

OH&S, Ergonomic & Manual Handling Tutorial



Overview

- Introduction
- Legislation
- Anatomy, physiology and injuries
- Specific manual handling / ergonomic examples
- Stretching in the Office

OHS&W Act 1986

Employer Responsibilities

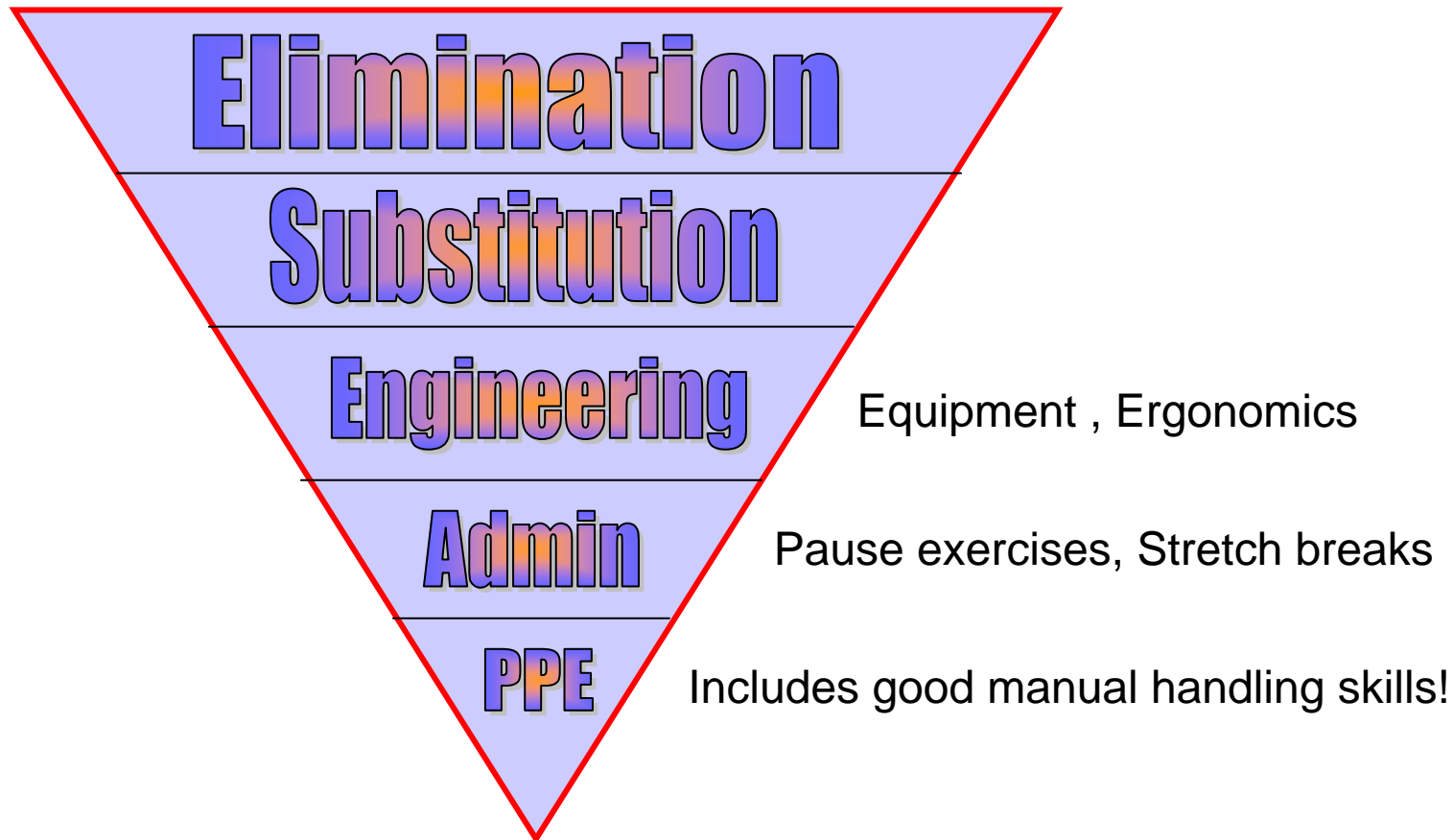
- Provide a safe work environment
- Provide safe systems of work
- Provide information, training and supervision to ensure employees are safe from injury
- Provide plant and substances in safe condition

