



Occupational  
Health Clinics  
for Ontario  
Workers Inc.

Centres de  
santé des  
travailleurs (ses)  
de l'Ontario Inc.

# Ergonomics & Occupational Cleaners



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# Presentation Overview

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- ❖ **MSD & Risk Factors**
- ❖ **Commonly Injured Areas**
- ❖ **Ergonomic Design Principles**
- ❖ **Lifting & Manual Material Handling**
- ❖ **Reaching & Bending**
- ❖ **Vibration**



# What is an MSD?

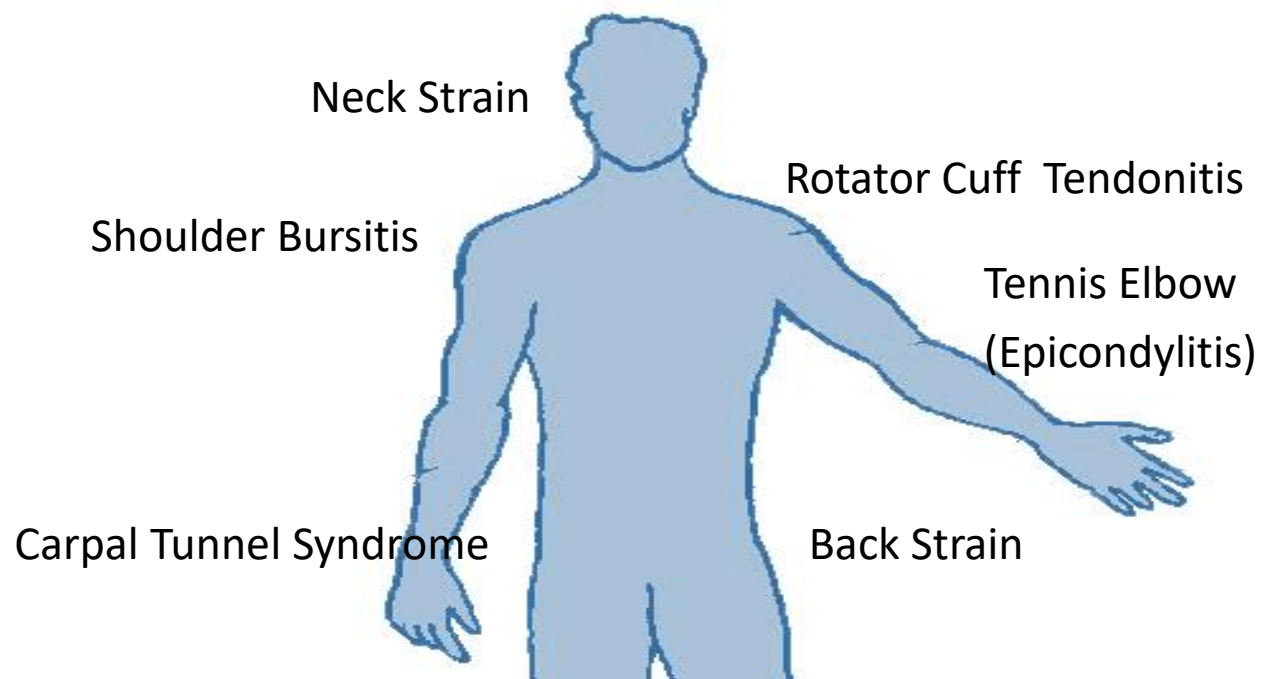
- Your body is made up of:
  - *muscles, tendons, ligaments, joints, vertebrae, vertebral discs, nerves, and other tissues*
  - This is known as the *musculoskeletal system*.
- Musculoskeletal disorders are injuries and disorders of the musculoskeletal system due to exposure of various risk factors





