

ERGONOMICS FOR THE 21ST CENTURY



**Sedgwick CMS
on the behalf of the
OFFICE OF RISK MANAGEMENT**

Revised 7/2015

PRE-TEST

- What is **ergonomics**?
- What are **MSDs**?
- What are symptoms of MSD?
- How can I evaluate my workplace?
- What are some ergonomic solutions?

COURSE OBJECTIVES

- Define ergonomics
- Establish ergonomics in the workplace
- Introduce basic skills in the recognition & control of occupational ergonomic hazards
- Introduce ergonomic exercises.



PROGRAM GOAL



To minimize injuries due to chronic physical and psychological stresses, while maximizing productivity and efficiency

ERGONOMICS DEFINED



Ergonomics is the science of fitting the job to the worker.

BIOMECHANICS



The science of measuring the amount of force put on the muscles and joints of people when working in different positions.

BIOMECHANICS CONT.

- **STATIC** - Holding one object or body part in one position for an extended period. *EX.* Standing or sitting in a parking booth or at a microscope.

BIOMECHANICS CONT.

- DYNAMIC - An activity created by the rhythmic contraction and relaxation of the muscles. *EX.* Walking

DID YOU KNOW?

- As early as the 1700's scientists were aware of *repetitive movement* injuries to workers.
- Bernardino Ramazzini (1633
 - Clerks
 - Cobblers and tailors
 - Porters



ERGONOMIC STUDY AREAS

WORKERS - what they bring to the job

TOOLS - what they bring to the worker

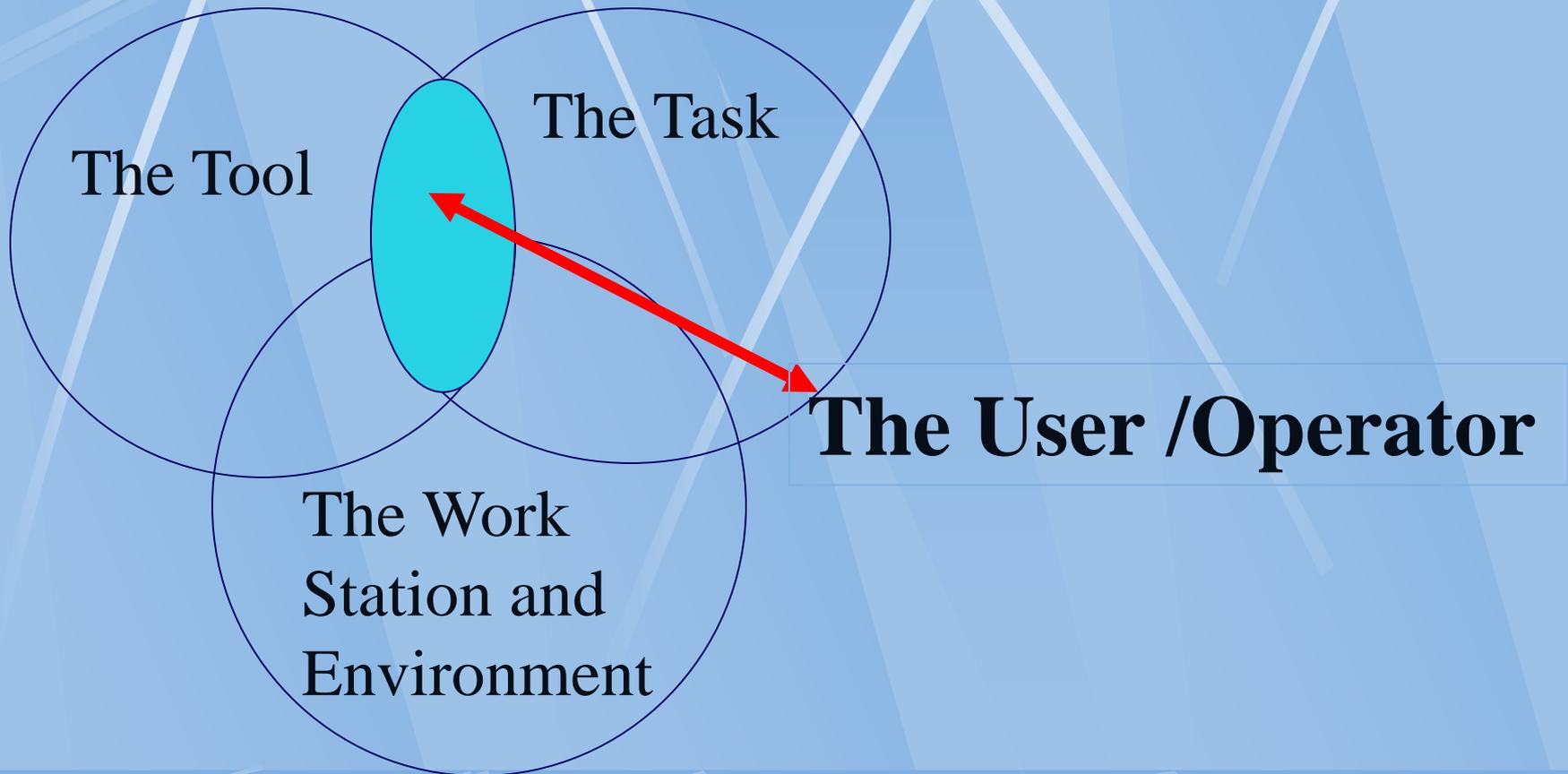
ERGONOMIC STUDY AREAS



TASKS - what the worker must do

ENVIRONMENT- the conditions
surrounding the worker and the tool

ERGONOMIC FOCUS



RESULTING INJURIES ARE CALLED:

