



COMPUTER WORKSTATION ERGONOMICS



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INTRODUCTION

THE PURPOSE OF THIS GUIDE

This guide will help determine if your computer workstation is a good fit for you. It provides suggestions for basic tools to set up and maintain a healthy computer workstation. This guide is not designed to address specific injuries – in that situation, a professional should be consulted.

It is recommended that a discomfort survey be completed by the user(s) both before any changes are made to a workstation, and after those changes are made.

These “pre” & “post” surveys will help determine the focus areas of an evaluation, as well as measure the effectiveness of any changes made in increasing user comfort.

A sample discomfort survey can be found on WorkSafeNB’s website.

The guide includes:

- Definitions to help you get familiar with the terminology.
- Posture and equipment guidelines and standards.
- Stretches.
- Computer workstation set-up checklist.

DEFINITIONS

Ergonomics

“The science of studying people at work and then designing tasks, jobs, information, tools, equipment, facilities and the working environment so people can be safe and healthy, effective, productive and comfortable.” (*Ergonomic Design Guidelines, Auburn Engineering, Inc., 1998*).

Musculoskeletal Injury (MSI)

An injury or disorder of the soft tissues, including tendons, ligaments, blood vessels and nerves, arising from exposure to risk factors such as awkward posture, repetitive motions, and forceful exertions. These injuries can be acute or cumulative.

- Signs and Symptoms of MSIs
These can include tenderness, weakness, tingling, disturbed sleep, swelling, numbness, pain, unreasonable fatigue, and difficulty performing tasks or moving specific parts of the body.
- Stages of MSIs
STAGE 1: Mild discomfort, present while working, but disappears when not working. Does not affect work or activities of daily living.
STAGE 2: Pain is present while working and continues when not working. May be taking pain medication. Begins to affect work and activities of daily living.
STAGE 3: Pain is present all the time. Work is affected. May not be able to complete simple activities of daily living.

Palm rest (wrist rest)

A soft surface designed to rest the palms. Often mistakenly used to rest the wrists.

Stretch

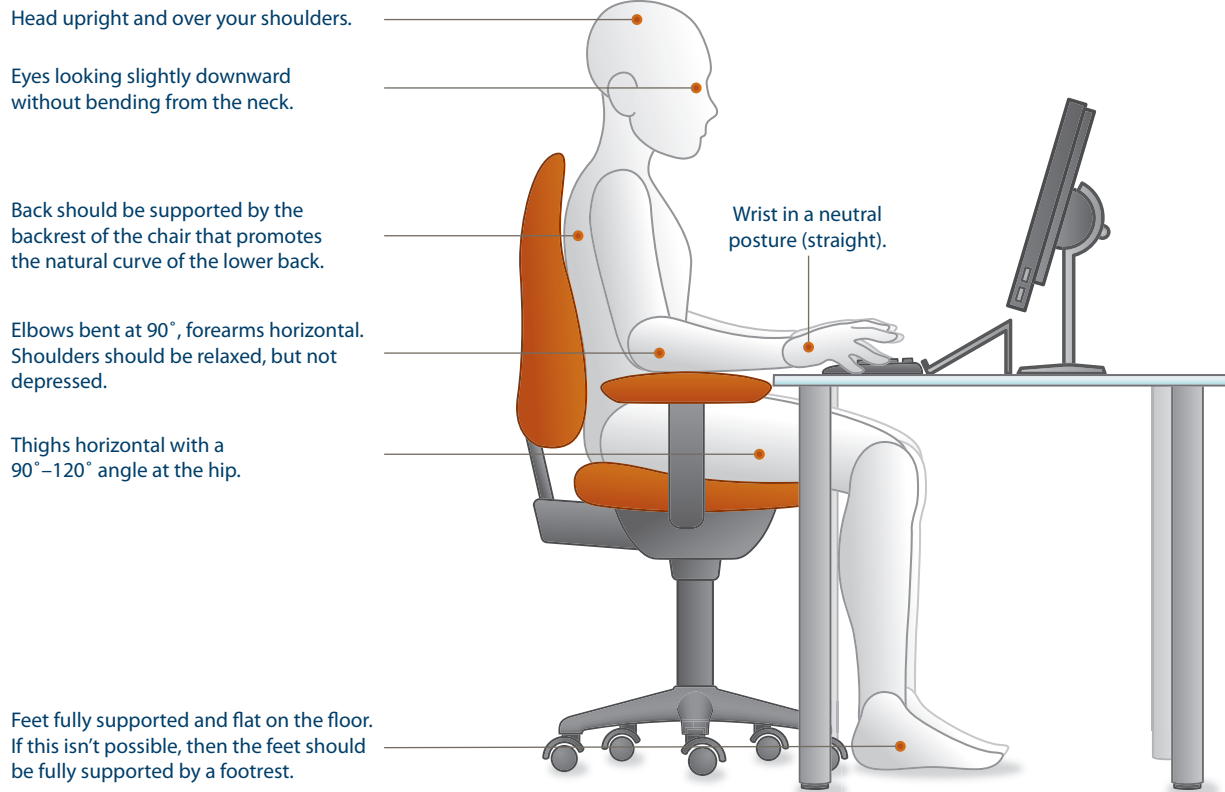
Activities and positions used to increase range of motion (ROM).

