NEW YORK SOCIETY FOR GASTROENTEROLOGY & ENDOSCOPY
48th Annual
NEW YORK COURSE
December 12-13, 2024 • New York, NY

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New York Society for Gastroenterology and Endoscopy

Ergonomics in Endoscopy

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Disclosures

I currently have no relationship of any kind with any company whose products or services in any way relate to the practice of medicine, medical education, or research.

Today’s Agenda

- Define Ergonomics
- Risk Factors for Injury
- Endoscopic Precautions to Prevent Injuries
- Common Precautions to Prevent Injuries
- Benefits of Ergonomics

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- **Define Ergonomics**
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What is Ergonomics?

- The study of matching job requirements and environment to maximize efficiency, quality, and quantity of work while minimizing work-related musculoskeletal disorders
- Medical professionals suffer some of the highest work-related injury rates of all employees

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Endoscopic Related Injuries

- Musculoskeletal injuries caused by repetitive microtrauma to the connective tissues of the body
- Back, neck, and upper extremity injuries are the most common work-related musculoskeletal disorders
- Consequences can range from pain and physical restrictions to disability
- Results in provider dissatisfaction and loss of a highly skilled workforce

American Society for Gastrointestinal Endoscopy guideline on the role of ergonomics for prevention of endoscopy-related injury: summary and recommendations. Pawa, S. et al. GIE Journal, 2023.

Endoscopic Related Injuries

- 61% of gastroenterologists report spending more than 40% of time performing endoscopic procedures
- A prevalence of 39% to 89% reported endoscopy related injuries

American Society for Gastrointestinal Endoscopy guideline on the role of ergonomics for prevention of endoscopy-related injury: summary and recommendations. Pawa, S. et al. GIE Journal, 2023.

Economic Cost

- Private industry employees reported 2.8 million nonfatal workplace injuries compared to medical personnel with 3.8 million injuries
- Healthcare institutions estimate $20 billion in losses due to back injury alone

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Risk Factors in Endoscopy

- Higher procedure volume
- Time spent performing endoscopy
- Cumulative time in practice
- Small hand size
- Age
- Female gender

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Other Contributing Risk Factors

- Burnout
- Stress
- Patient depersonalization
- Lack of concentration

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Three Phases of Endoscopic Ergonomics

- Maximize the endoscopist and nursing team's well-being and eliminate injuries
- Organize into 3 phases:
  - Pre-Procedure
  - Intra-Procedure
  - Post-Procedure

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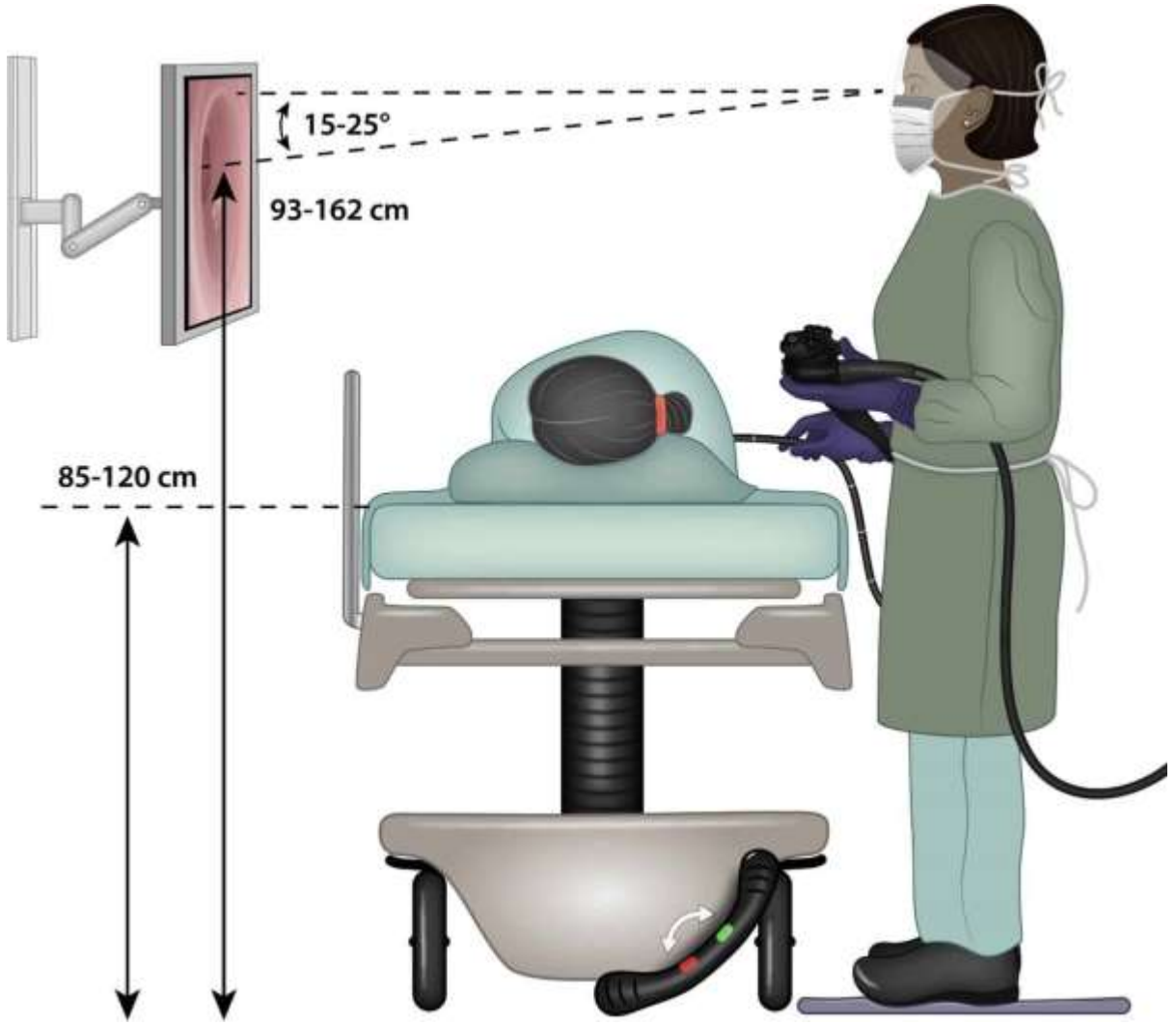
Pre-Procedure

