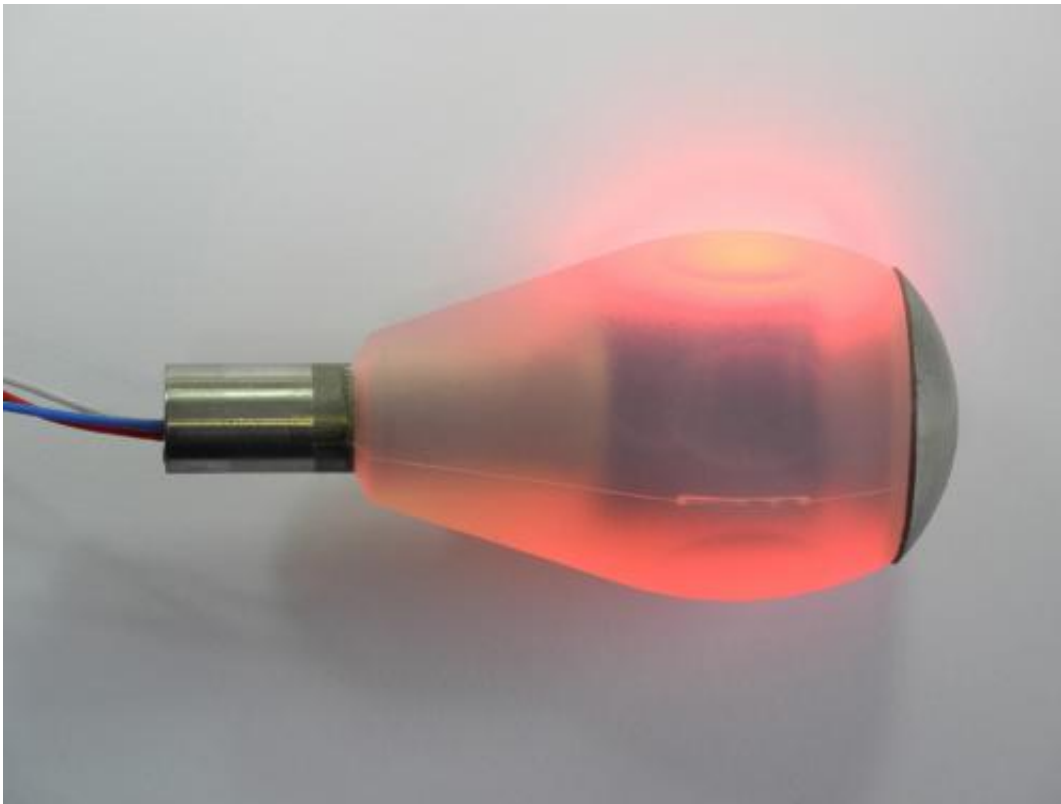


Instrument handle with integrated electronics facilitates surgical procedures

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Once the optimal torsional moment is reached, an LED on the inside of the instrument handle lights up. Credit: Fraunhofer IPA

Surgeons must operate with absolute precision; the handling of surgical tools requires the utmost sensitivity. A new kind of instrument handle will soon be supporting physicians in the OR. Fraunhofer researchers will present the first prototype at the 2013 Medtec trade show in

Stuttgart, Germany, from 26 to 28 February.

How deep have I already turned the screw into the bone? Did I apply too much force? Have we reached maximum force? While operating, surgeons have to ask these and similar questions. Until now, they only had their pure instinct and their experience to rely on. Yet soon, a vulcanized instrument handle, designed so that [surgical tools](#) – such as screwdrivers or spreaders – can be screwed into it, making precision surgeries easier to conduct. Researchers at the Fraunhofer Institute for [Manufacturing Engineering](#) and Automation IPA in Stuttgart developed the device in collaboration with Weber Instrumente GmbH. By integrating electronic components, the surgeon is given feedback during the procedure, advising him if he can insert the instrument even further. For example, if he tightens a screw, then the sensors measure the applied force. Once the optimal torsional moment is reached, LEDs report this through an [optical signal](#). This signal can be seen through the transparent silicon sections of the handle. "It is primarily the young, less experienced surgeons with little surgical practice who benefit the most from this technology," says Christof Giers, scientist at IPA.

The necessary power is supplied and stored via an inductive charging process or a coil system. "One coil is located inside the hand grip; the other is in a little table. The surgeon merely has to put the handle on the table, and the battery is charged," explains Giers.

All of the electronics – including the sensors, assessment and LED – are installed in the handle. This means there is no split or seam that would enable [germs](#) to penetrate and proliferate. Another special feature: The instrument handle can be sterilized at 134 degrees Celsius. Since the electronics are switched off in the sterilization process, it can withstand the high temperatures undamaged. "Previously, surgical instruments had no electronics inside – the heat would have rendered them inoperative," explains Giers.

The researchers furthermore intend to enhance the approximately nine-centimeter handle with a wireless interface, so that the sensor data can be transmitted to a PC, thus allowing the surgical process to be documented. An initial prototype will be on display at the Fraunhofer joint exhibition booth (Hall 3, Booth B04) at this year's Medtec trade show in Stuttgart from 26 to 28 February.

Provided by Fraunhofer-Gesellschaft

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