

Wireless Tissue Palpation for Minimally Invasive Robotic Surgery Techniques

Summary

Researchers in Vanderbilt University's STORM Lab have developed a wireless palpation device that uses magnetic coupling between two units to provide valuable feedback about tissue properties and potential abnormalities. The wireless capabilities of this technology make it ideally suited for minimally invasive surgery and natural orifice procedures, as the device does not require the use of a surgical port.

Challenges in Tissue Palpation

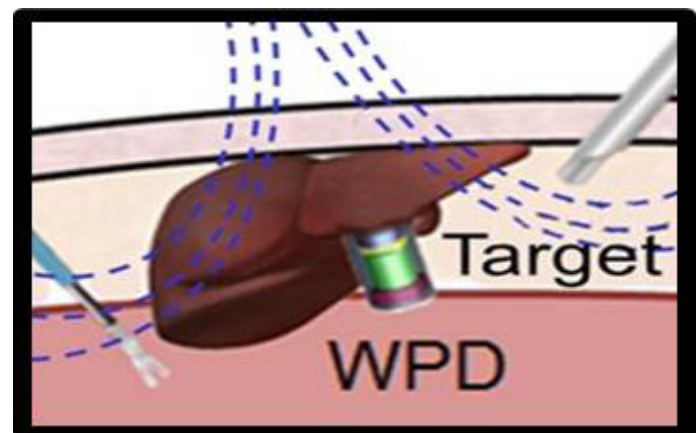
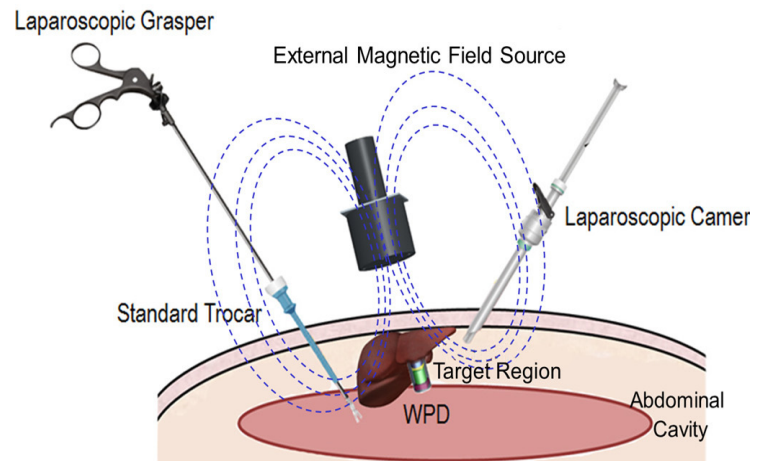
- » Manual tissue palpation techniques require open surgery, which comes with large incisions and longer recovery times
- » Most tissue palpation devices use wires or probes to operate, which require the use of a surgical access and therefore have little application in minimally invasive procedures
- » As the use of minimally invasive techniques has rapidly expanded, a need for tissue palpation devices suitable for these procedures has developed

Technology Description

This novel device enables intraoperative palpation to determine tissue properties and detect abnormalities such as tumor growth. This wireless tissue palpation mechanism consists of two units: a positioner located outside the patient's body and a disposable wireless palpation device (WPD) placed inside the patient's body during a minimally invasive procedure. As magnetic coupling allows the two units to interact remotely, sensors on the WPD detect force and compression as the two units execute a specified palpation modality. The WPD wirelessly transmits the data in real time to a remote receiver, and from this information tissue properties can be determined. Upon completing the procedure the WPD is then easily removed from the body through one of the small surgical ports.

Intellectual Property Status

- » A US Utility Application is pending.
- » Control, data acquisition and data manipulation algorithms and software have been developed.
- » Wireless Tissue Palpation for Intraoperative Detection of Lumps in the Soft Tissue. Marco Beccani, Christian Di Natali, Levin J. Sliker, Jonathan A. Schoen, Mark E. Rentschler, and Pietro Valdastri. IEEE TRANSACTIONS ON BIOMEDICAL ENGINEERING, accepted Aug. 21, 2013
- » Additional information available on [STORM Lab Webpage](#)



Unique Features and Competitive Advantages

- » The WPD can enter the body through natural orifices or through minimally invasive techniques, eliminating the need for a dedicated incision/access port
- » This device detects tissue properties in real time and transmits palpation data wirelessly
- » This wireless palpation technique does not consume port space in minimally invasive procedures
- » This technology relays immediate intraoperative feedback to the surgeon, allowing the surgeon to more precisely locate the tissue abnormality during a procedure
- » This device can be used beyond minimally invasive surgery whenever the WPD can be introduced by natural orifices or tiny incisions
- » Palpation modalities can be altered to enrich feedback information

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VU REFERENCE: VU12130

Link to Vanderbilt technologies available for licensing