- Take an “ergonomic time out” before each procedure
  - A microbreak to shake out your hands and roll your shoulders
  - Check your posture
  - Use a checklist
  - Make your breaks team-based

Pre-Procedure

- Focus on room set up
  - Ensure environment is optimized from the first case
  - Adjust height for comfort from the beginning
  - Minimize strain



"Integrating Ergonomics into Endoscopy Training: A Guide for Faculty and Fellows", Patel, S. Clinical Gastroenterology and Hepatology 2023;21:868–872

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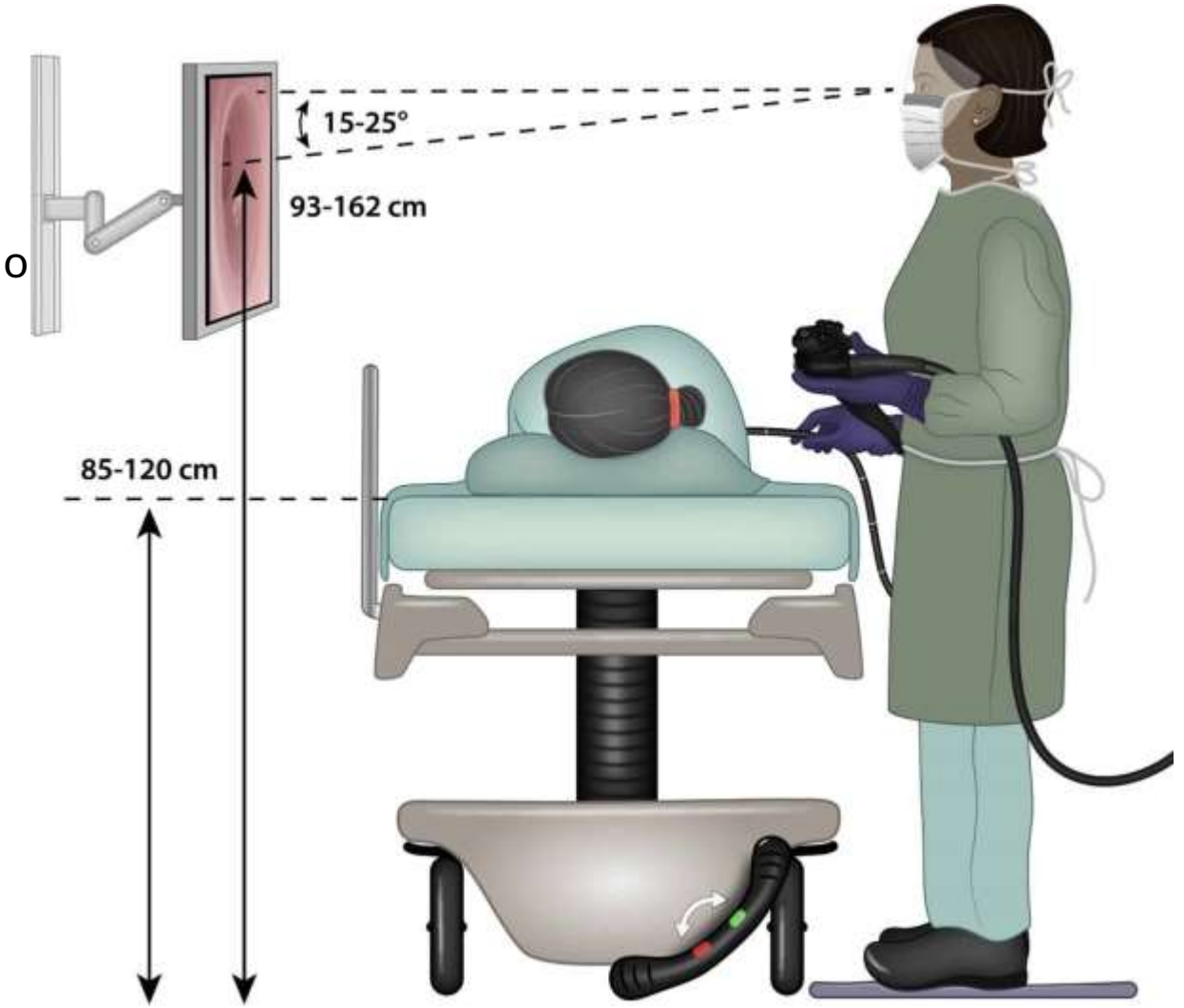
Pre-Procedure

