

ERGONOMICS



University at Albany
Office of Environmental Health and Safety
2019

WHAT IS ERGONOMICS?

From the Greek: *ergon* work and *nomoi* natural laws

Defined by Merriam-Webster as:
An applied science concerned with designing and arranging things people use, so that the people and things interact most efficiently and safely - also called biotechnology, human engineering or human factors

WHAT IS ERGONOMICS?

- *The study of interaction between people and their work environment*
A main goal of ergonomics is adapting the work environment to the worker, whenever possible.
- **Looking for adjustability, not one size fits all**

ERGONOMICS

Interdisciplinary:

Anthropometrics – (body sizes and types)

Biomechanics

Psychology

Industrial Design and Engineering

Safety

Includes:

Lighting & Temperature

Process (heights, reaches, weights)

Layouts/types of controls & displays

ERGONOMICS AT WORK



JET COCKPIT

GOALS OF ERGONOMICS

- **To reduce occupational injury and illness, such as carpal tunnel syndrome, tendonitis, and low back pain**
- **To improve productivity and work quality**
- **To reduce employee absenteeism and improve morale**
- **To contain worker's compensation costs**

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- **Work Related Musculoskeletal Disorders**
- **What Are Work Related Musculoskeletal Disorders (WMSDs)?**
- **When a muscle, tendon, nerve or joint is stressed and traumatized on a repeated basis for days, months or years, those body tissues eventually become damaged. This leads to a work related musculoskeletal disorder.**

ERGONOMICS

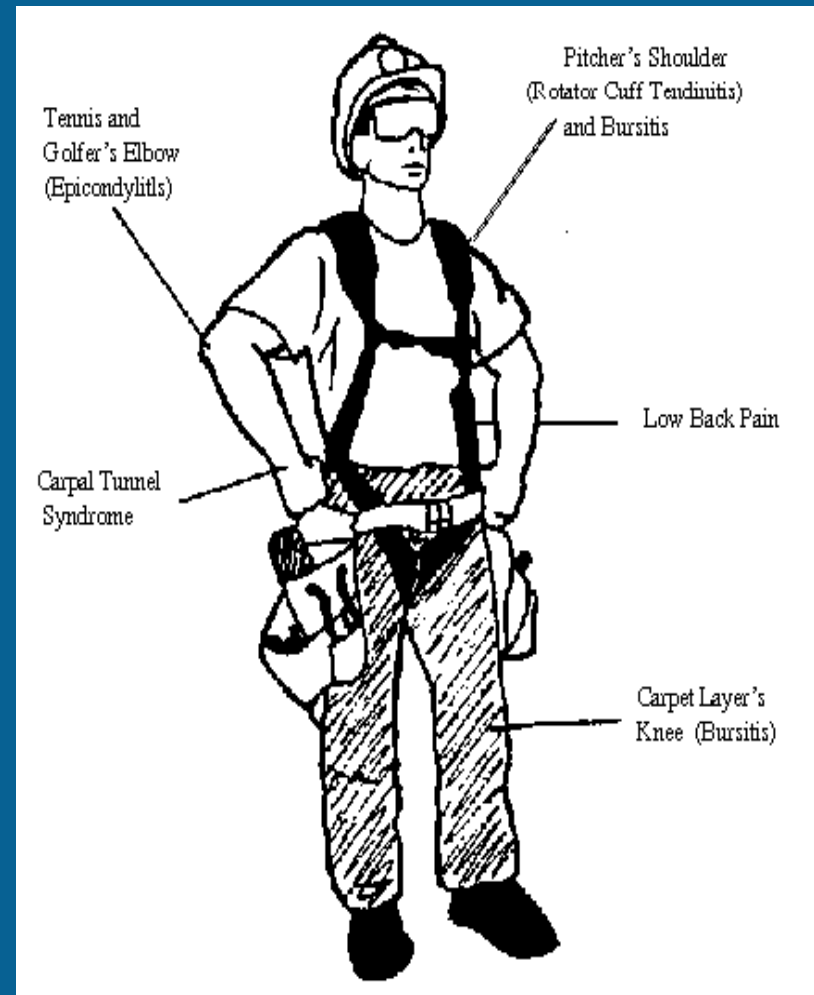
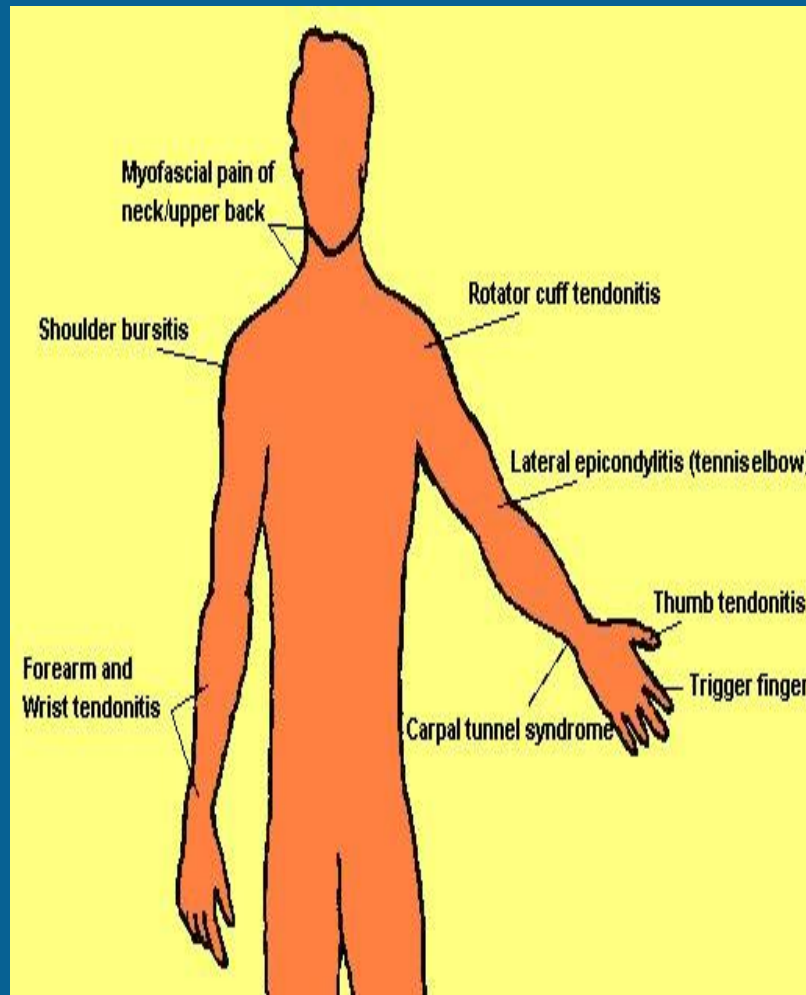
- **Work related musculoskeletal disorders (WMSDs) are sometimes called repetitive motion injuries, repetitive strain injuries (RSIs), cumulative trauma disorders and overuse injuries.**
- **Carpal tunnel syndrome, Tendonitis, Thoracic outlet syndrome, and Tension neck syndrome are all examples of WMSDs.**

