BodyMap
Brochure

2020.04

Introduction

What is BodyMap

BodyMap is a medically accurate representation of the human body that can be manipulated in 3D virtual reality. Our strict data reconstruction and design methods set us apart and provide users with realistic visualizations of every detail of the human body. Users may interact with the virtual body in numerous ways, including walking into the virtual body for a detailed inspection of internal organs, grabbing out anatomy structures for a closer look, and simulating instrument insertion techniques with instant haptic feedback. BodyMap features are described in full detail below.

Growing needs of digital learning to anatomy study and more!

At its core every medical school aims to educate the next generation of practitioners who will make wise medical decisions and treat their patients to the best of their knowledge and abilities. As anatomy plays a critical role for all branches of medicine, it is the obligation of medical institutions and their educators to provide students with reliable and effective anatomy education. Medical Augmented Intelligence (MAI) aims to address this need with BodyMap — a VR training solution for medical students. And while BodyMap does not intend to replace traditional teaching methods based on cadaver dissection,it aims to augment this educational process with advanced and engaging technology. BodyMap offers a general human anatomy learning experience that all students and residents can enjoy.

Increasing benefits of VR medical training approaches

Virtual reality gets real. An increasing number of institutions recognize the value of integrating VR into their study environment and aim to position themselves as leaders of innovative teaching.

Improved learning performance. Increased information retention rates.

Learning by VR improves understanding and amplifies recall of material. These positive experiences are based on the 3D immersive and interactive options available in a VR environment as compared to traditional methods.

Self-learning environment. Unlimited repetition.

This modern learning approach enables students to transfer their knowledge gained from anatomy books and cadaver dissection lessons into an immersive environment and enhance it by continuous repetition. This way of learning increases confidence in students' own abilities and knowledge.

Cost-effective application. Flexible and mobile.

The simple framework underlying VR solutions and reusable medically accurate 3D content serves as good long-term investment with minimal recurring costs. The ability to easily transport and store the VR hardware in different environments increases the number of users who can make use of MAI's software.

BodyMap unique offering

Installation environment
Flexible

Customer base
Large and small groups, individuals

Reconstruction accuracy
Strict MRI- and CT-based data reconstruction

Visualization
Cinematic rendering of life-size 3D avatar

Clinical tools
Cutting simulation customizable for further clinical skills

Technological progress
Continuous development and update of new features and content

Customization
Potential collaboration and adaptation of features and content

Comprehensive content

BodyMap avatars represent medically-accurate virtual anatomy models, which are based on magnetic resonance imaging (MRI) and computed tomography (CT), as well as data based on sizes and locations of each anatomical feature.

12 human body systems

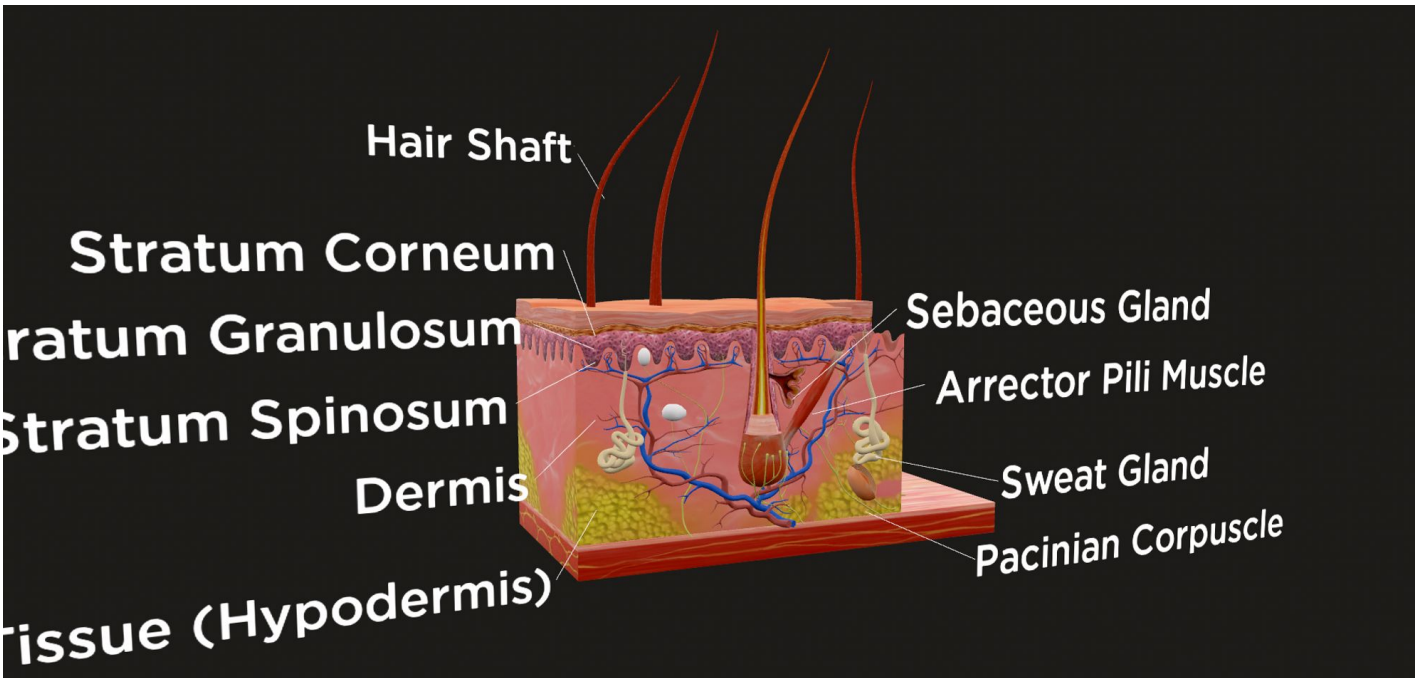
12 human body systems are provided in BodyMap so that users may see how the systems and structures within those systems relate to one another. BodyMap body systems include: skin, skeleton, muscle, connective tissue, circulatory, nervous, lymphatic, digestive, reproductive, urinary, endocrine, and respiratory.

