VCU Safety and Risk Management

Ergonomics

1. **Purpose:** Virginia Commonwealth University Department of Safety and Risk and Risk Management (SRM) developed this program to improve the health and happiness of it's employees by assisting with fitting the workstation and activities to the person. Proper ergonomics can increase health and safety, job satisfaction, work quality and productivity, while reducing lost work hours and injuries.

2. **Scope:** Ergonomic injuries can occur from job duties or personal activities. Often an employee can perform a self-assessment and make simple changes to their workstation, job duties or personal activities, which can make significant improvements.

   For additional assistance, contact the Occupational Safety office to schedule an evaluation.

3. Table of Contents:

4. Definitions:

- Ergonomics as defined by Merriam-Webster is an applied science concerned with designing and arranging things people use so that the people and things interact most efficiently and safely.

- Musculoskeletal disorders (MSDs) are injuries affecting muscles, nerves, tendons, bones, ligaments and joints. Also known as "Cumulative Trauma Disorders "(CTDs) or "Repetitive Strain Injuries" (RSIs).

5. **Background:** Risk factors and symptoms of Musculoskeletal disorders (MSDs). It is important to introduce adjustments and treatment quickly for the most impact. Delaying can lead to more serious injury and treatment.

a. Risk factors

- Physical stresses such as awkward/sustained postures, repetitive motion, excessive forces, vibration and contact stress
- Environmental stresses such as noise, lighting and extreme temperature
- Age and Certain medical conditions

b. Symptoms

- Pain, numbness, tingling, stiffness or cramping
- Reduced grip strength

6. **Guidelines:** The Occupational Safety office does not provide equipment. The office can assist with purchasing decisions or in designing of the workspace using ergonomic principles to promote comfort and productivity.

   Note: there is no one perfect chair, desk, mouse etc. that works for every person. These guidelines will help identify situations where problems can occur and provide recommendations for improving the workspace and or actions performed to reduce likelihood of harm. Keep in mind many times there are alternatives to buying new equipment, simple modifications to the current space may help achieve the ideal setup.

   a. General principles of Ergonomics

   - Do not sit/stand in awkward positions, maintain a neutral posture
   - Work in your power/comfort zone, keep frequently used objects within reach
   - Take breaks regularly, plan your day so you are not performing one task for long stretches, vary your duties
   - Reduce extremes; force, motion, temperatures, contact stress with hard objects, lights, sound, etc.
   - Remove clutter from your work area

b. Back injuries and Lifting

- Not all back injuries are a result of sudden trauma – most are cumulative. Repeated minor injuries, constant or awkward positions and poor health can result in a flare up or major injury. Keep the following in mind for proper lifting or moving materials.

- Squat to lift and lower, with your legs
- Do not bend at the waist
- Use lift equipment or another person for heavy or awkward loads
- Push the load rather than pull
- Keep the weight as close to you as possible, in your power zone
- Turn with your feet, not your body
- Never jerk or twist
- Do not obstruct your vision
- Keep your feet apart, staggered if possible
- Wear shoes with non-slip soles

c. Sedentary Work

- Sedentary defined by Merriam-Webster – doing or requiring much sitting; not physically active
- Sit vs. Standing - ideally you should vary your position throughout the day, standing all day is just strenuous on the body as sitting all day
- If prolonged standing is necessary, shift weight often, prop up a foot to relieve back pressure, use supportive footwear or cushioned mats
- Vary your activities, for example stand while talking on the phone, walk to co-worker instead of emailing, move your printer so you have to get out of your chair to get the paperwork, move more overall
- If purchasing new equipment adjustable is best

d. Laboratory ergonomics: avoid prolonged work in any one activity for example awkwardly bent over a microscope for hours at a time, take frequent breaks.

