



Office Ergonomics Handbook

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Introduction

The Office Ergonomics Handbook provides an overview of ergonomics and the risk factors present in an office environment that may contribute to musculoskeletal disorders (MSDs). This handbook outlines general office ergonomic guidelines that will assist workers with adjusting their computer workstations to accommodate their needs and minimize risk of injury.

This handbook does not cover all possible tasks executed by University of Windsor employees who work at a computer workstation. Rather, it is meant to act as a guide to outline the most commonly practiced adjustment procedures required in a computer workstation, applicable both in and outside of the office. This handbook is designed to act as a proactive measure to minimize MSD risk factors and is not intended to replace outside ergonomic assessments that may be required if pain or discomfort is experienced.

The Occupational Health and Safety office is responsible for providing guidance to the University community on all aspects of health and safety. Further health and safety information can be found on our website at www.uwindsor.ca/safety.

What is Office Ergonomics?

Ergonomics is the scientific discipline involved with understanding the relationship between humans and their work environment (tools, products, tasks) to optimize the well-being and performance of humans.

Ergonomists, professionals who are trained in ergonomics, determine what the physical demands of a job are and what changes can be made to these demands to ensure that the capabilities of workers are not exceeded. Essentially, Ergonomists attempt to balance job demands and worker capabilities to minimize risk of injury.

Office ergonomics pertains to modifications made in an office environment. Typically office equipment is made to accommodate a wide range of users, and as such, it requires appropriate adjustment and arrangement for individual users to ensure job duties are performed with minimal risk of injury. Office ergonomic guidelines provide employees with procedures to follow to ensure suitable adjustments of their workstations are made and appropriate behaviours are employed.

Goal of Office Ergonomics

The main goal of office ergonomics is to reduce the incidence of musculoskeletal disorders (MSDs). From 1996 to 2004, the Workplace Safety and Insurance Board (WSIB) reported that MSDs accounted for nearly 42% of all lost time claims in Ontario. This statistic accounts for only lost time claims, which underestimates the true nature of the problem as many individuals continue to work with pain and discomfort.

By implementing office ergonomic methods, many MSD risk factors present in the office environment may be recognized and controlled, diminishing the risk of MSD injury.

What are Musculoskeletal Disorders (MSDs)?

MSDs are injuries and disorders of the musculoskeletal system originating from exposure to risk factors in the work environment. MSDs encompass damage to muscles, tendons, tendon sheaths, nerves, bursa, blood vessels, joints and ligaments.

Injuries that result from an acute event involving an external force, such as a fall, motor vehicle accident or violence are not classified as MSDs.

MSDs are typically caused when the demands of a job exceed the capabilities of the worker performing the job. Every individual is different in body size and shape, physical strength, flexibility, knowledge and experience. Each of these variables plays a role in the development of MSDs and explains why one individual may be injured performing one task, and another performing the same task will not be.

MSD Risk Factors

The use of ergonomics in an office environment can assist in the recognition of risk factors that contribute to MSDs. There are three primary risk factors for MSDs:

1. Force
2. Frequency/Repetition
3. Posture

Force is the strength or energy exerted by the muscles on an object. Force becomes a concern when muscles and tissues are overloaded, exceeding their capabilities. An example of force as a risk factor in the office would be when sitting for long durations. Static forces are required to maintain stability in the back and neck. These forces may result in injury when the tissues and muscles in the low back become fatigued.

Frequency/repetition relates to how often a motion or task is performed in a given time period. Frequency/repetition becomes a concern when the amount of rest between movements is not sufficient to allow muscle recovery. An example of repetition as a risk factor in the office would be when typing for an 8 hour shift without taking a break or changing tasks. These conditions expose the fine muscles of the wrist and hand to overuse with minimal recovery. This may cause injury due to decreased tissue tolerance levels.

