



Cyborgs and Cybernetics

Cyclists as cyborgs

Narrator

One ground-breaking application of body machine communication already offers paraplegic people a mobility they thought they'd lost forever.

Prof Tim Perkins

Julie, did we have a little accident?

Narrator

Prof. Tim Perkins has developed a system, which allows communication between the crank mechanism of the tricycle and a set of electrodes which stimulate nerves controlling some of the muscles in the lower limbs.

Julie Hill was one of Tim's first guinea pigs. So far she's the only person in the group to have implanted electrodes linked directly into her nervous system.

Signals from the crank pass via a computer programmed controller into the implant, stimulating her legs to make a circular motion.

Prof. Jim Perkins, University College London

There's a line that runs back to this control box. This is her stimulation controller. As I say she's got an implanted stimulator. So the connection between the outside world and her implant inside is via this RF transdermal transmitter. And she places this on the right side of her chest. And just immediately over where the implant is inside. And that takes the signals via some cabling that's implanted round to the small of her back, and into the electrodes on her spinal nerve routes. So that's how it works. All we have got to do really is to map out which nerve route corresponds to which set of muscles and measure over which angle of the cranks that the pedal force is actually positive. Because there's no point in doing it the other way round, otherwise the pedals would go backwards, and that wouldn't do would it.

Julie Hill

It's good fun. It's very good for me. It's keeping me healthy and fit. It's keeping my blood pumping. It's keeping my bone density high. It's just.. I'm going to have a long happy normal life. And it's mainly down to the fact that I can keep as fit and active as I am.