

# The Long Haul – Ergonomics and Safety for your Career

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Program Director Vascular Fellowship

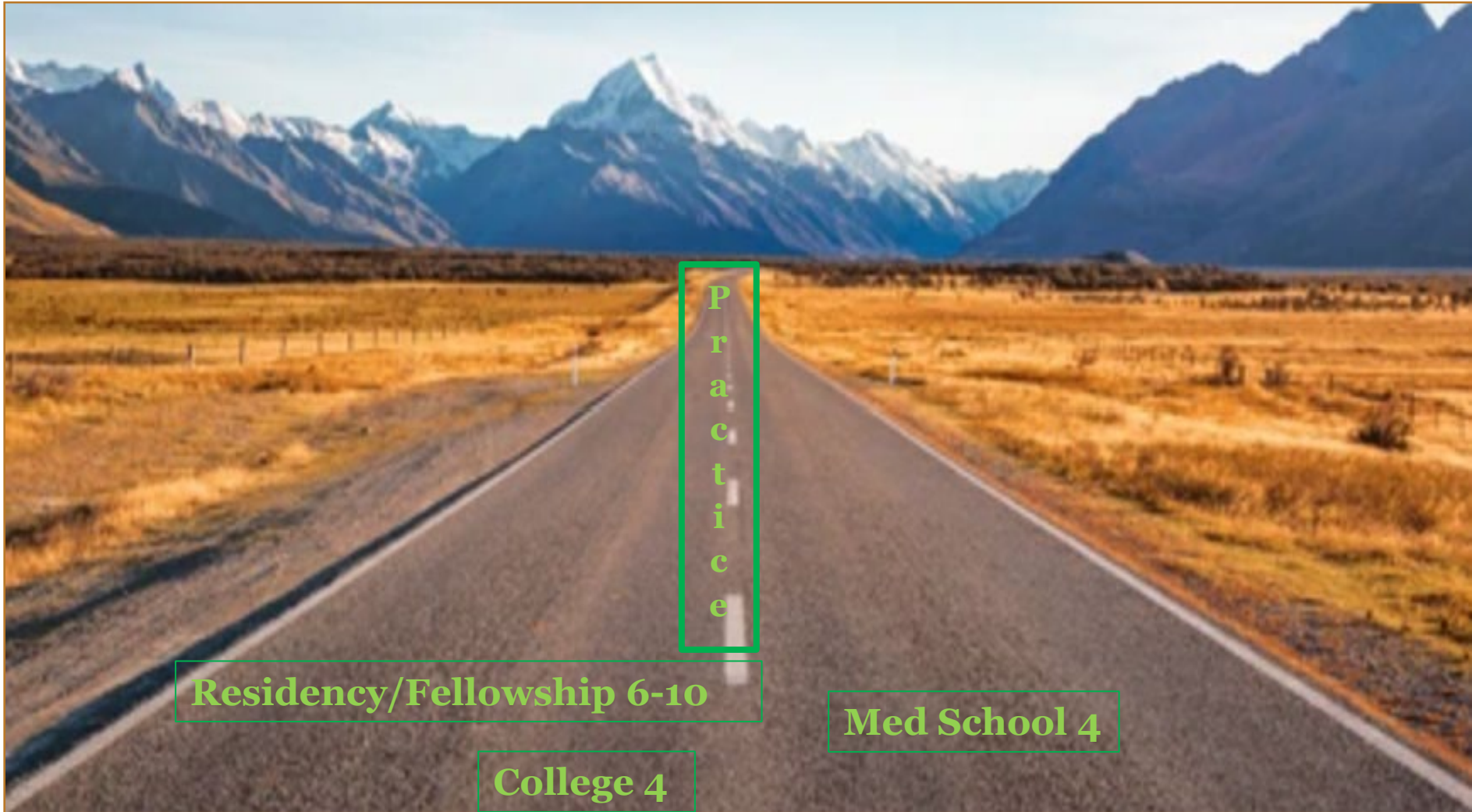


I have no disclosures –

other than I've been doing this for 32 years

# Definition: Long Haul

to be involved or willing to be involved in an activity or situation for a long time rather than just a few days, weeks, etc.:



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Residency/Fellowship 6-10

Med School 4

College 4

# Outline

Discuss ergonomics, work related musculoskeletal disorders, and cumulative traumatic disorders

Review the literature and recommendations on surgical ergonomics

Ways to protect yourself

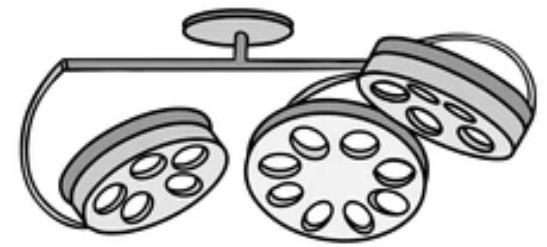
# Why I chose this topic

Remember your mother would say: “Stand up or sit up straight?” She was RIGHT!

“Ask for the table to be adjusted”

“Move the screen”

“Adjust the lights”



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# What is Ergonomics?

- The word **ergonomics** stems from the two Greek words “ergon” meaning to work and “nomos” meaning natural laws or arrangements
  - It is the study of people at work and how the working environment is designed to suit the worker*
- Integrating ergonomics into surgery can be challenging as multiple factors cannot be manipulated
  - These include the patients body habitus or the necessity to remain within the constraints of a sterile surgical field*
- Problem in Surgery:
  - Adapting workers to the environment instead of adapting environment to the workers*
  - “Part of the Job”/ Resistance to change*

# As a Program Director

## Unmet need for education

- Survey of ACGME-certified program directors (PDs)
  - 14 surgical and interventional medical specialties
  - Completed questionnaires from 130 of 441 (29.5%) PDs
- Formal Surgical Ergonomics Education was rare - only 1.5%

MIND THE GAP

Epstein S et al. Ann Surg 2019



Copyright: Society of Surgical Ergonomics

## What about trainees? General Surgery

**TABLE 3.** Prevalence and distribution of musculoskeletal symptoms

Symptom	N	Percentage (%)
Pain	17	85
Stiffness	16	80
Numbness	7	35
Weakness	4	20
Affected body part		
Neck	16	80
Shoulders	14	70
Low back	10	50
Limbs	8	40
Chest	1	5
Symptom onset		
PGY 1	11	55
PGY 2	6	30
PGY 3	3	15