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- **When a WMSD develops, a worker experiences:**
- **swelling, as tissues become irritated**
- **pain**
- **stiffness and loss of range of motion of surrounding joints**
- **inability to work and function at home**



Work Related Musculoskeletal Disorders



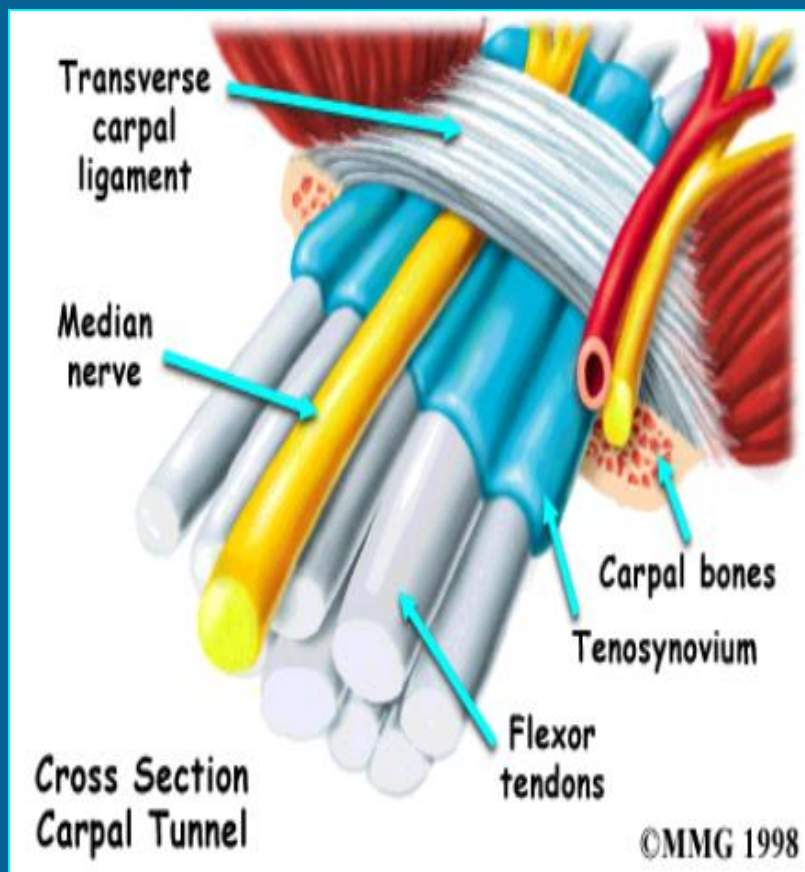
WHY WORRY ABOUT ERGONOMICS?

- **Work Related Musculoskeletal Disorders (WMSDs), often referred to as ergonomic injuries, accounted for 32% of the injuries and illnesses with days away from work in 2017 in private industry, according to the Bureau of Labor Statistics (BLS).**
- **The median days away from work for WMSD cases in 2017 was 12 days, as compared to 8 days for all days-away-from-work cases.***
- ***BLS 2017**

CARPAL TUNNEL SYNDROME

- **CARPAL TUNNEL SYNDROME (CTS)**
- **Occurs with repetitive motion of hands & wrists--especially with high force levels**
- **Incidence up to 15% in certain industries.**
- **In 2017, median days away from work for CTS was 30 days.**
- **A “natural” keyboard and good wrist support can help most PC users avoid problems.**
- **GOOD NEWS: The incidence of CTS has dropped about 30% since 1990, which most attribute to strong workplace ergonomics programs.**

CARPAL TUNNEL SYNDROME



- When the lining around the tendons is inflamed, there is less space for the median nerve and it becomes compressed.

