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# ERGO 100: Intro to Ergonomics

## Fundamentals, Tips, and Tools for Every Body



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Disclaimer: The information provided in this presentation is intended solely for the general information of the audience. It is not medical advice and shall not replace consultation with your physician or other qualified health provider (QHP). If you have health-related questions or problems, please seek the advice of your physician or other QHP.

# ABOUT THIS SESSION

- Background and history of ergonomics
- Common ergonomic stressors that can lead to musculoskeletal injuries
- Practical strategies for avoiding work-related pain
- Optimal workstation setup for ergonomic considerations

# ERGO BASICS

- Proposed in 1949 by Hugh Murrell, Univ. of Bristol
- Ergon: Work; Nomos: Natural Law
- The study of people's efficiency in their working environment
- “Ergonomics is the study of human abilities and characteristics which affect the design of equipment, systems, and jobs.” Cornell University
- Fitting the Job to the person

# DIMENSIONS OF ERGO - WORK ENVIRONMENT

- Physical demands: Nature of work: lifting items, typing on keyboard
- Skill demands: Typing at 110 words per minute
- Risk demands: Walking on slick surfaces, trip hazards
- Time demands: Working quickly to meet a deadline

# PHYSICAL CONSIDERATIONS

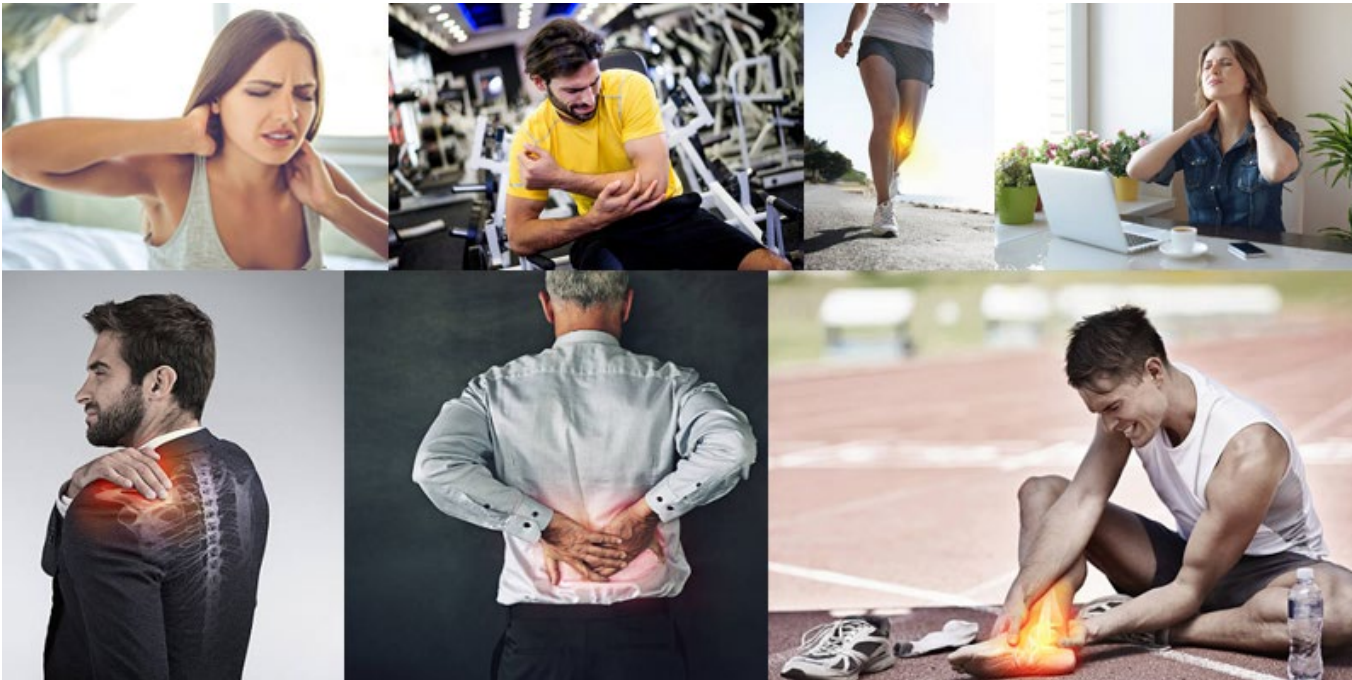
- Objects: Furniture, technology, tools, other commonly used items
- Biological factors: Physical structure and capabilities of the human body
- Physical distractors: Heat/cold, noise, vibrations
- Chemical agents: Air pollutants, chemical smells
- Biological agents: Airborne Disease

# PSYCHOLOGICAL ENVIRONMENT

- Social: Working in teams or independently
- Cultural: Pace of life, expected work hours, Covid-19 impacts
- Lifestyle: Work/Life balance, Quality of Life
- Management: Receptive to discussion on Ergonomics?

# MSD: MUSCULOSKELETAL DISORDERS

- MSD's are injuries to muscles, tendons and nerves that are caused by excessive stress to the tissue.
- Research has shown a close relationship between postural and biomechanical work stresses and the rate of MSD.



**Risk of MSD** increases with:

- Repetition
- High force
- Awkward postures
- Contact stress
- Hand-arm vibration

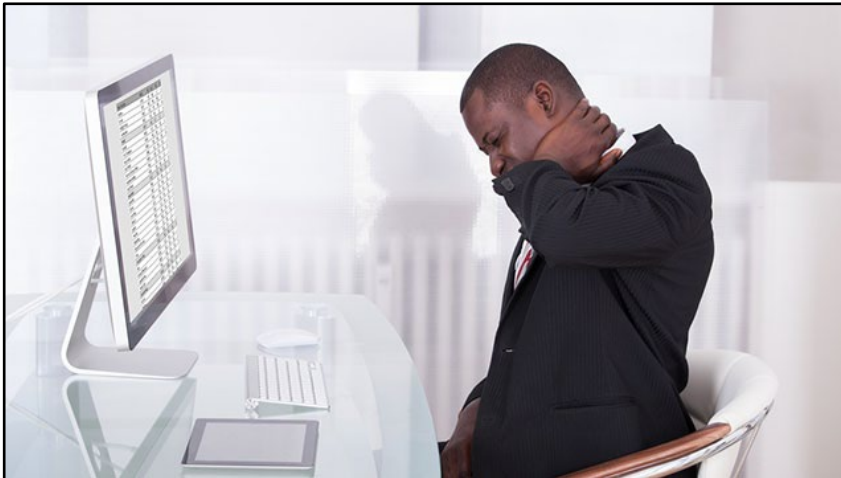


# CONTACT STRESS



# MSD: MUSCULOSKELETAL DISORDERS

- Two primary types of Employees: Field/Foot and Office/Chair
- Field Workers: Repetitive movement, high force, twisting motions, etc. Sprains and strains, back injuries, tendonitis, etc.



