



Ergonomics:

Best Practices
Lifting Tips and Techniques


**Environmental and Occupational Health
Support Services (EOHSS)**






Ergonomics: Agenda

- Ergonomics Definition and Application
- Legislation; RMM# 405: Ergonomics Safety Program
- Musculoskeletal Disorders (MSDs)
- Symptoms and Risk Factors
- Injury Statistics
- Ergonomic Awareness and Controls
- Tips for Working on the Computer; Laptop Use
- Back Pain; Safe Lifting Best Practices
- Stretches
- Resources; How to Request an Ergonomic Assessment



What is Ergonomics?



- The applied science and art that seeks to fit the job to the worker through the evaluation and design of work environment in relation to human characteristics and interactions in the workplace.
- " Adjusting the workspace to best fit the employee"



Ergonomics Applies to...

- Workstation Design—(desks, chairs, space, layout)
- Work Postures (sitting, standing, reaching, lifting)
- Work Organization (Pace, Breaks, Variety)
- Tools, Equipment, and Furniture Design—(body size, height, gender, promoting neutral postures, reduced vibration, exposure to acceptable lighting, noise, temperature)
- Manual Materials Handling—(lifting, lowering, pulling, pushing, carrying and holding materials)
- Work Environment—(ventilation, noise, temperature & humidity, lighting and vision)



The Legislation

- Currently no Ontario Ergonomic Regulations
- Occupational Health and Safety Act, (OHSA)
Section 25 'take every precaution reasonable in the circumstances for the protection of the worker'
- McMaster University's:
 - ❖ Ergonomic Safety Program # 405
 - ❖ Accommodation Policy



RMM# 405: Ergonomics Safety Program

- To provide direction for safe and efficient ergonomic design with the goal of eliminating all work related musculoskeletal disorders (MSDs)
- Applies to all work areas and work stations utilized by faculty, staff and students
- Supervisors shall ensure ergonomics are considered in the design of present and new work tasks and work locations
- Workers shall participate in ergonomic education programs and report ergonomic concerns to supervisor
- JHSC shall receive copies of incident reports including ergonomic concerns/injuries and report all concerns noted during routine workplace inspections



Signs and Symptoms of MSDs

- Muscle fatigue, aches which subside during rest
- Tight band of pain across shoulders, or back
- Pain or stiffness when changing positions, or rising from bed in the morning
- Difficulty in finger, thumb or hand movement
- Difficulty gripping things
- Loss of sensitivity to touch, or to temperature extremes
- Numbness, tingling, burning, weakness, pain



MSDs

- **Joints** (connect bone to bone)—repetitive forceful movements can result in softened cartilage which can lead to growths, degenerative disc disease, osteoarthritis
- **Muscles** (provide the force to perform a task—squeeze and relax)—if contraction is prolonged, blood flow is reduced and waste is not removed fast enough or if not enough rest—muscle irritation, injury and pain
- **Tendons** (fiber muscles attaching muscles to bones)—(hand, wrist, forearm, elbow, shoulder i.e. tendonitis, ganglion cyst, bursitis)
- **Nerves** (surrounded by muscles, tendons, ligaments and blood vessels and carry signals from brain to control muscle activity, temperature, pain.)—tissues surrounding nerves swell and squeeze or compress nerves; e.g. thoracic outlet syndrome and carpal tunnel



Primary Risk Factors

Repetitive Movements
 - Leading cause of MSDs
 - Same joints / muscle groups (keyboarding, mousing)




Forceful Movements
 - Excessive movements for long periods of time (e.g. extended reach)

Fixed or Awkward Postures
 Cause fatigue (sitting rigidly for long periods; reaching above shoulder)



Bending, Twisting and Heavy Lifting



Secondary Risk Factors


- Contact Pressure (holding tools, stapling, resting wrists while typing)
- Cold Exposure (working outside)
- Infrequent, heavy lifting (picking up a water jug; box of paper for photocopier)

