



ASSESSING BACK PAIN AND ITS RELATION WITH LEG LENGTH DISCREPANCY

Physiotherapy

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KEYWORDS

I would personally say that majority of patients who visit my clinic suffer from low back pain. Part of my initial screening is to have them stand with their back to me and I place my both hands on their iliac crest to see any pelvic obliquity (fig 2 and fig 4). Very often I do find a high side and a low side which indicates lower limb discrepancy. This discrepancy can significantly affect pelvis, sacro-iliac joint and the overall posture¹. Now one has to decide whether there is actual/true or anatomical leg length discrepancy or apparent leg length discrepancy. As these can have far reaching implications such as disorders of gait and running mechanics², postural dysfunctions, increased scoliosis, low back pain, sacro-iliac joint dysfunction, osteoarthritis of spine, hip and knee³. Even stress fractures of spine, hip and lower extremity are associated with change in leg length. The actual (true) leg length measurement is the length that is determined by use of tape, from pelvis (ASIS) to distal part of tibia (medial malleolus). The apparent leg length measurement is taken from umbilicus to medial malleolus. (fig 1). The supine to long sitting test is used to ascertain the relevance of SIJ to an apparent or true LLD. With the patient in supine position the therapist analyses the position of both the medial malleoli relatively. The patient is then asked to sit up, while keeping their legs extended and again the relative position of medial malleoli is compared. If for example there is posterior innominate present, the leg that appeared shorter in supine will now appear longer in sitting up position. If there is an anterior innominate present (common on right side), the leg that appeared longer in supine will become shorter in sitting up. If an actual true leg length discrepancy is present then true long leg will be longer in supine as well as in sitting position, so no obvious change will be observed. Leg Length Discrepancy can be of three types, First is structural LLD, which is actual (true) shortening of skeletal systems typically caused by congenital defects, trauma, surgery and disease process like osteoarthritis, tumor, Osgood schlatter disease and leg calve perthes disease. Fractured bones in children have known to grow faster for many years after healing process. This can naturally lead to a development of a longer leg. Second is functional LLD, which is development from altered biomechanics of lower body such as ankle foot over pronation or supination, pelvic obliquity and muscle imbalances as a result of Gmed and abdominals or tight adductors and hip flexors, hip or knee joint dysfunction or even poor inner core stabilisation. However if a therapist cannot ascertain a reason for the change in presenting leg length, the condition would be classified as idiopathic⁸. Kiapour et al. (2012) estimate that a LLD of as little as 0.4"(1 cm) increases the load across SIJ fivefold.

When the patient presents to the clinic, one can assume that the pain has been present for a while. Because of the natural overcompensatory mechanisms, postural muscles are held in shortened and tight position⁵. One particular lumbar spine muscle that has a natural tendency to shorten as a result of LLD is Quadratus Lumborum⁶.

It is very important when assessing your patients you should observe the position of lower limb and in particular the foot and ankle complex as the faulty foot and ankle posture can profoundly affect leg length and natural position of pelvis³. The most common asymmetrical foot position that patients present is over pronated foot (pes planus). On the contralateral side the compensatory mechanism will cause the medial arch to adopt a supinated position (tri-planar motion of plantar flexion, inversion and adduction). The compensatory mechanism changes the position of arch in an attempt to lengthen the apparent shorter leg. Excessive foot pronation caused by anatomically longer leg and subsequent supination caused in contralateral foot will in turn cause an internal rotation of lower extremity and an external rotation of the contralateral lower limb. This compensatory mechanism will then have the effect of altering the whole kinetic chain from the foot all the

way upto the occiput. Let's continue with the thought process just for a moment. The innominate rotation will naturally be coupled with LLD as a result of the compensatory mechanisms⁷. The femoral head on the long leg side forces the innominate into a superior and posteriorly rotated position. Conversely the innominate on the low femoral head side drops down and anteriorly rotates. Think about what lies between the two innominates,- the sacrum. As a result of rotations of both innominates in opposite direction due to compensation sacral torsion occurs (fig 3). The sacrum moves on oblique axis, commonly left rotation on left oblique axis and side bends to opposite side as is ruled by type 1 spinal mechanics. You will also notice that the left shoulder will be lower on the higher innominate side. This is seen in case of compensatory functional scoliosis. Also because of the higher innominate on left side, the left side QL will be shortened too. The lumbar spine side bends to longer left side and rotates to shorter leg side¹⁰.

You might also see a short "C" curve in cervical spine⁹, this will cause the scalenes, SCM, upper trapezius and possibly the levator scapulae muscles on the right side to adopt a shortened tight position. This typical adaptation of muscular imbalance will help maintain an erect head position with eyes level. The body would always want to be level no matter what and will do almost anything to accomplish this, through naturally adapting the position of the occipitoatlantal joint (OAJ) and in doing so can endure pain in order to maintain equilibrium. Common painful conditions are headaches, active trigger points, tinnitus, TMJ dysfunction, eye and facial pain.

Keypoints

The sacrum typically rotates towards long leg and side bends towards short leg. Posterior sacrum (counter nutation) has been associated with same side piriformis spasm. Anterior sacrum (counter nutation) has been associated with same side Gmed spasm. Lumbar spine typically rotates towards side of low sacral base/short leg and side bends towards the long leg.

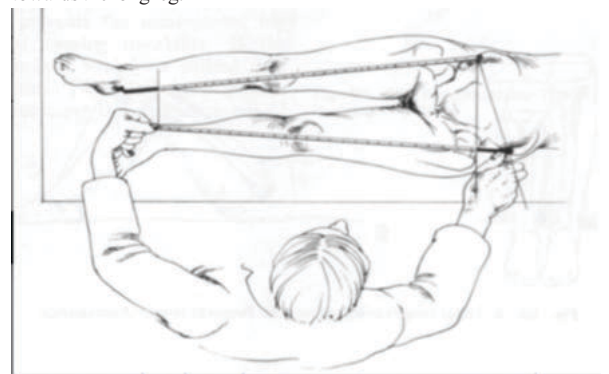


Fig 1

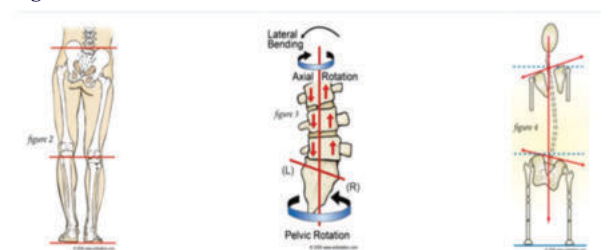


Figure 2

Figure 3

Figure 4

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