CARPAL TUNNEL SYNDROME

Symptoms may include: Pain, Numbness, Tingling, “Funny Feeling” in the fingers (thumb, index and middle fingers), hand or wrist.

CTS is one of the most common job-related injuries.

CTS accounts for ~ 10% to 17% of repetitive strain injuries.

CTS strikes ~ three times as many women as men.

CTS results in more than 2 million visits to physician’s offices each year.

*** From YourMedicalSource.com**

THE NEUTRAL POSITION



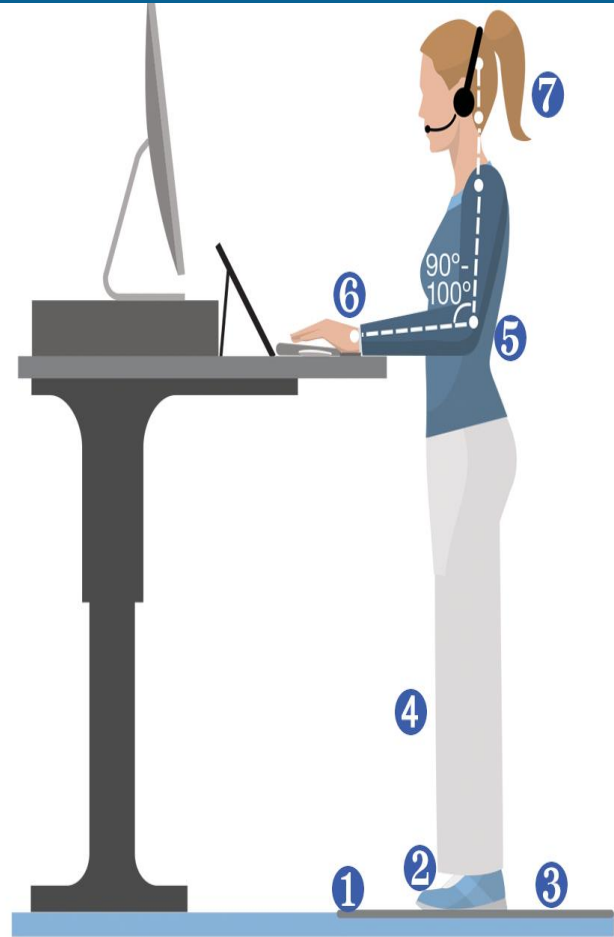
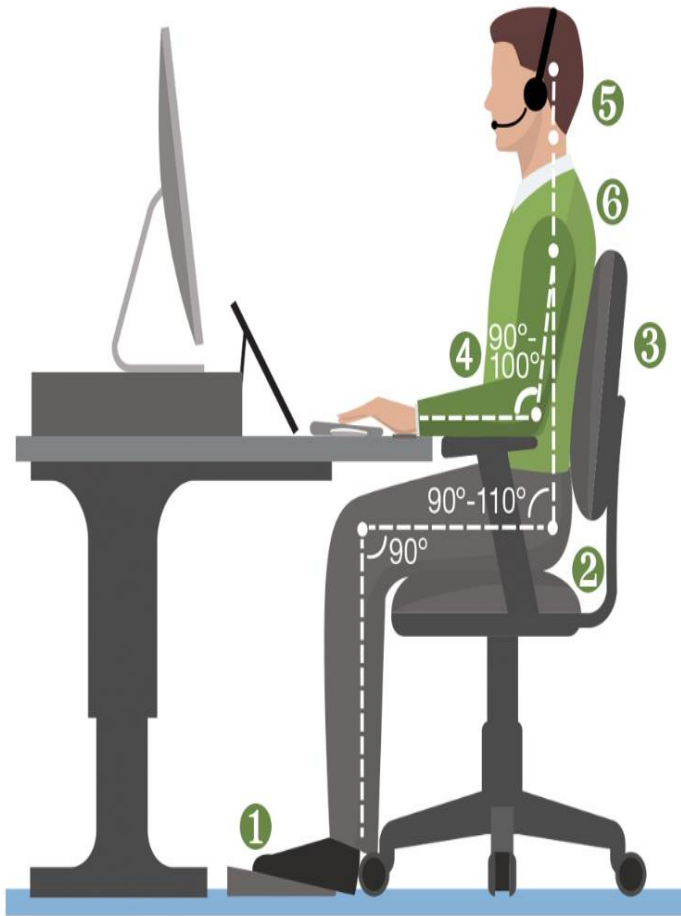
- **Neutral Posture (GOOD)**
Defined as the position our bodies take in the absence of gravity (e.g., in space)
- Position in which repetitive stress injury is least likely to occur
- **Static Positions (BAD)**
Muscles become fatigued when blood flow is reduced

A NEUTRAL POSTURE

- While sitting, your head is balanced naturally over your shoulders. Your shoulders are relaxed and your forearms and thighs are parallel to the floor, at a 90 angle to upper arms and lower legs.