• *Remember Frequency and Duration are key*



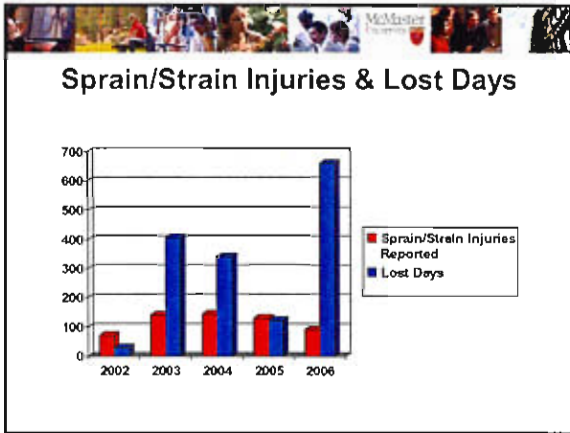
McMaster's Incident Summary

	2017 Jan - Mar	2017 Apr - Jun	2017 Jul - Sep	2017 Oct - Dec	2017 Calendar
Incidents	336	409	458	589	732
Healthcare	99	110	121	106	148
Lost Time	90	88	81	89	38
Lost Days	518 Days	691 25 Days	311 Days	889 Days	361 Days
Average Lost Days per LT Incident	6 Days/Incident	8 Days/Incident	4.9 Days/Incident	15.1 Days/Incident	9.5 Days/Incident



McMaster's Injury Type Reported

	2017 Jan - Mar	2017 Apr - Jun	2017 Jul - Sep	2017 Oct - Dec	2017 Calendar
Sprain/Strain	141	143	133	149	175
Laceration & Cuts	36	60	58	98	77
Contusion/Abruasion	46	56	129	100	92
Burns	15	21	13	43	14
Medical symptoms	15	18	18	48	22
Allergic reaction	8	7	8	7	12
Fracture	5	6	5	4	2
Puncture	5	3	2	10	7
Hazard/Other	83	94	41	131	343
Total Incidents	336	409	405	589	732
Total Lost Days	536 days	704.25 days	311 days	889 days	361 days



WSIB Lost Time Claims Costs

Between 1998 and 2004, in Ontario, MSDs accounted for 42% of all Workplace Safety and Insurance Board (WSIB) claims, costing \$ 3.3 billion in direct costs, and 50% of all lost time claims.

At McMaster University, MSDs account for 35% of all WSIB claims.

The average Ontario WSIB Claim results in 6 weeks off from work at a direct cost of \$ 19,560*

The hidden costs increase this amount to \$98,000 per claim*


Are MSDs a cost of doing business?

*(2006 data from WSIB)

Ergonomic Awareness


Starts with you and your supervisor:

- Learn to recognize potential work -specific ergonomic hazards through additional training and /or workplace inspections. If you are a computer user, ask yourself the following:
 - Are office chairs height adjustable? Do the chair's arm rests interfere with the keyboard tray? Is the seat pan long enough to fully support the legs, but not dig into the back of the knees?
 - Is the computer mouse resting on the keyboard tray? Are telephone headsets available for frequent telephone users?
 - Are laptops fully retrofitted?
- Remember to report signs or symptoms of MSDs by completing an injury/incident report and sending to EOHSS (fax to 905-540-9085) and/or FHSc Safety Office (fax to 905-528-8539)




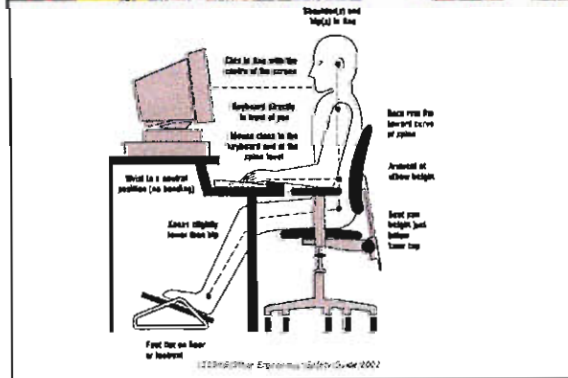
Controlling Ergonomic Hazards

- **Workstation Design**—(desks, chairs, space, layout)
- **Working in Prolonged Positions** Sitting/Standing—(alternate postures, footwear, floors)
- **Work Organization** (Pace, Breaks, Variety)
- **Tools, Equipment, and Furniture Design**—(body size, height, gender, promoting neutral postures, reduced vibration, exposure to acceptable lighting, noise, temperature)
- **Manual Materials Handling**—(lifting, lowering, pulling, pushing, carrying and holding materials)
- **Work Environment**—(ventilation, noise, temperature & humidity, lighting and vision)



