

FINDING NEUTRAL SPINE POSITION

It seems everywhere you look people are talking about the benefits of being able to achieve and maintain a neutral spinal alignment.

Most exercise regimes and especially **Pilates based exercise programmes** encourage working with the spine in a neutral position.

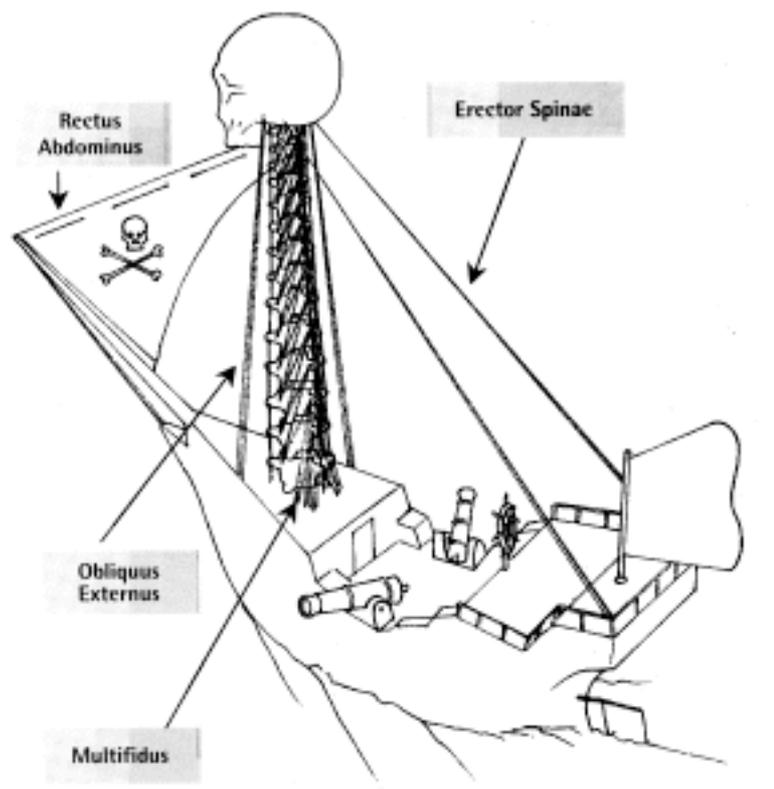
Understanding the Neutral Spine Position

There are **three natural curves in a healthy spine**.

1. The neck or *cervical spine*, curves gently inward (**lordosis**)
2. The mid back, or *thoracic spine*, is curved outward (**kyphosis**)
3. The low back, or *lumbar spine*, also curves inward (**lordosis**)

It is important to maintain the neutral alignment of these curves to assist with cushioning the spine from excessive stress or strain. Learning how to maintain a neutral spinal alignment will also help to stabilise the spine during everyday activities such as walking, sitting and lifting, not to mention your Pilates practice.

These natural curves of the spine are caused by muscles, ligaments and tendons that are connected to the vertebrae of the spine. These structures support the spine which would collapse without them. These ligaments, muscles and tendons are often compared to the guide ropes that support the mast of a ship.



Muscles Involved

The muscles involved in this balancing act are mainly the back and the abdominals. The abdominals attach to the ribs, pelvis and indirectly to the lumbar spine to offer support, whilst the muscles of the back are layered, with each layer working to balance the spine.

The Pelvic Tilt

Learning how to place the pelvis in a neutral alignment will help to balance the spine. The extensor muscles of the low back are mostly responsible for the forward tilting of the pelvis, with some help from the hip flexors. When the pelvis is tilted backward it is the lower section of the abdominals that are active, if the movement is performed with force, the gluteals (buttocks) will assist.

As the pelvis rotates forward the curve of the lumbar spine increases, alternatively when a backward tilt is performed the lumbar curve is flattened. It helps to think about the rotation of the pelvis forward and backward (anteriorly and posteriorly) as a wheel that has its centre at the hip joints.

Pelvic Range of Motion

If the muscles of the low back, abdominals, hip flexors or gluteals become over active (short and tight) or under active (long and potentially weak) the pelvis will be pulled into an excessive anterior (forward) or posterior (backward) tilt.