OHS&W Act 1986

Employee Responsibilities

- Take reasonable care of their own safety and the safety of others around them
- Report any injuries, accidents, risks or hazards
- Make recommendations to improve safety
- Follow all policies and procedures
- Wear appropriate clothing
- Use mechanical aids and equipment provided
- Know responsibilities under OHS&W Act 1986

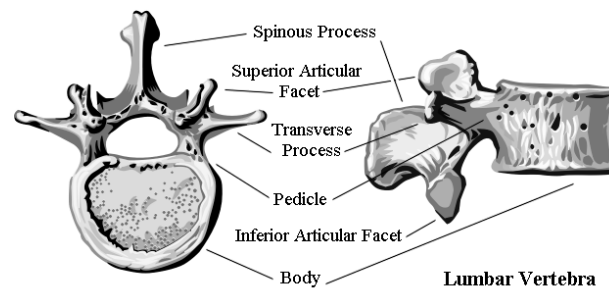
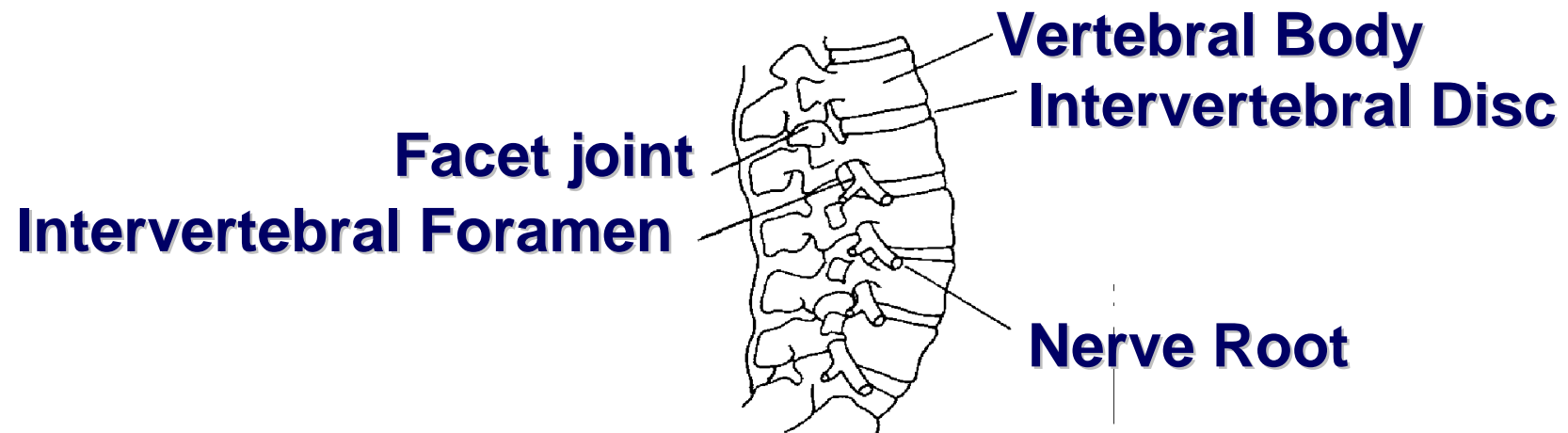
Risk Control Hierarchy



Risk Control Hierarchy

- **Eliminate** any unnecessary manual handling tasks. This may include good storage design to eliminate lifting heavy items from low down or overhead. Another way of eliminating unnecessary manual handling is by avoiding double handling of items.
- **Substitute** lighter objects for heavier ones. This can be achieved by reducing the number of items in a box, breaking bulk packs down in to smaller parts before moving them or purchasing products in smaller portions.
- **Engineering.** Use mechanical aids wherever possible to assist with manual handling tasks. In the office, mechanical aids can assist with good ergonomics of your workstation.
- **Administrative controls** mean spreading the manual handling tasks over a larger number of people or a longer period of time to reduce the load on your body. In the office, this includes regular breaks from sitting and good stretches.
- **PPE-The final step** is to complete the required task safely. Use strong postures that protect your back and shoulders and allow you to generate the necessary force with your legs and body weight. When you are sitting in the office, sit with good posture.

