



Title

LAPAROSCOPIC INSTRUMENT FOR ACCURATE EXTRALUMENAL LOCATION OF A COLORECTAL TUMOR



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Short presentation

The precise location of gastric and colorectal tumours is of paramount importance for the oncological surgeon as it dictates the limits of resection and the extent of lymphadenectomy. However, this task proves sometimes to be very challenging, especially in the laparoscopic setting when the tumours are small, have a soft texture, and do not invade the serosa. In this view, our invention refers to a new instrument adapted to minimally invasive surgery and manipulated solely by the operating surgeon which has the potential to precisely locate the tumours of the digestive tract. It consists of an inductive proximity sensor and an electronic block encapsulated into an autoclavable stainless-steel cage that works in tandem with an endoscopic hemostatic clip whose structure was modified to increase detectability. By scanning the serosal side of the colon or stomach, the instrument is capable to accurately pinpoint the location of the clip placed previously during diagnostic endoscopy on the normal bowel mucosa, adjacent to the tumour. Using a laparoscopic approach, the detection rate of this system reached 65% when the sensor scanned the bowel at a speed of 0.3 cm/s and applying slight pressure on the serosa. This value increased to 95% when the sensor was guided directly on the point of clip attachment. The detection rate dropped sharply when the scanning speed exceeded 1 cm/s and when the sensor-clip distance exceeded the cut-off value of 3 mm.