Jensen et al. JSE 2020

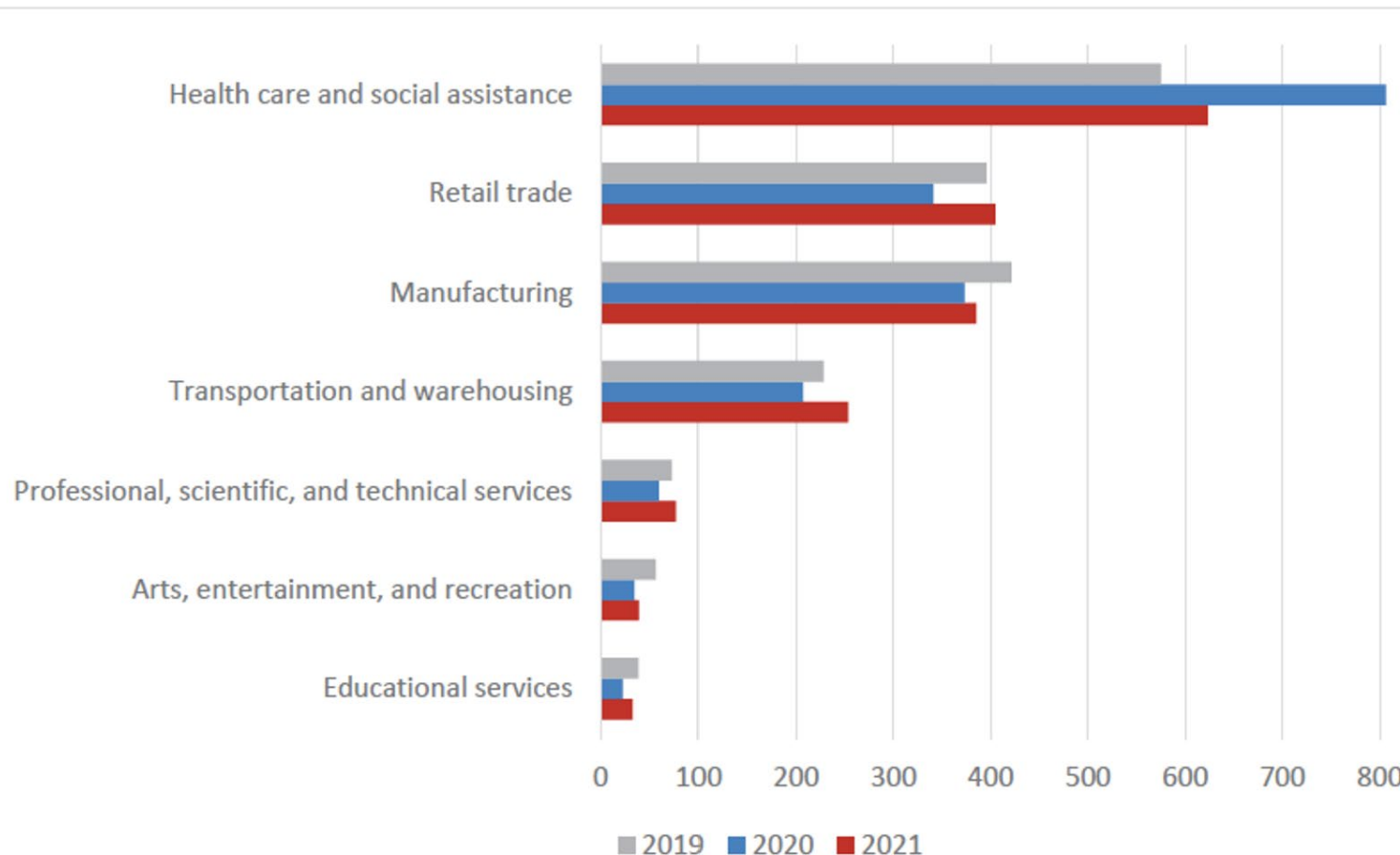
# Work Related Musculoskeletal Disorders (WRMSD)

Private industry employers reported 2.6 million nonfatal workplace injuries and illnesses in 2021

Reportedly costs the US \$20 billion annually in the US

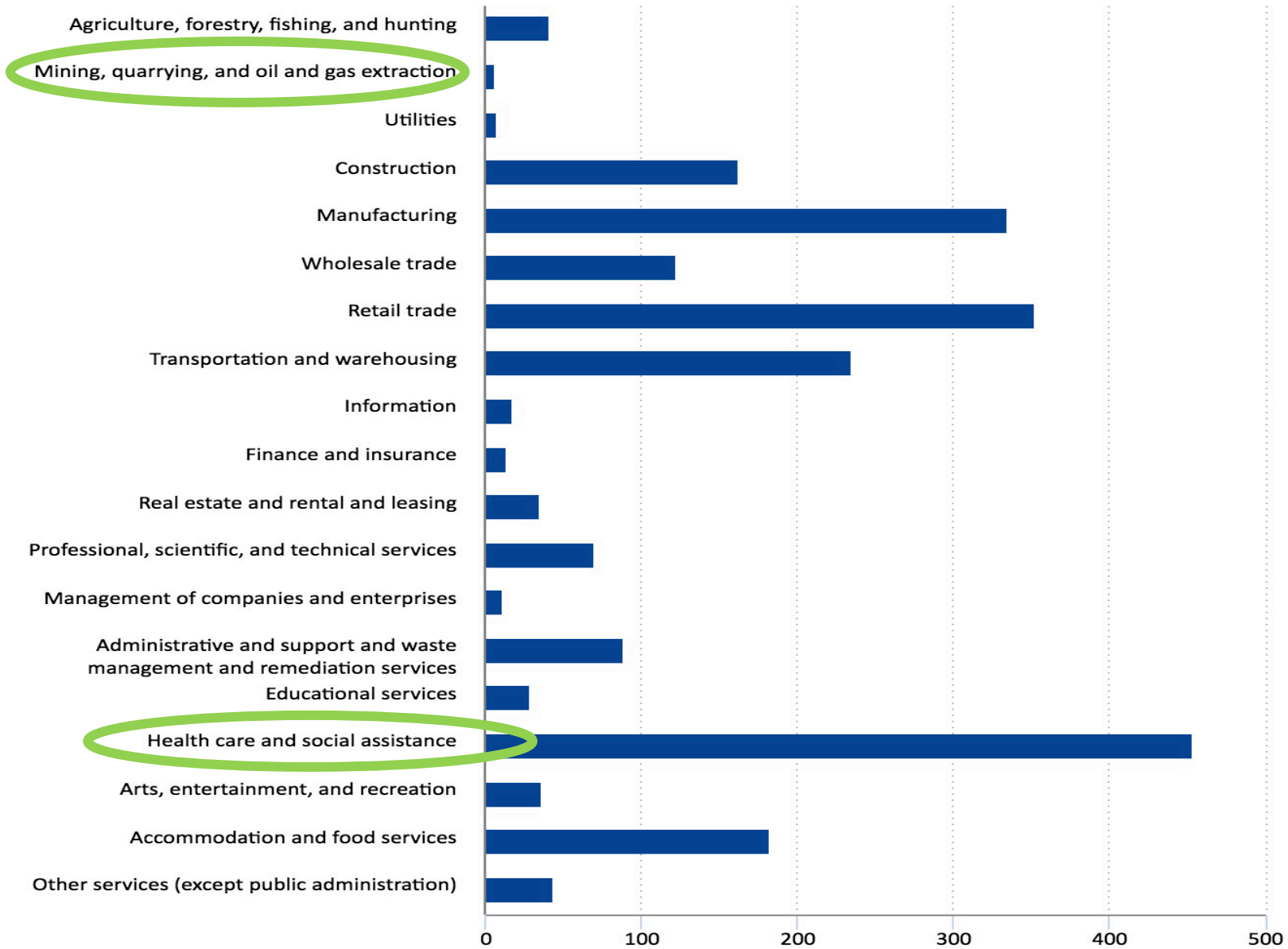
Examples: carpal tunnel, tendonitis, neck tension etc.

Chart 3. Total injuries and illnesses in selected industry sectors, thousands, private industry, 2019-21



# Number and rate of nonfatal work injuries in private industries, 2021

■ Number of injury cases (in thousands) ■ Rate of injury cases (per 100 full-time workers)



Source: U.S. Bureau of Labor Statistics.



# Cumulative Traumatic Disorder (CTD)

WRMSD, when accumulated over and over again, lead to concept of Cumulative Traumatic Disorder (CTD)

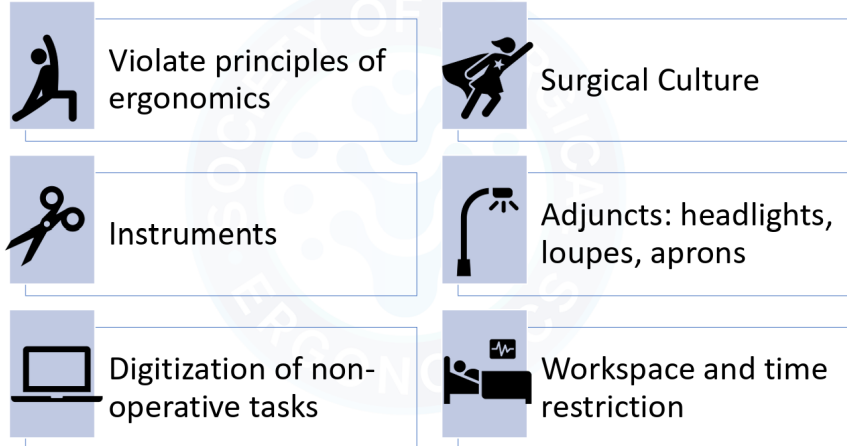
CTD defined as excessive wear & tear on tendons, muscles, and nerves by continuous use over an extended period of time

