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Biomechanical Assessment

A biomechanical assessment involves an examination of the lower limbs, looking at their structure, alignment, strengths and weaknesses.

The foot is a complex structure of 26 bones, 214 ligaments and 38 muscles bearing our bodyweight as we walk every day.

The assessment is not directed simply towards the feet but includes the pelvis, the legs, the knees and the relationships between them.

A biomechanical assessment can be very beneficial if you are experiencing pain in your feet, lower limbs or back, particularly if no cause has been established. A biomechanical assessment is often very helpful in understanding and directing treatment at the cause of the problem.

During a biomechanical examination, the podiatrist will start by taking a full medical history. He will also have a look at you standing normally and note the position of the feet. For example, if the feet roll in this can cause an abnormal, secondary rotation of the lower leg. This rotation of the legs can place abnormal physical stresses on the back, the hips, the knees, the ankles and the feet. Even if there is a previously diagnosed problem such as osteoarthritis, recognising that structures are subjected to high physical stresses as a result of abnormal mechanics can be very important in reducing symptoms.

The podiatrist will then ask you to sit on the couch and will examine the legs and feet. The feet themselves will be examined for any abnormal mechanics. This will include the ankle joints, the subtalar joint, which is the joint below the ankle, the mid-tarsal joint and those of the toes. The range of motion of each joint will be examined and noted. Joints that are hyper-mobile such as the subtalar joint, ankle joint and large toe joints can markedly increase symptoms.

The length of each leg is measured and any limb length difference noted.

There are many common conditions associated with abnormal mechanics:

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- **Heel pain and long arch pain** (plantar fasciitis for the long arch pain). These symptoms are commonly caused by rolling over of the foot (successive pronation). As the foot pronates the long arch is forced to stretch. This puts traction on the various structures in the area.

- **Knee pain** is also associated with excess pronation. As the foot rolls over the leg internally rotates, putting abnormal forces on the knee joint and knee cap.

- **Pain from the ball of the foot** is often associated with abnormal mechanics and can be due to corn or callous formation, or inflammation. The first metatarsal joint is often involved.

- **Back pain** can result as the pelvis is forced to tilt forward as a result of the feet rolling in and the legs internally rotating. This results in increased curvature of the lower back and tightness and stiffness of the lower back muscles.

- **Achilles tendonitis** is often associated with excess pronation and also limited motion at the ankle.

- **Shin splints** is a common term for describing pain at the front of the leg, often associated with overuse of muscles due to abnormal foot mechanics.

There are many different types of treatment following a biomechanical assessment, dependent upon the outcome. For people who have good, structural foot mechanics for example, the podiatrist may advise on the best footwear or trainers to reduce the risk of foot problems. If the assessment indicates that the mechanics are contributing or prolonging your symptoms, he may prescribe various insoles, or orthotics. Please refer to our section on ‘Orthotics’.

Very often, after a biomechanical examination and a discussion with the patient, a treatment programme is devised which may include temporary orthoses, advice regarding trainers, rest, ice, elevation. A course of ultrasound therapy may be offered, externally applied ointments such as arnica may be advised, and so on.