

Using Ergonomics to Improve Your Working Conditions



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SRI • Ergonomics



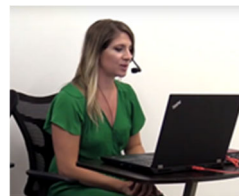
THE OHIO STATE UNIVERSITY

Captioners

Steno Captioning



Voice Writing



Reducing Physical Stress in the Work
Environment: Focus on Seated Workstations

Introduction

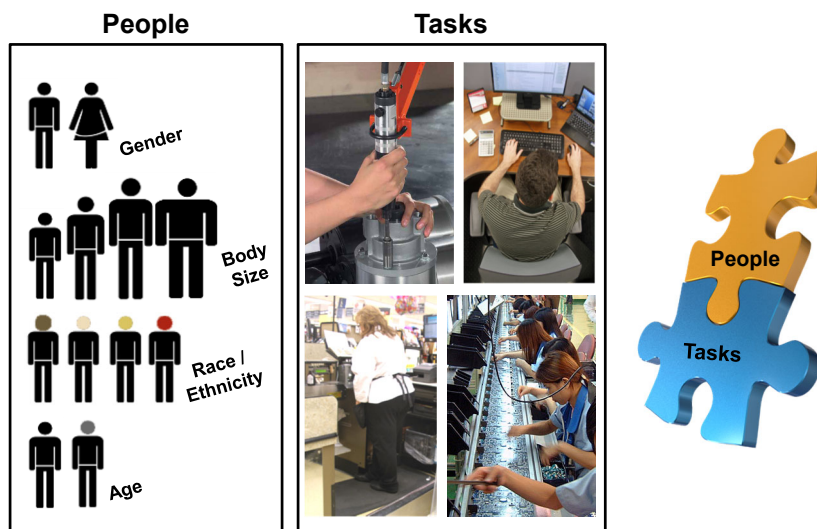
Focus of this Presentation

- Brief summary of ergonomics science
- Workplace exposures for development of fatigue, pain, or injury, with applications for:
 - Court Reporters
 - Captioners
- How to set up your “workplace” to improve job functions

Ergonomics Definitions

- The study of work
- The design of work systems around the capabilities and limitations of people

Ergonomics Definitions



Common Ergonomics Exposures

- High force exertions
- Awkward working postures
- Repetitive motions using the same muscle groups
- Long duration (static) work
- Compression of the soft tissue



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Common Ergonomics Exposures

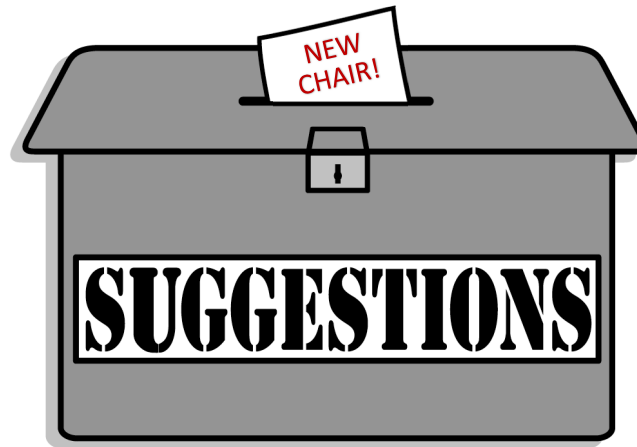
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Conducting A Workstation Self-Evaluation

Steps to Evaluate and Improve Your Work Set-Up

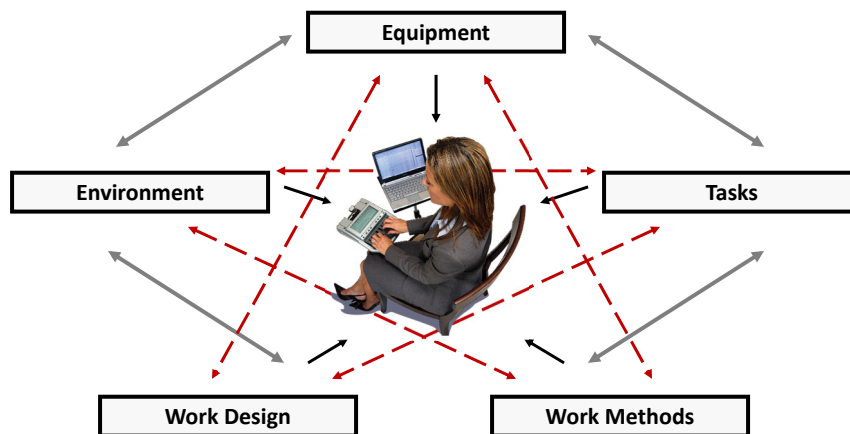
Commonly Considered Solution to Seated Work