- **Cumulative Trauma Disorders (*CTD*),
Or**
- **Repetitive Strain Injuries (*RSI*),
Or**
- **Musculoskeletal Disorders (*MSD*)**

HOW SERIOUS ARE MSD

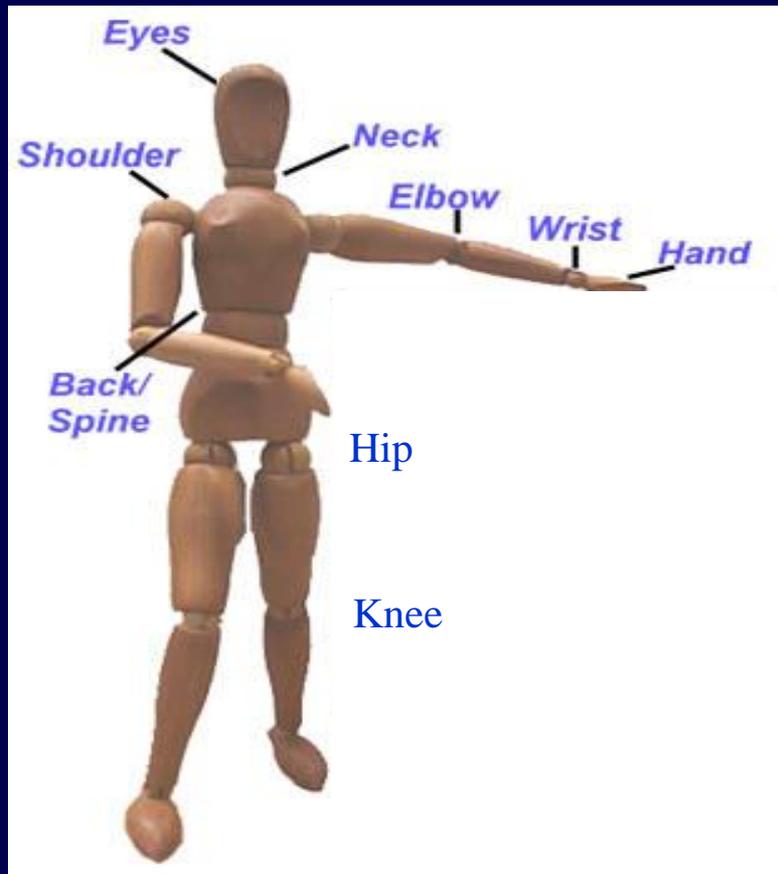
- MSD account for:
 - 1/3 of all lost day injuries each year
 - These injuries cost business \$15-20 billion in worker's compensation each year

COMMON CAUSES:

- Repetitive and/or prolonged activities
- Awkward postures/positions for an extended time
- Static postures
- Vibration
- High/low Temperatures for an extended time
- Forceful exertions



ERGONOMIC STRESS AREAS



SIGNS OF MSD

- Decreased range of motion
- Loss of function
- Deformity
- Cramping
- Loss of color
- Decreased grip strength
- Loss of balance
- Swelling
- Redness

