



**MERCER
ENGINEERING**
Different by design

3-D Printed Custom Standard Wrist Brace

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Abstract

The primary goal in this research project is to address the issue of the lack of custom and better fitting wrist supports. In orthopedics, patients are not given many options when it comes to acquiring supports for their conditions. This often results in braces that do not fit well. The supports may also cause the patients discomfort due to the design.

To combat this issue, the plan is to take 3-dimensional scans of patients arms and hands to custom fit a standard wrist brace. The wrist brace will perfectly fit the patient's hand contours, be sized correctly for the arm, and provide enough padding to be comfortable.

Example 1—Handcrafted Support



Hand-constructed 3-D Support Interior View

Early Work

To start, the current way custom wrist brace are created at Ortho Georgia was determined. From there, the current method being used was tested to determine where possible complications may be.

Currently, the most effective way to scan arms and hands to obtain an accurate and detailed scan is being determined. Different scanners have been used. So far, the EinScan-Pro has provided the most details needed to customize the brace. However, this scanner is more difficult and time consuming to use, so a method of combining parts of scans is being attempted. The amount of the hand and arm that needs to be scanned is also being determined.

Additionally, MeshMixer is being used to create a brace model and become familiar with the platform features that may be used for customization. The different functions and design options that allow customization in a quick and reproducible way are being explored. This will increase efficiency and reduce possible errors.

Comparison



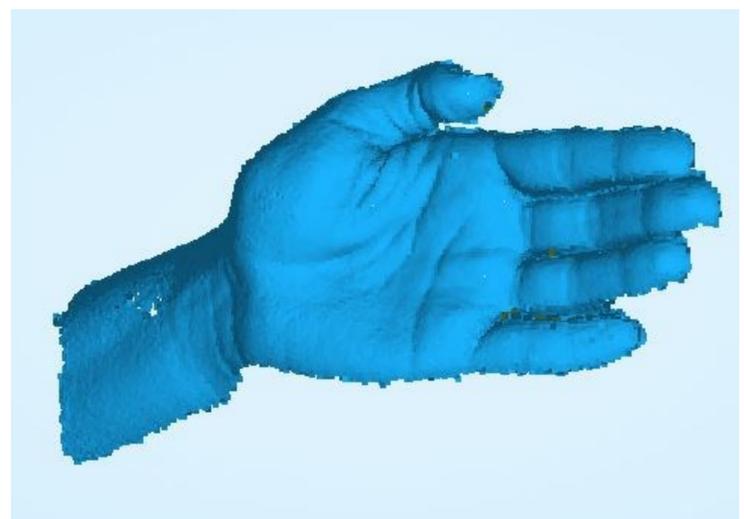
Custom 3-D Model Example vs. Mass Produced Standard Wrist Support

Future Planning

The first step is to create a wrist brace model to use. Then, the type of scan and how much needs to be scanned to be effective will be finalized. This scan would then be used in MeshMixer to custom fit the brace model to the scan. Ideally, these steps will be time effective and easily reproducible.

From there, the best material to use and the best way to print the support will be determined. The brace will be printed and tested, so alterations can be made as needed. Padding and straps will be added after the design is printed.

Scan of Hand



Scan of Hand Using EinScan-Pro

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