Further Developing a Merged Aspiration Thrombectomy Device and Rotational Atherectomy Device for Efficacious Individual or Joint Removal of Thrombi and Plaque

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Endovascular occlusive diseases are among the leading causes of death around the world. Specifically, thrombosis is responsible for 1 in 4 people dying worldwide. Atherosclerosis is the cause of over 50% of deaths in westernized society. The purpose of this research was to improve on existing atherectomy and thrombectomy technology by producing a novel device that can conduct an atherectomy or thrombectomy independently or simultaneously. The goal of this research was to design, construct, and test an efficacious and safe joint rotational atherectomy, aspiration thrombectomy, and balloon angioplasty device. The device was designed using 3D models and constructed using surgical and metal tubing, ball bearings, DC motors, 3D-printed components, wires, batteries, gears, and a balloon angioplasty balloon. The constructed device was a proof of concept prototype and was only stress tested. Conceptually, the joint device can be safer and more efficacious compared to already existing devices. It can also help patients and health institutions save money on training and equipment costs. This research introduces a new approach to further developing endovascular devices and is applicable in health institutions that conduct atherectomies and thrombectomies.

Awards Won: