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Let's Gain More Confidence of Clinicians with Our Colorful Contours: Blood Flow Simulation in Arteries using Abaqus & STAR-CCM+

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The numerical simulations realised by biomechanical engineers have been evaluated with a certain precaution by clinicians and surgeons. On the other hand, time-consuming nature of our simulations is another reason why they keep us far from thier operation rooms.

The objective of the current work is to present the results of several numerical simulations of pulsatile blood flow in healthy and diseased arteries and compare with clinical expectations. Different realistic and physiological aspects such as blood flow interaction with arterial walls, effect of heart movement, cardiovascular autoregulation, arterial walls' hyperelasticity and cardiovascular disorders have been incorporated in the models thanks to a direct coupling of Abaqus and STAR-CCM+. Comparisons of implicit and explicit coupling methods in cardiovascular simulations have been discussed. An in-house methodology combined with explicit FSI coupling has reduced considerably calculation time while the simulations stay realistic and reliable for clinicians.

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Industries:
Life Sciences [2] ? Life Sciences - Application ? Blood Flow & Hemodynamics[3]
Products:
STAR-CCM+®[4]
Conference:
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