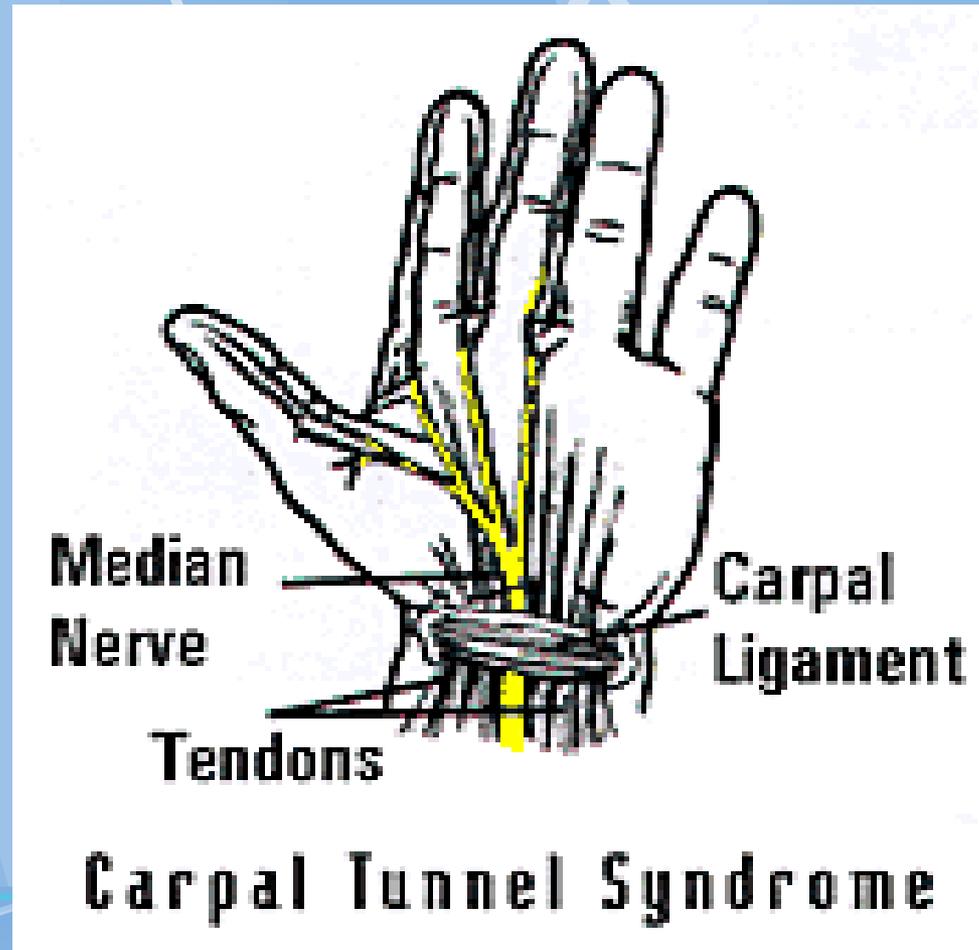
SYMPTOMS OF MSD

- Muscle fatigue or pain
- Aching
- Burning
- Numbness
- Stiffness
- Tingling

EXAMPLES OF MSD

- **TENDONITIS-** An inflammation of the tendon. Typically occurs in the shoulder, wrist, hands, or elbow.
- **CARPAL TUNNEL SYNDROME-** Irritation of the median nerve, which runs through a bony channel in the wrist called the carpal tunnel. Usually results from excessive flexing or twisting of the wrist.

CARPAL TUNNEL SYNDROME



MSD CONT.

- **TRIGGER FINGER SYNDROME**- Tendons in the fingers become inflamed, causing pain, swelling, and a loss of dexterity.
- **EYE STRAIN** - The eyes become strained as a result of poor lighting, glare or viewing from awkward positions.

MSD CONT.

- **HAND/ARM VIBRATION SYNDROME-**
Tingling, numbness, blanching, loss of dexterity in the hand/arm
- **MUSCLE STRAIN – Pain in muscles**

VIDEO

WHAT CAN WE DO?

- Administrative controls
- Work practice controls
- Engineering controls

ADMINISTRATIVE CONTROLS

- Employee rotation/job task expansion
- Physical adjustments to the work pace
- Redesign of work methods
- Alternative tasks
- Breaks

WORK PRACTICE CONTROLS

- Safe & proper work techniques & procedures
- Training
- Physical conditioning period