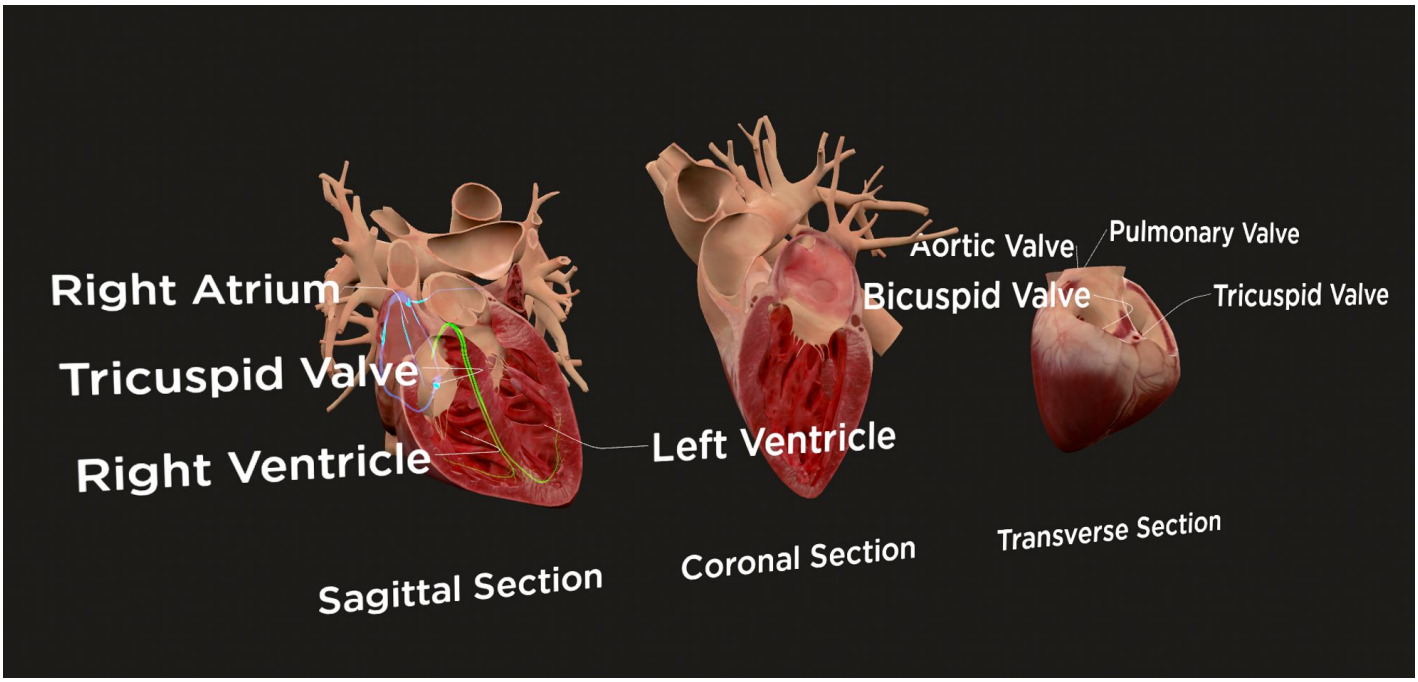
Male and female models

Users may easily switch between male and female models, which are displayed in 1:1 ratio, for further examination of anatomical differences between genders.

Cross-sectional views

3D organizational stratification and micro-structures are presented including a skin layered profile model, a kidney profile and a genital cavity model. The animated cardiac conduction system provides close-up views related to the closure frequency, structures of heart valves and fibrous skeleton allowing users to observe the conduction and cardiovascular physiology.

