



Robert Bowles/3D printer

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NEW TECHNIQUE ALLOWS 3D PRINTING OF HUMAN TISSUE



A new technique uses an adapted 3D printer to print tissue to replace damaged tendons and ligaments.

With existing technology, engineers can print [ballet shoes](#), [bike tyres](#) and even a [pedestrian bridge](#). But a team of biomedical engineers at the [University of Utah](#) have now developed a way to 3D-print human tissues. The team, led by Robert Bowles, have pioneered a technique to print tendon and ligament tissue. The technique could eventually allow doctors to print replacement tissues for those suffering from damaged tendons, ligaments or spinal disc ruptures.

The process involves using the printer to layer the stem cells on a hydrogel medium. The cells are then grown in vitro in a culture before being implanted in the patient. The team used a medical printer from [Carterra Inc.](#) that is normally used to print antibodies for cancer screening. The researchers modified the printer head to allow them to control how the cells are organised. According to Bowles, it's a very complicated process because the connective tissue is made up of different cells in complex patterns. However, the technique creates, "a pattern and organisation of cells that you couldn't create with previous technologies". This allows the researchers to very specifically put cells where they want them.

Currently, replacement tissue is harvested from another part of the patient's body or from a cadaver, but it can be poor quality, which can slow or prevent recovery. The 3D printing technique can also ease replacement of spinal discs, which must be recreated to be successfully transplanted.

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Takeaway:

Although the technique was designed for creating ligaments, tendons and spinal discs, Bowles reports that it could be adapted for engineering any type of tissue. It could even be applied to 3D printing of whole organs, and the changes to the print head made by the team could be adapted to any kind of 3D printer. This research has brought bespoke organs a step closer. Will made-to-order organs be available soon?