



# motion palpation assessment of the sacroiliac joint

The sacroiliac joint (SIJ), one of the most controversial joints in the human body, is challenging to assess and treat because its motion is subtle. For this reason, a clear understanding of SIJ structure and function, and experience working with clients with SIJ conditions, are necessary for competent assessment and treatment to be performed.



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### THE SACROILIAC JOINT (SIJ)

The SIJs are paired left and right, located between the sacrum and the iliac portion of the pelvic bone on each side of the body (Figure 1). The SIJ is an unusual joint in that early in life, it is synovial, but as a person ages, because of the physical stresses placed upon it, it changes to become a fibrous joint. These physical stresses come from both directions, above and below, because the SIJ is the transitional joint that bridges the axial body above with the lower extremity appendicular body below. Whenever we are standing or sitting, weight bearing compression forces enter the joint from above; and every time our foot strikes the ground, shock waves travel up through the lower extremity and pass through the SIJ from below (Figure 2).

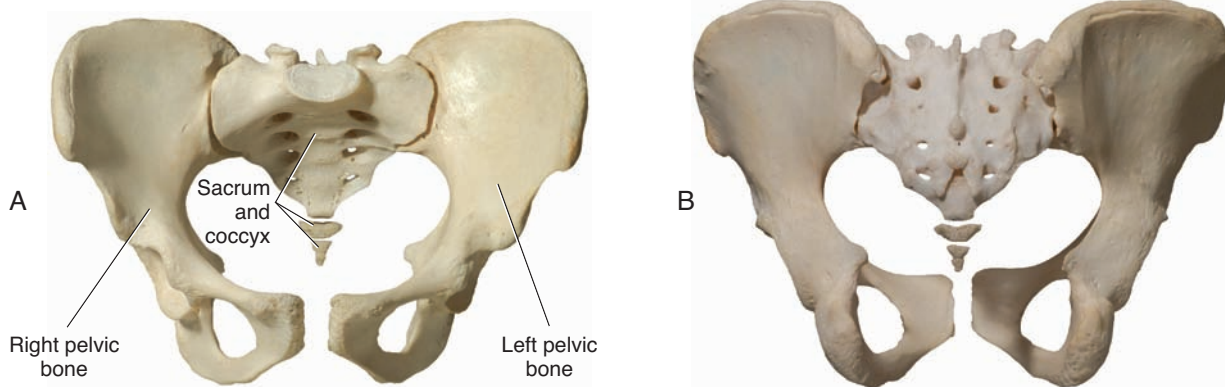
The SIJ is also unusual in that there are no muscles that attach directly from the sacrum to the ilium, crossing and providing stability (as well as motion) to only the SIJ. The piriformis does cross the joint, but it continues on to attach to the femur, also crossing the hip joint. Other muscles from the lumbar region such as the erector spinae and latissimus dorsi have fibrous attachments that span over the sacrum and iliac crest, but these fibers do not run from the sacrum to the ilium. As a result, there is little muscular stability provided to the SIJ.

To provide stability, the SIJ is heavily invested with fibrous fascial ligamentous tissue (Figure 3). Because the majority of its stability is provided by ligaments, the SIJ is described as a ligamentous joint. A consequence

of this structure is that when the SIJ is injured, the injury is often a sprain (compared to a muscular strain) in which the ligaments are overstretched or torn. This has implications for healing because ligaments do not have a good blood supply; therefore sprains generally do not heal well and therefore tend to become chronic in nature, often creating an unstable hypermobile SIJ. This tendency toward injury and hypermobility can be countered by the tendency to accumulate fibrous tissue over time within the joint, which tends to decrease mobility and create a hypomobility. One of the major keys to SIJ assessment is to assess its motion\*. This is accomplished via the assessment technique known as motion palpation assessment.

### SIJ MOTION

Before discussing the technique of SIJ motion palpation, it is helpful to examine SIJ motion. The pelvis is often looked at as moving as a fixed unit relative to either the thighs inferiorly or the spine superiorly. However, given that there are two SIJs and a pubic symphysis joint located between the bones of the pelvis, motion within the pelvis is also possible. The types of motion that occur at the SIJ are primarily sagittal plane motions and described as nutation and counternutation (Figure 4). With nutation, the base (superior end) of the sacrum moves anteriorly and inferiorly; relatively, the pelvic bone tilts posteriorly. With counternutation, the base (superior end) of the sacrum moves posteriorly and superiorly; relatively, the pelvic bone tilts anteriorly.



