



# SMART Orthopedics Spinal Institute (OSI) Surgical Table Preparation

## Eliminate 55 Pounds Repetitive Manual Lifting



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# Our journey

- Care manager in OMCS onsite visit to PWH OT to facilitate an injured staff getting back to work.
- During the onsite visit, an occupational hazard was identified in OSI table preparation by orthopedic PCAs
  - OSI surgical table is designed for spinal trauma patient positioning in surgical procedures





# Job duty of orthopedic PCA in OT

**Limbs disinfection**



**Maneuver bulky  
OT equipment**



**Set up OT table  
accessories**



**Patient transfer**



**Essential in preoperative preparation and intra-operative support  
Their work is labour intensive involving lots of MHO**

**Adjusting surgical lamp**





# Original OSI table preparation process

PCA are required to take different accessories from factory rack and fix it on OSI table framework, including the table platform

OSI table accessory rack

**55 lbs**

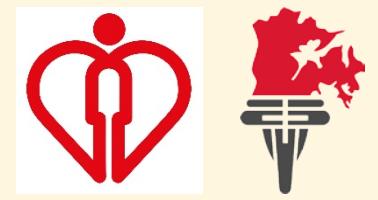


OSI table framework



Prepared table





# Original OSI table preparation process

**Risky work task 1**

Factory rack is not ergonomic friendly

Too heavy and bulky item for MHO



Lift and carry 55 lbs OSI table platform, tilt it from vertical to horizontal

**Risky work task 2**

Persistent exertion

Awkward posture



Hold the platform manually while connecting to two ends of OSI table framework

Average preparation time: 16 min



# Original OSI table preparation process

How do you feel about  
the procedure?

Uneasy, but this is what  
I can do for patients,  
no alternatives !





# Original OSI table preparation process

## Risk assessment

- Ergonomic assessment tool: Rapid Entire Body Assessment (REBA)
- Ergonomic risk is classified as “**very high**”

**REBA Employee Assessment Worksheet**  
based on Technical note: Rapid Entire Body Assessment (REBA). Hignett, McAtamney, Applied Ergonomics 31 (2000) 201-205

**A. Neck, Trunk and Leg Analysis**

**Step 1: Locate Neck Position**  
+1 120° +2 20° in extension +2  
Step 1a: Adjust...  
If neck is twisted: +1  
If neck is side bending: +1

**Step 2: Locate Trunk Position**  
+1 in extension +2 20° +3 20-60° +4 60°+  
Step 2a: Adjust...  
If trunk is twisted: +1  
If trunk is side bending: +1

**Step 3: Legs**  
+1 +2 Adjust: 30-60° Add +1 Add +2  
Step 4: Look-up Posture Score in Table A  
Using values from steps 1-3 above, locate score in Table A

**Step 5: Add Force/Load Score**  
If load < 11 lbs: +0  
If load 11 to 22 lbs: +1  
If load > 22 lbs: +2  
Adjust: If shock or rapid build up of force: add +1

**Step 6: Score A, Find Row in Table C**  
Add values from steps 4 & 5 to obtain Score A.  
Find Row in Table C.

**Scoring:**  
1 = negligible risk  
2 or 3 = low risk, change may be needed  
4 to 7 = medium risk, further investigation, change soon  
8 to 10 = high risk, investigate and implement change  
11+ = very high risk, implement change

**Table A**

|                            | Neck                      |                           |                           |
|----------------------------|---------------------------|---------------------------|---------------------------|
| Legs                       | 1                         | 2                         | 3                         |
| Trunk Posture Score        | 1 2 3 4 1 2 3 4 1 2 3 4   | 1 2 3 4 1 2 3 4 1 2 3 4   | 1 2 3 4 1 2 3 4 1 2 3 4   |
| 1 1 2 3 4 1 2 3 4 1 2 3 4  | 2 2 3 4 5 3 4 5 6 4 5 6 7 | 3 2 4 5 6 4 5 6 7 5 6 7 8 | 4 3 5 6 7 5 6 7 8 6 7 8 9 |
| 5 4 6 7 8 6 7 8 9 7 8 9 10 |                           |                           |                           |

**Table B**

|                 | Lower Arm     |                |
|-----------------|---------------|----------------|
| Wrist           | 1             | 2              |
| Upper Arm Score | 1 2 2 1 2 3   | 1 2 3 2 3 4    |
| 1 1 2 3 2 3 4   | 2 3 4 5 4 5 5 | 3 4 5 6 5 6 7  |
| 4 5 6 7 6 7 8   | 5 6 7 8 7 8 9 | 6 7 8 9 8 9 10 |

