Harmonization of Washing and Disinfection of Electroencephalogram (EEG) Electrodes

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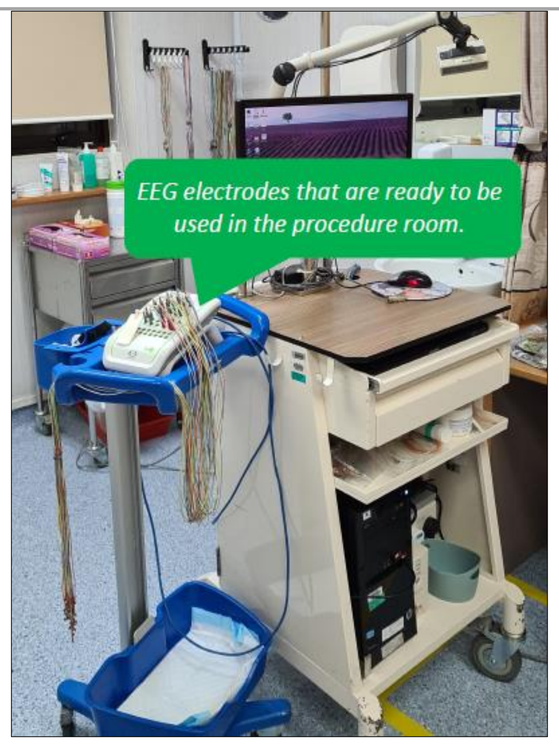
Introduction

The EEG electrodes are made of tiny flat metal disc cups. These are semi-critical devices applied on abraded skin. In the Neuro-Diagnostic Unit, it is an entrenched practice for staff to manually wash the soiled electrodes and soak them in diluted Sodium Hypochlorite Solution 1000ppm for disinfection within the procedure rooms.



Problem: Safety Concerns

A lack of proper washing and high level disinfection facilities can increase the risks of cross contamination within the procedure room. Studies have reported a high number of cleaned ready-to-use reusable EEG electrodes contaminated with potential risk of microbial and cross contamination (1Albert et al., 2018). In addition, the inadequate ventilation and air exchange in the procedure room may be suboptimal for the dissipation of vapors from the activated Sodium Hypochlorite Solution.

Objective

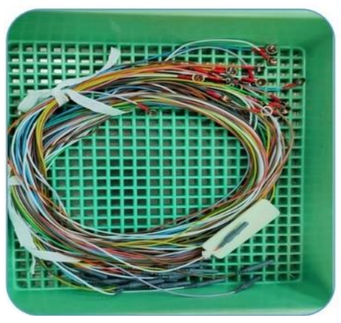
To centralize the washing and disinfection of the soiled EEG electrodes in the SSU@SGH

Methodology

Cleaning the long EEG electrodes is complex as it is challenging to remove the conducive paste and microscopic debris from the metal disc cups. Moreover, the cup electrodes and lead wires often become entangled, complicating the cleaning process. To address this, SSU@SGH gathered information from the manufacturer's instructions for use (IFU) and consulted colleagues from the other institutions on the best practices in the reprocessing of the EEG electrodes.

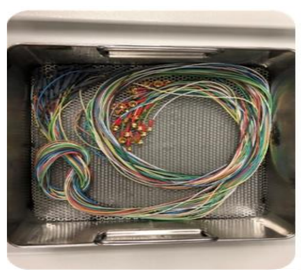
PDCA 1: Mechanical washing of EEG electrodes in perforated basket

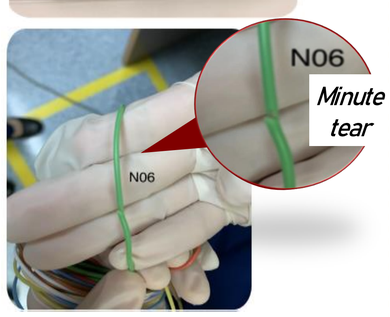
Plan	Mechanical washing of EEG electrodes in perforated basket.
Do	The EEG electrodes were neatly assembled, coiled, bundled and laid out on the perforated basket for the auto-washing disinfection program at 40 minutes including 5 minutes of thermal disinfection at 90°C.
Check	Due to the washing process, some of the electrode leads dropped out through the perforated holes and the EEG electrodes were damaged as a result.
Act	Consider the use of basket with smaller perforated holes.



