Intracranial Implantable Mechanical Device for Housing Neurostimulators or Drug Infusion Pumps

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OTHER INFORMATION

KEYWORDS

brain, neurostimulator, deep brain stimulation, implantable pulse generator (IPG), drug infusion pumps, implantable drug delivery, intracranial implants, minimally invasive surgery, brain-computer interface (BCI), brain-machine interface, neural interfacing

CATEGORIZED AS

- **Engineering**
  - Engineering
  - Other
- **Medical**
  - Delivery Systems
  - Devices
  - Rehabilitation
- **Sensors & Instrumentation**
  - Biosensors
  - Medical

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SUMMARY

UCLA researchers in the Department of Surgery have developed a novel device described as the Skull Universal Indweller for Generators (SUIG) to house cranial energy or drug delivering apparatuses.

BACKGROUND

Traditional implantable brain stimulators and drug infusion pumps require the stimulation generators and drug pumps to be implanted in the patient's chest, with wires or catheter tubes running up through the neck. These wires and tubes may be uncomfortable for the patient and are at high risk for mechanical wear, failure and infection over time. A device that could localize generators and pumps and associated wires and catheters to a single site in the skull would obviate extensive operations. Reducing the number of operations would decrease the possibility of infection, leading to better surgical outcome and patient satisfaction.

INNOVATION

UCLA researchers in the Department of Surgery have developed a novel device described as the Skull Universal Indweller for Generators (SUIG) to house cranial energy or drug delivering apparatuses. A rigid mechanical enclosure houses an implantable electrical pulse generator (IPG) or drug infusion pump in the thickness of a removed portion of the skull, eliminating the need for wires and tubes tunneling through the neck. Enclosures can readily accommodate a range of commercially available IPGs and pumps.

APPLICATIONS

- The reported technology is designed specifically for cranial implantation of devices such as implantable pulse generators (IPGs) for electrical brain stimulation and drug infusion pumps.
- The design principle may be applicable for other cranially implantable devices including:
- Brain-computer or brain-machine interfaces (BCIs or BMIs) – e.g. for control of prosthetic devices
- Cochlear implant systems
- Retinal implant systems
- Impact monitoring devices (e.g. for concussion detection and management)
- Activity monitoring/tracking implants
- Wireless communication devices

ADVANTAGES

- Devices and all associated components can be localized to site of implantation
- Reduces the number of procedures needed for device implantation
- Readily accommodates a wide range of commercially available IPGs and pumps

STATE OF DEVELOPMENT

The principle has been tested in surgical procedures.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	9,421,363	08/23/2016	2008-616

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