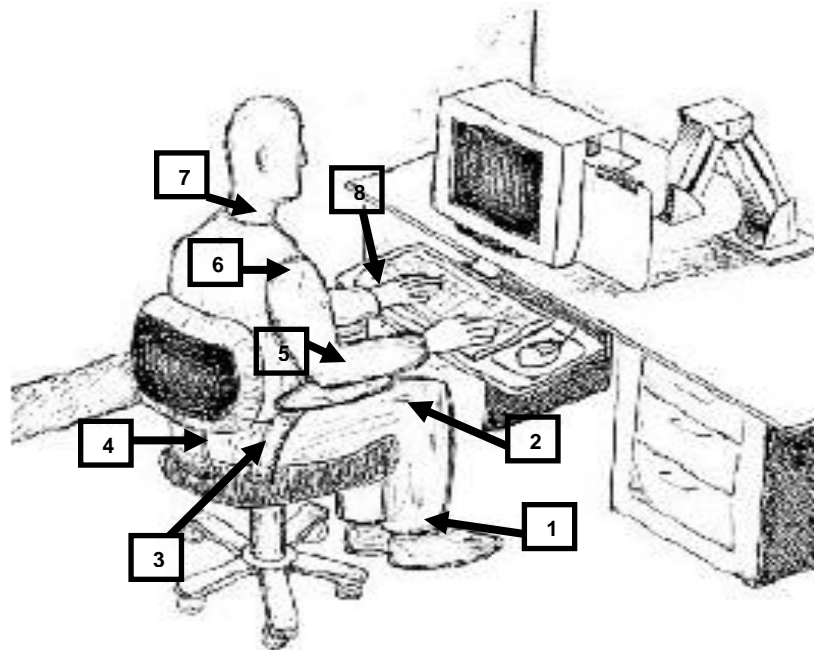
Posture is the position of various parts of the body in relation to one another. Posture becomes a concern when a joint moves further away from a neutral position (middle of the range of motion for a joint). An example of posture as a risk factor in the office is when holding the telephone between the head and shoulder. In this position, the neck is placed in an unnatural posture. This may cause injury due to impingement of the tissues in the neck and muscle strain in the shoulder.

Office Ergonomic Guidelines

Preferred Seated Posture

The preferred seated posture is recommended to minimize spinal compression and prevent muscle fatigue due to static muscle forces. It is important to note that although this is a preferred posture, it may vary slightly for some people to ensure comfort.

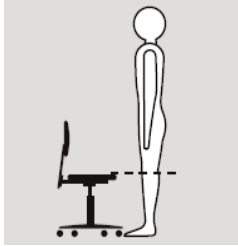
It is also essential to understand that although the preferred seated posture may be assumed, risk of injury is still present if seated for extended periods of time. It is important to move or change postures every hour to provide relief to the stabilizing muscles in the back and neck.



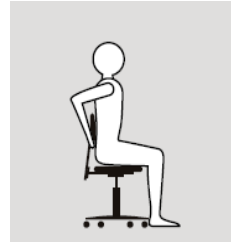
When sitting at your computer workstation, ensure that:

1. Feet are flat on the floor or supported by a foot rest.
2. Knees are approximately 90° with a fist space between the back of the knees and the chair seat pan.
3. Hips are approximately 90° and thighs parallel to the floor.
4. Back is straight and the lumbar region supported by the chair backrest.
5. Elbows are approximately 90° and arms supported by the chair armrests.
6. Shoulders are relaxed, not slouched or raised.
7. Neck is facing forward and straight, not bending forwards, backward or to the side.
8. Wrists are straight, not bending upward, downward or to the side.

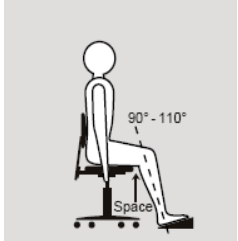
Adjusting your Chair



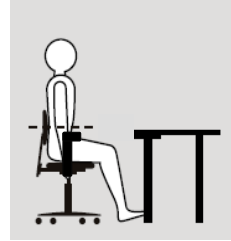
1. Raise/lower the seat height so the seat pan is below your kneecap.



2. When seated, your feet should be flat on the floor with a closed fist space between the back of your knees and the seat pan.



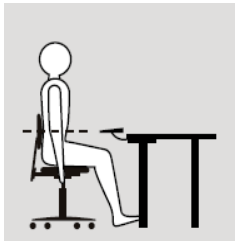
3. Adjust the backrest so the lumbar support sits comfortably in the small of your back (lumbar region).



4. Raise/lower the armrests to support a 90° elbow angle.

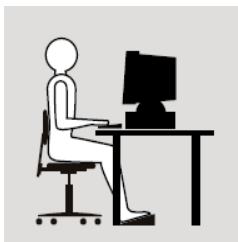
Adjusting your Workstation

Adjustable Work Surface (height adjustable desks and keyboard trays)

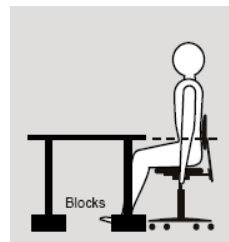


1. Raise/lower the desk or keyboard tray to elbow height when sitting with arms lowered.
2. Adjust arm rests if necessary to maintain a 90° elbow angle.

