

PosiSeat(TM): Assured Seating of Threaded Surgical Components

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Technology description

Summary

Vanderbilt presents an intraoperative device for taking the guesswork out of whether or not a threaded component is securely affixed to bone. This device is an anchor driver that automatically releases upon proper seating of the anchor on the bone of interest.

Description

Image guided surgery involves intraoperative surgical navigation by linking preoperative radiographs to intraoperative anatomy. In this rapidly evolving technology, an essential requirement is that of accurate registration, i.e., the linking of the radiographic images to the patient. The required degree of accuracy is achieved by placing fiducial markers that can be identified both in the radiographs and on the patient. Fiducial markers need to be positioned by anchors, which have also been used in other medical procedures.

A common system for image-guided surgery utilizes self-tapping anchors that are screwed into a bone, such as a patient's skull, through an incision in the scalp. The anchor is placed into a driver that is inserted through the incision. The surgeon then presses on the driver and starts to rotate the driver, thus screwing in the anchor. During this process, the overlying scalp (flap) prevents the surgeon from physically seeing the anchor. It is essential that the surgeon place the anchor such that its bottom surface is seated flush with the surface of the skull. Currently, the surgeon depends purely on feel to determine when the anchor is properly seated against the skull. Improper seating of the anchor's bottom surface on the skull bone can have adverse effects. If the driver is over-driven, the self-tapped threads in the skull bone can get stripped. Conversely, under-driving can result in a gap between the two surfaces. In either case, the anchor will not be secure. Several adverse effects can result from insecure placement of threaded components ranging from inaccuracy to increased opportunity for infection.

Vanderbilt University researchers have developed an anchor driver named PosiSeat (TM) that automatically releases upon proper seating of the anchor on the bone of interest. This inexpensive device will eliminate guesswork on the part of the surgeon and ensure enhanced patient care. The manufacture of the anchor driver does not use any exotic processes, and several versions can be manufactured to best fit specific circumstances. While originally developed for image-guided surgery,

the device has significant advantages in any surgical procedure involving placement of threaded components in bone. Anticipated applications include the placement of various implantable plates.

Potential Market Size

The combined U.S. neurostimulation market (2003-2013) for deep brain stimulation and spinal cord stimulation is estimated to be approximately 300,000 cases. Assuming that PosiSeat (TM) is used in half of these cases and the anchor drivers sell for \$400 each, the total anticipated revenues (2003-2013) is estimated at \$60MM.

In addition, it is anticipated that the PosiSeat (TM) device can also be used for screw insertion in orthopedic implants. The estimated market size for these applications is difficult to quantify but is expected to be rather large.

Value Proposition

This simple, inexpensive mechanical device increases the selling advantage for any medical device whose functionality is dependent on being threaded into bone. As part of a bone-repair kit, the value of the kit is improved by obviating guesswork on the part of the surgeon.

Investment Needed

This technology will require no significant investment for development prior to bringing it to market. A minimal investment will be needed to specify surface finishes and have a machine shop build prototypes. Following that, normal marketing expenses are anticipated.

Advantages

- Low manufacturing cost
- No special training required
- Reduction of surgery cost
- Eliminates adverse effects from improper seating of threaded components
- No competitive products

Institution

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