

Non-surgical treatment for sacroiliac joint dysfunction/pain in Japan

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Introduction

Sacroiliac joint (SIJ) dysfunction due to minor subluxation of the joint can cause SIJ pain. Most patients with SIJ dysfunction or pain are treated conservatively. Long-term joint subluxation can induce inflammation in the intraarticular region. For chronic and severe SIJ conditions, various conservative therapies should be administered according to the pathophysiology of each condition. In addition, SIJ dysfunction occasionally occurs with lumbar spine or hip joint disorders.

First, I will explain our conservative treatment strategy for SIJ dysfunction and pain in Japan. The conservative treatment approach may differ in each region and among professionals. These differences are worthy of discussion. I respect the conservative therapy methods and techniques of all professionals. I invite you to share your opinions on the SIMEG.

Practical conservative therapy

Figure 1 illustrates the conservative therapy and the flow of treatment performed in outpatient and inpatient settings. Conservative treatment is first performed as often as possible in an outpatient setting, and hospitalization is recommended for patients with persistent severe SIJ dysfunction/pain. In an inpatient setting, there is more time for substantial physical therapy and treatment can be performed in close collaboration with a physical therapist.

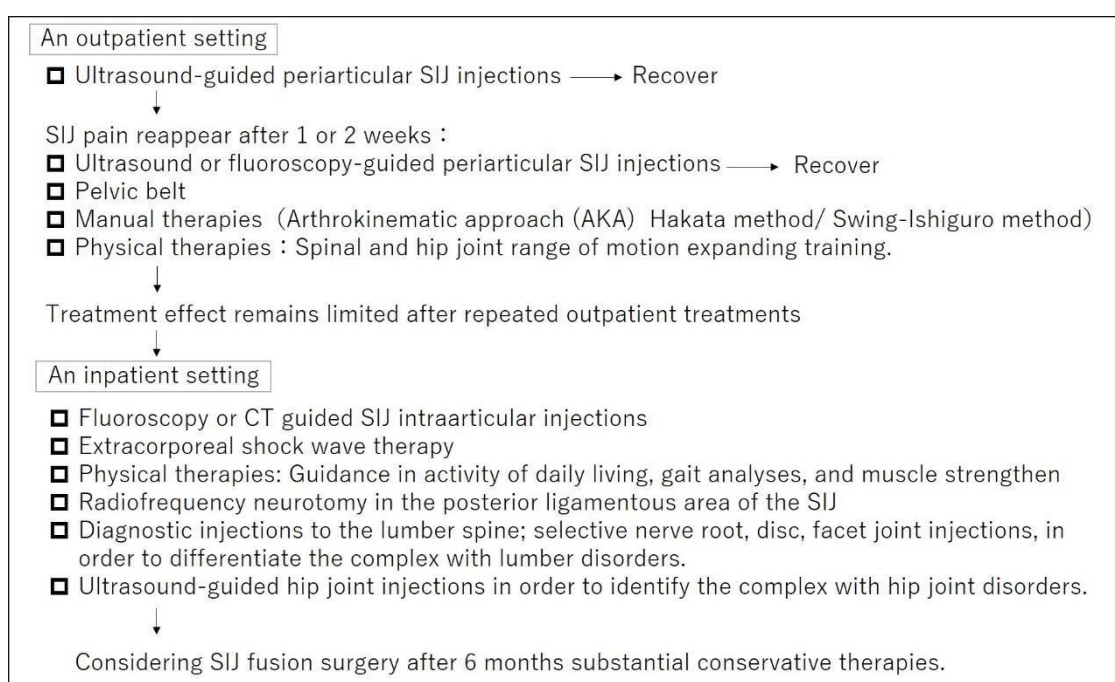


Fig. 1 The flow of treatment in Japan

a. Pain relief using SIJ injections

