



# BIOMECHANICS & PODIATRIC ORTHOSES

## BIOMECHANICS

Biomechanics is the study of the interaction between the human body and its environment. It examines the forces acting upon and within the body and the effects produced by those forces.

The average person takes between 5,000 to 18,000 steps per day. This low-grade but repetitive motion can place stress on the foot, legs, pelvis and spine predisposing to pain and discomfort. If you have a low-arched (pronated) or high arched (supinated) foot then you may be more predisposed to problems. However, muscle inflexibility and weakness, footwear and activity levels can all affect function. Detailed assessment of the underlying structure and function can help to identify factors that may be causing or contributing to discomfort.

Podiatric biomechanics is the science as it relates to the lower limb, the foot and related pathologies. It involves the assessment of the structure, alignment and function of the feet and legs and their relationship to the rest of the body and the ground. Various treatment regimes are then put in place to increase functional efficiency and reduce or eliminate symptoms.

### Typical problems include:

- Postural problems which commonly include back, hip, knee, ankle and foot pain
- Heel pain
- Tendon ligament and muscle injuries
- Bone and joint problems – e.g. painful bunions
- Nerve problems – e.g. Morton's Neuroma
- Painful corns and callus
- Mobilisation/manipulation of dysfunctional joints or soft tissues

Early recognition of abnormal foot and lower limb biomechanics can often avoid injury and should always be considered in the prevention of injury. This also applies to children, where feet and walking problems may be corrected during growth.

### Treatment includes:

- Exercises to strengthen, stretch and mobilise tissues
- The prescription of orthoses - shoe inserts that correct control realign or cushion abnormalities
- Footwear advice
- Referral for further investigation

Podiatric Orthoses are devices that are worn inside the footwear and are designed to support, align or improve the function of the feet and lower limbs during gait.

There are three fundamental types of orthoses:

- A temporary device made from simple materials – economical but short lifespan
- A pre manufactured "over the counter" device which can be customised to the patient's individual requirements

A bespoke customised foot-orthotic constructed on a plaster of paris cast of the patients foot to ensure the best fit and comfort. ForbesFeet only use top class laboratories to manufacture orthoses so we would expect them to last for a minimum of 5 years, however refurbishments may be necessary

All orthoses are manufactured or modified to suit each patients individual needs. It should always be remembered that treatment with orthoses may take some months before the benefits are seen

## **Children's feet and orthoses:**

A child's foot is more flexible and mobile than an adult foot. It may appear flat because there is a fatty pad which disappears around the age of two. In fact, you may not see the arch until a child is six years old. As the child's foot grows it gradually develops into the less flexible foot of adult life. During this time badly fitting shoes can easily distort growing feet and may lead onto the foot problems suffered by many adults.

It is important to measure children's feet for new shoes and footwear, including trainers, and these should be replaced regularly in the growing years. Tight socks, babygrows and pyjamas with 'feet' may also cause the child's feet to be squashed and lead to problems later.

Orthoses are effective in the treatment of children's foot, lower limb and gait problems. The conditions often treated using foot orthoses include pigeon toed / out toe-ing gait, tripping, knock knees, poor posture, bow-leggedness, pelvic imbalances and scoliosis (excessive curvature of the spine).

Biomechanical screening is important to rule out whether or not treatment is necessary. Early treatment helps to avoid foot, knee and back problems later on in life.

Return to the prescriber of the orthoses if there are problems. Minor modifications will often alleviate most problems. If you are not happy with your orthoses it is crucial that you let us know. You may have spent a lot of money and the users of orthoses are the only ones who can raise the standard of care by ensuring that problems are reported.

## **Wearing Instructions**

### **1st Month**

Always take out the insoles which come already in your shoes. The orthoses should only be worn on a flat surface within the shoe.

DO NOT wear your orthoses in shoes that are already significantly worn on one side or the other.

Orthoses are not like ordinary shoes. Instead, they are more like putting braces on your teeth. You will usually feel soreness or pain during the initial break-in period. This is normal. In fact, it is unusual if there is no soreness or pain after the first week. Follow the wearing plan regardless.

Please be patient during the first few weeks. Do not forget that the orthoses are under your feet. Do not run, or use the orthoses during strenuous activity during these first weeks. When first starting to use the devices in sports or other strenuous activity after the initial break in period, there may be a further adjustment period again. USE WITH CAUTION.

Take your orthoses off when your feet or body are getting too sore. Wait until later in the day or the next day to put them on again. There is no rush. Follow the wearing plan if you can but change it if you must to accommodate your soreness or pain. You will adjust eventually, so don't worry.

Sensation of a lump or itching under the arch may be felt for a while. This is normal. This sensation should disappear gradually between 21-28 days. Very flat or high arched feet can take much longer (45-120 days).

One foot may feel more comfortable than the other for a while. This is also normal. Adjustments should not be necessary during the first 3 months of wearing the orthoses. A review for adjustment will be more appropriate once your complaint appears more constant and annoying past 3 months.

## **2nd and 3rd months**

Aching on your feet or other parts of your body may still be felt even after 3 months. This is normal. Remember your whole body is being affected toward a new healthier alignment so please be patient. Muscles, tendons and ligaments take a long time to adjust.

When repetitive ache continues past 3 months try the following:

Take the devices out for 3 – 5 days. The aching should reduce significantly or even disappear. Later, put the orthoses back in. The ache should come back with less intensity this time. Repeat this process as many times as necessary until your soreness goes away.

## **Wearing-in Schedule**

Day 1	15 mins – 1 hour or until sore anywhere
Day 2	15 mins – 2 hours or until sore anywhere
Days 3 to 7	2 – 4 hours or until sore anywhere
Week 2	4 – 6 hours or until sore anywhere
Week 3	6 – 8 hours or until sore anywhere
Week 4	Gradually increase the time until wearing all day