Both of these exaggerated positions can cause changes to the structure of the spinal curves potentially causing pain as well altered movement patterns. For example it is generally accepted that when the low back (lumbar spine) has an excessive anterior tilt, the same will be seen in the cervical spine (neck) consequently, in an attempt by the body to keep the eyes in the correct alignment for clear vision the chin will jut forward creating what is called a forward head position. This chain reaction throughout the spine can cause many compensations to occur, including internal rotation of the thigh bones which will place added stress on the medial (inside) section of the knee which may in turn effect the feet, dropped arches and pronation are a potential affect.

If the pelvis is pulled into a posterior tilt the result can be a slouch or lazy posture.

How to Find your Neutral Spine

Simply, explained a **neutral spine alignment** is when the pelvis is balanced between the two exaggerated anterior and posterior positions. To become familiar with this position in your own body **begin by standing sideways in front of a mirror:**

- Place your hands on top of your pelvis, just below your waist
- Soften your knees and roll your pelvis forward and towards the floor

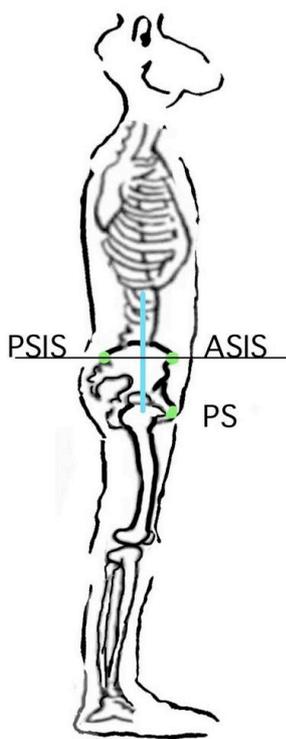
- Now slowly roll your pelvis backward dropping your tailbone to the floor

Notice the range of movement that you have in each direction, it may be that you have a larger “tilt” to either the front or the back, this is quite common.

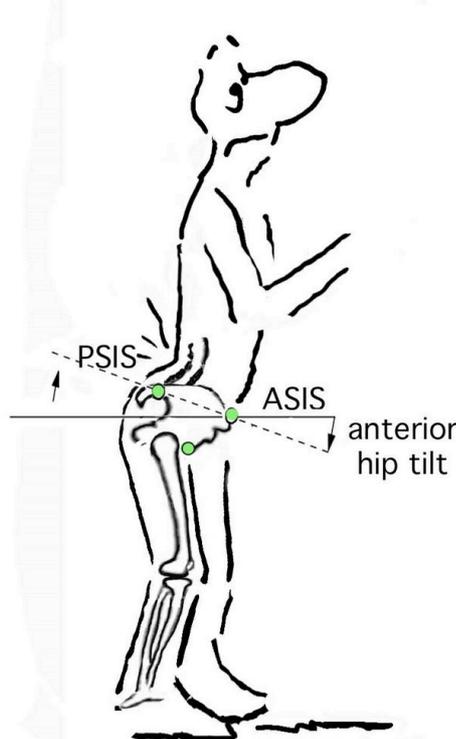
- Find the place where your pelvis is half way between the two extremes
- Pay attention to the “feel” of this position

This is your neutral lumbar spine today. It is necessary to note that this position may alter as you change your movement patterns with exercise or if you begin to add any kind of repetitive behavior to your normal routine. This could be work related, a new hobby or sport.

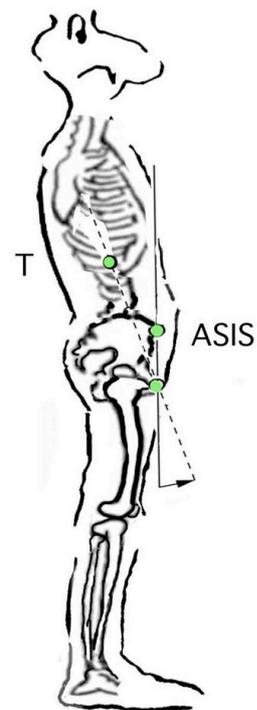
It may take some time to become confident that you have achieved your neutral alignment, When the pelvis is in neutral the bones at the top of the pelvis back and front, the Anterior Superior Iliac Spine (ASIS) and the Posterior Superior Iliac Spine (PSIS) are level.



Neutral spine



Anterior hip tilt



Level hip, thoracic lean

You may find it easier to think about neutral alignment being when the Pubic Symphysis (PS) is in line with the ASIS when you are laying in supine (on your back).

So Why Does It Matter?

