Constantinescu, G. Mobili-T: An interdisciplinary approach to developing solutions for patients with chronic swallowing difficulties (Poster presentation)

Authors: Gabriela Constantinescu, Rinde Johansson, Mikenna Tansley, Jaymes Barone, Jana Rieger
Presenter: Gabriela Constantinescu, MSc-SLP, R.SLP, S-LP(C) – Speech Language Pathologist, Institute of Reconstructive Sciences in Medicine
Gabriela.Constantinescu@albertahealthservices.ca

Background. Swallowing impairments can lead to serious health problems such as malnutrition and aspiration pneumonia, as well as psychosocial concerns and poor quality of life. Effective treatment can be enhanced with the use of adjuvant visual biofeedback from surface electromyography (sEMG) to monitor muscle movement during swallowing exercises. However, access to therapy is limited due to several barriers ranging from low clinical capacity to expensive and impractical current technologies.

Methods. Our team, comprised of clinicians, Industrial Design students, and Biomedical Engineers met within the context of an interdisciplinary design course to draft an innovative solution to existing swallowing therapy challenges. The design was selected with input from biomedical engineers (weight, size, connections, signal quality), clinicians (target therapy, patient demographics, shoulder range of motion)and uses principles of universal design.

Results. Our team developed a prototype for a mobile health device that replaces the existing technology and translates sEMG information into a more engaging interface for the patient (Figure 1). Future development will involve pairing the small, portable device with iPads via a downloadable application. The application will provide meaningful visual feedback to the patient and upload home practice data to a central server for the clinician to monitor progress.

Conclusions. Engaging clinicians in the design process of medical devices can ensure patient-focused prototypes and increase the likelihood that new technologies will be adopted more rapidly.

Acknowledgements: The authors would like to thank Robert Lederer, Eleni Stroulia, PhD, for their guidance; Herman Lundgren, Dylan Scott and Mark Fedorak for their work on the mobile sEMG technology. Components of this project were completed as part of DES 500, The Practice of Industrial Design and CMPUT 605, Computing for Ubiquitous Health Applications, offered at the University of Alberta.

Figure 1. Mobili-T prototype