Due to improper work positioning, repetition, and force

CTD results in:

- Missed work*
- Reduced case volumes*
- Practice modifications*
- Forced retirement*

## Causes for high rates of WRMSD in surgeons

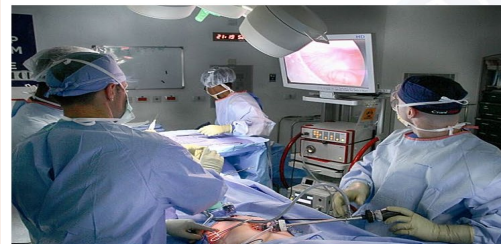


**WRMSD = Work-related MSK disorders**

Copyright: Society of Surgical Ergonomics

## Highest risk

Minimally invasive/endoscopic surgery



Women surgeons



- Stucky CCH et al. Ann Surg Med 2018
- Sutton E et al. Surgical Endoscopy 2014

Copyright: Society of Surgical Ergonomics



Contents lists available at ScienceDirect

# Annals of Medicine and Surgery

journal homepage: [www.elsevier.com/locate/amsu](http://www.elsevier.com/locate/amsu)



Review

## Surgeon symptoms, strain, and selections: Systematic review and meta-analysis of surgical ergonomics

Chee-Chee H. Stucky<sup>a,\*</sup>, Kate D. Cromwell<sup>a</sup>, Rachel K. Voss<sup>a,1</sup>, Yi-Ju Chiang<sup>a</sup>, Karin Woodman<sup>b</sup>, Jeffrey E. Lee<sup>a</sup>, Janice N. Cormier<sup>a</sup>

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# 2018

Reviewed over **40 articles**/surveys comprising over **5000 surgeons**

68% of surgeons reported generalized pain

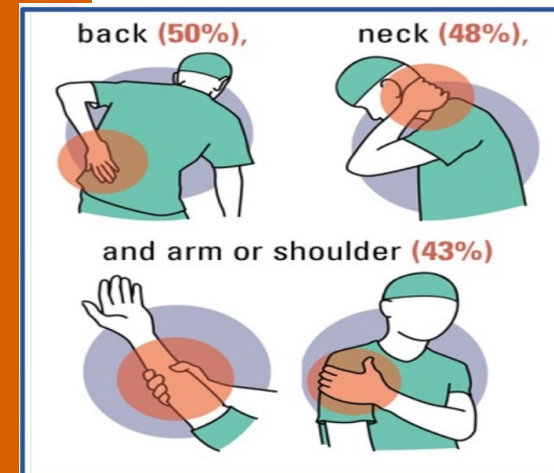
71% experienced fatigue

37% attributed numbness to operating

PAIN according to surgical approach MIS/Lap vs Open:

**69%** of MIS    **60%** Open

**30 % of surgeons sought treatment for their symptoms**



# Prevalence of Work-Related Musculoskeletal Disorders Among Surgeons and Interventionalists A Systematic Review and Meta-analysis

Sherise Epstein, MPH; Emily H. Sparer, ScD; Bao N. Tran, MD; Qing Z. Ruan, MD; Jack T. Dennerlein, PhD;  
Dhruv Singhal, MD; Bernard T. Lee, MD, MPH, MBA

2018

## ➤ Review 126 articles (1974-2016)

Determine the prevalence & disability burden of work related MSDs and if any interventions were being done to reduce them.

Meta-Analysis included 21 articles that encompassed **5828** physicians

Prevalence:

neck pain 65%

shoulder pain 52%

back pain 59%

upper extremity pain 39%

- Overall, **12%** of physicians required a leave of absence, practice restriction or modification, or early retirement due to work related MSDs
- Several studies state that surgeons and interventionalists lack awareness of applied ergonomics recommendations.

# The risk of ergonomic injury across surgical specialties

Ksenia A. Aaron<sup>1</sup>, John Vaughan<sup>2</sup>, Raghav Gupta<sup>3</sup>, Noor-E-Seher Ali<sup>1</sup>, Alicia H. Beth<sup>2</sup>, Justin M. Moore<sup>4</sup>, Yifei Ma<sup>1</sup>, Iram Ahmad<sup>1</sup>, Robert K. Jackler<sup>1</sup>, Yona Vaisbuch<sup>1\*</sup>

1 Department of Otolaryngology–Head and Neck Surgery; Division of Otolaryngology/Neurotology Lateral Skull Base Surgery, Stanford University School of Medicine, Stanford, California, United States of America, 2 Environmental Health & Safety Department, Stanford Health Care and Stanford University School of Medicine, Stanford, California, United States of America, 3 Rutgers New Jersey Medical School, Newark, New Jersey, United States of America, 4 Department of Neurosurgery, Boston Medical Center, Boston University, Boston, Massachusetts, United States of America

2021

Prospective observational study  
surgeons multispecialty tertiary hospital N=167

SUBJECTIVE (survey of 14 ?)  
OBJECTIVE (REBA)

**A**

**Tap Neck position**

Neck is twisted?  No  Yes  
Neck is side bending?  No  Yes

**NECK SCORE 2**

**Tap Trunk position**

Trunk is twisted?  No  Yes  
Trunk is side bending?  No  Yes

**TRUNK SCORE 3**

**Tap Legs position:**  +1  +2  
**Tap Adjust:** 30-60° add +1  >60° add +2

**LEG SCORE 1**

**Select load / force score**

Load < 11 lbs  Load 11-22 lbs  Load > 22 lbs

Shock or rapid build up of force?  No  Yes

**TABLE A SCORE IS 4**

**B**

**Locate upper arm position:**

Shoulder is raised?  No  Yes  
Upper arm is abducted?  No  Yes  
Arm is supported or person is leaning?  No  Yes

**UPPER ARM SCORE 3**

**Locate lower arm position:**

**LOWER ARM SCORE 2**

**Locate wrist position**

Wrist is bent from midline or twisted?  No  Yes

**WRIST SCORE 1**

**Select coupling score: ?**

Good  Fair  Poor  Improper

**TABLE B SCORE IS 4**

**C**

**TABLE C SCORE IS:**

**4**

**ACTIVITY SCORE:**

1 or more body parts are held for longer than 1 minute (static)?  No  Yes  
Repeated small range actions (more than 4 times per minute)?  No  Yes  
Action causes rapid large range changes in postures or unstable base?  No  Yes

**D**

**REBA SCORE**

**6**

**REBA DECISION**

**Risk Level**

Medium

**Action**

Further investigation, change soor

# Subjective Ergonomic Hazard Assessment

**70 %:** significant discomfort  
*Cervical and lumbar*

**50 %:** pain at least once a week

**60 %:** pain impacted their life  
outside of work

**88%:** had pain within 5 years of  
surgical training

Consistent with previous studies: surgeons have  
little knowledge of ergonomics (29%)

Standing was the most common position leading  
to back pain

Encourages forward neck flexion

Early Career Surgeons had significantly higher  
MSK complaints when compared to their senior  
colleagues

# Objective Ergonomic Hazard Assessment

Table 4. Intraoperative objective REBA observation scores across subspecialties.