Non-adjustable Work Surface (fixed desk height or non-adjustable keyboard tray)



1. If the work surface is too high, raise the chair to ensure the desk is elbow level and support the feet with a footrest.



2. If the desk is too low, elevate to elbow level using blocks.

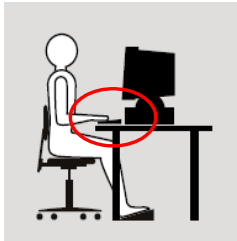
Using a Footrest

A footrest is required when a fixed work surface forces the worker to elevate their chair, preventing their feet from remaining flat on the floor.



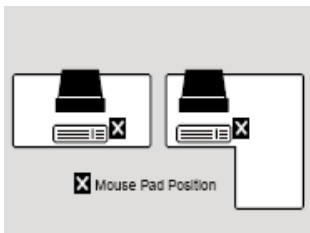
1. Angle the foot rest to maintain a 90° angle at the foot and ankle.
2. Place the foot rest on the floor so that your knee angle is maintained at approximately 90°.

Adjusting your Keyboard



1. Place the keyboard directly in front of you.
2. Ensure the height of the keyboard maintains a 90° angle at the elbow and relaxed shoulders.
3. Adjust the tilt of the keyboard or tray to suit your typing style. It is crucial to ensure that your wrists are straight when making this adjustment. Typically a negative tilt (tilted away from you) is recommended.

Adjusting your Mouse



1. Place the mouse directly in front of your mousing hand and on the same level as the keyboard.
2. Use your entire arm to move the mouse, not just your wrist. Be sure to maintain a straight wrist posture.
3. Adjust the sensitivity of the mouse if used intensely or use an L-shaped desk surface to support the arm.

Using a Wrist Rest

Wrist rests provide support to the arm to allow muscle recovery from static postures and reduce contact stress.

When typing, wrist rests should not be used since this may cause the wrist to deviate from a neutral posture. Instead, intermittent breaks should be taken where the wrists are rested.

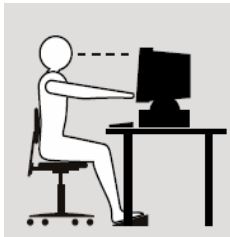
It is commonly believed that the wrists are actually rested on wrist rests, but rather, it is the heel of the hand that should be rested to prevent compression of the nerves and tendons that run through the carpal tunnel of the wrist.



1. Place the wrist rest close to your keyboard/mouse so that the heel of your hand is resting, not your actual wrist.

Adjusting your Monitor

Adjustment for Non-Bifocal Wearers



1. Place the monitor directly in front of you an arm's length distance away.
2. Ensure the top of the monitor is at eye level.
3. Ensure the monitor is tilted close to vertical. The greater the upward tilt, the more glare found on the screen.

Adjustment for Segemented Bifocal Wearers

1. Place the monitor directly in front of you 40-50 cm away (arm length to the wrist rather than finger tips).
2. Ensure the height of the monitor allows for reading without extension (bending back) the neck. This will be lower than eye level.
3. Maintain a vertical monitor tilt.

Using a Document Holder

Document holders are required when a worker reads/inputs data from source documents. Using a document holder prevents excessive head, neck and eye movements that are required when viewing various visual objects.



1. Place document holder at the same height and distance as the monitor.
2. Adjust the angle of the holder to allow comfortable reading without flexion of the neck (bending forward).

Adjusting your Workstation Lighting

Proper lighting in your workstation is essential to prevent eye strain. A common problem with lighting in an office environment is glare.

Glare is created by luminance differences between an object and its background. *Luminance* refers to the amount of light that is reflected by a surface at a given angle and is somewhat similar to brightness.

There are two types of glare:

1. *Direct glare*: caused by light directly in your field of view.
2. *Indirect glare*: caused by light reflecting off of shiny surfaces into your field of view.

