

Technical Report

Double Needle Technique: An Alternative Method for Performing Difficult Sacroiliac Joint Injections

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The sacroiliac joint (SIJ) is a common source of low back pain. The most appropriate method of confirming SIJ pain is to inject local anesthesia into the joint to find out if the pain decreases. Unfortunately, although the SIJ is a large joint, it can be difficult to enter due to the complex nature of the joint and variations in anatomy. In my experience a double needle technique for sacroiliac joint injection can increase the chances of accurate injection into the SIJ in difficult cases. After obtaining appropriate fluoroscopic images, the tip of the needle is advanced into the SIJ. Once the tip of the needle is correctly placed, its position is checked under continuous fluoroscopy while moving the C-arm in the right and left oblique directions (dynamic fluoroscopy). On dynamic fluoroscopy the tip of the needle should remain within the joint line and not appear to be on the bone. If the tip of the needle appears to be on the bone a new joint line will need to be identified (the most translucent area through the joint) by dynamic fluoroscopy and another needle advanced into the newly identified joint line. Dynamic fluoroscopy is repeated again to confirm that the tip of the second needle remains within the joint line. Once both needles are in place contrast dye is injected through the needle that is most likely to be in the SIJ. If the contrast dye spread is not satisfactory then it is injected through the other needle. I have used this technique in 10 patients and found it very helpful in accurately performing SIJ injection which can at times be challenging.

Key words: double needle technique, sacroiliac joint, low back pain, contrast dye, fluoroscopy

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The sacroiliac joint (SIJ) is a common source of low back pain. The nerve supply and technique of performing an SIJ injection has been described (1-8). SIJ injections are commonly performed interventional pain management techniques (9,10). SIJ pain is generally unilateral, more common in multiparous women, and in patients likely to have maximum pain below the L5 vertebral body level (4). The most appropriate method of confirming SIJ pain is to inject local anesthesia into the joint to find out if the pain decreases at rest and during activities of daily

living (4). Unfortunately, although the SIJ is large, it can be difficult to enter due to its complex nature and variations in individual anatomy.

In clinical practice I have observed that although the tip of the needle may appear to be in the SIJ on fluoroscopy, the contrast dye spread may not indicate so. However, once the contrast dye is injected, it becomes difficult to place another needle as the fluoroscopic landmarks are obscured by the injected contrast dye. In my clinical practice I have done over 60 SIJ injections in the last 5 months and felt the need to use the

double needle technique which I describe below in 10 patients; I have found this technique very helpful in successfully injecting the SIJ in difficult cases. To my knowledge this technique has not been described before.

DOUBLE NEEDLE TECHNIQUE FOR SACROILIAC JOINT INJECTION

After obtaining appropriate fluoroscopic images, the tip of a 3.5-inch long, 22-gauge curved tip spinal needle is advanced into the SIJ (Fig. 1). Once the tip of the needle is correctly placed, its position is checked under continuous fluoroscopy while moving the C-arm in the right and left oblique directions (dynamic fluoroscopy). On dynamic fluoroscopy the tip of the needle should remain within the joint line and not appear to be on the bone. If the tip of the needle appears to be on the bone (Fig. 2), a new joint line will need to be identified (the most translucent area through the joint) by dynamic fluoroscopy and another needle advanced into the newly identified joint line (Fig. 3). Dynamic fluoroscopy is repeated again to confirm that the tip of the second needle remains in the joint line. Once both needles are in place, contrast dye is injected through the needle that is most likely to be in the joint (Figs. 4 and 5). If the contrast dye spread is not satisfactory, then contrast dye is injected through the other needle. I have found this technique very helpful in accurately performing an SIJ injection, which can at times be challenging.

DISCUSSION

The SIJ is a synovial joint, the upper two-thirds of which become more fibrotic in adulthood, and hence the need to enter the SIJ in its lower third. The SIJ is diffusely innervated by several spinal nerves and can produce symptoms mimicking discogenic pain (11).

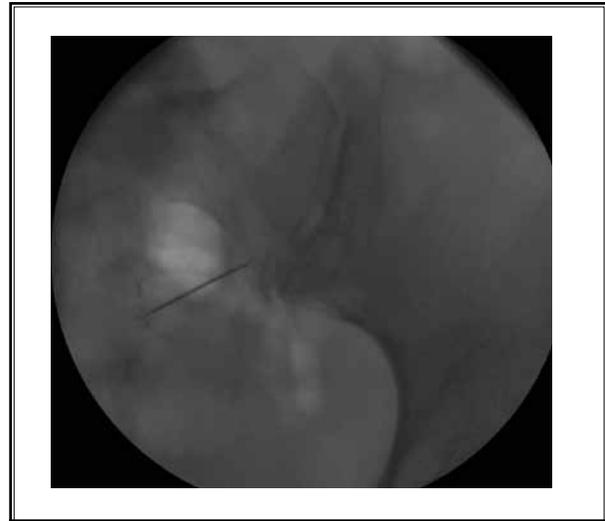


Fig. 2. On dynamic fluoroscopy the tip of the needle appears to be on bone rather than in the joint.



Fig. 1. A curved tip needle is advanced into the right sacroiliac joint.