# Examples of MSD

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# MSD Hazards



**Psychosocial**

**REPETITION**

**Force**

***Static Postures***

**CONTACT STRESS**



**AWKWARD POSTURES**

**VIBRATION**

**Extreme Temperatures**



# Primary Risk Factors

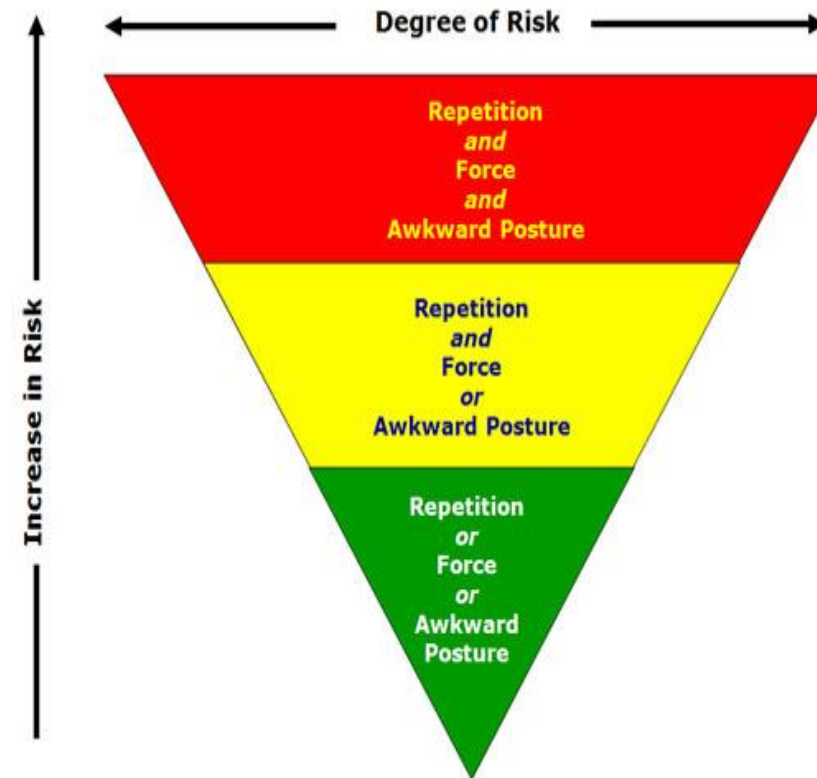
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- MSD are usually associated with physical demands of work activities including:
  - Lifting or pushing heavy loads
  - Reaching or bending in awkward postures
  - Holding the same position for a long time
  - Repetitive movements with little rest or recovery



