

# The Equipment Journey as a tool to design safe surgical equipment for low-resource countries

The aim of this study was to determine how the low-resource healthcare context triggers safety risks during electrosurgery. Therefore, the general technology related risks, the journey of the electrosurgical equipment in terms of activities, and the user characteristics were researched. On this poster three activities from the pre-treatment and surgical treatment phase are illustrated.

Below, the translation from those insights into a design intervention is illustrated.

Procurement

Pre-treatment

Surgical treatment

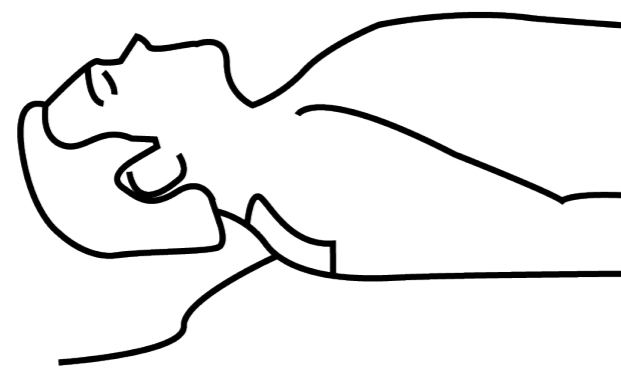
Post treatment

Maintenance

Repair

Disposal

## Incorrect placement patient plate



Activity

The return electrodes are re-used & therefore lose its stickiness. As a result the nurses place the patient plate underneath the body, e.g. on the shoulder, to ensure contact.

Technology related risks

One should avoid areas with irregular body contours, bony prominences, & areas where the patient touches the surgery table, because the blood circulation is reduced at these spots.

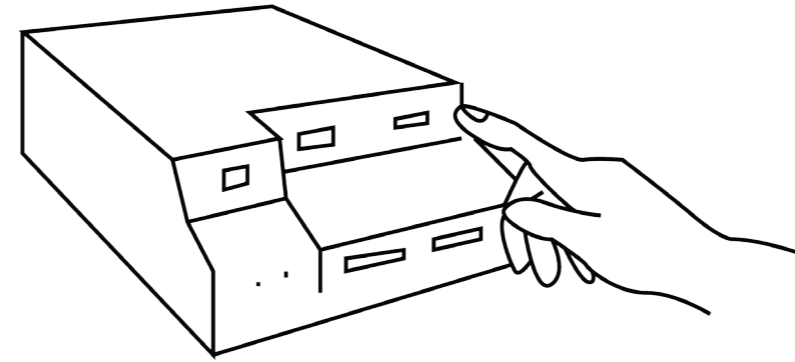
User characteristics

The nurses did not receive any training during their education on how and where to place the patient return electrode.

Safety risks

Incorrect placement of the patient plate can cause burns and a delay in case the plate loses contact and needs to be re-attached.

## Operating the electrosurgical unit



Ideally a Biomechanical engineering technician (BMET) should operate the ESU, but due to a shortage of staff usually someone from the medical staff takes over this task.

The electrosurgical unit (ESU) has an interface with a lot of different functions/modes.

*"I have not learned anything about electrosurgery or how to operate the machines at college."* - Nurse

Especially with new medical staff members there is a great potential for use errors. They might for example put the ESU on too high power settings.

A new more userfriendly interface was designed to make it more easy for inexperienced users to operate the machine.

## Not knowing how to react to system error

--- 196 ---

The staff has no idea what the number 196 on the screen stands for.

