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## The role of the patient specific vascular geometry and blood flow dynamics for vascular treatments

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Computational methods and three-dimensional imaging techniques have enabled the quantification of cardiovascular mechanics in vascular treatments especially for individual cases as congenital subjects. Biomechanical models based on multi-slice based on medical imaging, could provide more data about physiologic results of blood flow. The objective of this study is examining the mechanical effects of the blood flow which is relevant to the geometric topology of the arteries. The analysis includes tomography images of patients, codes of computer aided design and computational fluid dynamics. The realistic volume of the arteries of the patients obtained from DICOM by image segmentation methods. The geometry meshed by finite element models. The blood flow is recreated by defining boundary conditions of patients in the clinical results. Two sample which were taken were, a stenosed and a normal artery of eleven years old patients and was explored by pressure and wall shear stress distributions. In different artery profiles, wall shear stress, pressure and velocity results were significantly different. However, in the critical regions, the arterial wall was in the risk of deformation after narrowness in the lumen. Modeling and simulating depicted evident information about mechanical effects of blood flow. Understanding the flow regions and effects in different regions were, the most effective and productive treatments which were particular for the patient and could be chosen by realistic modeling and simulation. However, comparing biomaterials, examining tools and developing better designs will be the goal for medical researches and for the benefits of the patients.

### Biography

K Banu Köse has published her MSc thesis on blood flow dynamics. She has published papers on medical imaging and computational blood flow dynamics. She is a PhD candidate of Biomedical Engineering at Istanbul Medipol University and Project Manager of Sidre Consulting about Cardiovascular Surgical Planning Solutions. She is teaching Medical Imaging Techniques at Istanbul Medipol University and is the Owner of the first website of Cardiovascular Mechanics Engineering News.

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