# Synergistic Effect

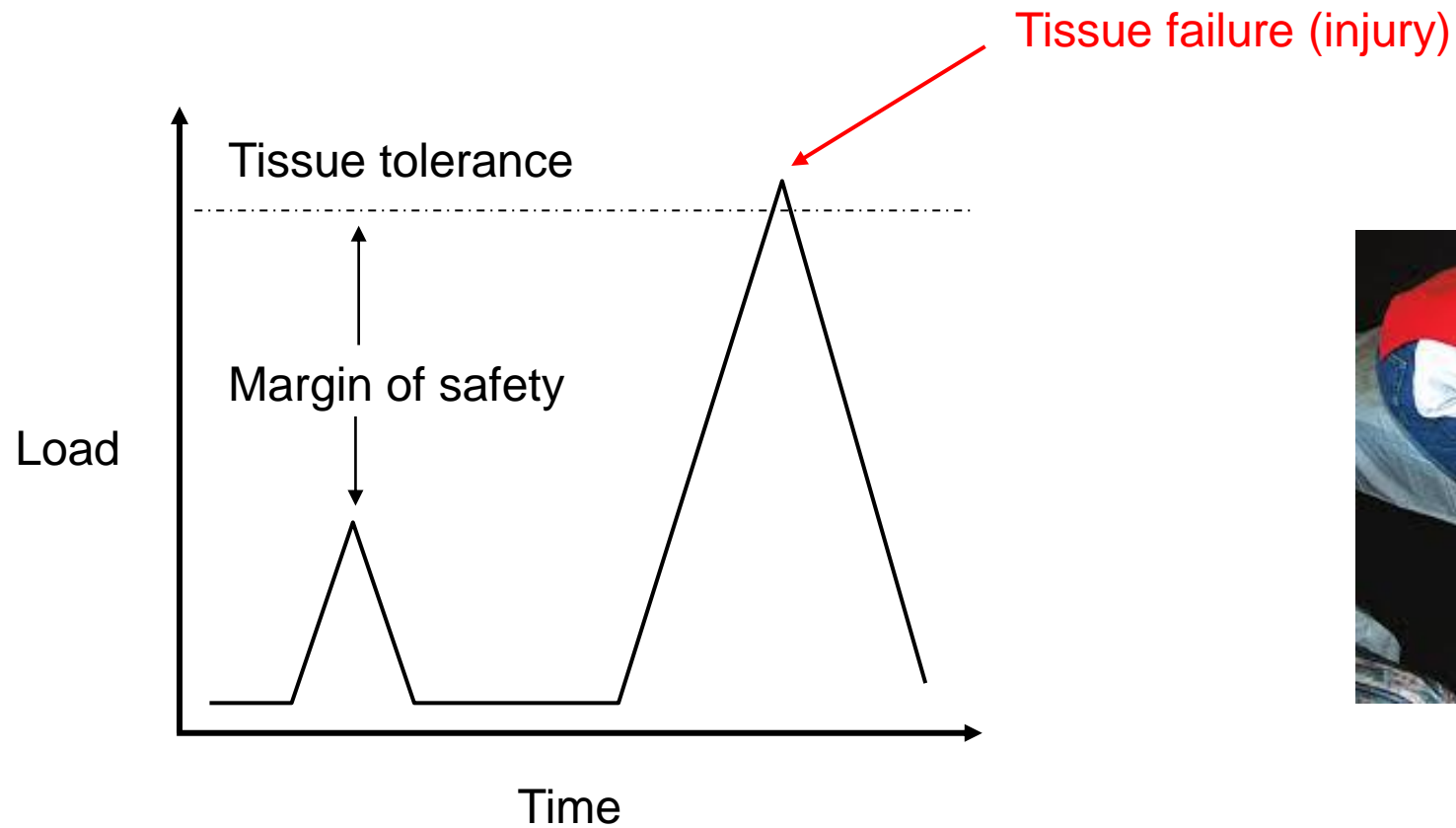
- **Very Important!**
- Combinations of force, posture, repetition, etc. can greatly increase the level of risk
- ↑ exposure time = ↑ injury risk





