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Ergonomics		
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SAFE WORK PROGRAM: ERGONOMICS

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PREAMBLE

This program sets out ergonomic expectations for Mount Royal University and outlines the procedures to follow in the event of an ergonomic concern.

Ergonomics is the process of designing or arranging workplaces, products, and processes so that they fit the people that use them. The risk of injury is reduced when considering human factors in the development or update of workplaces and environments.

Ergonomics consists of three main fields: physical, cognitive, and organizational ergonomics. This program focuses specifically on physical ergonomics, which is concerned with human anatomy and anthropometric, physiological, and biomechanical characteristics as they relate to physical activity and the environment.

Examples of physical ergonomic hazards that this program addresses include, but is not limited to: fixed or constrained postures, repetitive movement, strong forces on small parts of the body, or lack of recovery for the body between movements or tasks. These conditions can lead to Musculoskeletal Disorders (MSDs), such as Repetitive Strain Injuries (RSIs), overuse or overexertion injury, or Cumulative Trauma Disorders (CTDs).

SCOPE

This procedure applies to all faculty, staff, and volunteers of MRU when performing work on behalf of the University, whether on or off campus.

LEGISLATION

Alberta's Occupational Health and Safety (OHS) Code provides ergonomic guidelines for manual handling in Part 14, Lifting and Handling Loads. The requirement for additional ergonomic hazard assessment and controls are covered under Part 2, Hazard Assessment, Elimination and Control and the general duty of care requirements outlined in Alberta's OHS Act.

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RESPONSIBILITIES

MRU Board of Governors:

- Provide management support and leadership necessary to provide a safe and healthy working environment for employees and students, in compliance with the Mount Royal Health and Safety Policy.
- Ensure that adequate resources are available to implement appropriate measures.

Associate Vice-Presidents, Deans, Directors, and Department Managers:

- Ensure that safety procedures are communicated to their employees.
- Ensure that safety procedures are understood and followed by workers.
- Identify areas or work processes that may need ergonomic assessment.
- Provide funding as required for medical accommodations and other ergonomic requests.
- Replace tools and equipment with more ergonomically safe items, as they come up for replacement.
- Coordinate replacement of furniture with Facilities Management to adhere to the current MRU Furniture Standard.
- Ensure that employees within their area understand how to set up their workstation and tasks to be ergonomically safe, and know to contact their supervisors if they have questions or concerns.

Supervisors / Chairs:

- Provide approved furniture and equipment to protect against physical and environmental ergonomic hazards.
- Ensure that users are provided information on setting up their workplace to be ergonomically safe.
- Work with Environmental, Health & Safety (EH&S) and Human Resources (HR) to accommodate workers with ergonomic concerns or work limitations.

MRU Employees (Staff, Faculty, or Volunteers):

- Comply with ergonomic procedures and principles when performing tasks on behalf of MRU, including teaching, field-based, workshop-related, and office-based tasks, on and off campus.
- Request ergonomic assessments when experiencing ergonomic complaints or concerns, such as musculoskeletal pain or discomfort or eye strain. Keep supervisors notified of any changes that may affect their ability to work safely.
- Work with EH&S and HR and Supervisors to address accommodations as recommended by medical professionals.

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- Use furniture and equipment, including ergonomic furniture and equipment, in the manner for which it is intended, and submit a Frontline request for repair if furniture or equipment becomes damaged.

Contractors:

- Required to have ergonomic and/or manual lifting procedures or policies that meet or exceed applicable legislation, as applicable to their work scopes.
- Contractor policy will apply to their employees and subcontractors when performing work on MRU property.

Environmental, Health & Safety (EH&S):

- Provide expertise and advice on ergonomic hazards and controls.
- Provide training to workers on the set up of ergonomic work stations.
- Provide training and guidance to workers to help them identify and control field level ergonomic hazards.
- Investigate all ergonomic complaints and concerns and provide potential solutions to employees and supervisors.

Human Resources (HR)

- Maintain records regarding ergonomic-related worker medical accommodations.
- Work with EH&S and FM to ensure suitable furniture or equipment is provided to address worker medical accommodations when standard equipment does not meet requirements.
- Ensure department Deans / Managers are informed of the obligation to provide suitable furniture or equipment for the purpose of medical accommodation.
- Coordinate 3rd party ergonomic assessments when required.

Facilities Management (FM)

- Assess and approve vendors and furniture to meet MRU Standards.
- Assess workspaces for furniture requirements and provide furniture in accordance with procedures established by Supply Chain and MRU's Tender agreements with pre-approved Vendors.
- Work with EH&S and HR to ensure suitable furniture or equipment is provided to address worker medical accommodations when standard equipment does not meet requirements.

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ERGONOMIC HAZARD ASSESSMENT AND CONTROLS

Ergonomic hazards are physical factors within the environment that can cause harm to a worker’s musculoskeletal system.

Ergonomic hazards shall be considered when performing position hazard assessments (PHAs) and field level hazard assessments (FLHAs). A risk assessment shall be performed and appropriate controls determined to reduce the risk of harm to an acceptable level. For more information on the hazard and risk assessment process, see [MRU's Hazard Identification, Assessment, and Control Procedure](#), available on the MRU website.

In general, ergonomic hazards include themes such as repetitive movement, manual handling, workplace or task design, uncomfortable work station height, and poor body positioning. Noise, poor lighting, and thermal discomfort can also be considered ergonomic hazards.

Examples of common ergonomic hazards and their associated controls include:

Hazard	Suggested Controls
High Task Repetition	Avoid using excessive force or awkward posture, take regular breaks, rotate between different tasks, share tasks between different workers
Excessive Force	Use mechanical aids, use proper lifting and carrying techniques, handle smaller / lighter loads or use two people for heavier loads, keep tools and equipment in good condition
Awkward Postures	Set up workstation to reduce or eliminate awkward postures including over-reaching and twisting, take regular stretch breaks or rotate between different tasks, use proper posture and body position
Vibration	Use anti-vibration tools when possible, wear anti-vibration gloves, take regular breaks
Overhead Work / Overreaching	Set up workstation to reduce overhead work and reaching, keep frequently used tools and equipment close to hand
Eye Strain / Headaches	Ensure lighting is adequate for task, set up the workstation to reduce glare and shoulder strain, maintain lighting equipment

Additional office and field specific hazards and controls are outlined in Appendices A and B, respectively.