- Office Workers: Prolonged sitting in unnatural positions. Carpal Tunnel, neck and shoulder pain, lower back pain, tight hips are a few common examples.
- Workload and Body positioning determine MSD risk
- Kinetic Chain- each link is connected
- Lab work



# SLIPS, TRIPS, AND FALLS



**STF's are Preventable!**

## Common Causes:

- Objects in Walkway
- Weather Conditions
- Floor Contamination – 55% of STF injury
- Irregular or Damaged Floors
- Inadequate Lighting
- Stairs, Ladders, Step Stools
- Floor Mats/Runners
- Unprotected Edges and Openings

## Prevention

- Good Housekeeping- clear walkways
- Clean spills/slick areas immediately
- Adequate Lighting
- Proper Footwear
- Training and Education
- Work on the Same Level

# SAFE LIFTING PRACTICES

- Get close to the object
- Bend at the hips and knees
- Head up, back straight
- Lift smoothly and slowly
- Keep the load in the 'power zone'
- Avoid twisting your back
- Don't rely on a back brace
- When in doubt, ask for help
- A lifetime of pain is not worth it!





**BOXES  
CAJAS**



# LIFTING SAFER LEVANTANDO CON MAYOR SEGURIDAD



**LUMBER / PIPES  
MADEROS/TUBERÍA**

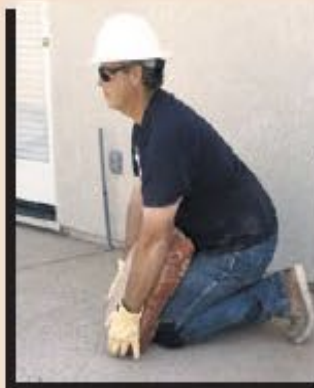




# SHEETS LÁMINAS

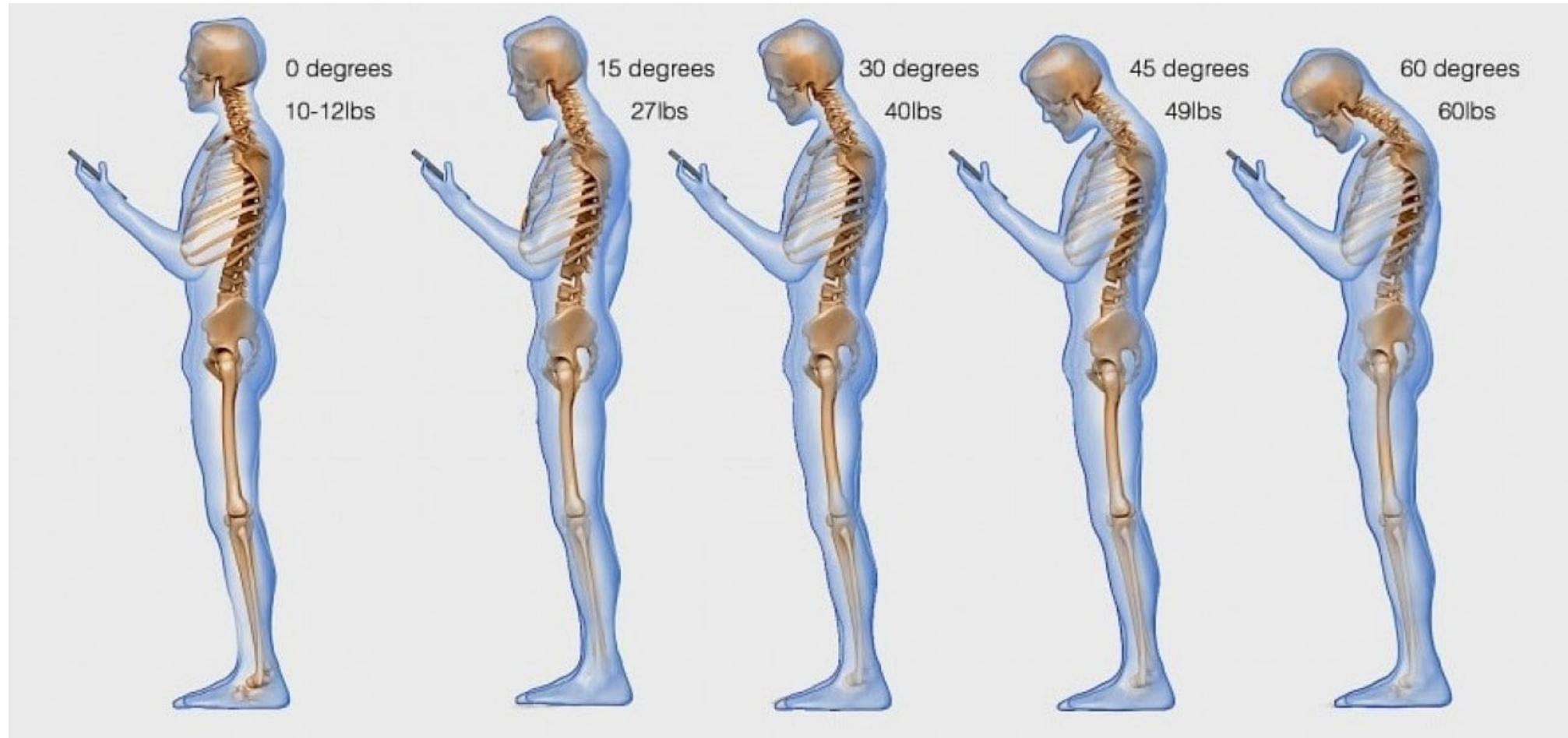