Anatomy of the Spine



Anatomy of the spine

The spine is central to our whole body's function, providing a stable base for our limbs and head and protecting our nervous system from harm. Understanding how it works helps us to look after it better!

Intervertebral Disc: - Made of 2 parts

Annulus - Tough fibrous ring, layer made of fibres and like a radial ply tyre. This supports the nucleus and keeps it in place. Discs do not slip!

Gelatinous nucleus - Inner ball made of thick, toothpaste-like matter. Its function is to equalise pressure by changing shape during movement. With a disc injury the 'toothpaste' in the middle can herniate (leak) out into the layers of the annulus.

Facet Joints:

Facet Joints are small joints at the back and sides of the vertebra. They allow movement of each vertebra on the next while stabilising the spine. They are an integral part of the mechanical function of the vertebral system.

Nerve Roots:

Come from the spinal cord and pass through the intervertebral foramen to the area of the body that they supply. Pressure on them from a disc injury or swelling can cause nerve root pain and irritation.

Ligaments:

These are tough fibrous bands that connect the vertebrae. They provide support and stability.

Anatomy of the spine

Muscles:

Hold the vertebral column together with the ligaments. Strong muscles allow good posture and support the other spinal structures, minimising stress, damage and degeneration.

The main groups of muscles that support the lumbar spine are:

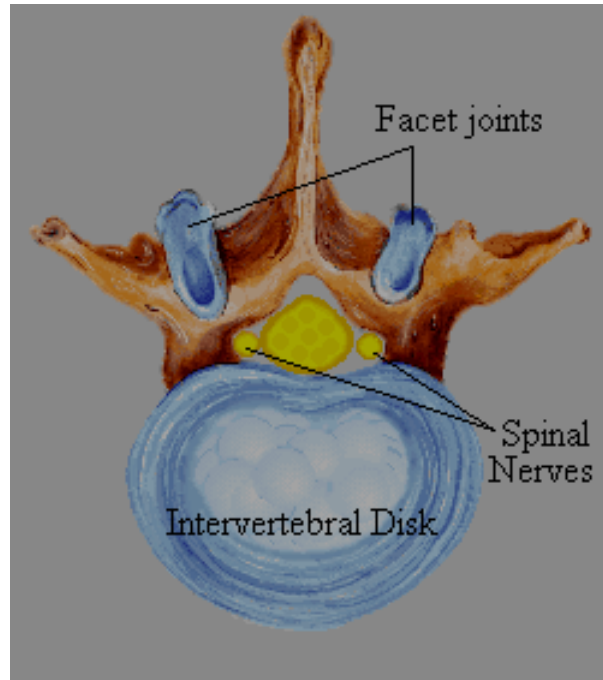
Abdominals - from the ribs to the pelvis, they act as an elastic corset to support the abdomen and stabilise the whole lower back during movements.

Paravertebral muscles - these run next to the vertebral column (spine) to provide stability to small sections of the spine.

Abdominal Stabilising:

- Abdominal stabilising exercises provide improved co-ordination of the muscles that provide stability and strength to your lumbar spine
- Maintain normal breathing and draw your belly button gently towards your spine. This can be done sitting at your desk or in your car, or standing in a queue at the supermarket.
- Good abdominal muscles protect and support static postures (eg sitting) just as much as they support dynamic lifting actions

Intervertebral Disc



Source: American Academy of orthopaedic surgeons

Activity	Load on Disc (kg/cm ²)
Lying on back	20
Standing	70
Sitting	100
Sitting slumped	180
Walking	85
Coughing, sneezing	110
Laughing	120
Bending forward 20°	120
Lifting 20kg, back straight	210
Lifting 20kg, back bent	340

Load placed on the discs during various activities.

