

Real-Time Acoustic Measurement and Feedback for Surgical Implants

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SUMMARY

UCLA researchers have recently developed a method of measuring the proper fit and placement of medical implants based on the acoustic reverberations from hammering the implant into place.

BACKGROUND

When implanting devices into bone, surgeons currently rely on experience to determine proper placement and fit. Two dimensional x-ray images can help with planning the implant procedure, but they lack the full three dimensional, real time data needed to ensure proper placement. Therefore, the current method of device implant is subjective and can be prone to technical error. When an implant is not properly fitted, the resulting pain can lead to revision surgeries, thus doubling the patient's risk of infection and death. Furthermore, new surgeons do not have sufficient training devices to develop the experience necessary prior to working in the field. A measurement and feedback system is needed to ensure proper placement and fit.

INNOVATION

UCLA researchers have developed a method of analyzing the acoustic reverberations that are caused when hammering medical implants into bone. The reverberations alter their characteristics when the implant is securely fit in its proper placement. By providing a measure of fit for the device implant, this technology quantitatively compliments the surgeon's practical experience. Such a method is ideal for medical procedures such as hip replacement surgery.

APPLICATIONS

- ▶ Surgical aid for total hip replacement surgery
- ▶ Potential application in partial hip replacement surgery

ADVANTAGES

- ▶ Safer alternative to traditional implant monitoring methods
- ▶ Quantitative measurement of implant placement and fit
- ▶ Cost effective software and hardware combination

STATE OF DEVELOPMENT

Technology premise has been designed. Proof-of-concept studies will be done as more data is collected. The technology has not been used on any patients and no FDA/IRB steps have been taken.

PATENT STATUS

Patent Pending

CONTACT

UCLA Technology Development Group
ncd@tdg.ucla.edu
tel: 310.794.0558.



INVENTORS

- ▶ Hafzalla, George W.

OTHER INFORMATION

KEYWORDS

medical device implants, joint replacement, acoustic feedback, total hip replacement, signal processing, acoustic monitoring, medical decision making, imageless computer-assisted surgery

CATEGORIZED AS

- ▶ **Imaging**
 - ▶ Medical
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UCLA Technology Development Group

10889 Wilshire Blvd., Suite 920, Los Angeles, CA 90095

tdg.ucla.edu

Tel: 310.794.0558 | Fax: 310.794.0638 | ncd@tdg.ucla.edu

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