# SACKS / BAGS SACOS / BOLSAS



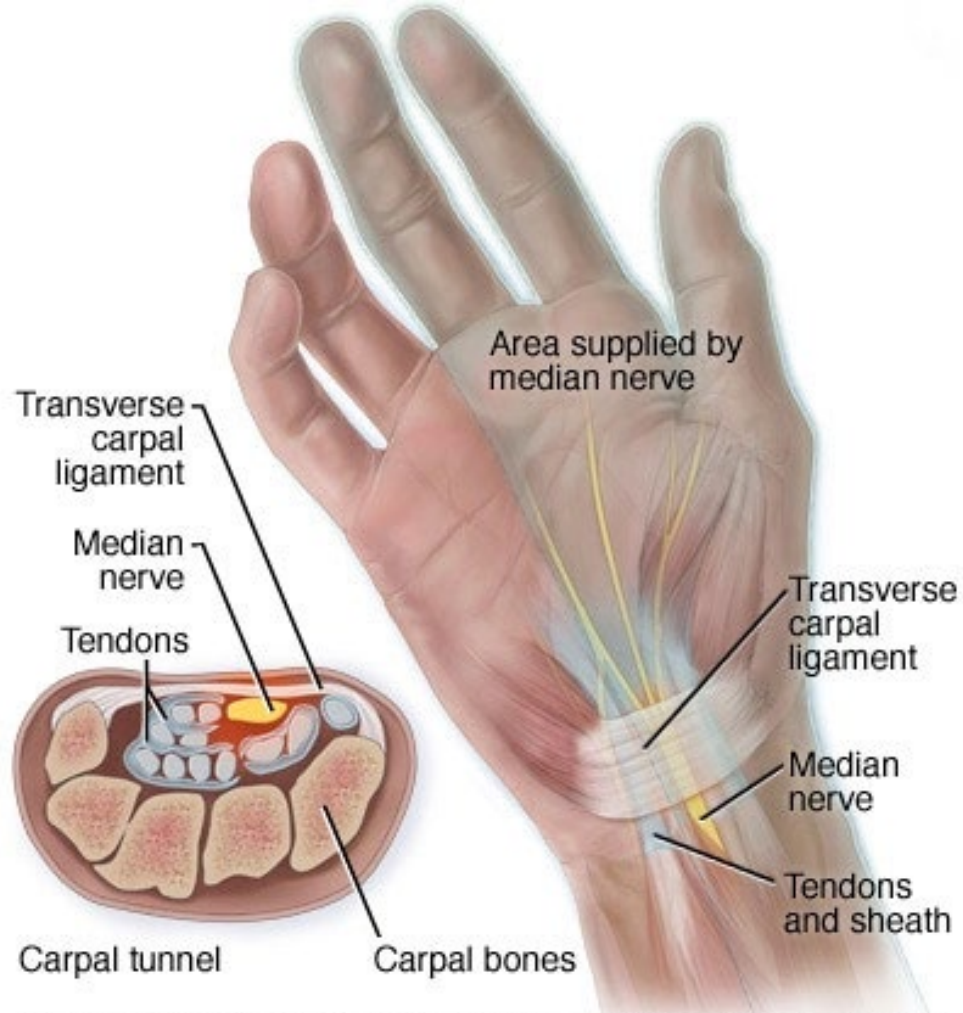
To learn more about job safety and receive free publications, please call our toll-free number at 1-800-963-9424 or download from our Web site at [www.dir.ca.gov/dosh/puborder.asp](http://www.dir.ca.gov/dosh/puborder.asp)

# VISUALIZING THE EFFECT OF 'TEXT NECK'





# CARPAL TUNNEL SYNDROME

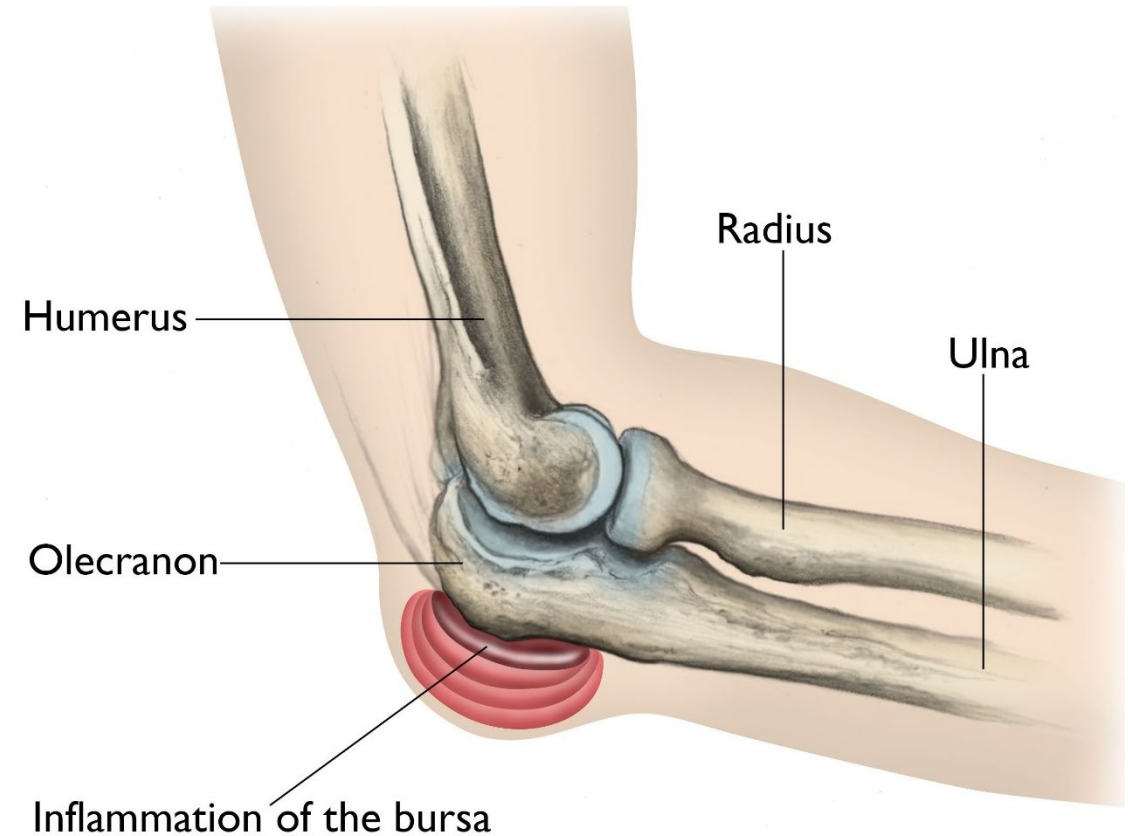


- Compression of the median nerve at the wrist.
- Numbness, tingling, weakness, or muscle atrophy in the hand and fingers.
- Repetitive motion with the arm, hand, wrist
- Breaks, Ergonomic tech, Stretching, Splinting, NSAIDS, Steroids, Surgery



# TENDONITIS/BURSITIS

- Tendonitis:  
Inflammation/strain of tendons, often in injury-prone areas like knee, wrist, elbow.
- Bursitis: Inflammation of the bursa. Often due to frequent kneeling, elbow pressure, repetitive movements of the arm/shoulder
- Rest, anti-inflammatories



## LIGHTING/EYESIGHT



- Is there sufficient lighting to accomplish the task without straining your eyes?
- Are there unwanted dark spots and shadows being cast that can be eliminated?
- Is there excessive glare, especially on your computer screen?