There are two types of SIJ injection: periarticular SIJ injection into the posterior ligamentous region and intraarticular SIJ injection. Periarticular SIJ injections are easier and more effective than intraarticular SIJ injections; therefore, periarticular SIJ injections should be administered first in patients with SIJ pain (Murakami 2018). It is usually performed under fluoroscopic guidance (Figure 2), although ultrasound-guided periarticular SIJ injections are currently recommended to avoid exposure to radiation (Figure 3). The posterior SIJ ligamentous region is divided into four sections. The needle is inserted sequentially and infiltration with 0.5–1.0 ml of 1% lidocaine (Xylocaine®) confirms the reproduced pain of needle stimulation in each section. When periarticular SIJ injections are not effective, intraarticular SIJ injections should be performed. In our comparison of clinical characteristics between the effective periarticular and intraarticular SIJ injection groups, there were not significantly different between these two injection-type groups except for the tenderness of the sacrotuberous ligament (Murakami 2018). We often perform intraarticular injections for patients with nocturnal pain, pain at rest in the supine position, or exacerbation of pain due to bad weather because intraarticular inflammation may be present. For intraarticular injection, 2 ml of 2% lidocaine (Xylocaine®) and 1.9 mg of dexamethasone sodium phosphate (Orgadron®) were used. We found that the middle approach was easier than the conventional caudal approach (Kurosawa 2017). The procedure was performed under CT guidance to reduce the operator's radiation exposure (Figure 4).



Fig. 2 Periarticular SIJ injections under fluoroscopic guidance

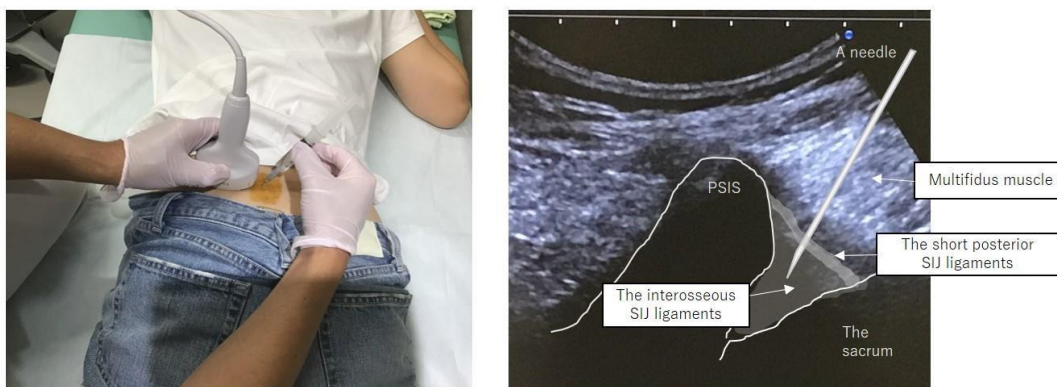


Fig. 3 Ultrasound-guided periarticular SIJ injections

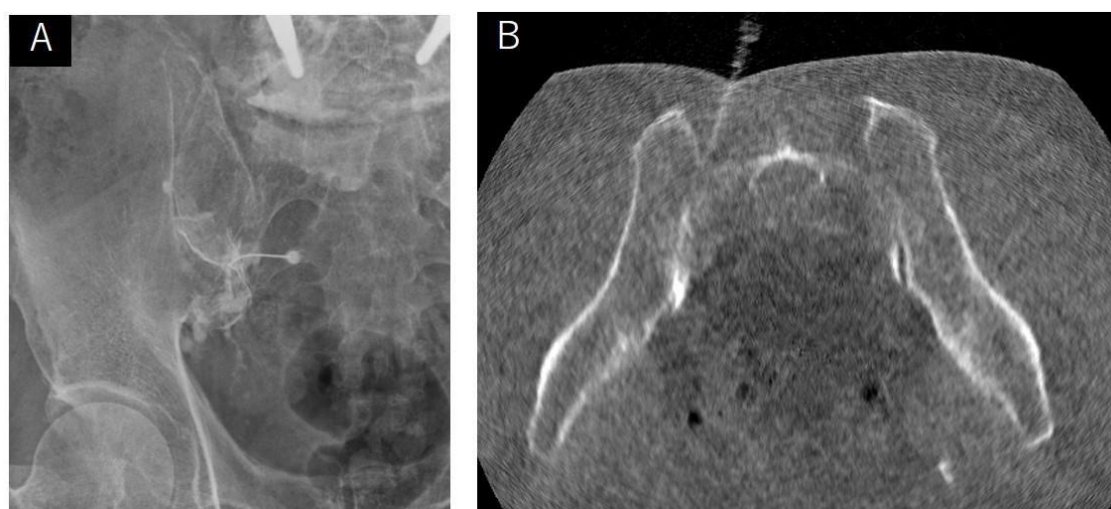


Fig. 4 A) Intraarticular SIJ injection via the middle portion of the joint.

B) CT-guided SIJ intraarticular injection.

