**Turning Veins into Arteries¿No Surgery Required**

By [Harald Franzen](http://www.scientificamerican.com/author.cfm?id=12)

Without touching the knife, doctors have managed to turn a coronary vein into a coronary artery in a 53-year-old patient, bypassing a blockage. "This milestone marks the first coronary artery bypass performed with a catheter," says Stephen Oesterle of Massachusetts General Hospital and Harvard Medical School. Oesterle was the lead author of a study that documents the procedure in this week's *Circulation: Journal of the American Heart Association.*

Traditional bypass surgery involves opening the chest and using a blood vessel there or from the calf to bypass whichever coronary artery is clogged. In the case described by Oesterle, the patient's artery was completely blocked, causing severe chest [pain](http://www.scientificamerican.com/topic.cfm?id=pain). The international team used a catheter to enter his body through an artery in his leg. They ran the catheter up the artery through the aorta and into the clogged heart artery where, guided by ultrasound, they pushed a needle through the artery wall into the adjacent vein. They then ran a wire through the needle and pulled out the needle and catheter. Using the wire as a guide, they ran an angioplasty balloon to the spot and widened the opening in the artery/vein wall. Next they threaded a device similar to a stent onto the wire and inserted it into the opening to keep the blood flowing. Finally they blocked the vein and reversed the flow, thereby providing the heart muscle with oxygenated blood.

"The technique described in this report is ingenious," Timothy Gardner, a national spokesperson for the American Heart Association, says. "However, it can be used only for an unusual type of coronary blockage¿that is, in an artery that is open in its first portion, closed in the middle and still supplying good heart muscle." David Faxon, also of the American Heart Association, adds: "The reality is that veins are not always located that close to an artery, so it wouldn't work under certain circumstances." Still, Oesterle is optimistic: "Our ultimate goal is to replace traditional coronary artery bypass with a procedure that does not require surgery." For this patient, at least, the procedure, performed in November 1999, was a success: he remains pain-free.