REPORTING ERGONOMIC CONCERNS

It’s important that ergonomic concerns and musculoskeletal pain be addressed quickly so that injuries can be prevented or mitigated. Catching ergonomic conditions early provides the opportunity to correct

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the hazards contributing to the development of musculoskeletal disorders (MSDs), and provides early medical intervention if required. Cumulative MSDs tend to worsen over time, so early treatment reduces the risk of a long term, potentially permanent disability.

Some common signs and symptoms of an MSD include:

- Pain, burning, aching
- Fatigue
- Tingling or numbness
- Loss of grip, clumsiness
- Hypersensitivity to touch
- Headaches
- Stiffness
- Reduced control or coordination of body movements

In the early stages of an MSD, the aching and tiredness will only appear when doing the task and fades overnight or with some time away from work. The ability to perform repetitive work may decrease, but there are no physical signs.

As the MSD progresses, the aching and tiredness will appear earlier in the task and persist longer, even overnight or into days off. Physical signs, such as swelling, may start to appear and light duties may become more difficult.

If an MSD is not addressed, it may progress to continual pain that occurs even when at rest or with non-repetitive movement, and may interfere with non-work tasks. When an MSD progresses to that point, it may not be easily reversible.

Workers should report all ergonomic concerns and musculoskeletal pain to their supervisors promptly, and contact the Environmental, Health & Safety (EH&S) department for an ergonomic assessment.

ERGONOMIC ASSESSMENT PROCESS

Most employees can self-assess when setting up a new workstation by following the advice provided in the appendices. Appendices A and B provide information on setting up an office space and performing a self-assessment. Appendix D provides information on common ergonomic hazards encountered when performing manual tasks and provides guidance on controls to consider. Appendix E provides guidance on proper lifting techniques.

Where an employee has an ergonomic concern, an actual or potential MSD, or still has questions after their self-assessment, EH&S should be contacted to perform a more formal ergonomic assessment. In some cases, particularly MSDs or pre-existing conditions that may be complex or difficult to accommodate, a third-party ergonomist may be brought in to assist.

EH&S will assess the employee's workstation and tasks and endeavor to modify them so that workers can perform the tasks with a minimum amount of strain. Issues with office ergonomics can often be

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resolved with simple adjustments to the heights and placement of furniture, computers, and accessories (e.g. keyboards, mice, monitor stands, footrests, etc.). Field ergonomic concerns can often be addressed by changing how a task is completed, allowing for more rest breaks, or incorporating task rotation.

Where an employee has visited a physician and obtained a request for medical accommodation, the documentation shall be provided to the MRU Ability Management Consultant in Human Resources. HR will then work with EH&S and the employee’s Supervisor to determine the best options for accommodation.

If a worker is unsure if they should obtain a medical assessment (for example, if the pain continues or adjustments don’t result in improvement), they should contact the MRU Employee Wellbeing Coordinator in HR for direction and assistance.

OFFICE ERGONOMIC ASSESSMENTS

Where current furniture or accessories are found to be inadequate to allow for a correct ergonomic setup, EH&S may recommend the purchase of new equipment. EH&S will submit recommendations directly to the employee and their Supervisor.

Smaller items, such as mice, footrests, monitor risers, and keyboards can be ordered directly from the office supplier by the employee’s Department, using the Ergonomic FOAP (72027). EH&S will follow up with the worker two to three weeks later to ensure the changes were effective.

For larger furniture or changes in office setup, the employee’s Supervisor shall submit a Frontline Furniture request:

- If the requirement is a result of a medical accommodation, the request shall be entered as follows: **“Ergonomic Accommodation Request. [Employee] requires [list requirement] to be purchased and installed.”**
- If the requirement is a recommendation by EH&S that is *not* accompanied by a medical accommodation request from HR, the request should simply be entered into Frontline as a request for furniture replacement or repair.

The Frontline request will prompt the Facility Planners in Facilities Management (FM) to evaluate the work area and determine the most effective options for the space. FM will obtain approval and FOAP from the employee’s department Supervisor or Manager and have the furniture installed.

After installation, the employee will contact EH&S to revisit the employee and ensure the work station is set up correctly. EH&S will also follow up two to three weeks later to ensure the updates have been effective.

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FIELD ERGONOMIC ASSESSMENTS

When field workers report ergonomic concerns or signs or symptoms of an MSD, EH&S should be called in to perform an ergonomic assessment.

If the employee has a concern about the ergonomic hazards of a task, EH&S will watch the task being performed and provide feedback and suggestions to make the task or work station more ergonomic. Where the hazard controls are more complex, the employee's Supervisor and other task experts should also be brought in to provide input.

Where a worker is experiencing signs or symptoms of an MSD, EH&S will ask the employee about the area of the body that is affected and what tasks aggravate the injury. EH&S will then work with the employee, their Supervisor, and other task experts to determine appropriate controls to reduce strain on the affected body part.

Where medical accommodations are required, such as specialized ergonomic tools or equipment, task rotation, or task limitations, the employee will work with the Ability Management Consultant or Employee Wellbeing Coordinator in HR and their Supervisor to determine the best course of action.

DEFINITIONS

Contractor: A worker performing work on University property while being employed by another organization.

Ergonomics: The study and process of designing or arranging workplaces, equipment, and systems so that they fit the people that use them, thereby improving safety and efficiency. Ergonomics includes physical ergonomics (concerned with anatomy, physiology, anthropometry and biomechanics), cognitive ergonomics (concerned with mental processes, such as perception and memory), and organizational ergonomics (concerned with socio-technical systems, such as organizational structures).

Employees: Volunteers or individuals who are engaged to work for the University under an employment or apprenticeship contract, including Faculty, Staff, exempt Employees, Management Employees, and Undergraduate, Graduate or Postgraduate students carrying out work for the University.

