Giving a Hand: A 3D Printed Modern Day Miracle

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Prosthetics, artificial limbs for amputees or those born with congenital defects, are often commercially priced high making them unattainable for many low income families and patients. Applying my knowledge of engineering design and a three dimensional printer, I tested the quality, durability and usability of an alternative device, the 3D hand, for a kindergarten student with a congenital defect. Different designs for the hand were entered in AutoCad software before being tested on the subject. Five different hands were printed before the final print was the perfect fit, size and had the most efficient feasibility. Data was taken after each fitting along with video and photo evidence that captured the changes in design that needed to be made. Compared to all other designs, this “robot hand” was the most effective use of materials and time with the most functionality and durability. The subject was able to manipulate pencils, hold a drink and perform daily tasks as they could not before at a cost of $25 per hand. The material that the hand was printed in (PLA) prevents the hand from being fragile or easily broken while still providing the comfort and support that a commercially produced prosthetic would provide. For a prosthetic hand, the mean cost is around $20,000, whereas the cost of the alternative device is $25 - while continuing to ensure a practical and functional product of equal quality and durability. This study shows that the world of healthcare and medical technology can be and should be innovated to provide for all groups of people in need. Further testing would provide evidence that 3D printed custom prosthetics are much more efficient and cater better to the vast majority of people than commercially produced prostheses.

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