Surgical Specialty	N	Min	Max	Mean (± S.D.)
Cardiac	6	6	8	7.0 (± 0.9)
General	9	3	8	7.0 (± 1.7)
Interventional Rad.	4	4	5	4.8 (± 1.3)
<u>Neurosurgery</u>	7	6	10	8.6 (± 1.3)
OB/Gyn	5	4	7	5.6 (± 1.1)
<u>Ophthalmology</u>	5	0	0	0.0 (± 0.0)
Orthopedics	6	7	9	7.8 (± 0.8)
Otolaryngology	38	1	9	5.4 (± 2.1)
Plastics	5	7	9	7.4 (± 0.9)
Vascular	5	6	8	6.8 (± 0.8)

LOW Risk 3 or less MODERATE 4-7 HIGH 8-10

Mean REBA score for each specialty 0 – 8.6

Average REBA score across ALL specialties was **6.65**

## Intraprocedural ergonomics of vascular surgeons

Victor J. Davila, MD,<sup>a</sup> Andrew J. Meltzer, MD, MBA,<sup>a</sup> Emma Fortune, PhD,<sup>b</sup> Melissa M. B. Morrow, PhD,<sup>b,c</sup>  
Bethany R. Lowndes, PhD,<sup>b,d</sup> Anna R. Linden,<sup>c</sup> M. Susan Hallbeck, PhD,<sup>b,c,e</sup> and [Samuel R. Money, MD, MBA,<sup>a</sup>](#)  
*Phoenix, Ariz; Rochester, Minn; and Omaha, Neb*

observational study wore sensors 16 VS

### OPEN:

Worse ergonomics & more pain;  
more physical demanding

### Loupes / Headlights :

worse ergonomics increased back pain &  
physical demand

### Lead aprons :

didn't affect ergonomics

**Conclusions:** Vascular surgeons should be aware of EPR during the performance of their duties. Procedure type and surgical adjuncts can alter EPR significantly. (*J Vasc Surg* 2021;73:301-8.)

**Keywords:** Ergonomics; Posture; Vascular surgeon

# Musculoskeletal Disorders in Surgeons: A Systematic Review on Prevalence, Risk Factors, and Mitigation Strategies

Austin Stewart, BS<sup>1</sup>, Kristen Brown, BS<sup>1</sup>, Kristina Booth, MD<sup>2</sup>, and Dee H. Wu, PhD

The American Surgeon™

2026, Vol. 0(0) 1-15

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- Lifetime MSD prevalence exceeds 70% ( 68-97%)
- Concentration neck, shoulders and lower back
- Risk is multifactorial, cumulative, workload/procedural dependent
- Persists despite minimally invasive and robotic
- Problem with training, workflow, device design and culture
- Propose a teachable framework MSK
  - Mindful Preparation
  - Sustain & Scan
  - Kinetic Recovery

# WRMSD for Surgery

- Ergonomics rarely emphasized despite the physical demands, prolonged static posture, repetitive motion and sustained procedural intensity
- By 2036, the AMA projects that Surgeons will comprise 75% of the 86,000-physician shortage of ( 65,000)
- Maintaining the current surgeon to population ratios would require training more than 100K additional surgeons by 2030 with a cost of \$37B
- Nearly half of practicing surgeons are over 55 with 1/4 of surgeons anticipating leaving practice within 2 years.
- With WRMSD affecting over 70% of surgeons, this leads to 10-30% restricted practice or early retirement

# Surgical Ergonomics of Body Position

Excessive forward head position

## Shoulders:

Relaxed with upper arm adducted to body

## Upper arm:

Perpendicular to floor

## Elbows:

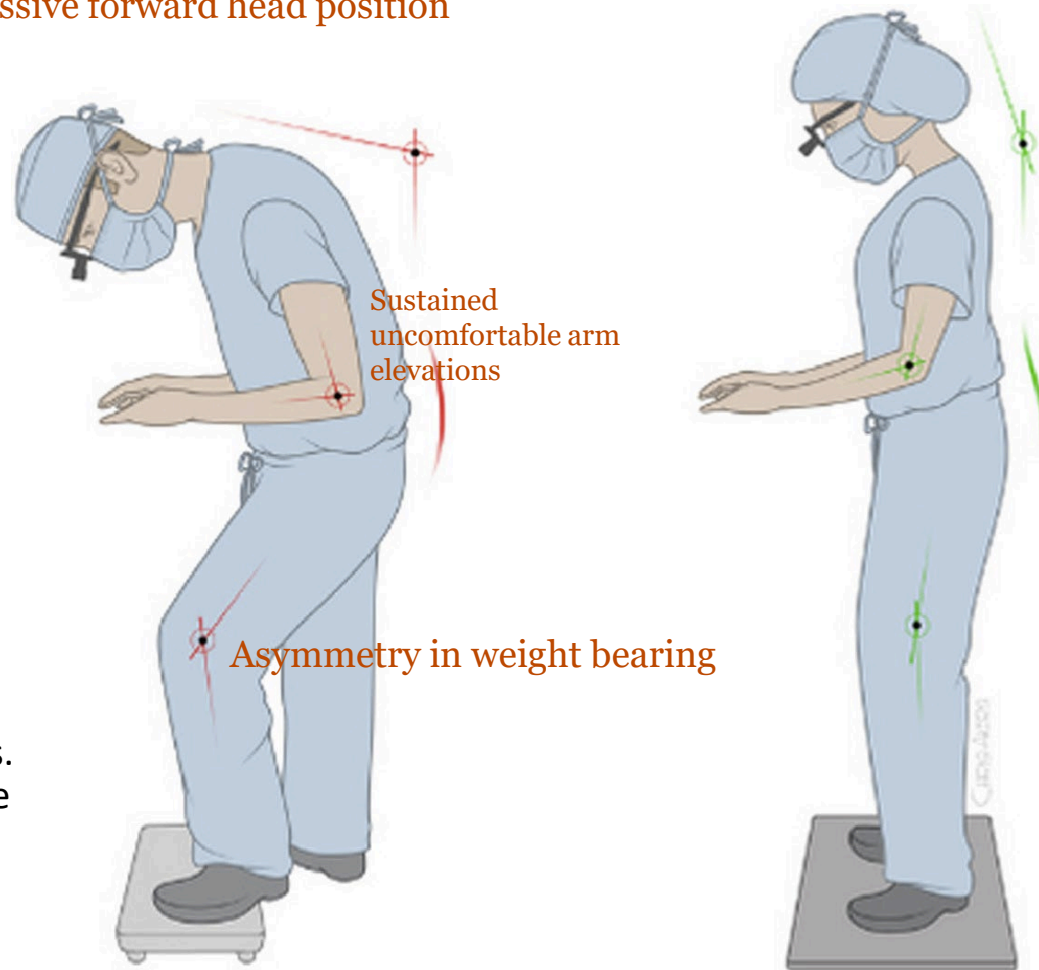
Held between 90-120 degrees of flexion

## Neck:

Flexed between 10-30 degrees. Limit axial rotation < 15 degree

## Legs:

do not lock knees. Assist posture with core muscles



# Head Position

Lenses increase surgical leading by 40%



## Why Orascoptic?

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You can trust our advertised magnification. It's verified. We welcome comparisons. We also build in your prescription for free. That's right — the lenses *and* the magnifiers.

**And last, but certainly not least: we back up our product.**

### STUDENT PEACE OF MIND BENEFITS

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- **INTEREST-FREE** payment plans
- **FREE** accessories
- **One FREE** cleaning & refurbishment
- **45-DAY** trial period
- **UNLIMITED** free Rx changes
- **UNLIMITED** free working distance adjustments
- **UNLIMITED** free repairs
- **FULL PROTECTION** against shipping damage
- **COVERAGE** for normal wear & tear damage



## HDL™ Ergo 3.5x

By using refractive prisms to allow clinicians to sit up straight and reduce neck tilt, the HDL™ Ergo loupe is an ergonomic option that delivers all-day comfort.

