Virtual ACS 2021 Surgeons and Engineers: A Dialogue on Surgical Simulation Meeting

Research In-Progress

Interprofessional discovery learning of the human biomedical musculoskeletal system. Combining a virtual patient case and a finite element based cervical spine model to visualize trauma biomechanics.

Li Fellander-Tsai, MD, PhD.

Karolinska, Stockholm, Sweden

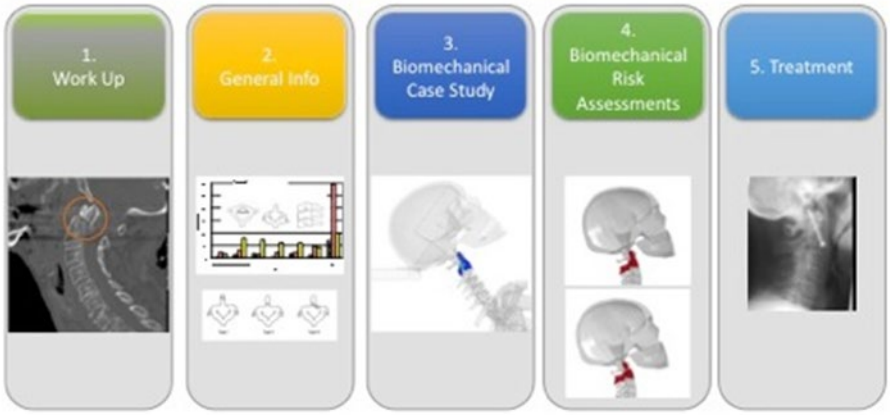
Introduction: generation and integration in a virtual environment combining a virtual patient case and a finite element model (FEM) based cervical spine injury. Special focus is on interprofessional learning in medical-, nursing, physiotherapy- and occupational therapy students. New visualization techniques and virtual environments enable design of educational arrangements directed towards competencies that cannot be learnt by traditional forms of university-based education. Understanding human anatomy can be identified as memorizing, contextualizing and experiencing. Today, normal and pathological anatomy can be visualized by e.g. Computed Tomography (CT) and Magnetic Resonance Imaging (MRI). Visualization of different diagnoses for clinical application and treatment is a significantly expanding area within healthcare. For instance, so-called *passive visualization* includes CT and MRI, and is mainly used for the visualization of anatomical and functional structures. However, so-called *active visualization*, including haptic devices in virtual reality, is just in its infancy.

Methods: A PC based virtual program combining a virtual patient case with a cervical spine fracture and FEM visualizing the biomechanics of the fracture was developed (Fig 1). Ten interprofessional groups of three students enrolled in different programs, (medical-, nursing and physiotherapy-/occupational therapy students) were video recorded while going through the virtual program. Student interactions were analyzed as well as interactions with the visualization program. Focus group interviews were undertaken. The study was approved by the regional ethical committee (Dnr 2016/450-31).

Preliminary Results: The focus group interviews revealed that students in general appreciate learning with the visualization program. Analyses of the video recordings regarding interactions between the students as they work their way through the visualization program indicate that the format stimulates embodied understandings of the biomechanical conditions related to the case. The findings indicate that the visualization program induces interprofessional clinical reasoning among the students.

Next Steps: Active visualization of biomechanical events in trauma holds promise for interprofessional training. Analysis of the variation in how interprofessional collaboration emerges as an effect of the interaction with the visualization program is ongoing.

Fig 1


1.
Work Up
2.
General Info
3.
Biomechanical
Case Study
4.
Biomechanical
Risk
Assessments
5. Treatment