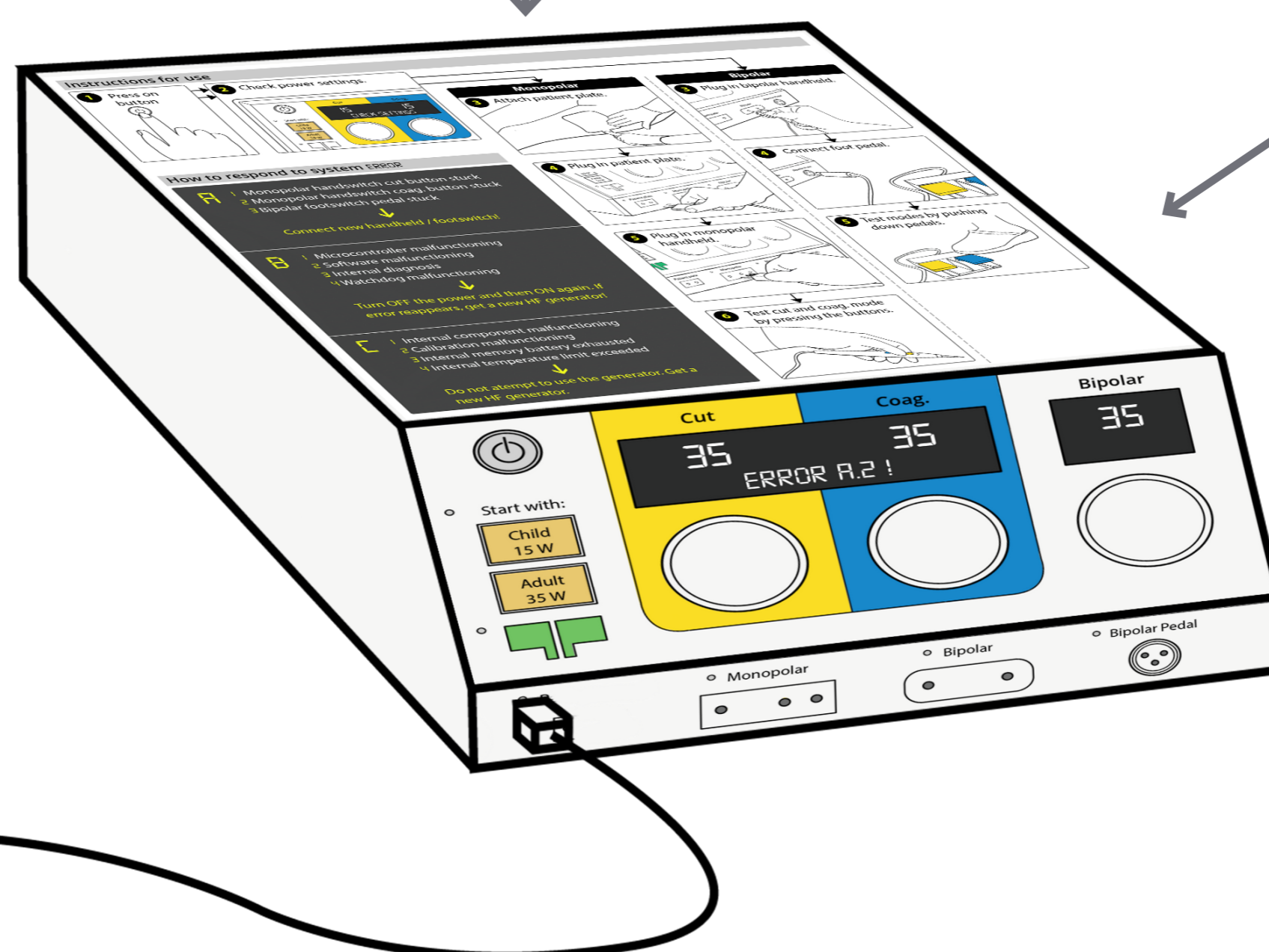
The current ESUs give no informative error message.

The medical staff has not learned how to react to a system alarm.

Not knowing what to do in case of an error delays the procedure and can lead to patient harm depending on the error.

An information sticker on top of the ESU illustrates how to safely use the machine, and provides instructions on how to react in case of a system error.

In order to avoid that the nurses place the patient plate underneath the shoulder, an information sticker for on top of the plate was design. It shows on which areas the plate should be placed and which are to be avoided.



Whole Journey

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