Field Level Hazard Assessment: An assessment of hazards performed before work starts at a site and at a site where conditions change or when non-routine work is added. Any hazards identified are to be eliminated or controlled immediately, before work begins or continues.

Field Ergonomics: Ergonomic processes focused on manual labour, trades, and field work. Applies to positions that are not primarily office or instruction based, e.g. those within Building Operations, Grounds, Security, Theatre, Retail.

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FOAP: Refers to the elements of the MRU chart of accounts funds, organizations, accounts, and programs. A charge code required for MRU purchases.

Hazard: A situation, condition, or thing that may be dangerous to the safety or health of workers or the environment.

Hazard Assessment: A written problem solving tool used to recognize existing and potential hazards at work before they cause harm to people or property. It includes a task outline, associated hazards of the task, risk analysis, and hazard controls for the associated hazards.

Medical Accommodation: Adjustments to an employer’s standards, rules, policies, culture, and environment to accommodate a worker who might be negatively affected by a medical limitation. Under the Alberta Human Rights Act, employees have a legal duty to take reasonable steps to accommodate individual needs to the point of undue hardship.

Musculoskeletal Disorder (MSD): An injury or disorder of the muscles, tendons, ligaments, joints, nerves, blood vessels or related soft tissues, including sprain, strain, and inflammation, that may be caused or aggravated by work activities. Includes overexertion and overuse injuries.

Musculoskeletal System: The bones of the skeleton and the muscles, cartilage, tendons, ligaments, joints, and other connective tissues that stabilize or connect the bones.

Risk: The chance of injury, damage, or loss, based on the likelihood of an incident, the frequency a task is performed, and the potential consequence of an undesirable event.

Student: Any individual who maintains an affiliation as a learner in the University educational community. Students are not workers, but receive credits, grades and fulfills tasks as a requirement of graduation. Work experience and Co-op students are treated as “workers”.

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REFERENCES

Alberta Occupational Health and Safety Act, Regulations, and Code

WorkSafe BC – Preventing Musculoskeletal Injury (MSI): A Guide for Employers and Joint Committees

Canadian Centre for Occupational Health and Safety – OSH Answers Fact Sheets: Ergonomics

<https://www.ccohs.ca/oshanswers/ergonomics/>

US Occupational Safety and Health Administration – Ergonomics: The Study of Work

REVISION HISTORY

Date	Revision	Notes
March 2019	01	Creation of Safe Work Program

APPENDICES

[Appendix A: Office Ergonomic Set-up](#)

[Appendix B: Office Ergonomic Self-Assessment Checklist](#)

[Appendix C: Office Ergonomic Purchasing Process Flowchart](#)

[Appendix D: Field Ergonomics](#)

[Appendix E: Proper Lifting Techniques](#)

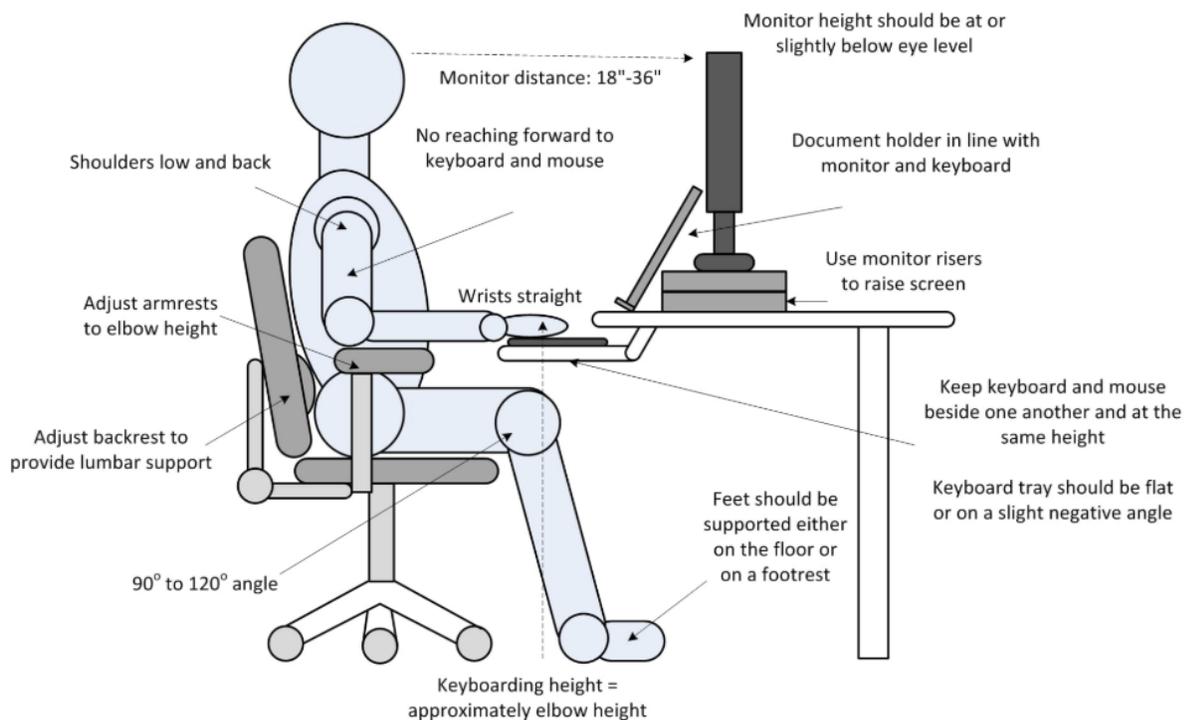
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APPENDIX A: OFFICE ERGONOMIC SET-UP

To reduce the risk of ergonomic injuries and MSDs, office workstations should be adjusted to fit the worker assigned to them. Adjustments should be made any time a worker is moved to a new station, whether they are a new hire moving to a previously established station, or a current worker being moved to a new location or being provided with new furniture and equipment. If the worker is unable to adjust their workstation to a comfortable position, please contact EH&S for further assessment.