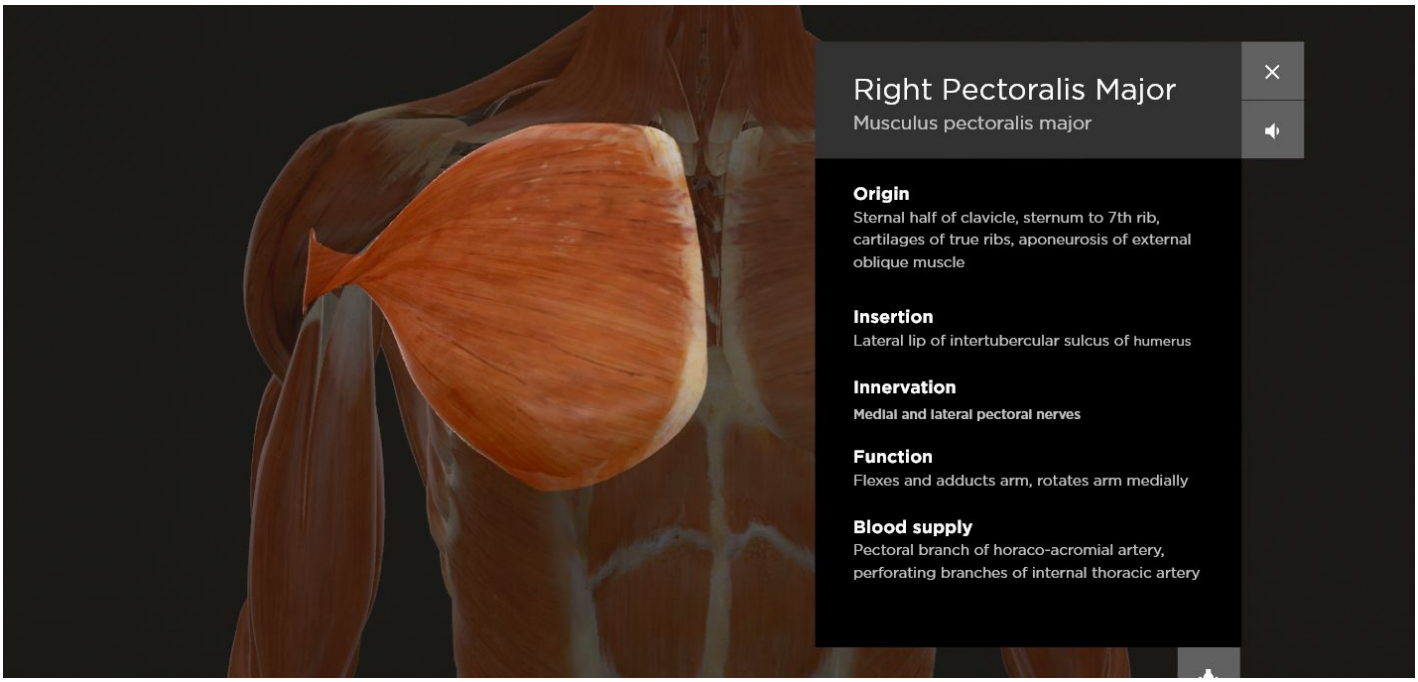


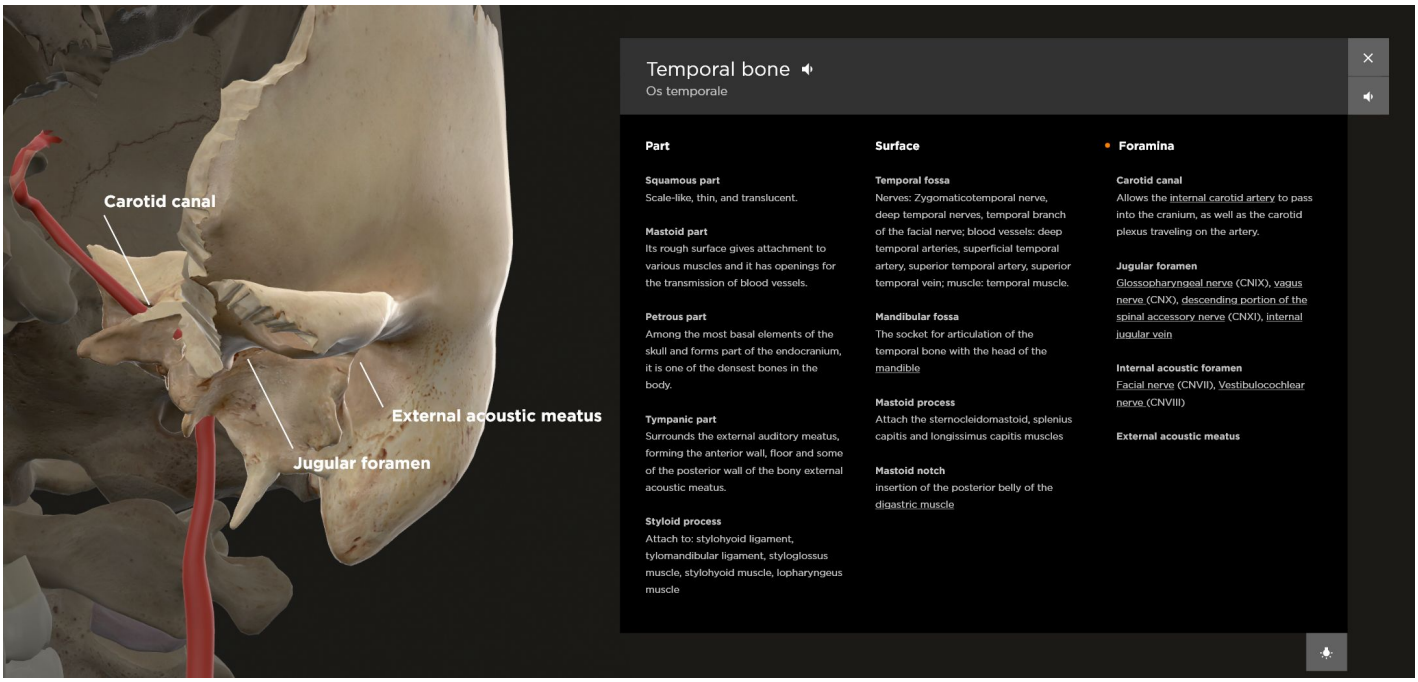


Anatomy flashcards

Anatomy flashcards provide users with additional anatomy content, and each card is divided into different sections depending on the system to which the anatomy structure belongs. For example, when a particular muscle is selected, flashcard content is divided into sections including origin, insertion, function, innervation, and blood supply. When a nerve is selected, information on the flashcard is sectioned into origin, course, and structures innervated.

Flashcards for skeletal structures include sections such as part, surface, and foramina. Certain systems may also include a 'clinical box' which offers clinical notes such as syndromes or diseases related to that structure.



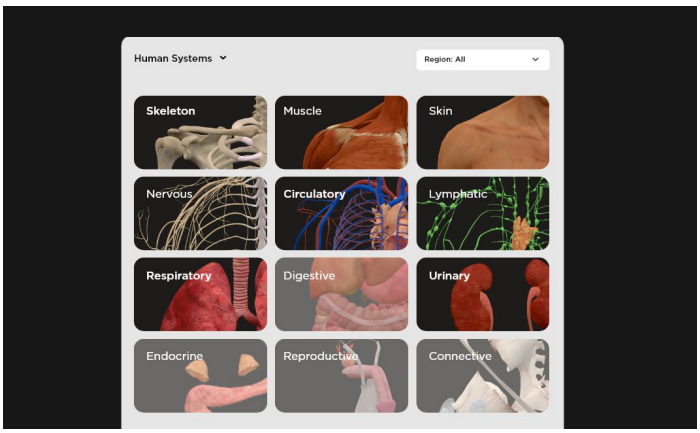