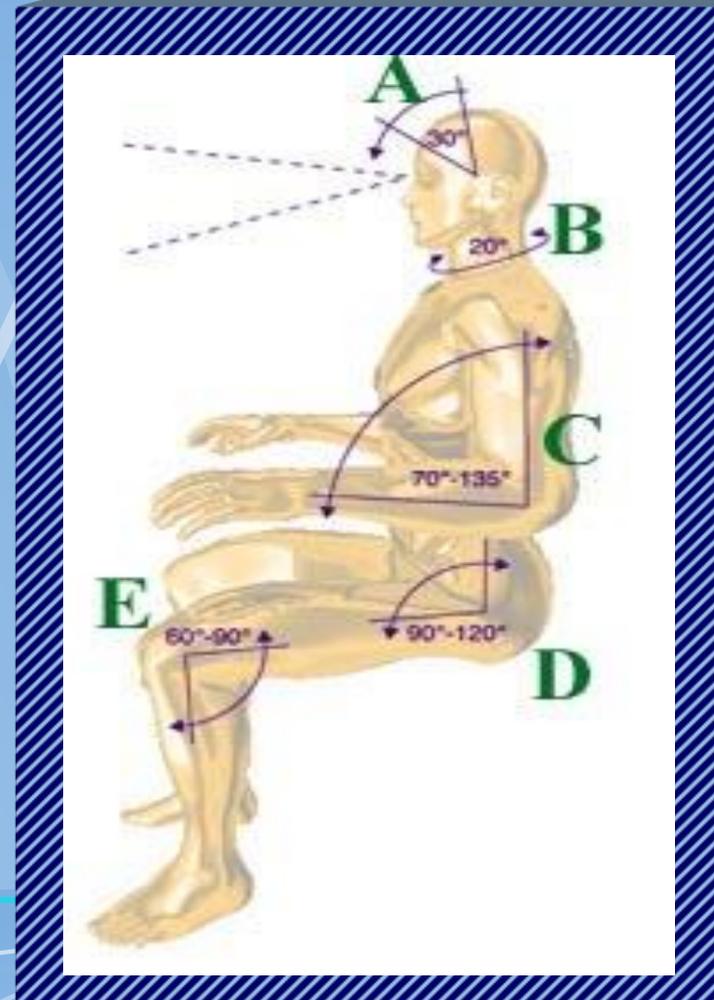


POSTURE & ANGLES

- Whether your tasks are performed while sitting or standing, always maintain proper posture & angles--and avoid:
Awkward positions, and
Extreme reaches for materials

BODY ANGLES

- HEAD
- SHOULDERS
- ELBOWS
- HANDS
- WAIST
- LEGS
- FEET



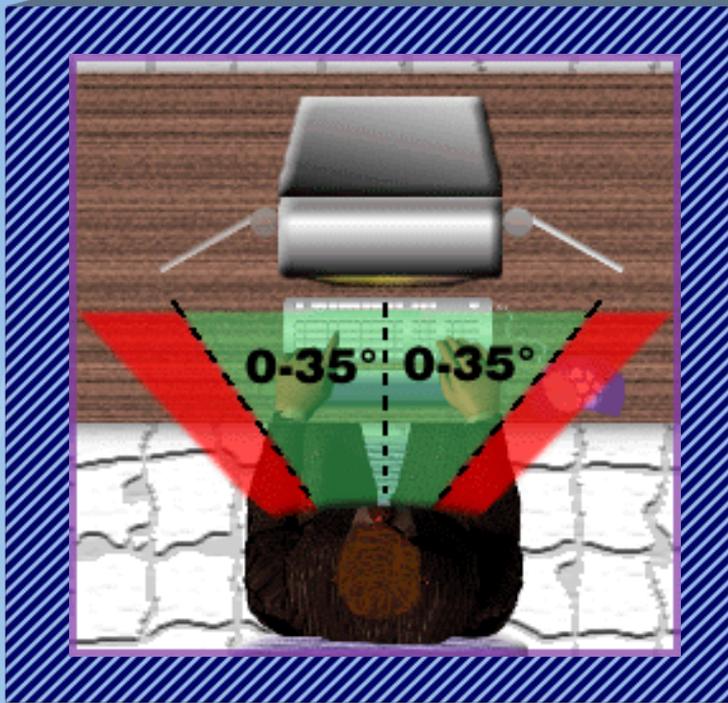
SITTING POSTURES



MORE ANGLES...



MORE ANGLES...













ENGINEERING CONTROLS

- Workstations
- Tools/equipment
- Facilities

WORKSTATIONS

The objective is to:

- Fit the workstation to the employee
- Reduce awkward positions

This can be done by using two methods:

WORKSTATIONS CONT.

Standard Way

- Adjustable workstation
- Adjustable chair
- Foot rests
- Adjustable monitor
- Document holder

Innovative Way

- Cut legs off
- Add blocks
- Build foot rest
- Thick book
- Build platform

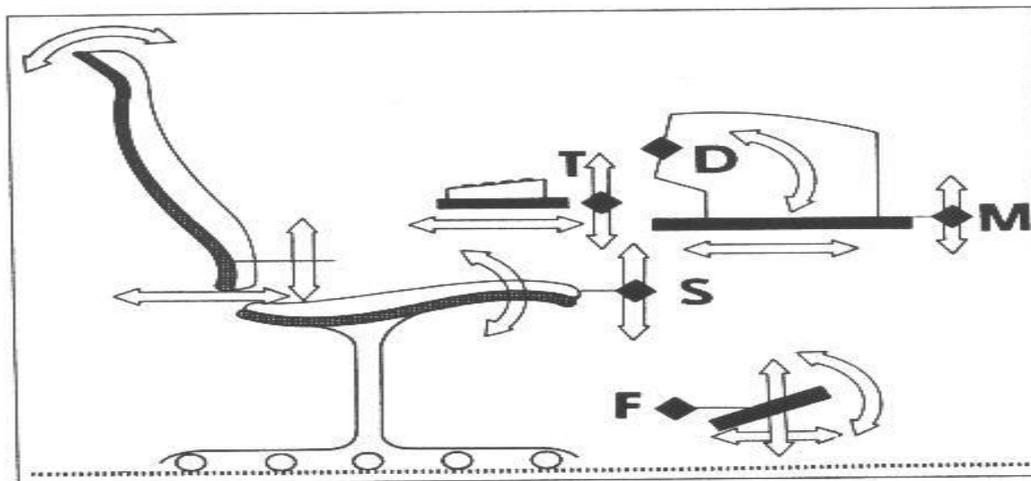


Figure 10-4. Adjustment features of a VDT office workstation. Key: S = seat height; T = table; F = footrest; D = monitor; M = support. (Reprinted with permission from Kroemer, 1985.)