For the standard seating position, Figure A-1 outlines the key points to consider:

Figure A-1: Proper Desktop Position



<https://sites.ewu.edu/ehs/occupational-health-safety/ergonomics/>

Adjust your workstation by following the general directions below. Note that the chair, keyboard and monitor heights work together – you may need to go back and forth between them to find the position that works best for you.

1. Customize the chair:
 - a. Adjust the height so that you can sit comfortably with your thighs approximately parallel to the floor and your feet flat on the ground. If you are unable to reach the ground

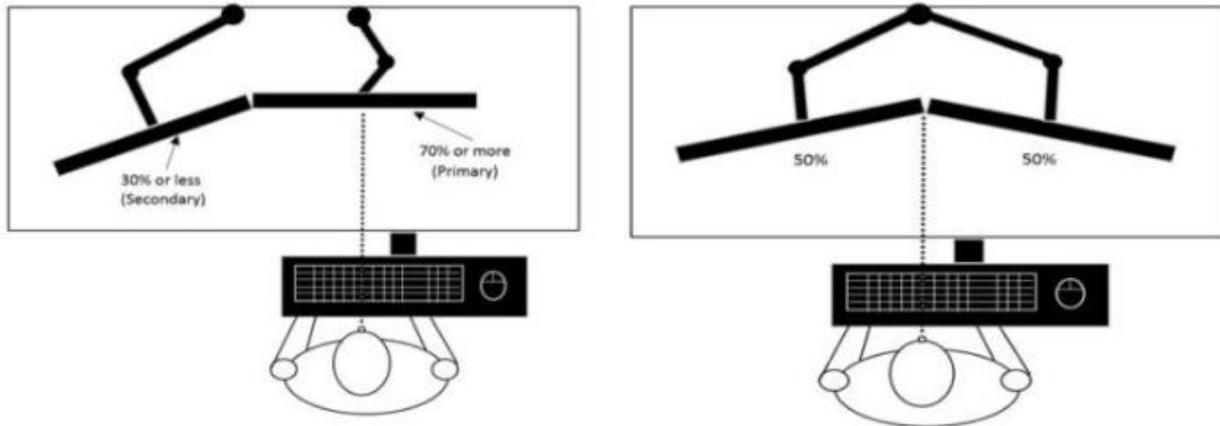
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comfortably, you may need a footrest. If you typically wear heels, you may need to position your seat slightly higher to accommodate the extra height.

- b. Adjust the seat back so that the lumbar support sits comfortably in the natural curve of your back. Some seats allow you to customize the position or depth of the support as well. Consult the manufacturer's information or FM Facility Planners for specifics.
 - c. Adjust the seat pan depth so that your legs are supported while still leaving a clenched fist-width (approx. 5 cm / 2 inches) between the front edge of your seat and the back of your knees.
 - d. Sit upright with your arms loosely by your sides. If your chair has armrests, bend your elbows to 90° and adjust the armrests to where they barely touch the underside of your elbows. If the armrests can't be adjusted to this height or interfere with the desk / keyboard tray height, they can be removed. Submit Frontline request.
 - e. If desired and available, adjust the tilt of the office chair to a comfortable angle (typically 90°-100°).
2. Adjust the keyboard / mouse height:
 - a. If you have a keyboard tray, adjust it so that you can type and mouse with your arms relaxed at your sides and your elbows bent to approx. 90°-100°. Keep the mouse at the same level as the keyboard.
 - b. If you do not have a keyboard tray, adjust your chair height so that you can type and mouse on the desk with your arms relaxed at your sides and your elbows bent to approx. 90°-100°. This may require you to obtain a foot rest to support your feet.
 - c. If you are unable to adjust the keyboard / mouse to a comfortable height with your current equipment, contact EH&S for further assessment.
 3. Adjust your monitor(s):
 - a. Adjust your monitor so that it sits about arms-length away when you are relaxed in your chair.
 - b. Adjust the height of your monitor so that the top of the screen sits at approx. eye level or just above (eyebrows) when your head is in a relaxed position. If needed, obtain monitor risers to elevate the monitors.
 - c. Adjust the tilt of your screen so that it's comfortable to view, without getting glare from overhead lights.
 - d. If you have two monitors and use each one equally, place them so that the inner edges touch directly in front of you. Angle the monitors into a slight semi-circle. The idea is to see as much of the screens as possible without having to move your head out of a neutral position.

- e. If you don't use both monitors equally, place the one you use most often in front of you as if it was a single monitor. Place the second monitor to one side and at an angle (forming half of a semi-circle). See Figure A-2.

Figure A-2: Dual Monitor Setup



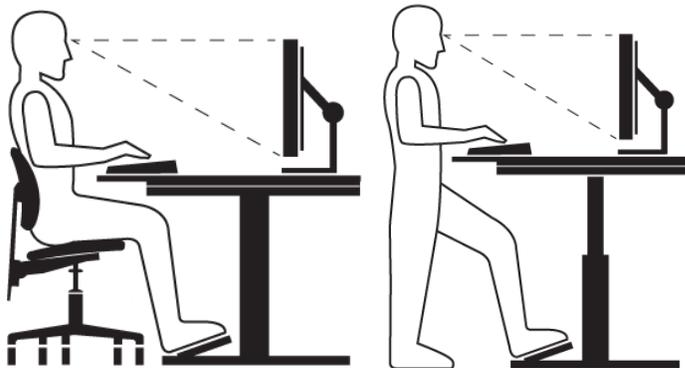
- f. If you wear bifocals or progressive lenses, you may find it more comfortable to lower the monitor height to reduce the tilt of your head when reading through the bottom part of your glasses.

For standing desks, position the keyboard, mouse, and monitor as noted above. Adjust the height of the desk so that your arms are relaxed comfortably by your side and hands, wrists and forearms are straight, in-line, and roughly parallel to the floor. Note that if you alternate between sitting and standing, the monitor height might need to be different in each position.

