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Scientists help nerves to heal with 3D printing

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REPAIRING DAMAGED nerves can be a tricky and unpredictable operation for even the most experienced surgeons.

If nerves do not grow back in the correct way it can lead to loss of sensation or extreme pain if the ends remain unconnected.

But scientists at Sheffield University have developed a device using tiny 3D printed tubes which can direct the regrowing nerves.

The device, called a nerve guidance conduit (NGC), is a framework of tiny tubes that guides the damaged nerve ends towards each other so that they can repair naturally.

The team has already used it to repair nerve damage in animals and say the method could help treat many types of traumatic injury in humans, such as burns.

Current methods of repairing nerve damage require surgery to suture or graft the endings, a practice which often yields imperfect results.

Researchers used the 3D printed guides to repair nerve injuries in mice, growing around 3mm of new nerves over a three-week period.

The Sheffield team used a material called polyethylene glycol, which is already cleared for clinical use and is suitable for use in 3D printing.

Further work is already under way to investigate using biodegradable materials.

"The advantage of 3D printing is that the devices can be made to the precise shapes required by doctors," said John Haycock, professor of bioengineering at Sheffield.

"We've shown that this works in animal models, so the next step is to take this technique towards the clinic."

Nerves act like electricity cables – an outer layer protects smaller cables which send messages back and forth to the brain.

It is only possible for the surgeon to repair the outer layer but not the tiny inner cables. When they try to repair themselves they often end up connecting to the wrong part of the injury.

The research was published in the journal *Biomaterials*.