Interactive features

Learning through interactive options within a 3D virtual immersive environment enhances student understanding of anatomy material and is shown to improve knowledge retention rates.

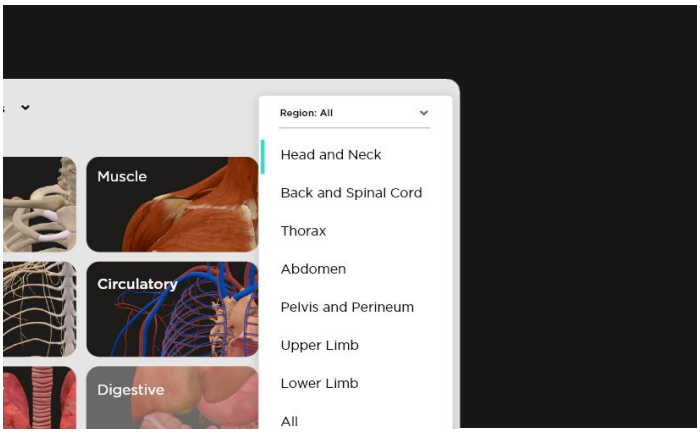
Comparison of body systems

Up to 12 human body systems provided in BodyMap may be selected at any one time to see how the systems and structures within those systems relate to one another.



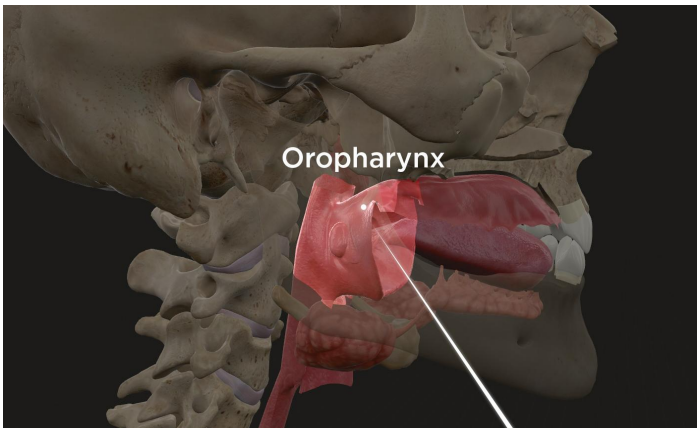
Anatomical region selection

Users can choose to focus on any one of or all 7 anatomical regions including: head and neck, back and spinal cord, thorax, abdomen, pelvis and perineum, upper limb, and lower limb. Selection of an anatomical region provides the user with a more localized map of that particular region.



