Utilizing 3D Printing Technology to Engineer Prosthetic Human Heart Valves

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For children in need of a heart valve replacement there are many options available. However, none of the available prosthesis are long term solutions. Because the valves are unable to grow alongside the child, the prosthetic will have to be surgically replaced every few years. As 3D printing technology is being introduced into the field of prosthesis, scientists and engineers are beginning to wonder if 3D printing prosthesis could minimize the amount of surgeries children would have to go through when in need of a heart valve replacement. Using 3D printing technology, I was able to develop prosthetic human heart valves. A simple pump was set up to test the valves in the place of a heart. Out of the prototypes engineered, none of the valves were successful in both opening to allow water flow through and closing in order to restrict water flow in the incorrect direction. Throughout the process of this project I was able to take note of the design flaws that lead to errors in the prototype. When engineering future prototype heart valves, the previous design flaws will be taken into account. In continuing to improve upon the design of this experiment the results could be applied by scientists and engineers in the process of engineering long term heart valves for children.

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