



# Improving Stents

Stents are expandable tubes that are inserted into blocked or damaged blood vessels. They offer a practical way to treat coronary artery disease, repairing vessels and keeping them open so that blood can flow freely. When stents work, they are a great alternative to radical surgery, but they can deteriorate or become dislodged. Mathematical models of blood vessels and stents are helping to determine better shapes and materials for the tubes. These models are so accurate that the FDA is considering requiring mathematical modeling in the design of stents before any further testing is done, to reduce the need for expensive experimentation.

Precise modeling of the entire human vascular system is far beyond the reach of current computational power, so researchers focus their detailed models on small subsections, which are coupled with simpler models of the rest of the system. The Navier-Stokes equations are used to represent the flow of blood and its interaction with vessel walls. A mathematical proof was the central part of recent research that led to the abandonment of one type of stent and the design of better ones. The goal now is to create better computational fluid-vessel models and stent models to improve the treatment and prediction of coronary artery disease—the major cause of heart attacks.

**For More Information:** “Design of Optimal Endoprostheses Using Mathematical Modeling,” Čanić, Krajcer, and Lapin, *Endovascular Today*, May 2006.

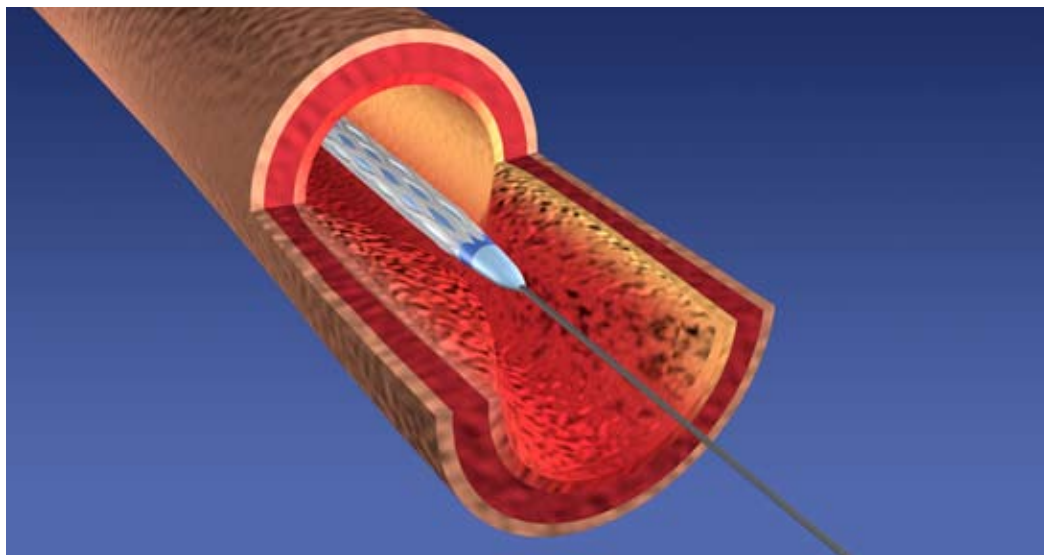


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