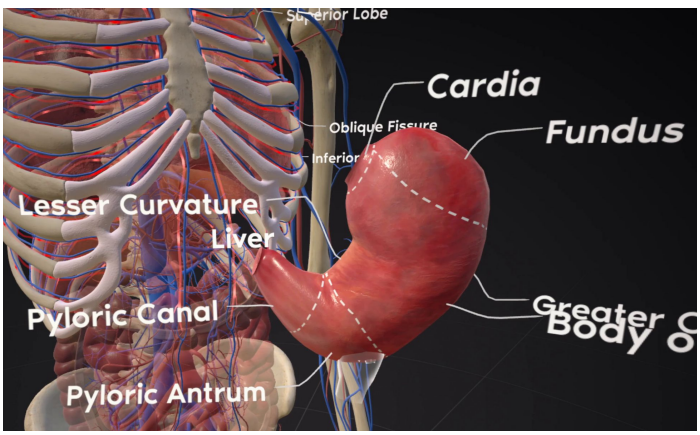
Real-time text display and audio playback of anatomy structures

Real-time text display of anatomical structures is provided upon controller laser pointing to a specific area of interest. Users may choose between English, simplified Chinese, and traditional Chinese text for display. Audio playback in English can also be activated by selection of the anatomical structures.



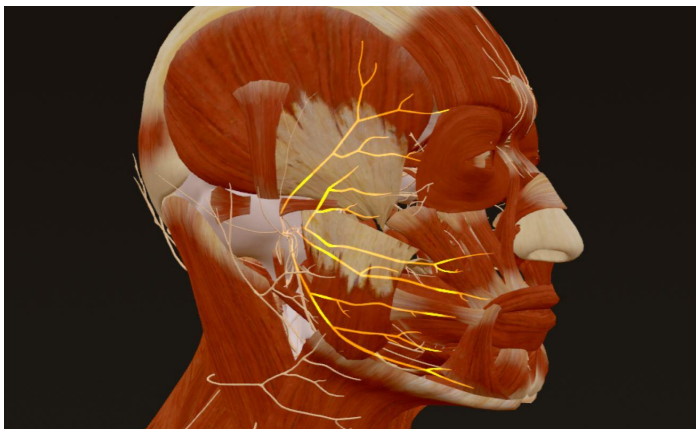
Grabbing for closer viewing

A user may “grab out” structures with a virtual hand for closer observation. Once the structure is removed from the body, the user may rotate and view the structure from any direction for further study.



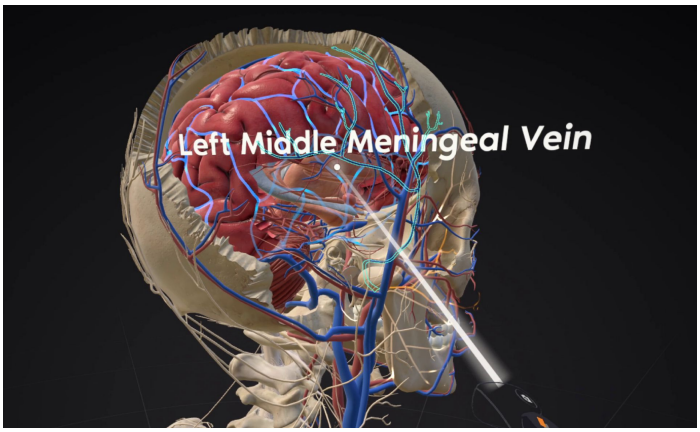
Pathway

Users may highlight structures within the circulatory, nervous, and lymphatic systems to observe flow pathways throughout the body.



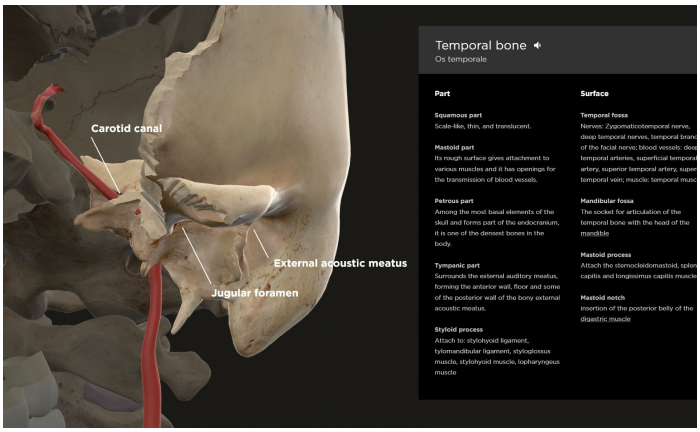
Hiding of structures by layer

Anatomical structures may be hidden, layer by layer, to reveal deeper structures or a particular region of interest.



