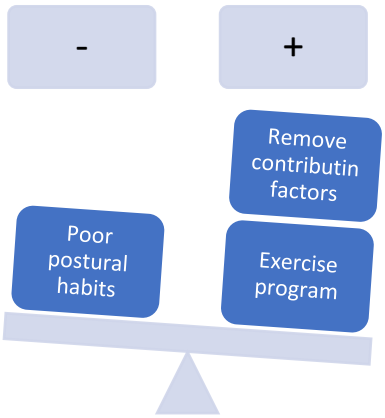
THE POSTERIOR CHAIN - POSTURE

Posture refers to the relationship between the many joints of our body and varies considerably for person to person. There are many factors that influence posture and therefore affect optimal alignment which can lead to poor movement, poor performance and ultimately pain. Identifying the reason why you have poor posture is the first step in correcting it; then you can work out how to remove those factors and implement a training program to improve your posture. This will involve specific stretching exercises alongside strengthening work.



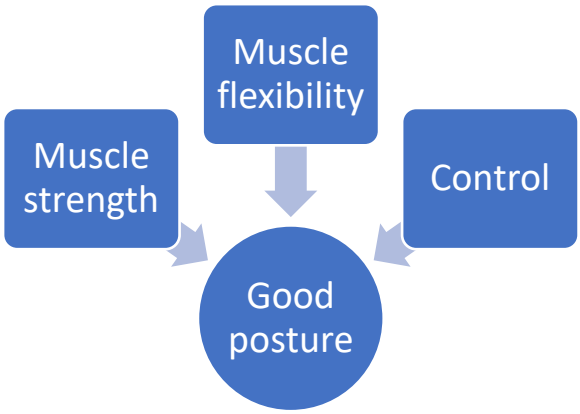
Poor posture or faulty alignment of the body segments results in undue stress and strain on the joints and other soft tissue of the body (ligaments, muscle and tendons, connective tissue etc) and is often as a result of muscle imbalances. Muscle tissue adapts relatively quickly to activities that we perform regularly and so play a vital role in our posture at rest and through movement.

How can Physio help?

The assessment of your posture by a physio provides vital clues to how your body has adapted to the activities you do regularly and if you are in pain, it is very important that you seek help from a qualified physio early. When we are in pain, our body compensates to offload injured tissue. This often becomes habitual and persists long after the original injury has healed. Therefore, previous injuries can affect your performance, posture and stress on your body and should be considered when seeking the cause of poor postures.

The identification of tight or shortened muscles and weak muscles (those that have been stretched as a result of poor posture or not used effectively) will help with reducing undue joint stress on your joints and restore optimal alignment. However, the story does not finish there! In order to fully correct poor posture, we need to retrain the muscles of the body to move as they are intended. This involves performing whole body movement patterns and is largely dependent upon retraining the central nervous system in order to restore good posture. This will ultimately lead to muscle tissue that is capable of activating to provide joint stability and alignment when required as well as perform more demanding tasks as part of a team of muscles – this is often referred to as a

myofascial sling or chain); muscle tissue will also relearn the ability to lengthen or relax in order to allow joints to move through their full range of mobility.



The posterior chain

Can you bend down and touch your toes without bending at the knees?

In order to achieve this, we need to have good flexibility of the muscle and other soft tissue that form the posterior chain. The posterior chain is a group of muscles and soft tissue (including ligaments and fascia) that works as a functional unit to maintain our posture and allow us to bend forwards. It therefore needs to be both mobile and strong. Working its way upwards, the posterior chain runs under the foot, up the back of the leg, across the pelvis and up the spine towards the head.

The posterior chain starts at with the plantar fascia which is a taught band or ligament running along the length of the underside of the foot and is responsible for the optimal functioning of the foot. It is often a source of pain and if not functioning properly can also lead to recurrent calf strains, hamstring injury and low back pain. Often, soft tissue massage of the plantar fascia can release the tension in the posterior chain and increase your range of movement in the lower limb and into trunk flexion.