# Support Systems

The Fatigue and Pain Reduction

## Exoskeleton

Used By **Surgeons**  
and **Doctors**



- Provides postural support and passively creates postural awareness
- Lightweight and non-obtrusive
- Integrates seamlessly into your workflow



### The NeKSpine™ Advantage

- NeKSpine™ utilizes a lightweight vest, tuned carbon fiber support beam and tailored head frame designed to offload the stress and prevent "overuse" of the cervical spine region.
- Provides support in the lumbar, thoracic and cervical regions
  - Rigid head frame efficiently and ergonomically facilitates the transfer of load
  - MR Compatible
  - Customizable fit and tension setting



DM Quora Wear & Cool LED Head Lamps available

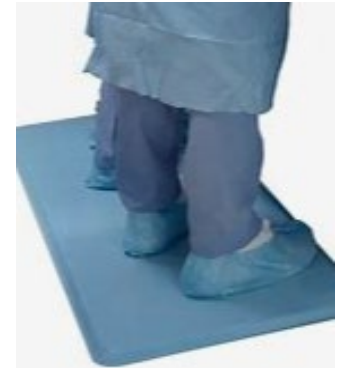


Lightweight & fully adjustable

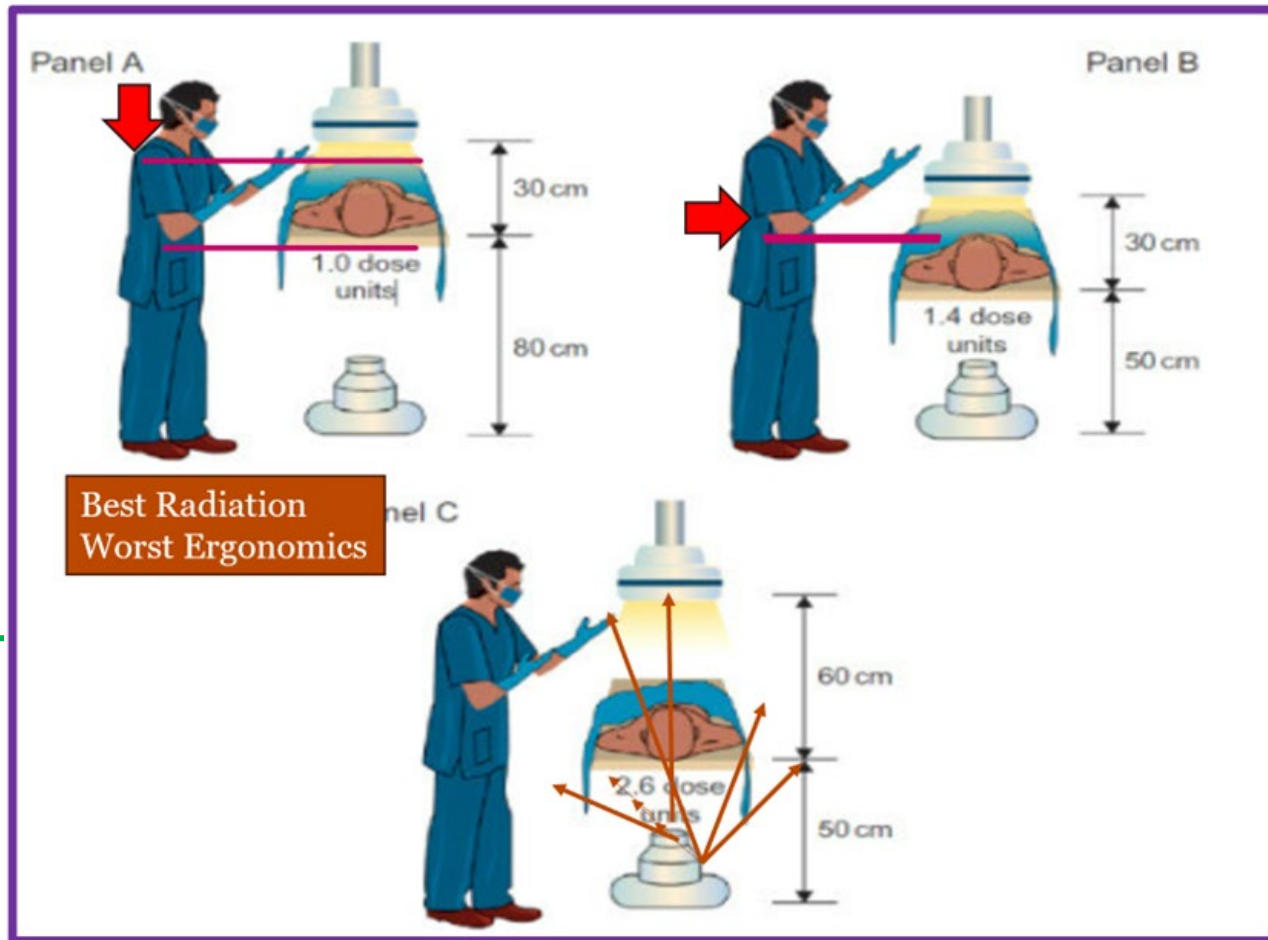
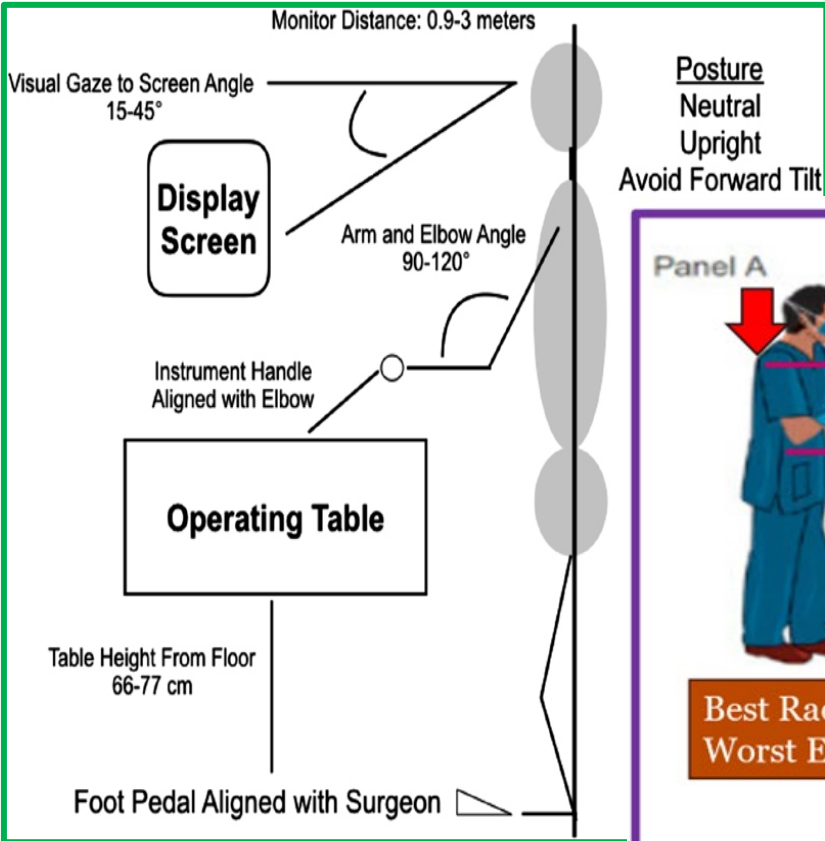


Fits under radiation vests and surgical gowns

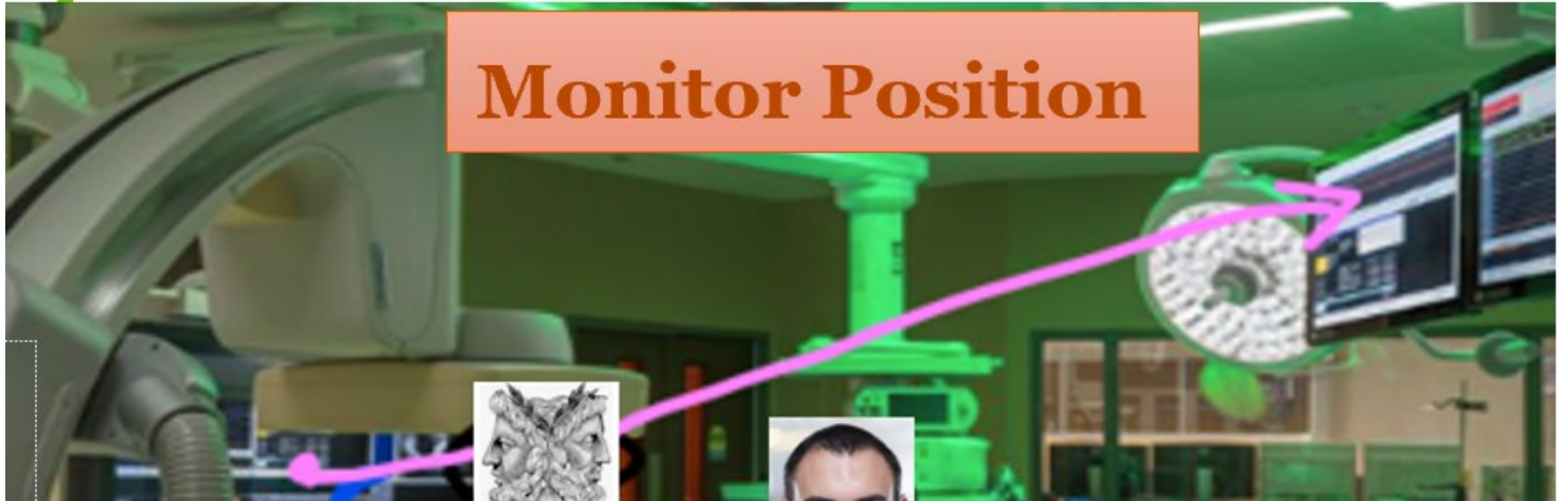
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# Endovascular Ergonomics



