

MODULE ONE

of the

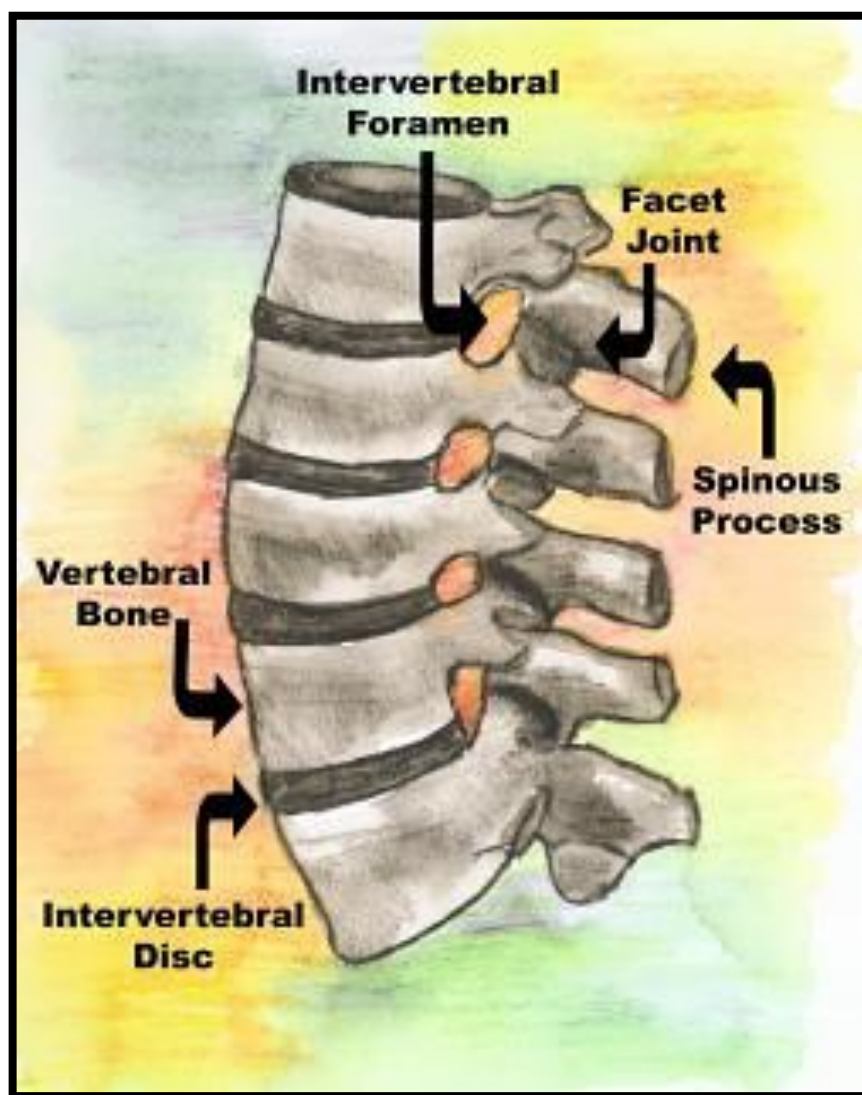
SAFE CLIENT HANDLING & INJURY PREVENTION PROGRAM

for all Employees



Musculoskeletal Injury Prevention Basics

High Risk Anatomy: Our Back And How To Protect It



The Spine

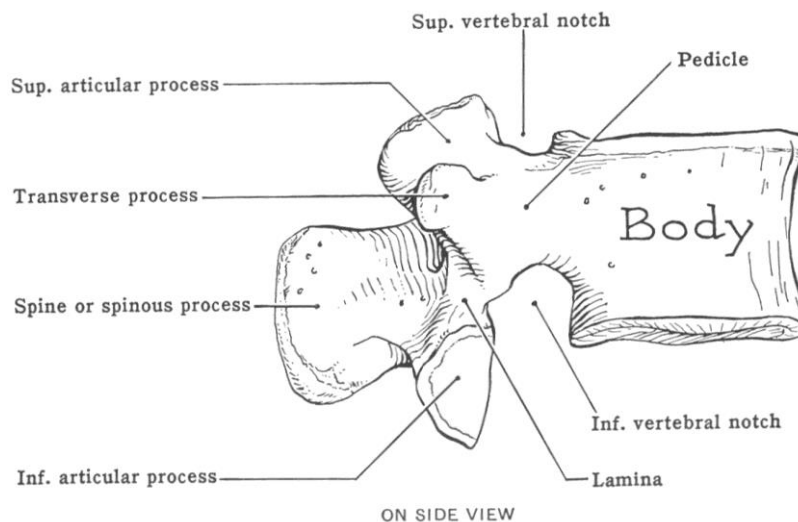
If we understand what comprises a healthy spine, we can better understand the risks for injury.