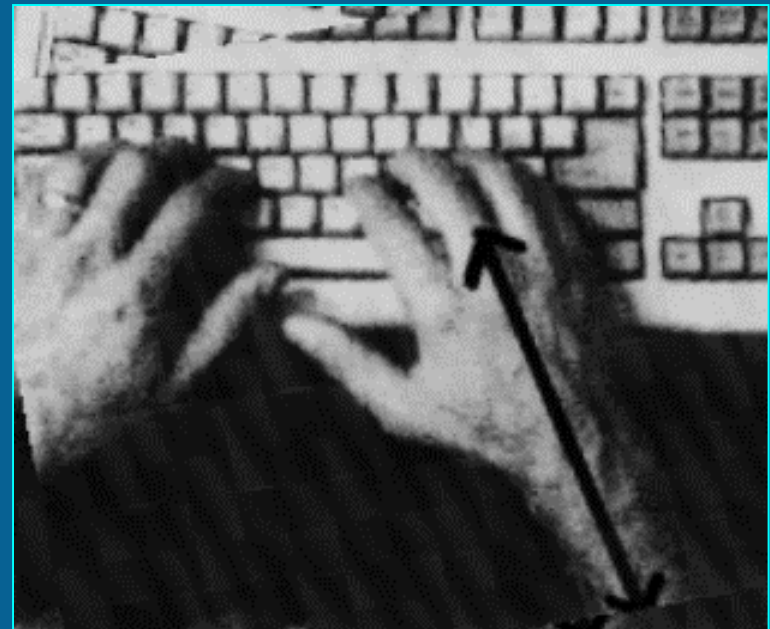
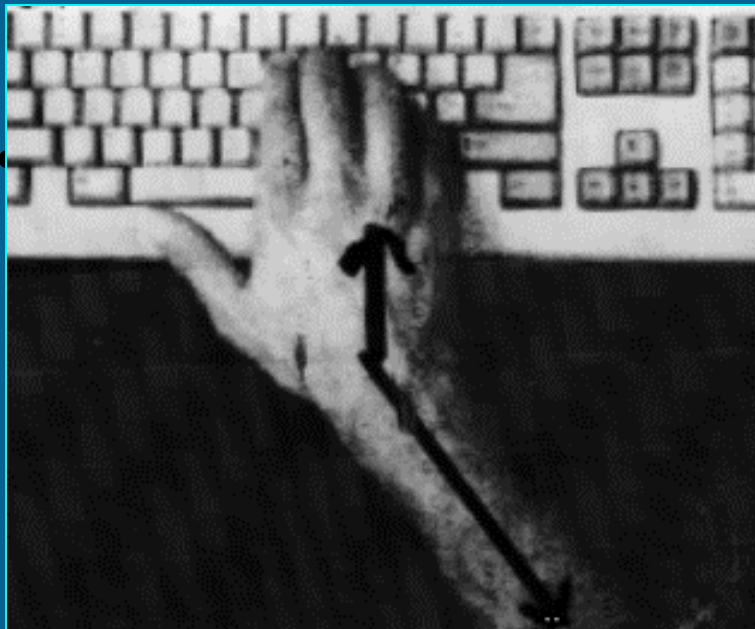


