

A Systematic Risk-Mitigating Approach to Rectify a Hazardous Operating Table Design



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Chia Soon Noi, KK Women's and Children's Hospital
Yin Shanjing, KK Women's and Children's Hospital
Ong Lay Teng, KK Women's and Children's Hospital



Introduction

Surgical intervention has the ability to save lives, but a number of hazards lurking in the operating rooms. Surgeons, nurses, anesthesiologists, assistants and other professionals working in surgical environments put themselves at risk every day in their careers.

There were two incidents of foot injury resulting from operating table swerved during table manipulation intraoperative on two separate occasions within a period of three years. One surgeon sustained toe fracture while the other had bruises and abrasion on the foot. Both hospital and vendor engineers were unable to identify the cause of the swerve.



Aim

Such uncommon injury raised concern from the OT team as staff were worried that the operating table will swerve and cause injury to another staff. The team came together to examine the cause of the swerve and prevent further recurrent.

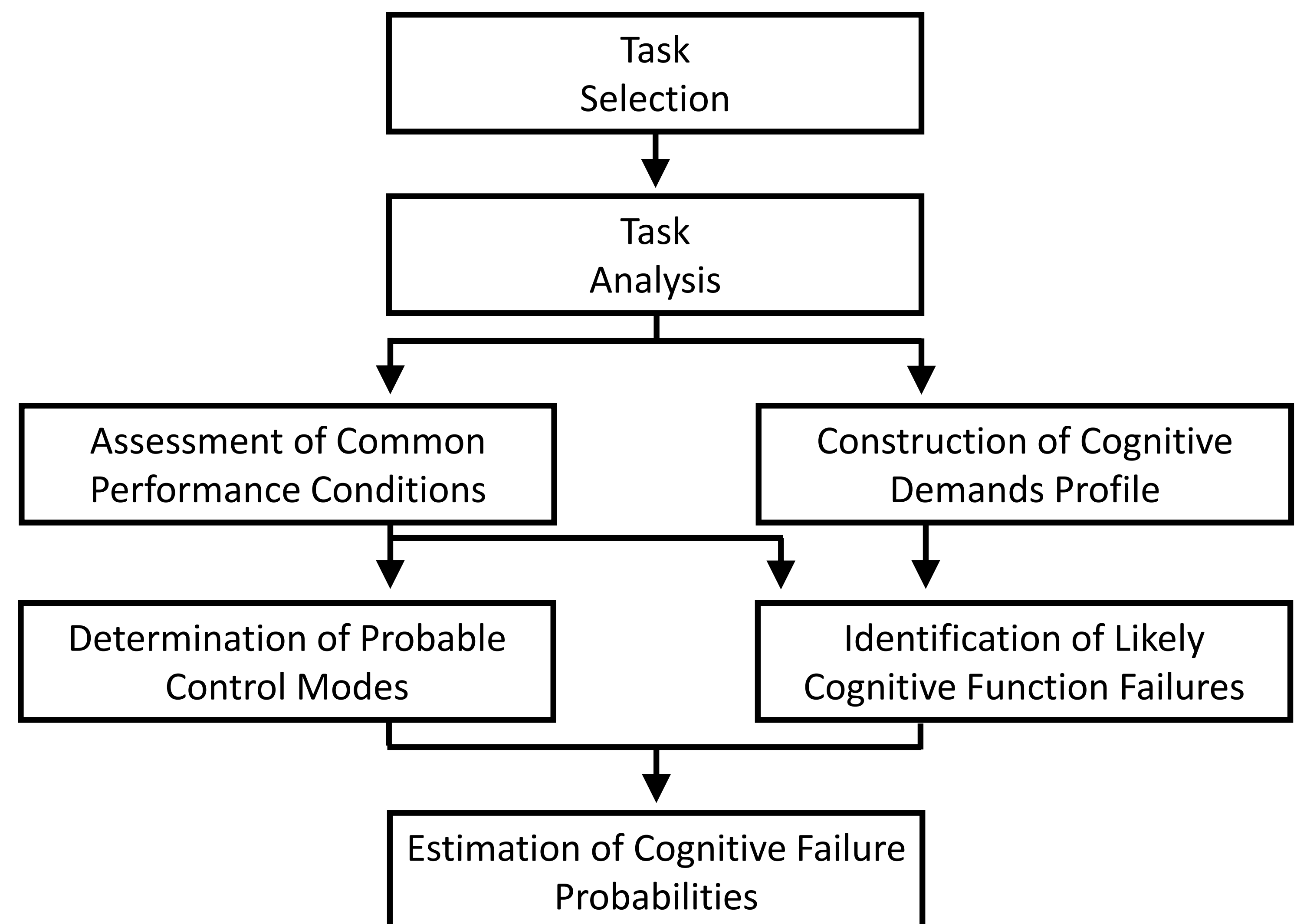
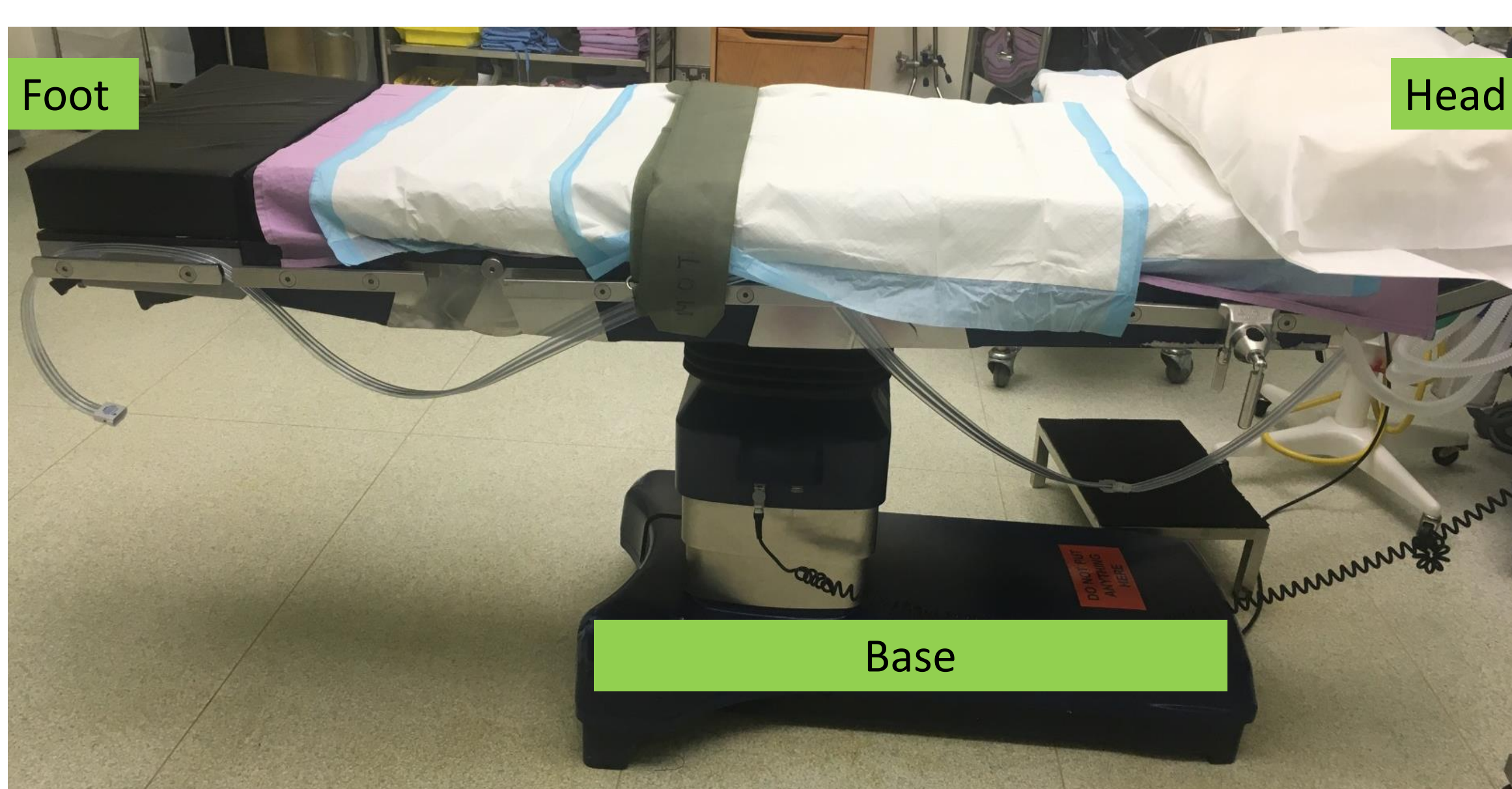
Methodology

