

## The Problem with Poor Movement Patterning

The start of any sporting season provides a great opportunity to work on an athlete's mobility, stability, strength, power and speed just to name a few attributes. But how we make these improvements and how we determine the extent of these improvements is key.

Firstly we need a baseline marker to judge where the athlete is at that current stage and also a baseline to judge all further testing. The testing battery may pick up areas of weakness that need to be improved. For example, a restriction in ankle dorsiflexion, seen tested in the picture below, may warrant attention.



Poor ankle mobility, whether due to poor joint movement or poor posterior ankle muscle and tendon length will result in abnormal movement mechanics. These altered mechanics will occur both locally at the ankle and at other joints and thus influence global movement patterns.

If the ankle joint is restricted the body will find a way to compensate. It will find a path of least resistance to produce the intended movement. Therefore an athlete with poor ankle mobility may be able to complete all their sporting activities with apparently no issues. However, long term this is unlikely to prove efficient and is more likely to produce an increased risk of injury.

As a rule of thumb with the athletes I treat, I aim to get a least 10 cm of ankle range of movement.

If we didn't screen our athletes we wouldn't know what movement deficiencies they have. If we don't know what they have how can we intervene to improve such deficiencies.

### Local problems

So we have identified a restriction in ankle mobility. Where the athlete feels this restriction is vitally important and will help identify what corrective strategies are prescribed.

Poor dorsiflexion can be the result of several factors. One reason is due to reduced length of the muscles in the back of the lower leg (gastroc/soleus/achilles complex). If they are tight, obviously they will cause a dorsiflexion restriction. These athletes will feel a restriction at the back of the ankle during dorsiflexion testing.

More common than a muscle length restriction is an ankle joint restriction. The ankle joint itself can become restricted due to a tight joint capsule and/or scar tissue and adhesions which occur within the joint. These athletes will generally feel the restriction in the front of the ankle although a small number can get posterior joint restriction that will also limit ankle dorsiflexion.

If the ankle doesn't move feel it is unlikely that force transmission through this joint will be efficient. Due to the lack of mobility the muscles of the lower leg, namely the gastroc and soleus, will not be able to lengthen through a full range of movement. This may mean that these muscles are not able to maximise the potential effects of the muscle stretch shortening cycle thus, resulting in a less efficient and weaker muscle contraction. This will lead to a detrimental performance level in any activity involving ankle movement e.g. walking, running, jumping, squatting, lunging i.e. EVERYTHING!!!

Poor mobility can also result in problems with the foot particularly the plantar fascia as this structure is directly influenced by the amount of ankle movement. Loss of movement at the ankle means less movement and flexibility with the plantar fascia where adhesions and tightness are a common occurrence.

In addition to the problems occurring local to the ankle, problems can occur up the movement chain into the knees, hips and lower backs secondary to poor ankle mobility.

### Global problems

The body is a clever system and will always try and find a way around a movement restriction. As mentioned in my previous post this is often the body's way of finding the 'path of least resistance.' So if an athlete has limited ankle mobility the body will try and find that mobility from somewhere else causing an almost ripple effect to the knees, hips and the lower back. As this happens, problems can arise in the following areas:

### **Squatting and Lunging Patterns :**

- Both are basic fundamental movement patterns. An athlete with poor dorsiflexion will compensate. With a squat they will need additional flexion to account of the flexion loss at the ankle. The hip may need to move more with could depending upon an athlete's skeletal make up and hip mobility result in an increased risk of hip impingement (femoro-acetabular impingement). If a lack of hip mobility exists it is likely that the lumbar spine will begin to flex to allow an athlete to lower their hips towards the floor whilst squatting. This is of major concern particularly when we are asking our athletes to squat with weight. Excessive lumbar flexion puts an athlete at risk of lumbar disc pathology in addition to the altered lumbo-pelvic control mechanics that will ultimately follow.

### **Knee:**

- Poor dorsiflexion will usually cause foot pronation, then knee valgus, which can lead to multiple knee injuries. Not only does this increased knee valgus promote poor muscle activation of both the quad and hip muscles it also increases the risk of serious knee injury i.e. ACL, meniscal. An inability to keep the knee and hip in a

good strong position i.e. not in valgus, is imperative for any athlete involved in sports that require cutting, turning and changes in direction/speed. Poor control at the knee and hip has been strongly correlated to such injuries.

In summary it is imperative that athletes have good ankle mobility to prevent problems both locally at the ankle and at joints elsewhere in the body. Look out for my next post looking at what corrective strategies can be employed with athletes who present with an ankle mobility restriction. In addition, I will post a few research papers which will give some more background on the ankle joint and its influence of movement mechanics.

Thanks for reading

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