Innominates

The innominates are paired bones that join with the sacrum to create the bony pelvis. The innominates have numerous structural and dynamic functions such as transferring weight from spine to lower extremities, facilitating postural stability, and serving as a base for lower extremity locomotion. A variety of forces from muscles, ligaments, and external sources can lead to dysfunctional innominate motion. We evaluate for dysfunctional motion at two main joints, the sacroiliac (SI) joint and the pubic symphysis. The tests used to evaluate innominate dysfunction include the standing flexion test, the ASIS compression test, and the stork test. Innominate somatic dysfunctions include superior and inferior pubic shears, anterior and posterior innominate rotations, innominate upslip, innominate downslip, and innominate inflares and outflares. Evaluation and treatment of innominate somatic dysfunctions is important in the treatment of low back, pelvic, and lower extremity pain syndromes.



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Anatomy

Sacroiliac Joints

Sack-rum-island-bum

The sacroiliac (SI) joints are two diarthrodial synovial joints that connect the sacrum to the illia. The shape of the articular surface is highly variable but usually consists of an upper pole and a lower pole that form a C or L shape. The joint is surrounded by a fibrous capsule and stabilized by numerous ligaments, including sacroiliac, sacrospinous, and sacrotuberous ligaments. The SI joints are critical structures in gait and posture, as they transmit forces from the spine and upper body to the pelvis and lower extremities. SI joint inflammation (sacroiliitis) and dysfunction are a common cause of low back pain. The SI joint can be examined for somatic dysfunction by examining the sacrum and iliac bones.

Pubic Symphysis

Pubic Symphony

The pubic symphysis is a secondary cartilaginous joint that is between the superior and inferior pubic rami and united the pubic tubercles. The tubercles meet in the midline and are separated by a fibrocartilaginous disc. The joint is reinforced by four pubic ligaments. The pubic bones and pubic symphysis serve as attachment points for numerous muscles, including anterior abdominal wall muscles and medial thigh muscles.

Tests

Standing Flexion Test

Standing and Flexing

The standing flexion test is a dynamic examination technique that evaluates motion of the innominate bones and helps lateralize innominate dysfunction. The test is performed by having the examiner palpate the inferior slope of the posterior superior iliac spines (PSIS) with her thumbs. The patient then bends forward as though to touch their toes. The examiner maintains firm pressure on the PSIS, following their movement. A positive test occurs when the PSISs are unlevel at the end of range of motion. The dysfunctional innominate is indicated by the PSIS that moves more superiorly at the end of the range of motion.

ASIS Compression Test

Super Island-bum on Spine and Vice

The anterior superior iliac spine compression test (ASIS compression test) is a passive, dynamic exam technique for evaluating pelvic somatic dysfunction. The test is performed with the patient supine and the examiner palpating both ASISs. Pressure is applied through the ASIS towards the exam table. A positive test occurs when one side has more resistance to pressure. A positive ASIS compression test can indicate somatic dysfunction of the SI joint, sacrum, and/or pubic symphysis.

Stork Test

Stork

The stork test (also known as the Gillet test) is a dynamic exam technique used to evaluate iliac motion. The Stork Test is performed with the patient standing and the examiner positioned behind the patient, much like the standing flexion test. The examiner tests one side at a time. The examiner places one thumb on the ipsilateral PSIS, just like the standing flexion test. The other thumb palpates the midline of the sacral base. The patient is instructed to lift the knee and the foot on the side of the palpated PSIS. This creates about 90 degrees of hip flexion and knee flexion. A normal or negative test involves the PSIS moving inferiorly relative to the sacral base. The exam is repeated on the contralateral side. A positive test is found when the PSIS does not move inferiorly

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or moves superiorly. A positive stork test indicates dysfunctional innominate motion at the SI joint.