Some causes of back pain

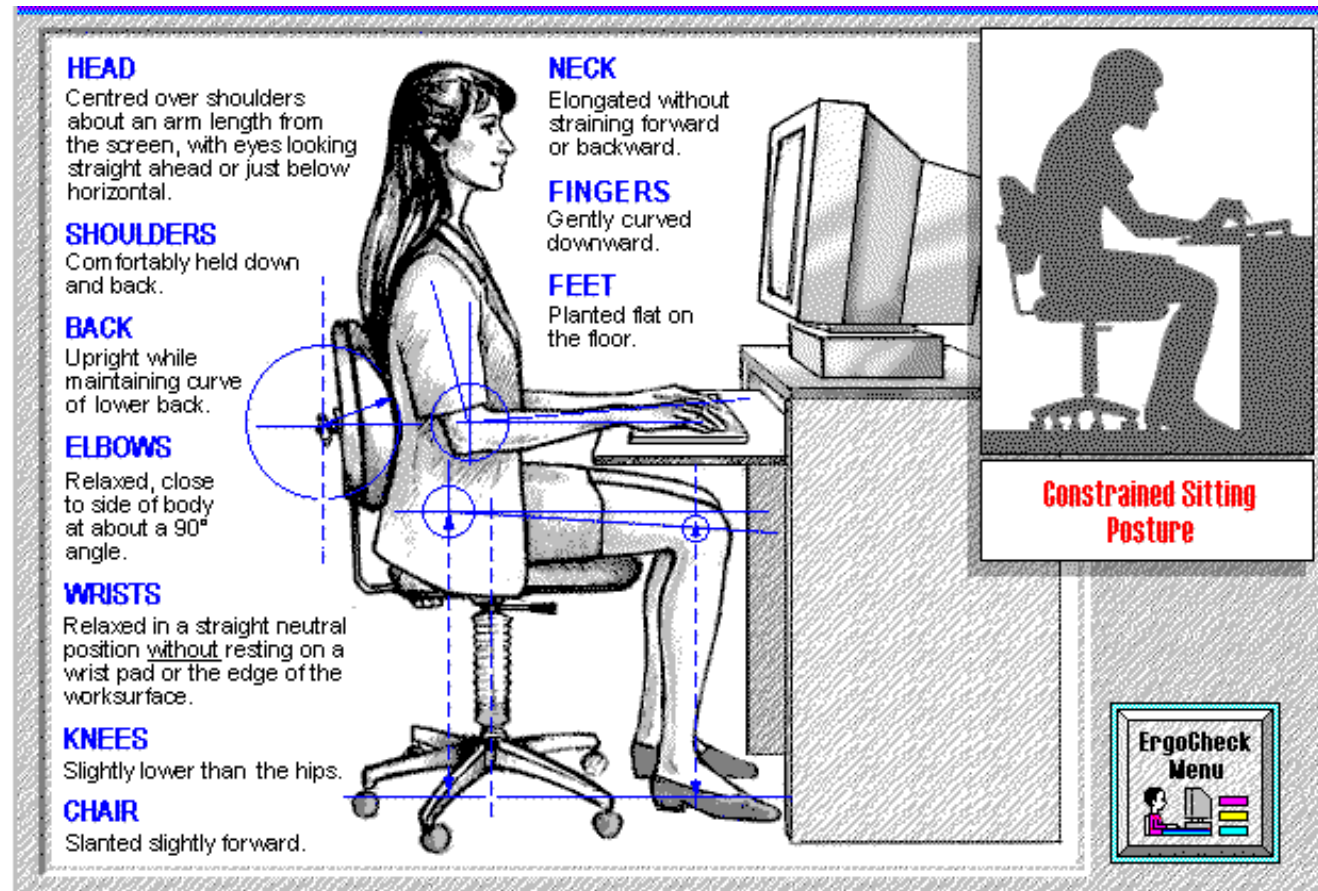
- Acute Sprain or Strain
- Muscle Fatigue
- Poor Posture
- Osteoarthritis (degeneration)
- Disc damage (no nerves, no pain!)

Some causes of back pain

- **Acute injuries** are sudden in nature, usually have identifiable cause and resolve relatively quickly with minimal treatment.
- **Muscle fatigue** can result from dynamic work, or more quickly from static loading (ie holding a weight in one position for a period of time). Stretching regularly, warm up, warm down assist with easing muscle fatigue.
Sometimes, after a physical day, sore muscles are unavoidable, but they can be minimised by stretching, gentle exercise (warm down) and ice packs if necessary.
- **Poor posture** is the most common cause of chronic discomfort. It places overt strain on many structures in the spine, causing discomfort. It can lead to more serious pathology if not corrected. It is usually easy to correct, and at the same time incredibly difficult to maintain.
- **Osteoarthritis** = degeneration + inflammation. Usually irreversible but can be managed with exercise, decreased body weight and medications (seek advice from your doctor).
- **Disc damage** occurs slowly, but often goes un-noticed until an acute aggravation. It can cause referred pain, may take a long time to repair, can be very serious.