**FIGURE 1** The sacroiliac joints are located between the sacrum and iliac portion of the pelvic bones. **A**, Anterior view. **B**, Posterior view.

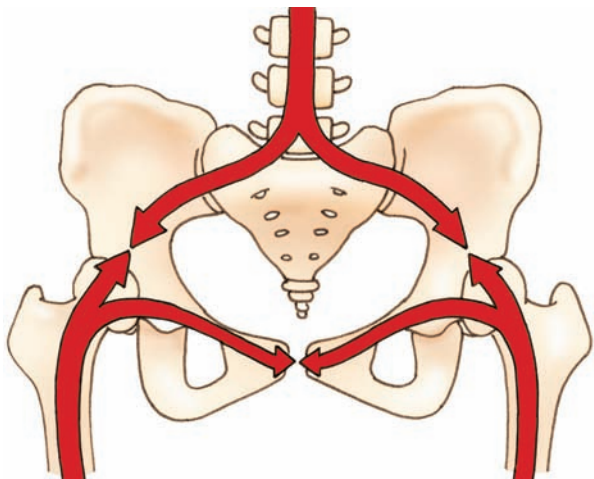
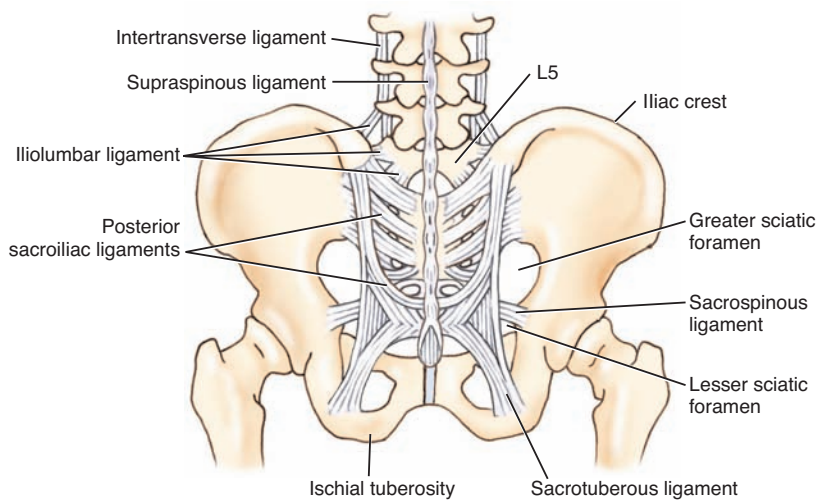
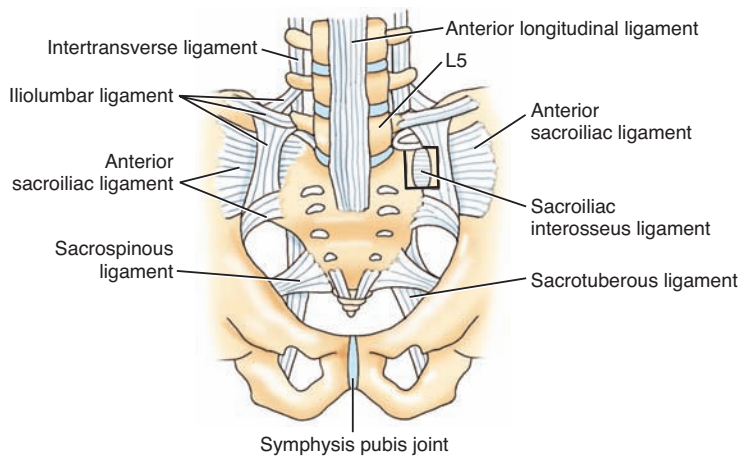


FIGURE 2 (Left)  
Physical stress enters the sacroiliac joints from above and below.

FIGURE 3 (Below)  
The sacroiliac joints are heavily ligamentous. A, Posterior view. B, Anterior view.