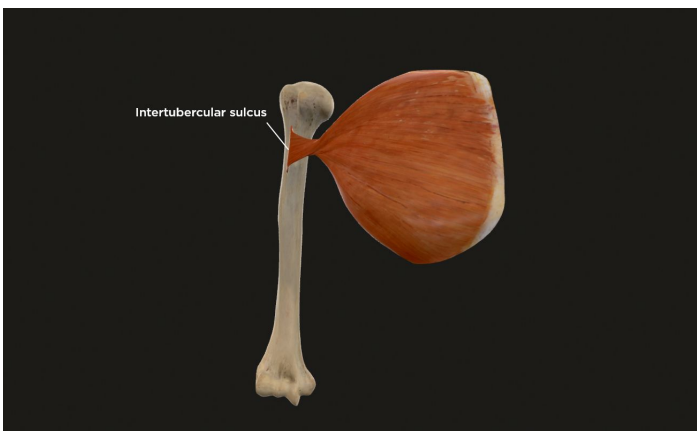
Hyperlink

When a section of the anatomy flashcard is selected, structures and labels listed in those sections will be displayed directly on the model. For example, once the section “foramina” is selected within the “temporal bone” flashcard of the skeletal system, structures such as “internal carotid artery” or “internal jugular vein” listed in that section of the flashcard will appear.



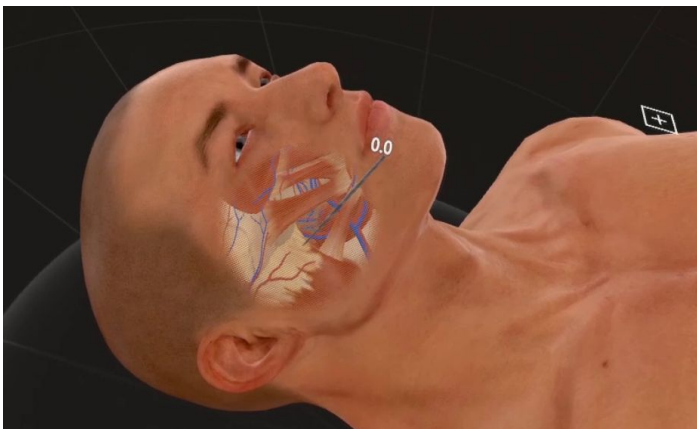
Isolated visualization

Users can point to different sections on anatomy flashcards and directly isolate anatomy structures for visualization. For example, a flashcard for the right pectoralis major muscle would allow for users to isolate that muscle as well as the humerus to which it is inserted. When the ‘isolate’ button is selected, the right pectoralis major muscle and humerus would be displayed with all other structures becoming transparent.



Manipulating body positions

The virtual body may be moved and rotated into various positions, e.g., supine, lateral, prone. Users can scale the model up to seven times the original dimension to observe each structure in detail.

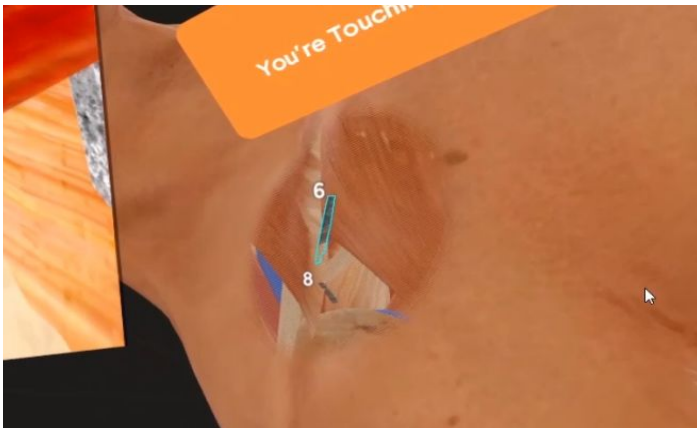


Instruments for simulation training

Users may simulate insertion of a medical instrument into the virtual avatar. The current default instrument is configured as an 8cm blade.

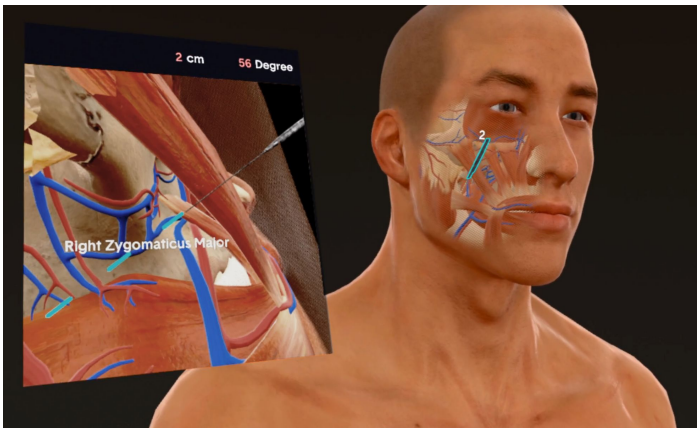
Haptic feedback

Haptic feedback can be felt in the controllers during virtual simulation, providing different intensities of “anti-force” during training simulations.