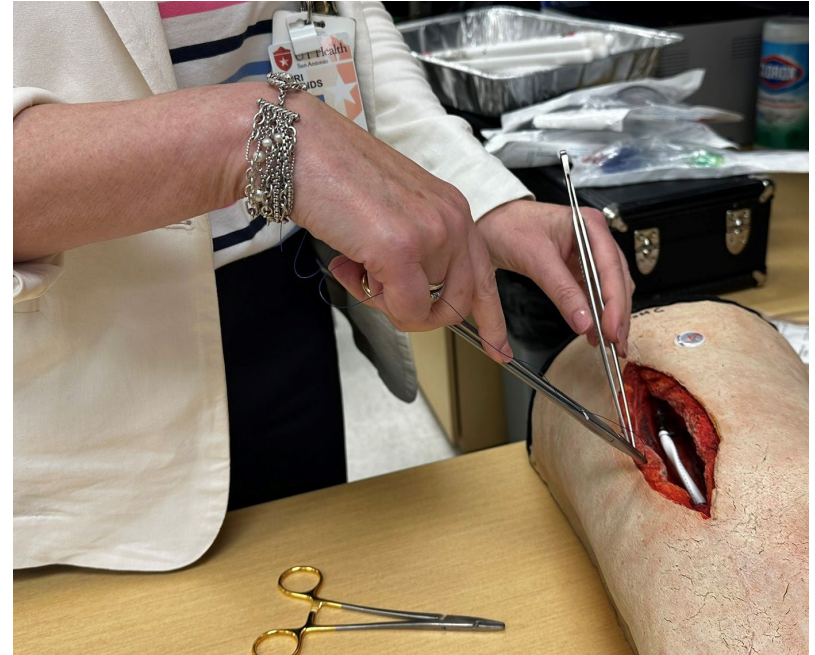
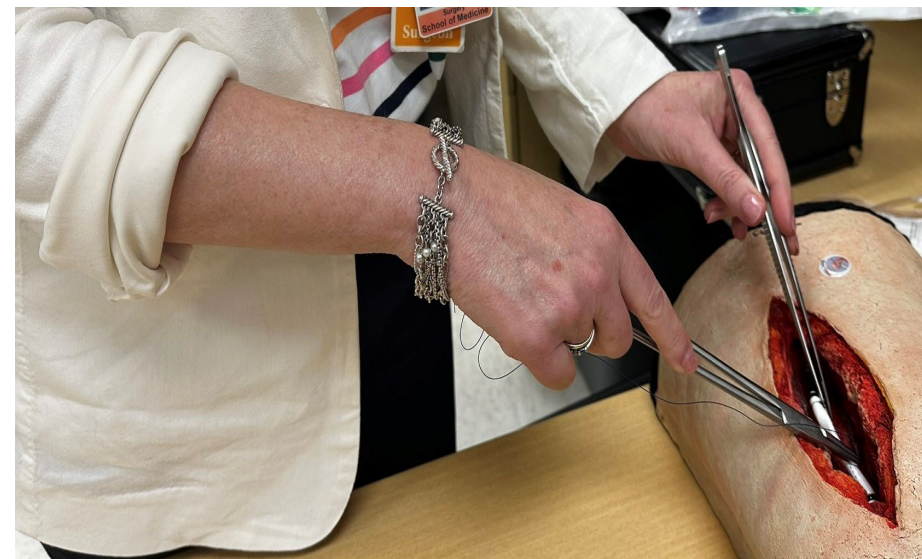
## Monitor Position



# Instrument Choice - Length

Deep Space 8 inch driver

Superficial Closure 8 inch driver



# Instrument Choice - Length

Superficial Closure 6-inch driver



# Ergo or RVU?

## **Tips to Improve Ergonomics and Prevent Injury**

- Stagger OR schedule; limit back-to-back days.
- Limit OR time to 10 hours per day.
- Be mindful of OR table position—arm angle should be 90 degrees.
- Plan your instruments wisely.
- Be mindful of how you stand—unlock knees, engage your core.
- Take microbreaks every 20 to 40 minutes.

# Surgical Ergonomics Recommendations



## Between Cases Exercises for the Neck and Shoulder

### 1. Cervical and Shoulder Stretching

a. Upper Trapezius: Gently bring your ear to your shoulder with your hand while placing your opposite hand behind your back. Hold this position for 30 seconds. Repeat two times on each side (see Figure A-4).



Figure A-4. Upper Trapezius Stretching

b. Levator Scapulae: Gently look at your armpit while placing your hand on your head for slight overpressure. Place your opposite hand behind your back. Hold this position for 30 seconds. Repeat 2 times on each side (see Figure A-5).



Figure A-5. Levator Scapulae Stretching

c. Pectoralis: Place your forearm against the corner of a wall and step forward with the ipsilateral foot. While looking ahead, gently bend the forward knee; the contralateral leg remains straight. Do not hyperextend your lumbar spine. You should feel a stretch in the pectoralis/anterior chest wall. Hold this position for 30 seconds. Repeat 2 times on each side (see Figure A-6).



Figure A-6. Pectoralis Stretching

### 1. Lumbrical stretching:

Hold each position A, B, C, and D for 10 seconds alternating with position Z with all digits extended and the wrist in neutral for 5 seconds. Repeat 5-10 times (see Figure A-9).

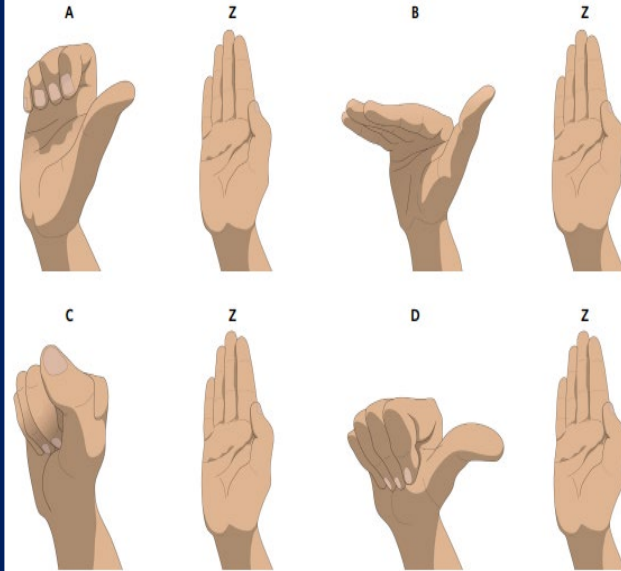


Figure A-9. Lumbrical stretching

## Appendix 1.

### Pre- and Postcase Stretching and Stabilization Exercises

#### Intraoperative Exercises for the Neck

##### 1. Range of Movement (ROM)

Cervical: Move your neck in each direction 10 times every 20-40 minutes or when experiencing stiffness in the neck (see Figure A-1).

