

Using X-rays to Identify Pelvic Instability

When a patient presents with pelvic pain and a history of trauma, the physician suspects pelvic instability. In this study, the use of X-rays taken with the patient standing on one leg called a *single-leg stance* was evaluated in the diagnosis of pelvic instability.

The entire pelvis is formed by the *sacrum* (wedge-shaped bone at the base of the spine), the coccyx (tailbone at the bottom of the sacrum), and the hip bones. The upper (socket) portion of the hip is made up of the *ilium* (pelvic crest), *ischium* (bones you sit on), and *pubis* (birth canal ring).

The pubis symphysis is in front of the body where the two pelvic bones come together. This is the area of interest in the current study. A disruption of the connective tissue between the two pelvic bones at the symphysis pubic can cause pelvic instability. Disruption can be defined as *translation* (movement of the pubis on one side up or down), *widening* (separation), or *impaction* (narrowing or overlapping of the space between the two bones).

Separation of the symphysis pubis is referred to as *symphyseal diastasis*. Since this area is connected together by soft tissue, there is a certain amount of normal give. This slight shift can best be seen by comparing the position of the symphysis pubis when standing first on one leg and then on the other (*single-stance*).

Experts propose that *normal* motion in this area is up to 0.5 mm in men and up to 1.5 mm in women who aren't pregnant. Pregnant women (or women who have had multiple births) may have up to a 3.0 mm shift. For the purposes of this study, anything 0.5 mm or more was a sign of change in alignment and considered a positive response for pelvic instability.

Trauma such as a car accident, childbirth, or a fall is the most common cause of pelvic instability. In older adults with *osteoporosis* (brittle bones), stress fractures can occur that also lead to disruption of the symphysis pubic and pelvic instability.

The diagnosis of pelvic pain is difficult. Identifying instability can be equally difficult. X-rays are usually taken in the standing (on two legs) position and *supine* (lying on the back). But these views don't always show pelvic instability even when it's present.

In this study, single-leg stance X-rays (standing on one leg at a time) were used to diagnose this type of pelvic instability in 38 patients. One-fourth of the group had a history of a car accident. One-fourth suffered trauma during childbirth. Four patients had *osteopenia* (decreased bone density; this is the step before developing osteoporosis) and eight others had other causes linked with this problem.

The results of single-leg stance were compared with two-legged and supine views. Twenty-five of the 38 patients (two-thirds of the entire group) did have pelvic instability using the single-leg stance method of assessment. No one had diastasis using the two-leg standing position. Only two patients showed diastasis in the supine position. When level of pain was compared with patients who had a stable vs. unstable pelvis, there was no difference between the two groups.

This study showed that pain was not a good measure of pelvic instability. But the single-leg X-ray, a simple, inexpensive, diagnostic tool, can be very helpful. A history of preceding trauma, older age, or abnormal motion in the pelvic area is reason enough to order this type of X-ray view. Damage to any part of the pelvic ring can result in disruption of any other portion of the ring. A positive single-leg stance X-ray signals the

need for further evaluation.

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