Anatomy of a Healthy Back

The Spinal Column is made up of four basic elements:

1. **Bones**
2. **Discs**
3. **Nervous System Components**
4. **Muscles and Ligaments**

1. **Bones** - The spinal column is made up of 33 bones, called **vertebrae**, stacked one on top of the other. Each bone is made up of the **vertebral body** and several **posterior elements**. The vertebral body bears the load in the spinal column and the posterior elements protect the spinal cord and provide attachments for muscles and ligaments.



2. **Discs** - The **discs** are found between each vertebra, and provide shock absorption in the spine. They also allow motion in the spine as they are soft and pliable. When we are standing, discs compress when they are loaded with the body's weight. Lifting and handling weights leads to further compression of the disc which can cause injury if the weight is too heavy or unevenly distributed.

Structure:

Annulus

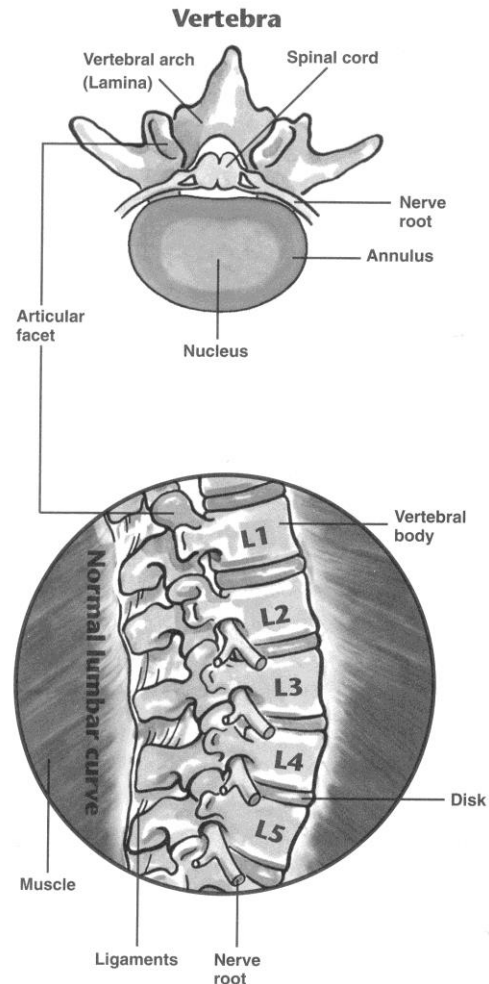
- Outer portion of the disc which surrounds the nucleus.
- Made up of strong criss-crossing elastic/fibrous fibres.

Nucleus

- Is the centre of the disc
- Made up of a jelly-like substance, 88% water when the discs are young and healthy.
- Can absorb stress placed on spine by compressing under pressure and spreading the load throughout the annulus.

Function As:

- Shock absorbers.
- Spacers are sandwiched between the vertebrae.
- Hold the vertebrae together strongly. Discs have very little blood and nerve supply. This poor supply means at early stages damage to the discs may not be felt. Poor blood supply means that a damaged disc doesn't heal easily.



3. **Nervous System Components** - The nervous system components of the spinal column include the **spinal cord** and the **spinal nerves** that exit the spinal column at the holes between two vertebrae. The spinal cord and spinal nerve roots are protected by the bony structures of the spinal column.



4. **Muscles** - Muscles are connected to bones by tendons and provide the forces for movement. Muscles have different roles depending on their position and size.

Abdominals

- 3 sets of muscles
- These are broad flat muscles which should be kept strong

Function:

- Provide strong support of abdominal contents and spine.
- Maintain neutral pelvis to prepare your low back when lifting.

Back (Spinal) Muscles

- Short, less powerful, found in two layers – superficial and deep – are closest to the spine.

Function:

- Mainly postural, they keep the vertebrae aligned and balanced, allowing flexibility and mobility.
- Not designed for lifting.

While the back is the most common site of injury for care providers, other areas are also at risk. The soft tissues of the shoulder, elbow, and wrist can also be injured. This like the back often occurs over time and due to handling excessive loads on an ongoing basis.

THE SHOULDER

The shoulder joint is frequently at risk for injury in health care workers.

