



YOUR GUIDE TO

CORE STABILITY

MUSCULOSKELETAL

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Introduction

Please take note of the following before starting any of the exercises in this guide:

- The information contained in this guide is intended to assist in managing your recovery.
- This guide is based on the latest medical research in the field and contains, to the best of our knowledge, the best advice available.
- This guide is complimentary to other medical services and is not intended as a substitute for a health

care provider's consultation. Never disregard medical advice or delay in seeking it because of something you've read in this guide.

- Should you doubt a particular exercise in your situation, please consult your health professional.

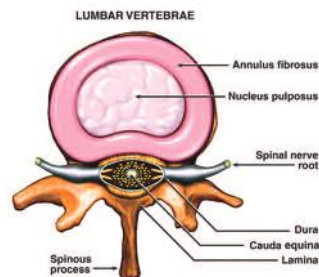
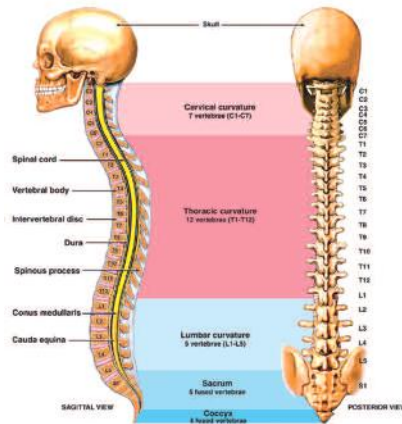
When consulting your health professional, it is wise to take this guide with you to show them.

Understanding your back

It is important to have an understanding of your back, and the way it moves and functions, especially if you are suffering from low back pain. Low back pain is not uncommon! An estimated 70-80% of individuals will experience some form of back pain during their lives. Why is back pain so common? The back bears the weight and load of the trunk and at the same time allows for movement. It is, in one way or another, involved in almost all joint movements in the body, by providing dynamic movement and stability through the core muscles. Research in recent years has shown that many people suffer from lower back pain because their core stability muscles are weak or not functioning properly. With this in mind, it is essential that we look after these muscles, to relieve pain, or just to protect the back against injury.

VERTEBRAE

The lower back is made up of 5 vertebrae, namely L1 - L5. These are larger and sturdier than the neck and upper back vertebrae, as they are designed to support a bigger load, and bear the weight of the rest of the spine. The front part of the vertebrae (vertebral body) is flat and oval-shaped to stack on top of each other. The back of the vertebrae is a triangular shape, supporting the spinal cord in the middle. The bony wings on either side are called **transverse processes** and the central **spinous process** is the bump which you can see running down your back.



INTERVERTEBRAL DISC

The intervertebral discs lie in between each vertebrae, and help to absorb shock and distribute weight. The pressure on your discs, or the load that it has to bear, will depend on the position or movement of your spine. For example, this internal disc pressure is at its least when we are lying down, but it increases significantly when you bend forward.

FACET JOINTS

The facet joints are plate-like structures that connect the vertebrae to each other. The facet joints are coated in cartilage and lubricated by synovial fluid, which enables them to slide easily on each other. They regulate and control movement, and help to prevent overstretching of the discs.

The back is designed to give us a wide range of movement. It can bend forward, backward, sideways and can rotate. Due to the range of movement available, it is at a higher risk of being injured. If one position is maintained for a prolonged period, or if the back is excessively moved in one direction, damage can occur to parts of the vertebrae.

LIGAMENTS AND TENDONS

Ligaments are strong bands of connective tissue linking bone to bone, and tendons link muscle to bone. There are small ligaments that link each vertebra in the lower back, and then larger ligaments that link many vertebrae together. Ligaments play an important role in the stability of the spine, both in movement and at rest. They cannot, however, do the job

alone, and they need the support of the surrounding muscles.

MUSCLES

There are two types of muscles, dynamic mover muscles, and smaller stabilising muscles. The smaller muscles lie deeper and closer to the vertebral column and help to stabilise the lower back. The bigger muscles move the spine in a specific direction, depending on which muscles are being used. The muscles at the back of the spine contract to move the spine backwards (a movement called extension). The trunk is moved forward (flexion) by the big muscles in the front such as the stomach (abdominal) and hip muscles. The trunk can also rotate using the abdominal muscles called the internal and external oblique muscles.