PDCA 2: Mechanical washing of EEG electrodes in smaller perforated basket causing minute tears

Plan	Mechanical washing of EEG electrodes in metal basket with smaller perforations.
Do	The coiled EEG electrodes were placed in a metal perforated tray before washing and thermal disinfection in mechanical washer.
Check	Some of the EEG electrodes still fell through the smaller perforated holes, causing minute tears on the cable.
Act	Consider placing the EEG electrodes into a netted bag instead.

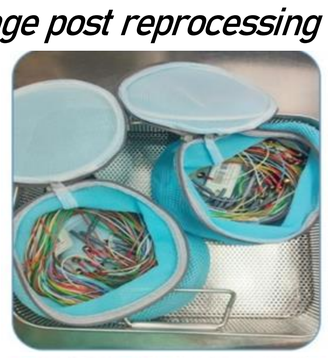




Results

PDCA 3: Mechanical washing using netted bag to protect the EEG electrodes during washing showed no entanglement or damage post reprocessing

Plan	Mechanical washing using netted bag to protect the EEG electrodes.
Do	To ensure electrode leads are protected and to prevent falling, the coiled EEG electrodes were placed into a netted bag before they were placed into the perforated basket for washing.
Check	The final result was that the EEG electrodes were intact and no damage was observed after reprocessing.
Act	Proceed with the use of netted bag. Users' feedback was positive.



Users' feedback for the use of netted bag for washing was positive.
After washing, the EEG electrodes were placed in the drying cabinet for 15-20 minutes at 55°C. After drying, the EEG electrodes were then placed into a plastic bag ready to be returned to the user. At SSU@SGH, each set of EEG electrodes is registered in the SSU inventory system and identified with a barcode to track its reprocessing conditions, product utilization and shelf life.

Reprocessed EEG electrodes with barcode tracking

In collaboration with the Neuro-Diagnostic Unit, SSU@SGH established a workflow for collection of the used electrodes and return of the reprocessed EEG electrodes on a daily basis. The Neuro-Diagnostic Unit also procured and increased its inventory of EEG electrodes to meet the turn-around time and clinical demand. On 4 June 2020, the new workflow to centralize the washing and disinfection of EEG electrodes was implemented. The new practice of reprocessing the EEG electrodes at SGH was shared at the SingHealth Sterile Supplies Workgroup (S3W) meeting and our Chair proposed for the harmonization and standardization of the practice for EEG Electrodes across the SingHealth Cluster.

Singapore General Hospital, SingHealth — A new workflow to centralize the washing/ disinfection of EEG electrodes was implemented in SGH. — **4 June 2020**

Changi General Hospital, SingHealth — CGH completed harmonization process on 26 Jun 2020. Similarly, all the electrodes were tagged and labelled for traceability. — **26 Jun 2020**

Sengkang General Hospital, SingHealth — SKH adopted the initiatives and started the reprocessing of EEG electrodes in the SKH SSU. — **19 Aug 2020**

KK Women's and Children's Hospital, SingHealth — KKH had purchased the EEG electrodes and commenced the reprocessing EEG electrodes in the CSSU. — **7 Mar 2022**

Harmonization of newly adopted practices across SingHealth Cluster

Conclusion

The harmonization and standardization of the reprocessing of EEG electrodes by SSUs across the cluster allows best practices and infection control to be propagated for optimal staff and patients' safety. Risks of microbial contaminations and exposure to undesirable vapor from the chemical disinfectant are also prevented. It is recommended that reprocessing should be performed in a centralized area that complies with physical and human resource requirements. The SSUs play an integral role to provide the required infrastructures and standard procedures for washing, disinfecting and sterile reprocessing of medical devices.

Reference

1. Albert, N. M., Bena, J. F., Ciudid, C., Rice, K., Slifcak, E., & Runner, J. C (2018). Contamination of reusable electroencephalography electrodes: A multicenter study. *American Journal of Infection Control, 46*(12), 1360-1364. https://doi.org/10.1016/j.ajic.2018.05.021