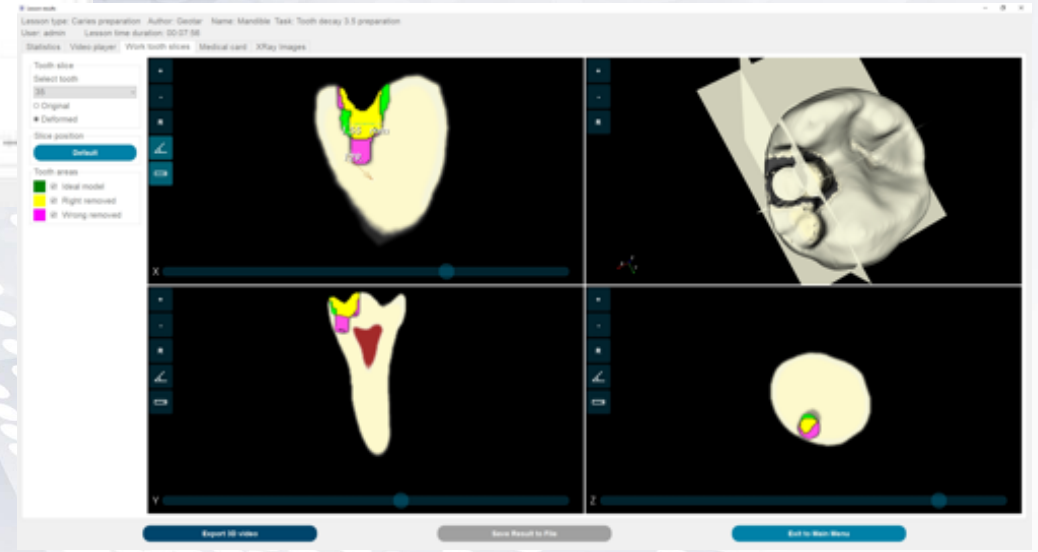
X-ray image can be taken on low and upper jaws



Every image is saved in a library and available for debriefing

ASSESSMENT

Report is generated according to a student`s selection of relevant parameters depending on what student is tested on

