

"Smart" Surgical Tools for In-Situ Tissue Characterization

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Technology description

This invention is an intelligent medical tweezers that can measure tissue stiffness and thickness, and transmit the data using built-in RF channels, enabling surgeons to make more informed suturing choices during surgery.

At present, most gastrointestinal surgeries do not use any tissue monitoring devices. The surgeon's expertise drives the choice of anastomotic technique to suture the tissue and, if a stapling device is chosen, the size of the staples to be used. This invention is an intelligent medical tweezers -- a class of sensor that can be integrated within surgical tools to measure tissue stiffness and thickness, and transmit the data using built-in RF channels.

This tool set has the potential to revolutionize the choice of the anastomotic technique and technology used by providing measurements of tissue characteristics which better inform the surgeon at the time of the surgical procedure. Specifically, the measurement of tissue stiffness and thickness can aid the surgeon in determining the best tissue suturing technique, such as what size staples are needed, and whether hand suturing may be warranted for optimum tissue apposition and healing. These real-time measurements can enable better tissue-suturing decisions that could reduce the current 1-7% postoperative dehiscence rate in which the tissue fails to heal appropriately. The reduction of the dehiscence rate has the potential to spare thousands of patients this catastrophic complication, save millions of dollars in health care expenses and reduce the cost of medical malpractice to hospitals and physicians.

To minimize any potential complications the new tools are designed with no wires attached and with the ability to be sterilized in an autoclave so that they can be used on the operating field. The tools will be the same tools that the surgeons are accustomed to using in shape and feel, and yet provide information about the tissue stiffness and size.

Application area

Tissue monitoring during gastrointestinal surgeries, e.g. colon surgery, intestinal resections and anastomoses

Tissue diagnosis based on measurements, e.g. cancerous tissue detection

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