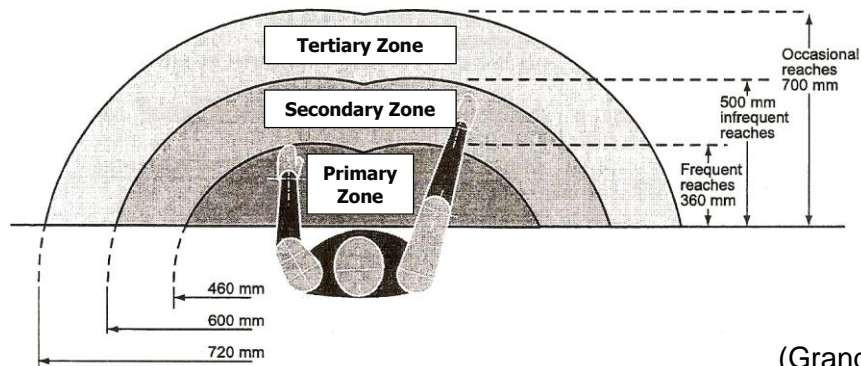
There are various methods that can be employed to reduce glare. The following provides some helpful suggestions to assist in reducing glare experienced on your computer monitor.



1. Locate the monitor and yourself beside windows and between overhead lights. Do not sit directly under overhead lights.
2. Control light from windows by using curtains or blinds.
3. Position task lighting so that it is directly over source documents and angled away from you.
4. Check for glare on your monitor by shutting it off and looking for items reflected on the screen. These items are causing glare and should be removed or repositioned.

Adjusting your Workstation Layout

The goal when organizing office equipment and materials on your desk is to decrease trunk flexion and reaching. This can be easily achieved by locating the most frequently used items closest to you. It is recommended that items used most often during a typical workday should be located within a comfortable reach distance of 36 cm-46 cm from you when sitting comfortably in your chair. The following diagram depicts the suggested distances for items to be located on your desk based on frequency of use.



(Grandjean, 1980)

Work Organization

If possible, organize work tasks to reduce the duration of repetitive tasks performed throughout the work day. For example, if your job requires you to mouse for the entire duration of your shift, split the mousing time up by reading or filing documents, photocopying, and returning phone calls. Avoid performing all your mousing duties, then returning all your phone calls, and then doing all of your photocopying. Organizing your work by alternating between tasks not only provides frequently used muscles time for recovery but also allows you to take a cognitive break from your work as well.

Breaks and Stretching

Pressure on the discs between the lumbar vertebrae is greatest when sitting, therefore every effort should be made to avoid sitting for long durations. Taking scheduled breaks allows you to move from seated postures to relieve disc pressure and allow muscle recovery. When taking scheduled breaks, it is imperative to ensure the entire duration is not spent in a seated posture which would prevent muscles in the back and neck from resting. Instead, walking or standing for a portion of the break is encouraged.

In addition to scheduled breaks, for every hour of intensive computer activity (continuously typing or mousing), a 5 minute break away from the task should be taken. This break can be 5 minutes of performing another task not involving the computer or 5 minutes where no tasks are performed. These breaks should not be accumulated since short frequent breaks are more beneficial than one longer break.

Micro-breaks can also be taken at anytime while working. These breaks last 2-95 seconds and provide relief from static postures. A micro-break can be removing your hands from the keyboard/mouse when reading a document to relax hand and arm muscles or looking away from the computer monitor to reduce eye strain.

Stretching regularly during the work day is also encouraged. This alleviates muscle tension and fatigue caused by static postures. Stretching is encouraged while taking micro-breaks and can be performed right at the workstation. Always consult your doctor before attempting stretching activities.

Example stretches can be found at the Occupational Health Clinics for Ontario Workers (OHCOW) website:

<http://ohcow.on.ca/resources/handbooks/execomp/compexercise.pdf>

Pain and Discomfort Troubleshooting

Common Symptoms	Possible Causes	Reference adjustment or use of:
Neck Pain	• Monitor too high or too low	Monitor
	• Monitor not in front of worker	Monitor
	• Document holder not in front of worker	Document holder
	• Improper seated posture	Preferred seated posture
	• Improper chair height	Chair
	• Keyboard too high	Keyboard
	• Mouse located too far from the body	Mouse
Shoulder Pain	• Work surface too high	Work surface
	• Improper seated posture	Preferred seated posture
	• Armrests too high	Chair
	• Reaching for supplies or equipment	Workstation layout
	• Mouse too far from body	Mouse
Hand / Wrist / Elbow Pain	• Keyboard too high or low	Work surface / keyboard
	• Improper keyboard tilt	Keyboard
	• Wrist bending while typing	Preferred seated posture / keyboard
	• Resting wrist while typing	Wrist rests
	• Armrests too low or not used	Chair
	• Poor task variety	Work organization
	• Contact stress on body part	Wrist rest / chair
	• Moving the mouse with only the wrist	Mouse
Low Back Pain	• Sitting for too long	Breaks and stretching
	• Improper seated posture	Preferred seated posture
	• Chair too high or low	Chair
	• Lumbar support too high or low	Chair
	• Reaching for frequently used items	Workstation layout
Upper Back Pain	• Sitting for too long	Breaks and stretching
	• Improper seated posture	Preferred seated posture
	• Chair too high or low	Chair
	• Work surface too high or low	Work surface
	• Armrests too low or not used	Chair
	• Monitor or document holder too far	Monitor / document holder
Eyes	• Uncorrected vision	Have eyes checked
	• Glare	Lighting
	• Lack of task variety from computer	Work organization
	• Monitor or document holder too close or far away	Monitor
	• Not taking breaks from computer	Breaks and Stretching
Thighs / Leg Pain	• Improper seated posture	Preferred seated posture
	• Feet not flat on floor or footrest	Chair
	• Inadequate space behind knees	Chair
	• Sitting with legs crossed	Preferred seated posture

Self-Assessment of your Workstation

For your convenience, a self-assessment checklist has been provided to you as a pullout in this handbook. This self-assessment can be performed at anytime to ensure your workstation is adjusted to accommodate you. Recommended modifications are provided and this handbook can act as a resource to you when making these modifications. If, after trying these adjustments, pain and discomfort persists, an ergonomic assessment of your workstation by a qualified person may be required.

Outside Assessment of your Workstation

When pain or discomfort is experienced, it is recommended that you inform your manager or supervisor as soon as practicable. If the modifications attempted in your self-assessment have not provided relief, an ergonomic assessment of your workstation can be arranged through your manager or supervisor.

An ergonomic assessment of your workstation would be performed by a qualified person trained in ergonomics. This individual would conduct a brief interview followed by a period of observation of your job functions. Measurements and pictures of the workstation may be required to ensure an accurate representation of the job is acquired. At the conclusion of the assessment, the assessor will provide you and your manager or supervisor a written document including their observations and recommendations for change.

Your supervisor or manager may contact the Office of Occupational Health and Safety for assistance in obtaining an ergonomic assessment

References

- Canadian Standards Association (CSA). (2000). A Guideline on Office Ergonomics (CSA-Z412-00). Toronto: Canadian Standards Association.
- Grandjean, E. (1980). Fitting the task to the Man: An ergonomic approach. London: Taylor & Francis Ltd.
- Ministry of Labour (MOL). (2004). Computer Ergonomics: Workstation Layout and Lighting. Retrieved August 7, 2007, from http://www.labour.gov.on.ca/english/hs/pdf/gl_comp_erg.pdf
- Ministry of Labour (MOL). (2005). Rest Breaks for Computer Operators. Retrieved August 7, 2007, from http://www.labour.gov.on.ca/english/hs/pdf/gl_comp_rest.pdf
- Occupational Health and Safety Council of Ontario (OHSCO). (2007). Part 1: MSD Prevention Guideline for Ontario. Retrieved August 7, 2007, from [http://www.wsib.on.ca/wsib/wsibobj.nsf/LookupFiles/DownloadableFileMSDGuideline/\\$File/OntMSDPrevGuideline.pdf](http://www.wsib.on.ca/wsib/wsibobj.nsf/LookupFiles/DownloadableFileMSDGuideline/$File/OntMSDPrevGuideline.pdf)
- Occupational Health and Safety Council of Ontario (OHSCO). (2007). Part 2: Resource Manual for the MSD Prevention Guideline for Ontario. Retrieved August 7, 2007, from [http://www.wsib.on.ca/wsib/wsibobj.nsf/LookupFiles/DownloadableFileMSDResourceManual/\\$File/ResourceManualMSDPrevGuideline.pdf](http://www.wsib.on.ca/wsib/wsibobj.nsf/LookupFiles/DownloadableFileMSDResourceManual/$File/ResourceManualMSDPrevGuideline.pdf)
- Occupational Health Clinics for Ontario Workers Inc. (OHCOW). (2003). Office Ergonomics Handbook (4th ed.). Retrieved August 7, 2007, from <http://www.ohcow.on.ca/resources/workbooks/ergonomics.pdf>
- Occupational Health Clinics for Ontario Workers Inc. (OHCOW). (2005). A Step by Step Checklist for Setting up the Computer Workstation to Fit You. Retrieved August 7, 2007, from <http://www.ohcow.on.ca/resources/handbooks/execomp/chklist.pdf>

Acknowledgments

Pictures used in this handbook can be found in the Occupational Health Clinics for Ontario Workers Inc. (OHCOW) Office Ergonomics Handbook.