Work Set-Ups, Job Functions, Equipment, and Postures Vary

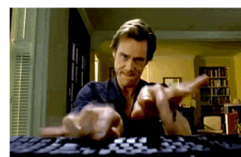
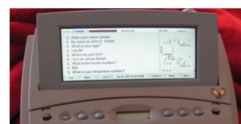


Step 1: Understand the Range of Factors that Impact Work



Step 1: Understand the Range of Factors that Impact Work

- Equipment
 - Chair, steno machine, monitor, keyboard, mouse
- Task
 - Continual typing; viewing fine details on monitor
- Work Methods
 - Typing style; posture



Step 1: Understand the Range of Factors that Impact Work

- Work Design
 - Always at “work station” or able to get up frequently?
- Environment
 - Noise/distractions; coworker relationships



Court Reporting & Captioning Potential Ergonomic Issues

Physical Issues

- Working in awkward postures
- Performing repetitive activities
- Contact stress
- Using excessive force

Work Design and Environmental Issues

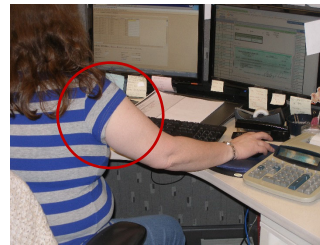
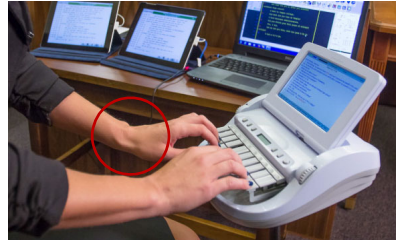
- Mental overload
- Lack of rest and fatigue
- Lighting, temperature
- Stress, due to:
 - Job requirements
 - Interpersonal situations
 - Visual requirements

Court Reporting & Captioning Potential Ergonomic Issues

- Working in awkward postures
- Performing repetitive activities
- Contact stress
- Using excessive force

Why?

- Weaker
- More stress on joints



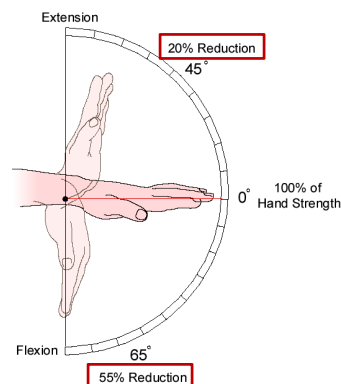
Court Reporting & Captioning Potential Ergonomic Issues

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Impact of Awkward Wrist Postures



Court Reporting & Captioning Potential Ergonomic Issues

- Working in awkward postures
- Performing repetitive activities
- Contact stress
- Using excessive force

Why?

- Body may not be able to quickly recover
- Changes tolerances to damage

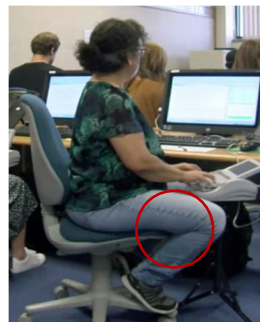


Court Reporting & Captioning Potential Ergonomic Issues

- Working in awkward postures
- Performing repetitive activities
- Contact stress
- Using excessive force

Why?

- Reduces blood flow
- Delays healing



Court Reporting & Captioning Potential Ergonomic Issues

- Working in awkward postures
- Performing repetitive activities
- Contact stress
- Using excessive force



Why?

- Stresses muscles and tendons

Court Reporting & Captioning Potential Ergonomic Issues

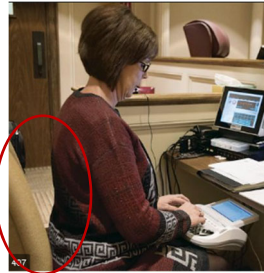


Why?