TOOLS

- Use of Force or of grip-strength
 - Longer/shorter and thicker/thinner handles
- Repetitive motion
 - Ratcheting mechanism or gears
 - Power tools
 - Electric stapler
 - Electric knife
 - Spring-loaded returns

TOOLS CONT.

- Awkward positions
 - Bent or curved handles
 - Extensions or add-ons
 - Headphones
 - Support equipment overhead
 - Step stool
- Forceful exertions
 - Soft-touch keyboards/buttons
 - Lifting devices





TOOLS CONT.

- **Static positions**
 - Anti-fatigue mats
- **Vibration**
 - Anti-vibration materials
 - Anti-vibration mounts/handles
 - External support
 - Anti-vibration gloves

FACILITIES

- **Lighting/glare**



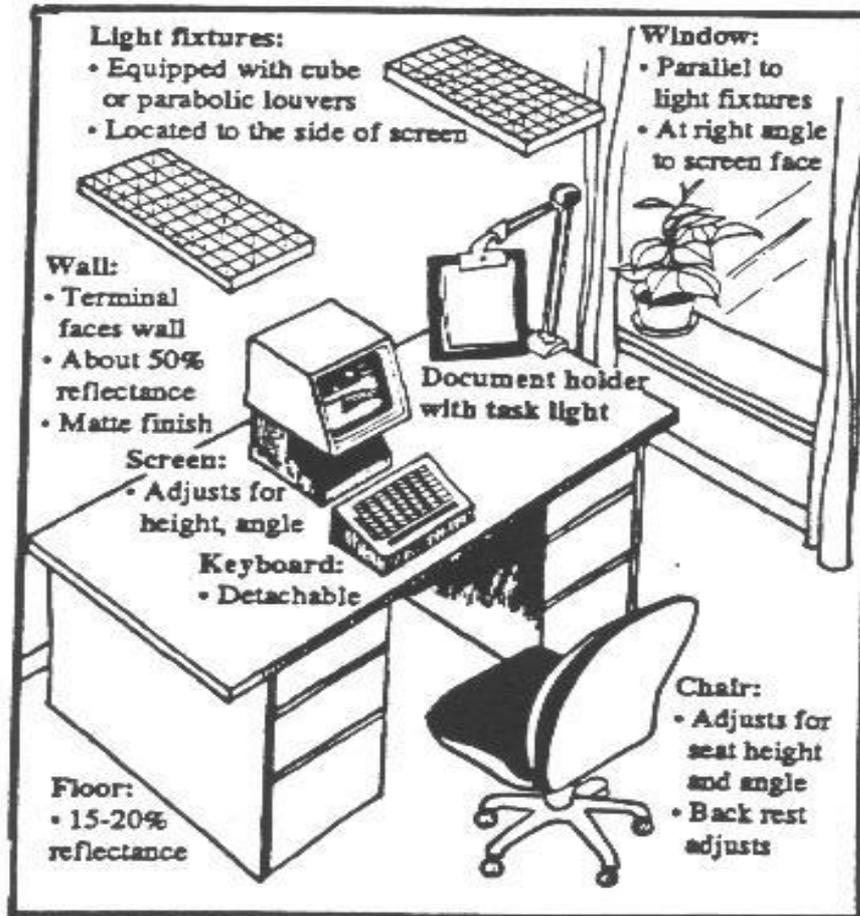
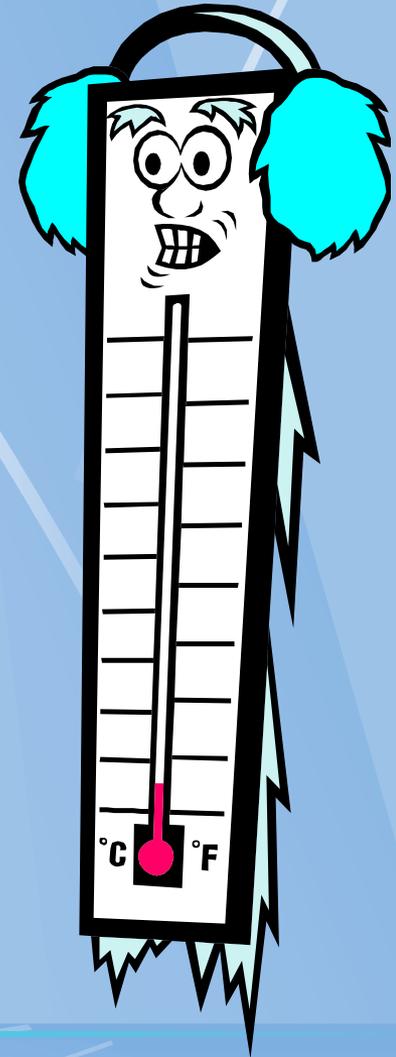