Warm-up

Activities performed before stretching to warm the body.

POSTURE

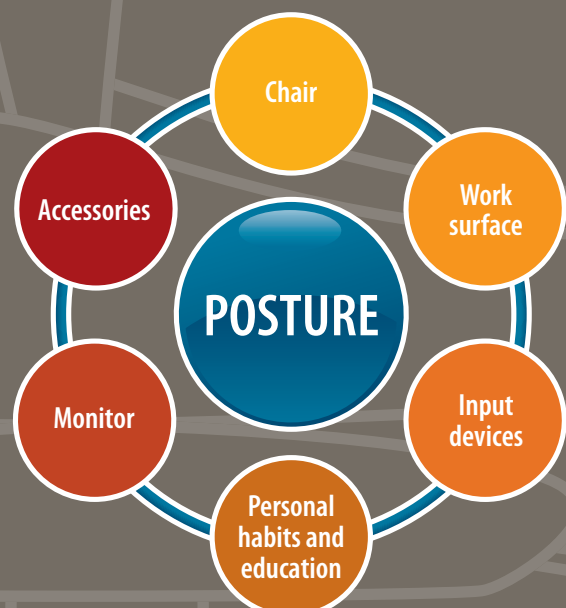
At your computer workstation, optimal posture can be described as:



This image depicts optimal sitting posture. Please note, however, that no posture is ideal indefinitely. You must change your posture and position frequently by alternating tasks (typing, writing, walking and standing) as often as possible. This will ensure proper blood flow and reduce the risk of injury.

Posture is the most important aspect when looking at workstation design.

Chairs, work surfaces, input devices, personal habits and education, monitors and accessories can help or hinder in maintaining optimal posture, but they cannot cause optimal posture. For example, having an adjustable chair does not guarantee, but merely facilitates, optimal posture. It is up to the user to identify their optimal posture, and how to make workstation adjustments to help maintain it.



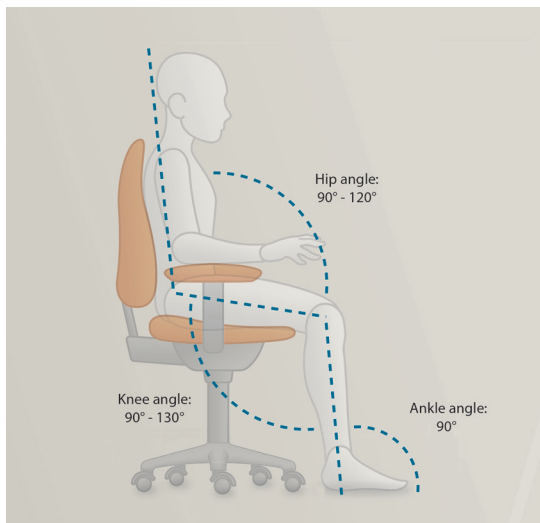
The following sections provide information on how to adjust your chair and workstation.