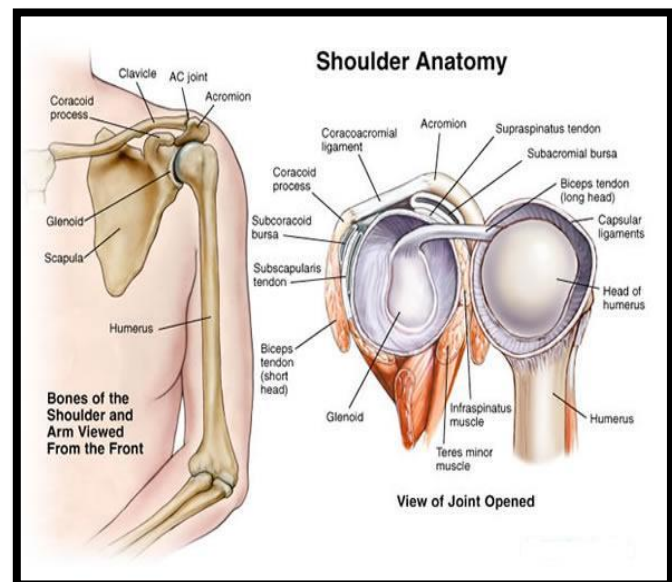
Anatomy of a Healthy Shoulder

The Shoulder is made up of three basic elements:

The main components of the Shoulder Anatomy are:

1. **Ball and socket joint** – which provides greater mobility
2. **Smaller muscles and ligaments** – which stabilize the joint
3. **Nervous system components** – which provide messages to the upper extremities for sensation and movement of the arm

Shoulder joints inherently have a lot of movement and thus can be more susceptible to stress with overexertion, over reaching, or lifting too much outside of a neutral position.



MUSCULOSKELETAL INJURY

Injuries or disorders involving muscles, tendons, ligaments, joints, blood vessels, nerves and other soft tissues are known as **musculoskeletal injuries or MSIs**. Examples include sprains, strains and inflammation.

They are among the **most common injuries** that occur throughout all areas of healthcare.

Signs and Symptoms of an MSI may include:

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

When you use more than a low level of effort with manual lifting techniques, we put ourselves at risk for **Musculoskeletal Injury (MSI)**. Excessive force gradually wears out soft tissues and may result in serious health problems. In short term, there is a higher risk of pain, stiffness and injuries.

MSI diagnosis is based on principal physical characteristic(s) of the injury or disease. It does not consider the event associated with the MSI.

MSI Risk Factors

- Lifting excessive weights or pushing/pulling with excessive force
- Awkward postures
- Repetition
- Prolonged postures
- Temperature extremes
- Areas of direct contact pressure
- Poor work organization

Mechanisms of Injury

If we understand the risk factors for MSI, then we can examine what happens when those factors cause injury to various parts of our body.

In our backs, high forces or weight applied to the spine can injure the discs and other elements of the spine. There are three different types of forces that act on the spine and can cause injury.

Compression - is a downward force on the spine. The weight of your upper body constantly compresses your spine when you are standing upright. Additional weight lifted or carried can cause an increase in compressive force through the spine.

Shear - is the force that acts in a horizontal direction, like sliding sandpaper across wood.

These forces are important when you are bending forward and creating a horizontally directed force in the disc, pressing it backward. When additional weight is added by picking up an object while bending, shear force is increased.

Torque - is the rotational or twisting force, like when using a socket wrench. It is important when you are bending forward, to the side or twisting, as you are creating a rotation about the point where you are bending. When twisting, torque forces are generated, and the nucleus of the disc can be pushed backwards or sideways. With repeated twisting, especially when the spine is loaded with extra weight like that of a client or heavy equipment, the disc is at risk for injury.

Discs will change or deform as the body moves. This movement of the nucleus usually occurs in the backwards direction, since forward bending is a very common activity. The result can be pressure on the nerves as they exit the spine, causing pain and numbness that radiates to the legs.

The less the disc is stressed over the lifetime (i.e. by forward bending or twisting), the less likely it is that sufficient damage will occur to the disc and result in a serious injury.

Disc bulging or herniation (what is sometimes incorrectly referred to as a “slipped disc”) is a common injury and occurs when the tough outer layer becomes weakened and tears, allowing the nucleus to move backwards into the spinal canal.

SAFE HANDLING GUIDELINES

The **National Institute of Occupational Safety and Health (NIOSH)** has guidelines to protect workers.

The weight limit they recommend for a worker to lift, under ideal conditions, is 51 pounds, which equates to a spine compression force equal to 764 pounds.

With less predictable loads, as in client handling, weight limits for safe lifting are reduced even further to 35 lbs. Lifting weights beyond these limits eventually results in damage to muscles, ligaments, discs and vertebrae.

The spine can accommodate these types of stresses a limited number of times but once a person exceeds that number damage **WILL** occur. Therefore ANYTHING you can do to reduce the stress will extend your body’s health.

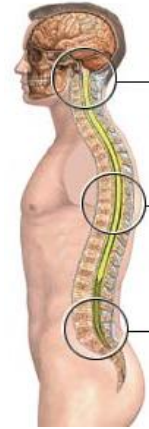
- NIOSH Guidelines:
 - Load limit for lifting material (non-client) loads: **51 lb**
 - Spine compression force: **764 lb**
 - The maximum weight limit for client handling is **35 lb** if the client is cooperative and load close to the body (NIOSH, 2007)
- Spine compression forces for client handling activities:
 - Pulling **105 lb** client (with bedsheet) from bed to stretcher: **832-1708 lb** (source: Hess, 2006)

Damage **WILL** occur

POSTURE

There are three natural curves present in a healthy spine.

- The top **cervical** area is curved forward.
- The middle **thoracic** area is curved backwards
- The lower **lumbar** area is again curved forward.



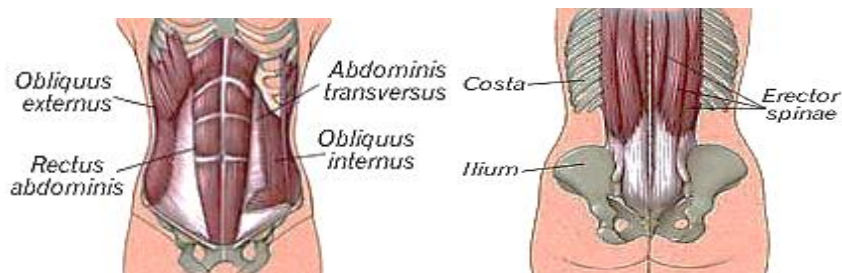
When the natural curves are maintained, it is known as neutral spine. Neutral spine is the position where the spine is most stable, balanced, and least likely to be injured.

Maintaining these natural curves of the spine distributes the load to the vertebrae evenly and reduces the chance of injury. It is important in helping to cushion the spine from the stress and strain associated with lifting.

Many injuries occur when the spine is overloaded or from repetitive overuse when the natural curves and positioning of the spine are not maintained.

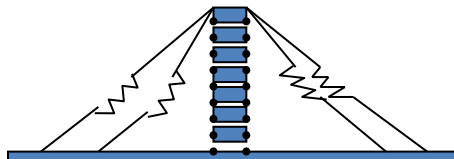
Learning how to maintain a neutral spine position helps workers to move safely during activities like sitting, walking, and lifting.

Another important part of posture is the muscles that stabilize and support the spine. To have a healthy spine, it is important to ensure the abdominal and back muscles are healthy.



These muscles act as stabilizers to the natural curves of the spine.

Without these supporting structures, the spine would collapse. They support the spine - much like guy wires support the mast of a ship.



BODY MECHANICS

Refers to:

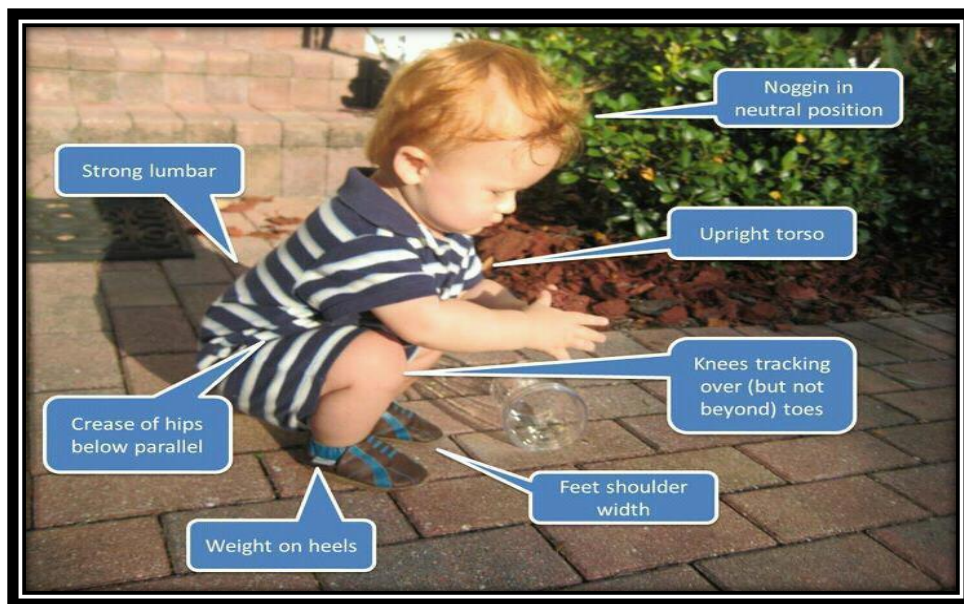
- Moving and using your body in the **best way possible** to prevent injury
- It should be part of **every** activity
- **GOOD** body mechanics takes practice and awareness
- It is most important when no other ergonomic solutions are available