Research suggests that many problems with the back result from a combination of poor posture and body mechanics which create abnormal stress on the spine. This stress can eventually develop into structural changes in the spine which manifest as disc and joint degeneration, shortening or lengthening of support ligaments and muscles together with wear and tear on cartilage. All of these changes can lead to pain.

The key elements to keeping your spine healthy are:

1. Learning and practicing good posture
2. Using good body mechanics during everyday activities
3. Regular exercise

Posture

The basis of effective back care begins with good posture. Poor posture can cause spinal pain as well as exacerbate existing pain, it can also delay rehabilitation. Poor posture has been associated with chronic headaches, Temporomandibular Joint Disorder (TMJ) and shoulder pain.

Lifestyle Effects Posture

Often people spend many hours during their daily activities lifting, bending forward and sitting. Consider your lifestyle, how many times during the day do you compromise your spine when lifting, bending, or sitting at your computer.

If you can master maintaining a neutral spine, retaining the three natural curves of the spine as you move from one position to the next you will be closer to protecting your spine from unnecessary stress and strain.

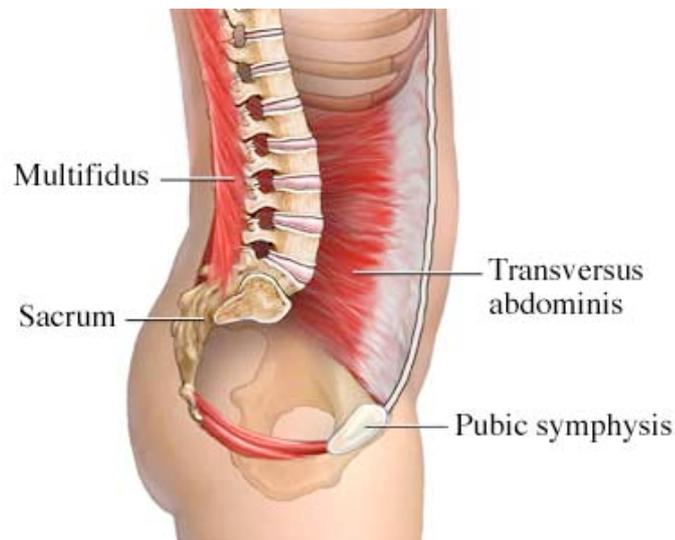
Neutral Spine - Only Part Of The Answer

It is obvious that once the spine is placed in a neutral position it needs to be kept there and it is the **postural muscles** that achieve this.

Postural Muscles

The muscles that hold the spine in correct alignment are found deep in the body close to the spine and are referred to as **stabilisers** naturally, because that is their function, to help stabilise the spine in readiness for activity.

These **deep abdominals** respond most effectively to a gentle contraction and together with a neutral pelvic alignment and a lateral thoracic (wide and full) breathe create the correct intra-abdominal pressure to assist with spinal stability. (Richardson et al 1996, Queensland University). Another good reason to locate and activate them.



The Core

The **deep abdominals** or **postural muscles** are also commonly called **the core**. The core, simply, are the muscles that connect your lower body to your upper body, it is made up of four major muscles:

1. The Transversus Abdominis (TA)
2. The Pelvic Floor
3. The Diaphragm
4. The Multifidus

The Transversus Abdominis

The TA is the body's natural corset. It's the muscle you use to pull in your tummy when you walk along the beach!

The T.A. connects at the left of the spine, wraps around the abdomen attaching to the ribs and hips, until it reaches the right side, encasing the internal organs. The more superficial abdominal muscles that give you a six pack are layered on top of these support muscles. However if you want those washboard abs., to stay flat you will need to work your core as well as trim the fat and work the more aesthetic muscles.

Of course another important function of the TA is to assist with spinal stability which is essential for good posture.

The Pelvic Floor

You will have located and used your PF when you have been in need of a toilet and can't find one. You will also be aware of them when you cough or sneeze as they tend to tense spontaneously under this pressure.

Unfortunately people generally do not pay enough attention to these important muscles. The PF is the structure, not unlike a basket that hold in and support your abdominal organs, stabilise the hips in association with the core and helps with balance as well as reducing the risk of stress incontinence.

The Diaphragm

The Diaphragm is a sheet of muscle that works with the muscles of the ribs to expand and contract the ribcage during respiration (breathing). We do not often take control of the Diaphragm. The way we control our diaphragm is usually through breathing; rate, rhythm and depth, you don't focus on the diaphragm but the inhale and exhale. The stronger we make the diaphragm, however, the deeper, slower and more paced our breathing will be.