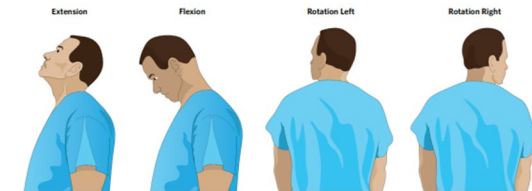


Figure A-1. Cervical ROM Exercise

##### 2. Exercise/Stabilization for the Neck and Shoulder

a. Deep cervical flexor training (nod head up and down as if indicating "yes"): Hold (or imagine holding if scrubbed) your closed fist between your chin and chest and flex your neck for 10 seconds. You should feel the front neck muscles engage. Repeat 10 times throughout the day. Do this exercise without an actual fist if scrubbed (see Figure A-2).

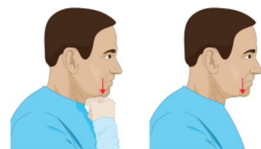


Figure A-2. Deep cervical flexor training

b. Standing Scapular Retraction: Pull shoulder blades down and towards the spine, pulling your upper trapezius down away from the ceiling. Hold for 5-10 seconds. Repeat 10 times (see Figure A-3).



Figure A-3. Standing Scapular Retraction

### 2. Improving Thoracic Mobility

a. Using a foam roller for thoracic/lumbar mobility: Place the foam roller perpendicular to your spine and slowly roll up and down on the foam roller using your feet to move you while arching backward to extend the spine. Be sure to support the neck. Perform for one to two minutes (see Figure A-7).



Figure A-7. Using a foam roller for thoracic/lumbar mobility

b. Using a foam roller for pectoralis stretching: Lie with the foam roller under your spine. Engage your core to maintain full spinal contact with the roller. Allow your arms to extend towards the floor, stretching your anterior chest wall. This position can be held for 30-60 seconds. Repeat 2 or 3 times (see Figure A-8).



Figure A-8. Using a foam roller for pectoralis stretching

### 2. Passive wrist extension with elbow straight:

With your arm flexed forward, your elbow extended, and your palm of the hand facing upward, gently pull back on your hand and fingers. Hold for 10 seconds. Repeat 5-10 times (see Figure A-10).



Figure A-10. Passive wrist extension with elbow straight

### 3. Median nerve mobilization:

With your elbow bent by your side and palm facing upward, pull back on your wrist and fingers. Hold for 10 seconds. Repeat 5-10 times (see Figure A-11).



Figure A-11. Median nerve mobilization








# Wall poster of OR-Stretch sequence



OR-Stretch

Center for the Science of Health Care Delivery

## OR-Stretch - Standing

<p>1</p>  <p>Stand tall. Inhale/ exhale.</p>	<p>2</p>  <p>Shrug shoulders, then back and down.</p>	<p>3</p>  <p>Push hands away following with shoulders. Pinch blades together as hands return.</p>	<p>4</p>  <p>Flip hands and repeat push away.</p>	<p>5</p>  <p>Face ceiling, inhale and exhale. Tuck chin to chest; inhale and exhale.</p>
<p>6</p>  <p>Right foot forward; turn head right. Follow with shoulders; side bend left.</p>	<p>7</p>  <p>Left foot forward; turn head left. Follow with shoulders; side bend right.</p>	<p>8</p>  <p>Clench gluteal muscles. Arch low back.</p>	<p>9</p>  <p>Clench gluteal muscles. Abdominal crunch.</p>	<p>10</p>  <p>Inhale/exhale.</p>

### OR-Stretch information

OR-Stretch web-app can be found at: [ORStretch.mayoclinic.org](http://ORStretch.mayoclinic.org).

Log in using the surgeon's email, no password needed

More detailed (and slower) instructions for the stretches can be found at: <https://youtube.com/In00TbNgplg>

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10/2019 (04/2019)

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Health  
nio



Cervical Rotation



Shoulder Shrugs



Scapular Retraction



Finger Flexion/Extension



Lumbar Extension & Spine Rotation



Alternating Stance/Weight-bearing

# The Banana



# Solutions: The MSK Way

## MSK: A Practical Ergonomic Framework

### M – Mindful Preparation (Before Surgery)

*Set your posture before you set your scalpel.*

- **Mentally prime:** Are your neck, shoulders, and core relaxed? Intend to stay aware of your posture, tension, and breath.
- **Map your environment:** Confirm foot pedal, correct instruments and sizes, exosupports, and light positioning
- **Monitor and table setup:** Align monitor upper edge at  $-15^\circ$  below eye level; elbows near  $90^\circ$ .
- **Mobilize:** Perform 1-2 minutes of stretching or deep cervical flexor activation.

### S – Sustain and Scan (During Surgery)

*Still but not static.*

- **Schedule microbreaks** every 20-30 minutes; even 20 seconds helps.
- **Scan your body:** Check for raised shoulders, forward head, or locked knees.
- **Stretch:** Gentle scapular retraction, neck rotation, or finger/lumbar extension.
- **Switch stance:** Alternate weight-bearing legs or reposition your feet.
- **Support:** Use armrests, anti-fatigue mats, exosupports, your support buddy to reduce static strain.

### K – Kinetic Recovery (After Surgery)

*Recalibrate before you chart.*

- **Keep moving:** Spend 1–2 minutes on post-case stretches (neck, scapula, pectoralis).
- **Kinetic reflection:** Note any muscle tension or numbness from the case.
- **Knowledge sharing:** Discuss ergonomic challenges with your “ergonomics buddy.”
- **Keep habits consistent:** Incorporate strengthening or mobility routines off-shift.

# The Microbreak App

## Intraoperative Microbreaks to Improve Surgeon Efficiency, Mental Focus, and Physical Well-Being



Multicenter Surgeon Champion Initiated Study Using the OR-STRETCH™ Application



**Multi-Institutional Surgeon Champions Across Disciplines with OR Staff Support**



Operations > 2 Hours  
Open and Minimally Invasive  
Standing or Seated

**Intraoperative Usage of Free OR-STRETCH™ Application with Microbreak Stretching Videos**



**Survey Data Collection**

- ✓ Improve Physical Discomfort
- ✓ Mental focus
- ✓ Successful surgical outcomes
- ✓ Minimal Distractions



↓ Barriers to Implementation  
↑ Organizational Buy-In  
↑ Surgical Ergonomics Knowledge  
↑ Surgeon Well-Being



*Society of Surgical Ergonomics & Mayo Clinic's OR-STRETCH™ Microbreaks*

# Disability Insurance – Own Occupation

Want an “Own – Occupation”  
Hard to get Specialty Specific  
Women cost more (pregnancy risk )  
Grab policy young and keep it



**Money Meets Medicine**  
Jimmy Turner  
★ 4.7 (209) · INVESTING · UPDATED WEEKLY

On Money Meets Medicine, Dr. Jimmy Turner discusses all things career and finance for physicians. With expert guest discussions, Jimmy tackles the personal finance topics you wish you had learn **MORE**

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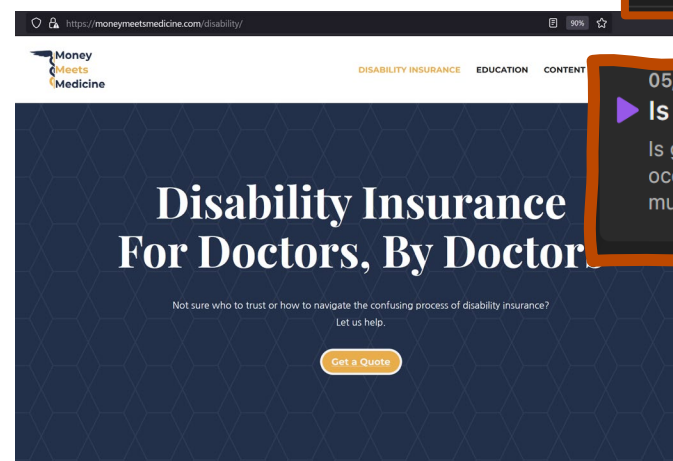
4 DAYS AGO  
**Is Buying Land a Good Investment?**  
In this episode of the Money Meets Medicine podcast, hosts Dr. Jimmy Turner and Justin Harvey explore the complexities of buying land as an investment. After discussing their personal holiday experiences, they dive into a listener's question about purchasing land for personal use and enjoyment versus financial gain. They highlight the importance of understanding the purpos...

