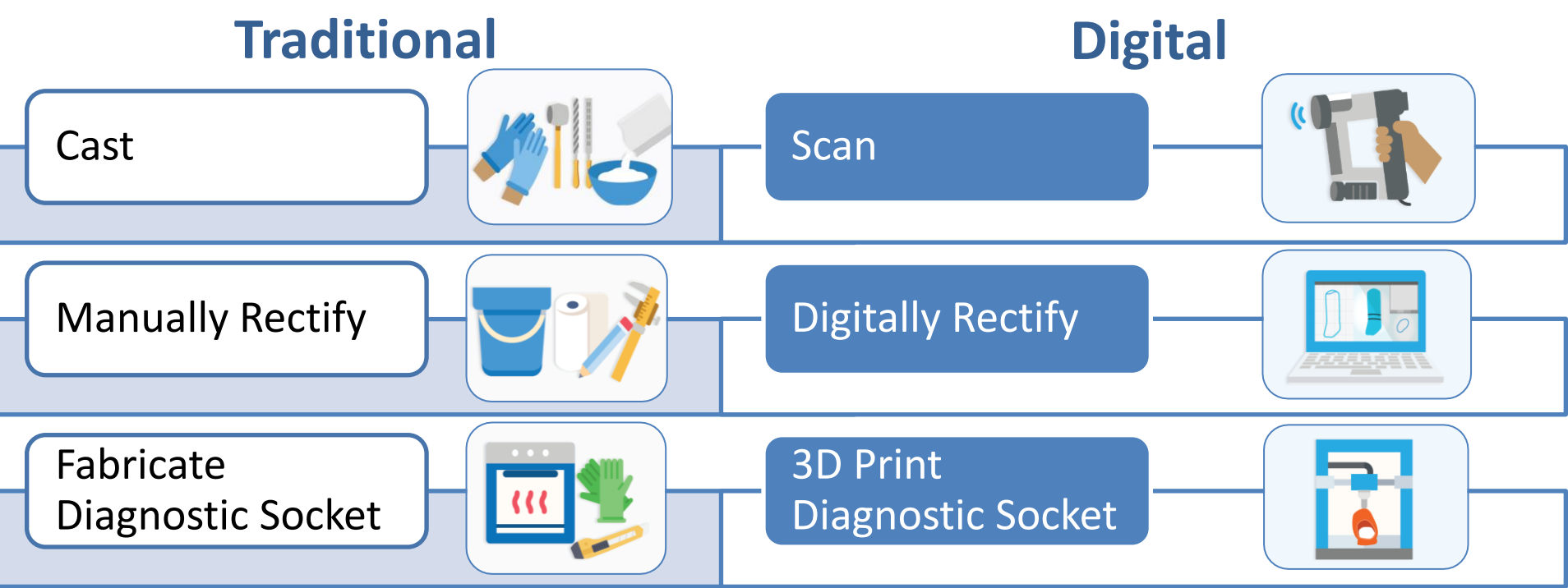


3D Printing Transradial Prosthetic Diagnostic Sockets

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Background

How are prosthetic sockets made?

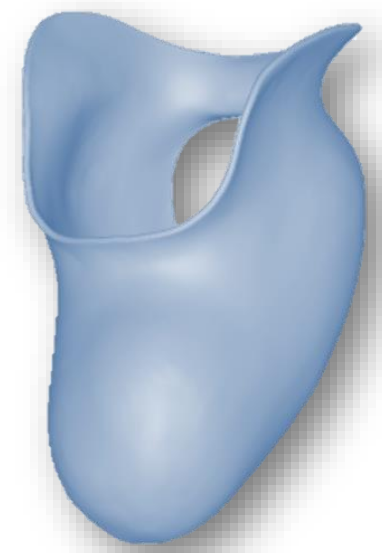


Challenges

- Digital rectification process lacks physical feedback
- Current 3D printed diagnostic sockets are not suitable for performing clinical assessments
- No known research on transradial (below-elbow) sockets