# LIGHTING/EYESIGHT

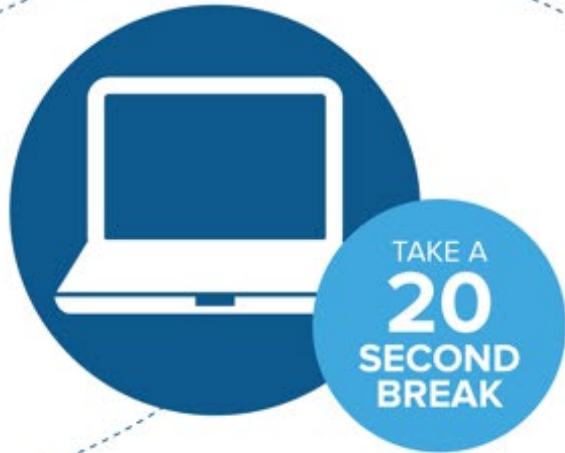
- Is there enough contrast between your task and the background?
- Is the color temperature appropriate based on your mood or task?
- Blue Light- What's the deal? Sleep Cycle interruptions



# 20-20-20 RULE

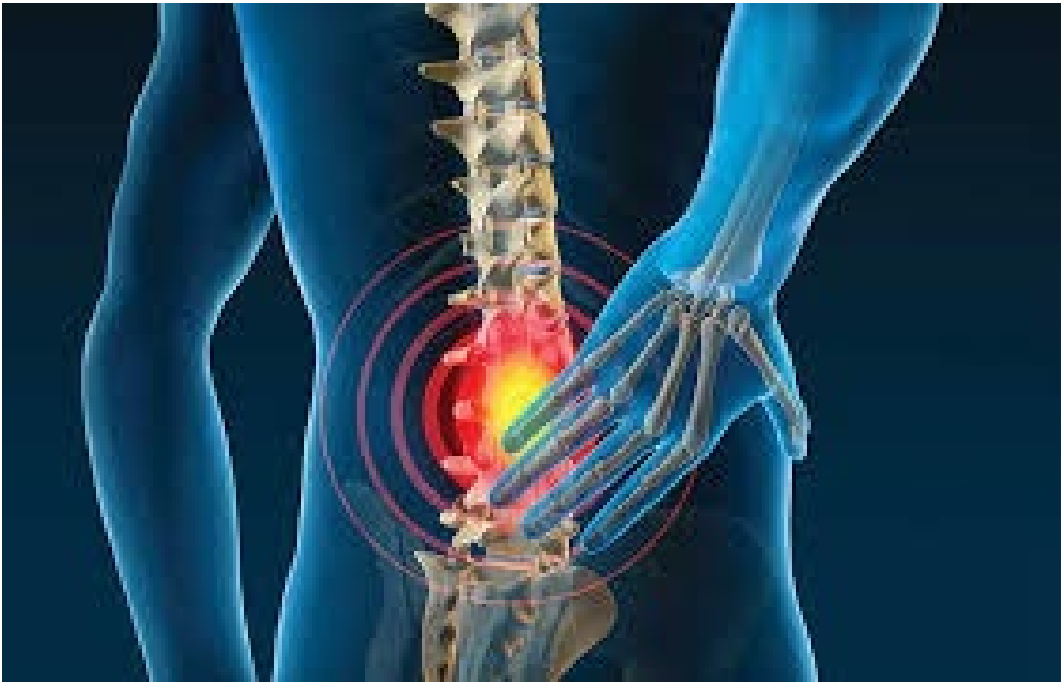
# 20/20/20

## TO PREVENT DIGITAL EYE STRAIN



Visit [www.aoa.org](http://www.aoa.org) for more tips on how to protect your eye health and to find a doctor of optometry near you for your annual comprehensive eye exam.

# BACK INJURIES



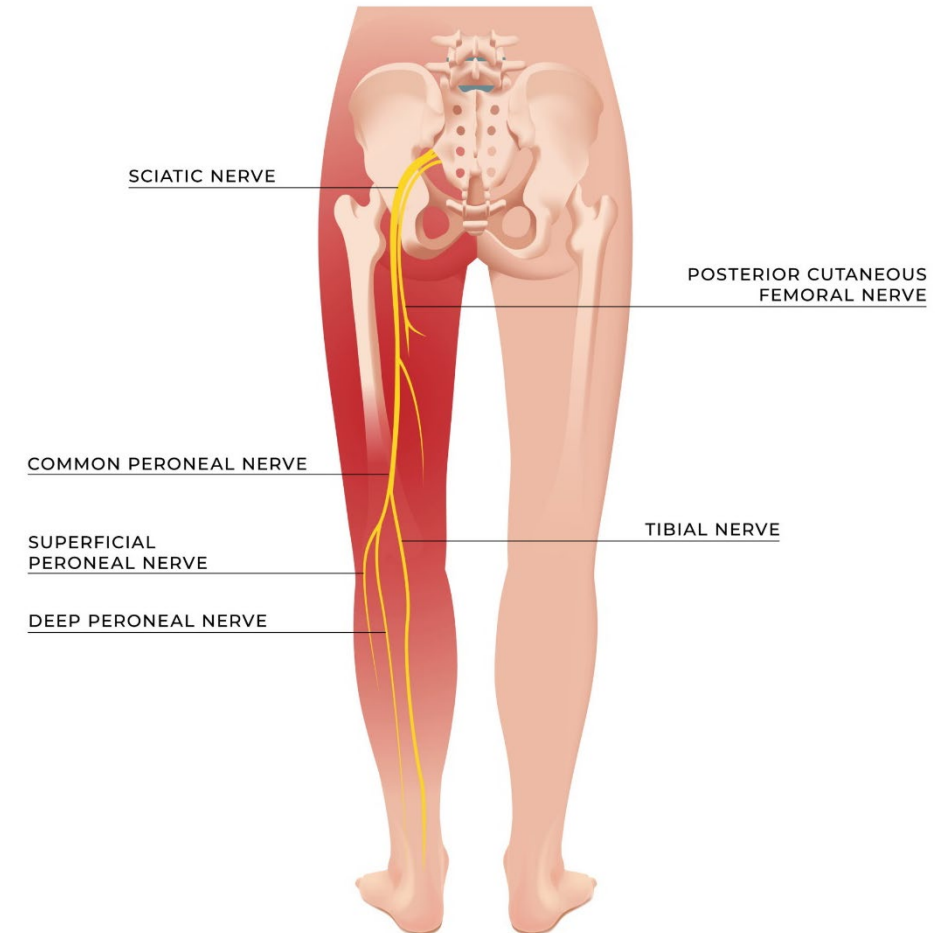
- Acute injuries
- Accumulated injuries – twisting, bending, etc.
- Poor Seating = Impeded circulation