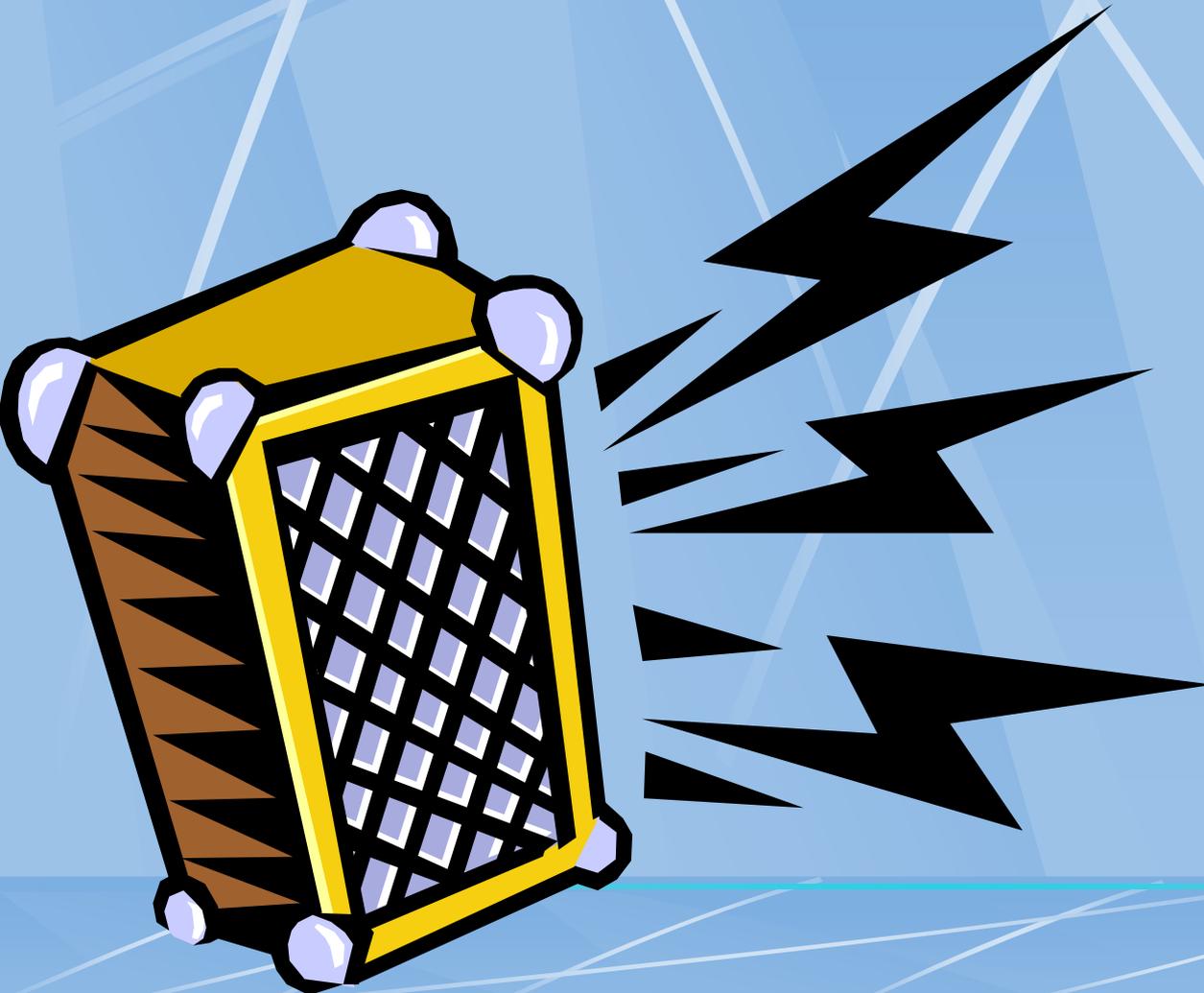
Figure 1. VDT work station

FACILITIES

- **Temperature**



FACILITIES



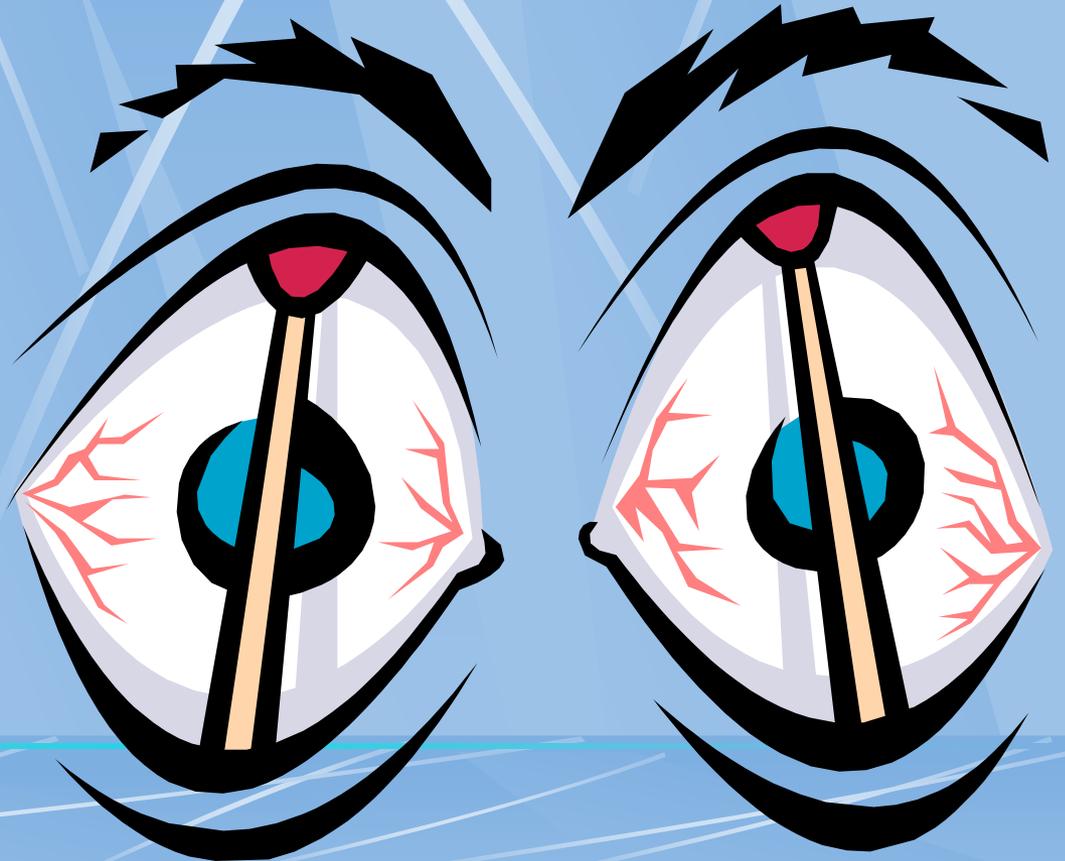
● Noise

EXERCISES & STRETCHES

These are exercises or stretches that can be performed at your workstation, home, just about anywhere.