- Monitor: Directly in front,15-25º below eye height
- Bed: position between elbow height and 10 cm below elbow height



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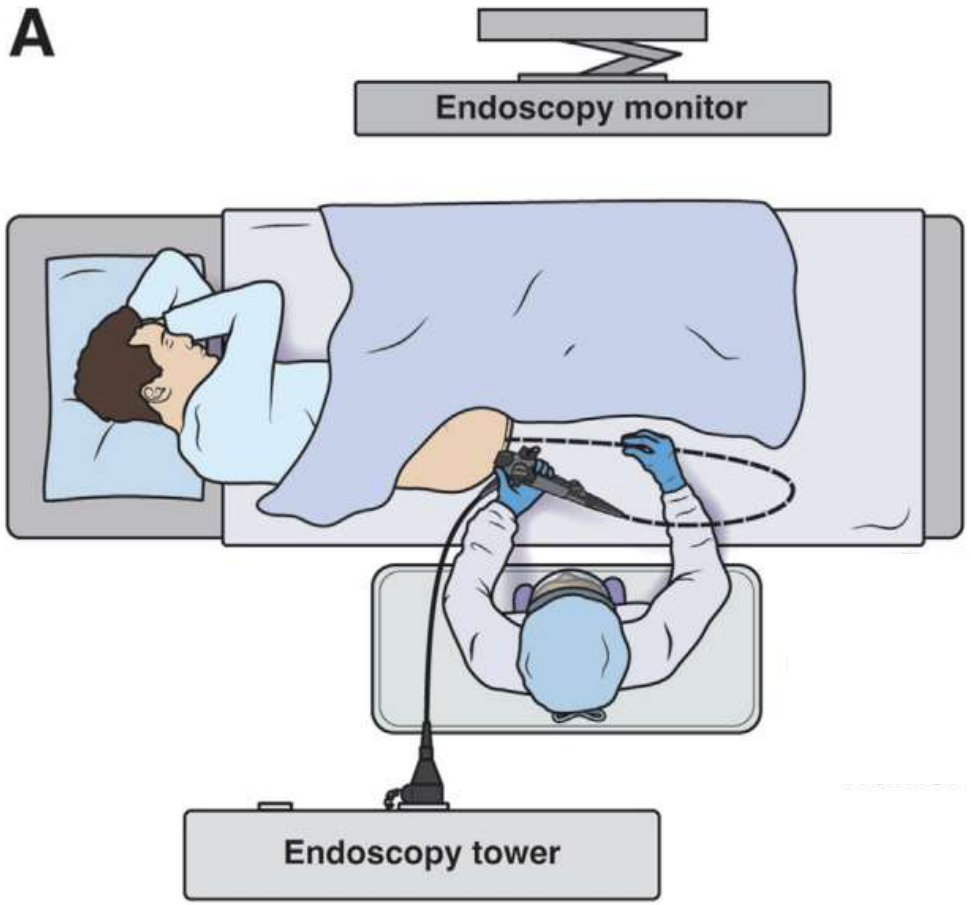
Pre-Procedure

- Endoscopy Tower: Insertion in line with orifice to be intubated
- Foot Pedal: In front of body
- Cords and wires: Contained on the floor