- When standing, wear supportive footwear and consider the use of an anti-fatigue mat if you will spend long portions of the day standing. If you want dressier, less supportive shoes for meetings or personal style, consider keeping some comfortable shoes at the office.
- Use a footrest when standing to shift your weight as needed, and take advantage of your standing position to frequently change body position.
- Standing for extended periods can be as harmful as sitting. Typical recommendations are to alternate between sitting and standing every 30 to 60 minutes, or as per your health professional's recommendations.

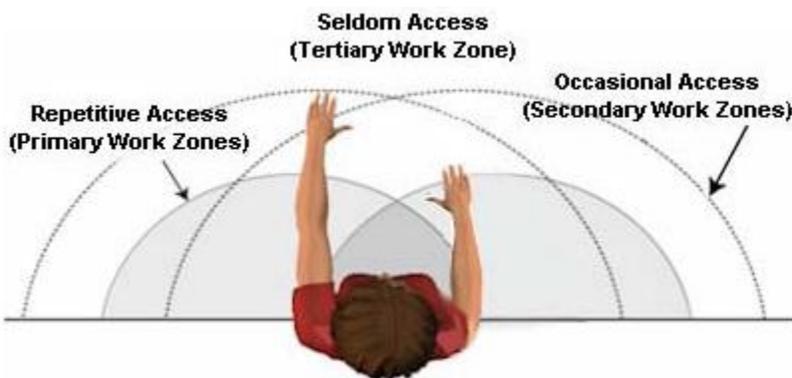
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Figure A-3: Sitting and Standing at Desk:



When setting up peripherals on your desktop (keyboard, mouse, telephone, pens, documents, etc.), position items that you use most often close to hand, in the “Primary Work Zones” indicated in Figure A-4. Items that you use occasionally should be positioned in the “Secondary Work Zones” and items that are rarely used can be put in the “Tertiary Work Zone”. The idea is to keep frequently used items near to hand to reduce overreaching and twisting during your work day.

Figure A-4: Desktop Work Zones



https://www.osha.gov/SLTC/etools/computerworkstations/components_desk.html

When typing, reduce wrist strain by keeping your wrists in a neutral position, as demonstrated in Figure A-5. Hands and wrists should move freely and be elevated above the desk or any wrist / palm rest when typing. Sit your heel or palm of your hand on the desk or a wrist / palm rest when resting.

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Figure A-5: Wrist Positions When Typing



<https://infograph.venngage.com/p/146324/canada>

Laptop computers present special hazards as their design forces users into awkward postures. To make laptop use as safe as possible, follow the guidelines below and see Figure A-6:

- a. When using a laptop frequently, elevate the screen to the same height as a monitor using a riser or monitor stand and connect it to an external keyboard and mouse to work in a more neutral position, as outlined on pages 9 to 11 of this document.
- b. For short-term laptop use, sit in a comfortable, supportive chair in an upright position. Position your laptop in your lap or on a surface in front of you to keep the wrists as neutral as possible. Maintain a neutral neck posture as much as possible, and take frequent stretch breaks.

Figure A-6: Laptop Computer Setup

Ergonomics



<https://www.alwaysworkwell.com/correct-use-of-laptop/>

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APPENDIX B: OFFICE ERGONOMIC SELF-ASSESSMENT CHECKLIST

This checklist is also available as a PDF form on the EH&S website, www.mru.ca/ehs.

Review the checklist to identify ways to set up your workstation for optimal comfort. If any of the answers are no, adjust your workstation or contact ehs@mtroyal.ca for an ergonomic assessment.

Keyboard Position	Yes	No
Upper arms hang relaxed at side during computer use (armrest optional)	_____	_____
Elbow joints are at about 90°	_____	_____
Hands are in line with forearms when using keyboard and mouse	_____	_____
Forearm is supported when using a mouse or other hand-held device	_____	_____
Both keyboard and mouse height allow comfortable arm postures	_____	_____
Monitor Position	Yes	No
The top of the screen is at eye to eyebrow height (bifocal and trifocal wearers excepted)	_____	_____
Viewing distance (eyes to screen) is approximately arm length	_____	_____
Monitor is centred in front of user during continuous computer use	_____	_____
Dual monitors are positioned in half circle centered in front of user, or primary monitor (>70% of day) is positioned directly in front with second screen angled to side)	_____	_____
Laptops used as monitors are positioned on laptop holder to elevate screen	_____	_____
Seating	Yes	No
The seat height is adjusted so thighs are roughly parallel to the floor	_____	_____
The lumbar support supports lower back arch	_____	_____
The thighs are roughly parallel to the floor	_____	_____
Feet are flat on the floor or a footrest is provided where necessary	_____	_____
Seat pan is adjusted so that front edge sits about fist-width from back of calves	_____	_____
Arms are adjustable and can be moved out of the way of desk / keyboard tray	_____	_____
The worker knows how to adjust chair for maximum comfort	_____	_____
Desks	Yes	No
Desk has comfortable space for knees and feet	_____	_____
Desk height keeps keyboard/mouse at comfortable height, or has keyboard tray	_____	_____
Standing desks are easy to adjust between positions	_____	_____
Document Holders	Yes	No
An adjustable document holder is available if required	_____	_____
The holder is large enough for documents being used	_____	_____