Objective

Develop a process to digitally design and create transradial prosthetic sockets

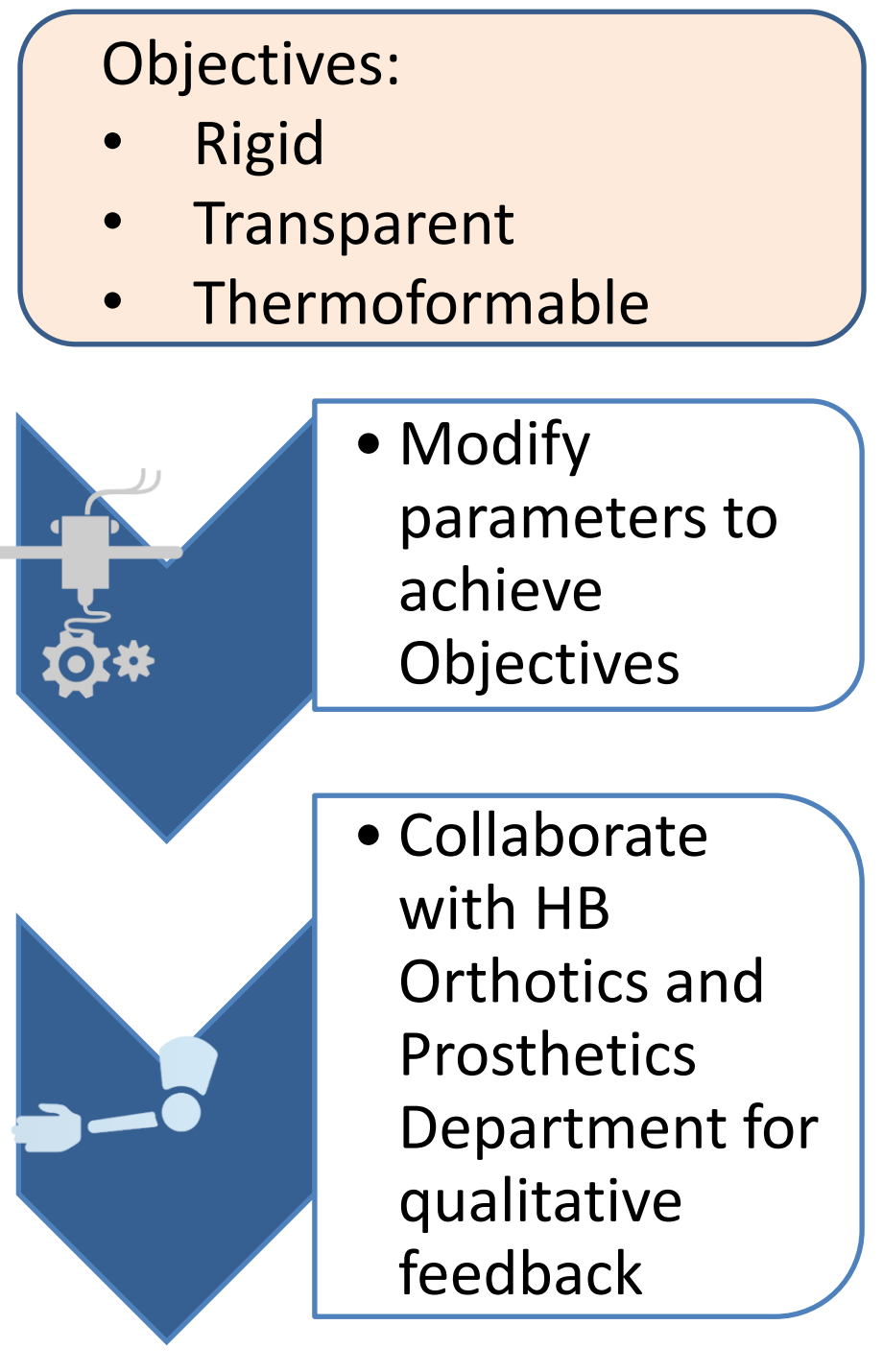


Methods

Improve Digital Rectification Process



3D Printing Diagnostic Sockets

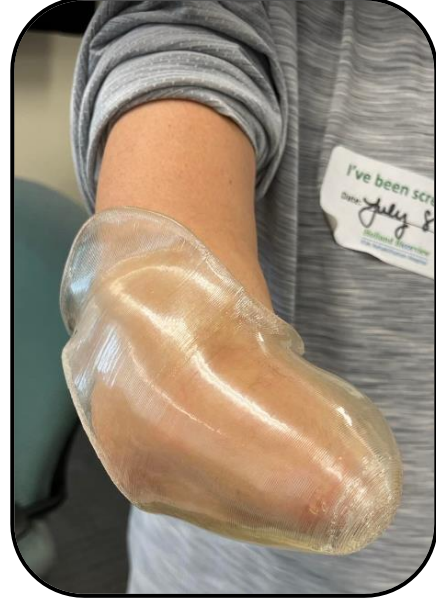


The use of Digital Technologies, such as 3D scanners, CAD software, and 3D printing, have the potential to revolutionize traditional prosthetic practice



Results/Discussion

Preliminary Analyses Reveal:

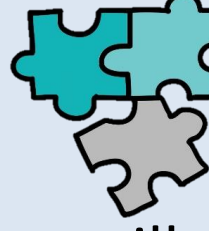


Time



Software automation reduces # of steps for basic modifications

Socket Fit



Software still requires refinement for areas of compression/expansion

20+ Diagnostic Sockets were printed while varying the following printing parameters:

Material



PLA, PVB, PETG

Socket Thickness



1.5mm-2.5mm

Post Processing



Chemical Treatment

- Average Print Time: 5 Hours
- Material Cost per printed socket: \$5-\$15

Feedback from Prosthetists:

2.0mm-2.5mm provides the rigidity needed

Clarity improved. Skin blanching is visible

Material reacts to heating and adjusting very well





Next Steps

- Improve digital rectification process so prosthetists can easily incorporate it into clinical practice
- Continue testing 3D printed sockets on clients



Impact

- First ever clear, thermoformable, 3D printed transradial diagnostic socket
- Digital Technologies have the potential to significantly improve access to prosthetic services (i.e., remote care, lower costs)
- Discover for Action:** HB clients will participate in development of a first-of-its-kind digital process for the creation of transradial sockets

Acknowledgements

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