The Physical Cost of Being a Vascular Surgeon

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• Nothing to disclose
The Physical Cost of Being a Surgeon

• The Health Care Industry has more work related injuries than manufacturing, construction and transportation combined.

• But, what about the surgeons?
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• 40-80% of surgeons suffer work ergonomic related pain issues during their career
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- In a meta analysis of surgeons and interventionalists over a 12 month period the prevalence of
  - Neck pain 60%
  - Arm/should pain 52%
  - Back pain 49%
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- Reduced sleep increases workplace physical issues
- Over 60% of surgeons report less than 6 hours of sleep per night on average
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- Majority of Surgeons with musculoskeletal discomfort report that the pain negatively impacts their operating room performance with a significant reduction in their caseload or case selection.
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Vascular Surgeon Survey Results

- 6.1% stopped operating due to pain
- 53.6% felt that current physical discomfort may influence their ability to perform future procedures
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- Real time measurement of ergonomic issues in vascular surgeons

IMU → Inertial Measurements Units
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Real time measurements

• Average case → 233 minutes
• 83% of surgeons rated the operation as physically demanding
Personalized ERRGO Report
Ergonomic Risk and Real-time Guidance Outerwear

Name: S003 Task/Procedure: Fem-tib bypass
Date: 8/15/17 Time of collection: 8:50-14:55 MT

Neck Posture Risk

Trunk Posture Risk

Shoulder Elevation Risk

Right

Left

High 4 3%
Mild1 12%
Mod 2 22%
High 3 63%

High 4 0%
Mild1 35%
Mod 2 34%

High 4 12%
Mild1 .46%
Mod 2 42%
High 3 2%
Mild1 61%

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Neck in high or severe stressed positions

Over All  No Lead  Lead

Lead vs No Lead  p<0.01
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Cervical Risk

• Surgeons unconsciously drift their head forward
• This increases the movement arm on the neck
• Every inch forward increases the stress on the midcervical neck by 10lbs
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Cervical Risk

• Head lights increase the load and increase poor cervical posture

• Loops “pull” the neck forward… exacerbating poor posture
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Back in High or Severe Stressed Positions

- Over All
- No Lead
- Lead

\[ p = \text{NS} \]
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- Endovascular Procedures
  - Lead and the weight of the lead
  - Radiation
  - Monitor visualization
    - Increase eye and mental stress to 2D→3D
    - Improper monitor placement (10-20° below eye level)
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- More satisfaction with work $\Leftrightarrow$ Less pain
- Increased physical pain is correlated with burnout
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- Ergonomic and musculoskeletal issues in vascular surgeons are real
- Operating room modification, good ergonomic choice, and education can reduce some of these risks
Questions & Discussion
Personalized ERRGO Report
Ergonomic Risk and Real-time Guidance Outerwear
Name: S003  Task/Procedure: Fem-Lib bypass
Date: 6/15/17  Time of collection: 8:50-14:55 MT

Neck Posture Risk
- High 4: 3%
- High 3: 63%
- Mild 1: 12%
- Mod 2: 22%

Trunk Posture Risk
- High 4: 0%
- High 3: 31%
- Mild 1: 35%
- Mod 2: 34%

Shoulder Elevation Risk
- Right
  - High 4: 40%
  - High 3: 2%
  - Mod 3: 8%
  - Mild 1: 61%
- Left
  - High 4: 6%
  - High 3: 2%
  - Mod 3: 57%
  - Mild 1: 61%

Body Segment/Joint Posture Time Series Data

- Neck Posture

- Trunk Posture

- Right Arm Posture

- Left Arm Posture
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- Numerous studies have demonstrated
  - 60-90% of surgeons suffer pain or stiffness in neck, back, or shoulder during their career.
  - Urologic surgeons, the severity of the pain is related to volume and case load.