Bone Replacement Using 3D Printing

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The purpose of this experiment was to determine if we could engineer a PLA filament 3D printed scaphoid bone that could be used as a bone replacement. We printed five bones at low, medium, and high resolutions and at every 20% interval, starting at 10% and ending at 70%, for each of the three resolutions. After analyzing data, we narrowed our search to high resolution based on areas of strength shown by control pig bones. We then printed high resolution bones at 5% intervals from 50% to 70% infill and strength tested these. After analysis of this data, we met our engineering goal and found that 65% high resolution correlated most closely to the tested pig bones. These results indicate that a 3D printed bone could be designed to withstand pressures equivalent to those of a real bone and may make bone replacement a successful and cost effective medical alternative in the near future.

Awards Won: