NOVA SCOTIA
Labour and Workforce Development
Occupational Health and Safety

Ergonomics Fact Sheet

Working with Laptop Computers

Laptop computers have become standard issue for many employees in Nova Scotia. For workers who do not work from a traditional office, the portability of the laptop computer enables them to take their work pretty much anywhere - to clients, home offices, and on the road.

Laptops were originally designed for shorter-duration and irregular use, not for daily, continuous use as happens in some cases. It is not surprising then, that many musculoskeletal complaints arise out of work with laptop computers.

How Can Laptop Computers Cause Problems?

Laptop computer design is evolving and improving constantly. However, here are a few features and conditions of use that have resulted in musculoskeletal complaints from users.

Location of use
When laptops are used in non-conventional settings, it can be difficult to position the laptop appropriately to achieve a relaxed upper body position. Many tables are too high, resulting in elevated shoulders and flexed wrists. Use on the lap can be too low, requiring wrists to be bent back (extension). Other locations can require the user to reach forward to the keys.

Pattern of use
When a laptop is substituted for a full-size desktop computer system, problems can arise if the user regularly keys for long periods of time. Prolonged use acts to magnify the effects of the other points listed here.

Type of task
One's work may include a variety of computer tasks, including keying or data entry, scrolling through a document, editing, or graphic input. Dedicated use of the pointing device (touchpad, or mouse nib) or

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keyboard may produce more symptoms, due to constrained hand and finger positions, than scrolling through to read a document.

Laptop design features

Laptops vary in design across brands, models and time. The table below lists features of some laptops which can be associated with musculoskeletal symptoms. Comparisons are made with reference to standard desktop computer systems.

Laptop Design Feature	Possible Consequence	Associated Risks
Smaller size of keys	- more keying errors requiring correction and additional keying	- time and productivity losses
Keys spaced more closely together	- constrained hand and finger positioning -more keying errors	- awkward, static work for muscles of hands - time and productivity losses
Forward position of keys, with hand rest area between keys and user	- encourages 'planting' of hands on surface while keying, and/or reaching forward to use the keys	- bent wrist postures - increased pressure at base of palm (carpal tunnel) - increased tension in muscles of upper back and shoulders
Small pointing devices in lieu of mouse (e.g. touch pad or mouse nib)	- requires use of fewer, small muscles in one finger to operate	- prolonged (static) muscle tension, leading to fatigue in muscles of hand and finger
Screen attached to keyboard	- can be difficult to position laptop for ideal keying *and* viewing set-up	- prolonged 'shrugging' of shoulders - neck bent forward too much (flexion)
Smaller screen size	- can be limited in resolution capabilities, meaning smaller display fonts	- eye strain - awkward upper body position while leaning closer to view screen contents
Weight of laptop	- extra weight to carry	- shoulder/neck strain

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Transporting the unit
When used as a portable computer, the laptop and associated cords must be carried. Often, other related computer equipment (e.g. a portable printer) is carried too. Carrying cases add extra weight to the total load. Different methods of carrying and handling loads exist, and some are associated with more injury risk than others.

Ten Recommended Practices for Using Laptops

If regular use of a laptop computer is part of the job, follow these guidelines for a more comfortable, healthy and productive experience.

1.   For people who key on a steady, regular basis:
     a) use a full-size, stand-alone keyboard.
     b) position the laptop to minimize reflective glare from overhead or surrounding light sources.
     c) position the screen to optimize screen viewing (i.e. head erect with chin tucked in).

2.   When choosing a laptop, select one with a full-size keyboard area.

3.   If a pointing device is used on a frequent basis, especially for precision pointing tasks, use of a stand-alone mouse (or other full-size pointing device) is recommended.

4.   Select a laptop model with a screen that can be opened to tilt back fully.

5.   When choosing a work location for the laptop, consider any other equipment, books, or materials that will need to be in close proximity. Ensure adequate space is available.

6.   Select or create a surface that allows for the following body positioning while keying and using a mouse or other pointing device:
   • shoulders relaxed - not elevated or "shrugged"
   • upper arms hanging by sides
   • right angle at the elbow (approximate)
   • forearms, wrists and hands in alignment - no bent wrists!
   • fingers resting lightly on the keys.

7.   If the laptop has a smaller sized keyboard area, and/or the integrated pointing device must be used, take frequent mini-breaks from the task to stretch the hands and 'make a fist'.

8.   Select a carry-case designed to hold only the laptop and associated cords. Larger bags have a tendency to fill up with other items, making for a heavier load.

9.   If the laptop and other materials must be carried regularly and/or for lengthy distances, consider using a backpack style bag, or use a pullman-style case that has wheels and can be pulled. Avoid carrying the laptop and other heavy loads over one shoulder.

10.   When placing the laptop in a vehicle (or putting it down anywhere), set the weight down close to the body. Avoid reaching across a car seat or deep into the trunk while holding the weight of the laptop.