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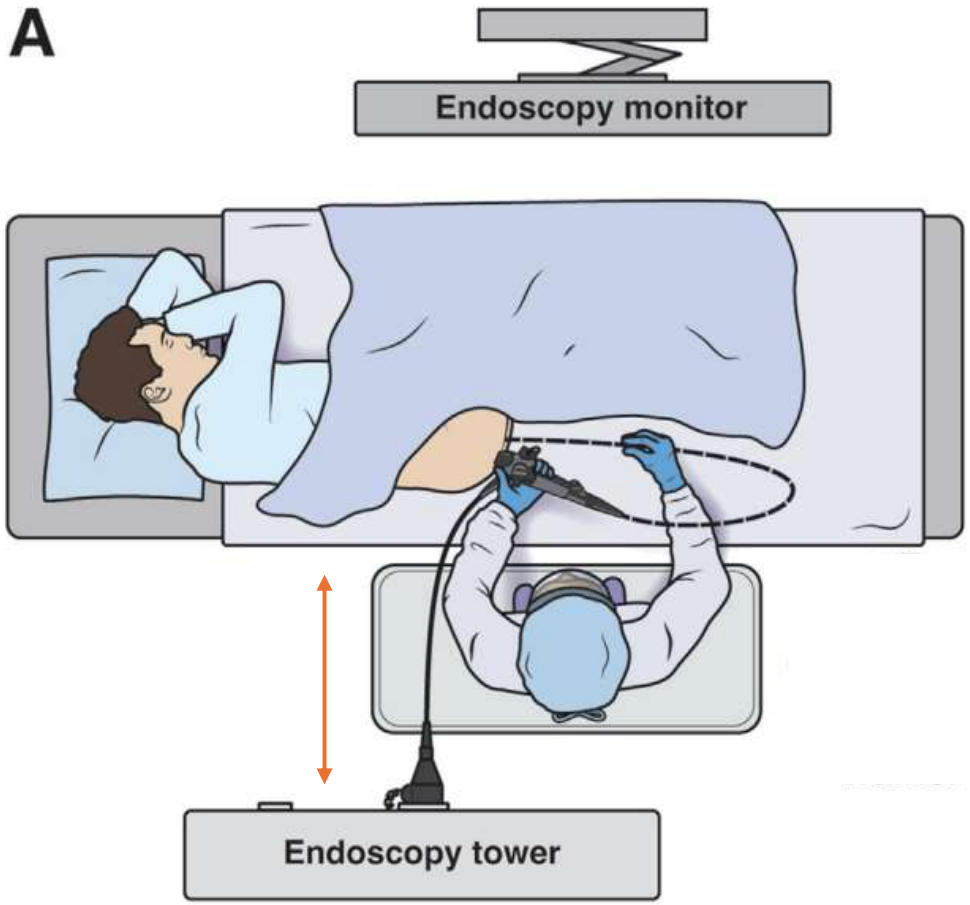

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Intra-Procedure

- Adjust dynamically during the procedure to ensure environment is ergonomically favorable
- Nurses should stand close to the endoscopist, on the same side of the bed, to ensure optimal view of the monitor and the endoscope

Intra-Procedure

- Patients frequently require repositioning for colonoscopy advancement and visualization
- Abdominal pressure from endoscopy team helps to:
  - Prevent looping
  - Results in a shorter procedure
  - Reduce discomfort for the patient
  - Reduce the angle of the turns
  - Helps prevent perforations

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Intra-Procedure

- Understanding abdominal pressure is important to protect the staff and the patient from injury.
- The most effective muscle actions and body positioning to assist with applying pressures correctly and safely.
- Discuss the process as a team
  - How the table height is set
  - Whether others will be available to assist with pressure
  - Duration of pressure before a moment of release is needed
  - What are appropriate forces for pressure applied
  - An appropriate height step stool (if needed)

Open-hand technique (not recommended)

- The palm of the left hand is placed parallel to the pelvic bone, with fingers spread to cover as much area as possible
- The right hand grasps the patient's shoulder to pull the patient onto the left hand
- If more pressure is required, place the right hand under the diaphragm which will achieve both sigmoid and splenic flexure pressure.
- Most effective if another member of the staff can provide counter pressure
- Consequence of this technique is wrist injury

Single Forearm Technique

- Place the left hand (palm down, fingers extended, knuckles down, or in a fisted position
- Push the left hand under the patient so that the whole hand is positioned just above the pelvic bone
- The right hand can be used to pull the patient's right shoulder and roll the patient onto the forearm
- The patient's weight on the forearm applies the pressure

Two-Forearm Technique with Counterpressure

- When more pressure is needed to be given in a broader area
- Keeping the left forearm in place, the assistant places his right hand just under the splenic flexure and below the diaphragm.
- fingers can be extended, knuckles down, or fisted
- Counterpressure is applied by another staff member
- Pressure will be given to the sigmoid, midline, splenic flexure, and mid-transverse colon

Abdominal Pressure

- Most pressure, when applied with good body mechanics and positioning, should be sufficient for 3-5 minutes.
- We are not all the same heights, arm lengths, and muscle strengths
- Applying pressure in a precise location, pinpoint force with elbows or fists may cause bruising
- When pressure is given on broad spectrum, the pressure is being displaced evenly.

Intra-Procedure

- Abdominal Pressure Precautions:
  - Avoid lifting beyond capabilities
  - Rotate responsibilities
  - Proper lifting techniques: use hips and knees, a wide base, and minimize forward flexion
  - Ok to ask for feedback: “Is this pressure helping?”

Post-Procedure

- Microbreak for rest and stretching to improve muscle recovery
- Running, yoga, and strength training to maintain and boost your sense of wellness
- Exercise is essential

Exercise in the Workplace

Luis Heuel · Ann-Kathrin Otto · Bettina Wollesen
Institute of Human Movement Science, University of Hamburg, Hamburg, Germany

Physical exercise and ergonomic workplace interventions for nursing personnel—effects on physical and mental health: a systematic review

- Some studies have shown a reduction in back pain with exercise while others have not.
- 37 studies with sample size 14-316.
- Programs including aerobic exercising, “back school,” ergonomics, increasing physical activity, physiotherapy, yoga’
- Interventions such as “back school”, multicomponent ergonomics, as well as yoga positively impact work ability via psychological and physical mechanisms

Exercise in the Workplace

- Integrated yoga showed improvements in physical, psychological, and social health domains of quality of life
- Better than physical exercises among nursing professionals with chronic lower back pain
- Consider incorporating yoga as a lifestyle intervention for nursing professionals

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Patil NJ, Nagaratna R, Tekur P, Manohar PV, Bhargav H, Patil D. A Randomized Trial Comparing Effect of Yoga and Exercises on Quality of Life in among nursing population with Chronic Low Back Pain. Int J Yoga. 2018 Sep-Dec;11(3):208-214. doi: 10.4103/ijoy.IJOY_2_18. PMID: 30233114; PMCID: PMC6134737.