JAN 15  
**Expert Witness Work as a Physician Side Gig**  
In this episode of the Money Meets Medicine podcast, host Dr. Jimmy Turner converses with Dr. Gretchen Green, a and expert witness educator, about lucrative non-clinical income opportunities through expert witness work. The di covers Dr. Green's journey, including her North Pole expedition and her experiences in medical malpractice cases.

JAN 8  
**Should You Loan Money to Friends/Family?**  
In this episode of the Money Meets Medicine podcast, hosts Dr. Jimmy Turner and Justin Harvey CFP discuss the c of loaning money to friends and family. Reflecting on their personal experiences, they emphasize the importance of relationships and setting clear boundaries. They discuss the emotional and financial impacts of giving or loaning mon

11/01/2023  
**Disability Insurance Mistakes with Mike Kittner**

The #1 financial task for a doctor is getting disability insurance. Why? Because you can know everything there is to know about investing or paying down debt, but if you don't have an income... neither of them matter. Looking for Disability Insurance from a source you can trust? Visit Money Meets Medicine Our guest on this show, Mike Kittner...



Money Meets Medicine

DISABILITY INSURANCE EDUCATION CONTENT

## Disability Insurance For Doctors, By Doctor

Not sure who to trust or how to navigate the confusing process of disability insurance? Let us help.

**Get a Quote**

05/29/2024  
**▶ Is Group Disability Insurance Enough?**

Is group disability offered by your employer enough (the answer is “no”)? Or do you need to supplement with an individual own-occupation disability insurance policy? In this episode, we discuss all things DI from portability, cost-of-living adjustments, how much disability insurance you need and more/ Need a student loan plan? Own-Occupation Disability Insurance? You can get...



# Radiation Safety – LIFETIME Dose

Wraparound Lead

Lead Glasses







Thyroid Shield

? Hat

ALARA

Safety Training 8 hours


## Radiation Protection Eyeglasses

<p><b>NIKE Brazen</b> Rc: 0 to +/4.50 SV   BF   PRO</p> <p>7NKRZ2-BLK Black (shown)</p>  <p>Flg. rubberized nose bridge</p>	<p><b>NIKE Mercurial 6.0</b> Rc: 0 to +/3.50 SV   BF</p> <p>7NMEC6.0 NAV Navy (shown) 7NMEC6.0 BLK Black 7NMEC6.0 GRF Gray</p> 	<p><b>NIKE Premier 6.0</b> Rc: 0 to +/3.50 SV   BF   S</p> <p>7NPRE6.0-BLK Black (shown)</p> 
<p><b>Bolle Heron</b> Rc: 0 to +/3.50 SV   BF</p> <p>7BOHER-DCGRY Dark Gray/Yellow Matte</p> 	<p><b>Bolle Keelback</b> Rc: 0 to +/3.50 SV   BF</p> <p>7BOKE-SBK Shiny Black (shown) 7BOKE-SBKBLU Shiny Black/Blue Translucent</p> 	<p><b>Bolle King Snake</b> Rc: 0 to +/3.50 SV   BF</p> <p>7BOKS-TOR Tortoise (shown) 7BOKS-SBK Shiny Black</p> 

### Caps

Minimize radiation exposure of the head and brain with effective, lightweight and ergonomic BLOXR® XPF® Attenuating Caps. Our caps provide the safe of 0.5mm lead equivalency against scatter radiation around the front and sides of the head. The cap is durable and machine washable.

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### BAT - Breast, Axilla and Thyroid Coverage

The BAT™ is designed to reduce the risk of breast cancer and associated cancers in healthcare professionals. It seamlessly existing gear and offers superior universal shielding for potent sleeves. This versatile accessory can be worn over or under a protection apron, enhancing safety and providing added assurance for community aprons in hospital settings. Featuring .35mm protection in the main body, sleeves, and breast plate, the BAT comprehensive coverage. An adjustable hook and loop closure custom fit, including sleeve adjustments, ensuring comfort and protection for every user.

The attached thyroid shield offers 0.5mm protection to safeguard thyroid tissue.

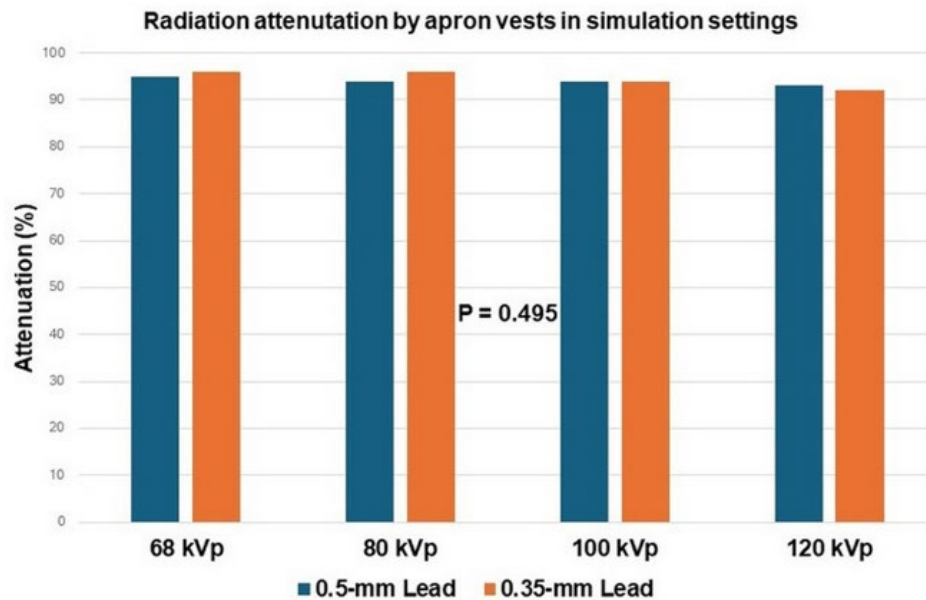
For the best fit and comfort when wearing the BAT over another recommend sizing up. For accurate sizing, please consult the located below the photo.



From the Society for Vascular Surgery

## 0.35-mm lead-equivalent aprons provide similar protection to interventionalists compared to 0.5-mm lead-equivalent aprons during fluoroscopically guided interventions

Antonio Solano, MD,<sup>a</sup> Alejandro Pizano, MD,<sup>b</sup> Bala Ramanan, MBBS, MS,<sup>a</sup> Michael C. Siah, MD,<sup>a</sup> Khalil Chamseddin, MD,<sup>a</sup> Gerardo Gonzalez-Guardiola, MD,<sup>a</sup> Vivek Prakash, MD,<sup>a</sup> Michael Shih, MD,<sup>a</sup> M. Shadman Baig, MD,<sup>a</sup> Carlos H. Timaran, MD,<sup>a</sup> Jeffrey Guild, PhD,<sup>c</sup> and Melissa L. Kirkwood, MD,<sup>a</sup> *Dallas, TX; and East Meadow, NY*



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Aprons | Other Wearables & Accessories | Barriers & Drapes | Pressure Management | Storage & Supplies

### Enhanced Full Overlap Vest (FVEST)



The Full Overlap Vest provides front and back protection with a low weight. Pair this vest with a kilt for better weight distribution. The 6" Stretch Belt is an option for extra support. The kilt shown in the image separately. Tether with ring is included unless otherwise specified in special instructions during checkout.

The back panel all features a standard protective layer of 0.25mm

#### Protective Material

- Lead - 0.5mm (Heavy)
- Lead - 0.35mm (Heavy)
- Xenolite 600-ETM - 0.5mm
- Xenolite 600-ETM - 0.35mm
- Xenolite 600-ETM - 0.25mm
- Xenolite 800 NL™ - 0.5mm
- Xenolite 800 NL™ - 0.35mm
- Xenolite 800 NL™ - 0.25mm

San Antonio

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# Conclusion

Poor ergonomics can lead to musculoskeletal issues and potentially a shortened career

Being aware of this issue and being cognizant of our posture in the OR is key

Take charge of the operating room and adjust the surroundings to YOU

Take short breaks during long cases

Help others



Thank you!