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Atherosclerosis and Scientific Interventions: A Review

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- Chapter

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Abstract

In this review, insight is given on the effect of wall shear stress (WSS) on the initiation and progression of plaque growth in micro-circulation by using mathematical models. The understanding of the trigger for the initiation and progression of the disease has improved over the years and has led to better models for describing the process. Models have been developed and tested in order to describe haemodynamic properties in blood vessels to accurately simulate the process. The Navier-Stokes equation is the backbone model for all computational fluid dynamic simulation and applications, which has found foundational importance in simulations related to atherosclerosis studies. The risk factors associated with the disease are discussed. The rheological models associated with blood are analyzed and compared with studies that have been carried out in the past. A systematic review of the major findings of the simulation results has been brought afore, with a focus on wall shear stress (WSS), degrees of stenosis and plaque growth. It was concluded that the current studies are not holistic enough to give insight into the pathophysiology of the disease. Recommendations on how further studies should be done to improve the knowledge gap in this subject matter were proposed.

Keywords

- **Atherosclerosis**
- **Blood rheology**
- **Cardiovascular diseases**
- **Micro-circulation**
- **Newtonian fluid**

- **Plaque initiation**

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Declaration of Conflict of Interest

The authors declare no conflict of interest in the contents of this manuscript.

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