Title: Evaluation of the Use of 3D Printing and Silicone Casting in the Manufacturing of Diabetic Foot Orthotics
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Various conditions are treated through the prescription of custom foot orthotics. These conditions include, but are not limited to, diabetes and plantar fasciitis.[1,2] Foot orthotics are used within the diabetic population to prevent or treat diabetic foot ulcers.[1] About 25% of all diabetics will experience a foot ulcer within their lifetime and, in the worst-case scenario, the ulceration could lead to amputation.[3] Custom molded foam orthotics are the current gold standard of prevention and treatment of mild ulcers. They have proven to be effective for the treatment and prevention or diabetic foot ulcers. However, some critical deficiencies within their manufacturing cycle need to be addressed: 1) slow manufacturing time, 2) limited ability to iterate as patient's needs progress, 3) cost.

Our group aims to address these critical deficiencies through the use of 3D printing and silicone casting. This presentation will cover the evolution and current state of our novel orthotic, and the materials, methods and results of the research that has led to this point. This includes material selection and characterization (i.e. hardness, pressure distribution, wear, etc.), as well as pilot clinical trials.

References:
[1]Paton J, et al., Effectiveness of insoles … foot: a systematic review J of Diabeties and Its Complications., 2011 Feb; 25-1.
[2]Rizzo L, et al. Custom-Made Orthesis … Ulcers in High-Risk Diabetic Foot Patients. Int J Low Extrem Wounds. 2012;11(1):59-64. 404 doi:10.1177/1534734612438729.
[3]Reiber GE, et al. Effect of Therapeutic Footwear on Foot Reulceration in Patients With Diabetes. 2016;287(19).