THE NEUTRAL POSITION

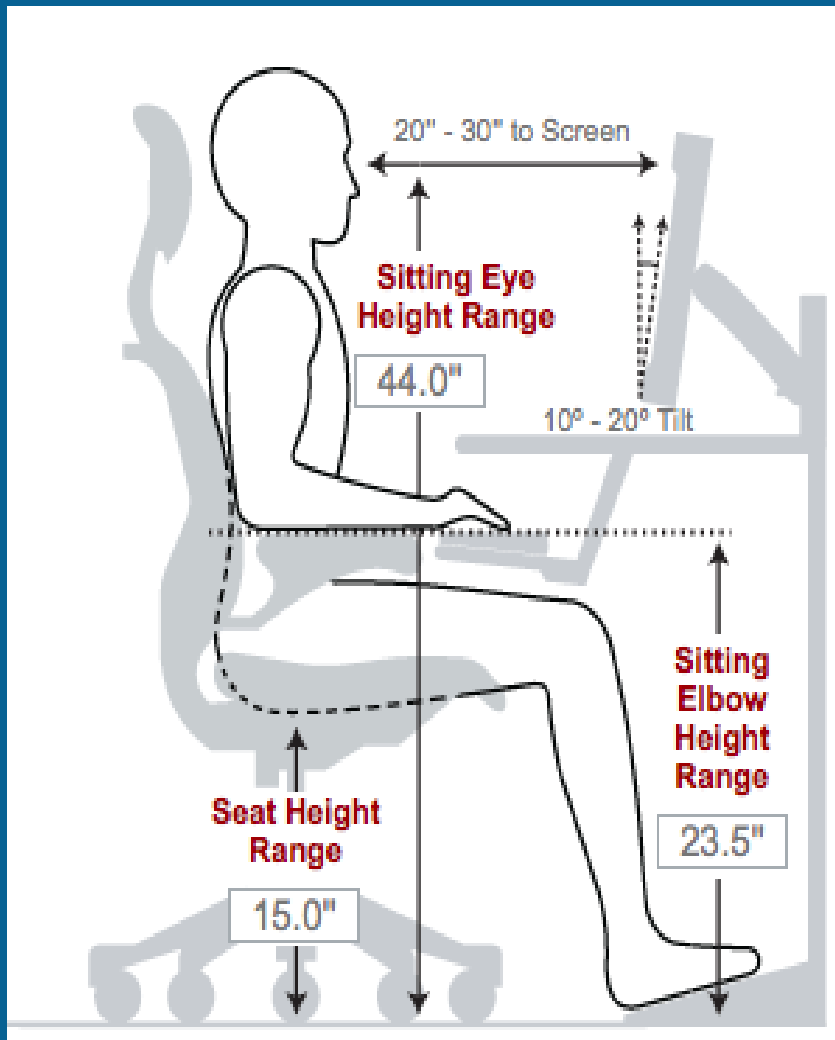


MORE NEUTRAL POSTURES

- **WRIST POSTURE – NOT BENT OR TWISTED**



WORKSTATION DESIGN



- *INCLUDES:*
- CHAIR
- MONITOR
- KEYBOARD AND KEYBOARD TRAY
- MOUSE
- DESK
- FOOTREST
- DOCUMENT HOLDER

A GOOD CHAIR

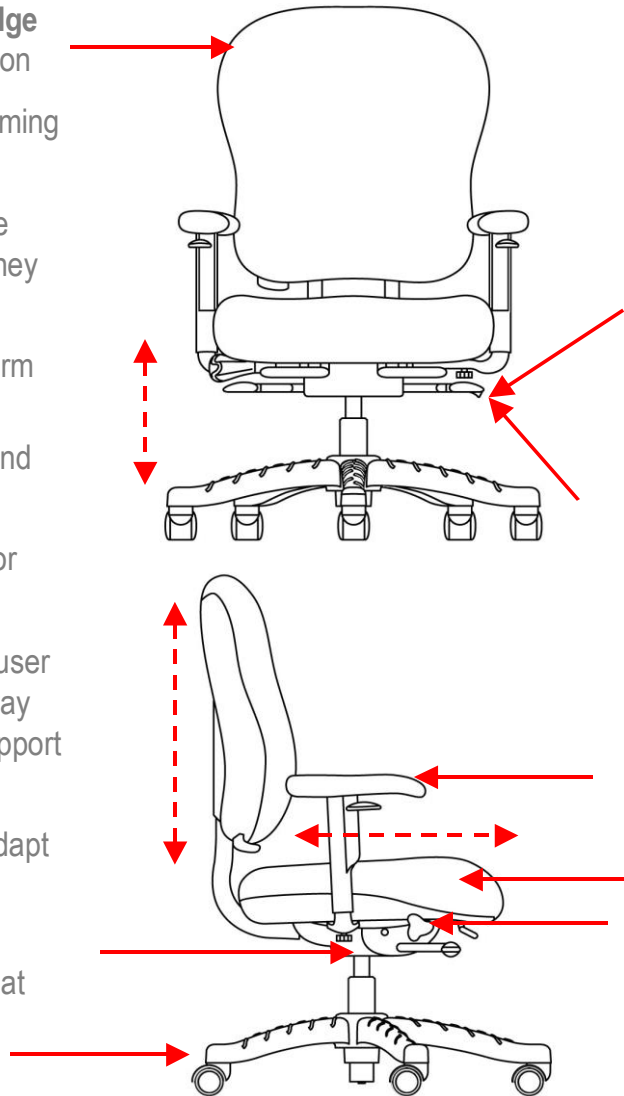
- **ADJUSTABLE FOR:**
- **HEIGHT**
- **SEAT DEPTH**
- **SEAT ANGLE**
- **BACK SUPPORT
(LUMBAR)**
- **ARM RESTS**
- **TILT**



What to Look for in a Good Ergonomic Chair

A good ergonomic chair should fit users comfortably and support different working positions

- **Generous cushions** and **waterfall edge** that encourage movement and circulation
- **Supportive foam** that prevents “bottoming out” and pressure points.
- **Soft edges on cushions** that promote comfort in different seated positions. They also protect surrounding workspaces.
- The **chair back** that does not hinder arm movement while seated
- **Adjustment knobs** that are intuitive and easy to grip
- Simple, east-to-reach **adjustments** (for ADA accessibility.)
- **Arms that are recessed** to allow the user to get close to the worksurface. Four-way adjustable arms include height, arm support width, fixed rotation and pad slide.
- **Removable/retrofitable arms** that adapt the chair to the users’ preferences and enable easy upgrades.
- **Pneumatic seat height** adjustment that includes optional cylinder sizes to accommodate different users.



- **Synchronized tilt** that mimics the body’s movement without straining the back. Good ergonomic tilts do not cause the front edge of the chair to rise during recline, ensuring proper circulation to the legs.
- **Tilt tension** that adjusts the recline resistance to the user’s preferred amount.
- **Tilt lock** that supports the back in the upright position and variable position stop tailors the recline range.
- **Back height adjustment** that controls the height of the entire back for lumbar and upper back support. (about 3”-4” covers the full lumbar range.)
- **Forward tilt** that creates a forward incline of the seat and back with the ability to recline and lock in this mode. Forward tilt allows the chair to support the body in the position most people assume when typing.
- **Seat depth adjustment** that changes the seat depth to accommodate different height users.
- **Five star base and casters** that provide stability and mobility.