# Injury Mechanisms

- **Acute**

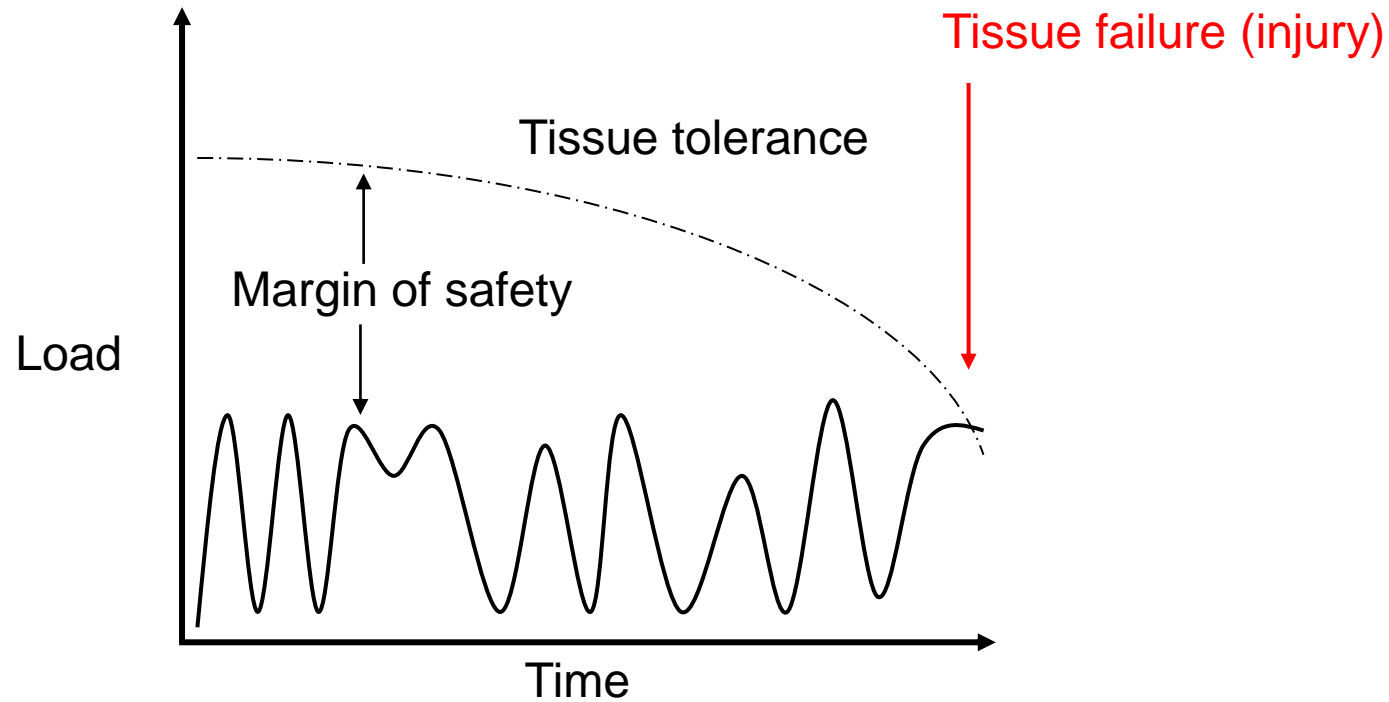




# Injury Mechanisms



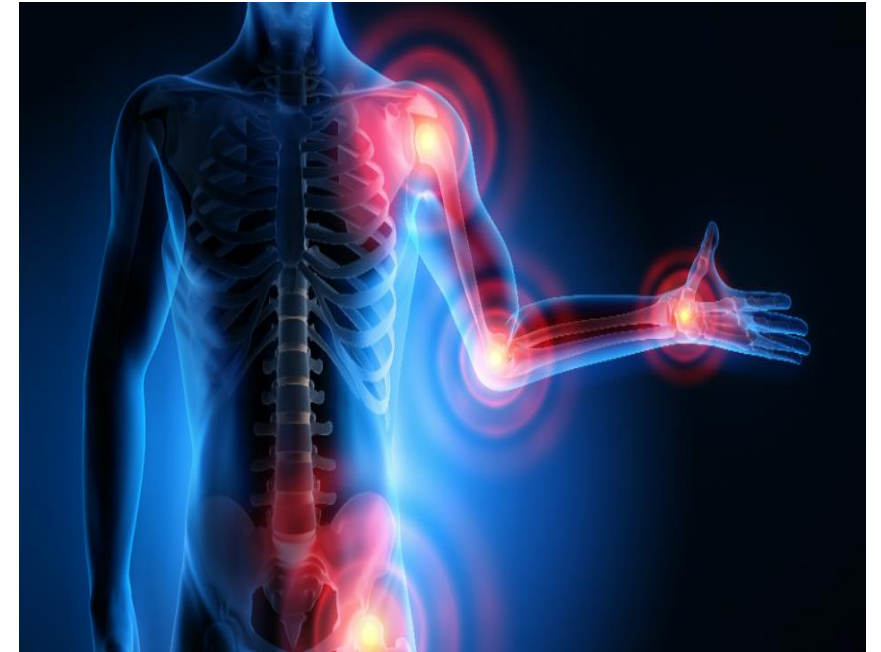
- **Cumulative - repeated**





# Common Injured Areas

- Shoulder
  - Tendonitis, bursitis, rotator cuff strains
- Lower Back
  - Low back pain, strain, and disc injuries
- Hand/Wrist
  - Carpal Tunnel Syndrome, tendonitis





