Ergonomics:
Optimizing human well-being & system performance
Overview & Objectives

Office Ergo Rep Training:

- UBC’s safety policy and legal requirements
- Role and responsibilities as an Office Ergo Rep
- Musculoskeletal injuries (MSI) signs and symptoms
- Identify potential risk factors at computer workstations
- Recommend action plans to eliminate or reduce the risks identified
WSBC Ergonomics (MSI) Requirements

WorkSafeBC OHS Regulations: Sections 4.46 - 4.53

Purpose:
to eliminate or, if that is not practicable, minimize the risk of musculoskeletal injury to workers.

UBC’s Safety Policy (#7)
...”the University’s responsibility to ensure that health, safety and person security form as integral part of the design, construction, purchase and maintenance of all buildings, equipment and work processes (1.1.3)”
WSBC 7 Step Process:

1. Consultation
2. Education
3. Risk Identification
4. Risk Assessment
5. Develop & Implement Control
6. Training
7. Evaluation
Tech Guidelines

Section 12001 (Furnishings)

1.2.3. Coordination Requirements

- UBC Workplace Health Services, HR, 2-9040

1.4.4 Design Requirements – General

- Ergonomics: to meet ANSI/BIFMA and CSA standards, contact UBC Workplace Health Services, HR
Office Ergo Rep Roles & Responsibilities

• Be a resource for ergonomics in your department

• Educate co-workers on MSI risk factors and prevention strategies

• Assist your co-workers in the optimal set of their workstation

• Act as a liaison to the Ergonomics Advisor in HR
Common MSIs

- Muscle Strain (Neck & Back)
- Rotator Cuff Tendonitis (Shoulder)
- Epicondylitis (Medial & Lateral Elbow)
- Carpal Tunnel Syndrome (Wrist)
Common Symptom Reports

40 to 50% of those requesting an ergo assessment reported moderate to high symptoms in their neck, shoulder and/or mid/low back.
Degree Symptoms Interfere with work

Based on 235 discomfort surveys completed over a 1.5 year period (2011 to 2012);
For those requesting an ergo assessment
MSI Signs and Symptoms

**Signs:**
- Redness
- Heat
- Swelling
- Reduced range of motion

**Symptoms:**
- Pain and/or localized discomfort
- Stiffness/Heaviness
- Tender to Touch
- Weakness
- Numbness/Tingling

**Report Signs & Symptoms Early**
How musculoskeletal injuries occur

Repetitive Strain & Overexertion
Injury can occur from:
• repeated loading, weakening tissues to failure (RSI)
  Or
• a one time load if the force is excessive (overexertion)
Risk Factors

• Awkward Postures
• Force
• Repetition and Static loads
• Duration

• Contact Stress
• Environment & Vibration
• Psychosocial
Stand up Straight

Neutral Standing Posture:
- Ears over shoulders
- Shoulders relaxed
- Shoulders over hips
- Neutral pelvis
- Knees relaxed

Used with permission from Dr. Aker, Sarasota Chiropractors
Neck Posture

The further your head sits forward, the greater the strain on your neck and shoulders.

http://painfreeposturemnandpilatesintegration
Engage your Transverse Abs (TA)

Engaging your TAs is considered critical in providing stability.

To locate your Transverse Abs:

1. Place your hands on hips (bony part)
2. Move your hands 1” towards your belly button & 1” towards your toes

When you contract your TAs you should feel tension under your fingertips and not a contraction that pushes your fingers out.
Discs when sitting

Leaning forward flattens out the curvature of the low back which can lead to the following:

- Uneven pressures on the discs of the spine
- Ligaments that support the spine become over-stretched
- Muscles of the back in a stretched position making them weaker
Seated Desk Posture

Head upright and over your shoulders.

Eyes looking slightly downward (30” range from horizontal line of sight) without bending from the neck.

Back should be supported by the backrest of the chair that promotes the natural curve of the lower back.

Elbows bent at 90°, forearms horizontal. Shoulders should be relaxed, but not depressed.

Thighs horizontal with a 90°–110° angle at the hip.

Wrist in a neutral posture (straight).

Feet fully supported and flat on the floor. If this isn’t possible, then the feet should be fully supported by a footrest.

