Novel Tension Transducer for Surgical Flaps

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Technology description

Background
The aesthetic appearance and wound healing of surgical flaps depend on the tension applied to pull the distant tissues together for suturing and holding them in place. Unfortunately, the quantitative measurement of the tension is technically difficult due to a lack of reliable tension measuring device in a clinical setting. The need to maintain sterile conditions, ergonomic considerations, limited working space and the need for continuous data acquisition are other factors that have contributed to the lack of an ideal device. Study comparisons for various closure techniques as well as the selection and reliability of a suture for a given closure have been limited for the same reasons.TechnologyThe innovators have designed a novel surgical instrument to reliably measure the pulling force in skin flap closures that would overcome the aforementioned technical difficulties. The crux of the design involves mounting of an ultra-thin and highly sensitive force sensor onto an ergonomically comfortable forceps which can be sterilized using ethyl alcohol. The force sensor is a piezo-resistive sensing device in which the resistance is inversely proportional to the applied force. The swinging arm design of the instrument translates the tissue pulling force onto the force sensor. The force sensing resistor is embedded in the amplifier in such a way that the output voltage of the amplifier is inversely proportional to the resistance change in the force sensor. The amplifier voltage will be calibrated into units of force and displayed on a monitor and simultaneously collected.Application* Suturing of surgical wound flaps

Advantages

* Can be used in a clinical setting as a sterilized instrument
* Can be used in a limited work space
* Allows for continuous data acquisition
* Ideal for aesthetically closed wounds in plastic surgery

Institution

University of Pittsburgh

联系我们

叶先生

电 话：021-65679356

手 机：13414935137

邮 箱：yeyingsheng@zf-ym.com