**Table C**

| Score B, (table A score + coupling score) |                                |                              |                            |                          |                        |                      |                    |                  |                 |                |             |
|---|--------------------------------|------------------------------|----------------------------|--------------------------|------------------------|----------------------|--------------------|------------------|-----------------|----------------|-------------|
| 1   | 2                              | 3                            | 4                          | 5                        | 6                      | 7                    | 8                  | 9                | 10              | 11             | 12          |
| 1 1 1 2 3 4 5 6 7 8 9 10 11 12            | 2 1 2 2 3 4 5 6 7 8 9 10 11 12 | 3 2 3 3 4 5 6 7 8 9 10 11 12 | 4 3 4 4 5 6 7 8 9 10 11 12 | 5 4 4 5 6 7 8 9 10 11 12 | 6 5 5 6 7 8 9 10 11 12 | 7 6 6 7 8 9 10 11 12 | 8 7 7 8 9 10 11 12 | 9 8 8 9 10 11 12 | 10 9 9 10 11 12 | 11 10 10 11 12 | 12 11 11 12 |

**Final REBA Score**

**B. Arm and Wrist Analysis**

**Step 7: Locate Upper Arm Position:**  
+1 20° +2 20° +3 20-45° +4 45-90° +5 90°  
Step 7a: Adjust...  
If shoulder is raised: +1  
If upper arm is abducted: +1  
If arm is supported or person is leaning: -1

**Step 8: Locate Lower Arm Position:**  
+1 0-45° +2 45-90° +3 90-135° +4 135-180°  
Step 8a: Adjust...  
If lower arm is bent from midline or twisted: +1

**Step 9: Locate Wrist Position:**  
+1 0° +2 15° +3 30° +4 45°  
Step 9a: Adjust...  
If wrist is bent from midline or twisted: +1

**Step 10: Look-up Posture Score in Table B**  
Using values from steps 7-9 above, locate score in Table B

**Step 11: Add Coupling Score**  
Wall fixing Handle and mid range power grip, *good*: +0  
Acceptable but not ideal hand hold or coupling  
acceptable with another body part, *fair*: +1  
Hand hold not acceptable but possible, *poor*: +2  
No handles, awkward, unsafe with any body part, *Unacceptable*: +3

**Step 12: Score B, Find Column in Table C**  
Add values from steps 10 & 11 to obtain  
Score B. Find column in Table C and match with Score A in  
row from step 6 to obtain Table C Scores.

**Step 13: Activity Score**  
+1 1 or more body parts are held for longer than 1 minute (static)  
+1 Repeated small range actions (more than 4x per minute)  
+1 Action causes rapid large range changes in postures or unstable base

Task name: \_\_\_\_\_ Reviewer: \_\_\_\_\_ Date: \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
This tool is provided without warranty. The author has provided this tool as a simple means for applying the concepts provided in REBA.  
provided by Practical Ergonomics  
rbarker@ergosmart.com (816) 444-1667



# Objectives

1. To improve occupational health of Orthopedic PCA
2. To streamline workflow, minimize MHO and enhance efficiency



# Team up!

- Engaging relevant stakeholders to form a focus group
  - OMCS
  - OSH
  - Operation Theatre
  - O&T
- Investigate risk level associated with the concerned procedure and identify potential improvement measures
  - Engage PCA and empower them to make the change **together**





# Difficulties

.....

- Resistant to change
- Different opinions
- Mistrust
- MHO risk related to OSI table is not their 1st priority, because there is no way out



Not engaged





# Staff engagement and empowerment

Listen to their concern and get them engaged in what they want to address first



Problem solving process on their concerned areas

- Enhance open / transparent communication
- Empower them contribute to improvement measures
- Care / building trust
- Recognize their input
- Ownership of the improvement
- Common goals to improve occupational health
- Give a good onboarding experience of success in OSH perspectives



# Staff engagement and empowerment

## Engaging PCA in OSI table preparation enhancement

### **1. Why we need to change**

- MHO risk at high level
- Results of symptom survey:
  - 71% reported pain
  - 93% perceived hardship



