Dynamic Chiropractic

CHIROPRACTIC TECHNIQUES

Functional Evaluation of the Hips, Part 1

Jeffrey Tucker, DC, DACRB

This article explains the importance and purpose of measuring medial and lateral rotation of the hips with the patient in the prone position. Insufficient hip rotation control can cause local hip pain, a pain-producing compensation in the lumbopelvic region or the knees. The ideal range of medial hip rotation motion is approximately 35 degrees (without pelvic rotation). The ideal range of lateral hip rotation is approximately 35 degrees from neutral without pelvic motion.[1]

I am not as interested in the exact number of degrees of rotation as I am interested in testing for excessive or decreased degrees of the range of rotation. In Shirley Sahrmann's book *Diagnosis and Treatment of Movement Impairment Syndromes,* she notes less than 30 degrees of lateral or medial rotation is movement impairment. I am also looking for symmetry or asymmetry of these movements. Evaluating excessive motion and/or decreased range of movement will provide information about the quality of movement at the hips. This is sometimes referred to as neuromotor control or movement coordination.

This evaluation will add another piece of the puzzle to understanding the biomechanics of the lower extremities during physical activities such as gait. It has been my experience that altered movement patterns in the hips may result in alterations of the load distribution across the patellofemoral joint[2,3,4] and lumbosacral region,[5] causing pain and dysfunction in these areas.

Gathering information about movements is part of a functional examination. Poor quality or altered movement patterns are usually more easily detected when we break down a component of the overall movement (e.g., gait). Recognizing poor hip rotation in the prone position may be easier than recognizing a faulty gait pattern during physical activities. Measuring the hips in a supine position with the hips flexed 90 degrees does not seem as functional as measuring the hips in a prone position with the knees together.

Procedure

The patient should be in the prone position on a flat table. Stand to the contralateral side of the table, to the side of the hip being examined (stand on the left side of the patient while testing the right hip). Grasp the patient's foot and passively bend (flex) the knee to 90 degrees. Make sure the knees are together and the thigh is in the neutral position. Slowly move the foot away from you, causing medial rotation of the hip. Evaluate how far the hip moves without moving the pelvis. Is it more than 35 degrees? Is it less than 30-35 degrees? Slowly move the foot toward your body, producing lateral rotation of the hip. Is it more than 35 degrees? Is it less than 30-35 degrees?

Interpretation

Excessive medial rotation of the hip (common): This indicates poor stability (ability to maintain a stabile core and move the extremities) function or excessive length of the hip joint capsule and the lateral rotator stability muscles, posterior gluteus medius and intrinsic hip lateral rotators (piriformis, gemellus superior, obturator internus, gemellus inferior, obturator externus, quadratus femoris).

The gluteus medius arise from the outer surface of the ilium, anterior to the TFL. The muscle converges to form a tendon that attaches to the lateral surface of the greater trochanter. The gluteus medius has fibers that attach forward and posterior of the greater trochanter. The posterior border of the gluteus medius may blend with the piriformis. Together with the glute minimus, the glute medius abducts and medially rotates the hip joint.

Therefore, if the G med is not firing properly, there will be excessive medial rotation at the hip. The glute minimus and medius are fundamental in keeping the trunk in an upright position when the contralateral foot is raised during walking. The hip joint capsule surrounds the acetabulum and neck of the femur. A number of ligament bands help keep the femur and acetabulum in check. The capsule can get tight or become loose.

Excessive lateral rotation of the hip: This indicates either poor stability function or excessive length of the medial rotator stability muscles (anterior gluteus medius and minimus).

Decreased lateral rotation of the hip (common): This includes shortening of capsule and shortening of myofascial structures (TFL/ITB). To differentiate between capsule or TFL, examine the end feel. Take the leg into abduction by 1 inch and if decreased restriction occurs, the TFL/ITB is limiting the movement. If there is no change, the capsule is causing the decreased lateral rotation.

The tensor fascia lata arises from the anterior part of the outer lip of the iliac crest, the lateral aspect of the anterior superior iliac spine and the upper part of the anterior border of the iliac wing. You should keep in mind that in addition to arising from the iliac crest, the iliotibial band (ITB) attaches into the posterior gluteus maximus muscle in the back. The gluteus maximus through the ITB also attaches on the tibia distally.

This is an important point to remember because the TFL/ITB muscle is producing movement of both the proximal and distal aspects of the thigh, which reinforces the maintenance of a relatively constant position of the femoral head in the acetabulum during hip extension. The TFL assists in the flexion, abduction and medial rotation of the hip joint and extension of the knee joint. Use specific muscle length tests to confirm myofascial shortening.

Decreased medial rotation of the hip: This includes shortening of the capsule and myofascial structures (piriformis or superficial fibers of gluteus maximus). The superficial fibers of the gluteus maximus attach proximally to four structures: the thoracolumbar fascia, the iliac crest, the sacrum and the coccyx. They travel distally to the deep part of the muscle and end in a tendinous sheet, which passes lateral to the greater trochanter and is attached to the iliotibial tract of the fascia lata. The iliotibial tract runs down the anterior lateral side of the thigh. It blends with the capsule of the knee joint to attach to Gerdy's tubercle, the lateral condyle of the tibia and the head of the fibula. Again, poor control at the hip does cause knee dysfunction.

The piriformis arises from the anterior aspect of the second to fourth segment of the sacrum between and lateral to the sacral foramina. Its tendon is attached to the upper border and medial aspect of the greater trochanter. The piriformis laterally rotates the extended hip joint and abducts the flexed hip joint. Differentiate by end feel. Assess specific muscle-length tests to confirm myofascial shortening.

When the glute maximus and piriformis are the dominant muscles producing hip extension, their proximal attachments provide more optimal control of the femur in the acetabulum than do the hamstring muscles. If the attachments of the piriformis and glute maximus muscles are overactive at the femur, they will not provide proper control of the proximal femur during hip extension.

References

1. Van Dillen LR, Sahrmann SA, Norton BJ et al. Reliability of physical examination items used for classification of patients with low back pain. *Phys Ther* 19998;78:979.
2. Brody LT, Thein JM. Nonoperative treatment for patellofemoral pain. *J Orthop Sports Phys Ther* 1998;28:336-44.
3. Witvrouw E, Lysens R, Bellemans J, Cambier D, Vanderstraeten G. Intrinsic risk factors for the development of anterior knee pain in an athletic population. A two-year prospective study. *Am J Sports Med* 2000;28:480-9.
4. Cesarelli M, Bifulco P, Bracale M. Study of the control strategy of the quadriceps muscles in anterior knee pain. *IEEE Trans Rehabil Eng* 2000;8:330-41.
5. Fredericson M, Cookingham CL, Chaudhari AM, Dowdell BC, Oestreicher N, Sahrmann SA. Hip abductor weakness in distance runners with iliotibial band syndrome. *Clin J Sport Med* 2000;10:169-75.

Part 2 of this article, which is scheduled to appear in the March 12 issue as of press time, will focus on specific corrective exercises for the hip.

JANUARY 2009