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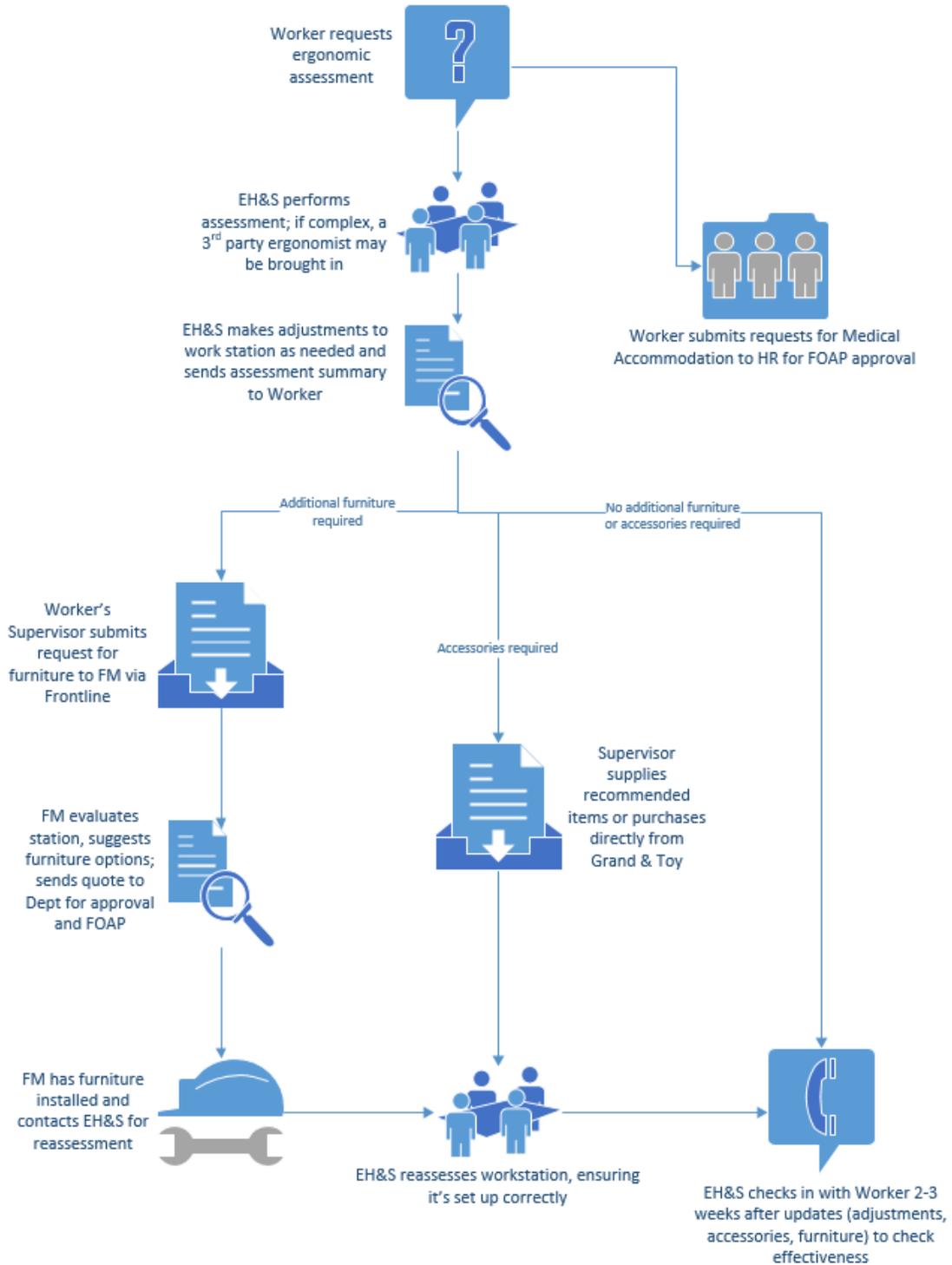
Lighting

	Yes	No
Lighting levels are comfortable	_____	_____
The computer screen is free of glare spots	_____	_____
The worker is shielded from sources of direct glare	_____	_____
The worker's line of sight is parallel to the plane of windows	_____	_____
The office area is illuminated with indirect light fixtures	_____	_____
The workstation is located between rows of overhead lights (where possible)	_____	_____
The worker is provided with an adjustable task light (if required)	_____	_____

Task Design

	Yes	No
Worker takes regular postural breaks every 30 to 60 min (standing, stretching, walking)	_____	_____
Frequently used items (e.g. phone, pens) within easy reach?	_____	_____
Worker takes regular eye breaks to look away from monitor	_____	_____

APPENDIX C: OFFICE ERGONOMIC PURCHASING PROCESS FLOWCHART



APPENDIX D: FIELD ERGONOMICS

Any physical position can cause discomfort and fatigue if maintained for a long period of time, increasing the risk of injury. This risk is amplified if the body is held or used near the extremes of their range of motion, which puts stress on tendons and nerves. The longer or more often a fixed or awkward body position is used, the more likely you are to develop MSDs. Repetitive movements are especially hazardous when they involve the same joints and muscle groups over and over and when we do the same motion too often, too quickly and for too long.

Examples of stressful body positions are diagramed in Figures B-1 to B-6, below:



Figure D-1: Bending forward

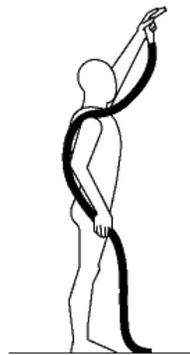


Figure D-2: Reaching above shoulder height

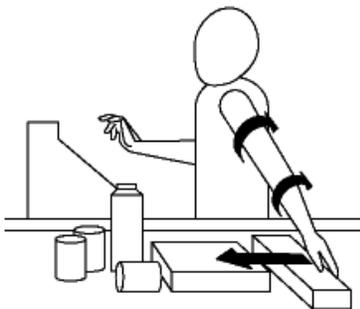


Figure D-3: Reaching behind the body

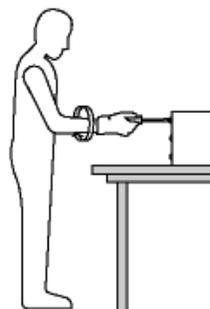
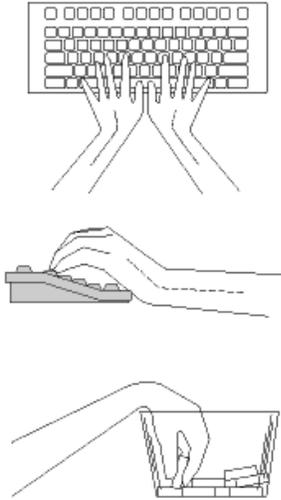
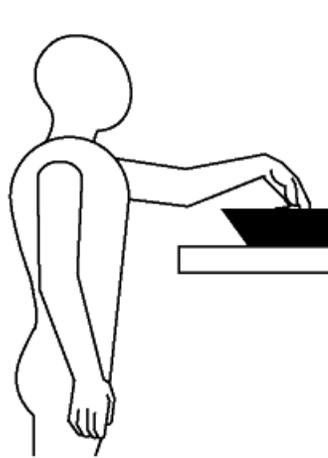


Figure D-4: Rotating the arms

**Figure D-5:** Bending the wrist**Figure D-6:** Reaching forward

<https://www.ccohs.ca/oshanswers/ergonomics/risk.html>

Physical ergonomic hazards are included in Position Hazard Assessments; since conditions can change when performing trade-related field or shop work around or off campus, Field Level Hazard Assessments (FLHAs) should also consider ergonomic hazards and how to control them.