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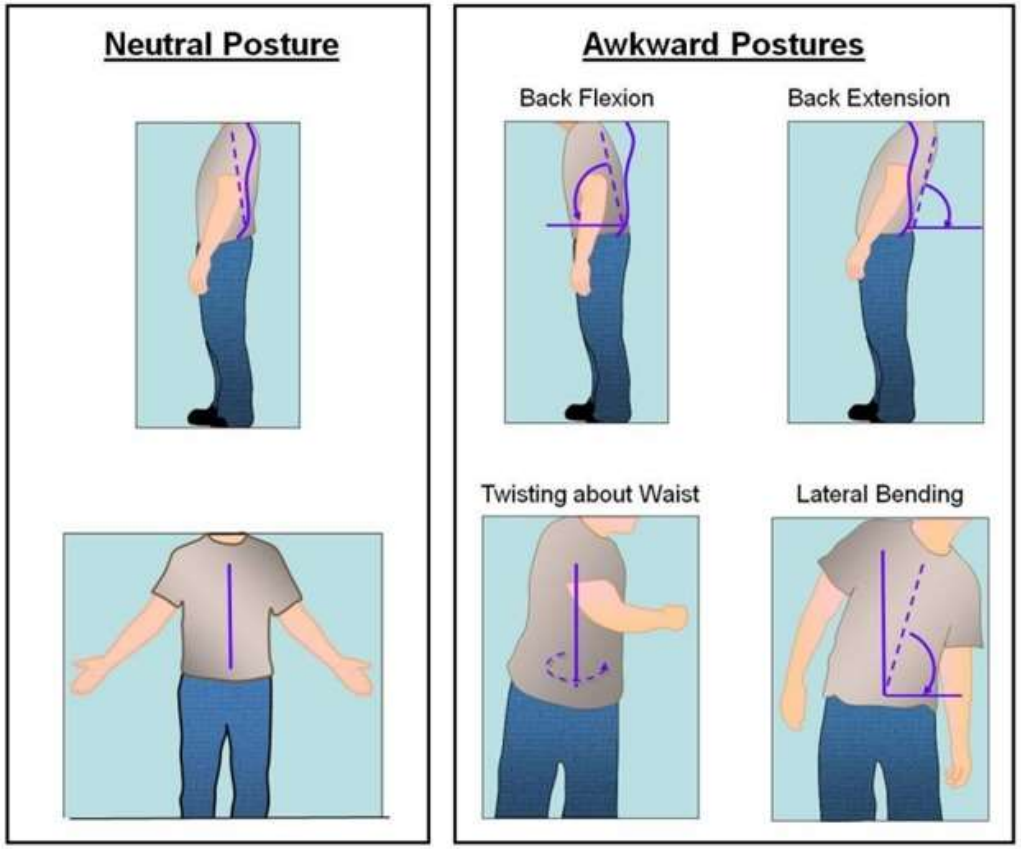
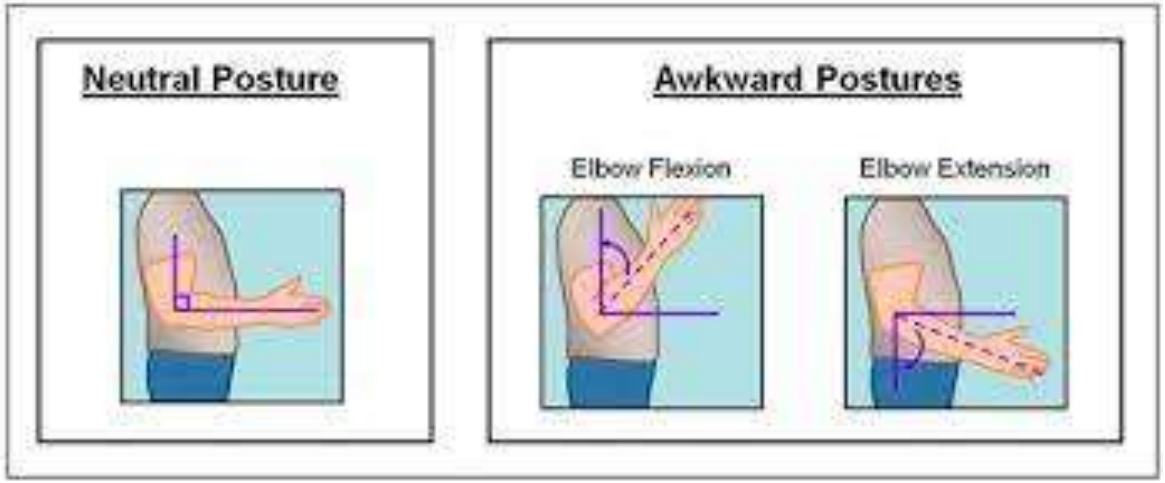
Recommendations

