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Biomechanical Analysis of Hemodynamic Muscular Pressure on the Arterial Blood Vessel: Insights from Computational Modeling

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High blood pressure, also known as hypertension, is a common medical condition where the force of blood against the walls of the arteries is consistently too high. During the last 100 years, pathological methods have been used to explain different ways that recapitulate the unique features of muscles and how they relate to the arterial blood vessel. The mechanical characterization of pressure acting on the artery blood vessel when the muscle collapses has resulted in high blood pressure. The biomechanical environment causes behavioral changes that affect the wall of the vessel. This is due to the mechanical properties applied to the artery to obtain stress relaxation, burst pressure on the valves, and dynamics biomechanical analysis. These resulted in the non-linearity and hysteresis of the blood flow. A consistent biomechanical contract of the muscles on the artery blood vessel can lead to high blood pressure, which can lead to death. This can be subdued by in-depth analysis using a computational technique to investigate the missing element that has resulted in physiological and biomechanical performance on the arterial blood vessel by the contracted muscles. The result shows the hemodynamic factor to be 6.6e-7 that help reduce high blood pressure. These models will help researchers and clinicians understand the complex hemodynamics and mechanics of blood flow, predicting the effects of various physiological and pathological conditions, and developing new diagnostic and treatment strategies for cardiovascular diseases.
Keywords: Hypertension; Biomechanical model; Static structural analysis; Finite element, Blood pressure flow; Muscles; Arterial

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