Muscle fatigue and cramping

Stiffness, numbness, aches/pains

# SCIATICA

- Describes pain caused by irritation of the sciatic nerve
- Hallmark is pain that runs from lower spine down back of the leg.
- Jolt, shock, numbness, tingling, weakness. Typically on one side only
- Often caused by a pinched nerve in the spine
- Not a condition, but a symptom of the pinched nerve
- Treatable with Rest, PT, Stretching, NSAID's. Surgery is rare, 5% - 10%



# WHY SEATING MATTERS

- Encourages proper posture
- Increases comfort
- Minimizes neck/back/hip pain
- Reduces the risk of neck problems
- Decreases workplace distractions
- Added support helps improve focus at work





# HOW TO BUY AN ERGONOMIC OFFICE CHAIR

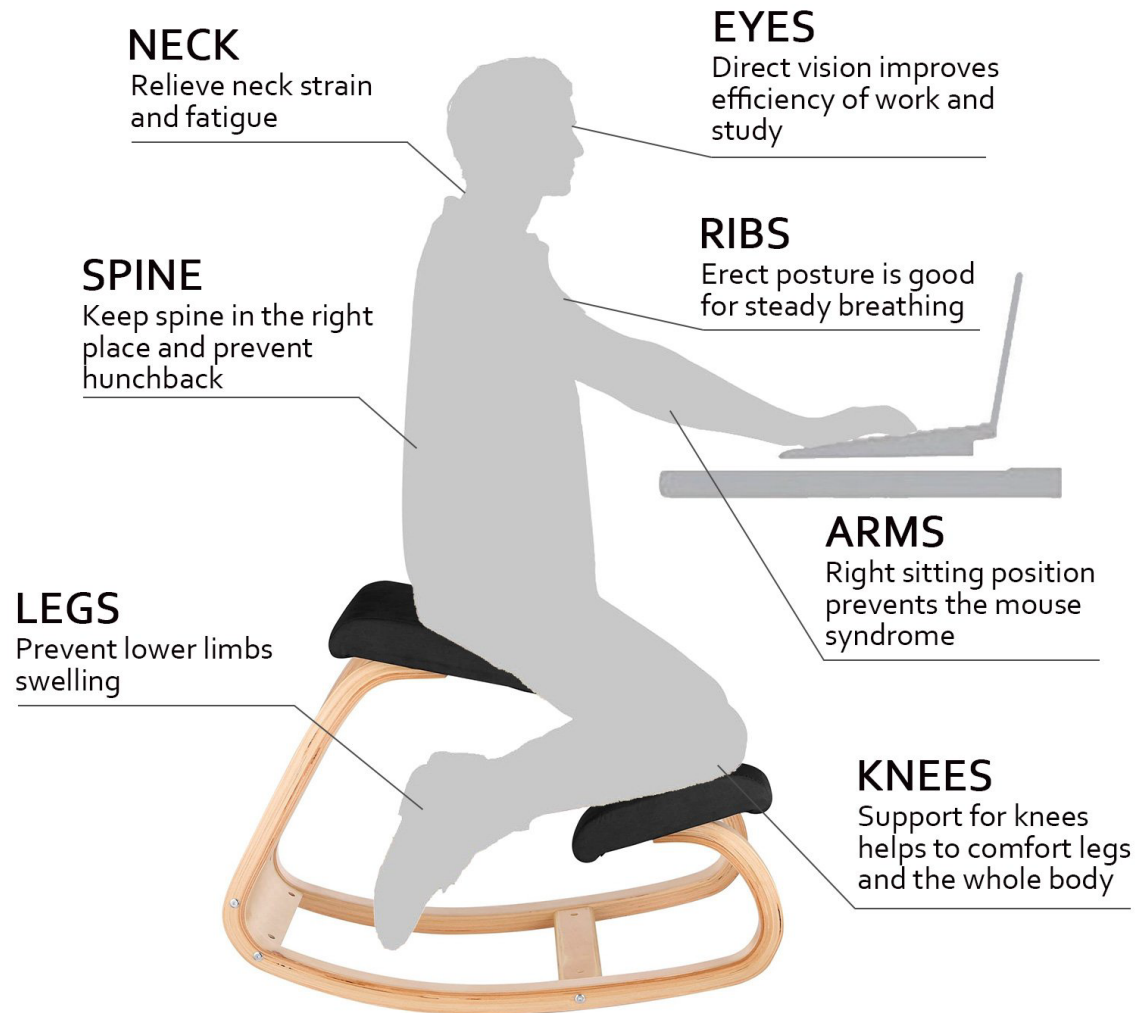


- Ergonomics, function, support of chair should be primary consideration
- Lumbar Support: Lower back should be well supported to prevent strain. Use adjustable support when available. Towels can be used in lieu
- Adjustability: Lumbar support, arm width/height, seat/back angle, lower back tension, height
- Wheels: Carpet or hard floors? Chair should roll freely so you don't have to reach & strain
- Swivel Base: Chair should swivel freely for easy access to desk items
- Fabric: Breathable, supportive fabric that is compatible with the user
- If feet don't touch the floor, use a footrest