Murakami E, Kurosawa D, Aizawa T: Treatment strategy for sacroiliac joint-related pain at or around the posterior superior iliac spine. *Clin Neurol Neurosurg.* 2018; 165: 43-46

Kurosawa D, Murakami E, Aizawa T. Fluoroscopy-Guided Sacroiliac Intraarticular Injection via the Middle Portion of the Joint. *Pain Med.* 2017 Sep 1;18(9):1642-1648.

b. Manual therapies (Figure 5)

The arthrokinematic approach (AKA)-Hakata method is a technique to normalize the movement of the SIJs and has been shown to be effective in a randomized controlled trial (Kogure 2015). The AKA-Hakata method is a very mild procedure and the most acceptable treatment for patients with SIJ dysfunction/pain. There is a problem that the number of qualified physicians and physical therapists is not increasing because it takes more than 10 years to master the techniques. There are numerous manual therapies worldwide, and I respect their great efforts over a long period.

Meanwhile, the Swing-Ishiguro method is another manual technique designed to correct the malalignment of the SIJs. This method is so simple that it can be performed by the family member of the patient. This is an important technique for self-care at home.

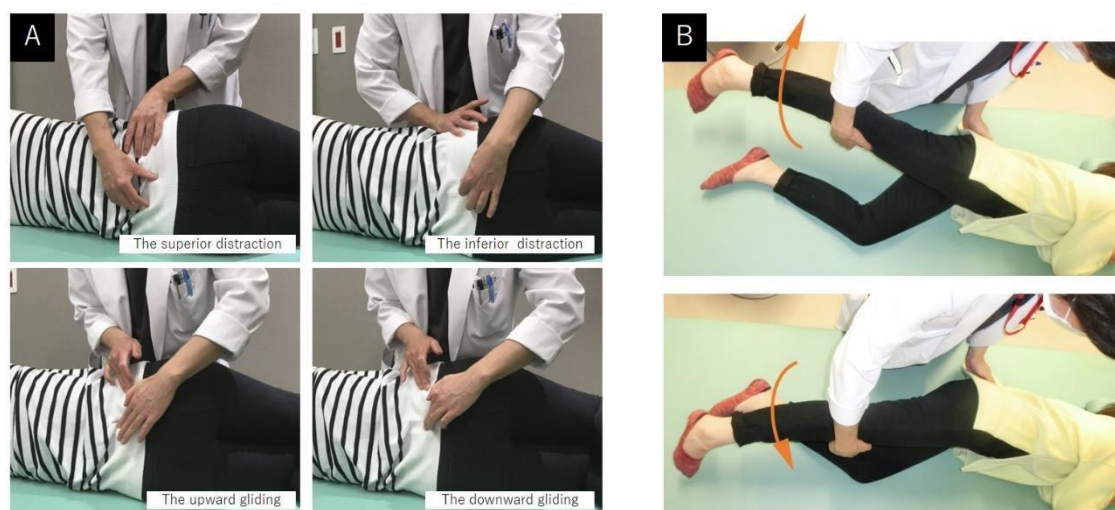


Fig. 5 A) AKA-Hakata method, B) The Swing-Ishiguro method

Kogure A, Kotani K, Katada S et al. A Randomized, Single-Blind, Placebo-Controlled Study on the Efficacy of the Arthrokinematic Approach-Hakata Method in Patients with Chronic Nonspecific Low Back Pain. PLoS One. 8; 10(12): e0144325, 2015

c. A pelvic belt

A belt worn caudally to the iliac crest effectively relieves acute SIJ pain and prevents recurrence. Pelvic belts are available as elastic or firm belts (Smart Spine SI Support®: Ottobock), and patients are asked to choose belts that provide better pain relief (Figure 6).



Fig. 6 Pelvic belts

d. Abdominal trunk muscle training

Abdominal trunk muscle training is effective in patients with SIJ dysfunction/pain. In the past, strengthening of the transversus abdominal muscles (draw-in) focused on adding a forced closure of the SIJ (Richardson 2002) . A draw-in is an important technique, but it is difficult for patients to learn self-care and it is difficult to perceive the effects themselves. Abdominal trunk muscle strength was objectively evaluated using RECORE® (Japan SIGMAX Co., Ltd.), which facilitates goal setting and patient motivation and objectively showed the effectiveness of exercise therapy (Figure 7). Kato et al. (2017) reported that positron emission tomography (PET) scans showed uptake in the transversus abdominal muscle after training with RECORE®, suggesting that abdominal trunk muscle training increases the stiffness of the SIJ.