Tips for Working on the Computer

- **Head:** held straight & squarely over shoulders
- **Eyes:** top of computer screen should be at or slightly below eye level
- **Shoulders:** relaxed, not raised or hunched
- **Arms:** supported comfortably & close to the body
- **Wrists:** naturally straight and flat
- **Elbows:** bent approximately 90 degrees and positioned close to the body
- **Back:** sufficiently supported to maintain its natural curve
- **Hips:** bent approximately 90 degrees
- **Knees:** bent approximately 90 degrees. There should be two to three finger space between edge of seat and back of knees
- **Feet:** placed flat on the floor or supported by a footrest

Laptops: The New Hazard?

- Laptops should only be used for short periods of time if not ergonomically retrofitted
- Retrofitting means adding a full size keyboard, external mouse and raising the laptop to eye level to promote neutral body postures
- Consider transporting your laptop in a roller cart, or ergonomically designed bag

Guidelines for Reaches

Reach Requirements

60 cm
20 cm

60 cm
20 cm

- USUAL WORK : Forearm Length
- OCCASIONAL WORK : Full Arm Length
- NON-WORK AREA : Beyond Arm Length

Adapted from: CCURE Ergonomics Program (2001)

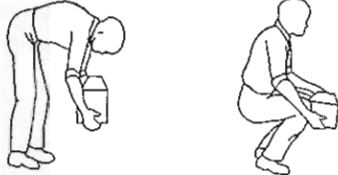
Back Pain

- ♦ Acute (Immediate) versus chronic (over time)
- ♦ Causes:
 - ❖ Poor body posture, working in a stooped position; prolonged sitting in fixed position
 - ❖ Lifting and handling heavy loads
 - ❖ Forceful pushing or pulling
 - ❖ Bending or twisting
 - ❖ Psychological stress
 - ❖ Inadequate rest periods
 - ❖ Poor fitness level
- ♦ Prevention:
 - ❖ neutral postures, using appropriate lifting techniques, alternating work activities, adequate rest periods

Safe Lifting

- In the early eighties, there was a big push to train everyone to 'lift with the legs, not with the back'.
- Over time, people started to wonder why injury rates were not decreasing in accordance with the efforts being expended on training. Despite knowing the 'correct' technique, workers were still bending at the waist to lift.

WHICH ONE IS CORRECT?



Safe Lifting

- Most workplaces are not designed for lifting with knees
- Effective only when load is small enough to fit between the knees!
- Not always applicable (e.g. removing parts from a bin)
- Squatting takes more energy than sloping
- Recognize some loads are too heavy to lift manually
- The best approach to prevent a back injury is to 'fit the job to the worker' by providing lifting conditions that avoid risk factors.

Safe Lifting

- Objects weighing more than 23 kg (50 lbs) should not be lifted.
- Objects weighing more than 11.5 kg (25 lbs) should not be lifted above the shoulders, below the knees or at arms length, more than 25 times a day.
- Object weighing more than 7 kg (15 lbs) should not be carried more than 15 meters (50 feet).
- Implement engineering controls to avoid the risk of manual handling objects beyond the acceptable limitations:
 - ❖ material handling devices (forklifts, dollies)
 - ❖ reduce the size of the object
 - ❖ layout changes



Safe Lifting

- Starting push forces should not exceed 23 kg (50 lbs)
- Rolling push forces should not exceed 18 kg (36 lbs)
- If a push force is sustained for more than 1 minute or the distance is more than 3 meters (10 feet), then the rolling force should not exceed 11.5 kg (25 lbs) Pushing lasting more than 4 minutes should be kept below 3.5 kg (8 lbs)
- Ideally, pushing occurring once per minute should have a starting force of less than 13 kg (28 lbs)