- Increased muscle tension
- Impact on job satisfaction

- Mental overload
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Court Reporting & Captioning Potential Ergonomic Issues



Why?

- Physical discomfort
- Distraction
- Reduced productivity

- Mental overload
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Court Reporting & Captioning Potential Ergonomic Issues

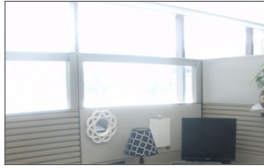


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Court Reporting & Captioning Potential Ergonomic Issues



Why?

- Dry eyes
- Reduced monitor contrast
- Increased errors

- Mental overload
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Court Reporting & Captioning Potential Ergonomic Issues

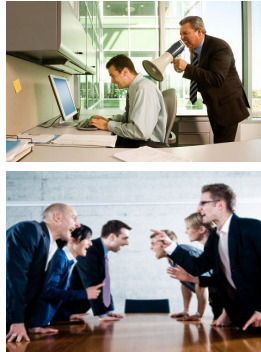
Visual Responses to Computer Use*

- Less blinking (blinks/min)
 - Relaxed conditions (22)
 - Reading book on a table (10)
 - Reading text on a computer monitor (7)
- Wider eyes (exposed ocular surface)
 - Relaxed conditions (2.2 cm²)
 - Reading book on a table (1.2 cm²)
 - Reading text on a VDT (2.3 cm²)

- Mental overload
- Lack of rest and fatigue
- Lighting, temperature
- Stress due to:
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* Tsubota & Nakamori, Dry eyes and video display terminals, *New England J Med*, 328(8):584, 1993.

Court Reporting & Captioning Potential Ergonomic Issues

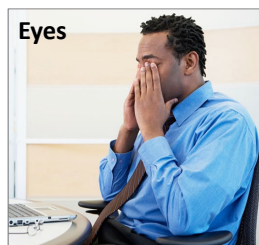
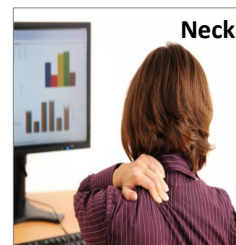
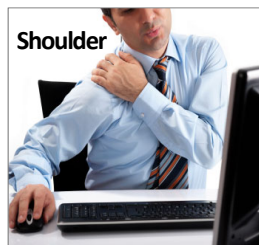
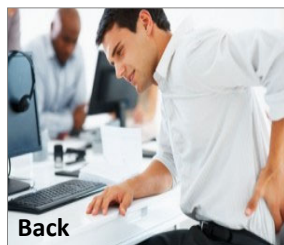


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- Impact on job satisfaction

Step 2: Make A Mental Note: *Do I Have Pain/Discomfort?*



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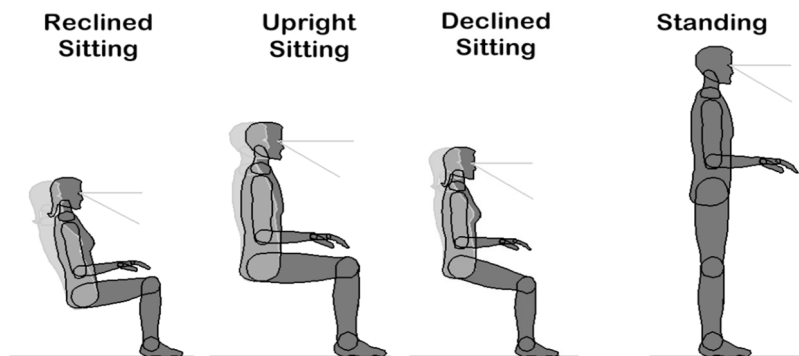
- What might be the cause?
 - Equipment?
 - Example: Chair and desk/table do not work well together -> sore shoulder from extended reaching
 - Tasks?
 - Example: Continuous data entry -> hand/wrist pain

Step 2: Make A Mental Note: ***Do I Have Pain/Discomfort?***

- What might be the cause?
 - Work Methods?
 - Example: Tendency to slouch on chair -> sore back
 - Task Design?
 - Example: Little opportunity for breaks -> More fatigue at end of day
 - Environment?
 - Example: Glare on monitor -> eye strain

Step 3: Make Sure You Have a Supported Working Posture

- Recommended reference postures:



Source: ANSI/HFES 100-2007, *Human Factors Engineering of Computer Workstations*, 2007

Step 3: Make Sure You Have a Supported Working Posture

- Recommended reference postures:



Step 3: Make Sure You Have a Supported Working Posture

Feet don't reach floor when sitting?

