

ORIGINAL ARTICLE

Sacroiliac joint pain in adolescents: Diagnostic and treatment challenges

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Abstract

The aim of this review was to assess diagnostic and treatment challenges of adolescents with SI joint pain. We diagnosed 13 of the patients who were referred to our chronic pain clinic because of low back pain (30%) with SI joint pain based on provocative tests response. We performed SI joint steroid infiltration. Six patients (46%) felt better immediately after the procedure and 1 (8%) patient had a one-side only pain relief after a bilateral block. Four of these patients (31%) did not experience any further episode of pain during the follow-up and three patients reported recurring pain on average 2 months after the initial procedure. The 2nd procedure was successful in two patients and the third one experienced pain again 12 months later, requiring a third successful infiltration. Six patients (46%) experienced pain again within a few hours or days after the infiltration and their pain score were unchanged compared with what they had reported prior to the procedure. We were unable to place the needle within the joint under fluoroscopy in 1 patient; however, we were successful repeating the procedure under CT guidance. One patient experienced a motor and sensory block in the distribution of the sciatic nerve immediately after the procedure, which resolved within 24 and 48 hours, respectively. SI joint pain is a distinctive pathology that can be present in children and adolescents and is often overlooked by practitioners. Its diagnosis and management are challenging in this population as it is in adults. SI joint steroids injections may play a role in the management of these patients.

KEYWORDS

adolescents, infiltration, sacroiliac joint, steroids

1 | INTRODUCTION

Sacroiliac (SI) joint pain is one of the most common sources of chronic low back pain in adults, accounting for 15%-30% of patients presenting with chronic low back pain.^{1,2,3} Leg length discrepancy,

older age, inflammatory arthritis, previous spine surgery, pregnancy, and trauma are often associated with development of SI joint pain.¹

Although the reported prevalence of chronic pain in children and adolescents varies significantly between studies, it is safe to

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estimate that approximately one-quarter to one-third of all children and adolescents suffer from chronic pain.^{4,5}

Back pain is the third most common type of pain children and adolescents report after headache and abdominal pain.⁶ Patients can present with nonspecific low back pain often due to muscular strain or more complex pathologies such as spondylolysis/spondylolisthesis, Scheuermann disease, scoliosis, intervertebral disk herniation, or neoplastic lesions. The exact prevalence of each one of these conditions in children is unknown.

In this study, we looked at adolescents with a diagnosis of SI joint pain. We reviewed their pain history, previous treatments, imaging studies of the lumbar spine, and SI joints. We then analyzed the effects of SI joint injections of steroids with the subsequent clinical outcomes.

2 | METHODS

We reviewed the medical records of patients who were diagnosed with SI joint pain in our chronic pain outpatient clinic between May 2019 and November 2020. In addition to demographic data, age, sex, and weight, we reviewed their medical history focusing on the duration of pain, previous treatments, and medications. The diagnosis of SI joint pain was based on the physical examination. Patients were diagnosed with SI joint pain when they tested positive on at least three of the provocative tests findings including positive Patrick's test, distraction test, compression test, and sacral thrust test.⁷ Only patients who had at least three positive provocative tests were selected to receive a SI steroid joint injection.

The patients' evaluation was conducted over a 2-hour visit in the pain clinic with the participation of a pain specialist, a psychologist, a physiatrist, and a physical therapist.

We reviewed imaging studies including MRI of the lumbar spine and SI joints and plain X-rays images of the hips. We used the numeric scale Numerical Pain Rating Scale (NPRS)⁸ to report pain levels.

The SI joint injections were done in Interventional Radiology under fluoroscopy. Patients were given the option of having the injection done under general anesthesia or with minimal sedation. We used a 22- or a 25-gauge, 3.5-inch Quincke needle for the SI joint injection. The intra-articular placement of the needle was confirmed by injecting approximately 0.2 mL of contrast (Iohexol 240) and observing the outline of the sacroiliac joint. If the needle tip was not in the joint, the needle was carefully repositioned into the correct position. Methylprednisolone 20mg diluted in bupivacaine 0.5% (final volume 2–3 mL) were injected in each site. The needle was flushed with a small amount of sterile saline and removed.

Patients were followed up for 6 months after the procedure with in-person or phone interviews.

Patients with recurring pain and physical examination consistent with SI joint arthralgia were offered the possibility of repeating the injections.