CHAIRS

When workstations cause discomfort, the first place people typically look is their chair. There are some basic guidelines to look for in a well-fitted office chair.

ARMRESTS

Armrests should be adjusted to elbow height. Too high, the shoulders will be shrugged; too low, the shoulders will be depressed. However, the armrests should not prevent the chair from being positioned close to the desk, nor restrict natural movements. If your armrests cannot be adjusted to allow for this, then consider removing or replacing them. Also, keep in mind that soft armrests will minimize contact stresses on your elbows. Gel wraps can be purchased to go over armrests that may be too hard.



BACK SUPPORT

When sitting, adjust the height of the backrest so the lumbar pad supports the natural curve of your lower back (lumbar curve). The tilt of the back support should allow you to sit with your upper body slightly reclined.



Knee height



Lumbar support



Depth of seat

DEPTH

When sitting, the seat pan (part of the chair you sit on) should allow you to use the back support without the front of the seat pressing against the back of your knees. If the seat is too deep, try a back support or lumbar roll to reduce the size of the seat pan. Some chairs have adjustable seat pans.

HEIGHT

While standing, adjust the height of the chair so the highest point of the seat is just below your kneecap. This should allow your feet to rest firmly on the floor when seated. If you feel pressure near the back of the seat, raise your chair. If you feel pressure near the front of the seat, lower your chair. The goal is to evenly distribute your weight.

SEAT TILT

Seat tilt can be adjusted to improve your comfort. This will also affect your weight distribution.

WIDTH

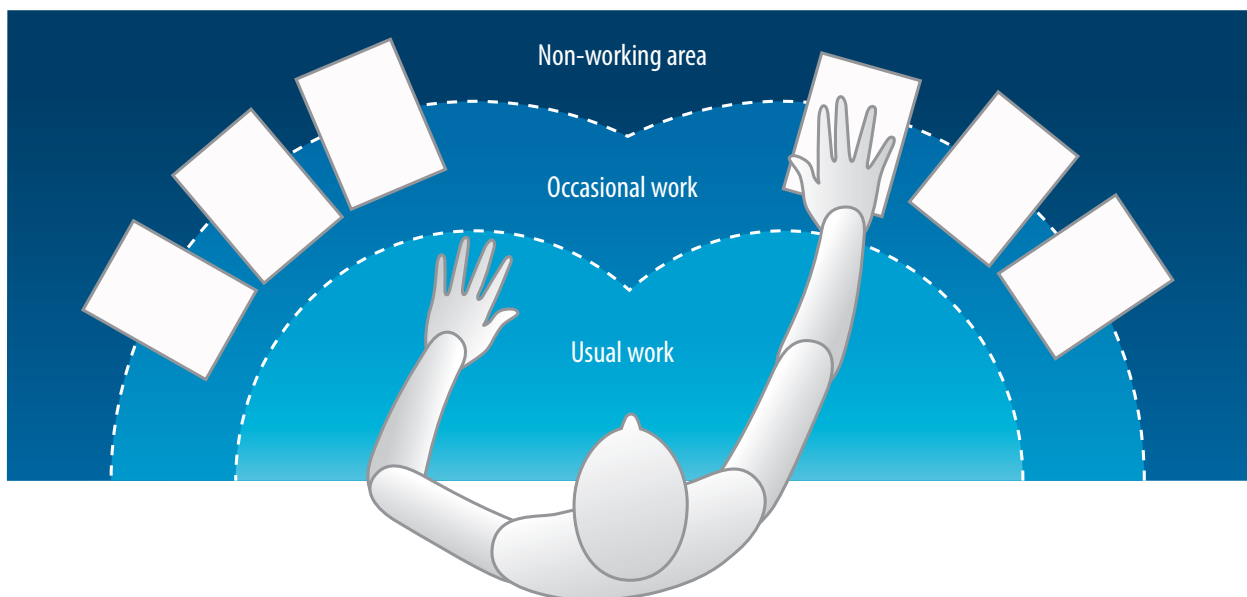
The seat pan should be wide enough so it does not apply pressure to your thighs, but narrow enough to be able to reach the armrests when they are properly adjusted.