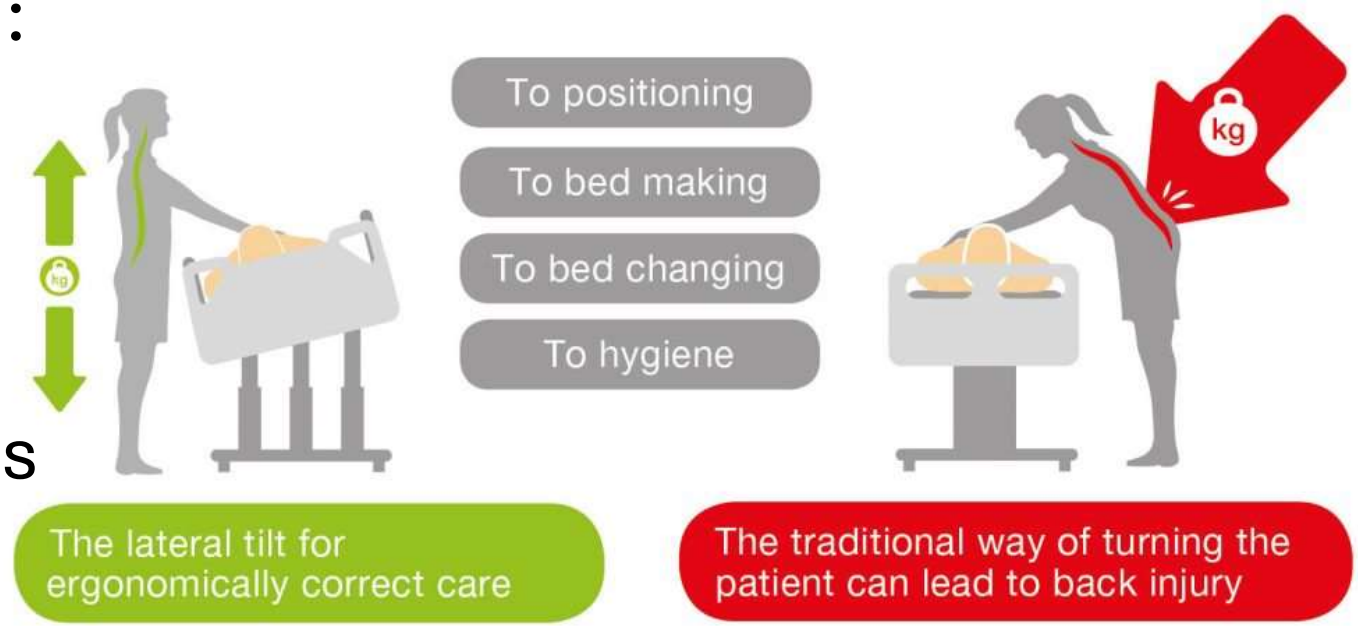
- Maintain a neutral posture with erect back posture, and squat





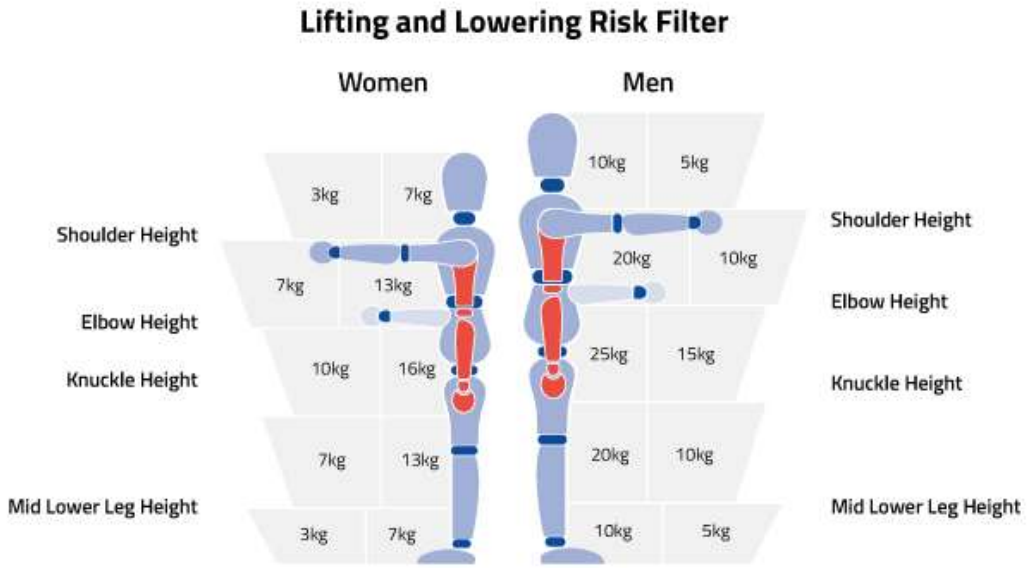
Recommendations

- Decreasing weight handled:
  - Team lifts
  - Use of equipment
  - Portioning the load into smaller or lighter containers
- Ensure the lifted object is as close to the body as possible



Recommendations

- Limit weight of load lifted
- Avoid carrying loads with one hand



Recommendations

- Maintain a neutral spine position with the muscles relaxed
- Seated positions that provide adequate support for the spine, upper, and lower extremities, including proper lumbar support.