# Shoulder Injury Risk Factors

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- Force - lifting, pushing, pulling, carrying, lowering, holding against resistance, etc.
- Sustained awkward postures – reaching overhead, reaching forward, reaching laterally, external rotation, internal rotation, etc.
- Repeated arm movements - flexion, extension, rotation, etc.

**Increased by any combination of  
the above**



# Low Back Injury Risk Factors

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- Force - lifting, pushing, pulling, carrying, lowering, holding against resistance, etc.
- Sustained awkward postures - bending, stooping, twisting, reaching, etc.
- Repeated torso movements - flexion, extension, rotation, etc.

**Increased by any combination of  
the above**



# Hand/Wrist Risk Factors

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- Force – power grip, pinch grip.
- Sustained awkward postures – wrist deviations (flexion, extension)
- Repeated hand/arm movements - flexion, extension, supination, pronation, rotation, etc.

**Increased by any combination of  
the above**



# Ergonomic Design Principles

## Minimize

- Heavy Lifting or High Forces
- Reaching
- Bending
- Awkward Postures
- Repetition
- Static Postures





# Manual Material Handling (MMH)

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- MMH includes manually lifting, carrying, lowering, pushing or pulling objects
- Many injuries that occur because of MMH are musculoskeletal (gradual over time or a one time over exertion)
- MMH is the most common cause of back pain
- 3 out 4 Canadians who's job entails MMH suffer from back pain
- Every year several thousand Canadians are permanently disabled due to back injuries

# Ergonomics and Lifting



Safe lifting principles will help keep you healthy, and your back comfortable.

## Principles of Lifting:

- B**ack Straight
- A**void Twisting
- C**lose to Body
- K**eep Smooth







# MMH Duties of an Occupational Cleaner

- Garbage
- Mopping
- Furniture & Supplies
- Supply Cart
- Shovelling Snow
- Vacuuming
- Making Beds
- Floor Scrubbers & Polishers



# Garbage



- Do not overfill: false bottoms to reduce the weight
- Utilize S/M trash containers
- Empty frequently
- Test the load before lifting it
- Beware of the suction effect: need air between container and bag to avoid this (i.e. drill holes in side or bottom of the container)





# Garbage

## Transporting Garbage to Dumpsters:

### REMEMBER

The dumping of garbage bags requires repeated high force and high shoulder lifts to toss in bags.

#### Common problems

- Heavy lids with stiff hinges
- Overhead push of lids for shorter workers
- Need to hold lid open with one arm while throwing bag in with the other

#### Possible solutions

- Step stool
  - for better working height to throw in bags
- Locking hinge lid
  - to allow two-handed handling of bags



### Transporting to Dumpster

- ◆ Always transport garbage bags to the dumpster with a cart
- ◆ Keep bags compact and light if no carts are available

# Garbage



- Use an extension device to push and hold the dumpster lid open. This will help eliminate holding the lid open with one arm and throwing the bag of material with the other.