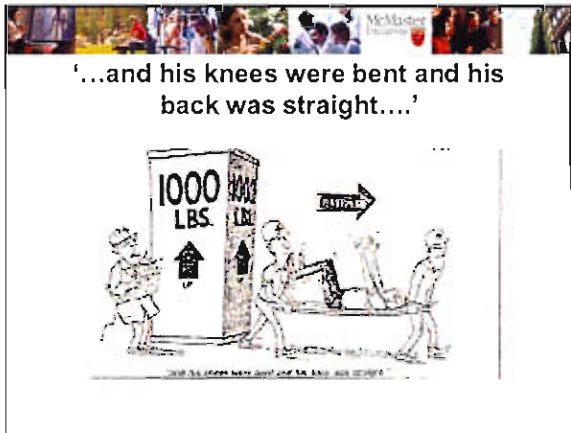
Lifting Tips

- Tip #1. Arch your back before lifting (stretch)
- Tip #2. Tighten abdominal muscles slightly at the start of the lift
- Tip #3. Maintain the natural low back curve
- Tip #4. Keep the load close (don't overstretch, use a stool)
- Tip #5. Push before pull before lift
- Tip #6. Avoid twisting the spine while lifting (twist hips not waist)
- Tip #7. Avoid lifting while seated
- Tip #8. Check your footing and path
- Tip #9. Test object weight before lifting
- Tip #10. Lift half of the load at a time



Lifting Tips

- Tip #11. Divert the forces around your spine
E.g. When shoveling the arm that is below the handle of the shovel can rest on the thigh to divert the load through the legs.
E.g. Place the bag of fertilizer on the floor and squat down enough to get your thigh under it. Slide the bag onto your thigh and stand up, using your leg muscles to raise the load.
- Tip #12. When lifting with a partner, communicate clearly.
- Tip #13. Keep fit.
- Tip #14. For repetitive light lifts, consider using a "golfer's lift"




Office Exercises/Stretches

1. Perform all exercises in your comfort zone, if discomfort persists STOP immediately.
2. Stretch regularly throughout your day.
3. Stretches should be done slowly and smoothly.
4. Change your activity. Where possible, every hour, take a few minutes to alternate your work activities. This will help to relieve muscle aches, eyestrain and stress.
5. If you are under treatment, or have any concerns regarding the exercises, please contact your physician before doing any of the following suggested exercises.

Wrist and forearm stretches:


a) Shake your arms


- Drop your arms and hands to your side
- Shake them gently for a few seconds



b) Wrist stretches


- Keep your elbows straight, grasp hand and slowly bend wrist until you feel a stretch
- Hold stretch for 6-10 seconds.






Shoulder/Arm Stretches:


- Reach with your arm across the chest
- Grasp opposite shoulder with opposite hand
- Gently pull the elbow across your chest towards the body
- When the stretch is felt in the shoulder
- hold this position for 6-10 seconds.






Shoulder Shrug:


- Sit in the chair with your back straight against the backrest.
- Let your head relax.
- Squeeze your shoulders up to your ears.
- Follow by stretching shoulders down with fingers pointing to the floor, draw chin in gently.
- Slowly change from one position to another.






Executive Stretch:


- Lock your hands behind your head.
- Stretch slowly backwards in your chair.
- Arch your back slightly and gently.
- Hold stretch for 6-10 seconds.
- Repeat 5 times with 5-10 second rest period between stretches.






Upper Back Stretch:


- Extend your arms out in front of chest, keeping them at shoulder height.
- Interlock fingers with palms facing away from your body.
- Keep elbows straight, do not over-extend.
- Reach forward while maintaining an upright posture.
- Hold stomach muscles tight to avoid arching your lower back.
- Hold this stretch position for 6-10 seconds.
- Raise your arms over your head and hold this position for 10 seconds.
- Repeat 5 times.






Neck Stretches:

- Sit in your chair with back straight
- Draw chin in gently and bend head to the right so that your right ear moves towards your right shoulder.
- Hold the stretch for 5 seconds.
- Repeat to the other side.





Additional Resources:

For additional tips and information visit Healthy Workplace at:
<http://www.workingatmcmaster.ca/link.php?link=healthy-workplace%20tips-to-be-ergonomic>

Faculty of Health Science Safety Office at:
<http://fhs.mcmaster.ca/safetyoffice/ergonomics.html>

Need an Ergonomic Assessment?
 Complete the Ergonomic Assessment Form available on the Healthy Workplace website and fax to:

Environmental Occupational Health Support Services (EOHSS)
 Sheila Rieth (27593); Monica Curta (20335)

Faculty of Health Sciences Safety Office (FHSc): ext. 24956
 Karln Cassidy; Mike McGuire