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Recommendations

- Sitting at a computer for long periods of time can cause neck and shoulder stiffness as well as lower-back pain.
- Static postures prevent blood flow to muscles, results in fatigue and discomfort

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Monitor in front, arm's length away

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Monitor at or slightly below eye level

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Keep back , shoulders, and neck aligned while in a relaxed position

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Rest against the back of your chair to give spine support and reduce the work of postural muscles

Adjust your seat and armrest height so forearms and thighs are parallel to the ground

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Leave two to three inches of space between the seat and the back of your knees

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Rest feet flat against the floor or on a footrest

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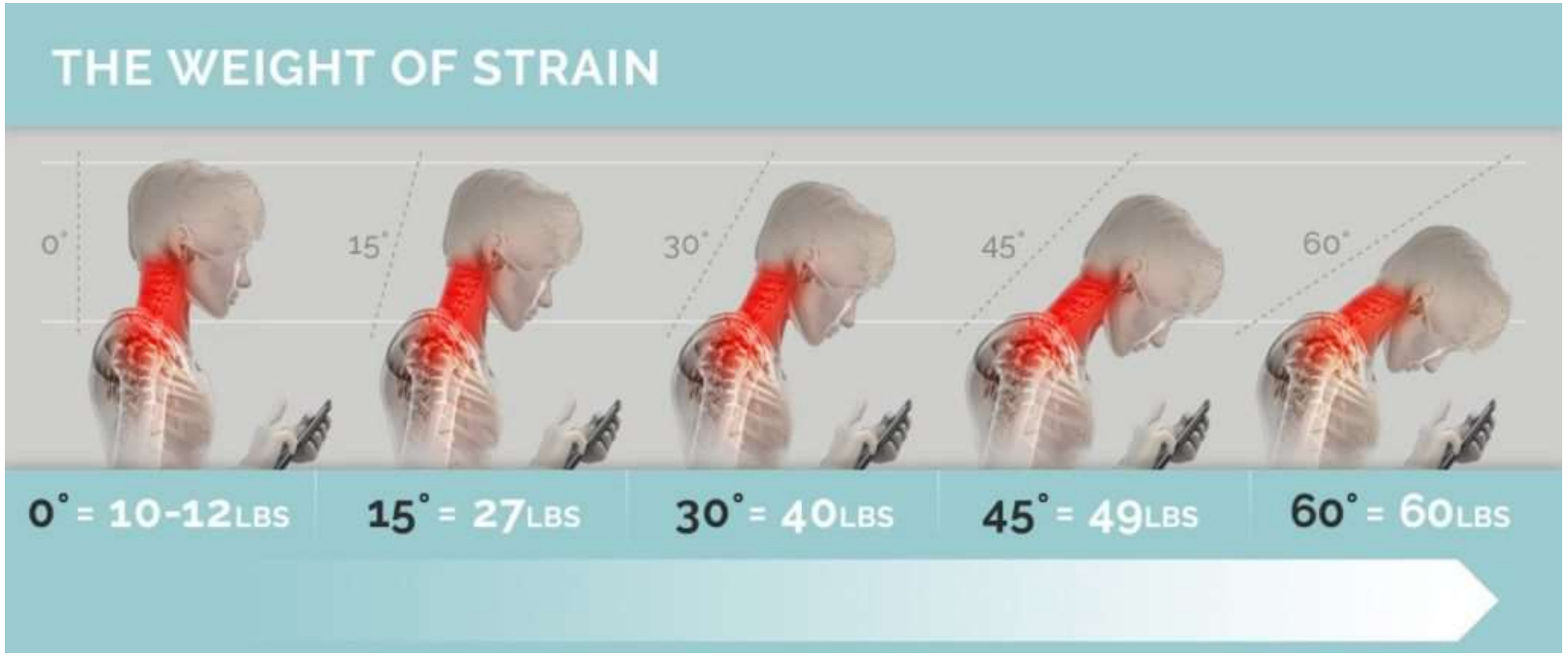
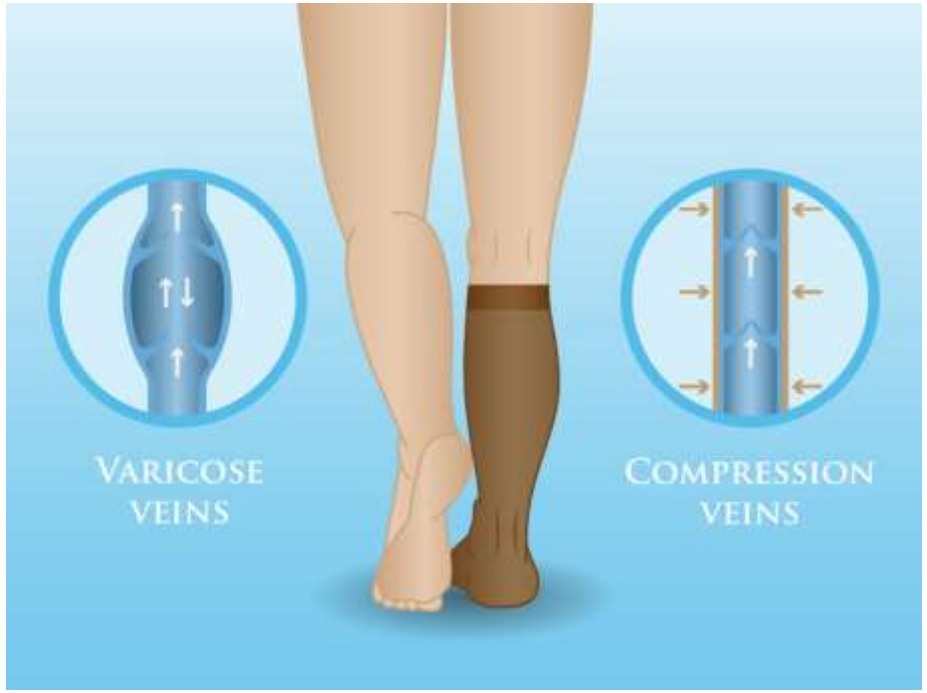
Recommendations