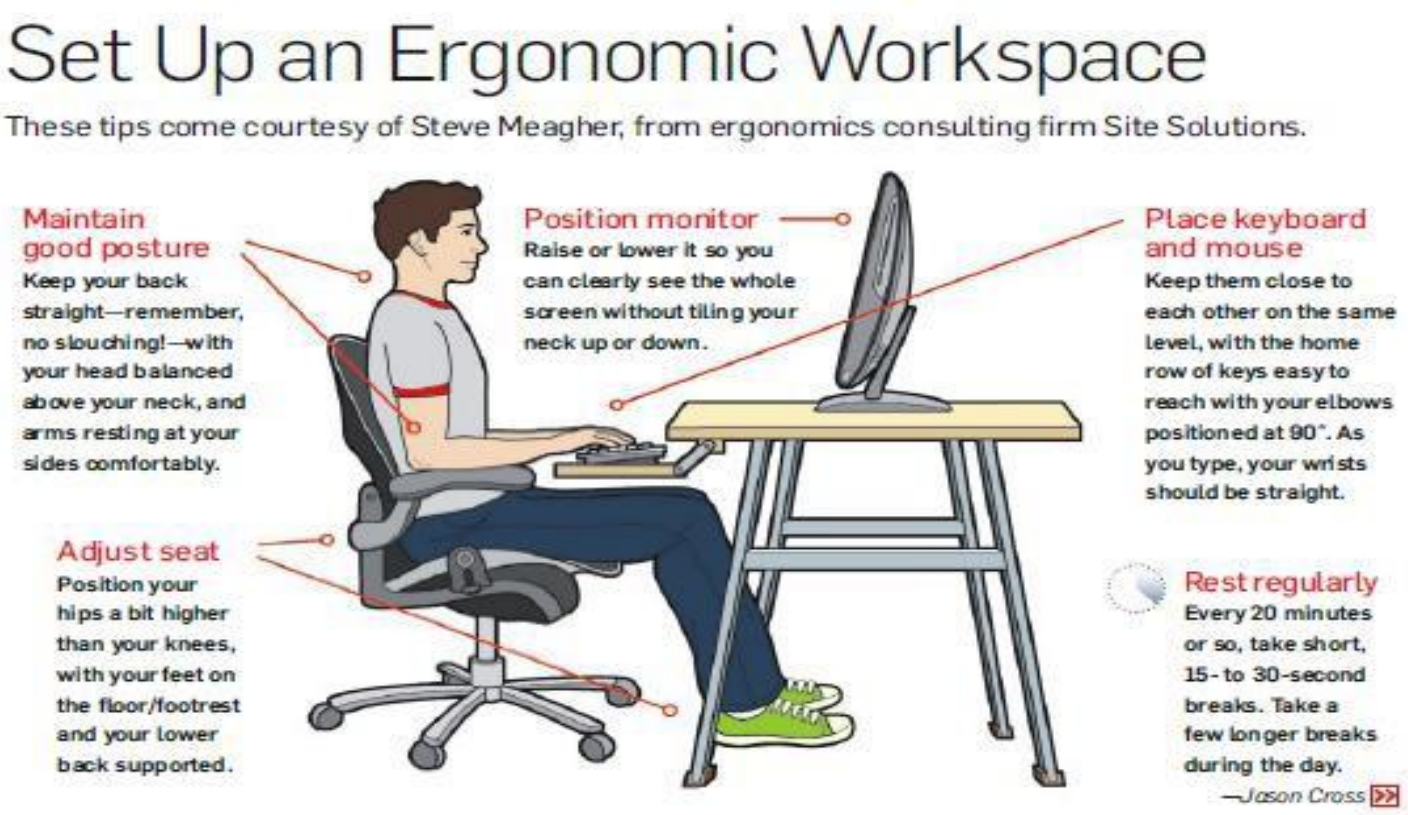
- General lab ergonomics
    - Get close to your work, use bench cut outs when possible
    - Avoid excessive pressure on hard surfaces
    - Keep frequently used supplies, instruments within close reach
    - Position work in the order of when they will be used
    - Wear supportive footwear or cushioned mats for long period of standing
    - Keep shoulders relaxed and elbows close to your sides, neutral wrist and arm postures
    - Use the back of the chair for support when sitting
    - Use thin, flexible, properly fitting gloves, ill-fitting gloves increase pinch and grip forces
- Pipetting
    - Select equipment and tools that are sized for your hands
    - Do not twist your wrist while pipetting
    - Alternate hands or use both for pipetting and use a relaxed grip
    - Use electronic or light touch pipettes, when possible
- Microscope
    - Use an adjustable eyepiece when possible
    - Elevate, tilt or move microscope to avoid bending their neck
    - Keep scopes repaired and clean to reduce eye fatigue

e. Computer/desk set up

Chair – the focal point of an ergonomic workstation, all other aspects should be adjusted around it	• Needs to be adjustable • Provide support for the lumbar region of the back and trunk • Feet should rest flat on the ground • T-armrests with adjustable height and width are recommended for intensive computer users • Seat pan should not hit the back of knee, there should be two-finger space between knees and seat • Should have a five-star base and casters compatible with the floor surface
Work Surface - large enough to accommodate all frequently used items in the comfort zone	• Height of the work surface should allow the forearms to be parallel with the floor, while not elevating the shoulders • Enough room under the work surface to allow free leg movement • Surfaces that are too high or low may lead to awkward postures • Hard, angled edges can create contact stress on hands or wrist, use a wrist rest (gel recommended) or buy furniture with rounded edges if possible • Keyboard tray can be used to increase depth and to provide proper keying level

Keyboard/mouse– should be on the same level	• Height of the keyboard and input device should allow the operator to position their forearms and hands in a neutral position parallel to the floor • Should be positions with a negative tilt –down and away • Avoid contact stress with a padded wrist (gel is recommended) • Avoid overreaching by keeping the input device close to the body
Monitor – should be arm's length away	• Position the monitor directly in front of the operator with the screen at or below eye level. • Bi-focal wearers may prefer a slightly lower monitor level • Monitors should have good contrast, sharp focus, and be free from flickering and glare to minimize eyestrain • Ergo trick – close your eyes, when you open them you should land on the address bar, if not adjust monitors properly • For two monitors set them touching side by side , create a slight semi-circle around you
Document Holder- reduces awkward head tilt	• For reading mostly position the document holder at eye level and close to the monitor • For access to write on the document, use a holder that sits between the keyboard and monitor
Phone Head Set- reduces awkward neck and shoulder postures	• Head set, notably by eliminating the habit of cradling the phone between the shoulder and chin when working using the phone and computer simultaneously • Using speaker phone if it will not bother others
Lighting – too bright or too low can cause eye fatigue	• Excessive overhead lighting can cause glare • Monitor shades and glare screens also reduce glare. Adjust monitor contrast and brightness for maximum personal comfort

Footrest – can reduce pressure on the legs and back	• A footrest can assist in supporting the feet as well, allowing the employee to sit back properly in his/her chair to fully use the support of the chair • Should be adjustable to allow for active sitting, those that allow a rocking motion keep legs moving and blood flowing



7. References:

- OSHA e-tool
- Merriam - Webster Dictionary