

Development of a Burst Pressure/Leak Testing System for Surgical Adhesives

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Surgical adhesives provide excellent tools for wound closure. However, prior to their use in clinical applications, extensive testing is required to evaluate their material properties and the forces that they can sustain. An important adhesive characteristic to consider is its burst pressure, defined as the pressure at which an adhesive applied over a hole or laceration fails. Burst pressure testing is a standard method used to evaluate the mechanical stresses that adhesives can withstand, and various laboratory bench tests have been individually developed across research and industry for evaluating this parameter in vitro. The aim of our project was to utilize aspects of prior burst pressure bench tests to design a custom testing apparatus optimized to both measure burst pressure and visualize leakage for the purpose of supporting Draper R&D efforts. To construct this system, a review of other burst testing systems was conducted to reveal necessary system components. Conceptual design iterations were then created, incorporating the components of prior designs that best fit the aims of our system. These conceptual designs were reviewed until one was selected to be physically prototyped and tested to validate the capabilities of the system. By allowing for both measurement and visualization of surgical adhesives, our design enables rapid and accurate testing of surgical adhesives to aid in the continuing development of novel surgical adhesives. Moreover, it can provide further precedent for the development of future burst pressure tests that can better yield insight into the qualities of surgical adhesives.