Tool design is only one thing to consider with field ergonomics. Ergonomically designed tools (engineered to reduce the physical demands of the user) should be used when possible, but even the best tools won't eliminate the risk of injury if the work is performed in an unsafe manner.

When performing manual tasks:

- Set up your work area to be as comfortable as possible. Keep frequently used items close to hand to avoid overreaching or twisting.
- Practice good housekeeping in your work zone and position equipment and materials to reduce trip hazards
- Avoid bending over your work whenever possible. It may be possible to elevate all or part of a task to a comfortable height using tables, benches, or even truck tailgates.
- Use knee pads or a padded knee board to reduce strain on the knees if working on the ground.
- Use a stepladder for overhead tasks to reduce the overhead reach and reduce shoulder strain (but use the ladder safely!). Tasks at higher heights can be performed using Mobile Elevated Work Platforms (MEWPs) when workers have MEWP and fall protection training.

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- Some tasks can only be performed in awkward positions (e.g. accessing pipe chases, gardening, cleaning tasks). When performing tasks like this, take frequent stretch, movement, and rest breaks to relieve muscle tension from awkward body positions. When possible, alternate tasks in awkward positions with those that allow your body to stay in a more neutral position.

MANUAL MATERIALS HANDLING

Manual materials handling (MMH) means moving or handling things by lifting, lowering, pushing, pulling, carrying, holding, or restraining. MMH is the most common cause of occupational fatigue, low back pain, and lower back injuries.

Some of the hazards associated with the manual handling of materials are listed below, along with example controls. This list is only a starting point; it may list controls that are not appropriate for your tasks, and may not list all available controls. Consider hazards like those listed when performing your FLHA, and ensure that appropriate controls are put in place before starting the task.

Manual Handling Hazards	Example Controls
Heavy Loads – lift, lower, or carry	<ul style="list-style-type: none"> Use mechanical aids (carts, trolleys) whenever possible Use two people to lift heavy (over 20 kg / 50 lbs), large, or awkward loads Minimize the distance that loads need to be carried Minimize the vertical distance that a load is lifted / lowered (e.g. use pallet jacks, limit shelf height) Avoid storing heavy loads below knuckle height or above shoulder height Avoid twisting when lifting / lowering / carrying Plan workspaces to avoid awkward / stooped positions or twisting while working with loads Reduce the size of the load where possible, make multiple trips with lighter loads Lift using proper lifting techniques (see below) and don't handle heavy (over 4.5 kg / 10 lb) or unbalanced objects when sitting down Take rest and stretch breaks to permit muscle recovery
Pushing or Pulling	<ul style="list-style-type: none"> Use carts that are appropriate to task, with handles between waist and shoulder height Secure loads on carts or trolleys to minimize shifting Maintain carts / trolleys to reduce mechanical issues

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Manual Handling Hazards	Example Controls
	<p>Pushing is better than pulling (more comfortable body position, easier to generate force from legs)</p> <p>Ensure that flooring / pathway is free of clutter, clean, and level (when possible)</p> <p>Reduce the load to lighten the force required to move the cart</p> <p>Take rest / stretch breaks when needed</p>
Gripping Forces	<p>Use clamps when appropriate</p> <p>Maintain a straight / neutral wrist position through ergonomic tools, workstation design, and conscious work practice</p> <p>Use handles on boxes and other material when possible</p> <p>Use power grip (whole hand) instead of pinch grip (fingers) on heavier loads or higher force tasks</p> <p>Use tools with vibration dampening device or wear vibration dampening gloves</p> <p>Wear gloves to reduce exposure to cold tools, equipment, and material</p> <p>Wear gloves with grip surface when handling slippery objects</p> <p>Take rest / stretch breaks when needed</p>
Repetition	<p>Use power tools or other engineering controls when available</p> <p>Reduce the pace of repetition through breaks or task variability</p> <p>Reduce exposure to repetition through job / task rotation</p>
Work Posture	<p>Adjust work tasks to a comfortable height when possible, through use of tables, benches, tailgates</p> <p>Put frequently used tools, equipment, and material in easy reaching distance in front of the worker to reduce overreaching, bending, and twisting</p> <p>Change position frequently, or take stretch / rest breaks and rotate tasks</p> <p>Minimize shoulder strain by reducing reach distances and positioning objects and tools in front of the body when possible</p> <p>Use powered tools to minimize wrist rotation</p> <p>Use tools with ergonomic grips to reduce awkward wrist postures (when available)</p> <p>Raise work to minimize squatting / kneeling (when possible)</p>

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Manual Handling Hazards	Example Controls
	<p>Shift weight regularly when working in a standing position and use anti-fatigue mats where workers are standing in the same location for extended periods</p> <p>Use adjustable chairs that provide good back support when working in seated positions</p>
Local Contact Stress	<p>Choose tools or equipment that reduces contact stress (e.g. use long-handled screwdriver to avoid handle butt from digging into palm, add padding or avoid tools with sharp edges that can press into skin)</p> <p>Use personal protective equipment to provide pressure relief (e.g. knee pads or board when kneeling, padding gloves when lifting heavy objects by narrow plastic strapping)</p>
Environment	<p>Maintain equipment to reduce vibration on both tools and riding equipment (whole body vibration)</p> <p>Incorporate breaks or work rotation to reduce exposure to whole body vibration</p> <p>Take warm up or cool down breaks as needed</p> <p>Ensure that lighting is appropriate for task, using work lights when needed</p> <p>Position work to avoid brightness and glare that might cause workers to assume unnatural postures to shield eyes</p>
Work Organization	<p>Ensure that workers have breaks from repetitive or physically demanding tasks (e.g. rest breaks, changing tasks, work rotation)</p> <p>Ensure that space to perform work is adequate</p>

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APPENDIX E: PROPER LIFTING TECHNIQUES

Before performing a manual lift, assess the weight of the load. If the load is heavy, use mechanical aids or get assistance. A general rule is to use assistance with loads over 20 kg / 50 lb, but every individual is different; always use mechanical aids if available and don't hesitate to ask for assistance.

