

2nd Place Award for Fall 2023 Outstanding Biomedical Engineering Senior Design Project

Team: Sonoguard™

Student team members: (L to R) Zach Kail, Andie Tubbs, Logan Bomar, and Artis Hardaway.



Team advisor: Carl Herickhoff, PhD, Assistant Professor, Department of Biomedical Engineering, The University of Memphis

Problem statement

Repetitive stress injuries are common among sonographers, causing severe pain and joint degeneration in their hands, wrists, shoulders, neck, and back. A solution is needed that reduces repetitive stress injuries in sonographers, is affordable, is widely available, does not disrupt their workflow or detract from patient care, is easy to clean, and takes minimal effort to use.

Design Description

Our design consists of a compression sleeve or shirt and two lotus microfiber fabric straps attached by snap fasteners. One attachment site is between the wrist and elbow, and the other is at the top of the shoulder. The two straps are meant to hold the transducer cable and mitigate the effect of its weight on the wrist and shoulder. The compression shirt is meant to provide support across the upper body and distribute the weight of the transducer cable over a larger surface area (Figure).

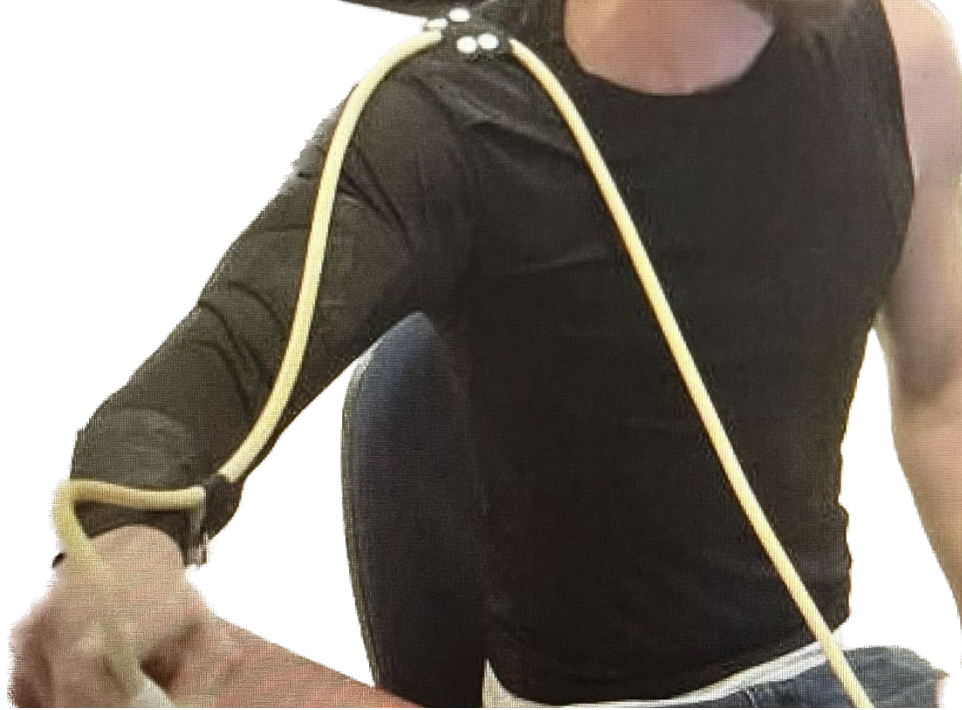


Figure. A picture of our final prototype, the Sonoguard™, which features a right-armed, one-sleeved compression shirt with two fabric straps that secure a transducer cable with button snaps.

Statement of project impact

Our device was designed to reduce repetitive stress injuries afflicting sonographers. This would allow sonographers to prolong their careers and consistently provide accurate medical images for clinician and their patients. This device would also help reduce the cost to employers associated with work related musculoskeletal disorders caused by repetitive stress.

Lessons Learned

This project allowed us to take everything we've learned during our time at Herff College of Engineering and channel it toward a specific topic and create something that is our own. Learning about the design process has also given us a blueprint for solving problems outside of a school setting. Our team would like to thank the Biomedical Engineering Department for this opportunity. We would like to give a special thanks to Dr. Curry and Dr. Herickhoff for their support and guidance and to our medical sonographers at Baptist Health Science University Katie Cody and Connie Willis for their feedback and providing a testing environment.