# KNEELING CHAIR



# IS SITTING THE NEW SMOKING?

**Sitting is the  
new smoking.**



**SITTING  
IS  
KILLING  
YOU**

The Truth About  
Sitting Down



# SHOULD I SIT, OR STAND?



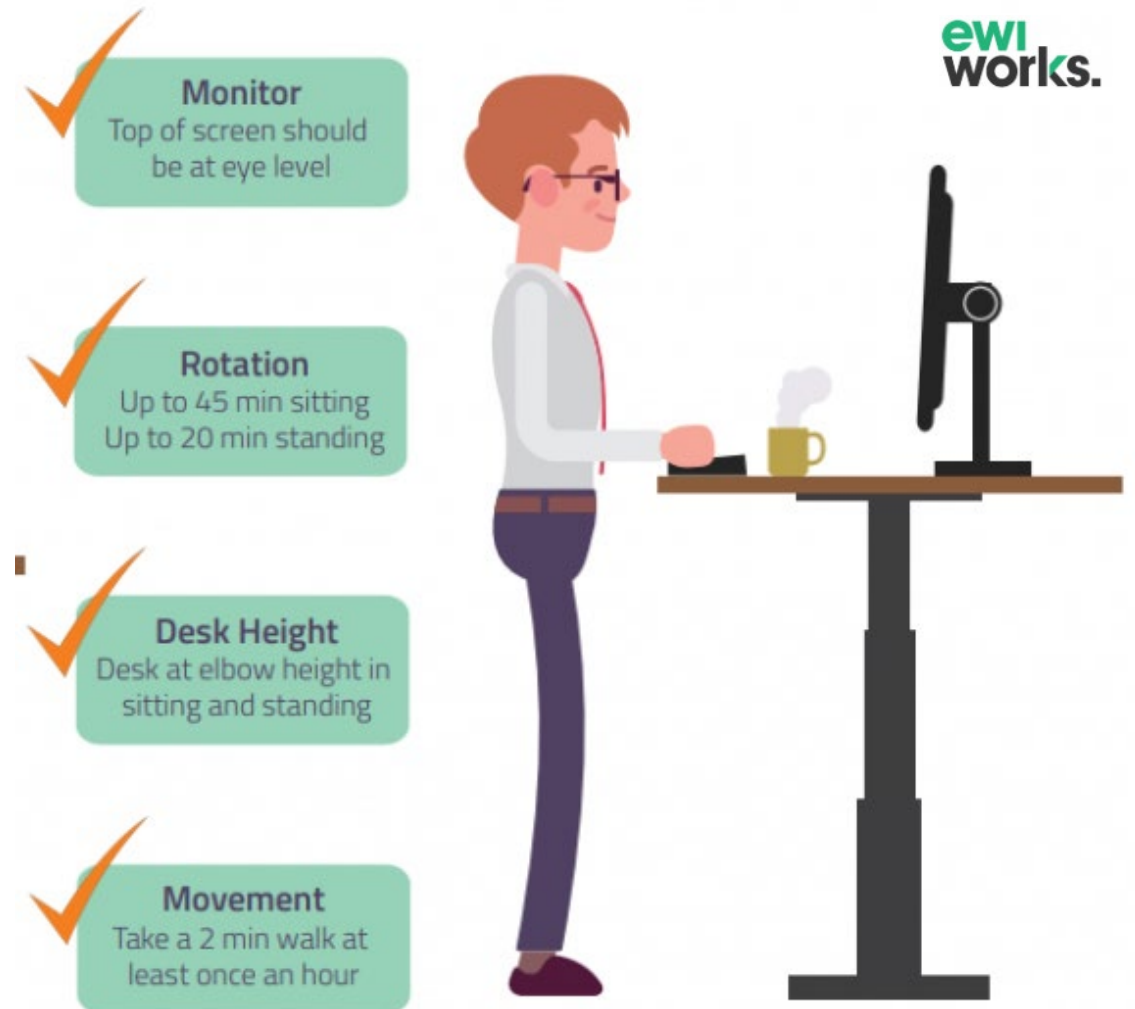
SHOULD I SIT, OR STAND?



**Yes**

# MOVE OFTEN, ALTERNATING SITTING & STANDING

- Start by standing for a few minutes at a time
- When you get tired, that's your cue to sit.
- Adjustable desks make the transition easier, but in lieu boxes, crates, books, ironing board etc. are suitable.
- Arms should stay relaxed at the sides with elbows at 90
- Break up monitor, keyboard, and mouse



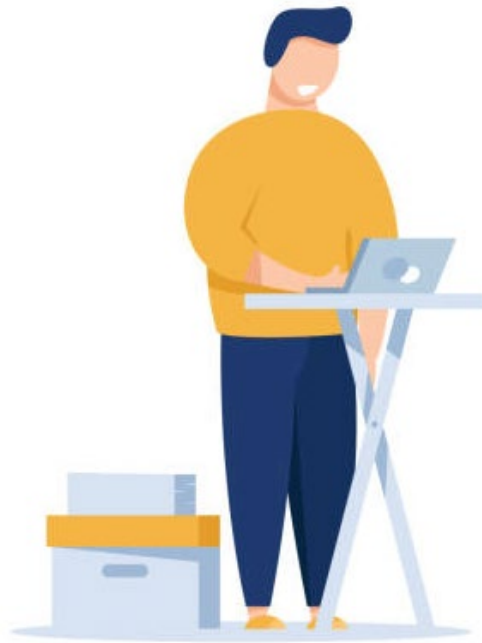
# 20-8-2 RULE

Developed by Alan Hedge, Cornell University, 2015

Every 30 minutes, try to:



