

Design of Two Switch Mechanism Concepts for a Surgical Shears Device

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Abstract

Since the widespread introduction of laparoscopic cholecystectomy in late 1989, the minimally invasive surgery (MIS) has been under rapid development and had been applied to many classes of traditional surgeries. Minimally invasive surgery (MIS) challenges the surgeon's skills due to his separation from the operation area which can be reached with long instruments only. Along with the germination of the first surgical robot in 1985, it was not until April 1991 that the first robotically assisted MIS was clinically applied to patients in a minimally invasive prostate surgery. Safety, Precision, Reliability over multiple and long procedures and ease of use for physicians are the most vital factors in a surgery. Robotics and Automation facilitates above factors de-creasing surgery time and recovery time of the patient. This paper addresses improved design of two switch mechanism concepts from existing handle mechanism increasing safety by locking jaw movements at open and close positions, ease of usability and assisting surgery automation i.e., performing the required assignment with just two switch movement & this proposal could come into practical existence when Computer Assisted Surgery (CAS) replaces manual methods. The Objective is to design a mechanism to evade partial holding and to seize accurately by locking the jaw movements. The paper presents different mechanism concepts for the function of two switches controlling jaw movements individually and locking the jaw movements at open and closed position. Paper also briefs the methodology used in concept development and concept selection according to specific criteria.

Keywords

Minimally invasive surgery, Laparoscopy, Safety, Automation, Concept development, Concept selection, Concept Scoring Matrix