Personalized Medical Training and Treatment Through Virtual Simulation

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Problem and Motivation

Surgical tools for training and teaching are limited and expensive. Models created from personal patient CT scans will provide an inexpensive and personal training option.

Currently medical mannequins, cadavers and other computer simulations are used. These options are usually one time use and only demonstrate “common” cases seen in healthy patients.

Methodology: From 2D Images to 3D Models

The objective was to create three dimensional models for simulation. Phase one was rendering the CT scans, and phase two was refinement.

Segmentation software was used to create surface models from the CT scans. In addition to inner and outer layers, the internal spongy bone layer was created. A mesh of the models was refined for simulation.

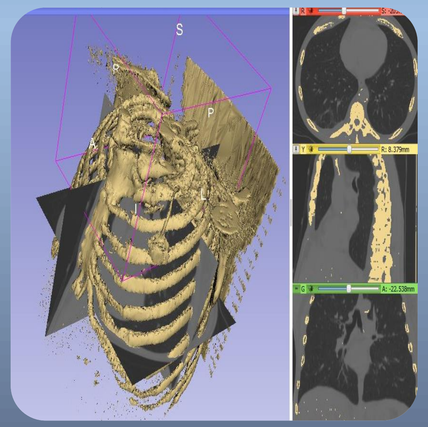
Future Plans and Benefits

Phase one and two provides a base for continuing research. The continuation will be to continue simulating using models created, with recommendation to investigate more interactive devices.

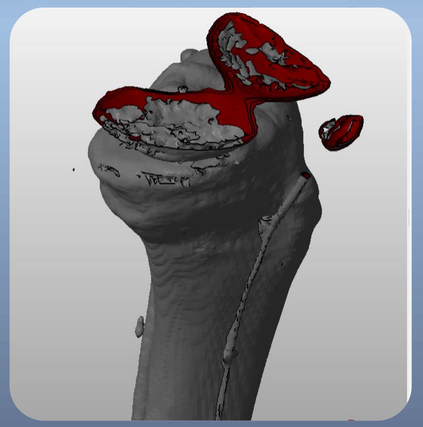
The procedure produced in this project allows for medical personnel to take personal CT scans and use them for effective training and treatment .

2-D Images to 3-D Models: Creating a Personalized Medical Training Tool

CT scans are converted from two-dimensional images to three-dimensional models using segmentation software.



3D Slicer



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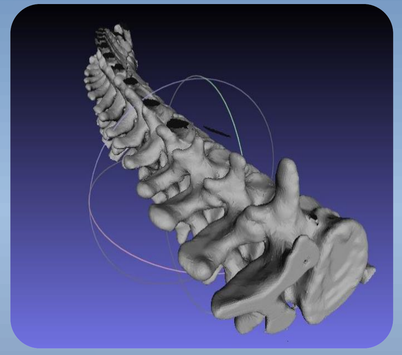
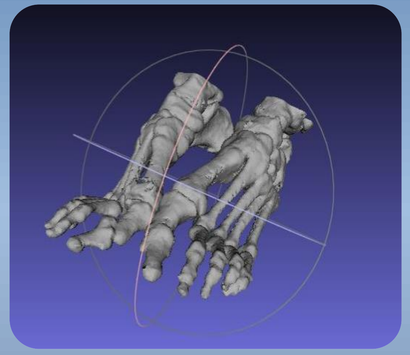
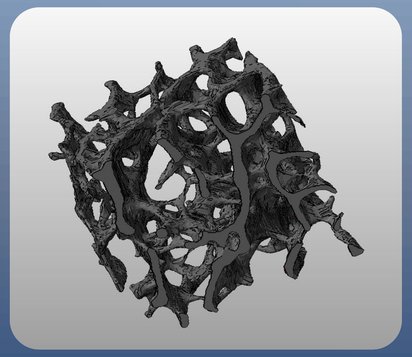
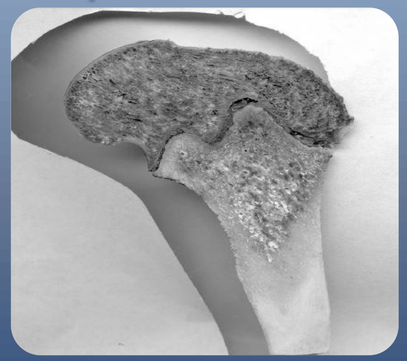




Models are refined for accuracy; imperfections are removed, and then exported.

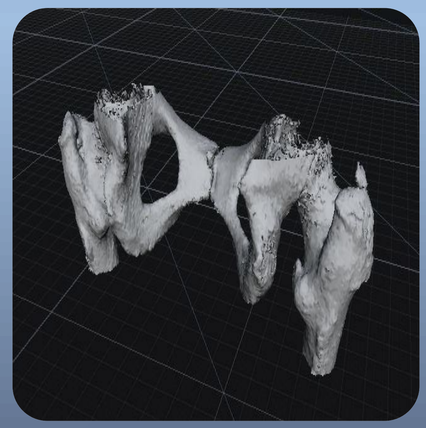


Human spongy bone

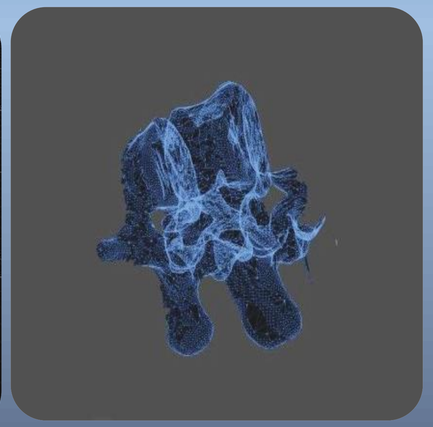


Sheep bone scan

Models are then ready for simulation.; they are manipulated using force feedback device.



Hip in Unity



Spine segment in Unity

Acknowledgements

We thank our advisors Dr. Pavel Ikonomov and Dr. Betsy Aller for their support and assistance throughout the process.
We also thank WMU for their financial support.

EDMMS 4930 – Fall 2014