COMPUTER MONITOR



- **POSITION THE MONITOR:**
- **Directly in front of body**
About 20 to 40 inches away from body (arm's length)
Top of monitor about eye level, or slightly below

KEYBOARD TRAY

- **KEYBOARD TRAY**
- Should be easily adjustable for **HEIGHT** and **TILT**
- Should allow for right or left hand placement of **MOUSE**
- Should be stable



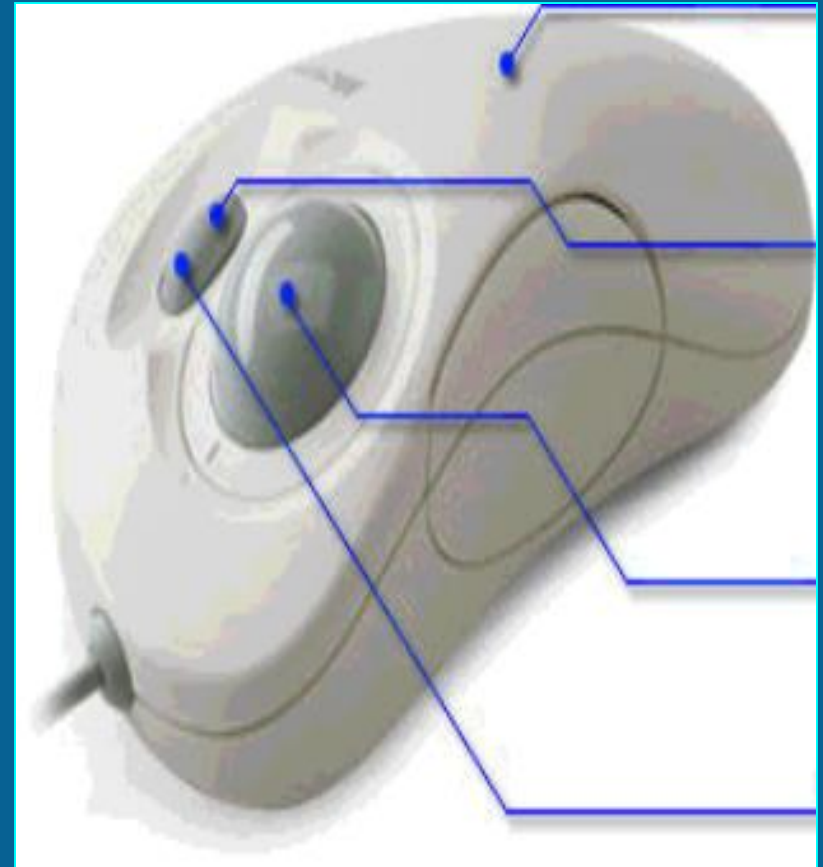
“NATURAL” KEYBOARDS

- **Three types:** Fixed split, Adjustable split & “Sculptured”
- Awkward wrist postures minimized with 15 to 25 horizontal degree key split AND 8 to 66 degree vertical incline.
- **Key Layout Design Changes Have:**
 - increased comfort (81% of users)
 - improved postures
 - reduced muscle activity
 - lowered carpal tunnel pressure in lab settings
- Obtained primarily to alleviate an injury

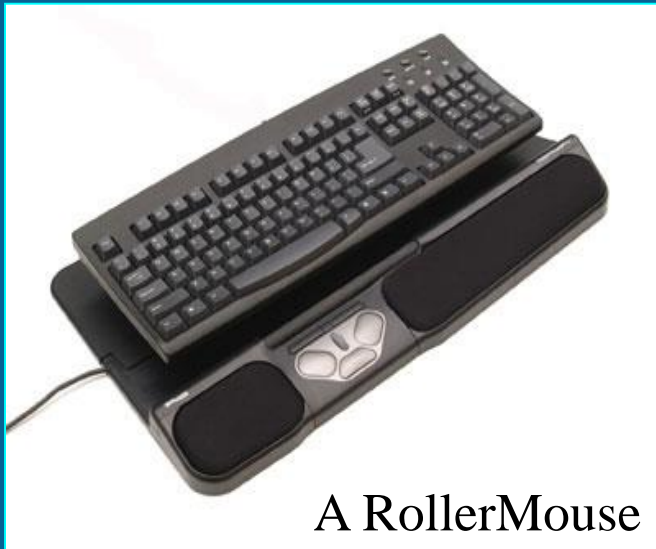


The MOUSE

- **The mouse should be at the same level and distance as the keyboard.**
- **The mouse should fit the hand. They do come in sizes!**
- **Also, track balls require less index finger work.**