- Get a foot rest



Where Do You Position Your Keyboard, Mouse, Monitor(s)?



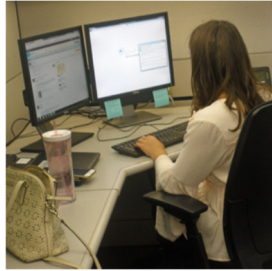
Room for improvement?

Where Do You Position Your Keyboard, Mouse, Monitor(s)?

Single Monitor



Dual Monitors
(equal size)

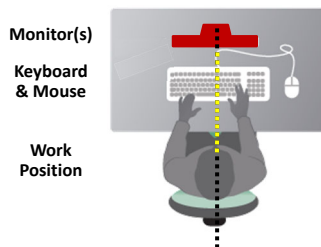


Dual Monitors
(unequal size)

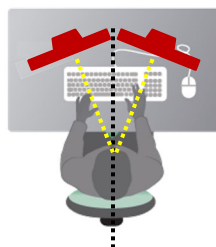


Step 4: Align Input Devices to Working Posture

Single Monitor



Dual Monitors
(used equally)



Dual Monitors
(one is primary)



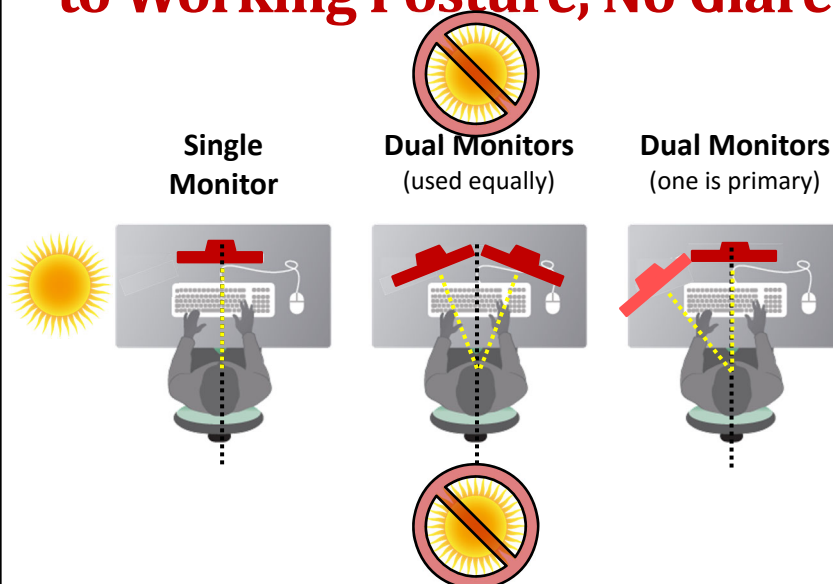
Applies to Sitting or Standing Workstations

Step 4: Align Input Devices to Working Posture

Dual Monitors
(used equally)



Step 4: Align Input Devices to Working Posture, No Glare



Step 4: Align Input Devices to Working Posture, No Glare



Room for improvement?

Step 4: Align Input Devices to Working Posture, No Glare

Bright Light?



Do "Visor Test"



Options to Reduce Glare



Step 4: Align Input Devices to Working Posture, No Glare

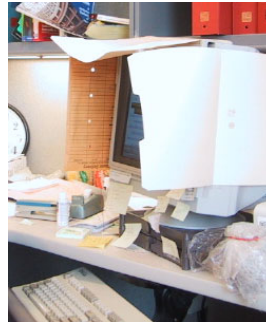
Bright Light?



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Options to Reduce Glare



Step 4: Align Input Devices to Working Posture, No Glare

Bright Light?