# Mopping



## Mop Buckets:

- Fill buckets on custodial cart if possible
- Use a hose to fill
- Only fill bucket ½ full; mark a fill line on the bucket
- When emptying use a floor drain or bail some water out first; remove wringer mechanism



# Furniture & Supplies



- Plan the lift
- Use carts (large wheels) or dollies
- Ensure the load is stable
- Use Safe Lifting Principles (BACK)
- Keep the load close to your body
- Lift heavy items with a partner





# Furniture & Supplies



- Bend your knees not your back
- Ensure a good grip on load
- Do not twist the torso, move the feet
- Frequently handled loads should be located waist to chest level





# Supply Cart

- Do not overload (increase force to push especially on carpet, ensure proper casters)
- Ensure even weight distribution
- Organize so most frequently used products are close





# Supply Cart



## Moving Supply Carts



**Store Heaviest or Most-Used Items between Your Hips and Chest**

- More body strength at this part of the body



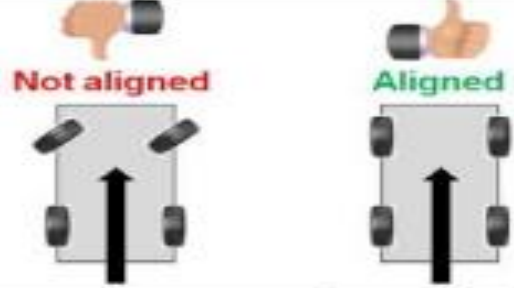
**Push Cart Using Both Hands**

- Keeps the body from twisting
- Distributes effort across both sides of the body



**Empty Trash from Cart as Often as Possible**

- Makes cart easier to push



**Align Cart Wheels in the Direction of Movement**

- Carts with aligned wheels are easier to push



**Replenish Supply Cart a Few Times over Shift**

- Less effort to push lighter cart
- A good, brief rest break



**Report Cart Problems to Supervisor**

- Repaired carts are easier to use

# Shovelling Snow



## Preparation:

- Attire
- Footwear
- Warm-up

## Choosing a shovel:

- Weight – light
- Length – based upon height
- Shaft Type – bent vs straight
- Handle Type - size
- Blade Size & Shape – non stick surface





# Shovelling Snow

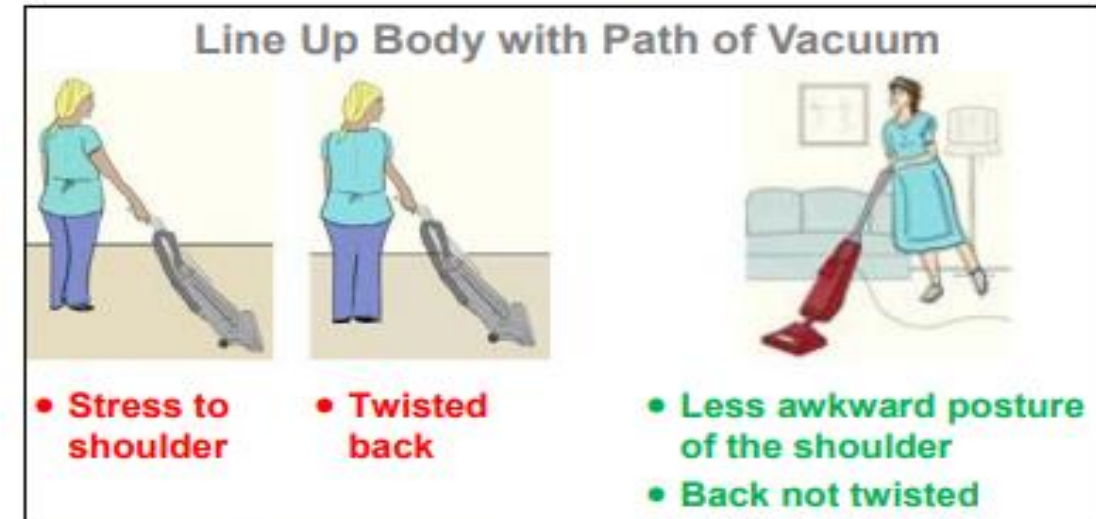
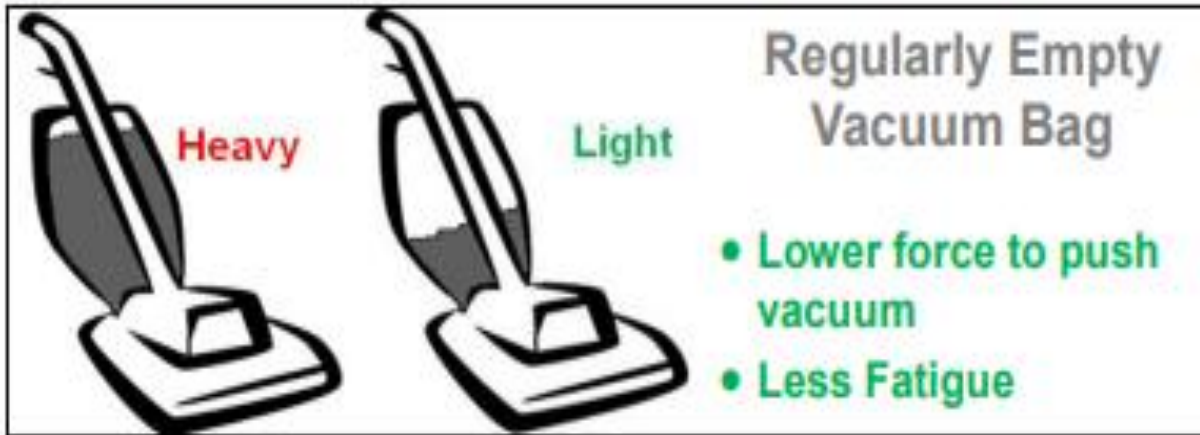
- Do not overfill shovel
- Push as much as possible; lift as little as possible
- Lift with the legs, move feet, do not twist torso
- Recommended rate of 15 scoops per minute.
- Shoveling should not last longer than 15 minutes followed by a 2-3 minute break.