Root cause analysis was conducted for the two incidents and there were no conclusive findings as the reason for the swerve was unexplained. The similarities of the two incidents are:

1. Both operating table were of same brand and model
2. The two operating tables swerved when patients were placed in lithotomy position.

Decision was made to engage the Human Factor Specialist to explore the preventive measures for such incidents. Understanding the various parts and normal function of the operating table is essential to further examine the operating table (Fig 1). Careful examination of the operating table was performed with multiple simulations of various positions of the operating table to explore reason for the swerve.

Fig 1: Operating table and its parts



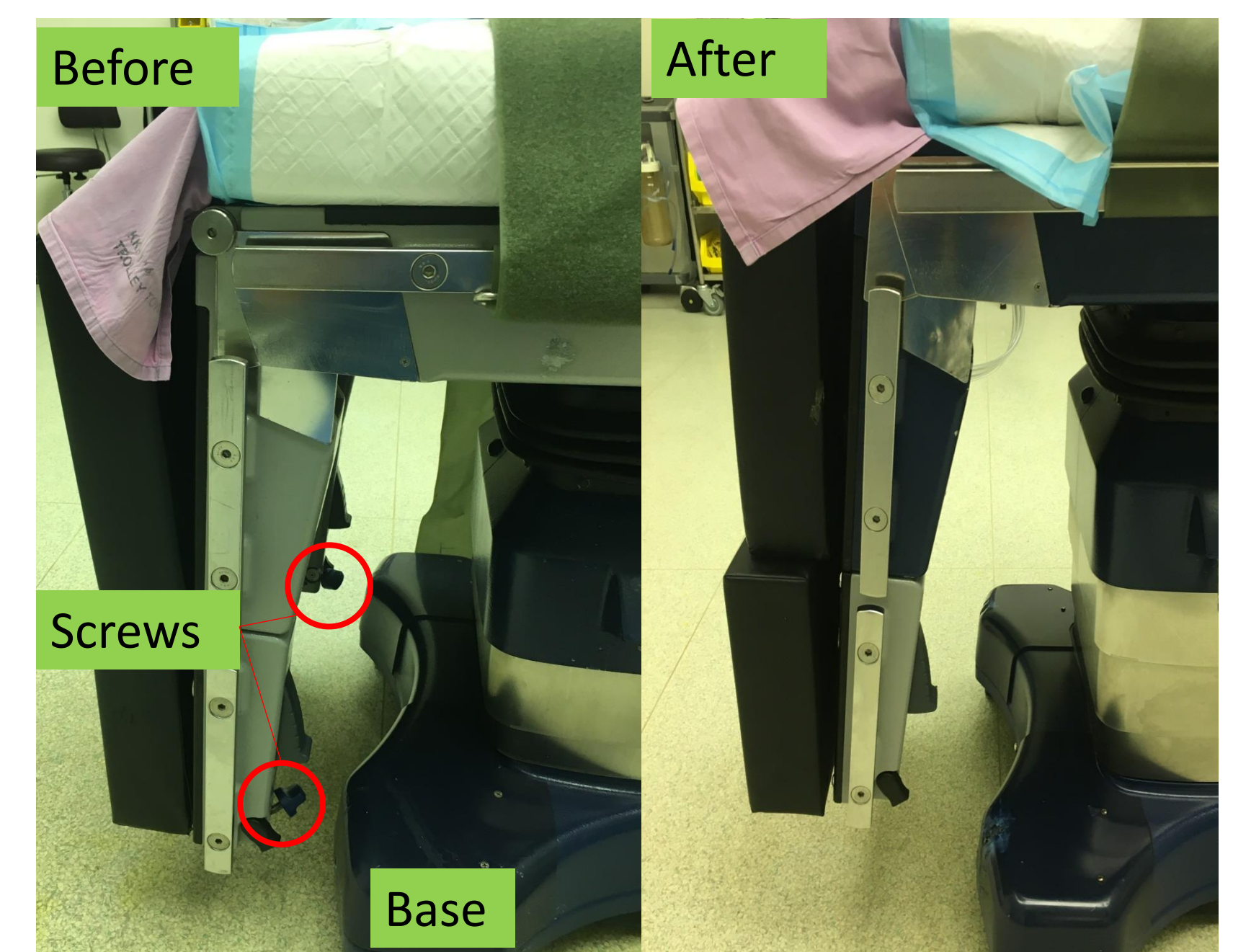
Systematic Human Factors Evaluation

The Cognitive Reliability Error Analysis Method (CREAM) was adapted as a framework to briefly guide the task analysis flow. The team focused on the task of adjusting the table's positions, which was a common factor among the two incidents. The team analysed the task being performed in multiple different scenarios, paying attention to the cognitive and perceptual processes that would have occurred among the users. Other common performance conditions were also noted, including where the surgeons' feet were frequently positioned and what the user controlling the table might be visually monitoring. Possible blind spots were noted, along with design features in the table itself that could have possibly contributed to its inappropriate movement. These conditions and features were further scrutinized for probable causal factors.

Result

After multiple trials, the swerve of operating table was finally simulated. The operating table foot portion was break for lithotomy position and these two screws were found to be resting on the base when the break was more than 90°. The screws on the foot portion of the operating table lifted the base when patient's head is lowered intra-operatively. This happened under surgical drapes therefore surgical team was unaware. When table was manipulated, the screws disengaged from the based causing the swerve and a sudden drop of the base of the operating table resulting in the foot injury.

These two screws are designed to secure the extension plate if longer operating table is needed. The two screws were removed after confirming with the engineer and swerving of the operating table was eliminated.



Conclusion

Physical hazards such as cuts, pricks, electrical shocks, burns and falls are some of the most common hazards in operating rooms. However, injury from swerving operating table is uncommon. The design of surgical equipment/instrument plays a very important role in hazards prevention. Careful assessment of equipment and instrument is essential to ensure safety of operators and patients.