Diagnosis

Anterior Innominate Rotation

Anteater Inn Rotating

Innominate rotation occurs around the inferior transverse (left-right) axis of the sacrum. Innominates normally move through anterior and posterior rotation during the gait cycle, but can become dysfunctional when stuck in anterior or posterior rotation. Anterior innominate rotation occurs when the anterior aspects of the innominate move inferiorly while the posterior aspects move superiorly relative to the contralateral innominate. Examination will find the ASIS inferior and the PSIS superior on the side that is rotated anteriorly. The dysfunctional side will also have a positive lateralizing test, such as ASIS compression test or standing flexion test. Anterior innominate rotations are not typically a cause of severe pain. However, subjective complaints may include ipsilateral hamstring tightness and sciatica.

Posterior Innominate Rotation

Post-terrier Inn Rotating

Posterior innominate rotation occurs when the anterior aspects of the innominate move superiorly while the posterior aspects move inferiorly relative to the contralateral innominate. Examination will find the ASIS superior and the PSIS inferior on the side that is rotated posteriorly. The dysfunctional side will also have a positive lateralizing test, such as ASIS compression test or standing flexion test. Posterior innominate rotations are not typically a cause of severe pain. However, subjective complaints may include ipsilateral groin or inguinal pain (secondary to rectus femoris dysfunction) and medial knee pain (secondary to sartorius dysfunction).

Superior Pubic Shear

Super Pubic Shear

Pubic shears are typically vertical and are often associated with another innominate dysfunction (such as posterior rotation or upslip). The pubic symphysis is examined by palpating the superior pubic tubercles. In a superior pubic shear, the ipsilateral pubic tubercle will be more superior than the contralateral tubercle, and a lateralizing test (ASIS compression, for example) will be positive ipsilaterally. For example, an examiner finds the ASIS compression to be positive on the left. Upon checking the superior pubic tubercles, one will find the left to be superior and the right inferior. The examiner can thus diagnose a left superior pubic shear.

Inferior Pubic Shear

In-fur Pubic Shear

Pubic shears are typically vertical and are often associated with another innominate dysfunction (such as posterior rotation or upslip). The pubic symphysis is examined by palpating the superior pubic tubercles. In an inferior pubic shear, the ipsilateral pubic tubercle will be more inferior than the contralateral tubercle, and a lateralizing test (ASIS compression, for example) will be positive ipsilaterally. For example, an examiner finds the ASIS compression to be positive on the right. Upon checking the superior pubic tubercles, one will find the left to be superior and the right inferior. The examiner can thus diagnose a right inferior pubic shear.

Innominate Upslip

Inn Up-hip

The innominate upslip (also known as superior innominate shear) occurs because of superior shearing of the innominate on the SI joint. This vertical translatory motion is not part of a normal gait cycle and almost always causes symptoms, most commonly low back and/or pelvic pain. On examination, the ipsilateral PSIS, ASIS, and ischial tuberosity will all be superior relative to the contralateral innominate. The pubic tubercle may be superior as well. A lateralizing test such as the standing flexion test will be positive on the ipsilateral side. Innominate upslips are often associated with a history of trauma, such as a fall or motor vehicle accident.

Innominate Downslip

Inn Down-hip

The innominate downslip (also known as inferior innominate shear) occurs because of inferior shearing of the innominate on the SI joint. This vertical translatory motion is not part of a normal gait cycle and frequently causes symptoms of back and/or pelvic pain. On exam, the ipsilateral side will have inferior PSIS, ASIS, and ischial tuberosity. The pubic tubercle on the ipsilateral side may be inferior as well. A lateralizing test will be positive on the ipsilateral side (with the inferior landmarks). Innominate downslips are rare, partly because the traumatic forces necessary to cause downslips are unusual, and partly because downslips may gradually self-correct with walking.

Innominate Flare

Inn Flare

Innominate flares are a rare type of innominate somatic dysfunction. The innominate flare occurs when the ASIS is displaced either medially (inflare) or laterally (outflare) relative to its usual position. This can also be imagined as innominate rotation around a vertical axis. Flares can be assessed by determining which innominate is dysfunctional (e.g. ASIS compression test) and then evaluating the distance of each ASIS from midline.

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