Do "Visor Test"



Options to Reduce Glare



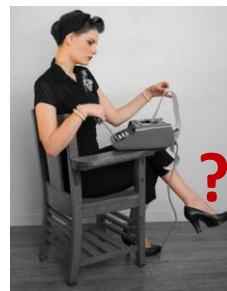
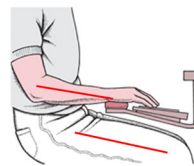
Step 5: Adjust Body Postures, as Needed and Possible



Room for improvement?

Step 5: Adjust Body Postures, as Needed and Possible

- Steno Machine / Keyboard
 - Wrists “neutral”
 - Forearms about parallel with thighs

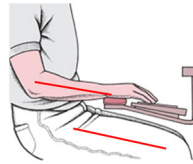


Shoe type can
impact leg posture

Step 5: Adjust Body Postures, as Needed and Possible

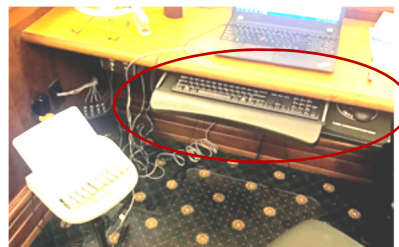
- Steno Machine / Keyboard

- Wrists “neutral”
- Forearms about parallel with thighs



- Mouse/trackball...

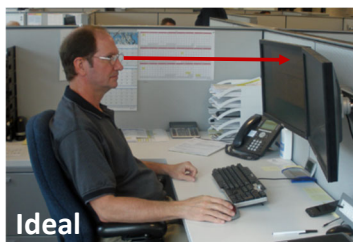
- Close to, same level as keyboard



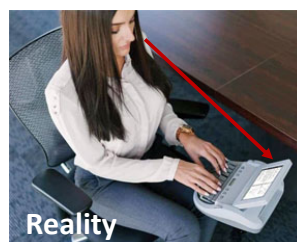
Step 5: Adjust Body Postures, as Needed and Possible

- Monitor(s)

- Top of viewing area level with eyes
- 20”–40” from eyes



Ideal



Reality

Step 5: Adjust Body Postures, as Needed and Possible

- Monitor(s)
 - Top of viewing area level with eyes
 - 20"–40" from eyes

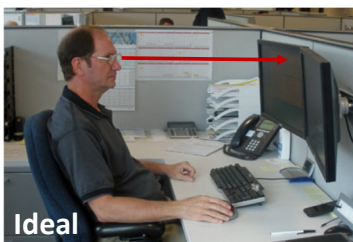


Temporary
solutions
for standard
computer
use

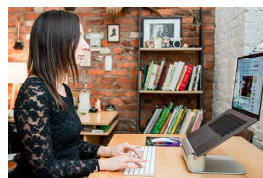
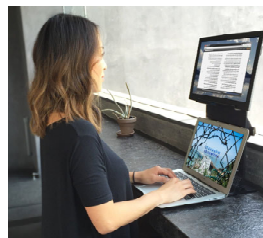


Step 5: Adjust Body Postures, as Needed and Possible

- Monitor(s)
 - Top of viewing area level with eyes
 - 20"–40" from eyes



More permanent solutions for
standard computer use



Step 6: Provide Support **across the Body (home/office)**

- Back

Chair
backrest

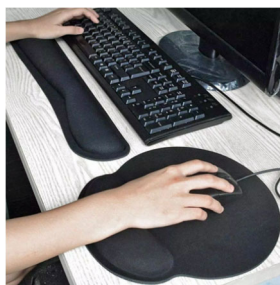


Lumbar support

Step 6: Provide Support **across the Body (home/office)**

- Wrists
and/or
- Forearms

Multi-
adjust
armrests



Wrist rests

Step 6: Provide Support **across the Body (in the field)**

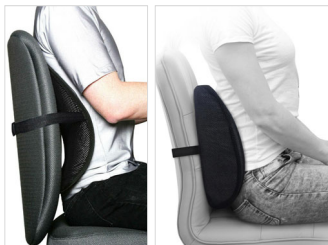
- What can be adjusted on this chair?
- What support does this chair provide?