OFFICE WORKSTATION SELF-ASSESSMENT CHECKLIST

PREFERRED SETUP	DIAGRAM REFERENCE	YES	NO	IF NO, TRY THE FOLLOWING
Are your feet flat on the floor?	1	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> • Raise/lower chair height • Use/remove foot rest • Reduce heel height of shoes
Are your knees at a 90° angle when sitting with your feet flat on the floor?	2	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> • Raise/lower chair height • Use/remove foot rest
Is your back straight and well supported by your chair?	3	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> • Sit back in your chair • Adjust lumbar support to fit the lower back • Adjust distance of monitor, keyboard and mouse
Are your shoulders relaxed (not slouched or raised)?	4	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> • Raise/lower chair height • Raise/lower armrests • Raise/lower workstation • Raise/lower keyboard height
Are your elbows at a 90° angle and arms are resting comfortably on your armrests?	5	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> • Raise/lower chair height • Raise/lower armrests • Raise/lower workstation • Raise/lower keyboard height
Are your wrists straight (not bent to the side, up or down) when typing or mousing?	6	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> • Raise/lower chair height • Raise/lower keyboard height • Close tilt risers on back of keyboard • Review typing habits
Is your head upright (not bent forward, backward or twisted) when looking at your monitor?	7	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> • Raise/lower monitor height so the top of the monitor is eye level • Adjust monitor distance an arm's length away • Position monitor directly in front of you
Do you know how use the features on your chair?	n/a	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> • Obtain information from your chair provider on how to use chair features
Is your keyboard slightly below elbow level and placed in front of you?	8	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> • Raise/lower keyboard or tray height • Raise/lower chair height • Move keyboard directly in front of you
Is your keyboard positioned flat and close to your body?	9	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> • Close tilt risers on back of keyboard • Move closer to keyboard or pull keyboard closer to you
Do you remove your hands from the keyboard and mouse when you are not using them?	n/a	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> • Rest hands and arms on arms rests or lap when not typing or mousing
Is your mouse on the same level as your keyboard and close to your body?	10	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> • Place mouse on same level as keyboard • Use a keyboard tray that holds both the keyboard and mouse • Move mouse closer to the body to avoid reaching to use it • Use a roller mouse or touch pad on the keyboard
Do you move your shoulder and arm when moving the mouse?	n/a	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> • Use whole arm to move the mouse • Adjust the sensitivity of the mouse
Is your monitor positioned directly in front of you?	11	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> • Move monitor in front of you • Move keyboard, mouse and chair in front of monitor

Continued on reverse side →

Is the top of your monitor level with your eyes and an arm's length away from you?	12	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> • Raise/lower monitor height • Adjust monitor distance an arm's length away from you
Is your document holder at the same height and distance as your monitor?	13	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> • Move document holder to same level and distance as monitor
Are the equipment and supplies used most often close enough to you that minimal reaching is required?	n/a	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> • Move frequently used items within 36-46 cm around you (a comfortable arm length with back against the chair)
Do you hold the telephone with your hand to your ear or use a headset?	n/a	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> • Hold phone to ear with the hand • Use a headset • Use a speaker phone
Do you sit beside lights and windows (are they parallel with your line of sight)?	n/a	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> • Move so that your line of sight is parallel to windows • Position monitor between overhead lights, not in front, behind or below them
Is your computer screen free of lights or object reflections when it is turned off?	n/a	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> • Use blinds or curtains to reduce glare from windows • Use filters on light fixtures • Use an anti-glare screen • Move task lighting that shines directly into eyes
Do you take your regularly scheduled breaks and lunches or stretch when sitting for a long duration?	n/a	<input type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> • Take scheduled breaks and lunches • Move from chair and stretch when sitting every hour

Reference Diagram