A



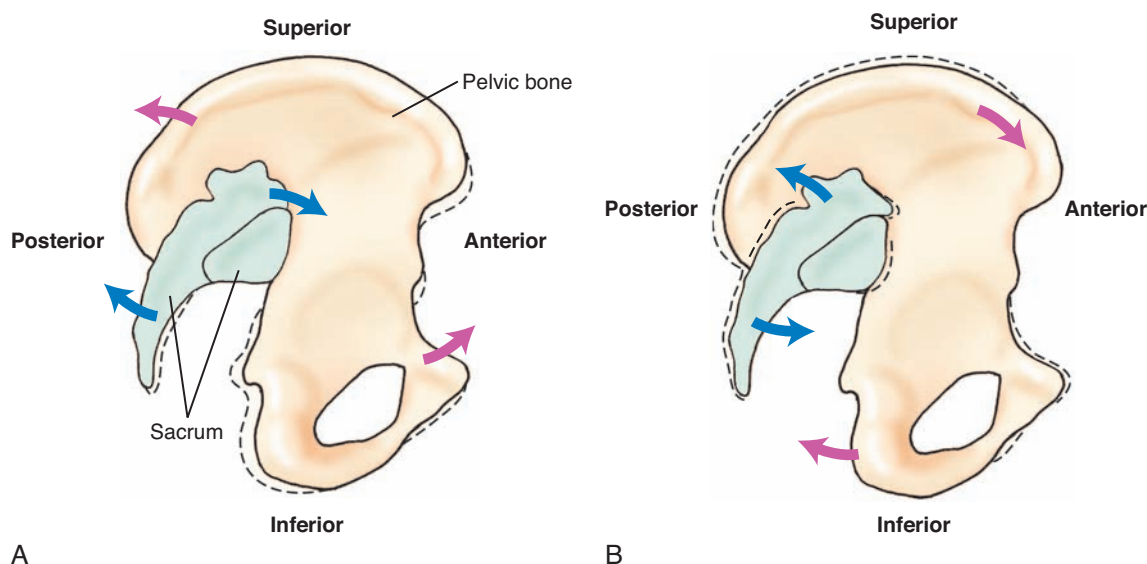
B

“The sacroiliac joint is probably one of the most controversial joints in the human body, and one of the most challenging joints to assess and treat.”

“Before discussing the technique of sacroiliac joint motion palpation, it is helpful to **examine the motion that occurs at the sacroiliac joint.**”

**FIGURE 4 (Below)**  
Motion at the SIJ. A, Nutation. B, Counternutation.

**FIGURE 5 (Opposite Page)**  
Example of femoropelvic rhythm. The right thigh flexes at the hip joint and the right pelvic bone posteriorly tilts at the right SIJ.



Because each SIJ is located between the sacrum and the pelvic bone on that side of the body, it allows motion to occur between that pelvic bone and the sacrum. This motion is extremely important to lower extremity functioning because it allows the lower extremity, including the pelvic bone, to move relative to the sacrum and other side of the body. The term femoropelvic rhythm describes the coupled-action interplay between motion of the femur at the hip joint and the pelvic bone at the SIJ. An example of femoropelvic rhythm is lifting our right foot in front of our body. This is accomplished by flexing the right thigh at the hip joint. However, there is a limit to how far the foot can raise by flexing the thigh at the hip joint. To augment this, we posteriorly tilt the right pelvic bone, which allows the right foot to rise higher in the air (Figure 5). However, we do not want the entire pelvis to posteriorly tilt along with the right pelvic bone because this would affect the posture of the sacrum and upper body, as well as the posture of the left pelvic bone and left lower extremity. The right SIJ allows this isolated motion so that the right pelvic bone can move (posteriorly tilt) independently from the rest of the pelvis. In this manner, the right lower extremity is allowed a greater range of motion while the upper body and left

lower extremity are able to maintain a stable posture.

#### **SIJ MOTION PALPATION TECHNIQUE**

An understanding of femoropelvic rhythm can be used to assess motion of the SIJ. This technique is called motion palpation because the joint's motion is being assessed dynamically as it moves (in comparison to static palpation of the joint's posture). Motion palpation assessment of the SIJ utilizes femoropelvic rhythm to challenge the SIJs to move. Two SIJ motion palpation techniques are presented: bilateral PSIS palpation technique and PSIS-sacral tubercle palpation technique.