In order for the spine to function best, it has to develop a balance between being stable while allowing for any movement that is required. A stable joint is a joint that moves through a normal range of movement when subjected to a normal physical load. When an 'unstable' joint is exposed to a normal load, it will move through an abnormal, excessive range of movement, usually because the surrounding structures (such as the ligaments and muscles) are unable to restrain the movement. A healthy back is one where there is a balance between the stabilising muscles activating to protect the back from excessive and unnecessary movement, whilst the dynamic muscles are moving the trunk, or bearing a load.

What is Core Stability?



Core stability describes the muscular control required within the lower back, hip and pelvic regions to maintain safe functional movement. Just as a chain with a broken link becomes weakened, so when one of the body's parts is not acting efficiently, other systems are forced to adapt and compensate. This may result in overloading certain structures which in turn increases the risk of potential injury.

The core muscles work together to create stability in a similar fashion to that of a corset, as they provide support from the back, front, sides and pelvic floor. These muscles activate prior to a movement of the limbs and trunk (in anticipation of a load). It is important that this system be activated before movement begins, so that your lower back can remain stable while the rest of your body moves. By preventing unnecessary movement of the lower back, you are protecting the vertebral column. After suffering from low back pain, these muscles often become lazy or weak and do not activate fast enough to keep up with our movements.

The aim of core stability exercises is to reconnect with these muscles, and consciously get them to activate and work. The good news is that after a while of doing these exercises; the brain will be so used to activating

these muscles that it will become a natural reaction to movement!

The **Core** consists of a group of muscles which surround the low back-pelvic-hip complex. These muscles are deeper within the body and closer to the bone structures. The major core muscles include:

SPINAL MUSCLES

- **Erector spinae** which aid in trunk extension (backward bending) & restrict flexion (forward bending).
- **Multifidi** which stabilise small segments of the spine. It has been shown that this muscle is often deteriorated in patients with lower back pain.
- **Quadratus lumborum** act as a lateral flexor (side bending) and maintains upright posture.

STOMACH (ABDOMINAL) MUSCLES

- **Transversus abdominis** runs left to right between the hips and can be activated by drawing in the abdomen. This muscle activates prior to any limb movement, to help protect the spine from unnecessary movement. People suffering with lower back pain may have delayed activation of this muscle.
- **Internal oblique** aids to increase intra-abdominal pressure and stabilises the lower back.
- **Diaphragm** acts as the ceiling of

the core and also aids in increasing intra-abdominal pressure.

HIP MUSCLES

- **Gluteus maximus** and **gluteus medius** play an important role in walking and steadying the pelvis and trunk. It has been noted that delayed activation of these muscles can be found in individuals with weakened stability or lower back pain.

How can we train the Core?

EXERCISE

The best method of treating poor postural stabilisers is through execution of specific safe exercises on a regular basis. Individuals looking to improve their stability must avoid weighted low back extension machines, doing too many sit-ups or stretching an unstable back to end-range flexion (forward bending of the lower back) as these increase risk of injury. Avoid exercising during the first hour after awakening due to the increased pressure within spinal discs.

Core stabilisation is achieved by conscious repetitive training that will, with time, become an unconscious natural response. In other words, the more you train, the quicker your body will learn to activate these muscles naturally.

Use it or lose it! Try to activate and use these muscles throughout the day, whilst driving, washing dishes, or even sitting at your desk!

Pilates and the Alexander Technique are common ways of strengthening the core muscles, and stability of the spine. Although Yoga is often classified in these types of low impact exercise groups, it actually focuses more on flexibility, and is therefore not always a good idea for someone who cannot control their core stability muscles.

PILATES

Pilates was developed by Joseph Pilates in the early 20th Century, which focuses on controlling the core postural muscles which help keep the body in balance and protect the spine.

ALEXANDER TECHNIQUE

This is a technique of body re-education and co-ordination using both physical and psychological principles.

DIET

It is important that you maintain a healthy balanced diet in order to avoid excessive weight gain. Added weight will put increased strain on your lower back and increase risk of injury.