- Head and neck position as close to neutral as possible
  - No more than 15° flexion recommended
- Position monitors 1 meter away with declination of 0 to 15°



Recommendations

- Using antifatigue mats, properly fitting and supportive shoes, and compression stockings to promote proper blood flow.

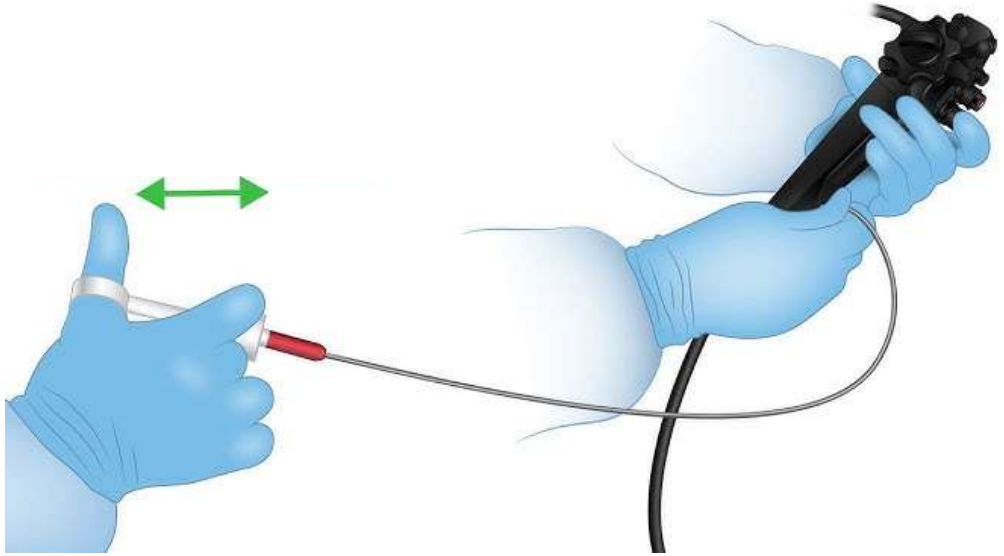


Recommendations

- Ensure gloves properly fit and are the correct material
- Decreases the risk of overuse injuries due to excessive gripping as compensation
- Decreases carpal tunnel syndrome

Recommendations

- Grip surgical instruments with a light hold
- Alternate hands when completing easier, repetitive tasks
- Evenly apply pressure when squeezing bottles using all the fingers instead of just the thumb or index finger.



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Benefits of Ergonomics

- Increase savings
  - Fewer injuries
  - More productive and sustainable employees
- Fewer employees experiencing pain
  - Reduce the risk factors that lead to discomfort
- Increase productivity
- Increase morale
- Reduce absenteeism

Summary

- Medical professionals suffer some of the highest work-related injury rates of all employees
- Back, neck, and upper extremity injuries are the most common work-related musculoskeletal disorders
- Risk Factors: higher procedure volume, time spent performing endoscopy, age, female gender
- Organize endoscopic ergonomics: Pre-procedure, Intra-Procedure, Post-Procedure events
- Common precautions to prevent injury is focused on a neutral position
- Applying ergonomics can reduce the chance of illness and injuries, improve worker productivity, and increase satisfaction in the workplace

Thank You!

- “To do what nobody else will do, a way that nobody else can do, in spite of all we go through — that is to be a nurse.”

  — Rawsi Williams

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