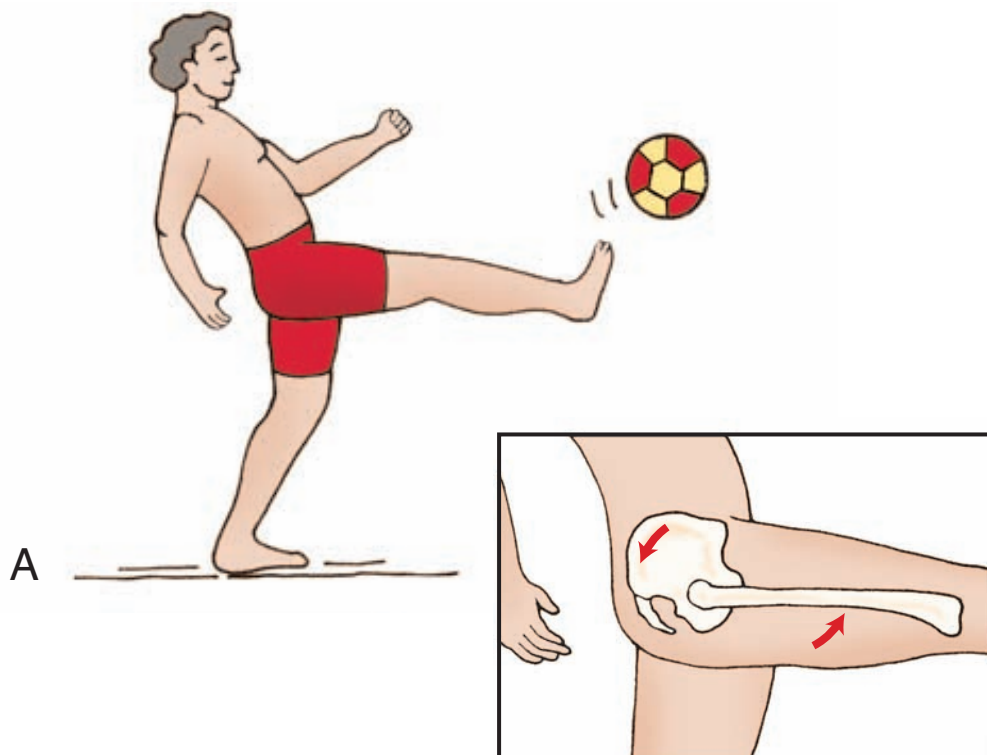


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“Motion palpation of the sacroiliac joint is a valuable assessment tool that should be added to the physical examination of **every client who presents with low back/ pelvis pain or dysfunction.**”

#### bilateral PSIS palpation technique

To perform bilateral PSIS SIJ motion palpation technique, have the client stand facing a wall, far enough so there is sufficient room to lift the thigh in front, but close enough so the client can place her fingertips against the wall for balance. It is important that the client does not lean into the wall; she should just use her fingertips to prevent wobbling as she lifts her thigh (Figure 6). The therapist places his palpating thumb pads at the inferior margins of the posterior superior iliac spines (PSISs). Now ask the client to raise her thigh until it is parallel with the floor; it is important that the client lifts the thigh to exactly 90 degrees, no higher, no lower (Figure 7). Via femoropelvic rhythm, flexion of the thigh couples with posterior tilt of that pelvic bone, which should result in the PSIS on that side dropping (moving inferiorly). The assessment of the motion at the SIJ occurs by feeling for this inferior motion of the PSIS on that side (Figure 8).

If the right PSIS drops and the left PSIS does not, then motion must have occurred at the one or both of the SIJs between them. Usually this motion occurs at the SIJ on the side where the thigh flexed, in this case the right SIJ. But if the right SIJ is locked (hypomobile), the sacrum will posteriorly tilt with the right pelvic bone, resulting in motion occurring between the sacrum and the left pelvic bone at the left SIJ. Therefore, palpating both PSISs as the right thigh lifts could result in motion at either SIJ. As the right thigh flexes, if the right PSIS does not drop at all relative to the left PSIS, it indicates that both SIJs are hypomobile.