# Vacuuming



## Vacuuming





# Vacuuming



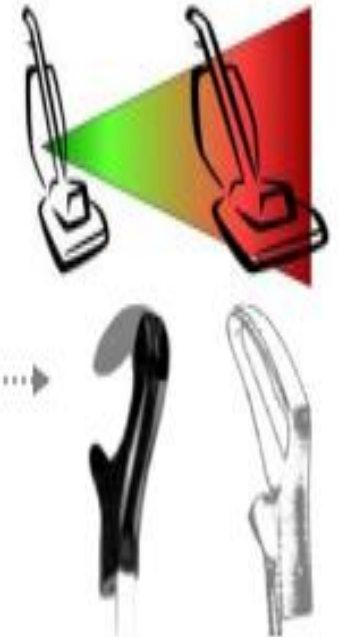
## Backpack Vacuums

- Ensure proper fit
- Ensure proper training (users should not need to bend)
- Empty Frequently



## For Vacuuming:

- Lighter-weight .....
- Self-propelled or brush-assist
- "Ergonomic" handles .....
- Alternatives to uprights (e.g., canisters, backpacks)





# Making Beds

## Mattress Lifting Tool:

- Can weigh as much as 100 lbs
- Without the tool workers need to lift with one hand and tuck with the other.
- Fitted sheets should be used
- Study found that using the tool with a fitted sheet reduced the number of mattress lifts and lowered perceived exertion among hotel room cleaners while making beds (Harris-Adamson et al, 2019)





# Floor Polishers & Scrubbers

- Buffers should have lightweight construction.
- Adjustable handles.
- Triggers (buffer) long enough to accommodate at least the index and middle fingers, and easy to reach controls.
- Technique is important for both devices, including use of appropriate grips, avoiding tight grips.
- Maintain and service the equipment



# Reaching & Bending



Reaching/Bending occurs when:

- Mopping
- Sweeping
- Dusting
- Making Beds
- Cleaning surfaces (i.e. bathtub)
- Shovelling Snow





# Mopping



- Shorter mop handles = Increased Bending
- Longer mop handles = Increased Awkward Shoulder Postures
  - Mop handle should be close to the height of the worker's chest
- Use **light** mop handles
- Adjustable handles accommodate more workers
- Use light-weight mop heads, including microfiber flat, tube, and string mops. Traditional heavy cotton-loop mop heads are not recommended.





