

Designing and Development of Prototype: Distractor Mechanic Endoano-rectal. Experimental Test in Mixed Simulator and Cadaver of TEM Without Pneumorectum



Instituto Universitario de Tecnología Industrial de Asturias

J.I. Rodríguez-García, Suárez-Méndez P, Sierra-Velasco JM, Moral Álvarez S. Surgery Department. Mechanic Engineering Department. Oviedo University Hospital de Cabueñes, Gijón. Spain

**INTRODUCTION:** Primitive devices TEM 80 and the new "soft" require pneumorectum sometimes difficult to maintain given the need to suck smoke, blood remnants, general anesthesia, colonic distension and neumoretroperitoneum. Besides limiting the possibility of introducing ultrasound device or gamma probes.

In order to overcome these limitations was designed and made a more versatile device that allows transanal endoscopic surgery with mechanical distraction and expand diagnostic and therapeutic possibilities of this approach.

**MATERIAL AND METHODS**: The device was designed using the SolidWorkseDrawings software, additive manufacturring with the



3D printer (HP Designjet 3D Printer) and some pieces made at the Polytechnic School of Engineering of Gijón-Oviedo Univesity. Were produced up to 3 prototypes. Operability tests were performed in a hybrid simulator ( synthetic pelvic and rectum of pig) and cadaver at the Center for Surgical Training and Technology Transfer (CEQTt) www.unioviedo.es/ceqtt

**RESULTS:** In the first prototype adequate mobility of the parts of the device and the inadequacy of ABS plastic 3D printing to some parts was found. In the second device is replaced those with metal pieces. Were able to perform a transanal endoscopic surgery procedures with fixed lens 35mm, 10mm and 30<sup>o</sup> and standard material of laparoscopy.

Dseign 3D and prototypes (pieces of ABS 3D printer)













Surgery on hybrid simulator

Surgery on Cadaver (x2)

**CONCLUSIONS**: It is currently possible to design and develop a mechanic ano-rectal distractor to perform transanal endoscopic surgery without pneumorectum on a hybrid simulator and one cadaver.

