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3D Printed Ear Canal Model

Ahmad Ali

Virginia Commonwealth University

Rosheena Hairston

Virginia Commonwealth University

Hunter Locks

Virginia Commonwealth University

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3D Printed Ear Canal Model

EGMN 522 | Team members: Ahmad Ali, Rosheena Hairston, Hunter Locks | Faculty adviser: Hong Zhao | Sponsor: VCU Otolaryngology | Sponsor adviser: Daniel Coelho

CAPSTONE DESIGN EXPO 2017

Introduction

- Surgical removal of the irritants is necessary for certain occurrences of ear infections, such as fluid removal behind the tympanic membrane.

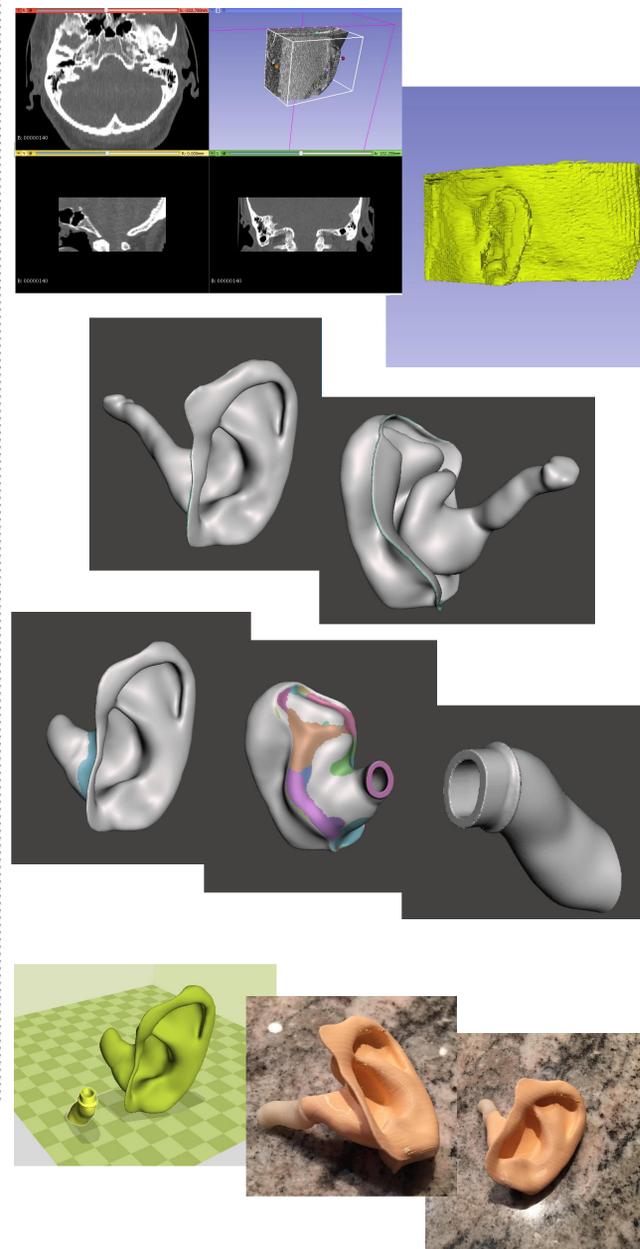
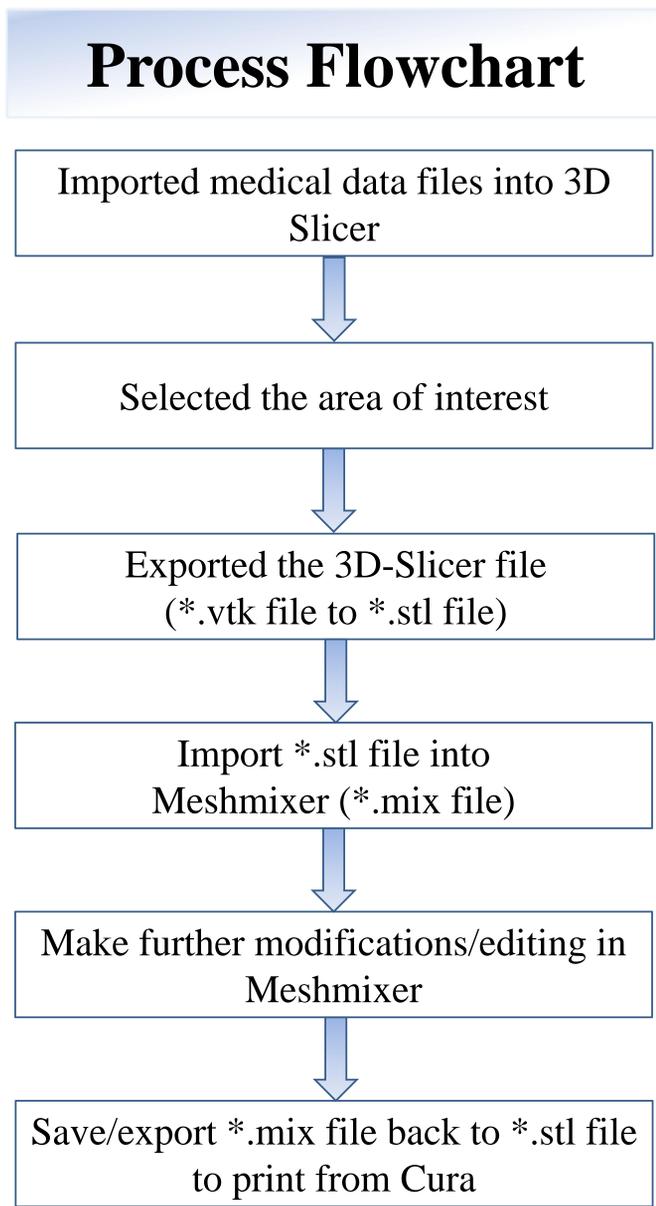
Objectives/Goals

- Creating a multi-material ear canal model for doctors and trainees that will ensure:
 - Better techniques for ear canal treatments.
 - Allow the doctors to perfect their techniques/skills and ensure safety.

Challenges/Solutions

- Working with Ninja Flex Material.
- Combining two different types of materials.
- Having small defects with the printed models.
 - Model losing adhesion mid-print.
 - Ninja Flex material mid-print would not hold up due to the model orientation.
- Replicating the tympanic membrane.

Process Flowchart



Software & Hardware

- 3d slicer: Analysis/scientific visualization used for medical applications.
- Meshmixer: Modeling program for editing imported files.
- Cura: Printing/communications program.
- LulzBot Mini 3D Printer: Printer utilized for creating all models.

Conclusion & Significance

- Corrected our issues/challenges to create an accurate, real-life scale, multi-material ear canal replica from modeling programs.
- This project serves a great benefit by allowing doctors and trainees from the medical society to fully understand the ear structure, while also improving their surgical techniques/routines.

Acknowledgment

- We would like to thank Professor Zhao and Doctor Coelho for allowing us to take on this project and for showing us around the hospital work environment.
- Also, a special thanks to Jason Barnes for allowing us to use one of his patient's files.