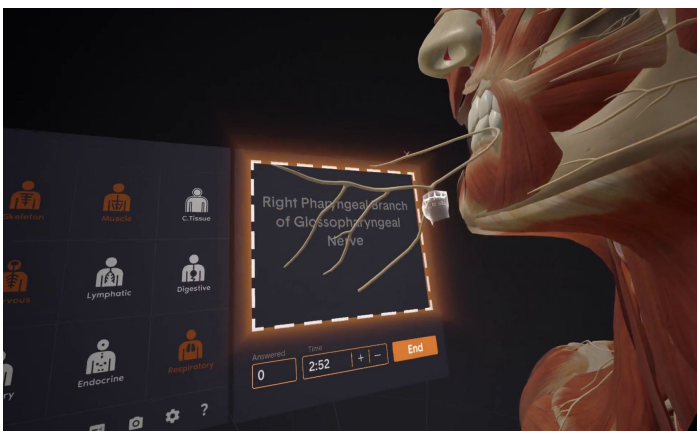
Magnification & visualization tools

Upon penetration of the virtual body during insertion simulations, the area being penetrated will be instantly magnified in real time on a separate screen, showing details including magnification of the various layers being penetrated, depth of insertion, and insertion angle.



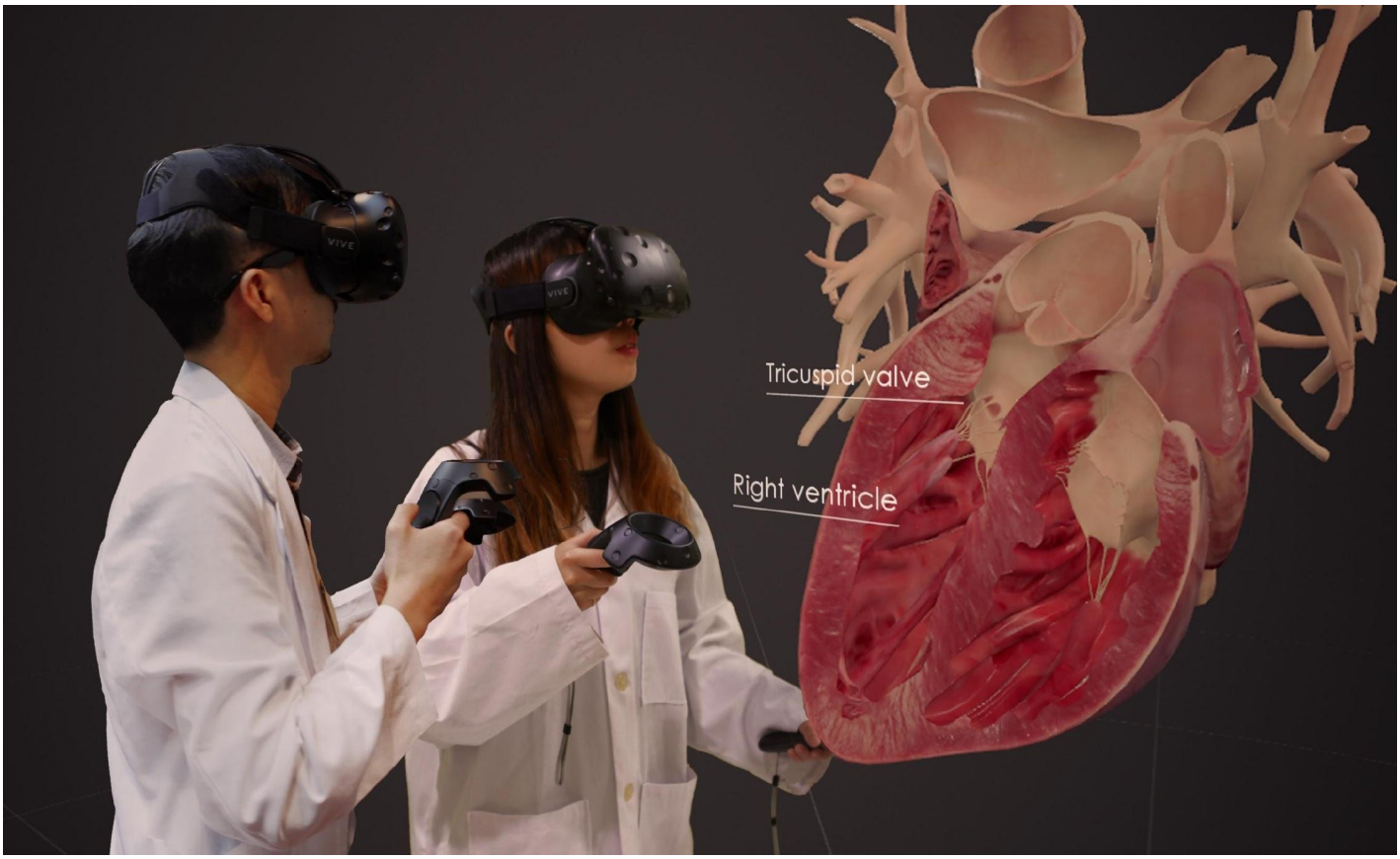
Question bank of 3,000 quiz questions

BodyMap includes a built-in quiz feature to assess student understanding of human anatomy, where students are asked to identify specific anatomy structures. Scoring is automatically calculated and assessed at the end of each quiz for additional insight on which concepts students are struggling with or whether teaching methods need to be improved.



