

# BBC NEWS

## TECHNOLOGY

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## Robot-inflicted injuries studied

**A future in which robots help around the home could prove harmful to humans, suggests a study.**

German researchers studied what happens in accidents involving robots using sharp tools alongside humans.

They used a robot arm holding a variety of bladed tools programmed to strike test substances that mimic soft tissue.

In some cases, the researchers found, the robots managed to accidentally inflict wounds that would prove "lethal".

The tests were conducted to see if a prototype safety system could limit the damage done.

### **Human subject**

The tests involved a robot arm weighing 14kg and a 1.1m reach that was equipped with a variety of bladed household tools including a steak knife, kitchen knife, scissors and screwdriver.

The robot arm was programmed to use the bladed tools to stab and cut a silicone lump, a leg from a dead pig and the arm of a human volunteer.

Striking, stabbing and puncturing tests with the safety system turned off were performed on the silicone and pig leg. Deep cuts resulted in most cases that, the researchers said, could prove to be "lethal" if inflicted on a living subject.

Three researchers from the Institute of Robotics and Mechatronics at the German aerospace agency wanted to carry out the tests because they envisage a future in which

robots will start to become domestic helpers.

Injuries were significantly reduced when the prototype collision detection system developed by the trio was switched on. This system uses torque sensors to spot when it has hit a different substance and halts movement. It was used to limit damage when human subjects were tested.

Previous studies have looked at what would happen when large heavy robots bump into people. However, the German study is thought to be the first to look at the slashing injuries robots could cause.

The results of the study were presented at the 2010 IEEE International Conference on Robotics and Automation, held in Alaska in early May.

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