WORK SURFACE

Like your chair, your work surface should fit you. Once you have adjusted your chair, you can determine the appropriate height for your work surface. The top of your work surface should be at your elbow height. Make any necessary adjustments by raising or lowering your work surface. If your work surface cannot be raised or lowered to accommodate your elbow height, you can raise your chair and use a footrest. The footrest should be large enough for both feet. Please note that a footrest can restrict movement and make it more difficult for a user to adjust chair features.

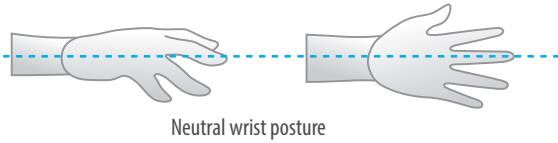
If necessary, a keyboard tray can be used to bring the keyboard and mouse to elbow height. A keyboard tray should be stable, height adjustable, have room for both the keyboard and mouse on the same surface, and should not limit legroom.

Items used frequently should be located within easy reach. Keeping infrequently used items out of reach will encourage you to get out of your chair for them - this will promote blood circulation and reduce overall discomfort.



INPUT DEVICES

There are several different types of input devices. The most popular and widely used are the keyboard and mouse.



When using a keyboard and mouse, your upper arms should be relaxed and by your sides, your elbows bent at a right angle (90 degrees) and your wrists straight.

KEYBOARD

There are many types of keyboards designed to place the hands in a more neutral position to help prevent injuries. The effectiveness of alternative keyboards depends on the user and the type of work being performed.



Keyboard with a negative slope

MOUSE

The mouse should be at the same surface/height as the keyboard and easy to reach. Users are encouraged to alternate mouse usage between the left and right hands (by changing hands you are using different muscles, thereby reducing the risk of injury). Users can go to the operating system control panel to adjust the button assignment so the primary button is the one closest to the keyboard.



Trial periods are recommended when introducing new devices. This will help to determine the suitability of the device as well as allow the user to become accustomed to it.

To further reduce the risk, limit mouse use and use keyboard shortcuts instead.
 Here are some examples of keyboard shortcuts that can be used in most popular software programs:

BASIC FUNCTIONS		
(PC)	(MAC)	IT DOES
Alt+Tab	Command-Tab	Next program
Alt+F4	Option-Command-Esc	Close program

EDITING AND FORMATTING		
(PC)	(MAC)	IT DOES
Ctrl+B	Command-B	Bold selected area
Ctrl+I	Command-I	Italicize selected area
Ctrl+U	Command-U	Underline selected area
Ctrl+Z	Command-Z	Undo
Ctrl+A	Command-A	Select all

CLIPBOARD RELATED COMMANDS		
(PC)	(MAC)	IT DOES
Ctrl+X	Command-X	Cut selected area
Ctrl+C	Command-C	Copy selected area
Ctrl+V	Command-V	Paste selected area



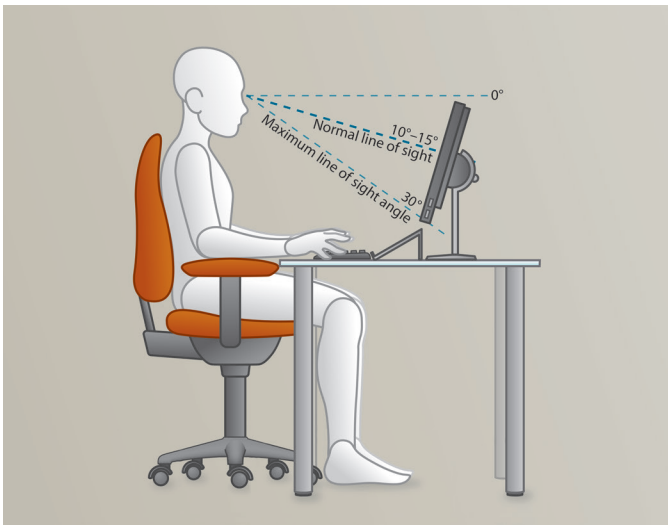
MONITOR

DISTANCE

How far you sit from your monitor will depend on your vision and the size and resolution of your monitor. As a general rule, it is best to move the monitor as far away as possible and increase the font size. The CSA Standard on office ergonomics specifies that the distance should be between 50-100 cm.