Step 6: Provide Support **across the Body (in the field)**

- Back

Portable
seat wedge



Portable back rest



Portable lumbar support

Step 6: Provide Support **across the Body (in the field)**

- Wrists
and/or
- Forearms



Ergoprise court
reporter chair *



Steno Rest
wrist support *



ReportIt™ *
foot and arm rests

* SRI•Ergonomics does not endorse any specific products

Step 6: Provide Support **across the Body**

- Arms



Steno Mask Strap *



Steno Hands-Free Stand *

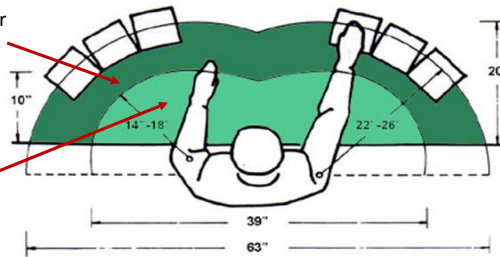
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Step 7: Consider Locations of Commonly used Items



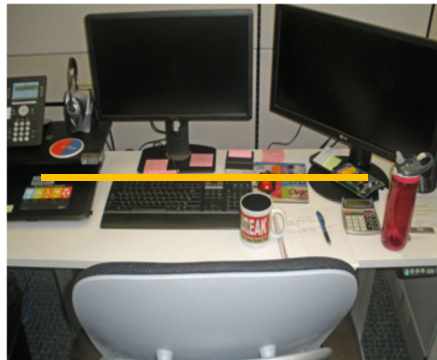
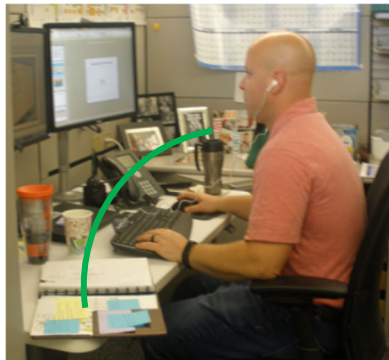
Work Envelope Reach Guidelines

- Recommended reach distance for accessing rarely used materials: 22"-26" from the shoulder (darker area)
- Recommended work envelope for commonly used materials: no further than 18" from the shoulder (lighter area)



Step 7: Consider Locations of Commonly used Items

Good...or Opportunity for Improvement?



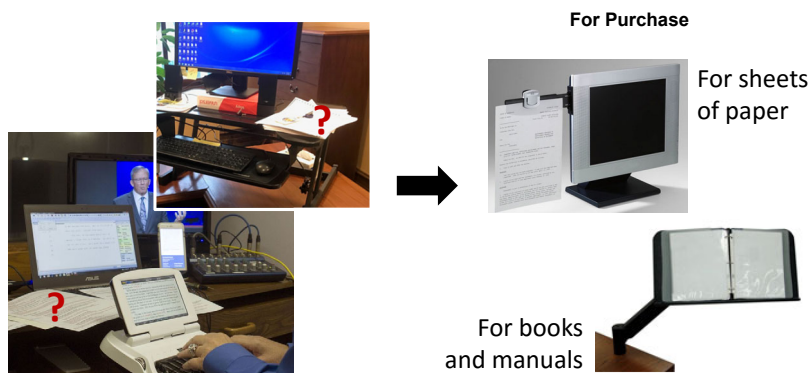
Step 7: Consider Locations of Commonly used Items

- When feasible, use document holders, which helps with posture and vision



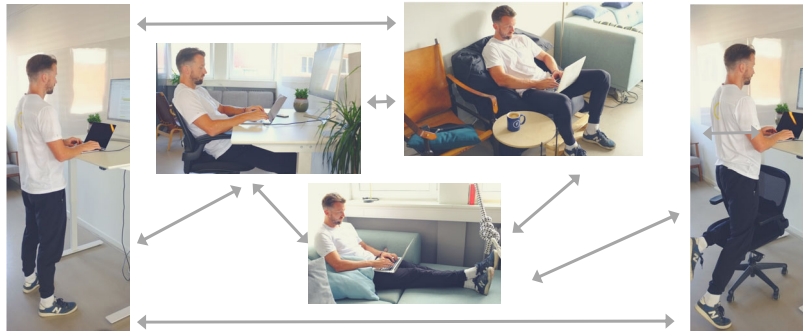
Step 7: Consider Locations of Commonly used Items

- When feasible, use document holders, which helps with posture and vision



Step 8: Remember: *The Next Posture is the Best Posture*

- These postures are acceptable...



