# Design of Laparoscopic Surgical Device

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## Technology description

Background

Laparoscopic surgery, also called minimally invasive surgery, is a modern surgical technique in which operations are performed through small incisions in the body using a tiny camera. Current laparoscopic surgical devices utilize cable-driven systems. While cable-driven systems allow for easier movement and rigid systems, they can experience altered force feedback, movements that are slightly altered from the intended movement, and large stresses despite having multiple joints.

Technology

Georgia Tech inventors have invented a mechanism and joint design of a novel single-port laparoscopic device, actuated through rigid elements. The system design uses rigid structural and gear elements, such as bevel gears, gears that allow for joint movement of two angled structural elements, to compensate for the drawbacks of cable-driven systems. Two major design components include a joint design for linkages and the design of bevel gear assembly. The joint design provides a solution to the problem of connecting several rigid bodies that can rotate relative to each other, without the use of complicated structural components to carry a load. The gear assembly design provides a solution for the design of bevel gears, which is useful when operating in small spaces.

## Application area

· Mechanism design of systems with varying applications
· Single-port laparoscopic devices
· Any system that requires joints without the use of rolling-element bearings

## Advantages

•Superior joint design– The design accounts for the use of load bearing components without rolling-elements gives a smoother motion and is safer for medical use
•Gear assembly design– Provides the ability to transmit rotations with two degrees of freedom

## Institution

Georgia Institute of Technology

Inventors

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