

## An Ergonomic Handle Design for Instruments in Laparoscopic Surgery

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**Abstract :** In this paper, the design and evaluation of a handle for laparoscopic surgery is presented. The design of the handle is based on ergonomic principles and tries to avoid awkward postures for surgeons. The handle combines the so-called power-grip and accurate-grip in order to provide strength and accuracy in the performance of surgery. The handle is tested using both objective and subjective approaches. The objective approach uses motion capture techniques to obtain the angles of forearm, arm, wrist and hand. The muscular effort is obtained with electromyography electrodes. On the other hand, a subjective survey has been carried out using questionnaires. Results confirm that the handle is preferred by the majority of the surgeons.

**Keywords :** laparoscopic surgery, ergonomics, mechanical design, biomechanics

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