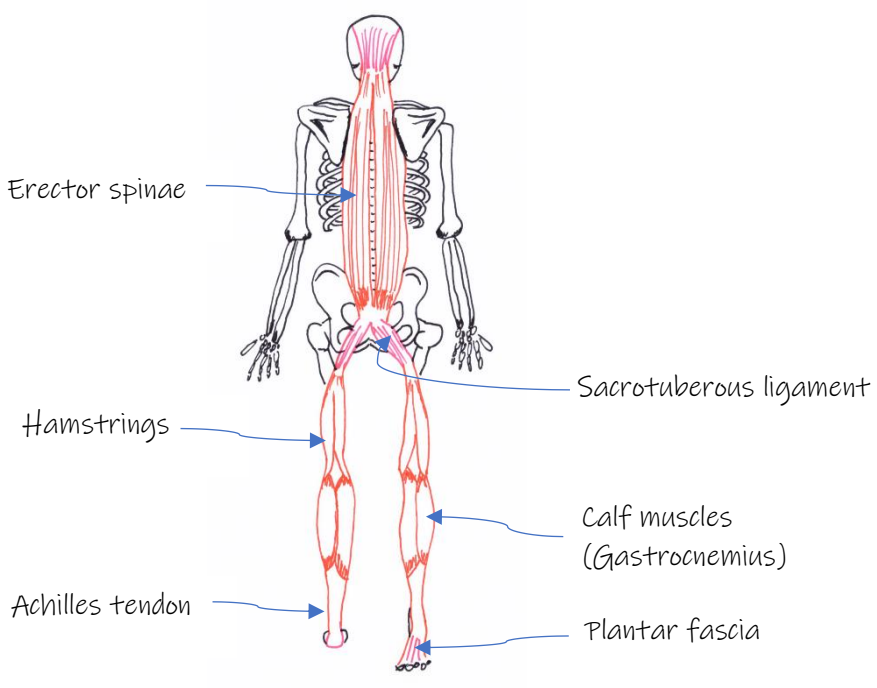
Have a go...

Bend forwards to touch your toes and note how far you can reach down your leg. Now, spend 5 minutes rolling a golf ball or similar object under your foot. Ensure to reach every part of the underside of the foot. Now have another go at reaching forwards and note the increased range of movement. You will now have to do the other side to even yourself up!

The posterior chain then travels upwards over the heel and takes the form of the **Achilles tendon** and calf muscles. Tightness in this area can often result in Achilles tendon pain, foot pain and also hamstring overload and low back dysfunction. The **Gastrocnemius** (the largest of the calf muscles) travels over the knee joint and inserts into the femur (thigh bone). Therefore, in order to effectively stretch the Gastocnemius, we must have our knee fully extended. Bending the knee will reduce tension in the muscle and this is why you feel less stretch in the posterior chain when bending forwards with bent knees. The **hamstring muscles** overlap with the Gastrocnemius muscle (starting their upward journey from below the knee and finishing on the ischial tuberosity (a bony landmark

on the pelvis that makes contact with the chair when you sit). Therefore, the hamstrings operate over two joints (flexing the knee and extending the hip) making the hamstrings more vulnerable to injury. To effectively stretch the hamstring muscles; we need to have the knees near full extension and flexion at the hip: The hip hinge exercise (see level 2 strengthening below) addresses Hamstring flexibility very well whilst also ensuring adequate loading in order to maintain strength through their full range.

From the ischial tuberosity the posterior chain continues as the dense fibrous band called the **sacrotuberous ligament**. This is vital in the maintenance of pelvic stability and upright posture and is continuous with the sacral fascia as it continues upwards blending with the muscles that maintain our spine in an upright position - the **erector spinae**. There are several layers to this muscle which act to maintain the normal curvatures of the spine. Weakness or reduced mobility in this area can have an effect on spinal mobility, posture and spinal functioning and be a source of headaches, low back pain among many other musculoskeletal conditions.



Exercises to strengthen the posterior chain

Here I am going to show you some low-level exercises to activate the posterior chain and then introduce some progressively harder exercises targeting these muscles.

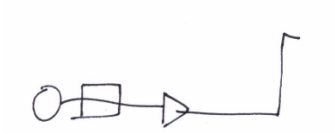
Posterior chain awareness - Forwards lean

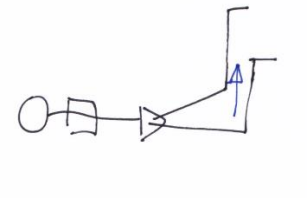
Stand tall and without bending your body, lean slightly forwards. You will feel that you want to curl your toes to grip the floor. Try to resist this and feel the muscles in the foot and calf start to work harder. You will also notice increased tension in your hamstrings and back muscles. To challenge this further, take your hands forwards and hold them out in front of you. This will shift your centre of mass forwards and further activate the posterior chain.

DISCUSS EXERCISE SEECTION WITH YOUR PHYSIO BEFORE COMMENCING REHABILITATION

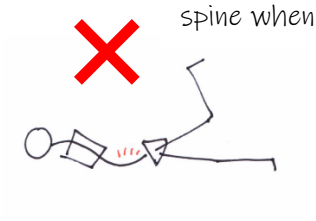
POSTERIOR CHAIN STRENGTH EXERCISES

Level 1

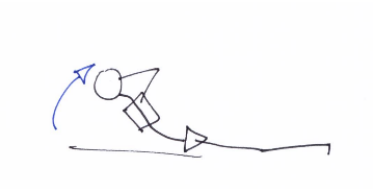




DO NOT bend at the lumbar spine when lifting the leg up

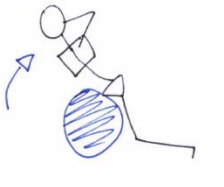


Prone hip extension



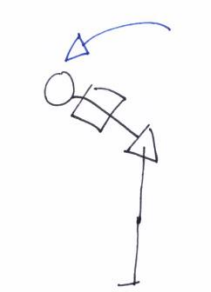
Prone dorsal raise

Progress with hands behind head.

