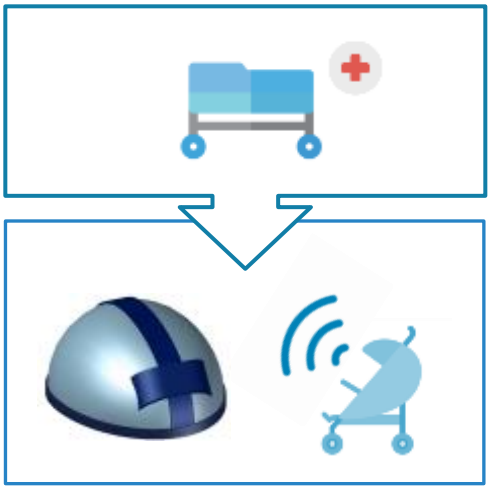
Ambulatory Electroencephalogram Headset for Infants

Infants suffering from epilepsy often exhibit subtle symptoms like loss of motor or social contact before spasms begin to occur. Serious and permanent developmental damage can occur as a result of delayed diagnosis during the period when spasms and other noticeable symptoms have yet to manifest. Electroencephalogram (EEG) technology can help eliminate this delay if infants with suspicious symptoms are screened using an EEG monitoring device.



Opportunity Overview

Wait times for in-hospital EEG testing can be as long as several months, and there is currently no portable EEG monitor that is designed for infant use. Creating an infant headset for the Hospital for Sick Children that implements the existing portable EEG technology that is used on adults would allow infant epilepsy to be diagnosed faster and developmental damage to be minimized.

Polyurethane sports mesh cap:
A breathable, comfortable, and sturdy solution for the overall body of the headset. Polyurethane was selected because it is flexible yet strong, and a cap can be built using a thin polyurethane mesh that will cause little pressure on the skull. An inexpensive mesh allows breathability and keeps the head from overheating or trapping sweat. An ethylene vinyl acetate frame will be used to lock electrodes in place to ensure consistent, accurate electrode placement.

Silver-impregnated foam electrodes:
A soft and comfortable, yet affordable, electrode choice. Unlike hard metal pronged electrodes, silver-impregnated foam electrodes will not protrude into the infant's skull and cause lasting damage. These electrodes can also pop in and out of place for easy maintenance and removal.

Ethylene vinyl acetate (EVA) microcontroller:
Microcontroller housing keeps electrical components away from the infant skull. EVA was selected for its light weight and stiffness, to keep the microcontroller from shifting and putting pressure on the skull.

Validation

Jason Boulet, a doctor from Sick Kids, validated that the use of an EVA frame would aid in avoiding electrode interference as well as improve usability. He believes this design accounts well for breathability and maintainability, and that silver foam electrodes are an appropriate choice for infants.