Skin-Screw Electrodes for Super-Fast Installation on Hairy Skin without Using Adhesives and Electrolyte Gel

Published date: Aug. 28, 2016

Technology description

Background

The electroencephalogram (EEG), as a commonly utilized clinical diagnostic tool, provides a unique window to observe the functional activity within the brain. Recent technological advances in electronic and computer systems have allowed over one-hundred EEG channels to be recorded simultaneously, and modern signal processing techniques have provided new insights into the recorded data in both the temporal and spatial domains. Despite these technological advances, affixing EEG electrodes on the human scalp requires a manual procedure which is a long, painstaking process for both the EEG technician and the person being studied. The labor and facility usage costs for electrode installation have been a large portion of the total cost of clinical EEG study and have significantly hindered the acceptance of large-array EEG in clinical applications.

Technology

This invention is a new electrode that can be installed within the hairy regions of scalp in a fraction of a second. This electrode requires no applications of electrolyte gel and adhesive. The electrode impedance is very stable over time. The skin contact part of the electrode or the entire electrode is of low cost and disposable. This electrode is also suitable for electrophysiological studies on animals. This invention intends to replace the widely utilized cup EEG electrodes and accessories, such as electrode gel, adhesives, skin prep material, and EEG tapes. Example applications include routine clinical EEG neurophysiological study, event related potential (ERP) study, sleep study, epilepsy diagnosis, EEG recording during intensive care, non-invasive brain-computer interface, psychiatric study, physiological monitoring, and drowsiness monitoring during motor vehicle driving.

Application area

1. Routine clinical EEG neurophysiological study
2. Event related potential (ERP) study
3. Sleep study
4. Epilepsy diagnosis

5. EEG recording during intensive care
6. Non-invasive brain-computer interface
7. Psychiatric study
8. Physiological monitoring
9. Drowsiness monitoring during motor vehicle driving

Advantages

1. Application requires no electrolyte gel or adhesive
2. Can be applied quickly to hairy areas
3. Contact part is low in cost and disposable

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