HEIGHT AND LOCATION

The monitor should be positioned directly in front of you with the top of the monitor just below eye level. A common practice is to place the monitor on a computer case or stand (sometimes even stacks of paper and phonebooks); however, this places the monitor too high for most individuals and causes neck discomfort and pain. The monitor should also be tilted 10-15 degrees for proper accommodation of the normal line of sight.



CORRECTIVE LENSES

If you wear progressive lenses, the monitor may need to be even lower to maintain optimal posture. Depending on vision levels, and the amount and type of computer work being done, corrective lenses specifically for computer use may be considered. Your optometrist will be able to determine the best solution, based on your needs.

LIGHTING AND GLARE

The CSA standard on office ergonomics specifies light levels between 75-300 lux for computer based tasks. Higher light levels may cause glare on work surfaces and monitors.

To test for glare, turn off your monitor – if the screen provides reflections, you have glare. Since this glare is caused by light

shining directly onto your screen, check its source. If it is a window, this can be corrected by positioning your monitor so that your line of sight is parallel to the window. If this is not practical, cover the window with blinds. If lighting is causing the glare, the lights should be shaded or removed. A desk lamp will provide the extra lighting to see paper documents, while avoiding excessive light near the monitor. If you are right-handed, the lamp should be on the left side (and vice versa) to reduce shadows.

Take regular eye breaks. Get into the habit of taking your eyes off the screen every few minutes and focusing on something far away. You can also move your eyes up and down, and side-to-side without moving your head. This will help decrease eye strain.

For more information on lighting, refer to the Canadian Centre for Occupational Health and Safety website.

DUAL MONITORS

When using two monitors, your screens should be positioned side-by-side, at the same height and with a slight “V” angle. You should be positioned at the centre of your “screen real estate.” This is the spot at the middle of the full width of your two screens.

An easy way to know if your screen is in the right position is whether or not you are squinting to read the text on it. Rather than leaning forward or backwards in your chair, move your screen closer or further away – make your screen accommodate you, not the other way around! Remember, you can also increase the font size or zoom setting on your monitor.

LAPTOPS AND MOBILE DEVICES

Laptops and mobile devices can compromise posture for portability and convenience. All the principles of computer workstation set-up previously discussed still apply when considering the use of laptops and mobile devices.

When possible, use a docking station where the laptop will be most used (at the office, or home office). This will allow the user to easily connect a keyboard, mouse and monitor to the laptop, encouraging optimal posture.



TABLETS AND CELLPHONES

Tablet and cell phone use encourages awkward and static postures. The CSA standard on office ergonomics (Z412-17) specifies that the following measures should be considered when using these devices:

- Using hands-free devices during long phone calls
- Using a neutral grip when holding the devices
- Alternating between using thumbs and other fingers to type
- Reducing keystrokes by keeping the text entries short and using abbreviations, text shortcuts and predictive text
- Maintaining a neutral and upright spinal posture when using the device
- Alternating hands when holding the device
- Providing an external keyboard for typing
- Using a stylus

ADJUSTABLE WORKSTATIONS (SIT-STAND STATIONS)

Adjustable workstations are encouraged as they allow for more posture changes throughout the day. This can increase circulation and productivity, as well as decrease the risk of developing an MSI. The same principles apply when using an adjustable workstation. The keyboard and mouse should be at elbow height, the monitor should be directly in front of the user and 50-100 cm away, and the top of the monitor should be just below eye level. When standing, use a footrest to encourage changes in posture. To see real health benefits, studies recommend that for every hour of work, the user should spend 30-45 minutes standing. (Dr. Jack Callaghan, University of Waterloo)