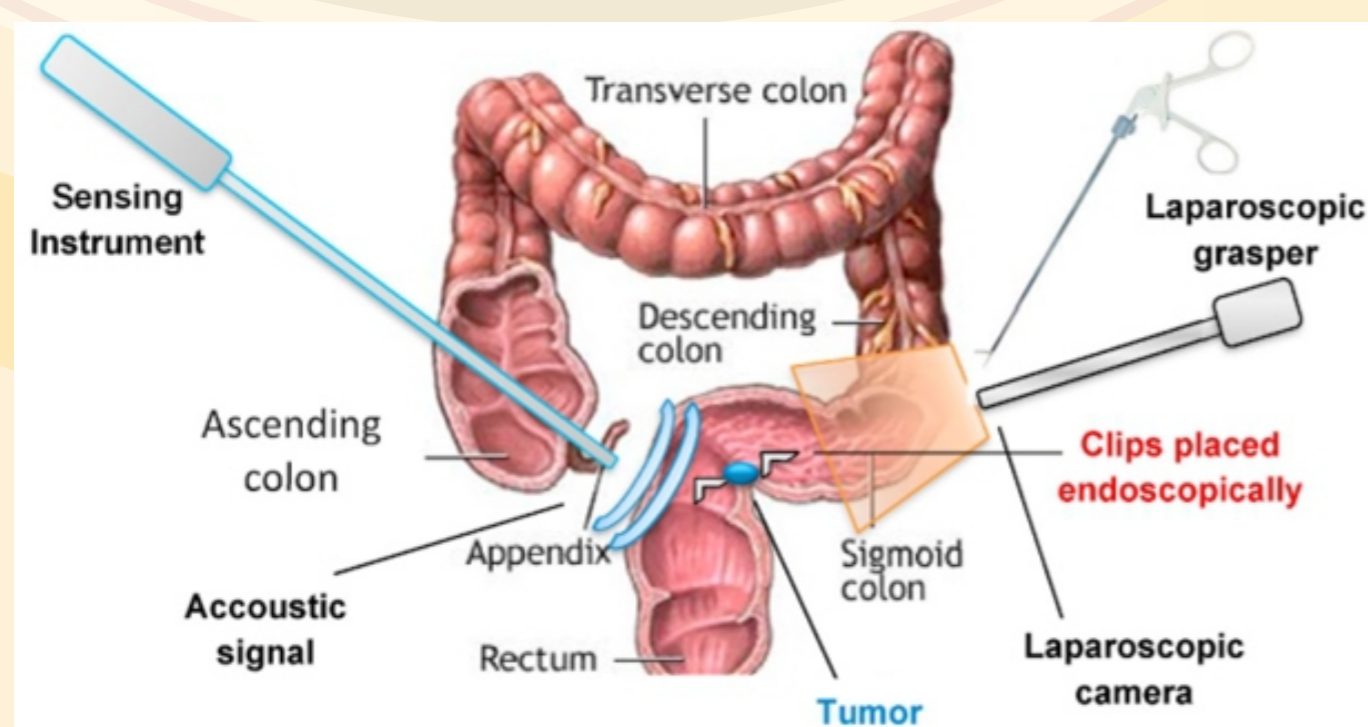


Applicability

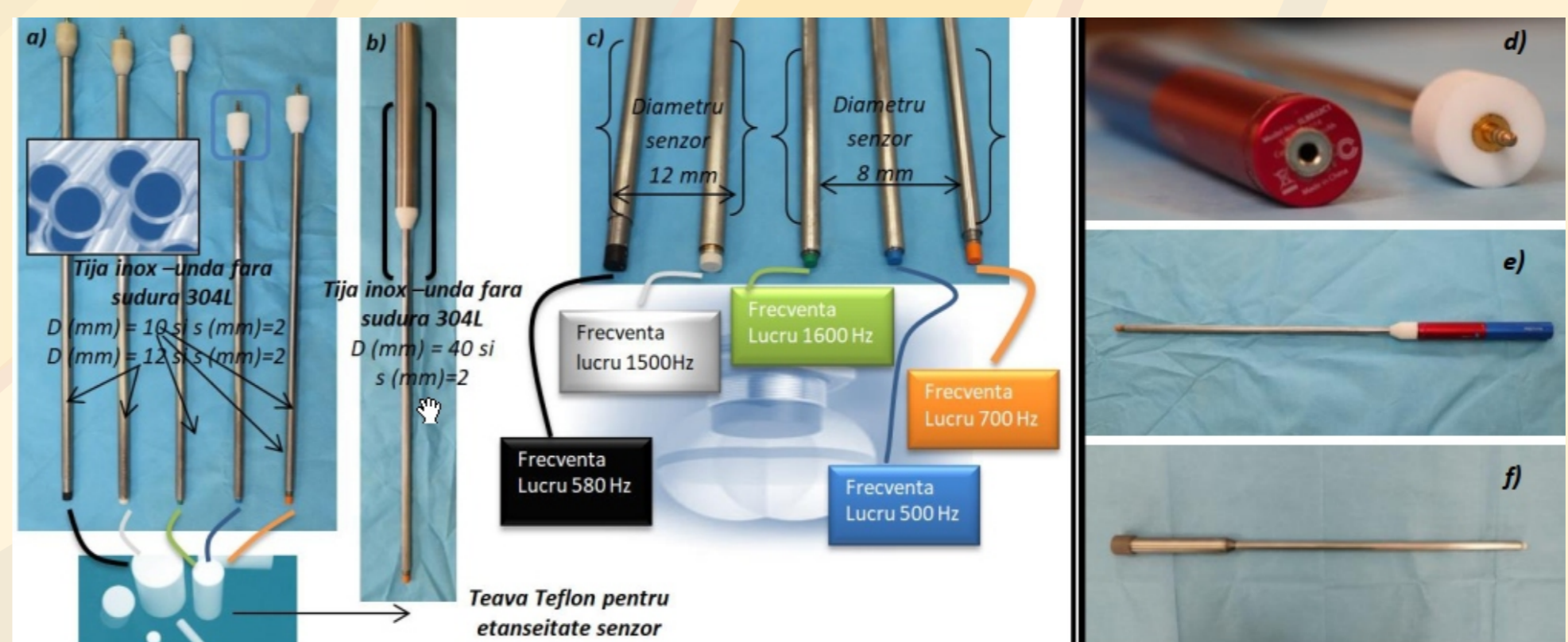
The application of the present invention is represented by the possibility of precise location of the tumour in the colon, its maximum axial dimensions and marking of tumour boundaries to facilitate resection surgery by laparoscopic surgery, and in the case of rectal tumours an additional advantage is given by accurate determination of the position of the lower pole of the tumour and thus the establishment of the optimal operating strategy (if the position of the tumour is not identified exactly then the whole surgery may be compromised from an oncological point of view, with adverse consequences on the patient's prognosis and long-term survival).



Images

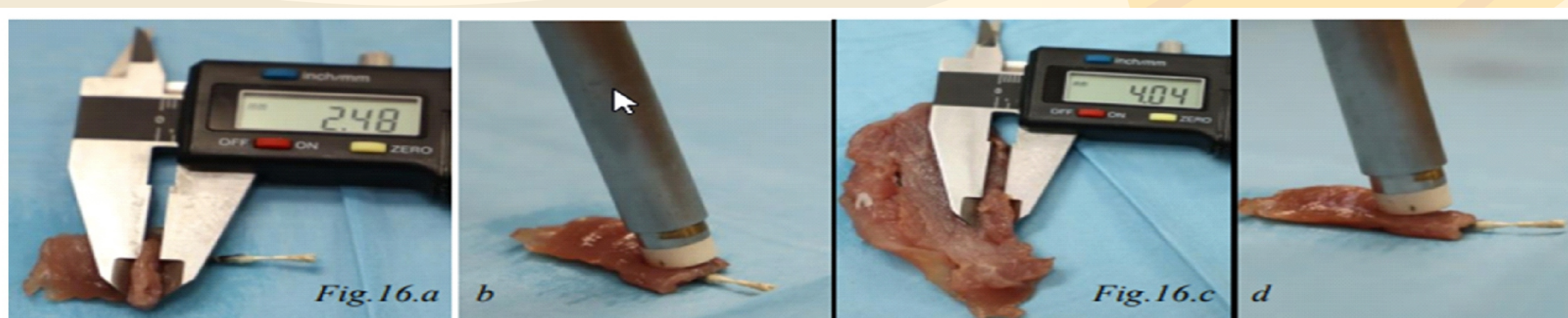


Functional diagram of the laparoscopic sensory instrument



Physical prototype of the laparoscopic instrument

EX VIVO - experiment



IN-VIVO EXPERIMENT