PHYSICAL THERAPY

If you continue to struggle with activating your core, or suffer with continued pain, physical therapy with a Physiotherapist, Osteopath or Chiropractor could be necessary. These health professionals will be able to guide you in re-activating these muscles, and strengthening your

back. They also provide other therapeutic treatments such as heat/cold treatment, soft tissue treatment, and electrical stimulation in order to reduce pain, and regain movement to enable these muscle to activate efficiently again.

Activating your core muscles... Getting started!

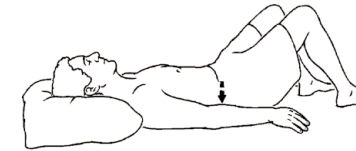
You may be given these exercises if you lack stability around the lower back or pelvic area, if you suffer with back pain, or even just as a preventative measure.

Activating these 'core' muscles can be quite tricky to start with but do not give up! The importance of activating these muscles cannot be stressed enough. The contraction should always be mild and controlled (around 50% of what you perceive as your maximum contraction). Try to do these exercises in a quiet place, where you can concentrate without distractions. When starting any new exercise, it is important that you start off slowly and easily, and progress as you improve.

STEP 1: Where is Pelvic Neutral?

We need to find our 'pelvic neutral' position, which is the most neutral position for the lower back (it is not tilted excessively in any direction). It is important to explore all your ranges of movement before we are able to find our unique 'neutral' position. This

is done by lying on your back with your knees bent, and placing your hands on the hip or pelvic bones.



1. Imagine there is a clock face attached to the front of your pelvis and looking forward.
2. Make your clock face "look upward" toward your head by tilting your pelvis so that 6 o'clock is higher than 12 o'clock. Hold, and take a couple of shallow breaths.
3. Now make your pelvic "clock face" look downward by tilting your pelvis so that 6 o'clock is below 12 o'clock. Hold and take a couple of shallow breaths.
4. Now come back to the centre of your pelvic range of movement. You should still have a small natural arch in your back (not quite enough to get your fingers under). Relax, and get the feel of pelvic neutral into your mind! The 'pelvic clock face' is now looking straight ahead. This is Pelvic Neutral! It is the middle point between your ends of range movement in each direction.

STEP 2: Let's activate!

Contracting the transverse abdominus (your core or lower stomach muscles) does take some getting used to and can seem quite complicated at first, but do not give up! Remember the corset structure - when we contract this muscle the pelvic floor, diaphragm and deep

muscles of the back automatically contract with it to support the spine. So this is a good starting point to start reactivating all these muscles.

Start off by lying on your back with knees slightly bent. Make sure that your feet are in line with your hips, and your knees are pointing towards the ceiling.

1. Find your **Pelvic Neutral**
2. Put your fingers on your pelvic bone (the bone that protrudes just by the hips), and slide them along the bone, 1-2cm towards the middle of the abdomen. The muscle we are trying to activate runs left-to-right across from one hip to the other.
3. Pull your navel in and downwards, towards your coccyx (sitting bone), pulling this muscle flat and activate! You should feel a bulge under your fingers as the muscle activates. The back should not move while you are activating this muscle, and your stomach should not hollow. All that you should feel is this muscle tightening. Remember it is a slow and mild contraction (50% of your full effort).

The same muscle is used when we cough, so this can be done to make sure that we are reproducing that contraction, and be used as a way to check that we are contracting the correct muscle. Pain when coughing and sneezing is also a common symptom in people whose core muscles have become weak.

Do not progress to the individual exercises until you get the isolated muscle contraction right; don't despair—it does take some practise!

What exercises can I do?

If you have previously experienced low back pain, exercises performed should be those which reinforce pain-reducing movements and postures. Extension (backward bending) stretches the abdominals and reduces pressure on the intervertebral disks. This should be used when this movement decreases back pain or

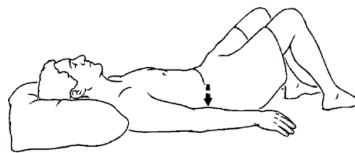
when a straight leg raise is limited and painful. Flexion (forward bending) strengthens abdominals, stretches the back muscles and decreases pressure off the nerve root. This should be used when back pain is reduced by sitting and forward bending and when extension increases pain or discomfort.