OTHER ACCESSORIES

PALM REST / SUPPORT

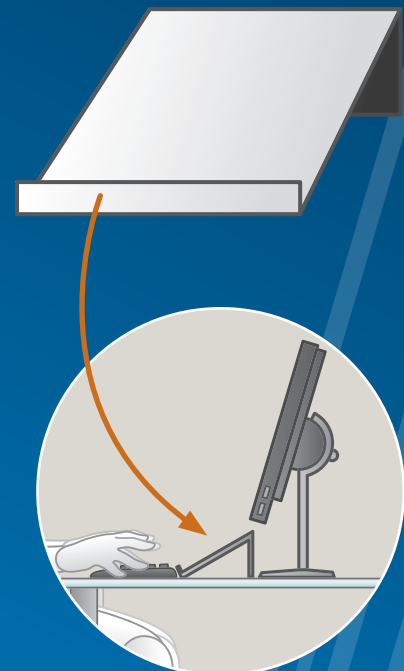
Palm rests are designed to raise the palms and keep the wrists in a neutral position. They are not meant to be positioned under the wrists; this will cause pressure on the underside of the wrists which will compress the tissues and blood vessels, resulting in decreased blood flow and increased injury risk.

DOCUMENT HOLDER

When frequent data entry from a source document is required, provide a sloped document holder positioned directly in front of the user to promote optimal posture while viewing the document.

PHONE

Keep your phone within easy reach. If you use it while typing or writing, use a headset or a speakerphone to avoid awkward positioning of your neck.



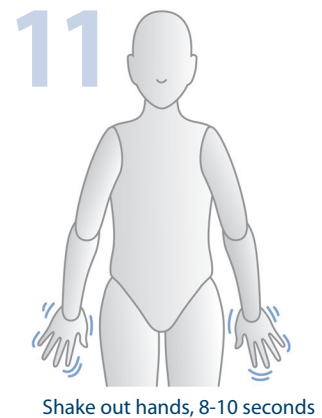
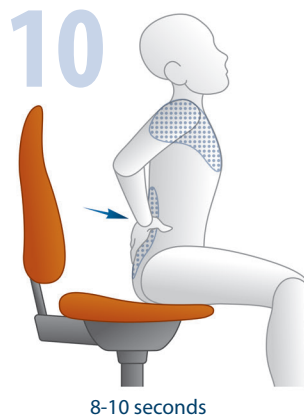
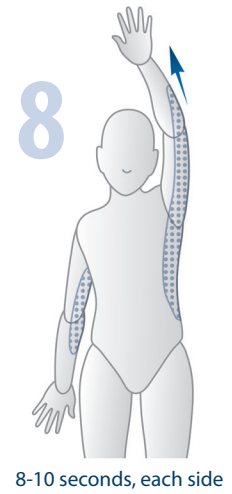
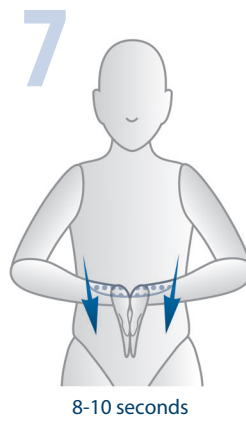
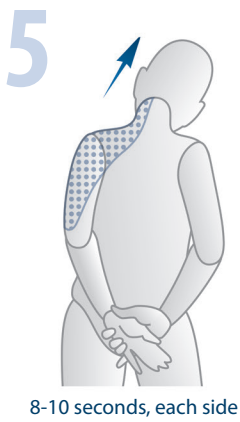
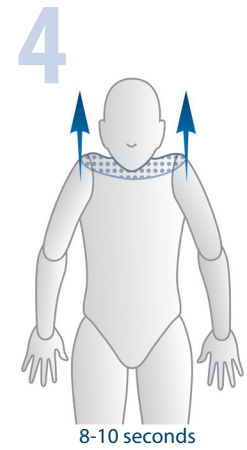
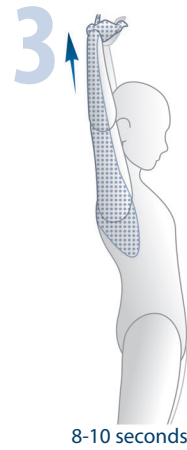
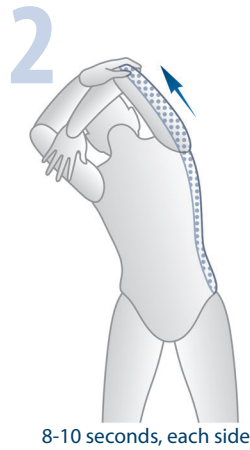
Document holder

