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

**Background**

How are prosthetic sockets made?

<table>
<thead>
<tr>
<th>Traditional</th>
<th>Digital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cast</td>
<td>Scan</td>
</tr>
<tr>
<td>Manually Rectify</td>
<td>Digitally Rectify</td>
</tr>
<tr>
<td>Fabricate Diagnostic Socket</td>
<td>3D Print Diagnostic Socket</td>
</tr>
</tbody>
</table>

**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

**Methods**

- Improve Digital Rectification Process
- 3D Printing Diagnostic Sockets
  - Objectives: Rigid, Transparent, Thermoformable
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**Results/Discussion**

Preliminary Analyses Reveal:

- 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

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