TABLE 1 Demographic data of study population. Data are presented as mean \pm standard deviation

| | |
|--------------------------------|---|
| Age (years) | 18 \pm 2 Range 15–21 Median 18 |
| Sex (M/F) | 11/1 |
| Weight (kg) | 69 \pm 23 BMI 26 \pm 6 Range 16–39 Median 24 |
| Pain level (numeric scale) | 6 \pm 1 pre 4 \pm 4 post 3 \pm 3 at 6 months |
| Duration of symptoms (months) | 38 \pm 27 |
| Duration of follow-up (months) | 10 \pm 9 |

3 | RESULTS

One-hundred-two patients were diagnosed with chronic back pain during the study period. Forty-four of them (39%) reported low back pain. We diagnosed 13 of them (30%) with SI joint arthralgia after they tested positive on at least three of the provocative tests. The SI joint infiltration were done under general anesthesia in 31% of our patients. In the remaining subset of patients, local anesthesia was used by infiltrating 1% lidocaine into the subcutaneous and deep tissues. The demographic data are shown in Table 1. Six patients (50%) had been diagnosed with depression and/or anxiety. Five of them were on psychotropic medications and seeing a psychologist. It should be noticed that three patients were transgender (female to male) and in the process of sex-reassignment surgical procedure. Three patients (25%) had been diagnosed with Ehlers Danlos syndrome type 3. Eight patients (67%) were able to attend regular classes, 3 patients were doing online school because of pain, and one had dropped out of school. Pain history and outcomes are shown in Table 2.

Five patients (42%) had consulted with an orthopedic surgeon and seven patients (58%) were evaluated by a rheumatologist. These providers had diagnosed three patients with fibromyalgia, two with SI joint arthritis, one with disk herniation, one with spondylolisthesis, and one with Juvenile Idiopathic Arthritis. No formal diagnosis was ever made in the remaining 4 patients besides generic low back pain.

Every patient had an MRI study of the pelvis as well as X-ray of the hips. They were all but one negative for sacroiliitis. The MRI of the SI joint of one patient showed significant peri-articular edema (Figure 1). The physical examination was positive for at least three of the provocation tests¹ in every patient.

Patients had failed different treatments prior to be referred to our clinic, which included different types of NSAID's in combination with gabapentin and/or cyclobenzaprine and antidepressants.

The average pain score prior to the procedure was 6 \pm 1. Six patients (46%) felt better immediately after the procedure and

TABLE 2 Patients' characteristics

| | Pain Duration (weeks) | Comorbidities | Pain score preinjection | Pain scores after injection | Pain score at 6 months | Laterality | Number of injections |
|----|-----------------------|--|-------------------------|-----------------------------|-----------------------------|------------|----------------------|
| 1 | 36 | Fibromyalgia | 7 | 0 | 0 | Unilateral | 2 |
| 2 | 24 | Anxiety Depression L4 herniation | 8 | 8 | 8 | Bilateral | 1 |
| 3 | 72 | Spondylosthesis | 4 | 0 | 0 | Bilateral | 1 |
| 4 | 48 | Fibromyalgia JRA | 6 | 0 | 0 | Bilateral | 1 |
| 5 | 72 | Ehlers Danlos Fibromyalgia | 6 | 7 left side 0 right side | 4 left side 0 right side | Bilateral | 2 |
| 6 | 5 | SI joint arthritis | 4 | 0 | 0 | Bilateral | 1 |
| 7 | 12 | Anxiety Ehlers Danlos | 6 | 10 | 10 | Bilateral | 1 |
| 8 | 1 | Anxiety | 7 | 0 | 2 | Bilateral | 1 |
| 9 | 60 | none | 6 | 6 | 3 | Bilateral | 2 |
| 10 | 36 | Ehlers Danlos | 7 | 0 | 7 | Bilateral | 1 |
| 11 | 72 | None | 7 | 7 | 4 | Bilateral | 1 |
| 12 | 17 | None | 5 | 8 | 4 | Bilateral | 2 |
| 13 | 4 | Anxiety POTS | 5 | 4 | 2 | Bilateral | 1 |

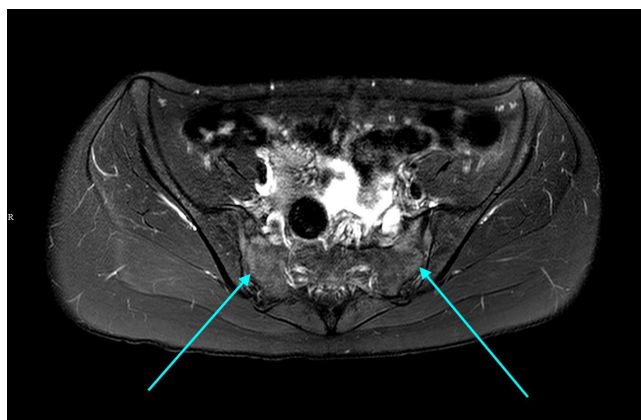


FIGURE 1 MRI of SI joint with significant surrounding tissue edema

reported no pain. One patient (8%) reported pain resolution only in one side immediately after a bilateral infiltration. Six patients (46%) did not feel any benefit from the procedure. Four patients (31%) did not experience any further episode of pain during the follow-up and three patients reported recurring pain on average 2 months after the initial block. We repeated the injection in these three patients and the second injection had long-lasting effect in two patients while the pain recurred in the 3rd patient 12 months after the second procedure. Six patients (46%) experienced pain again within a few hours after the infiltration and their pain score were unchanged compared with what they had reported prior to the procedure. We did not offer them a second set of injections. There was no correlation between the presence of anxiety or depression and failure of the infiltration.

