Sensor-Enabled “Smart” Surgical Technologies

Imperial College London

There have been many advances in keyhole, or laparoscopic, surgery — the whole process of carrying out a medical operation without having to make a large incision in the patient. Yet most surgical instruments used in keyhole surgery are “passive” mechanical devices, which offer the surgeon little feedback.

To overcome this, a team of researchers led by Professor Sir Ara Darzi at St. Mary’s Campus, Imperial College London, have integrated new sensor technologies into surgical devices to make them “active.” These potentially smart devices can reduce patient trauma and the time involved in operations, which in turn could lead to lower health care costs as well.

Imperial Innovations, a technology commercialization and investment company based at Imperial College London, has obtained patents on the “Smart Bougie,” a sensor-enabled dilator. The device is like a flexible metal basket that can be used to safely open blockages in the esophageal tube during laparoscopic surgery.

> *The Bougie actively gives feedback at the site of the surgical procedure, providing doctors with*

> *information from the repair site. Currently, blockages are opened using passive devices like balloons, which offer no active feedback to the surgeons conducting the surgery.*

The product development process took two years, and a design team, led by the Royal College of Art and supported by the Helen Hamlyn Foundation, designed the prototypes. Imperial Innovations is funding further prototype testing, and is considering the formation of a company to commercialize this and other "smart" devices developed at Imperial College London.

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