Sit: 20 minutes



Stand: 8 minutes



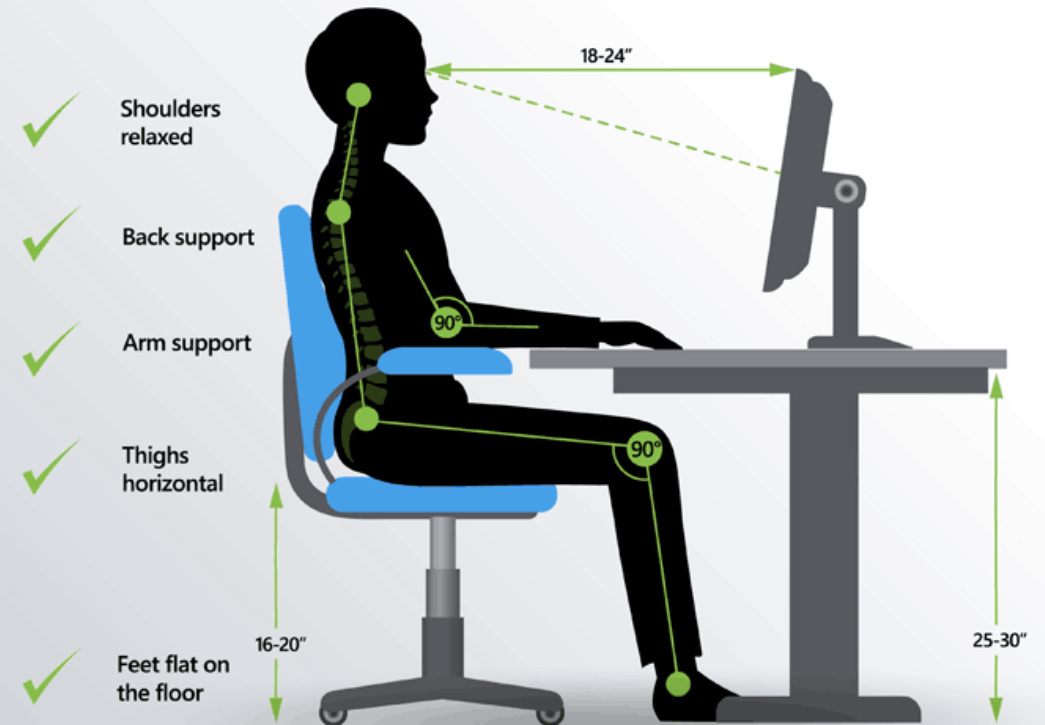
Move: 2 minutes



# SETTING UP YOUR WORKSTATION

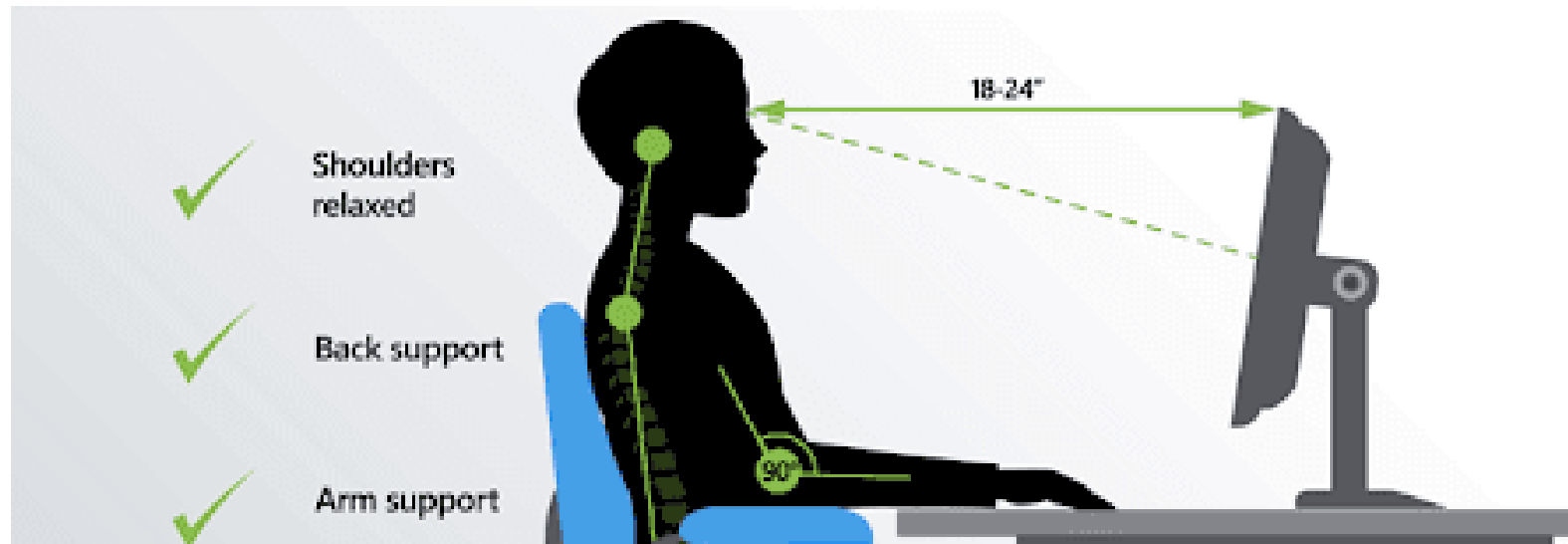
- Top of Monitor at or just below eye level
- Head and Neck balanced and in-line with torso
- Shoulders relaxed
- Elbows close to body and supported
- Lower back supported
- Wrists and hands in-line with forearms  
'Float' the wrist
- Adequate room for keyboard and mouse
- Feet flat on the floor

## Proper Sitting Posture/ Distances



# WORKSTATION SETUP: MONITOR

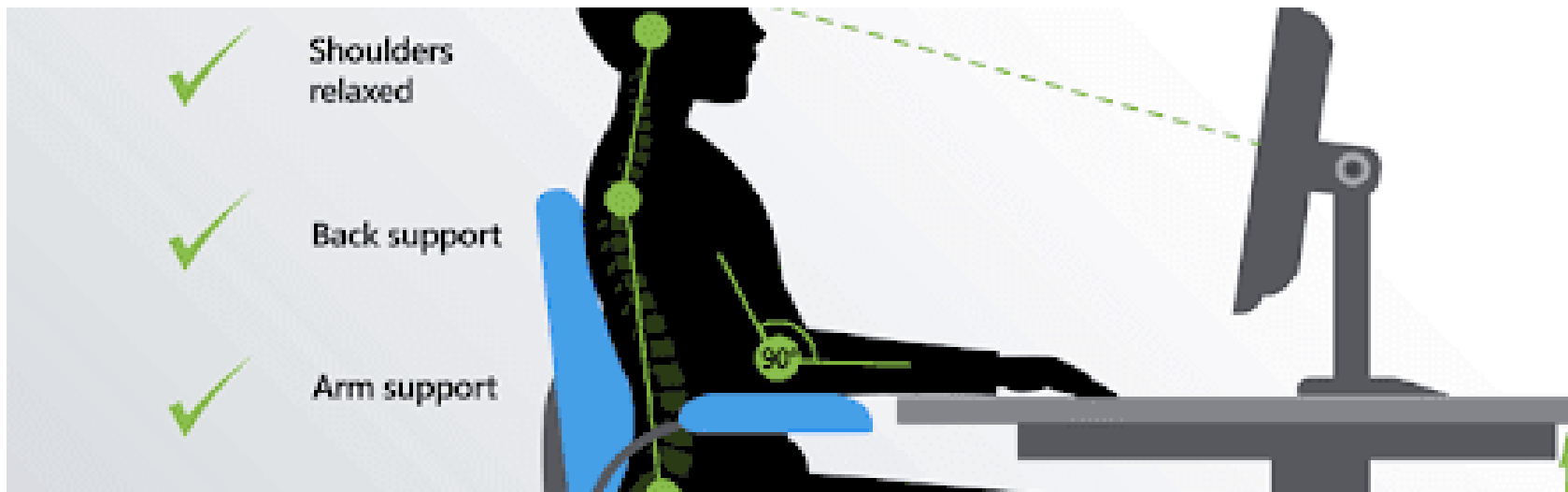
- Top of monitor is at or slightly below eye level
- Neck should stay straight
- Monitor positioned approx. arm's length away





