LIMB LENGTH DISCREPANCY

Differences between the lengths of the legs are called limb length discrepancies (LLD). A difference approximating 1 cm can have a profound effect on posture and function. The extent of the problem will also be determined by the activity of the patient. The difference affects the gait of a person, but disturbs the whole lower limb biomechanics and may cause pain in the lower back, hips or knees, and feet. However, in the majority of cases the difference in limb length is small and is difficult to appreciate the effect on appearance and function. In our office we see overuse syndromes (due to the asymmetric overload) with tendons, ligaments, and joints as well as differences in the length of feet. A bunion or heel spur that is difficult to completely eradicate may be attributed to LLD.

The difference in the length of limbs can be due to: Anatomical/structural: meaning one limb is actually shorter than the other due to a smaller femur (thighbone) or tibia (lower leg bone); also called true limb length discrepancy.

Functional: in which both limbs are equal in length, but the hips or lower back is uneven-making one hip higher than the other one. As a result, one limb appears shorter than the other limb, without an actual difference in the length of two. This type of length discrepancy is also called apparent limb length discrepancy.

In both cases; the greater the difference, the greater the disturbance in the normal biomechanics of the lower limbs, as the body has to alter its posture and functioning to compensate for the difference in leg length.
Cause

The most common causes include previous injury to a bone in the leg as well as scoliosis, previous surgery, and especially joint replacements. Sometimes the cause of limb length discrepancy is unknown. Conversely a limb length discrepancy can occur due to an excessively flat arch which may artificially cause a functional limb length discrepancy but more often it is the pelvis, hips, or lower back which creates a foot problem.

Symptoms

The body will try to adapt to or compensate for the difference in limbs. Generally the limb that is being forced closer to the ground causes flattening of the arch and accelerated degeneration of the joints on that limb, while the opposite side received less pressure and commonly there is a compensatory curvature of the spine. Moreover, the knee on the longer side becomes flexed. Sometimes this requires more effort walking and the “longer” limb takes more of the pressure which obviously increases the risk of development of degenerative arthritis in the hip of the longer limb. Postural changes occur as well in which the shoulders lean towards the shorter side and the spine also becomes curved sideways (functional scoliosis). It may also cause lower back pain and knee pain. Or this can occur conversely in which the curvature of the spine artificially elevates and depresses each leg in relationship to the ground.
Diagnosis

Diagnosis is difficult. Sometimes patients have a suspicion of this based upon how their shoes wear or whether a family member has noticed an odd limp or difference when walking. But most times a medical personnel will question this possibility. Physical therapists and chiropractor’s are good at detecting this problem. Once suspected, we measure this problem exactly with a radiology test including a long leg CT and standing pelvic x-ray which differentiates between a structural limb length discrepancy or functional. This x-ray sometimes captures a scoliosis.

Treatment

For minor limb length discrepancy we usually recommend a shoe lift. A lift is simply a piece of material that is placed in the shoe to elevate the extremity. For example silicone, foam, or rubber may be used which can often improve walking and running, as well as relieve any back pain that may be caused by the limb length discrepancy. This is done in 4 major ways.

1. A simple heel lift (from back of heel to arch) consisting of the exact difference once the lift is compressed
   Can be found on amazon.com or bought at our office
   Clearly adjustable heel lift (S, M, L)
   Heel Lift Self Adhesive (S, M, L)

2. A full length lift from heel to toe, without an arch support.
   Can be found on amazon.com or bought at our office

3. An orthotic (prescription arch support) with the exact “lift” built into the insert.
   The Dynamic Foot (Dr. Chanin) 303-781-5050
   Creative Technology 303-346-1906
   PTI Orthotics 303-443-9999

4. Or finally a lift can be built into the shoe within the actual sole.
   Creative Technology 303-346-1906
   Comfort Shoes, Inc. 303-220-0613
   Murray’s Shoes 303-972-8436

There are pros and cons to each one but the last option is the most visible and most expensive but works fairly well. The full length lift better supports the entire foot without changing the function and mechanics, while a simple heel lift elevates the heel without elevating the forefoot. However the first option is the most commonly chosen treatment and it is the least expensive.

For excessive discrepancies surgery may be needed to lengthen the bone permanently.