

The Iliopsoas and the Hip Vascular-Compression Theory

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Besides being related to the spine and lower extremity, a tight, shortened iliopsoas muscle can be related to hip problems, particularly to the hip's circulation and eventual degeneration. The femoral head has a unique circulation because the blood vessels that supply the epiphyseal, metaphyseal and ligamentum teres are beneath the capsule surrounding the hip. The vessels are covered by loose folds of synovial membrane, and to reach the femoral head, the vessels must travel almost the entire length of the neck between the capsule and bone.

During this long course, the vessels are exposed and relatively unprotected against increased hydrostatic pressure within the strong inelastic capsule.¹ It becomes apparent that anything which increases the pressure within the capsule will have an adverse effect and cause pain. Tightness of the hip capsule can create an increase in the intra-articular pressure. High pressure within the hip capsule creates high intra-osseous venous pressure, due to blockage of flow in the peri-articular veins, so that hemodynamic changes in the bone marrow are secondary to high pressure within the capsule.²

Oxygen tension studies have shown that when the hip is held in wide abduction, internal rotation and extension for a prolonged period of time, there is a reduction in the blood supply to the femoral head. As we age, the capsule becomes taut because of the spiral arrangement of its fibers, especially in medial rotation and extension, and fibrotic. Medial rotation, which is usually the first motion to become limited in osteoarthritis, is a position that, along with extension, causes a rise in intra-articular pressure.

The volume or space within the hip joint varies with the position of the hip. Since the hip holds a maximum amount of fluid in positions of flexion and external rotation, this is usually the relief position assumed by patients with increased intracapsular fluid, which may occur in slipped femoral epiphysis (Legg-Perthes disease in its acute stage, and suppurative and nonspecific synovitis). These patients also may show a strikingly high original pressure, even in the position of least capsular tension.¹ The capsule, which is richly innervated with pain fibers, will create pain when its stretch receptors are stimulated and may cause a protective reflex spasm of nearby muscles. In Legg-Perthes disease, slipped femoral epiphysis and synovitis, medial hip rotation is usually limited and painful.

The iliopsoas, before it inserts into the lesser tuberosity, goes over the capsule of the hip and can compress the capsule. Section of the iliopsoas tendon has been shown to create a reduction in intra-articular hip pressure,¹ thereby decompressing the capsule; and psoas tenotomy almost halved hip intra-articular pressure.²

It also has been found that the loss of medial rotation can be restored by regional anesthesia, which indicates that the loss of medial rotation may be due, at least in some cases, to reflex inhibition of the myofascial, rather than capsular contracture. In these cases, myofascial release

methods may be all that is needed to release the limited motion - not capsular release techniques as used by Mulligan, Mattes-type stretching and articular techniques aimed at freeing the capsule. In other words, a loss of hip motion (or other joints) can be related to a myofascial or joint causation, or both. Myofascial dysfunction can occur in a muscle due to restricted fascia muscle overload associated with local and distal trigger points, and has an effect on the functions of related muscles.

There will never be normal joint function if myofascial dysfunction abnormally stresses the joint; nor will there be normal myofascial function caused by joint dysfunction. Normal muscle length requires normal joint function.³ These basic principles underlie the reasoning for including soft tissue methods along with manipulation. Ferguson states that to create absolute lengthening of the psoas, it is necessary to normalize femoral/acetabular (F/A) dysfunction, just as normal F/A function will depend on a fully lengthened psoas.³ In your next hip case, if the hip flexors, adductors or rectus femoris test weak, think not only of lumbar-root pressure, but also of joint or myofascial dysfunction causing a reflex inhibition of the muscles.

References

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