OTHER OPTIONS



A RollerMouse

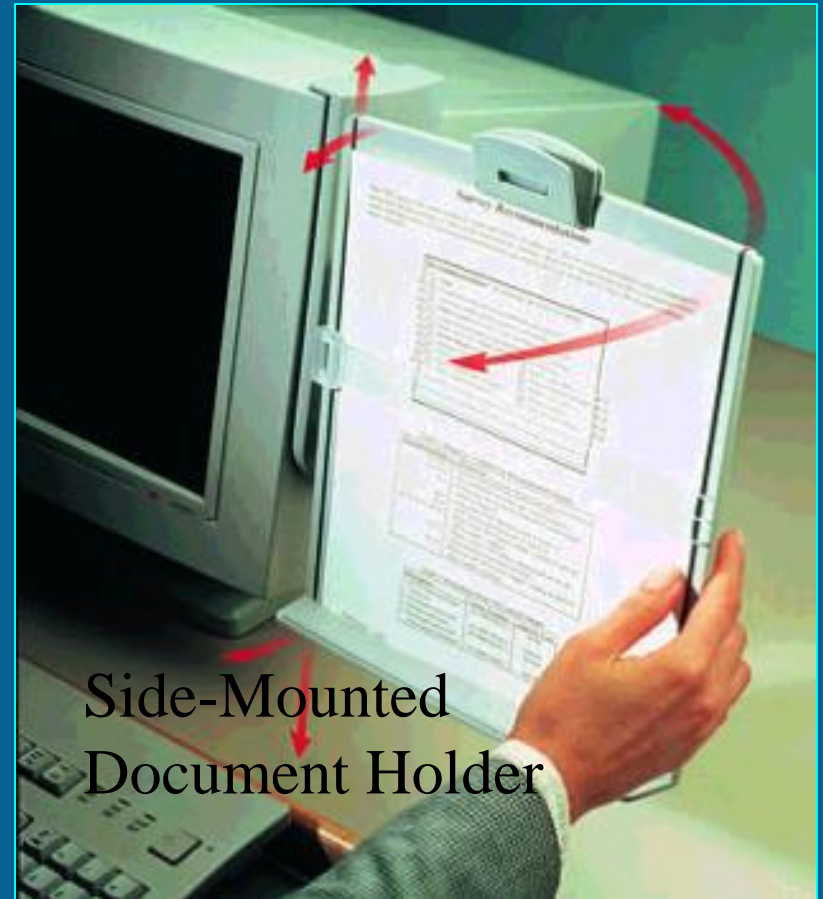


UltraLite Zero Tension Mouse

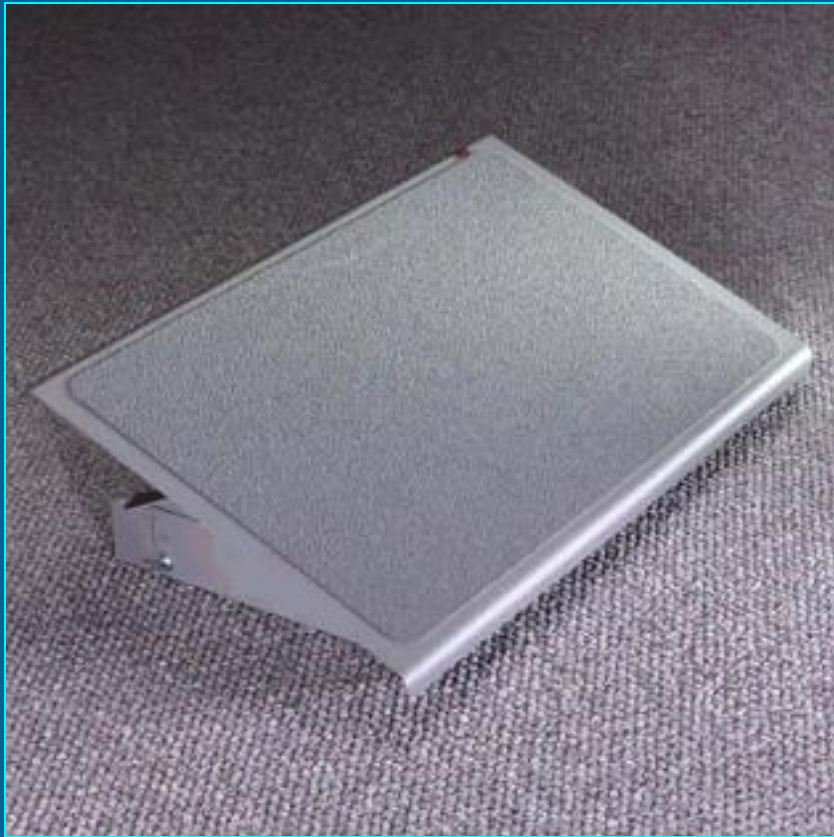


Wireless
Vertical
Mouse

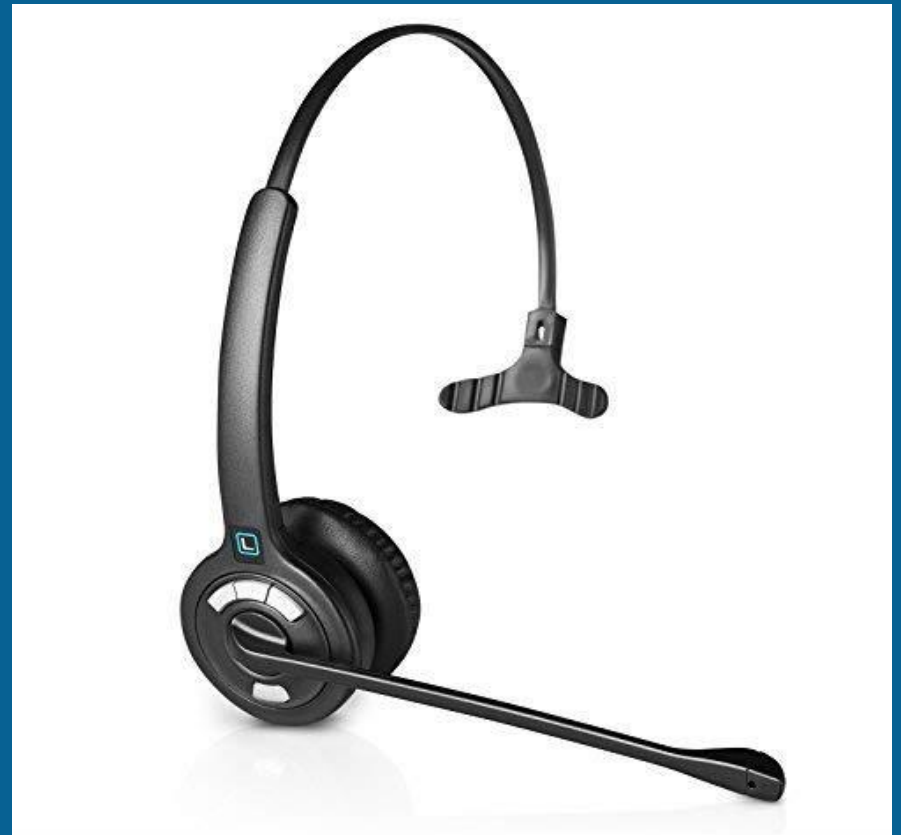
DOCUMENT HOLDERS



COMPUTER ACCESSORIES



FOOTREST

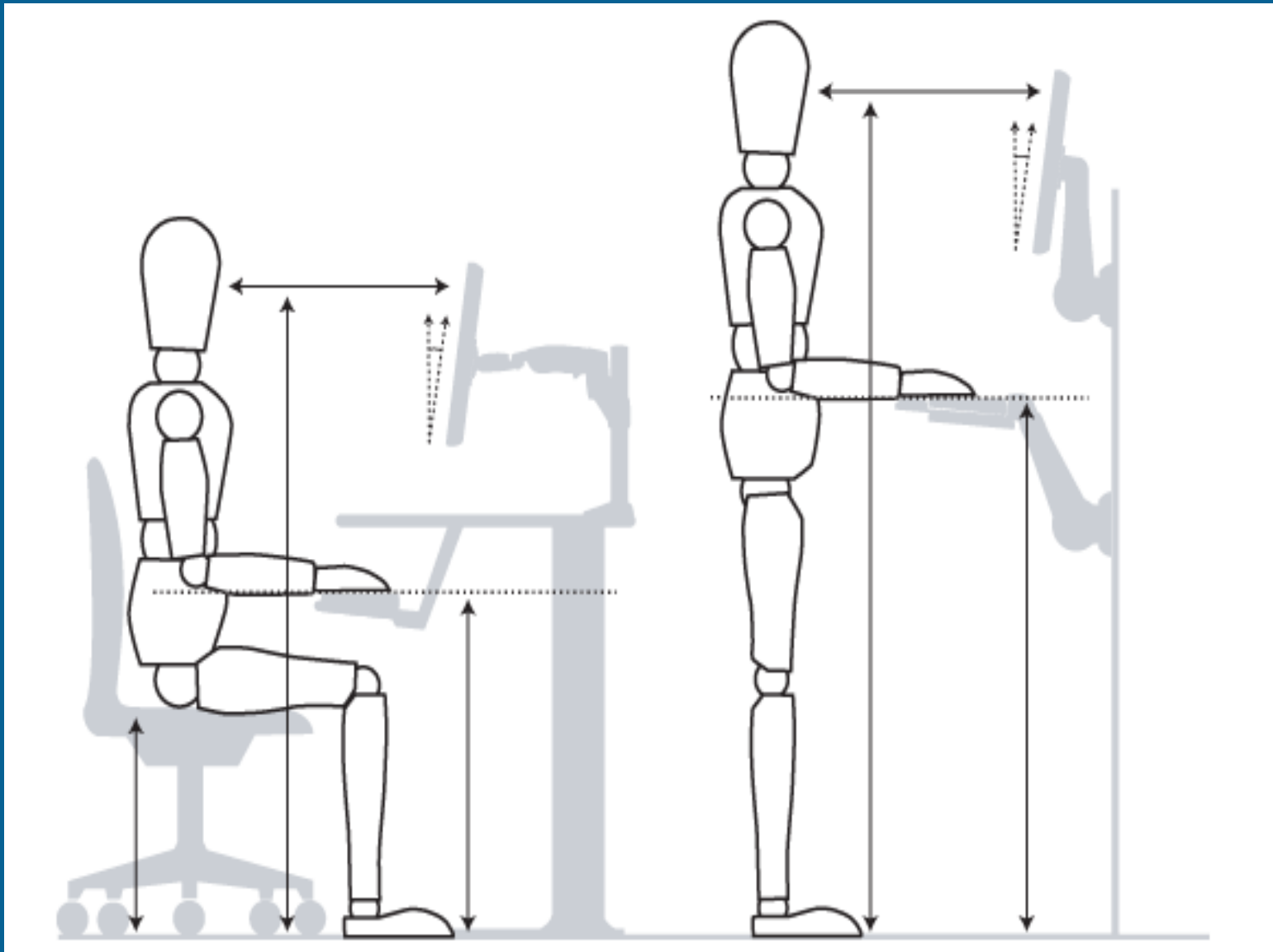


TELEPHONE
HEADSET

WRIST RESTS

- Buy rest that is even with top of keyboard
- Material should be “medium-soft” (foam--gel mix) so foam doesn’t break down. **AVOID** hard plastic types
- **DON’T** leave wrists on rest...which compresses carpal tunnel. *Palm rest instead.*
- Changing typing habits more critical than wrist support
- **MOST APPROPRIATELY USED TO REST HANDS DURING PAUSE IN TYPING**
- **LEARN TO TYPE CORRECTLY WITH “FLOATING WRISTS” FIRST!!!**





Sit-Stand Desk

ERGONOMICS

- ANY QUESTIONS?