

Local Magnetic Actuation for Obese and Pediatric Patients

Summary

Researchers in Vanderbilt University's STORM Lab have developed a novel actuation system that uses magnetic coupling to transmit mechanical power across a physical barrier. This technology is particularly suited for use in minimally invasive surgical procedures for manipulating surgical instruments across tissue barriers.

Challenges in Minimally Invasive Surgery

- » Because of the limited space and desire to minimize incision, instruments used in MIS procedures have very little mobility
- » Traditional MIS devices require a direct, continuous line of access from the surgeon's hand to the operation site within the body, increasing the number of necessary incisions and reducing the benefits of the MIS procedure

Technology Description

This novel technology consists of two primary components: a surgical tool to be controlled and an actuation mechanism. The surgical tool is introduced, preferably through a natural orifice (alternatively through a very small incision), into the body cavity in which it will perform its operative function. The actuation tool is placed on the other side of the cavity wall after entering the body through a small surgical access port. The actuation tool magnetically interacts with the dual magnets inside the surgical tool, allowing for the transmission of mechanical force across the tissue barrier. The system is designed such that the magnetic coupling that enables remote actuation can operate across tissue barriers over 3 cm thick, making it particularly suitable for use in obese and pediatric patients.

Unique Features and Competitive Advantages

- » A surgical tool can enter the body through a natural orifice or very minimal incision
- » The tool is remotely actuated using magnetic coupling, enabling the transmission of mechanical power across a physical barrier
- » This novel actuation mechanism allows for the manipulation of a surgical tool on the other side of a cavity wall without disrupting the tissue in between
- » This magnetic actuation mechanism can operate through tissue barriers greater than 3 cm thick, enabling the use of this device for obese and pediatric patients
- » This mechanism can be used with a wide variety of surgical tools such as surgical cameras, tissue retractors, cutting tools, cautery devices, etc.

Intellectual Property Status

- » A nonprovisional patent application has been filed
- » Lab webpage and publications: [Vanderbilt STORM Lab](#)
- » For inventor bio and publications click the name below

CTTC CONTACT:

Ashok Choudhury, Ph.D.
Phone: (615) 322-2503
Fax: (615) 343-4419
ashok.choudhury@vanderbilt.edu

VANDERBILT LEAD INVENTOR:

[Pietro Valdaastri, Ph.D.](#)
Assistant Professor of Mechanical
Engineering

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SUMMARY