RECORE®
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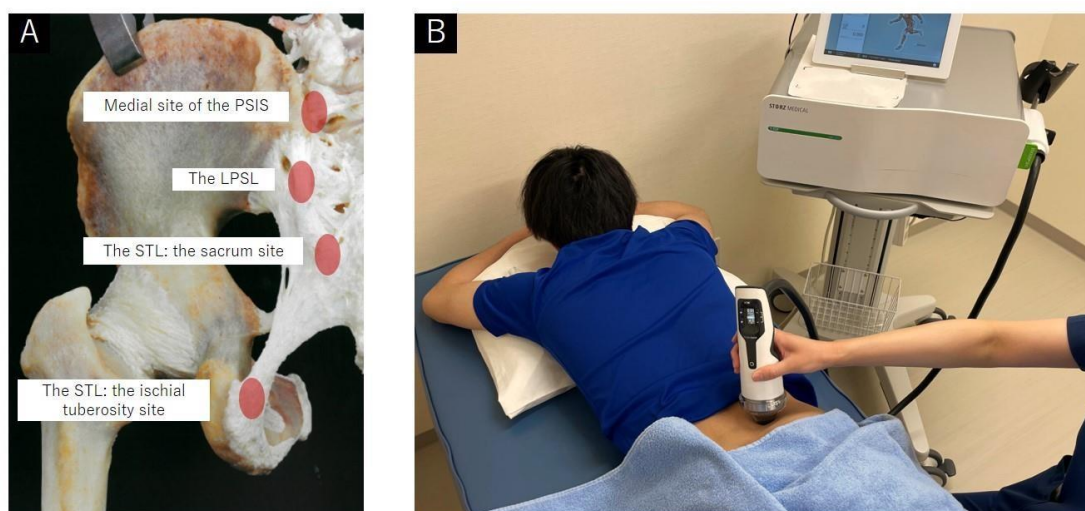
Fig. 7 An innovative exercise device for the abdominal trunk muscle.

Richardson CA, Snijders CJ, Hides JA et al: The relation between the transversus abdominis muscles, sacroiliac joint mechanics, and low back pain, Spine. 2002;27:399-405.

Kato S, Murakami H, Inaki A, Mochizuki T, Demura S, Nakase J, Yoshioka K, Yokogawa N, Igarashi T, Takahashi N, Yonezawa N, Kinuya S, Tsuchiya H. Innovative exercise device for the abdominal trunk muscles: An early validation study. PLoS One. 2017 Feb 24;12(2):e0172934.

e. Extracorporeal shock wave therapy (ESWT)

When tenderness is prominent at the ligamentous attachment site of the SIJ-related ligaments, ESWT at the tenderness points effectively reduces pain. The target areas for treatment were the superior posterior iliac spine (PSIS), long posterior sacroiliac ligament, and sacrotuberous ligaments (both sacral and ischium tuberosity sites) (Figure 8). Shortterm results are good and immediate pain relief can be expected. In the long term, regeneration of ligament attachment tissue can be expected. Many patients prefer ESWT to local injections. For physical therapists, ESWT is useful in relieving localized severe pain other than injections and facilitating the transition to exercise therapy, which they have not been able to do due to pain.



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Fig. 8

A) The ligamentous attachment site of the SIJ-related ligaments, where ESWT can immediate pain relief.

B) Therapeutic procedures

f. Guidance on activities of daily living

Reducing the load on SIJs during activities of daily living is important to prevent recurrence. Elongation stress in the sacrotuberous ligaments induces counternutation of the sacrum relative to the ilium, leading to increased shear forces in the SIJ. The slight flexion of the hip and knee joints while forward bending relaxes the tension of the biceps femoris. This could contribute to the relaxation of the sacrotuberous ligament because the ischial tuberosity site is the origin of both the sacrotuberous ligament and the biceps femoris muscle (Wingerden 1993). Patients with SIJ pain often show a short sitting tolerance on a chair and a longer time to turn over on a bed. Depending on the contact of the ischial tuberosity with the seat surface while sitting on a chair, sitting position for a long time could cause SIJ malalignment. Adjusting the seat surface or using a rolled towel is effective in controlling pelvic tilt (Figure 9) and preventing the recurrence of SIJ pain. Additionally, the height of the pillow should be adjusted to avoid twisting the SIJ when turning over on the bed. The correct height of the pillow allows patients to rotate the trunk and pelvis simultaneously while turning over (Yamada 2023).