Exercises

Phase 1

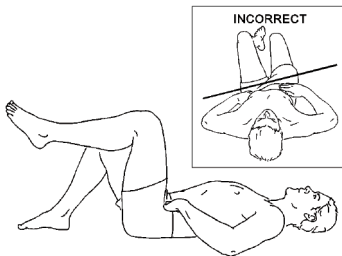
STABILITY EXERCISES

- Ensure that these exercises are done slowly and controlled.
- Hold each repetition for 5-10 seconds and repeat 5-10 times
- These exercises can be done regularly i.e. if possible a few times a day



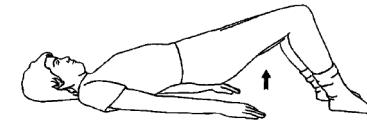
PELVIC TILT

Find your pelvic neutral, and mildly contract your **core** muscles. Then slowly tilt your hips upwards to flatten the arch in your back, and then tilt your pelvis in the opposite direction to increase the arch in your back.



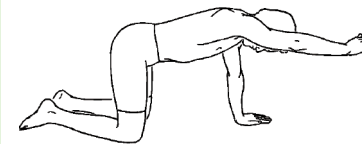
SINGLE LEG LIFT

Find the your pelvic neutral. Contract your **core** muscles without changing the position of your pelvis. Make sure you can still breathe. You should only feel a slight contraction in your core muscles. Hold for 10 seconds then raise one leg slowly up and down without moving your pelvis. Repeat on opposite leg.



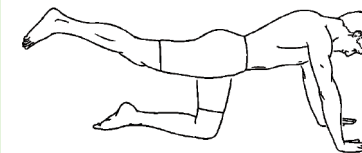
BRIDGING

Lying on your back, bend both knees to 90° with your feet flat on the floor. Tighten your **core** and lift your pelvis and lower back off the floor. Hold this contraction and then slowly lower down to the starting position, maintaining the contraction throughout the movement.



SINGLE ARM LIFT ON ALL FOURS

On all fours, hands under shoulders and knees under hips, ensure that your pelvis is in neutral (ie hips facing the ground) and your back is flat. Contract your **core** muscles lightly. Raise one arm out in front. Do not arch your neck and keep your back flat. Hold for 5-10 seconds on each side.



SINGLE LEG LIFT ON ALL FOURS

In the above position, contract your **core**, and raise one leg behind you until your leg is straight and in line with your body. Do not arch your neck or your back. Try and hold for 5-10 secs



GLUTEAL SETS

Lying on your stomach, find your neutral position and pull in your **core** muscles. At the same time squeeze your bottom ensuring not to alter your pelvic position. You can progress this by raising one leg in the air. Repeat 3x10 on each leg.

Exercises

Phase 2

Phase two should be started once you are able to perform the exercises in phase 1 **pain free** and with control (being able to hold and control your pelvic neutral and core muscles). This will probably be after a week or two of starting with this program. If you

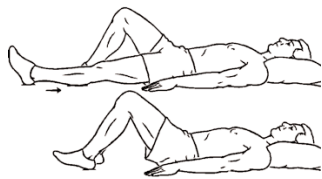
progress to phase 2 and find that you are unable to do some of the exercises, don't be afraid to use some exercises from each phase at the same time and progress **slowly as you feel comfortable**.

- Perform 2-3 sets of 10 on each side



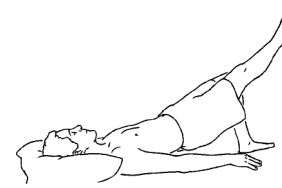
SINGLE LEG LIFT

Keep your pelvis in neutral, your **core** contracted at all times and move your one leg slowly, and controlled, with the knee bent. Repeat x 5-10



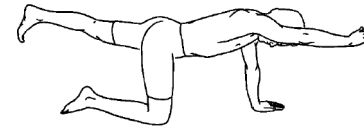
LOWER CORE STABILITY

Start in a lying position, with your **core** contracted. Now straighten both legs away from your body along the floor, maintaining neutral and ensuring movements are slow and controlled. Repeat 5-10 times (you may only be able to do one or two to start, but try and progress).