Multi-user mode

When an instructor and student(s) have access to BodyMap and multiple VR headsets, the instructor can host an online VR session for multiple students, allowing students to view instructor interactions with the virtual body in real-time. The purpose of the multi-user mode is to allow for real-time interaction between educators and students, facilitating shared learning and increased engagement.



Integration scenarios

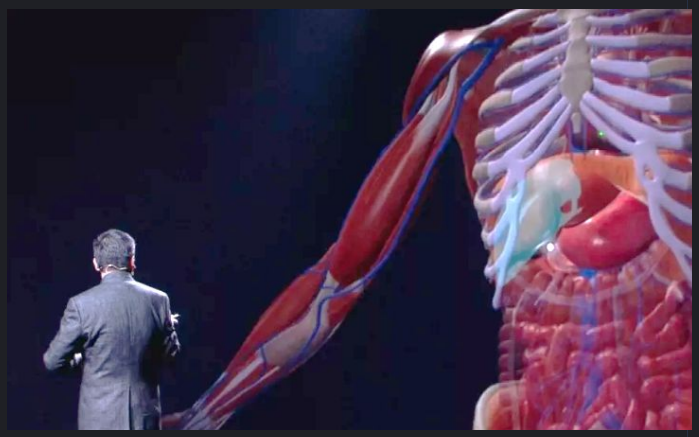
VR lab

Using BodyMap in a VR lab allows educators, students and residents to be simultaneously immersed in the virtual environment during dissection classes or clinical training sessions. While an educator demonstrates relevant content within BodyMap, students can virtually observe his actions. In this scenario, students can also individually learn anatomy material and practice simulation during or outside of classes. The virtual visualization increases student engagement rates and allows the “reuse” of virtual avatars on a regular basis.

VR Headset Units *
≥ 2 (1 for instructor + 1 per student)

Additional Device(s)
Router, Switch

Lectures



By connecting BodyMap to projectors or big screens during anatomy lectures or dissection classes, instructors can use the VR software as supplementary teaching material. This VR-based approach facilitates explanations of complex medical issues through simulated visualization and creates a more dynamic and engaging environment during classes. Furthermore, educators can use BodyMap for the purpose of online education.

VR Headset Unit
1 (1 for instructor)

Additional Device(s)
Projector / Big screen

* 1 VR Headset Unit = 1 headset + 1 PC

Hardware

Support from industry leaders

We’ve partnered with industry leaders such as HP, HTC, AMD, and NVIDIA to provide the best hardware solutions to fit your needs.

We ensure that our global partners will work with you to provide the best hardware solutions, which are compatible with MAI's VR training software solutions to deliver the best customer satisfaction.

- Local technical support
- Custom-built to perfection
- Competitive pricing

Hardware	Specification
CPU	Intel i7-7700 or better
GPU	NVIDIA RTX 2070/2080, AMD RX5700 / Radeon VII
OS	Windows 10
RAM	16GB DDR4 or better
HDD	256GB SSD or better
VR Headset	Oculus Quest, Oculus Rift S, Windows Mixed Reality Headset (Acer, ASUS, or HP), HTC Vive (Pro)

About MAI

Medical Augmented Intelligence (MAI) is a pioneer in the field of medical VR innovations focusing on anatomy and acupuncture. MAI started its journey in 2016 with a commitment to create high-quality VR-based solutions for the next generation of health practitioners. With locations in the United States and Taiwan, MAI is well-suited to combine medical knowledge and practices rooted in Western and Eastern cultures with the most current technological solutions.

MAI's VR applications include BodyMap - a medically accurate VR anatomy and simulation training software program, AcuMap - a visually immersive VR acupuncture learning and simulation training application, and DigiTwin – a comprehensive medical 3D imaging tool.

MAI's medical VR solutions combined with high-tech VR hardware can transfer users into an immersive virtual environment for a unique medical learning and simulation experience. By offering advanced technological VR solutions, medical educational institutions open new realms in the teaching of medicine and establish new effective learning methods for their students.

Collaborating with leading players in the VR hardware industry, we provide our clients a smooth transition from conventional teaching methods to virtual-based approaches offered by MAI. Maintaining strong ties with our advisors from the medical field and working closely with our current and potential clients, we continuously develop and innovate our solutions by adding more advanced features to serve the healthcare market in the most effective way. By doing so, we strive to continue creating value for health professional students, practitioners, and clients in other regions of the world.