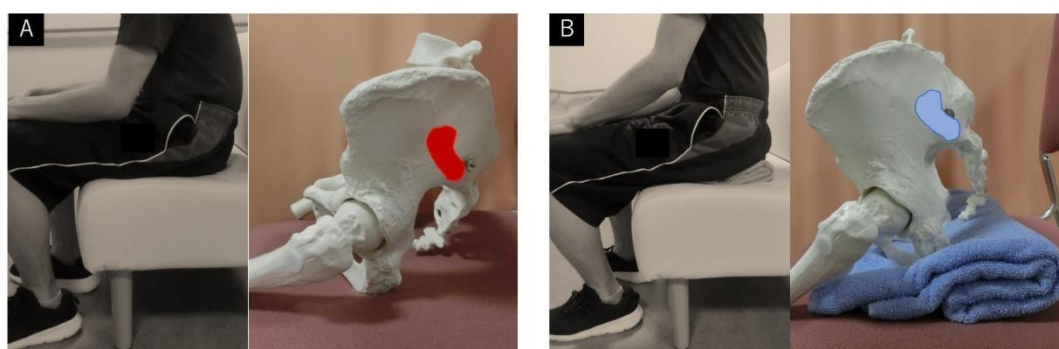


Fig. 9 A) Pelvic retroversion in sitting position.

B) A rolled towel is effective in controlling pelvic tilt.

Wingerden JP, Vleeming A, Snijders CJ et al: A functional anatomical approach to the spine-pelvis mechanism; interaction between the biceps femoris muscle and the sacrotuberous ligament. Eur Spine. 1993; J 2:140-144.

Shuori Yamada. Orthopaedic pillow: Theory and practice. Springer 2023 (in press)

g. Spinal and hip joint range of motion expanding training

SIJs are easily exposed to mechanical stress because they are located between the trunk and lower extremities. It is important to ensure the range of motion of surrounding adjacent joints, especially the lumbar spine (including the thoracic spine) and hip joint.

Recently, we experienced several patients with severe SIJ conditions who had limited range of motion of the hip due to potential abnormalities in the hip joint, such as femoral acetabular impingement. Many of these hip functional disorders are not often found by surgeons, but by fine physical therapists. Furthermore, when there are complications from lumbar disc or facet joint problems, the range of motion of the spine is limited and the treatment of the SIJ itself may be ineffective. We have experienced several patients who can bend forward well after injection of local anesthetic into the lumbar disc, and the stress on the SIJ is reduced, resulting in fewer flare-ups of SIJ pain.

h. Radiofrequency neurotomy to the SIJ

In cases in which the effect of SIJ injection is temporary, a radiofrequency neurotomy of the painful posterior ligamentous region of the SIJ could maintain the pain relief effect (Ito 2020). It is also effective for residual pain in SIJ-related ligaments after SIJ fusion surgery.

Ito K. Clinical results of the treatment for sacroiliac joint pain by radiofrequency neurotomy. Interdisciplinary Neurosurgery 21 (2020) 100755

Case presentation

1. The treatment course for a patient with SIJ dysfunction in an outpatient setting.

(Figure 10)

A 55-year-old woman presented pain in the lumborogluteal region around the right PSIS and numbness in the posterior thigh that had been present for 2 months. She identified PSIS as the main location of pain using her index finger (one-finger test positive), and the SIJ shear test was positive. Every week, an ultrasound-guided periarticular SIJ injection was administered, which relieved pain step-by-step. Pelvic belt and spinal and hip range of motion training were performed from the beginning. Although the pain was relieved with SIJ injections, the patient occasionally experienced misalignment of the SIJ, and manual therapy (AKA-Hakata method) was used to adjust and improve the movement of the SIJ.

In an outpatient setting, several periarticular SIJ injections and pelvic belts are the main treatments. Many patients can recover only with outpatient care by repeating periarticular SIJ injections.