VS

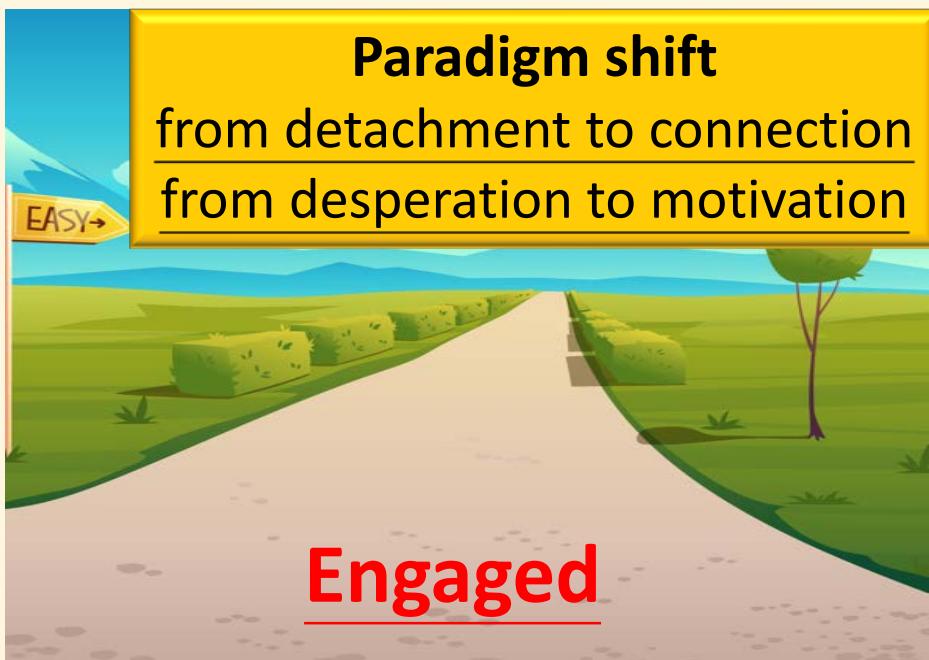


### **2. Benefits of the change**

- Less MHO demand
- More efficient

### **Paradigm shift**

from detachment to connection  
from desperation to motivation



### **3. Need their input for a feasible proposal**

- Make decision making together



# Consensus on improvement measures



## 1. Invention of an OSI table equipment mobile cabinet

- Keep table platform horizontally on top, push it to mount on OSI table framework for preparation, the mobile cabinet support it during the maneuver

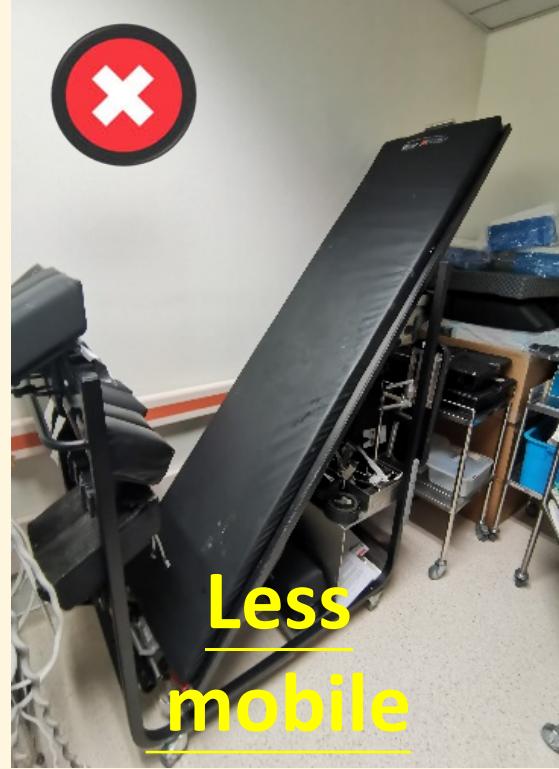




# Consensus on improvement measures

## 2. Streamline workflow by facilitating more flexible table preparation location

- Tailormade mobile cabinet carry all the required OSI table accessories to theatre in one go
- More available peer support
- More spacious





# Consensus on improvement measures

3. Train the trainer: tailor-made MHO training had been provided to ensure skill transfers





# Results and outcome

1. Enhance PCA's occupational health
2. Improve work efficiency

86% rated satisfactory or above with the new workflow

Reported pain 71% --> 14%  
Average 4.6/10 --> 1.5/10

Average preparation time  
dropped from 16 to 8.5 minutes

Perceived hardship 93% --> 28%  
Average 7.3/10 --> 3/10

REBA ergonomic assessment score:  
11 --> 3 (very high risk to low risk)