Used with permission from WorkSafe NB
Anything wrong:
Chair Fit

**Backrest:**
Adjust backrest height to support lower back (curve in backrest should match with curve in lower back)
Tilt backrest between 95- 110°

**Arm Rests:**
Adjust armrest height to support arms when shoulders relax. Elbows should be at 90-100°
Make sure arm rests do not restrict access to desk or computer

**Seat:**
Allow 2-4 fingers of space between the edge of the seat and the back of legs
Ensure user is sitting with buttocks all the way to the back of the chair
Adjust seat height so elbows are 90-100° when working on desk and knees are 90-100°
Use footrest if feet are not fully supported on floor
Seat Height

Adjust height so that:
✓ Feet are firmly supported
✓ Knees ~90°

• if you are not able to reach your keyboard and mouse you may need a keyboard tray or raise your chair and use a footrest

• When standing, the seat height should be just below crease at the back of your knee

Courtesy of: Global Total Office
Seat Pan

- Should have rounded, waterfall edge
- Allow 2-4 fingers of space between the edge of the seat and the back of legs
- Sit with buttocks all the way to the back of the chair
Backrest Height & Lumbar Support:

• Adjust lumbar support to fit the small of your back
  Note: on some chairs the lumbar support is adjusted independently of the backrest and on others the backrest is raised up and down

• Backrest height should be ≥17” (WSBC)
**Backrest Angle:**

- Tilt/recline backrest up to $\sim 13^\circ$

A reclined back posture reduces pressure on the disc but you must also be able to reach your keyboard and mouse.

Courtesy of: Global Total Office
Armrests:

- Adjust armrest height to support arms when shoulders relax. Elbows should be at 90-100°
- Ensure arm rests do not restrict access to desk or computer
- Rotate armrests in as needed

Courtesy of: Global Total Office
Selecting a Chair:

- **Various Checklists:**
  - Cornell University Seating Evaluation
  - Chair Checklist ANSI/HFES 100-2007

These are not suitable office chairs
Anything Wrong:

Shoulder hiking
Anything Wrong

Keyboard above elbow level promote awkward arm or shoulder postures
What’s wrong with these pictures

Move arm to reach ctrl key on keyboard - avoid straining wrist & when using the mouse don’t bend your wrist from side to side (mouse picture from WSBC)
What does correct look like

- Keyboard just below elbow
- Hover when typing (avoid planting your wrists)
- Place keyboard flat or on slight negative tilt (positive tilt promotes wrist extension)
Keyboard Trays

Humanscale keyboard tray
UBC Bookstore
Allen Ching:
allen.ching@ubc.ca

MMM AK60LE
Staples e-way

Keyboard trays should be:
• height adjustable
• Equal Height
• Palm rest not required
Anything Wrong?

- Mouse above elbow
- Awkward reach with armrest in the way
- Shoulder external rotation to reach to the side
Correct Positioning

- Mouse below elbow
- ~level with armrest
- In line with shoulder
Mouse

• Place the mouse directly beside the keyboard

• Consider keyboard without numeric keypad

• Avoid resting the wrist on work surface

• Clean or replace sticky mice

• Contoured mice—encourage neutral wrist postures
Mouse Settings

1. Pointer Options-Speed
2. Primary/Secondary Button
3. Scroll Wheel Speed
Mouse Settings

Start Menu---Control Panel
Mouse Settings: Pointer Options

Pointer Options --- Fast
Types of Keyboards

Separate Numeric Keypad: facilitates keeping the mouse closer to the body

Split Keyboard: facilitates a more neutral forearm posture when typing

From: Staples.ca
From: Ergocanada.com
A4Tech: $15.00 at UBC Bookstore
Types of Mice:

Contoured/Vertical Mice: facilitate a more neutral forearm posture

Trackball: may be useful for those with graphic/drawing applications

*although useful, trackballs can place a high workload on the fingers/thumb; therefore, users must be careful when using trackballs

From: Ergocanada.com
Anything Wrong?