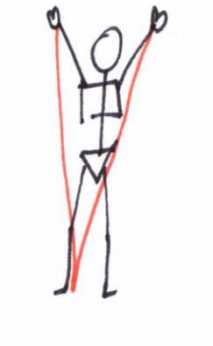


Progress over physio ball

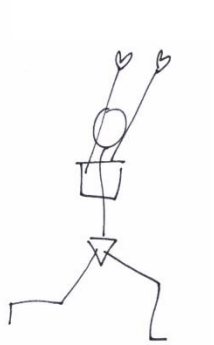
Level 2



Hip hinge

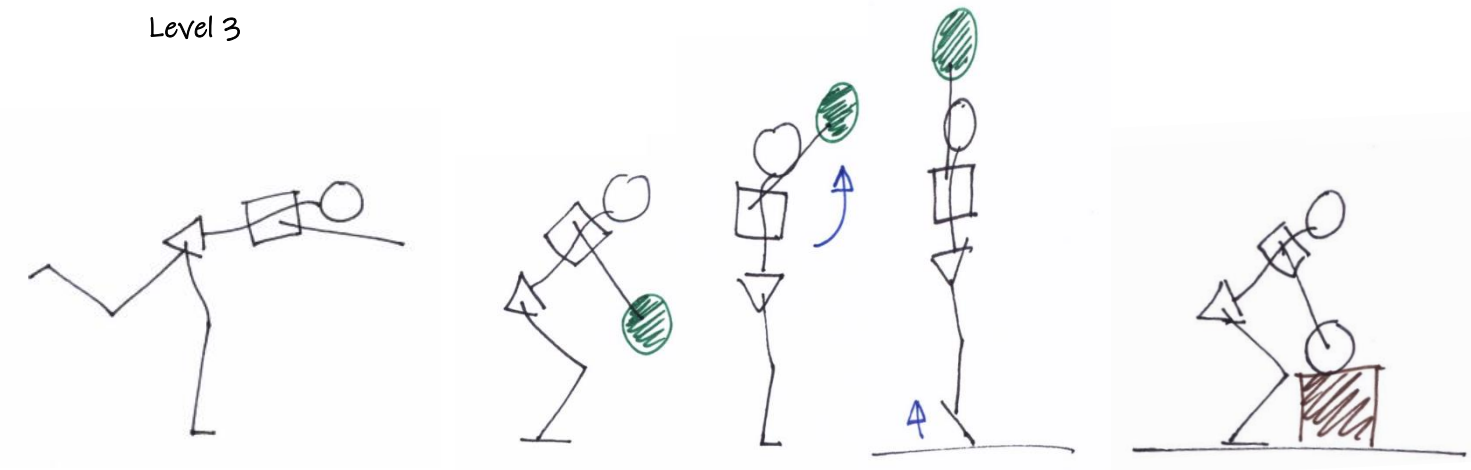


Y raise



Y raise in step standing

Level 3

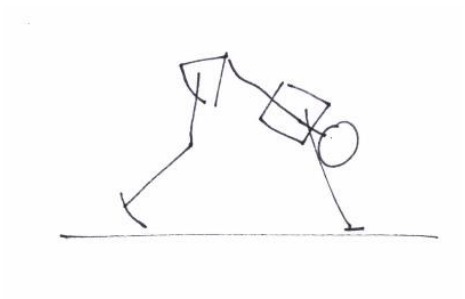


Arabesque + reach

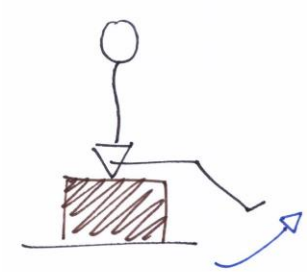
Med ball opening arc

Dead lift – start with a platform.

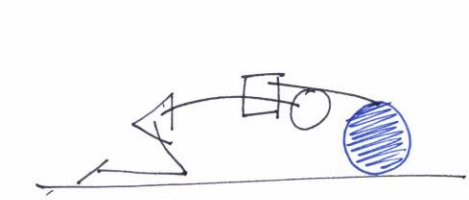
POSTERIOR CHAIN STRETCHING EXERCISES



Downward dog

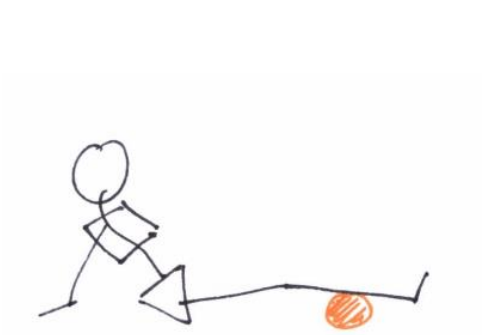


Hamstring stretching



Lumbar flexion with side flexion using gym ball in kneeling

SELF MYOFASCIAL RELEASE



Hamstring

Golf ball on Plantar fascia