Body mechanics not only applies to health care worker's jobs but also to performing tasks away from work. Body mechanics are an ergonomic solution that YOU have control over and can practice every day. Good body mechanics, while using appropriate equipment and environmental solutions, should be used at all times.

Tips for Good Body Mechanics

- **Plan Your Move** - Planning allows you to implement the most effective methods including the use of possible equipment, organization of the environment, and the best body movements. We need to consider the weight, size, and shape of a load in order to determine how to complete the task. It is important to move twice - in your head first, to ensure safety throughout the task, and second to perform the movement.
- **Use a Wide Base of Support** - Having a wide base of support and often a staggered stance is important for preventing loss of balance.
- **Keep the Load Close to Your Body** - Keeping a load close to our body reduces **torque** on the low back caused by a twisting or bending force. Torque damages ligaments, tendons and discs. Keeping the load away from your low back increases the amount of torque on your back and can lead to injury. It also makes the weight feel much heavier.
- **Bend at Hips and Knees, Not at the Waist** - Bending at the waist removes the natural curve of your lower back. It also requires spinal stabilizing muscles to act as lifters, which they are not designed to do. This places additional strain on the structures of the low back.
- **Face the Object / Client to be Moved** - Facing the object that is being moved and moving our feet to turn, reduces the stress on the low back. It allows us to continue facing the object or client throughout the move without twisting our spine. If we think about keeping our **nose between our toes**, we can keep our spine from twisting, which places our back at risk for injury. Twisting is dangerous when you are applying force to your back.
- **Lift Slowly and Follow your Head & Shoulders** - When rising during a lift, we should ensure that we lift slowly and straighten our legs while our back remains in a natural position. This will ensure that our back stays straight and does not bend during the lift. A slow and controlled rise protects our lifting muscles from injury.

- **Keep Elbows In and Thumbs Up** - One of the most important tips to protect our shoulders from injury during lifting is to keep our **elbows in and our thumbs up**. This will keep our arms close to our body and in a neutral and stabilized position. Our arms should not be reaching away from our body, as it places extra stress and strain on the shoulder joints.
- **Weight Shift Using the Lower Body** - Weight shifting allows us to move from side to side and from front to back using the big muscle groups in our legs and lower body, rather than twisting or bending our backs. It also allows us to keep our arms and elbows at our side while performing the movement with our legs. Weight shifting requires that we have a wide base of support and bent knees. We can position our feet either side to side as in a squat, or front to back as in a lunge.



There are a lot of things that we can do to improve our body mechanics. We can see from the picture above that we are able to use our bodies in these ways from a very early age. Often our movements change if we are in a hurry or we feel like we need to take a shortcut. Those shortcuts then become habits and we forget to move in a way that protects our bodies from injury.

Ultimately, we want to **maintain the natural curves of our back** and we also want to slightly contract the stomach muscles to add substantial **stability** to the back. This is something we can do when we are doing any activity. We need to reinforce good movement patterns in all of our activities. Just as an athlete practices the same motion over and over, you must also practice neutral spine and other good body mechanics.

Remember that practice makes permanent!

It's your health and your responsibility to work safely to protect it.

TAKE CARE OF YOUR BODY. IT'S THE ONLY PLACE YOU HAVE TO LIVE IN.

It affects you as the employee, your co-workers, and your clients!

HOW TO BE HEALTHY EMPLOYEES:

- Remain mindful of our body's structure and function.
- Practice good body mechanics.
- Choose safer practices, even if they take a bit longer.
- Support and promote a safe work culture for ourselves and our co-workers.

*Together leading the way for a healthier tomorrow.
Ensemble vers un avenir plus sain.*