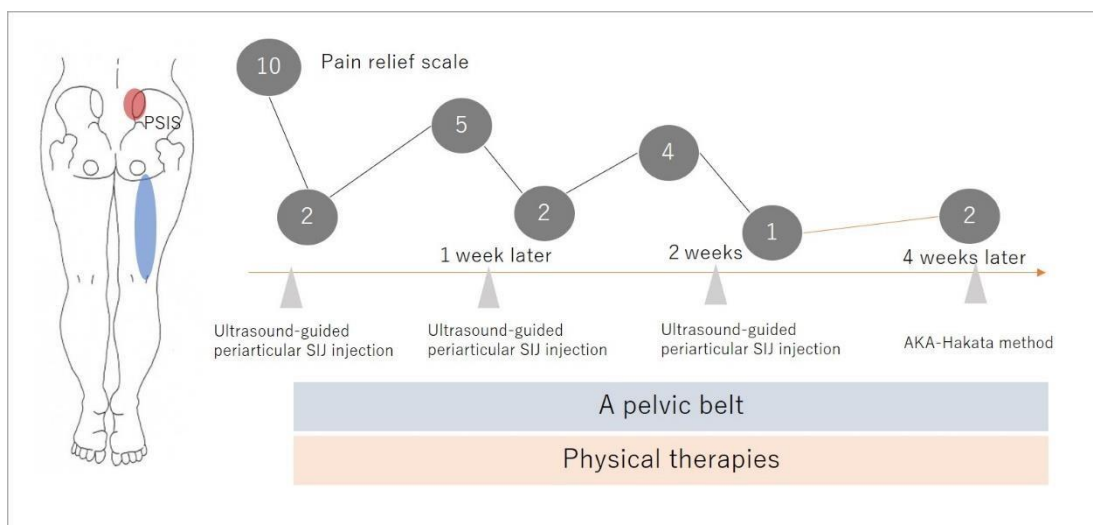


Fig. 10 Typical treatment course in an outpatient setting.

2. A course of treatment for a patient with SIJ pain could be induced by intraarticular inflammation in an inpatient setting.

A 46-year-old man developed pain in the left buttock 1 year ago for no specific reason. He was on leave from work and was referred to our hospital after his previous physician recommended SIJ fusion surgery. The results of bone SPECT/CT examination showed greater accumulation in the intraarticular region of the left SIJ (symptomatic side), and it was considered a difficult case with pain originating from an articular area (Figure 11). After hospitalization, he underwent ultrasound-guided periarticular SIJ injection and CT-guided SIJ intraarticular injection, and his pain decreased from 10 to 4 on the pain relief scale. Subsequently, the physical therapist provided spinal range-of-motion exercises and guidance in activities of daily living, and the pain gradually approached 0. The patient was discharged after 3 weeks of hospitalization. Both peri- and intra-SIJ injections, rest in the hospital, and daily physical therapies were very effective in patients with severe SIJ conditions.

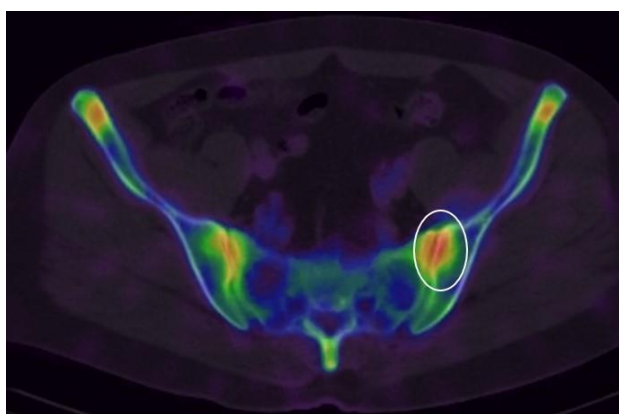


Fig. 11 Bone SPECT/CT

In a patient with unilateral severe SIJ pain, left-right differences in bone SPECT/CT uptake can be helpful in making surgical decisions.

Summary of conservative treatments of SIJ dysfunction/pain in Japan

The main conservative therapies for SIJ dysfunction/pain are periarticular SIJ injections, pelvic belt, and manual therapies (AKA-Hakata and Swing-Ishiguro methods). It is important to collaborate with physical therapists to reduce the load on the SIJ in daily life.

Most cases are treatable with conservative therapy. In Japan, ultrasound-guided periarticular SIJ injections, which can be performed immediately in outpatient settings, have become widespread. This type of SIJ injection provides an early diagnosis of SIJ dysfunction/pain and an early physical therapy intervention, preventing serious SIJ conditions. The skill of each physical therapist is also an important factor, and the original manual therapies developed in Japan are very effective. Inevitably, SIJ fusion is performed only in severe cases. As a result, conservative treatments are often performed for a long time before surgery, during which time the patient's activity of daily living (ADL) deteriorates; after surgery, even if the pain is relieved, the patient's ADL does not return easily, which is a disadvantage. It is necessary to identify the limitations of conservative therapy early, which is what we are now looking for.