

# Lower limb injuries and sports kinesiology

By Carl Montgomery and Kerrie McFarlane

The following is a brief look at the lower limbs and some of the major injuries and how they can often be caused. Some of the injuries are

- Shin splints
- Planter fasciitis
- Ankle injuries
- Stress fractures of the feet and legs
- Patella tracking issues
- Breast stroke knee
- ITB problems/ pain
- Hip instability/pain/dysfunction
- Osteitis pubis
- Groin strains
- Pelvic instability issues
- Sacroiliac problems
- Lower back pain/stiffness

A lot of these injuries stem from similar, and sometimes the same causes. We will look at how these are created from a mechanical point of view first.

From here we must then work from a neutral spinal posture in the skeletal system, and add then the muscles corresponding to the major problems.

In today's world of lack of walking and general exercise of a non-structured nature, we tend to develop several key postures that dramatically affect us.

Running technique, poor posture, incorrect equipment, impact, etc are all contributing factors but as to where the injury will rise in each person is a mystery.

Given time and continual exposure to these forces and skeletal tissue and other connective tissue begins to suffer, pain arises and eventually the tissues tolerance is unable to withstand the onslaught and injury arises.

One of these key postures is an anterior tilting of the pelvis, when this occurs, either one or both femurs medially rotate, this brings the knees closer together and decreases the arches of the feet. When this happens then undue stress at incorrect angles, is placed upon the skeletal system. As to what injury will occur is very individual and is difficult to judge but some of the more common ones will often surface.

The key muscles here are

- Internal and external Obliques
- Transverse Abdominus
- Iliacus and Psoas
- Quadriceps, particularly the Rectus Femoris
- Erector Spinae
- Gluteus medius, maximus and Piriformis
- Plus many smaller stabilizers and neutralizers of these areas.
- Hamstrings
- Gastrocnemius
- Soleus
- Tibialis Anterior
- Planter fascia of the feet
- Popliteus
- Peroneal

Once the pelvis is tilted too far forward and the femur medially rotate, we see a drop in one and more often both of the arches of the feet. When this happen we have several issues arising already.

One is, the longitudinal arch of the foot beginning at the ball of the foot to the heel is lengthened and drops the arch through the mechanics of the ankle rolling in. This places this fascia in a stretched position, long term irritation can begin and dropped arched are seen. This can create plantar fasciitis as the fascia of the foot is stretched and strained causing irritation of the tissue then resulting in the onset of pain.

Inversion of the foot is often treated with orthotics as a cause but in reality most people with this symptom do not need the orthotics as the problem stem from higher in the kinetic chain, namely the pelvic mechanism.

Patella tracking is also often affected with the same pelvic alterations. Once the knee is rotated inward, remembering the patella is suspended in an envelope of tissue that connects between the tibia and just below the ASIS, commonly known as the Rectus Femoris, part of the quadriceps.

It is commonly believed that this symptom is because the Vastus Medialis (VMO) is weak, not entirely true. The femur rotates medial or lateral. The origin and insertion remain the same but the patella's groove is shifted either medial or lateral, the muscle tries to pull straight between the origin and insertion, but the patella is held in the groove. This pulls the patella to one side and over time irritates the patella gliding surface, creating pain. So the tracking problem most often stems again from the hip/pelvic mechanism being faulty.

The major muscle that must resist and control this is the gluteus medius, when this fails often the Piriformis must try to do the work, if the person has either one or both of the sciatic nerves that pierce the Piriformis muscle, the Piriformis must do the work of the gluteus medius then it clamps down on the sciatic nerve on the side that has failed and sciatica presents, again a symptom of a dysfunctional pelvic mechanism as a whole.

The muscles that aid in the medial rotation of the femur and exacerbate the problem are the Psoas, then Iliacus, and the Rectus Femoris can influence this as well. Included is the Erector Spinae through anteriorly tilting the pelvis through excessive tension upon the lower spine/pelvic region of the back.

Many of these muscles can be both under facilitated and over facilitated even if they are short and tight or long and weak according to more traditional methods of assessment. This means that a tight hamstring tested using the kinesiology method of muscle testing (demonstrated in Kendall's muscle testing and function text) can show the hamstring to be either over facilitated (over active) or under facilitated (under active). This will change the treatment and outcome dramatically as it will require differing treatment procedures for the short and long-term recovery.