Check that the load is free to move and easy to access; pull it out from overhangs and restricted areas. Check that the path to the final destination is clear of obstacles and slip / trip hazards.

To lift:

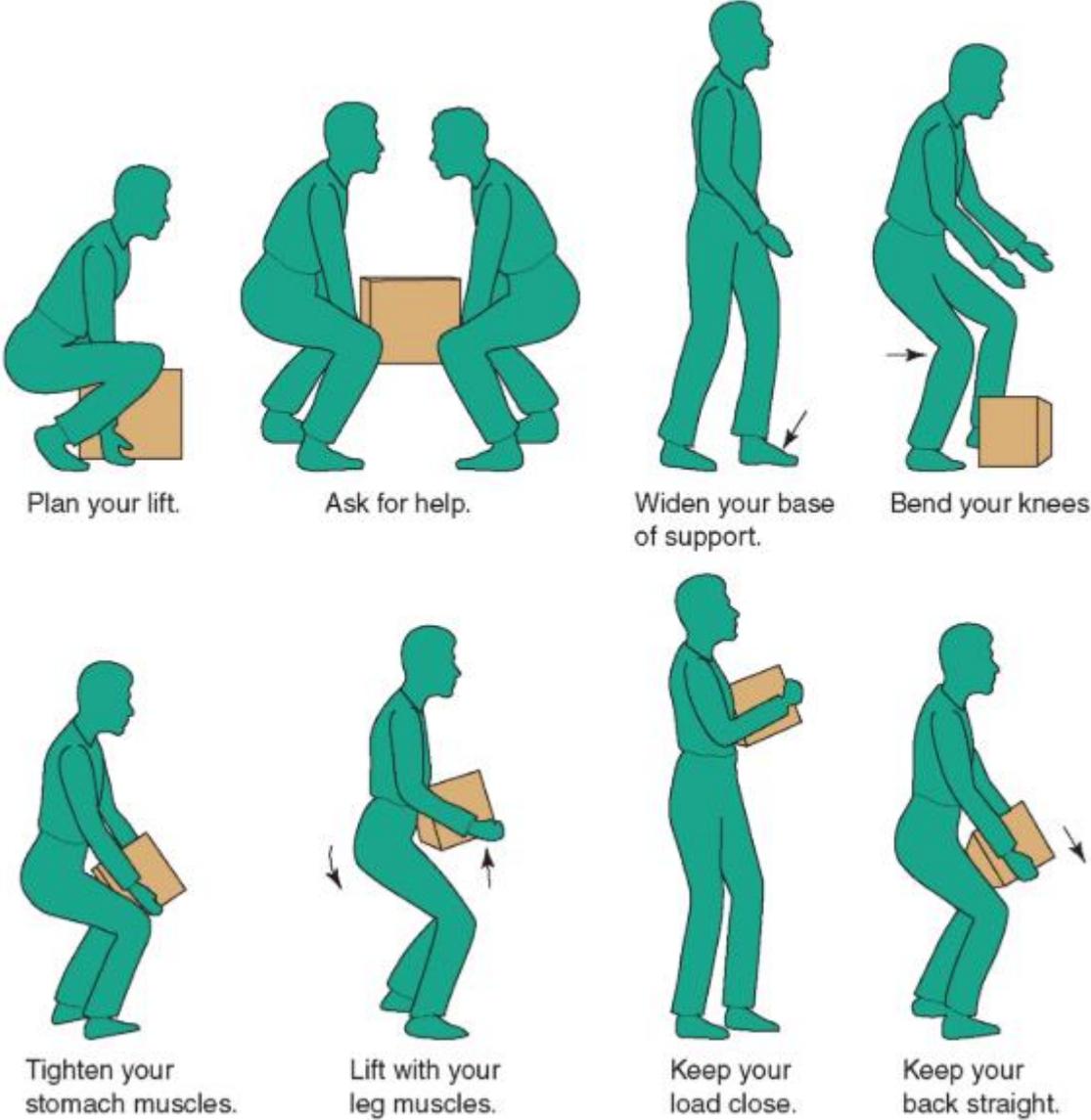
- Warm up your muscles before lifting by doing some light duty tasks.
- Stand close to the load with feet a bit wider than shoulder width apart.
 - For small or uneven loads, having your legs staggered (one in front of the other) may be more comfortable.
- Squat down to lift the load, keeping your abdominal muscles engaged, your back straight, your chin tucked into the chest, and your knees over your feet.
- Keeping the arms straight, get a good grip on the load and initiate the lift with your body weight.
- Lift the load smoothly, keeping it close to your body and don't twist or side bend as you stand.
- Avoid carrying loads with only one hand.

When carrying, keep the load close to your center line and turn from your feet (don't twist).

When lowering a load, keep the same principles in mind: position the legs slightly wider than your hips, lower the load smoothly, bending at hips and knees and keeping your back straight and chin tucked.

Some materials may need different kinds of handling and lifting techniques. Additional information can be found on the Canadian Centre for Occupational Health and Safety website, <https://www.ccohs.ca/oshanswers/ergonomics/mmh/>.

Figure E-1: Proper Lifting Techniques



<http://what-when-how.com/nursing/body-mechanics-and-positioning-client-care-nursing-part-1/>