# Mopping

- Mopping should be done in an S motion while walking backwards.
- Mop, rinse, and dry small sections at a time
- Use the appropriate mop head for different size area



# Sweeping



## Brooms

- Alternate hands
- Handle Length: optimal is chest height, adjustable
- Gripping Material
- Keep your upper arms close to your body, and move the handle by moving your feet.

Incorrect



Correct



## Dust Pans

- To minimize bending when sweeping up dirt, a long handle dust pan should be purchased.



# Dusting



- Reaching overhead while dusting can increase strain on the shoulder.
- Long handled dusters to reach baseboards without bending and to dust the tops of curtains without having to reach above shoulder height



Alternate left and right hands at the top of the handle.

# Dusting



- When dusting, keep the wrist straight.
- Get close to the work to avoid unnecessary bending and reaching.
- Consider switching to micro-fiber cleaning cloths (lighter).



Avoid extending arm and bending wrist.



Use a good body posture with safe arm, wrist, and hand position





# Making Beds

- Try to keep beds away from walls. Beds too close to a wall force workers to work in tight areas in awkward postures.
- Get as close as possible to the item needing to be moved. Go around the bed and don't stretch across it.
- Rather than bending over the bed, kneel on one or both knees or crouch and face the bed while pulling the corner of the bottom sheet over the mattress. This keeps the back straight and more in neutral.

## Bed-Making Postures:

- Encourage use of less-awkward postures when lifting mattresses or tucking sheets



# Cleaning Surfaces



## Cleaning Bathrooms:

- Stand inside tub, if allowed (stand on rag) .....
- Keep dirty towels off floor
- Do work at waist level as often as possible
- Do not carry large or heavy weights; make more trips if possible .....
- Alternate arms when cleaning surfaces



## For Bathrooms:

- Long-handled brushes and scrubbers
- Brushes and sprayers with more-comfortable grips



# Cleaning Surfaces



- Carry a light step tool on the cart and use it to clean hard to reach higher surfaces.
- Alternate between left and right hands when scrubbing.
- Use a mat or towel to protect the knees when kneeling.





# Shovelling Snow



- Stabilize the spinal posture with appropriate hand placement. Positioning one hand on the handle and the other about 12 inches lower on the shaft allows the back to remain straight and stabilized.
- Avoid excessive arm movement. While dumping snow, maintain minimal arm movement by keeping the shovel's load close to the body.
- Do not throw snow over your shoulder.
- Maintain your center of gravity- Keep the shovel close to your body and don't extend or reach to dump the snow.
- Avoid twisting; move your feet.



# Vibration



Hand arm vibration: ----->

- Walk-behind Scrubbers
- Rotary Buffers



Whole-body Vibration: ----->

- Ride on Machines



# Vibration



- Let the machine do the work.
- Keep a light hold on it while you are working safely and keep control. The more tightly we grip a machine, the greater the force of the vibrations on the fingers and the hands.
- Whenever possible, use the machine at low speed.
- Replace the polishing disks regularly.
- Anti-vibrating gloves can help absorb low-frequency vibrations

Incorrect



Correct



# Vibration



## Reducing Whole-body Vibration:

- Limit the time spent by workers on a vibrating surface.
- Mechanically isolate the vibrating source or surface to reduce exposure.
- Ensure that equipment is well maintained to avoid excessive vibration.
- Install vibration damping seats.



# Task Variation



Split up work tasks in order to provide rest to muscle groups

- Hotel Housekeepers: cleaning hotel rooms one at a time (i.e. garbage, bathroom, vacuum, etc.)
- School Custodians: break the school down into small sections so as not to perform the same tasks at one time (i.e. do not sweep all areas then mop all areas)