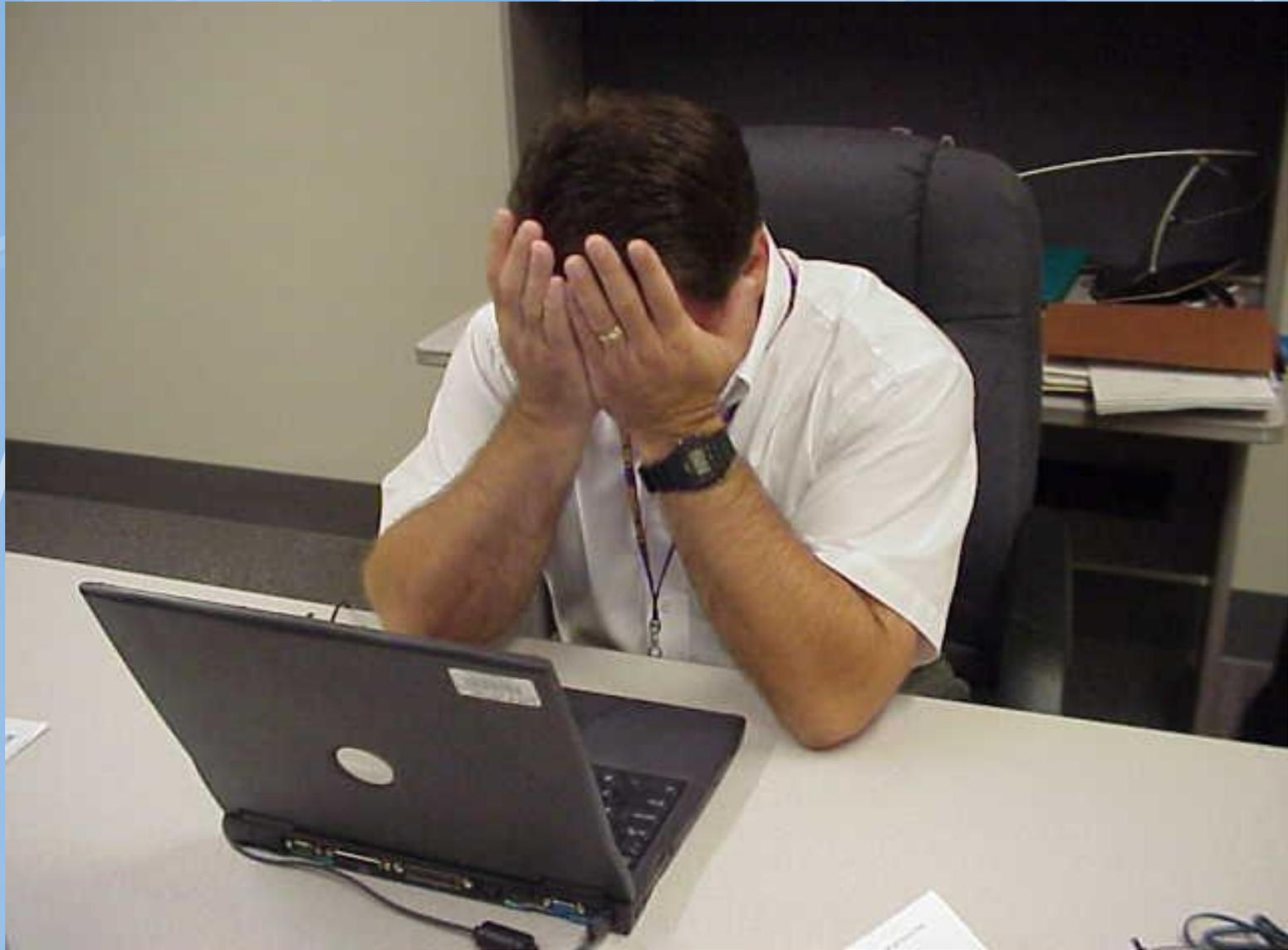
EYE

- Eye comfort exercises
 - Blinking
 - Yawning
 - Focus change



EYE Palming

- While seated, brace elbows on the edge of the desk
- Let weight fall forward
- Cup hands over eyes and close eyes
- Inhale slowly through nose & hold for 4 seconds
- Continue deep breathing for 15-30 seconds



EYE Movements

- Close eyes and slowly & gently move eyes up to the ceiling, then slowly down to the floor
- Repeat 3 times
- Close eyes and slowly & gently move eyes to the left, then slowly to the right
- Repeat 3 times

NECK STRETCH

- Tilt ear towards shoulder
- Reach up and touch top of head with palm to hold in tilted position
- Hold 5-10 seconds. Repeat 2-3 times (come out of stretch slowly)
- Reverse side and repeat



Pec Corner Stretch

- Stand at a corner about a foot away from the wall with forearms on opposite sides of the corner. One foot should be forward.
- Elbows should be at slightly below shoulder height
- Keep abdominals tight to avoid arching back
- Lean gently towards corner by bending the front knee until a stretch is felt in front of the chest.
- Hold 5-10 seconds. Repeat 2-3 times

Overhead Reach

- Take a deep breathe and reach up over head with both arms.
- Hold 5-10 seconds
- Exhale and lower slowly
- Repeat 2-3 times

Shoulder Pinch

- Place arms behind head being careful not to press hand into head
- Relax shoulders, and squeeze shoulder blades together while keeping shoulders back and down
- Hold 5-10 seconds. Repeat 2-3 times



Shoulder Shrug

- Sitting up straight, slowly bring shoulders up toward your ears.
- Hold positions 5-10 seconds
- Then bring the shoulders down and hold
- Repeat 2-3 times



Chair Rotation Stretch

- Sit in chair and place feet flat on floor
- Reach across your body and grab the back of the chair
- Pull gently to increase stretch in mid back