This palpation protocol should then be carried out on the other side by asking the client to raise the left thigh in a similar manner. This technique can be performed in a smooth, flowing manner by asking the client to alternately raise each thigh, one side at a time, in a repeated fashion, at a pace that gives the therapist

## body mechanics

time to feel the PSIS motion on each side. Thus, motion palpation of the SIJs by palpating simultaneously both PSISs allows the therapist to assess motion between the two PSISs, but does not allow the therapist to determine which SIJ is moving.

### PSIS-sacral tubercle palpation technique

To determine the motion at one SIJ compared to the other, another SIJ motion palpation protocol must be done: this time by palpating the PSIS of the pelvic bone and the sacrum. Again, let's use the right side as our example. The client is positioned similarly, but now the therapist places one palpating thumb on the right PSIS and places the other palpating thumb on a sacral tubercle (sacral tubercles are located midline on the posterior surface of the sacrum and are analogous to the vertebral spinous processes). The client is again asked to raise the right thigh until it is parallel with the floor, which should drop the right PSIS as it did before; this can be palpated with the right thumb. However, now, if the motion is occurring at the right sacroiliac joint, the therapist should feel with the left palpating thumb the sacrum nutate (drop anterior and inferiorly) relative to the right pelvic bone (Figure 9). If relative motion is not

felt between the right pelvic bone and the sacrum, then that SIJ is hypomobile. Thus by placing the palpating fingers on the bones on either side of one specific SIJ, this motion palpation technique allows for assessment of the motion at that specific SIJ.

Using these two motion palpation techniques, SIJ motion can be accurately assessed. However, because these joint motions are small and subtle, it can take practice to become proficient. Further, even if the degree of motion is accurately assessed, it can be challenging to determine if that degree of motion that is felt is healthy or not. For example, if it is determined that the left SIJ is moving more than the right SIJ, is it that the left SIJ is hypermobile and the right SIJ is healthy, or is it that the right SIJ is hypomobile and the left SIJ is healthy? Or, if both SIJs move the same amount, does that amount represent a healthy normal amount, or are both joints hypomobile or are both joints hypermobile? The difficulty lies in the fact that measuring SIJ motion is not something that can be measured with a goniometer or easily visualized and quantified in degrees. Rather, making these determinations requires experience. For this reason, begin practicing this technique on all of your clients with low back conditions. After you



FIGURE 6 (Left)

Starting position for motion palpation assessment of the right SIJ.

FIGURE 7 (Above)

Motion palpation assessment is done by asking the client to raise the thigh until it is parallel with the floor.



**FIGURE 8** One technique of SIJ motion palpation is done by palpating both PSISs and feeling for a PSIS to move inferiorly when the client flexes the thigh on that side. A, starting position. B, The right PSIS has moved inferiorly.



**FIGURE 9** Another technique of SIJ motion palpation is done by palpating the PSIS on one side and a sacral tubercle, and feeling for the PSIS to move inferiorly and the sacral tubercle to move anteriorly and inferiorly (nutation) toward the pelvic bone on that side, when the client flexes the thigh on that side. A, starting position. B, The right PSIS has moved inferiorly and the sacral tubercle has moved anteriorly and inferiorly.

FIGURE CREDITS: FIGURES 6-9: PHOTOGRAPHY BY YANIK CHAUVIN

have practiced these techniques a number of times, you will have a feel for the degree of motion that is considered healthy for the SIJ. Then you will be comfortable and competent at assessing SIJ range of motion, and you can determine whether the client's SIJs are healthy, hypomobile, or hypermobile.

Motion palpation of the SIJ is a valuable assessment tool that should be added to the physical examination of every client who presents with low back/pelvis pain or dysfunction. Once a client's SIJs are successfully assessed, you can apply the appropriate treatment techniques. These include soft tissue manipulation to loosen associated muscles and break up fascial adhesions, stretching and joint mobilization to loosen a hypomobile joint\*\*, and self-care recommendation to the client to strengthen adjacent musculature to stabilize a hypermobile joint, as well as other postural and activity self-care advice. ■

\* Other orthopedic assessment tests for the sacroiliac joint were presented in the fall 2010 MTJ body mechanics column, *orthopedic assessment of the sacroiliac joint*.

\*\* A treatment method of mobilization of the sacroiliac joint was presented in the winter 2009 MTJ body mechanics column article, *joint mobilization of the low back*.



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