Many injuries are created through the bilateral movement of the pelvis as we can see, but a more insidious version is when the pelvis is twisted, this is known as a Torti pelvis. The Torti pelvis is where the pelvis is twisted from one hemi-pelvis to the other. The pubis symphysis is twisted and often destabilized as well, and one of the sacroiliac joints (SIJ) is also destabilized and is often jammed or locked not allowing free movement of the pelvic bowl.

Once this happens the pelvis is compromised and problem will arise.

If we say the right SIJ is dysfunctional and jammed, then we will see the body begin to not load that side of the body as much as the left side.

If we do a postural sway test where the client stands with one foot on each of 2 scales we should see ½ their total body weight on each leg with in a total of ½ a kg. So if they weigh 80 kg, it should read 40kg each scale. But where there is a problem they will lean towards the stronger side to avoid the pain or weakness.

Once this is recorded after 3 trials to maintain a 'norm' of data, perform a standing and sitting bend test. This ascertains whether there is a SIJ that is locked to the pelvis and not freely moving. Often you will find the side of weakness or avoidance is the side with the locked SIJ as well.

This is far more of an issue because every time there is a load placed onto the weakened side; right side in this case, there is an increased risk of injury. Often the muscles related to the support of this hip mechanism are also weakened as the nerves through the lumbar spine are inhibited or impinged through the mechanics and structures of the spine.

Now the entire skeletal, neural and muscular systems are compromised, this includes the fascial meridian/train network for the dynamic structural integral balance, so if we send this client out to exercise or work, it is very likely that they could be injured further as their stability is dramatically reduced.

If the person is a runner or runs for similar fitness/ fun or other reasons then the risk of stress fractures etc is dramatically increased as the body in no longer able to dissipate the impact forces the body is placed upon.

It doesn't really matter that much which symptom is presented, ie

1. Shin splints
2. Planter fasciitis
3. Ankle injuries
4. Stress fractures of the feet and legs
5. Patella tracking issues
6. Breast stroke's knee
7. ITB problems/ pain
8. Hip instability/pain/dysfunction
9. Osteitis pubis
10. Groin strains
11. Pelvic instability issues
12. Sacroiliac problems
13. Lower back pain/stiffness

The issue is there is a major causal problem that must be rectified.

In Sports Kinesiology, we are interested in the cause of the problem and in rectifying it and well as preventing it at a later date, we look for the underlying dysfunction on all levels, emotional, nutritional, biomechanical, chemical, muscular, neurological, energetic, etc.

Once this has been identified the treatment will address these issues on a completely individual basis to achieve maximum results in a realistic minimum of time and effort.

When the pelvis is tilted forward and there is excessive lumbar lordosis, this position is known as the lower cross syndrome. The reason for being called this is because the lower back, hip flexors and quads are all tight pulling the back and pelvis forward while the hamstrings, gluteals and lower abdominals are long and weak.

Once we have the lower cross syndrome, it will have a ripple effect to the rest of the body, a further reflection of this is the synergistic presentation of the upper cross syndrome (similar to the lower cross with short tight and long weak combinations altering the mechanics and position of the head and neck) that leads to many other problems outside this article at present.

‘Tight, short’ muscles

- Psoas
- Iliacus
- Rectus femoris
- Quadratus Lumborum
- Sacrospinalis/erector Spinae

‘Long, weak’ muscles

- Lower abdominals, Rectus Abdominus
- Internal Obliques
- External Obliques
- Hamstrings
- Gluteals (medius primarily)
- ITB/TFL

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I started working with sports and athletes many years ago, after meeting Dr Charles Krebs at a pool and talking to him I felt that kinesiology could be interesting and very useful in sport and exercise. So I enrolled in a basic course with Kerrie McFarlane and Cathy Carmuciano.

On completion of the basic EKP course I proceeded to practice on some of my athletes for lots of different issues from physical to emotional.

I then completed the advanced EKP course and from there I could perform a lot more work more accurately and far more effectively.

After having tremendous results with one of my athletes with a performance issue I began to explore a lot more of how kinesiology can be used in sport.

Now we have developed an entire new way of combining kinesiology and sports science/medicine into an extremely effective program for general health, rehabilitation, performance training, including all the normal topics encountered and dealt with through traditional kinesiology techniques.

This is the future of sports and general exercise training, rehabilitation treatment, preventative training and general health and well-being.