

Computer Workstations (Design and Adjustment)

Course Overview

- This training module has been developed for workers at the University of Queensland, and forms part of the OHS training program at UQ.

The aims of this course are to:

- Assist UQ staff and students to assess and control manual risks arising from computer use e.g. mousing, keying, reading the screen and phone use
- Identify strategies and UQ resources that will enable implementation of risk control measures e.g. ergonomically designed seating, keyboard and mouse; improved seating adjustment; telephone head set; voice activation software; task variation
- Monitor risk controls and make appropriate adjustments e.g. re-adjust seating, trial an alternative mouse

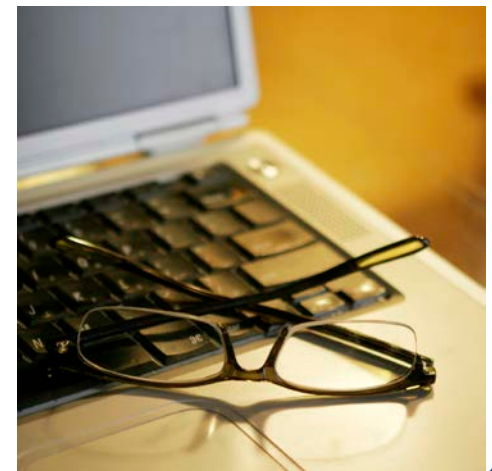
Introduction

Manual tasks at computer workstations can contribute to a number of musculoskeletal disorders including:

- Sprains and strains of muscles, nerves, ligaments and tendons in the hand, wrist, forearm, shoulders and neck

Examples:

- Eye strain
- Headaches
- Neck pain/strain
- Wrist pain/strain
- Upper back pain/strain
- Lower back pain/strain
- Shoulder pain/strain



Risk Factors

Manual task risk factors for computer workstations include:

- Repetitive hand, wrist and arm movements
- Awkward, static postures of the head, neck, mid and lower back and upper limbs
- Prolonged seated or standing posture
- Viewing the computer screen for prolonged periods

Controlling manual task risk factors reduces the risk of musculoskeletal disorders.

The control of manual task risk factors is the focus of this training program.

Risk Management Approach

- Optimal workstation set-up can help to reduce exposure to risk factors but should be used in conjunction with work practices to effectively minimise risk of musculoskeletal disorders.
- No single risk control measure will be effective on it's own.

Risk Management (continued) ...

The Manual Tasks Code of Practice specifies the effective approach for manual task risk assessment and control.

The Code of Practice can be found:

- https://www.worksafe.qld.gov.au/_data/assets/pdf_file/0008/58166/hazardous-manual-tasks-cop-2011.pdf

Responsibilities

UQ managers and staff have obligations under the Workplace Health & Safety Act to ensure health and safety at computer workstations.

Specific responsibilities are as follows:

Staff

- Complete online injury, illness, incident reports
- Self assess their computer workstations using Computer Workstation Design and Adjustment resources:
<http://www.uq.edu.au/ohs/?page=30233>
- Advise their supervisor of risk control requirements and implement them
- Monitor risk controls and request further assistance if necessary

Specific responsibilities (continued) ...

Managers

- Ensure the lodgement of online injury, illness, incident report
- Ensure the implementation and documentation of appropriate risk control measures
- Allocate adequate resources.

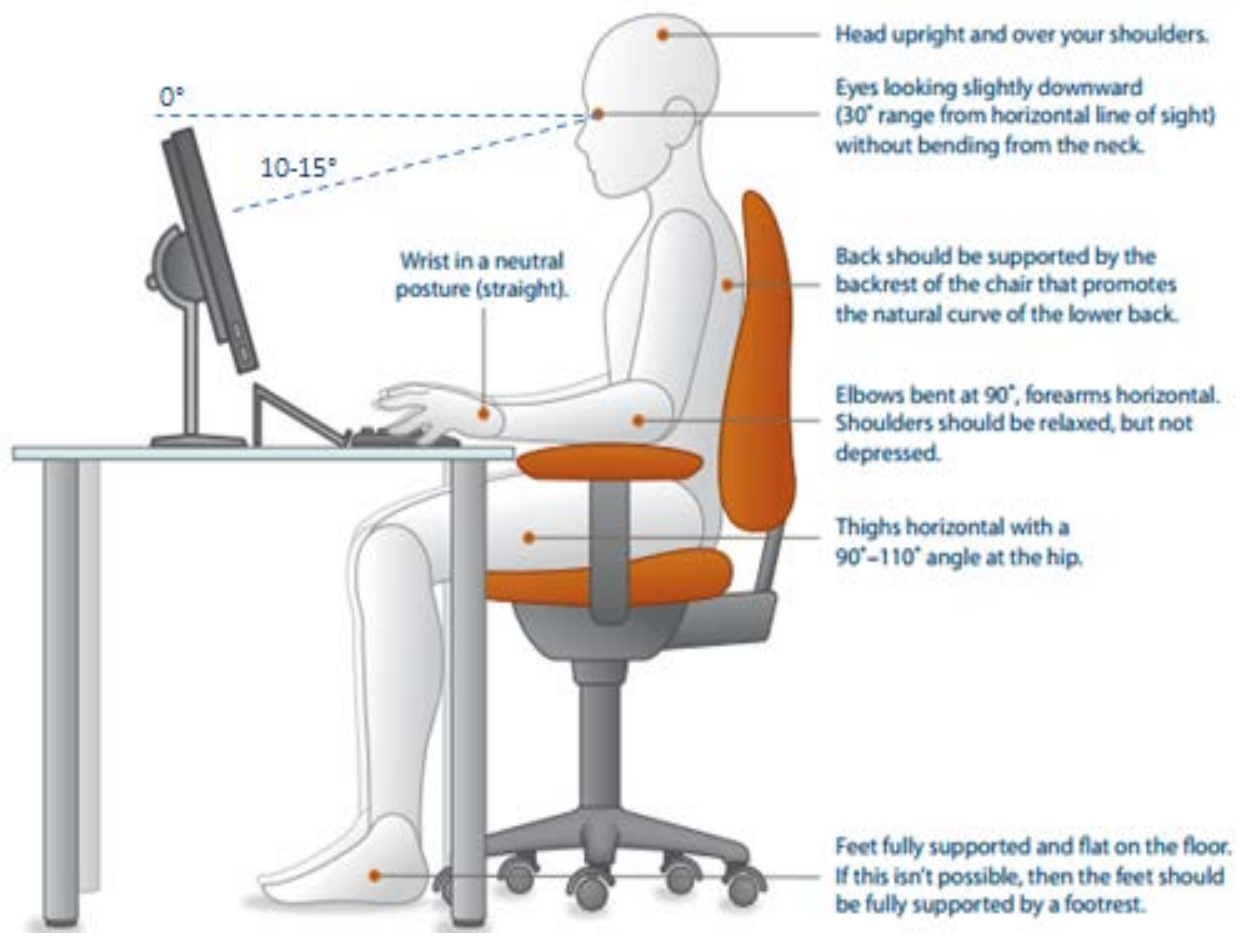
Work Health and Safety Managers and Coordinators (WHSCs)

- Assist staff with workstation assessment of risk factors
- Ensure the implementation and documentation of appropriate risk control measures

Ergonomics & Rehabilitation Adviser

- Provide written advice to the worker and other relevant staff (manager, WHSC, etc.) of the ergonomics requirements to minimise risk of injury aggravation
- To recommend risk control measures and optimal working postures to manage specific musculoskeletal disorders

Optimal Design of Computer Workstations



Workstation design and adjustment

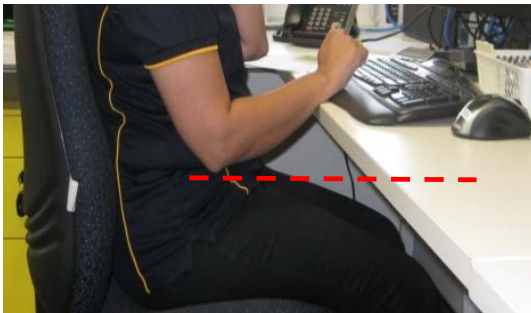
The following pages outline optimal computer workstation design and adjustment.

There are 14 Steps to consider:

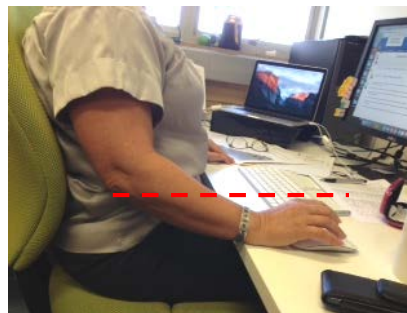
1. Seat height adjustment
2. Feet support
3. Backrest angle adjustment
4. Backrest height adjustment
5. Armrest adjustment
6. Forearm support
7. Computer screen adjustment
8. Laptop adjustment
9. Keyboard design & placement
10. Mouse design & placement
11. Document placement
12. Telephone Use
13. Sit/Stand Workstations
14. Work Practices

Step 1: Seat adjustment

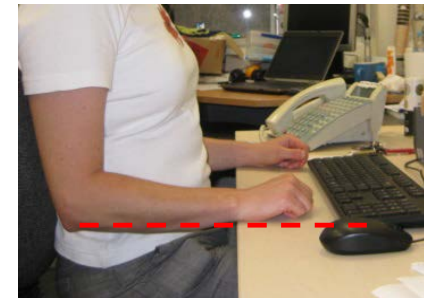
- Adjust the seat height so that your elbows are aligned to desk height
- Ensure shoulders are relaxed (try rolling them forward, backward, and shrugging a few times)
- You may need a colleague to help you verify your elbows are aligned to desk height



Seat too low
(elbow below desk)



Seat too high
(elbow above desk)



Seat optimal height
(elbow aligned to desk)

Step 1: Seat adjustment (continued)

Seat length

- Adjust seat length (if applicable) so thighs are fully supported but edge of seat does not touch back of knees
- 2-3 finger spaces between edge of seat and back of knees is optimal



Seat too short



Seat too long

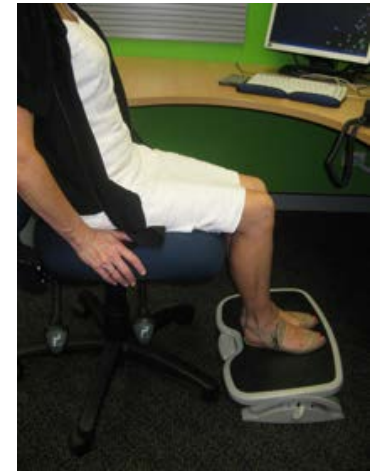
Seat angle

- Neutral seat tilt (flat seat) comfortable for most people
- Workers with lower back pain, hip pain or numbness/ tingling in one or both legs may find forward seat tilt helps reduce discomfort
- Forward seat tilt reduces rotation of pelvis and pressure on sciatic nerve
- Aim for posture with knees below the hips (ensure footrest doesn't raise knees above hips)
- A wedge seat cushion might be an alternative to a chair with forward seat tilt.



Step 2: Feet support

- Check if your feet are resting comfortably on the ground or whether they are dangling and in need of support. (This should be done after adjusting your seat height)
- The footrest should be positioned to enable you to sit close to the desk surface
- Tendency to tuck your feet on the legs of your chair can indicate that a footrest is needed



Step 3: Backrest angle adjustment

- Sit to the back of the seat
- Adjust the angle of the backrest to facilitate a comfortable upright seated posture
- A backrest angle between 92-100 degrees is generally most comfortable for most people

Some **mesh chairs** do not have a backrest angle adjustment but a recline tension adjustment instead

- Adjust the recline tension to facilitate upright posture without expending effort to keep the backrest in that position. This will vary across users based on body size and weight
- For users that do not wish to be able to recline, most chairs will have a recline lock function as well



Recline tension Adjustment
Usually, turn crank towards knees to increase tension and towards buttocks to reduce tension.

Step 4: Backrest height adjustment

- Adjust the backrest height so that the lumbar support in the lower part of the backrest supports the lumbar curve of your back. This is also known as the 'small' of your back.



Backrest height is usually adjusted by a ratchet mechanism:

- Raise the backrest to its highest point to disengage the ratchet
- Lower the backrest to its lowest point and clicking it into the ratchet
- Raise the backrest slowly until the lumbar curve supports the small of your back

Some **mesh chairs** do not have height adjustable backrests but instead have a height adjustable lumbar support. Adjust the lumbar support so it fits into the small of your back.

Step 5: Armrest adjustment

- Armrests should be adjusted 0.5-1cm below the elbow when the shoulder is relaxed
- Ensure armrests can adjust below desk height
- Armrests are not recommended for use with corner workstations
- If your armrests are not adjustable enough, ask your local WHSC if they can be removed



Step 6: Forearm support

- Supporting the forearms on the desk surface reduces static loads and tension in muscles.
- Move your chair close to the work surface so that your stomach is almost touching it. If the computer equipment is too close, move it further back on the desk.
- Sitting close to the work surface will allow your forearms to be supported by the desk whilst operating the keyboard/mouse/pen or when reading.
- When typing, look down at your elbows. If you see the crease in your elbow, that indicates you may be reaching forward. Try pulling the keyboard closer or pull your chair in closer to the keyboard.

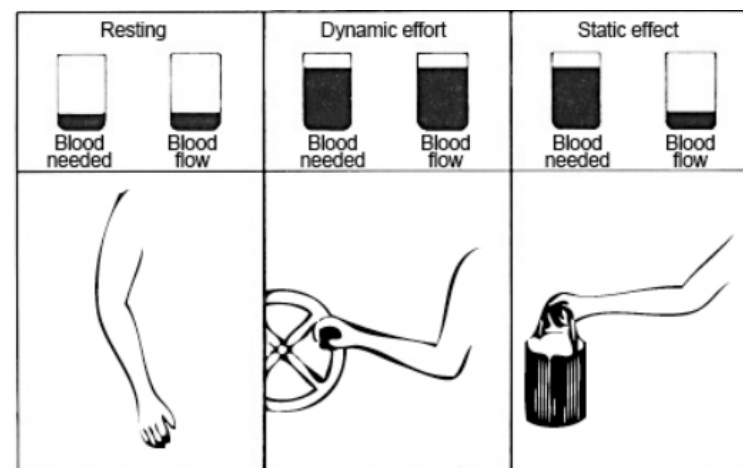
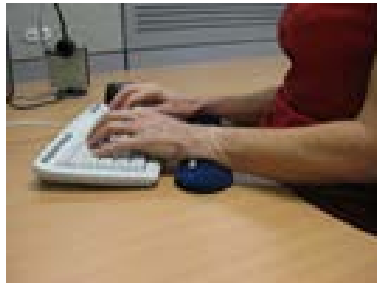


Figure 3. Diagram of dynamic and static muscular effort.

Step 6: Forearm support (continued) ...

- Keyboard: high profile (thick)
- Wrist rest?: **Maybe**
- Reduces contact stress on wrists
- Minimises wrist extension



- Keyboard: low profile (thin)
- Wrist rest needed? **NO**
- Wrist rest thicker than keyboard
- May create wrist flexion

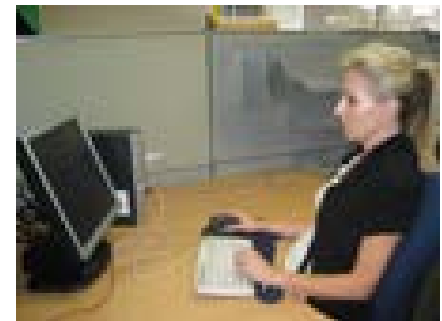


- Avoid “planting” the wrist on the wrist rests or desk and pivoting with the hands- this will increase wrist strain.
- Don't combine wrist rest with wrist support built into keyboard



Step 7: Computer screen adjustment

- Optimal monitor positioning can reduce risk of eye strain and headaches
- Monitor should be approximately an arm's length away
- Centre monitor directly in front of you and parallel to keyboard/mouse
- Monitor height should be 15-50 degrees below horizontal line of sight (top of monitor should be slightly below eye level)
- The monitor should be tilted back so that the top is slightly farther away from the eyes than the bottom
- Consider what programs are used most and where on the screen the active inputs are (i.e. where do you spend most of the time looking on the screen? Middle or bottom of screen?)
- Do you tend to scroll down to keep active work in the top half or two thirds of the screen?



Step 7: Computer screen adjustment (cont'd)

Dual Monitors

Monitors should be aligned to similar heights, directly beside each other and angled in towards user slightly to minimise neck twisting

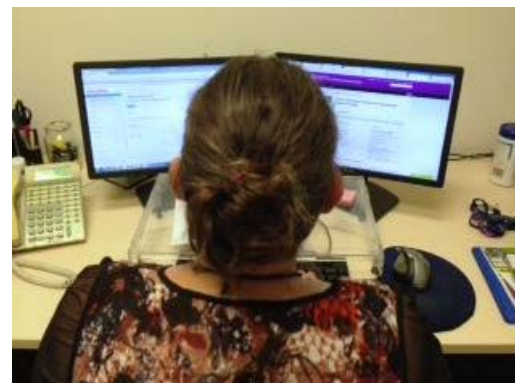
Monitors used equally or both used all/most of time
50/50, 60/40)

- align monitors to centre

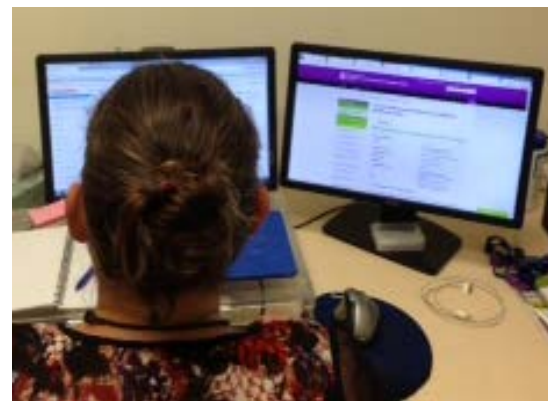
One monitor used more frequently than the other
(70/30, 80/20)

- Align primary monitor to centre, secondary monitor directly beside

Try to avoid using 3 or more screens.



Optimal set up when both monitors used equally (above)



Optimal set up when left monitor is used primarily and right monitor used less frequently

Step 7: Computer Screen Adjustment (continued) ...

Prescription glasses

- Progressive lenses or bifocals-usually need monitor lower, which may cause awkward neck postures, neck stiffness and pain
- Consider dedicated computer glasses
- Ensure prescription is up to date

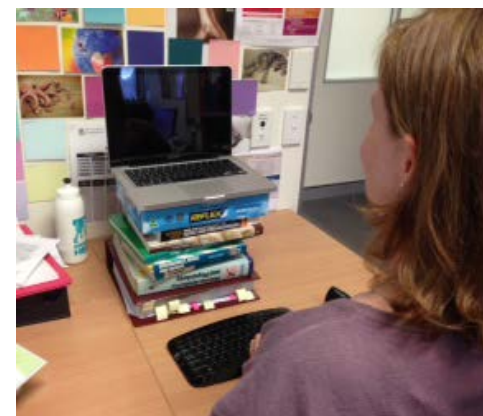
Lighting, glare and reflection

- Avoid placing monitor in front of windows or facing window
- Optimal location: perpendicular to window
- Apple monitors are highly reflective, consider anti-glare filter if too much glare
- Tilt monitor so top slightly further away than bottom to minimise glare from ceiling lights
- Close window shades/blinds when glare is at it's worst



Step 8: Laptop Use

- Risk results from inability to adjust screen, keyboard and mouse separately
- Use external mouse and keyboard and raise laptop to optimal monitor positioning
- Small laptop screens may increase eye strain
- Use zoom-in view or larger monitors whenever possible
- Ask your supervisor or local WHSC if you need an external mouse and keyboard to use with your laptop



Step 9: Keyboard design and placement

- The keyboard should be placed far enough onto the desk to allow forearm support, but close enough to avoid reaching forward.
- Close feet on keyboard (if applicable). This will help to prevent upward bending of the wrists and risk of wrist strain.



Angled keyboard, creates wrist extension and increases risk of strain

Flattened keyboard, minimises wrist extension and risk of strain



Step 9: Keyboard design (continued) ...

Using the conventional keyboard while mousing with right hand can cause awkward static shoulder postures.

Consider mousing with left hand or use of a compact keyboard (no numeric pad, or numeric pad on the left) so mouse is closer



Awkward shoulder posture using alpha-numerical keypad on same side as mouse



Neutral shoulder posture using alphabetical only or opposite side numerical keypad

Step 10: Mouse design and placement

Mouse placement:

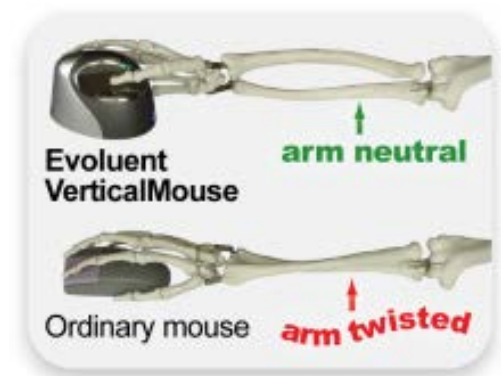
- Position the mouse directly beside the keyboard

Mouse design:

- Most workers will find a standard mouse is comfortable
- Some users with pre-existing wrist injuries or pain in the wrist may find a vertical mouse helps to minimise discomfort
- For large hands or small hands, consider larger or smaller mice

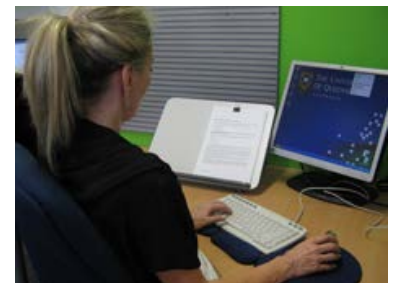
Mouse use and settings:

- Move the mouse with the entire arm, avoid “planting” the mousing hand on the wrist rest or desk- this will increase wrist strain
- Consider mouse tracking and scrolling speeds to minimise unnecessary hand and shoulder movements



Step 11: Document Placement

- Reading hard copy documents placed flat on the desk top requires forward bending of the neck and upper back, increasing neck strain
- Hard copy documents should be elevated and placed beside the monitor or between monitor and keyboard to enable neutral neck and head position.



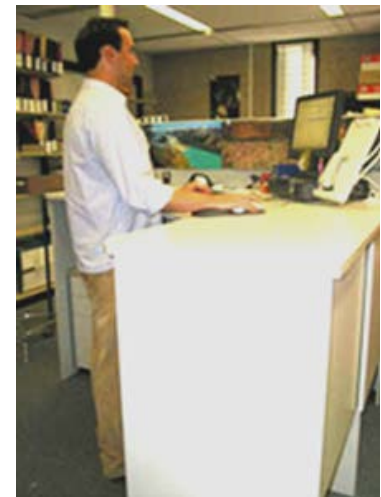
Step 12: Telephone use

- Extended telephone use and when telephone used concurrently with computer work can create awkward neck postures where telephone is often cradled between the ear and shoulder.
- This can cause neck and shoulder pain and headaches
- Consider use of a hands-free headset to avoid these awkward neck/shoulder postures.
- Headsets available from [VoiceOps ITS](#)