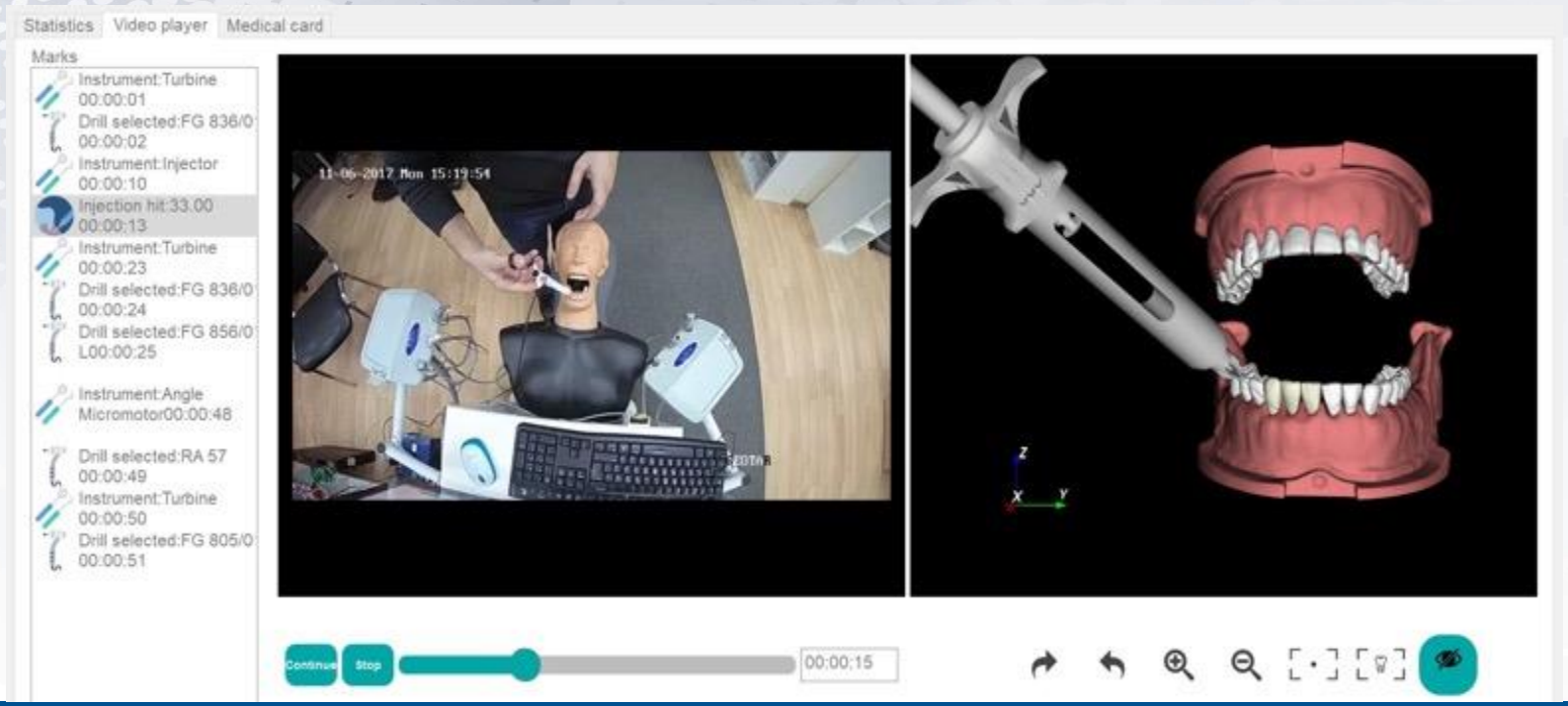


PATIENT MANAGEMENT ASSESSMENT

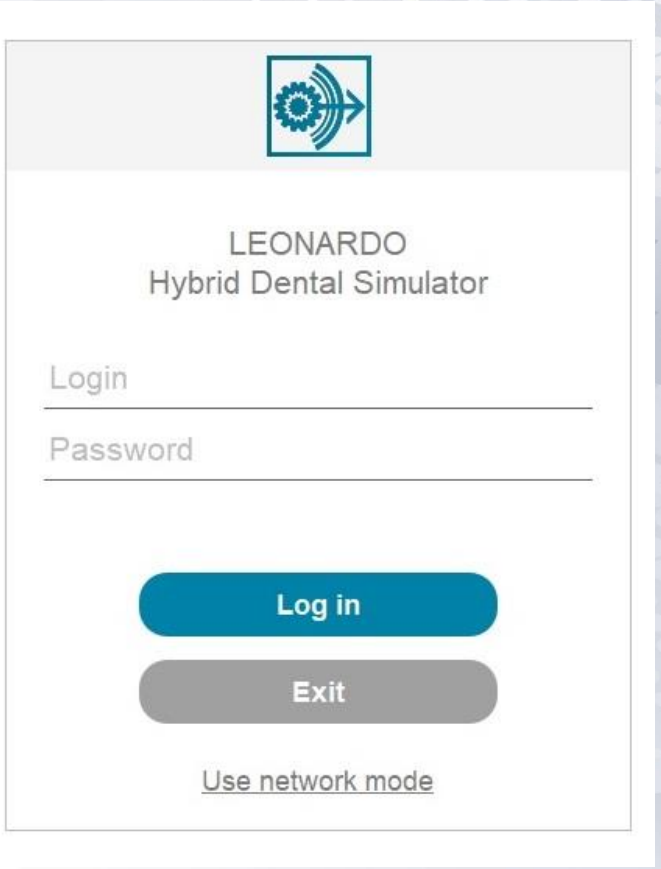
A teacher can also review all questions and answers from medical history data collected to the procedure accomplished by the student

DEBRIEFING OR SESSION REVIEW

- 3D-player with a zoom and rotation tool option
- Real video capture from the camera synchronized with 3D-player enabling the instructor to check ergonomic and posture
- Real Video capture eliminates issues of cheating during testing
- Real Video capture enables to control classroom environment remotely



LEARNING MANAGEMENT SYSTEM



- Allows to store all files locally on the simulator and on the server
- Review of the training progress by trainees, groups, courses