The Multifidus

The Multifidus runs the length of the spine, it has a unique design which provides support as well as keeping us upright by providing scaffolding for the vertebral column. Researchers for the National Institute of Health found short stiff muscles packed in a finger-like covering; it is this particular design that is responsible for the extra strength and support the Multifidus gives the spine.

Unlike most muscles when the multifidus is on stretch, (when we bend forward) it gets stronger. Generally if a muscles is lengthened it has a tendency to lose strength. Obviously the Multifidus is operating under different rules.

"Our research shows that it's the strongest muscle in the back because of its unique design," states Richard L. Lieber, PhD. Lieber is the director of the National Center for Skeletal Muscle Rehabilitation Research, a professor and Vice Chair at UCSD's Department of Orthopedic Surgery, and a senior research scientist at the VA in San Diego.

It is clear from the information above that learning to utilise the core to initiate movement whilst in a neutral pelvic alignment will not only reduce your risk of injury and low back pain but go a long way towards improving your general posture.

Putting It Into Practice.

You now have all this information and are convinced of the value of neutral spine, using your core and breathing properly, so how can you use it?

Exercise

When you are participating in your sport of choice, or exercise class, initiate all movement by using this simple system:

- Set the bones - Neutral Pelvis
- Engage the muscles - Core
- Breathe - wide and full

Once you have initiated this set up you are ready to add the more superficial muscles that will move your body into action.

The muscles of the core only need a mild contraction to become activated and function effectively (Richardson et al 1996) much like a light switch, they are either on or off. Once they are on you can confidently use the large muscles for the action phase of a movement now that you have stabilised the spine and reduced the effects of stress on the spine from the activity.

Test Exercise

- Lay on your back on a mat or towel with your knees bent and feet hip width apart.
- Allow your complete spine to “let go” of tension
- Roll your pelvis backward and forward to find the range of movement
- Place your pelvis half way between the two extremes (neutral alignment)
- Exhale and gently draw your naval inward
- “gently” if level 1 is no contraction and 10 is the maximum draw into level 3
- Try to maintain this alignment with a gentle contraction whilst you slide your right foot along the ground, keep this a **closed chain activity**, with your foot always in contact with the floor
- Only slide your foot as far forward as you can maintain the neutral spine, level 3 contraction of the core whilst you breathe naturally.

Repeat the movement up to 5 times on the right foot, then change to the left. This simple test of challenging your ability to move your limbs whilst maintaining the set up will demonstrate to you the subtlety of the action.

I recommend that until you are satisfied that you have your neutral set up and can maintain minimal involvement of the superficial abdominal muscles when working with low load (sliding the foot) you do not complicate matters by practicing more challenging abdominal exercises.

The purpose of first working in such a non challenging manner is to fully understand the “feeling” of the core connection. Once you are confident then of course you will utilise this foundation stabilising activation to be the foundation all abdominal exercises.

Use the neutral set up as the start and finish of a movement; throughout the activity you will ensure the deep abdominals remain engaged so that all abdominal exercises are effective.

Day to Day Activity

Of course you do not spend all your time exercising, throughout your day you will need to think about the value of stabilising your spine. Picking up your child for example, or taking luggage from the boot of the car require your deep abdominals to be stable before you complete the lift.

The most stress is placed on the spine when it is flexed (bent forward) and loaded (lifting). Reduce your risk of injury and take a second to activate your core when necessary.

Briefly, **good posture is awareness and persistence**. Poor posture takes a lifetime to manifest and will take time and effort to rectify. However, **perfect practice makes perfect** , soon you will find your neutral alignment to be “natural”.

The benefits are not only **reduced risk of injury and reduction of low back pain**, but a lengthened body appears slimmer and good posture can take 10 years off your age. So what are you waiting for? Start today.

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About Nuala Coombs. With over 25 years experience in the fitness and Pilates industry Nuala has taught hundreds of students worldwide to teach Pilates. She is the author of Golf and Pilates published in 2005 as well as an international presenter and teacher trainer. Based in the south of France along with teacher training and workshops she offers career guidance to teachers in training and qualified Pilates teachers at a crossroads in their working life. Nuala also offer Pilates Retreats for Pilates enthusiasts. Contact her to sign up for her **free monthly Newsletter** at www.thepilatesconsultant.com. email: info@thepilatesconsultant.com