Two patients had an SI joint infiltration done prior to our assessment because of a diagnosis of SI joint pain. One patient had SI joints injections of steroids, one had an SI joint injection of platelets-rich plasma. One patient had an epidural block steroids injection because of a disk herniation diagnosis. These blocks were ineffective. We did SI joint injections in each one of them. This new set of blocks were effective in two of these three patients.

We were not successful in injecting the joint in one patient; however, we were able to repeat the infiltration successfully under CT guidance. We observed a complication in one patient who experienced a sciatic nerve block with partial motor block within a few minutes from the injection. The motor block resolved within 24 hours and the numbness in the following 48 hours.

4 | DISCUSSION

The diagnosis of SI joint pain as well the identification of its causes can be challenging. A recent review article of the available literature⁹ confirmed the 2013 American Society of Interventional Pain Physicians guidelines¹⁰ for diagnosis of SI joint pain. Good evidence exists for the diagnosis of SI pain utilizing controlled comparative local anesthetic blocks, fair evidence exists for provocative testing, and limited evidence exists for the diagnostic accuracy of imaging. A correct diagnosis is even more complicated in children. Historically, SI joint pain has been divided into intra-articular causes (infection, arthritis, spondyloarthropathies, and malignancies) and extra-articular causes (enthesopathy, fractures, ligamentous injuries, and myofascial). Frequently though, no specific cause can be identified¹¹ and, with the exception of traumatic lesions, the identification of

the causes of SI joint pain in pediatric patients is often delayed by several years.¹² The relative rare occurrence of SI joint arthritis in this population (1%-2% of adolescents^{13,14}) can explain why this pathology is often overlooked by practitioners. Pediatric patients more often present with peripheral joints arthritis rather than axial skeleton pathologies. In addition, sacroiliitis can be particularly difficult to diagnose because its symptoms are similar to many other common sources of back pain. None of our patients had a history of trauma. Only two patients (17%) with chronic low back pain were correctly diagnosed with SI joint pain prior to our evaluation. They responded to the joints' infiltration with steroids.

Radiologic changes indicative of SI joint arthritis in pediatric patients become apparent 5-10 years after the beginning of symptoms.^{15,16} The presence of concomitant abnormalities of the spine (bulging disks) can also be misleading and further delay the correct diagnosis. Only 1 of our patients presented radiographic changes on the MRI suggestive of sacroiliitis. Two patients were found to have a bulging disk at the lumbar level and one with lesions compatible with spondylolisthesis.

The physical examination is based on provocative maneuvers. A single positive finding has a poor diagnostic value because the sensitivity and specificity of the clinical examination increase as a direct function of the number of positive tests. It has been shown that three or more positive provocative tests are needed for an accurate diagnosis of SI joint pain as the source of low back pain. Two studies have evaluated the value of using multiple positive tests and have shown that three or more provocative tests can result in a specificity and sensitivity as high as 79% and 85%, and 78% and 94%, respectively.^{7,17} The difficulties of diagnosing SI joint arthralgia are confirmed by our experience. We reviewed the notes from the providers that had evaluated the patients and then made the referral to our clinic. We have also reviewed the radiologic images with a radiologist to confirm or rule out an arthritic process. Among those patients who consulted an orthopedic surgeon and/or a rheumatologist, only two (15%) were diagnosed with SI joint disease prior to our evaluation. In three patients, outside providers attributed pain to fibromyalgia, in one patient to disk herniation, one to spondylolisthesis, and one to Juvenile Idiopathic Arthritis.

There are limited data in the literature on the most appropriate management of adolescents reporting SI arthralgia. We offered steroid infiltration only in patients who had at least three positive provocative tests and who had failed medical management. Our short-term success rate was of 33%, with pain resolution and no need for further infiltrations or medications in four patients. Three patients required a second infiltration because of recurrent pain and were subsequently pain free at the follow-up. We were not able to obtain short-term pain relief in six patients (42%). These data are similar to those reported in the adult literature where anywhere between 35% and 80% of patients reports a significant pain reduction at 6 months.^{18,19} In a study conducted in children with a diagnosis of Juvenile Spondyloarthropathy confirmed by MRI studies, the SI joint infiltration with steroids resulted in improvement of pain in 87% of cases.²⁰ The reasons for the relatively high failure rates in

our experience are not clear. It is possible that a different pathology may have been the source of the low back pain in those patients who did not improve after the procedure. This would further emphasize the difficulties of accurate diagnosis in patients with low back pain. We cannot rule out the possibility of technical problems with the procedure itself that were not detected under fluoroscopy including the infiltration of the adjacent tissues or extracapsular leakage of the medications.

The limitations of this review included the relative short follow-up and the small number of patients evaluated, which preclude us from identifying possible risk factors for developing SI joint pain in adolescents.

5 | CONCLUSIONS

Sacroiliac joint pain is a distinctive pathology that can be present in adolescents. Its diagnosis and management are challenging in this population as it is in adults. There is a role for SI joints infiltration with steroid for diagnostic and, in a selected group of patients, treatment purposes.

DATA AVAILABILITY STATEMENT

Data available on request from the reviewers

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