

The iTeam experience: Multimodal Interactive teaching of the cardiac anatomy in 3D

Klaudia K Proniewska-van Dam¹, Kaja Tatoń K.¹, Sandra Zarychta S.¹, Michał Karny¹, Peter M van Dam²

¹ Center of Digital Medicine and Robotics, Jagiellonian University Medical College, Krakow, Poland

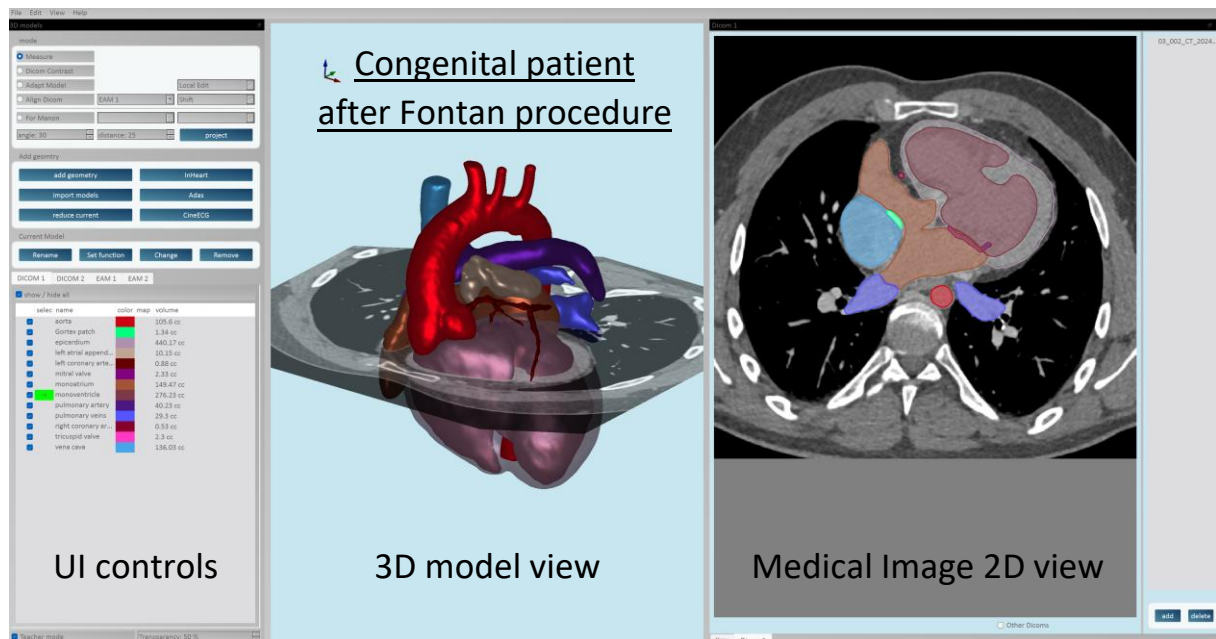
² Radiology department, Jagiellonian University Medical College, Krakow, Poland

Introduction: Medical imaging is in the fast majority collected as 2D images that need to be combined to a 3D structure, traditionally the expertise of radiologists. Moreover, the relationship between different imaging techniques like computed tomography (CR), magnetic resonance imaging (MRI), fluoroscopy or echo are not always easy to teach. To address these needs, the 3DMedical platform is being developed. In this study we will present several of the educational cases made available on the website.

Methods: From a CT medical imaging data set 3D reconstructions of the different structures of the heart were created using Slicer. Eventually 3D reconstruction could also be made from other imaging modalities. All Medical imaging data as well as the 3D cardiac anatomical models can be loaded into the program *3DMedical* and stored as a single binary file. Every 3D model can be moved, made transparent as well as hidden. Additionally the cross section of the heart model is shown in the medical image.

Results: To illustrate the educational value of *3DMedical*, 4 educational cases have been created: 1) an interactive case of a healthy female, 2) an interactive case of a patient with severe aortic stenosis scheduled for Transcatheter Aortic Valve Implantation (TAVI), 3) a congenital patient after Fontan procedure (see below), and 3) a patient with atrial flutter. For all cases the imaging and models can be visualized and taken apart. Educational material that can be used in medical education is available as well.

Discussion: The multimodal integration *3DMedical* provides, supports personalized interactive learning of the complex cardiac structures. It thus offers case-based learning that bridges anatomy, imaging, and clinical reasoning. *3DMedical* serves as an educational tool supporting expert medical knowledge, combining the precision of traditional imaging with the modern capabilities of digital modeling.



Downloads: iteam.cm-uj.krakow.pl/3d-medical

This work was supported by the grant and project "Interactive TEaching of Medical 3D cardiac anatomy supported by Mixed Reality (iTeam 3D-MR)," agreement number 2023-1-PL01-KA220-HED-000159314, Erasmus + Program, Strategic Partnerships (Key Action 2).