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3D Printed Surgical Manipulator for Minimally Invasive Lumbar Discectomy Surgery

A low-cost, disposable, MRI-compatible 3D-printed surgical master-slave manipulator enhances mobility and control for use in minimally invasive lumbar discectomies.

Discectomy is the surgery to remove the herniated disc material that is pressing on a nerve root or spinal cord. The surgical workspace is very small and surgeons have to navigate through channels as small as 3mm. Current surgical instruments consist of rigid probes with tips that manipulate and remove the patient's tissue; surgeons are limited to using just one at a time. The rigid structure of surgical tools increases the risk of inadvertent damage to spinal nerves, as well as other potential risks that can leave the patient paralyzed or require further surgery.

Researchers at Purdue University have developed a surgical master-slave manipulator for use in minimally invasive lumbar discectomies. This technology increases the extended range of motion by allowing wrist-like movements of various robotic manipulators that are controlled simultaneously from a single controller. This technology is MRI compatible, disposable, and made using 3D printing, allowing it to be mass-produced in large quantities at a very low cost.

Advantages:

-Increased ease of use and mobility of surgical tools used in discectomies

-Disposable

-MRI compatible

-Inexpensive

Potential Application:

-Surgical tools

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Category

Robotics & Automation/Automation & Control

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-Lumbar discectomies

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