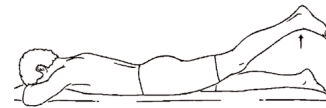
BRIDGE WITH LEG EXTENSION

Lie on your back with knees bent and feet placed onto the floor. Straighten one leg out so that it remains parallel at the height of the bent, stable leg. Activate **core** musculature and raise hips off the floor for 5 seconds. Repeat 10 times on each leg.



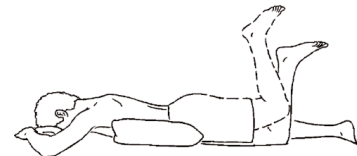
SUPERMANS (ALTERNATIVE ARM AND LEG LIFT)

In the all four position, with your **core** contracted, now raise your opposite arm and leg without moving your hips and keeping your spine in a neutral position. Do not arch your neck. Repeat x5 on each side and hold each for 5-10 seconds.



PRONE STRAIGHT LEG RAISE

In the lying position, contract your **core** without moving your pelvis. Keep both knees straight, and raise leg at hip into the air. Be careful to avoid arching low back. Repeat 2 sets of 10 reps on each side



PRONE KNEE BEND

Lying on your stomach, bend knee and slowly raise heel towards the ceiling. Maintain a neutral position in your pelvis, and keep **core** contracted throughout. Avoid arching the lower back. You should feel this in the buttock, not the back. Therefore if sore in the back contract your gluteus (Buttocks) and stomach muscles.

Exercises

Phase 3

Progress to this phase when you feel you have improved in both your **strength and control**. Again you can start with some of the Phase 3 exercises while still doing phase 2 if

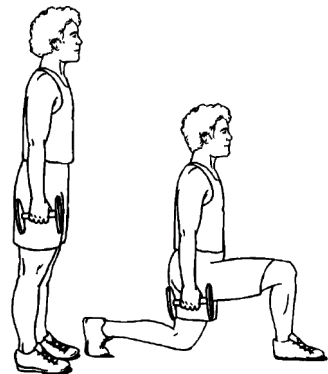
you are unable to do all of the progressions. Remember to keep your core muscles activated throughout all these exercises.

- Perform 1- 2 sets of 10 on each side, hold each one for 5 seconds



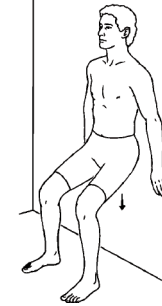
CURL UP

Keeping arms folded across chest, tilt pelvis to flatten back. Raise head and shoulders from floor. Use a ball to progress this.



LUNGES

Start with feet together and pelvis in a neutral position. Step forward into a lunge position but don't allow your back knee to touch the floor. When you lunge make sure that both knees are at a 90° angle and then return to the starting position. Keep both feet facing forwards. Try and keep a flowing movement up and down, by not holding the lunge position for too long, only 2-3 seconds. This can be progressed to walking lunges.



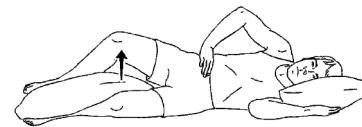
WALL SLIDES

Keep head, shoulders, and back against wall with feet out in front and slightly wider than shoulder width. Slowly lower buttocks while sliding down the wall, until thighs are parallel to floor. Keep the back flat.



PRONE SUPERMAN

Lying on your stomach, make sure your pelvis is in neutral and your stomach is contracted. Keep knee locked and lift leg 8-10 inches from floor, along with opposite arm. Ensure you don't lift your leg too high and that the exercise is pain free. Repeat 10 times each side.



OYSTER EXERCISE

Lying on your side with your knees bent and feet in line with your coccyx (sit bone), contract your core. Now allow the top leg to rise into the air as far as you can without moving your pelvis, and keeping the feet together. Hold for 10 seconds. Make sure you control the entire motion (up and down), and do not arch the back.

Contact us

This guide is designed to assist you in the self-management of your injury/condition.

We are here to assist your recovery in the shortest but safest possible time. If you have any uncertainties or queries regarding the information, please do not hesitate to contact us on:

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