Step 13: Sit/Stand Workstations

- Height adjustable workstations allow for raising or lowering of the work surface without disruption to workstation equipment
- Height adjustable workstations can help to accommodate very tall workers very short workers, and workers with mobility impairments
- Height adjustability ranges vary across workstations and required heights should be measured prior to ordering
- At UQ, height adjustable workstations are reserved for workers with medical conditions affecting their ability to sit for prolonged periods



Step 13: Sit/Stand Workstations (continued)

Alternatives to Sit/Stand workstations:

- Increased postural variation via work practices
- Shared hot desks
- Use bookshelves or filing cabinets to facilitate a standing work surface for paperwork or filing
- Schedule meetings to break up prolonged seated computer work



Step 14: Work Practices:

- Vary tasks throughout the day to avoid prolonged static postures
- Schedule meetings to minimise prolonged computer work
- Standing or walking meetings
- Take the stairs instead of the lift
- Use the toilet on a different floor (or building) than your office
- Walk to colleagues office to talk rather than call or email
- Stand up during telephone calls
- Go for a walk on lunch break
- Stretch throughout the day to reduce muscle tension
- Anticipate peak workloads to ensure extra staffing or assistance



Step 14: Work Practices (continued)

Stretch Prompting Software

- Software programs (Work Rave, Work Pace, etc.) can help remind users to stretch frequently throughout the day and to stand up and move around to break up prolonged sitting
- Alternatively, desktop calendars, phone reminders or egg timers could be used to remind you to get up from the workstation regularly



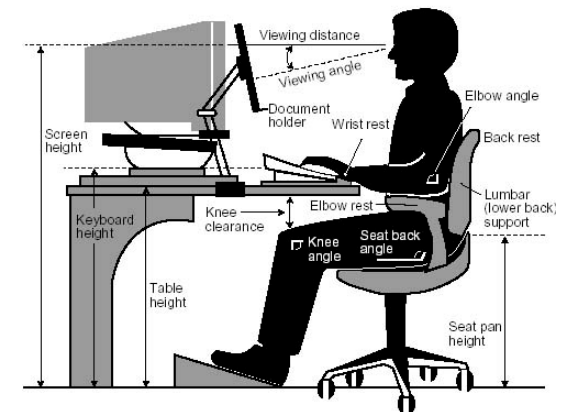
Self-Assessment Checklist

Use the information provided within this online module and the self-assessment checklist to ensure you have set up your workstation as optimally as possible.

- [Self-Assessment Checklist](#)

Other resources:

- PPL 2.50.03: [Computer Workstation Design and Adjustment guidelines](#)
- Workplace Health and Safety Queensland [Ergonomic Guide to Computer based Workstations](#)



Need more advice?

- This module hopefully helped identify some changes you can make to your workstation to decrease risk of musculoskeletal disorders
- Once these changes are made it may take a few weeks for symptoms to decrease or resolve
- If symptoms persist or you require assistance to implement changes to your workstation, consult your local WHSC or OHS Manager. Consult the [Safety Contacts List](#) if you are unsure who your local safety coordinator is.
- If you require further assistance and your work unit does not have a WHSC, contact the OHS Division: ohs@uq.edu.au
- For persisting or severe discomfort or pain, consult your doctor.

Selection and purchase of computer workstation furniture and equipment

- UQ aims to ensure the furniture purchased for use at the university complies with relevant standards and is durable, stable and is suitably adjustable
- New furniture (chairs, workstations, height adjustable workstations, bookshelves, etc.) should be purchased through [P&F Furniture Procurement unit](#), in accordance with [PPL 2.50.04 Selection and Purchase of Seating and Furniture procedures](#).
- Footrests, document holders, monitor risers, mouse pads, wrist rests can be purchased through [P&F Central Stores](#)



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Assessment

- You have now completed the University of Queensland Computer Workstations: Design and Adjustment training module.
- If you would like to revise any of the topics covered before you begin the assessment, please use the quick find index to navigate to a particular topic.
- You will be asked a set of randomly selected questions. The pass mark is 80%. You may repeat the test as many times as you require. Each time you attempt the assessment, you will be presented with a different set of questions.

Assessment location

- Please close this module and return to the OH&S courses main page. Select the relevant assessment to complete your test.