Trade-off between arm and neck positioning
Make positional changes frequently
If using laptop >2hrs/day then use external keyboard & mouse
Laptop Positioning

If you are working on a laptop >2hrs/day then:

• use a separate keyboard and mouse
• Raise your chair and use a footrest
• Position keyboard and mouse below elbow level
• Raise screen: top line of text at eye level
• Make frequent positional changes
Anything Wrong?
Monitor Height

Height:  Top line of the text ~ eye level
Line of sight:  15 degrees below the horizontal

*Bi/Tri focal users: Place the monitor so that the head is straight when viewing the monitor (or use reading glasses)
Correct Monitor Positioning:

- Top line of text at eye level
- Approximately arm’s length away
- Adjust font size (generally it is better to increase font size and position monitor further away)
Monitor Points to Remember:

**Lighting:**
Minimize glare: position monitors perpendicular to window and between banks of light; adjust blinds as needed

If it is too bright around your monitor, consider turning off 1 bulb and using task lighting (you need more light for paper based work than for the computer)

Adjust screen brightness (external buttons on bottom/side of monitor)-preferred brightness will depend on your vision and your environment, 70 to 80% tends to be comfortable for most people
Dual Monitors

Two Monitors:
Generally, if you have 2 monitors position them slightly further away to increase your field of view

If one is primary, center that one and place the other one on an angle (if you use your mouse on the right it will likely be easier if your secondary monitor is placed on the right)

If both monitors are used equally, center both and angle in slightly

Look away from the screen 20 seconds for every 20 minutes
Outlook Settings

Outlook defaults to an 8pt font in your inbox display window.

Larger font can promote sitting back in your chair while reading the computer screen.

1. View → View Settings
2. Other Settings
3. Click on Column & Row Font to Adjust
Display Settings: Font

Start Menu → Control Panel

View by: Large icons

- AutoPlay
- Configuration Manager
- Desktop Gadgets
- Ease of Access Center
- Getting Started
- Backup and Restore
- Credential Manager
- Device Manager
- Flash Player
- HomeGroup
Leg Clearance

Generally, there should be:

15” depth clearance for the knees
24” depth clearance for the feet
Accessories: Phone

Telephone:

Avoid cradling the phone between the ear and shoulder, this posture can cause neck strain and headaches.

If phone use is frequent:
• speakerphone
• hands-free headset
• Place on Left Side of Desk
Accessories

Document holders: useful when referring to documents. They help reduce awkward neck postures.

Wrist rests - occasional use only.

Available from: Staples, Ergovancouver.com; Ergocanada.com; Staples.ca
Desk Organization

• Frequently used items, such as the phone and notebooks etc. should be kept within an arms length

• Rarely used items should be placed further away
Positive factors such as autonomy, rewards/recognition and co-worker/supervisory support have a protective effect.

What can you do to improve the positive factors within your work environment?

Available Resources:

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<th>Staff &amp; Faculty</th>
<th>Students</th>
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<td><strong>UBC Counseling Services</strong></td>
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<tr>
<td>Employee &amp; Family Assistance Program</td>
<td>(Brock Hall)</td>
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<td><strong>Responding with Respect</strong></td>
<td><strong>UBC Mental Health Network</strong></td>
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<td>Free interactive training for departments</td>
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<td><strong>Thrive.ubc.ca</strong></td>
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<td><strong>Healthy UBC Newsletter</strong></td>
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</tr>
<tr>
<td>Free Newsletter</td>
<td>Student resources for healthy living</td>
</tr>
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Why Psychosocial?

Perceived ability to cope with demands

**Physiology**
- Increased cortisol levels
- Increased muscle tension
- Influences mechanical load
- Sleep Disturbance

**Behaviour**
- Skipping breaks (insufficient recovery time)
- Drinking too much caffeine, alcohol or smoking
Mental Workload

Humans have limited information processing capacity;

What is often called multi-tasking (performing tasks simultaneously) is actually task switching.

Task alternation results in “switching time” costs

Consider turning off Pop-Up Emails

Provide other ways to ensure you can focus on one task at a time

Require Software vendors to conduct Usability Testing prior to purchasing
Stretch Breaks

Research suggests that taking an extra 5 minute break every hour can significantly reduce symptom reports without negatively impacting productivity.

Those who didn’t take breaks were found to work at a slower rate and make more errors in the last hour (7.5 hour shift).

UBC Stretch Guide
WorkSafe Sam (computer program stretch break)
Identify the Risks:
For more information

Ergonomics, Workplace Health Services (HR)

Ergonomics.info@ubc.ca

604-822-9040

6th Floor, 6190 Agronomy Rd