

To Improve Current Leg Elevator(Braun Frame)

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Introduction

Ward 75 is an Orthopaedic and Hand Surgery Department, which deals with trauma cases. Elevating an injured leg is crucial in providing the next step of care for patients involved in trauma. It is important to elevate the injured leg for the first 24-72 hours, because the swollen leg can hinder the duration for surgery. By having the foot positioned higher than the hip (or heart), the force of gravity is used to drain swelling out of the affected lower limb. Doctor finds it more challenging to do surgery on swollen leg compare to a non- swollen leg. Therefore the Orthopaedic Ingenious Collaborative (OIC) Team felt that it is essential to analysed the problem in greater depth, based on the need and impact on the corporate goals and objectives; in providing to our customer with the best quality care through multidisciplinary approach.

Solution development and selection

The team decided to use the PDCA cycle and brainstorming techniques to gather alternative solutions.



1st prototype was to use micropore to secure the pins. However, the pins still gave way especially when it is used for a longer period of time. After 2 weeks of trials by 15 patients, 7 needed the lint to be changed.

Materials needed to prepare the current braun frame





Lint, micropore, scissors and pins

The frame

Steps in preparing the current braun frame



Step 1: measure the lint from mid thigh to ankle and cut the lint appropriately



Step 2: Pin the lint to the frame by using safety pins



Step 3: cover the pin with micropore





THE FINAL



Step 4: The view after being

2nd prototype was to use PVC material and Velcro as suggested by FPE expert personnel to replace the lint and pins. The advantage is that no pins were used and it makes the frame free from hazard. Staffs verbalized that it is user friendly and stains can be wipe easily. Orthopaedic Consultants were consulted for the preferred height.



The height of the 3rd prototype were adjusted equivalent to 2 pillows stacked up together.

The current frame is heavy weighing 4.5 kg. Our 4th prototype was made lighter weighing 2.5 kg. Overall we had achieved in making a lightweight and non-hazardous frame for limb elevation.





We compare the 2 frames side by side to see the difference in length and height.

PRODUCT

micropore



Cause and Effect Diagram: Analysis of the possible causes



Root cause of the problem



BEFORE						AFTER		
STEP	ACTIVITIES	SYMBOL	TIME TAKEN	NO. OF STAFF	TOTAL TIME	TIME TAKEN	NO. OF STAFF	TOTAL TIME
Α	Staff go to store room to get frame	Ō	5	1	5	5	1	5
В	Staff prepare requisites	Ō	5	1	5	3	1	3
С	Staff adjust the lint over frame	Ō	5	1	5	0	1	0
D	Staff pin the lint over the frame	Ō	5	1	5	0	1	0
Total Time in Minutes20								8

Time savings

Before implementation: 20 minutes x 1 (Staff) = 20 mins After implementation: 8 minutes x 1 (Staff) = 8 mins Therefore time saved per patients: (20-8) minutes = <u>12 minutes</u>

On average, we need to set up at least 20 frames per month with at least to reapply the lint twice per week.

Time saved per year: 12 minutes x 20 frames x 2 x 4 x 12 = 23040 minutes. Therefore we are able to save 23040 minutes or 384 hours per year.

Cost Savings

Cost of lint for 20 frames : \$54 Cost saving per year: \$54 x 2 times/week x 4 weeks/ month x 12 months/ year = \$5184/ year Proposed leg elevator: \$380/ Unit Cost of 20 units = \$7600There will be one time purchase and Return of investment at 1.5 years. Average salary: \$2000 Average working hours per month: 168 hours Average salary per hour: 2000 / 168 hours = 11.90

Cost savings per year = $386 \times 11.90 = \frac{768,000}{100}$





The pins used to hold the lint onto the frame can bring hazard to staff and patients. It can gave way and prick their limb.



The height of the frame is fixed at one height. Making it uncomfortable and due to that patient became non- compliance to elevation. The bulky feature takes up the bed space and causing hindrance for patient to move.

Project Sustainability

- We gathered continuous feedback from the ward nurses and patients to seek for improvement and to enhance better solution.
- 2. We acted on the feedback given. For example: elevating limb in a shorter time without any hazard.
- We informed & shared with the other departments regarding the availability of the 3. modified body restrainer.

Conclusion

This project has reduced time consumed in the applying lint over frame and ensuring patient get the correct height of elevation. With the time saved, nurses will have additional time to provide more quality care to their patients.