The Reliever: An Exercise in Port Protection

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A port-a-cath (port) is used to administer medications. A port includes an access target (port) and an artificial vein (catheter) that allows medical professionals to easily inject medications. The port creates a protruding bump under the skin that can be agitated causing discomfort to the patient. In extreme cases the port can suffer trauma causing the port to separate from the catheter, fracture, or malfunction. A device called “The Reliever,” was developed with the hypothetical recipient being a baseball pitcher, due to the complex movement the pitcher has to make to throw the ball, as well as the risk of being struck by a baseball. The Reliever was designed to be comfortably worn for extended periods of time and create an impact resistant surface to protect the port. The researcher determined a multi-layered system consisting of a tightly woven synthetic fiber layer (WSFL) and a thermoset elastic layer (TEL) would absorb most of the shock. The WSFL distributes shock over its entire surface area. The TEL, classified as a non-newtonian material, is able to absorb up to 90% of whatever impacts it, further nulling the impact of a baseball. Chicken eggs were suspended in ballistic gel to simulate the port in human skin. A pneumatic baseball device launched a baseball at the Reliever and egg/gel solution to determine the effectiveness of the multi-layered system. It was found that the egg survived when protected by The Reliever, when exposed to speeds up to 36.6m/s or 81 mph.

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