Considerations for Designing Ambulatory EEG Systems

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PROBLEM
Current ambulatory electroencephalography is inconvenient, interferes with daily life, and is not accessible to patients of all backgrounds.

By considering the human interaction EEG involves, aEEG systems can be better designed to improve readings and patient experience.

SOLUTION
The usability of ambulatory EEG can be optimized by implementing three considerations in the design process of aEEG systems:

1. Hair type compatibility
   • EEG does not work well with coarse, curly hair
   • EEG electrodes must be designed to be compatible with all hair types

2. Visibility and stigma
   • aEEG is commonly used for epileptic patients which carries a stigma.
   • By integrating aEEG into existing head ware, patients are less likely to be subject to stigmatization and discrimination

3. Ease of use and cost effectiveness
   • aEEG requires contact with the scalp over a prolonged period of time.
   • Electrodes that are made of low cost materials and can work for extended periods of time wet or dry increases user friendliness and accessibility.

EXAMPLES
Examples of human-centered design that have the potential to make ambulatory EEG more accessible while preserving or improving the accuracy of EEG.

Braiding method for curly hair allows better scalp contact than comparable methods used for straight hair. This method decreased impedance by a factor of four.

Conductive sponges perform comparably or better than traditional electrodes whether wet or dry.

REFERENCES and ACKNOWLEDGEMENTS
1. Etienne, 2018, “EEG systems for accommodating thick and curly hair”

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