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## Initial clinical experience using a novel laparoscopy assistant.

[Mishra R](#)<sup>1</sup>, [Martínez AM](#), [Lorias Espinoza D](#).

### + Author information

### Abstract

This article presents the first clinical and experimental experiences of the PMASS (Postural Mechatronic Assistance Solo Surgery) from a prospective study carried on on thirteen laparoscopic procedures. Also, their advantages and disadvantages are identified. The PMASS is a system with three articulations; two articulations are passive and one is active; this handles the optic in real time, reducing the latency time by spatial relocation. The surgeons assisted themselves visually in 13 surgical procedures, having direct and intuitive control in real time of the laparoscopic vision field using the PMASS. The surgical and delay time was documented for each surgery. The surgical procedures were: Laparoscopic appendectomy, ovarian cystectomy and laparoscopic sterilization. In all procedures, surgeons were able to auto-navigate in real time and there was no visual tremor while using the system. The global average times taken to perform the self-assisted surgery with the PMASS for the laparoscopic appendectomies were  $45 \pm 4.5$  minutes, ovarian cystectomies  $49 \pm 3.5$  minutes and for the laparoscopic sterilization  $22 \pm 2$  minutes. The approximate set-up time of PMASS was one minute, and removal almost a minute (the time required by the surgeon to remove the harness after completing the surgery). The laparoscope itself disengages from the PMASS in a couple of seconds approximately. There were no transoperative or postoperative complications during the procedures. Thirteen laparoscopic procedures were performed, the design of the mechatronic assistance allowed the surgeon to self-assist visually in real time and in an autonomous way in the solo-surgery mode, without compromising the surgical performance and the morbidity. Additionally, the latency times are also reduced by space relocation and coupling of the telescope.

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