# WORKSTATION SETUP: KEYBOARD/MOUSE

- Use an external keyboard when available
- Arms are close to the body with elbows near sides
- Straight wrists that 'float' when typing



# TECH: ERGO MICE



# TECH: ERGO KEYBOARDS



# TECH: TRACKPAD



# WRIST ALIGNMENT AND KEYBOARD INTERFACE

*Typical desk top typing posture that increases muscle fatigue and injury risks.*

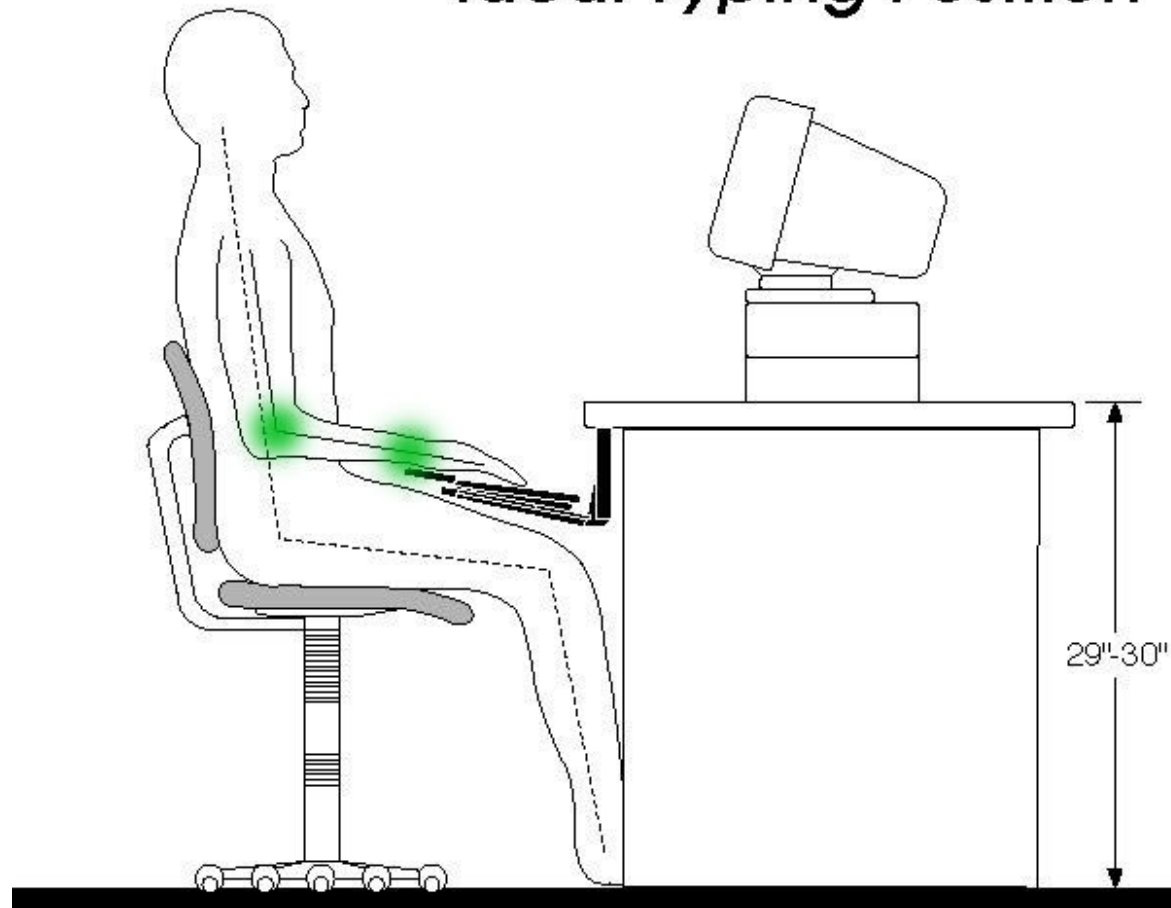


*Conventional keyboard trays can increase injury risks.*



# NEUTRAL WRIST ALIGNMENT

## *Ideal Typing Position*



## WORKSTATION SETUP: CHAIR

- Chair should have back and arm support
- Height should allow feet to touch the floor with thighs parallel to the ground or slightly below
- Adjust tilt back to  $100^{\circ}$  –  $115^{\circ}$
- Use lumbar adjustment to support low back



# DESK ZONES





# LAPTOP USE

- Convenient, not designed with ergonomics in mind
- Use a hard, flat surface for a desk
- Avoid prolonged time on the couch or in bed and remember good posture
- If available, use separate monitor, keyboard, mouse
- Same sitting/standing rules apply



# LIFESTYLE FACTORS

- Get up, stand, move, stretch, and walk around often during the day. Go for a walk at lunch to reset your mind and body
- Avoid 'settling' into a position for too long. Move often.
- Take walking meetings – they boost creativity!
- Get plenty of rest to maintain physical and mental health
- Find physical activities you enjoy and stay active
- Eat regular meals and drink plenty of water
- Spend time away from screens – accumulated s/t from work, phone, tv
- Pay attention to pain and rest when necessary

# DISCUSSION

- How has remote work impacted your ergonomic health?
- What strategies have helped you adapt?