Office Ergonomics

Importance of good posture



Importance of good posture

Good posture is the position in which our muscles work with minimal effort, while maintaining the natural shape of the spine. This places the spine in its most efficient, and powerful position.

Why is good posture so difficult to maintain, and why does slouching feel so good?

When we slouch, we allow our muscles to relax, placing the strain of supporting our weight on the ligaments and joints. In the short term this feels relaxing, as the muscles feel good but, if sustained, the load on the other structures will lead to greater, more long-term problems.

Why is it so important to sit properly?

Even when we sit well, the compressive forces through our lumbar spine are greater than when standing. If we slouch, these forces are increased to almost three times the standing compression. This can lead to short term discomfort, and contributes significantly to long term degeneration of our joints. Slouching also forces our neck into a forward-head posture, which causes discomfort in the neck and shoulder muscles, and can cause headaches.

Having a good chair, and adjusting it well helps, but you still have to sit on it with good posture. This is important in the office, but also in your car or at home sitting on your lounge.

Even if you sit well, remember to stand and stretch regularly. One minute of stretching every thirty minutes is usually better than one thirty-minute stretch per day.

Office Ergonomics - seating

Chair Height

- Adjust so that when elbows are resting by your side and your wrist is on the desk, your wrist is 1cm below your elbow.
- The height of the seat will be determined by your arm position when operating the keyboard. When your hands are resting on the home row of keys, your elbows and forearms should be level with the keys. That is, your elbows should be bent at 90° and resting by your sides.

Seat

- Adjust tilt of the base to suit your comfort.
- The thighs should be approximately horizontal and the lower legs approximately vertical. A footrest might be required for the correct arm position to be maintained.

Back Rest

- Firmly supporting the lower back in the natural curve.

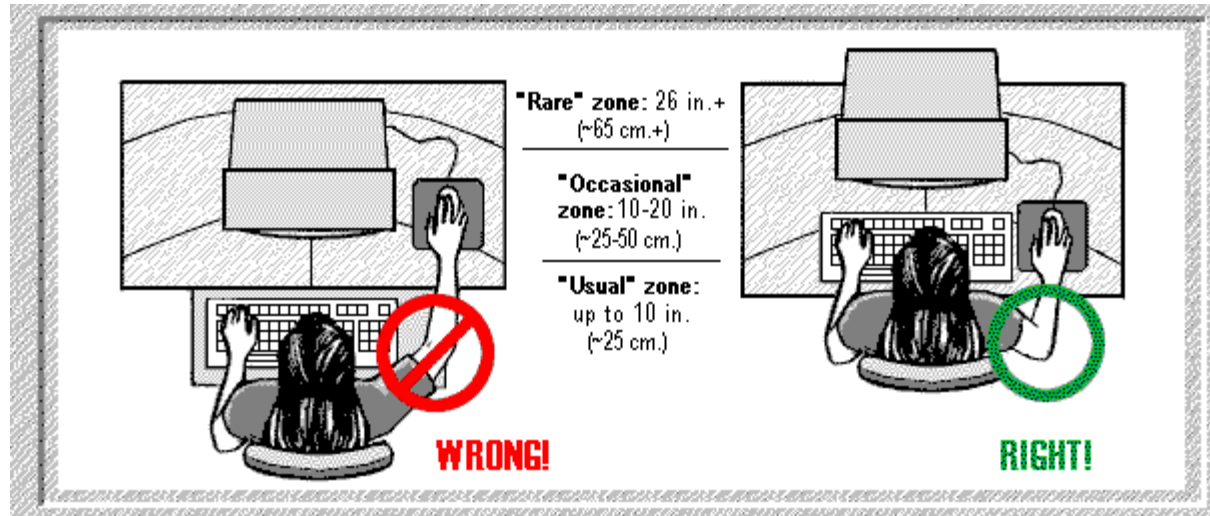
Feet

- Flat on the floor or on footrest. There should be enough knee and leg space under the work surface to allow free movement of your legs.

Knees

- Back of the knees should not press down on the front edge of the seat. There should be enough space between the back of your knees and the seat to fit 2 fingers. This avoids compression and restriction of blood flow.

