Surgical Tool with Integrated Pressure and Flow Sensors

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Technology description

Integration of sensors into surgical tools allows monitoring of important surgical variables, such as temperature, liquid pressure and liquid flow, to make surgeries safer. UW-Madison researchers have developed a surgical tool with an integrated pressure sensor that can be used to measure the pressure and flow of liquid being delivered to or removed from the surgical area. The surgical tool includes a needle-like portion that enters the tissue. The integrated sensor is coupled directly to a fluid flow channel in the tool, through which fluid may be injected into or drawn from a patient. The tool could be designed as a micromachined silicon tool with a fully integrated sensor formed from a silicon nitrate membrane and polysilicon resistors. Alternatively, the tool could be an ultrasonically actuated cutting tool.
The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a surgical tool with an integrated pressure sensor.

Application area

Optical surgeries for cataract removal
Laparoscopic ultrasonic tools

Advantages

Sensor signal can be used to provide feedback control of fluid pumping through the channel.
Advanced surgical tools incorporating virtual reality techniques will require the use of integrated sensors on all tools.
May be formed using conventional, low-cost, mass fabrication processing techniques
Provides instantaneous detection of changes in pressure and flow during surgery

Institution

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