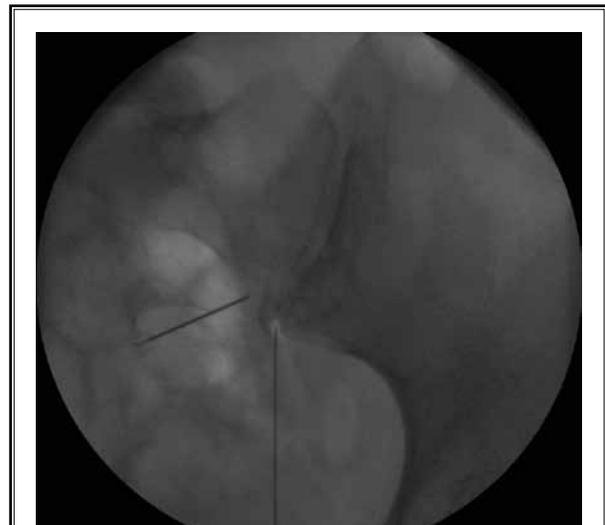


Fig. 3. On dynamic fluoroscopy another translucent joint is identified and a second needle is advanced into the joint.

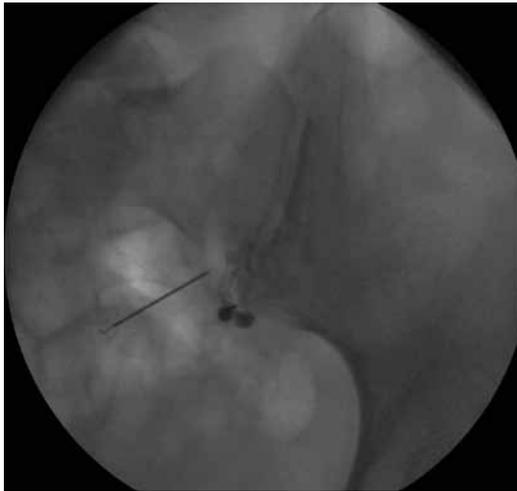


Fig. 4. Contrast is injected through the second needle. The lower one third of the sacroiliac joint is outlined

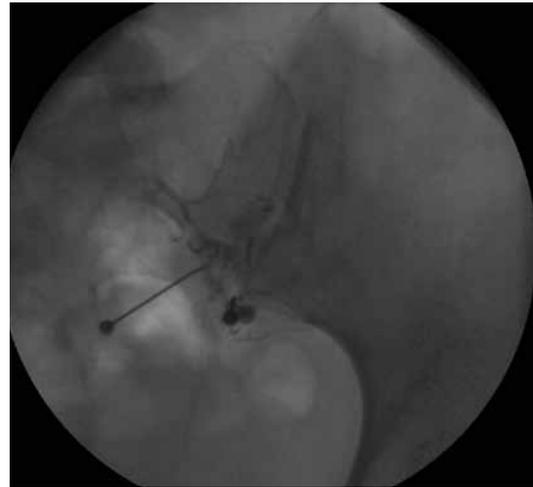


Fig. 5. Contrast is injected through the first needle which shows contrast spreading medially – possibly a vascular spread.

A study of 18 cadavers showed that the joint is innervated anteriorly from the ventral rami of L5 to S2 and via branches of the sacral plexus, and posteriorly from the lateral branches of the S1 to S4 dorsal rami (3). Recent studies have shown predominant dorsal innervation of the SIJ in humans with sensory fibers from the L5 dorsal ramus and the S1 to S4 dorsal rami (2,12,13). Another anatomic study on cadavers demonstrated that the number and location of lateral branches from each sacral dorsal ramus level traceable to the SIJ complex displayed marked variation. The lateral branches were seen to exit from the 2 o'clock to 6 o'clock position on the right and from the 6 o'clock to the 10 o'clock position on the left at the S1–S3 foramen dorsally (14). This study also describes that on lateral branch differential sensory stimulation in patients with SIJ pain diagnosed by SIJ injection, all patients demonstrated identifiable symptomatic branches stemming from both the L5 dorsal ramus and S1 dorsal ramus; 78% of the patients had a symptomatic lateral branch from S2 and 42% from S3 (14). These studies indicate that the nerve supply to the SIJ does not follow a particular pathway thus making it difficult to block and hence the need for intra-articular injection.

The SIJ is difficult to enter because the joint is sinusous both in a caudocephalad direction and in a dorsoventral direction (8,15). There are no studies to date describing the rate of unsuccessful SIJ injection with a

conventional single needle technique. To my knowledge 2 techniques have been described; one technique describes that the C-arm be angled in such a way that the lines of the posterior and the anterior aspects of the SIJ are seen to overlap to obtain a radiolucent line along the joint line before inserting the needle into the lower third of the SIJ and injecting contrast dye to confirm that the needle tip is correctly placed (1). With the second technique the anterior and the posterior SIJ lines are separated. Generally in the anteroposterior view, the medial joint lines correspond to the posterior joint lines. By dynamic fluoroscopy the posterior joint lines are aligned to obtain a zone of maximum radiolucency and the inferior third of the joint is entered (15,16).

I have used the above 2 techniques successfully. However, in some patients when I am not convinced that the needle tip is in the SIJ, I have used the double needle technique described above with good success. Although using the double needle technique increases the chances of appropriate injection into the SIJ, in rare instances both needles may not be within the joint. I have had one patient in whom the contrast dye spread was not satisfactory despite using the double needle technique. Is there a role for a third needle? That is a matter of judgment for each clinician.

In Figs. 3 and 4 the anterior and posterior sacroiliac joint lines are aligned only in the lower one

centimeter of the joint where the SIJ has been entered. In clinical practice I find that at times it is not possible to align these joint lines to obtain a crisp, single translucent SIJ line. In these situations the most translucent area at the junction of the anterior and posterior joint lines will need to be entered. If after all these precautions one finds that the tip of the needle has moved on to the bone on dynamic

fluoroscopy, then a double needle technique as described above can be helpful.

In my opinion, the double needle technique improves the chances of successful intraarticular injection in a selected group of patients. However, it can also increase the time needed to do the procedure, increase radiation exposure, and the chance of infection.

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