Office Ergonomics - desk set-up



Keyboard

- Place so that it is close to the edge of the table, the wrists are straight, the forearms are just below horizontal and elbows are close to your side.

Mouse

- Place the mouse close as possible to the keyboard and at the same height. You should be able to reach without the elbow leaving your side.
- If possible, alternate mouse between left and right hands to reduce static muscle loading on one hand.

Office Ergonomics - desk set-up

Screen placement

- Set the distance of the screen, try arm length first.
- Set the screen height so that the top line of characters are level with your eyes or
- Set the screen height so that centre of the screen is 30° below the horizontal level of the eyes.

Reference Material

- Use a document holder when referring to documents on a frequent or constant basis.
- Place the document holder close to the monitor - either between the keyboard and monitor or to the left/right of the screen.

Telephone

- The telephone should be placed on the non-dominant hand side, to allow for writing with the dominant hand while on the phone when required.
- The handset should not be held between the ear and shoulder as this increases shoulder and neck muscle tension.
- A headset should be used if the operator must also frequently type when on the phone, as a part of their duties.

Office Ergonomics

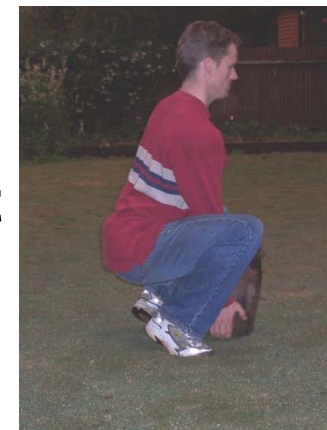
General

- Occasional changes in posture reduces fatigue. Frequent short rests are better than infrequent long rests.
- Avoid abnormal increase in keystroke rate or mouse use. Combine keying/mouse work with other duties as much as possible.
- It is important to give your eyes a break from the computer screen. Focus on a point at a distance of 6 meters. This stretches the eye muscles used for close distances.
- Regular office exercises can help ease cramped muscles and increase the blood flow.
- Sufficient space is needed for the task being undertaken. Avoid clutter.
- Frequently used items should be kept within easy reach. Items less frequently used, should be kept within distant reach.

Basic Lifting Positions



Stooped Lift (not recommended)



Deep Squat Lift



Semi Squat Lift

Basic lifting positions

- Better leg strength in a semi-squat position.
- Body weight is closer to the centre of gravity of the object with semi-squat position.

The basics, help you generate strength safely

- Feet comfortably apart, around the load if possible
- Knees bent
- Keep the spine in its natural curves
- Keep load as close to the body as possible
- Brace the abdominal muscles

Stretches

Whether you are performing physical work or you're working at your desk, stretching can help you to finish the day comfortably, minimising muscle aches as well as preventing acute strains and sprains.

All stretches should be comfortable, not painful.

Gently hold the end of the stretch, don't 'bounce' to try and stretch further.

Do not continue stretches if they cause discomfort, if you are concerned, talk to your doctor or a physiotherapist.

Repeat stretches on both sides



Neck Retraction

Sit with upright posture. Slide head backwards on your shoulders, keeping your head level. Do not tilt your head up or down. Hold for 3 seconds, repeat 3 times.

Low Back stretch



While sitting, lean forward and hug your arms around your knees, gently stretching forward.

Low back stretch



Place your hands in the small of your back and gently bend backwards. Hold for 3 seconds, and repeat 3 times.

Stretches

Thoracic stretch 1



Push both hands forward and away from your body as you breath out. Let your head rest between your arms. Hold for 3 seconds, repeat 3 times.

Thoracic stretch 2



Pull both hands down behind your back, breath in. Keep your head straight. Hold for three 3 seconds, repeat 3 times.

Neck Stretch



Stretch your ear to your shoulder, hold for 10 seconds. You can use your hand to apply a gentle overpressure if comfortable. Do not turn head, keep it straight forward.

Forearm stretch 1



Hold your arms in front of your body. Gently stretch each hand (and fingers) under for 20 seconds.

Summary

- Understanding our body helps us to look after it.
- Good body positioning is still only part of the risk control process.
- After all other controls are considered and implemented, we still need to think about how posture and technique affect our ability to perform manual handling safely.