- Hold 5-10 seconds. Repeat 5 times
- Repeat on other side



Arms Behind Back Stretch

- Hold hands behind back and grasp hands together
- Pull shoulder blades back and down
- Hold 5 seconds. Repeat 5 times



Thoracic Spine Extension Stretch

- Lie on your back with a pillow under your knees. Place a firmly rolled towel under your shoulder blades across your upper back
- Raise arms up as you inhale
- Lower arms as you exhale, and hold a couple of seconds
- Do this 5 times

Prop Ups or Press Ups

- Lie on stomach and either prop up on forearms or if wrists are not compromised, press up through hands.
- Let stomach sag, and allow back to arch without using back muscles.
- If propped on elbows, hold 5-10 seconds. Repeat 5 times
- If on hands, press up and down slowly 10 times

Foot Rotations

- While sitting upright, slowly rotate each foot from the ankles 3 times in one direction
- Then rotate 3 in the opposite direction

Wrist Flexed & Extended

- Hold arm straight at waist height
- With fingers of other hand, gently press down above the knuckles, bending wrist down. (DO NOT hold at the fingers to push down.)
- Hold 5-10 seconds and repeat 2-3 times
- For extending, hold onto palm of hand and stretch wrist back. (DO NOT pull on fingers.)
- Hold 5-10 seconds and repeat 2-3 times.





Finger Massage

- VERY gently, massage the fingers of each hand individually.
- Move toward the nail gently.
- Massage the space between your fingers to widen and relax

Finger Squeeze

- Squeeze a foam block OR the edge of your desk firmly with all fingers
- Hold for 3 seconds
- Relax your grip

ERGONOMICS PROGRAM

- Essential elements:
 - Management Leadership and employee participation
 - Hazard information and reporting
 - Job Hazard Analysis and Control
 - Training
 - MSD Management
 - Program evaluation