...if they are not *always* used

Step 9: Remember: *MOVE AROUND* whenever possible!

- Research on repetitive computer work:
 - For first four hours of work, an extra five-minute break each hour:
 - Reduced discomfort and eyestrain
 - Eliminated some discomfort
 - Breaks taken every 20 min. reduced discomfort; did not affect productivity
 - Exercise and rest breaks reduced discomfort in computer tasks

Sources: *Ergonomics*, 2000; *Applied Ergonomics*, 2001; *Journal of Physical Therapy Science*, 2007.

Step 10: Remember: Team Effort for Improvement

Employer

- Provide resources for evaluations and solutions
- Encourage employee control over equipment and layout design
- Get employee input on planned workplace changes

Employee

- “New equipment” is not always the answer
- Make quick fixes based on these Steps
- Address discomfort or other issues early
- Maintain adequate levels of health and nutrition

Reducing Physical Stress in the Work Environment: Focus on Seated Workstations

Picking the “Right” Equipment, if it’s Needed

Seated Workstations

Many Individual Preferences



Sit-Stand Workstations

Purpose

- Allows computer users to move between standing and sitting work positions



Sit-Stand Workstations

Rationale / Pro's

- 64% decrease in MSD complaints (1994)
- Standing, compared to taking a work break, changes body posture, can reduce fatigue, and may increase or at least not decrease performance (2002, 2019)
- Decreased discomfort ratings, especially later in work day (2004, 2019)
- Users preferred ability to vary work posture (2004)

Sit-Stand Workstations

Con's

- Blood circulates less when standing than when walking
- Some users stood only for short periods of time (i.e., <15 minutes total per day)
- Use declined rapidly after ~one month
- Does not improve psychological health (2019)
- Can be expensive



Sit-Stand Workstations

Bottom Line

- If used, all needed equipment should be on the working surface
- Correct postures needed for either sitting or standing
- Most important way to reduce fatigue from seated use is to move, about every 20-30 minutes; just standing up may not be enough

Exercise Ball Chairs

Purpose

- To strengthen core muscles (like in the gym) to tasks done at work



Exercise Ball Chairs

Rationale / Pro's

- Applies the benefits of exercise balls used in gyms (strengthening core muscles) to computer tasks in the office
- Anecdotally, reduced pain found among those experiencing back problems
- Recommended by several chiropractors who treat those with low-back pain
- Cheaper than chairs (cost - \$25-\$50)

Exercise Ball Chairs

Con's

- Most do not provide back support
- Usage increases activity of trunk muscles and reports of discomfort
- Ball material is non-breathable, so it will not transfer heat and moisture away from the body
- Ball instability could lead to safety issues (falling off while working)

Exercise Ball Chairs

Bottom Line

- Likely not a replacement for an ergo office chair that provides adjustability
- May be:
 - Beneficial for temporary sitting, to strengthen one's core, but not for long-term use
 - Effective rehab for those being treated for low back pain, but should be done only under supervised care

**Reducing Physical Stress in the Work
Environment: Focus on Seated Workstations**

Resources

Resources Online Tools

- OSHA - eTool -
www.osha.gov/SLTC/etools/computerworkstations/index.html
- Cal/OSHA - *Easy Ergonomics Easy Ergonomics for Desktop Computer Users* -
www.dir.ca.gov/dosh/dosh_publications/ComputerErgo.pdf
- WorkSafe Canada – *How to Make Your Computer Workstation Fit You* -
www.worksafenb.ca

Resources Free Smart Phone Apps*

- Ergonomics (Stand Up Apps)
 - Workstation set-up info, stretching exercises, break alarms
- Office Ergo (EWI Works)
 - Workstation adjustment reminders
- Workpose (Rehab Solutions)
 - Workstation set-up info
- Wellnomics Stretches
 - Stretch routines



* SRI•Ergonomics does not endorse any specific products

Final Thoughts

- Workstations are not “*one size fits all*”
- For a proper set-up, get comfortable, then “work outwards”
- There are many ways to improve off-site workstations
- Do not assume all “ergo” equipment is actually good
- There are lots of free resources to help

Questions?

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