Recognition & reward



# Conclusion

A bigger team

Teamwork

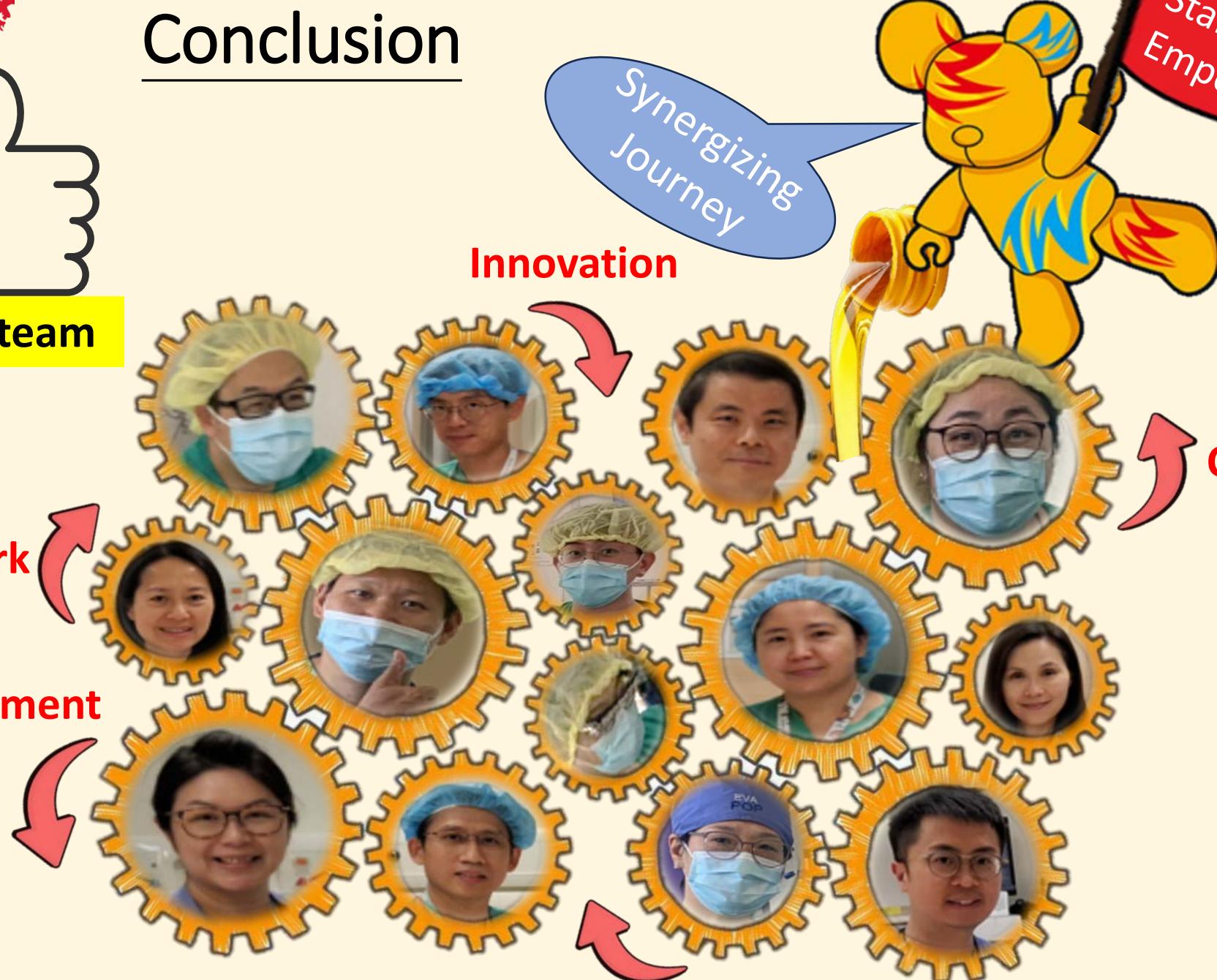
Management support

Innovation

Synergizing Journey

Staff engagement  
Empowerment

Commitment





# Way forward

- Advocate safe practice in OSI table preparation in NTEC
- Bring up to MHO committee (OSH, HAHO)
  - The concept in this project can be easily apply to other OT using OSI surgical table
  - Subject to local customization based on workflow and environmental factors



NEW Challenge 



Care for the Carers



~ Thank you ~

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