Reference:

Canadian Standards Association. (2017). Office ergonomics – An application standard for workplace ergonomics (CAN/CSA Standard No. Z412-17).

STRETCHES

Sitting at a computer for long periods often causes neck and shoulder stiffness and, occasionally, lower back pain. Do these stretches every hour or so throughout the day, or whenever you feel stiff. Be sure to move around frequently – you'll feel better!



COMPUTER WORKSTATION SET-UP CHECKLIST

Name: _____ Date: _____

Completed by: _____

Chair	Yes	No	N/A	(If no, suggested actions)
Can the height, seat and back of your chair be adjusted?				<ul style="list-style-type: none"> Obtain a properly functioning chair
Are your feet fully supported by the floor when you are seated?				<ul style="list-style-type: none"> Lower the chair Add footrest until an appropriate desk or chair is acquired
Are you able to sit without feeling pressure from the chair seat on the back of your knees?				<ul style="list-style-type: none"> Adjust seat pan Add a back support
Does your chair provide support for your lower back?				<ul style="list-style-type: none"> Adjust chair back Obtain proper chair Obtain lumbar roll
Do your armrests allow you to get close to your workstation?				<ul style="list-style-type: none"> Adjust armrests Remove armrests
Keyboard and Mouse	Yes	No	N/A	(If no, suggested actions)
Are your keyboard, mouse and work surface at your elbow height?				<ul style="list-style-type: none"> Raise or lower workstation Raise or lower keyboard Raise or lower chair
Are frequently used objects within easy reach?				<ul style="list-style-type: none"> Rearrange workstation
When using your keyboard and mouse, are your wrists straight and your upper arms relaxed by your side?				<ul style="list-style-type: none"> Recheck chair, raise or lower as needed Check posture Check keyboard and mouse height
Is your mouse at the same level and as close as possible to your keyboard?				<ul style="list-style-type: none"> Move mouse closer to keyboard Obtain larger keyboard tray if necessary
Do you alternate the hand used for controlling your mouse?				<ul style="list-style-type: none"> Switch hands and adjust buttons in Control Panel
Work Surface and Monitor	Yes	No	N/A	(If no, suggested actions)
Is your monitor positioned directly in front of you?				<ul style="list-style-type: none"> Reposition monitor
Is your monitor positioned at 50-100 cm away?				<ul style="list-style-type: none"> Reposition monitor Obtain deeper work surface if there is not enough space
Is your monitor height slightly below eye level?				<ul style="list-style-type: none"> Add or remove monitor stand Adjust monitor height
Are your monitor and work surface free from glare?				<ul style="list-style-type: none"> Re-orient workstation Cover windows Adjust lighting
Do you have a desk lamp for reading or writing documents?				<ul style="list-style-type: none"> Obtain desk lamp Place on left if right-handed – place on right if left-handed
Breaks	Yes	No	N/A	(If no, suggested actions)
Do you take stretch breaks every 30 minutes?				<ul style="list-style-type: none"> Set reminders to take breaks
Do you take regular eye breaks from looking at your monitor?				<ul style="list-style-type: none"> Refocus on a picture on wall every few minutes
Accessories	Yes	No	N/A	(If no, suggested actions)
Is your document holder positioned directly in front of you?				<ul style="list-style-type: none"> Obtain a different document holder Adjust workstation set-up
Are you using a headset or speakerphone if you are typing or writing while talking on the phone?				<ul style="list-style-type: none"> Obtain a headset Use speakerphone

