

Surgical Ergonomics in General & Breast Surgery: A Snapshot Study

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Introduction

Work-related musculoskeletal (MSK) disorders are increasingly prevalent among surgeons, with associated career modification. Formal education on surgical ergonomics and subjective assessments of the surgeons posture remain sparse.

We aim to objectively assess the surgeons' posture intra-operatively, using the Rapid Entire Body Assessment (REBA) toolkit and identify potential risk factors leading to acquired MSK disorders.

Methods

- Voluntary questionnaires distributed among surgeon to obtain baseline demographics
- Data collected prospectively between December 2023 – January 2024, using REBA toolkit
- Basic statistical analysis performed in Microsoft Excel

Musculoskeletal Discomfort Form (Based on the Nordic Questionnaire (Kourinka et al. 1987))

How to answer the questionnaire:
 Please answer by putting an "X" in the appropriate box - one "X" for each question. You may be in doubt as to how to answer, but please do your best anyway. Note that column 1 of the questionnaire is to be answered even if you have never had trouble in any part of your body; columns 2 and 3 are to be answered if you answered yes in column 1.

Picture: In this picture you can see the approximate positions of the parts of the body referred to in the table. Limits are not sharply defined, and certain parts overlap. You should decide for yourself in which part you have or have had your trouble (if any).

To be answered by everyone	To be answered by those who have had trouble	
Have you at any time during the last 12 months had trouble (ache, pain, discomfort, numbness) in:	Have you at any time during the last 12 months been prevented from doing your normal work (at home or away from home) because of the trouble?	Have you had trouble at any time during the last 7 days?
Neck	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes
Shoulders	<input type="checkbox"/> No <input type="checkbox"/> Yes, right shoulder <input type="checkbox"/> Yes, left shoulder <input type="checkbox"/> Yes, both shoulders	<input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes
Elbows	<input type="checkbox"/> No <input type="checkbox"/> Yes, right elbow <input type="checkbox"/> Yes, left elbow <input type="checkbox"/> Yes, both elbows	<input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes
Wrists/Hands	<input type="checkbox"/> No <input type="checkbox"/> Yes, right wrist/hand <input type="checkbox"/> Yes, left wrist/hand <input type="checkbox"/> Yes, both wrists/hands	<input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes
Upper Back	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes
Lower Back (small of back)	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes
One or Both Hips/Thighs	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes
One or Both Knees	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes
One or Both Ankles/Feet	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes

ERGONOMICS REBA Employee Assessment Worksheet

A. Neck, Trunk and Leg Analysis

Step 1: Locate Neck Posture: Neck Score: 1-5

Step 2: Locate Trunk Posture: Trunk Score: 1-5

Step 3: Leg Posture: Leg Score: 1-5

B. Arm and Wrist Analysis

Step 4: Locate Upper Arm Posture: Upper Arm Score: 1-5

Step 5: Locate Lower Arm Posture: Lower Arm Score: 1-5

Step 6: Locate Wrist Posture: Wrist Score: 1-5

Step 7: Add Force/Load Score: Force/Load Score: 1-5

Step 8: Score A, Find Box in Table C: Find Box in Table C

Step 9: Add Coupling Score: Coupling Score: 1-5

Step 10: Look-up Posture Score in Table B: Posture Score B

Step 11: Add Coupling Score: Posture Score B

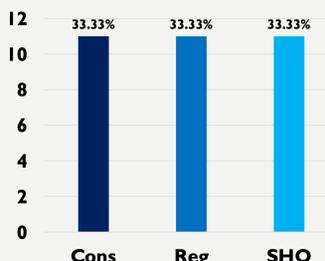
Step 12: Score B, Find Column in Table C: Score B

Step 13: Activity Score: Activity Score

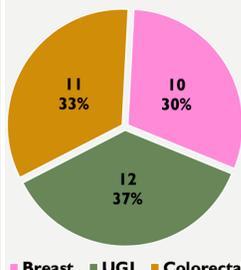
Step 14: Final REBA Score: REBA Score

Results

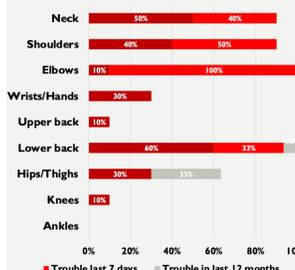
Grade



Subspecialty



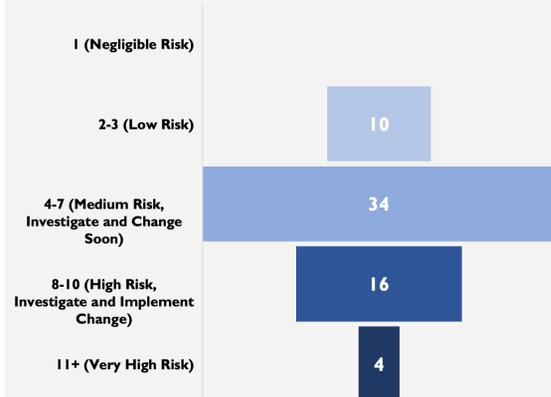
Anatomical Distribution of MSK Issues



Formal training/education on surgical ergonomics?



Overall REBA Assessment Scores



Risk Factors	Relative Risk (95% CI)	p-value
Open Surgery	5 (1.648 – 15.175)	0.004
Pre-Existing MSK Issue	1.56 (0.532 – 4.573)	0.452
Primary Surgeon	2.05 (0.668 – 6.345)	0.210
Assistant Surgeon	0.49 (0.158 – 1.497)	1.27
Height difference > 10cm	0.46 (0.084 – 2.55)	1.37

Conclusion

Open surgery appears to be a statistically significant risk factor for poor surgical ergonomics. There remains an important need for formal education on surgical ergonomics, surgeons are actively encouraged to perform regular stretches in between cases and ask for assistance from colleagues for height adjustments as necessary. We aim to reassess for progression once an educational intervention is completed.