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Diagnosis and Treatment of Sacroiliac Joint Dysfunction: A Case Report

Joseph R. Perry
University of North Dakota

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DIAGNOSIS AND TREATMENT OF SACROILIAC JOINT DYSFUNCTION: A
CASE REPORT

by

Joseph R. Perry
Bachelor of Science – Biology
Viterbo University, 2012

A Scholarly Project Submitted to the Graduate Faculty of the

Department of Physical Therapy

School of Medicine

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in partial fulfillment of the requirements for the degree of

Doctor of Physical Therapy

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This Scholarly Project submitted by *Joseph R. Perry*, in partial fulfillment of the requirements for the Degree of Doctor of Physical Therapy from the University of North Dakota, has been read by the Advisor and Chairperson of Physical Therapy under whom the work has been done and is hereby approved.

X *Schraun Decker*

Graduate School Advisor

X *David Perry*

Chairperson, Physical Therapy

PERMISSION

Title Diagnosis and Treatment of Sacroiliac Joint Dysfunction

Department Physical Therapy

Degree Doctor of Physical Therapy

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Mr. President's classic jam.

"Ayyayaya coco jambo ayyayai"

Abstract

Sacroiliac joint dysfunction (SIJD) is plausible and can be treated through skilled physical therapy. The purpose of this case study is to educate and inform on the treatment for sacroiliac joint dysfunction. The patient was an 81 year old female, who was direct access and presented to physical therapy with complaints of left buttock and hamstring pain that was exacerbated with prolonged sitting. Upon physical examination it was determined the patient presented with SIJD which demonstrated a left on left sacral rotation, left upslip, and bilateral anterior rotation of either pelvis intermittently. Official diagnosis was sprain of the sacroiliac joint and pain in the left leg (S33.6XXD, M79.605). The patient was seen for twenty-one visits, an hour each visit. Upon discharge the patient was pain free, without reoccurrence of symptoms. Manual therapy, strength training, stretching and modalities were used in her treatment sessions with achievement of goals and good outcomes.

CHAPTER ONE

Background and Purpose

The purpose of this case study is to educate and inform on physical therapy treatment for sacroiliac joint dysfunction (SIJD). SIJD can cause or refer radiating pain to low back or pelvis. Low back pain is the second most common reason patients visit primary care physicians¹. However, SIJD accounts for 13%-30% of low back pain^{1,2,3,4}. A sample population of 392 participants, from Cohen et al.⁴, concluded that the sacroiliac (SIJ) is a major contributor to low back pain. A different study, using local anesthetic blocks, concluded SIJD to have a prevalence rate from 10%-62%⁴. Anesthetic blocks are an effective treatment for the low back and sacroiliac pain^{1,5}. Another study states that the specificity and validity of anesthetic blocks is moderate^{1,3}. It can be said that another avenue of efficient diagnosing SIJD must be found. Sacroiliac joint dysfunction is very plausible and a contributor to low back pain.

Piriformis syndrome can manifest in a variety of methods and present with symptoms similar to SIJD. The piriformis muscle originates on the anterior sacrum and runs laterally to the medial aspect of the greater trochanter on the femur. Most commonly the sciatic nerve passes below the piriformis^{5,6}. When the piriformis is hypertrophied, inflamed or tight it can compress on the sciatic nerve, causing low back pain, buttock pain or radiating pain down the leg⁵. When a patient presents with the aforementioned symptoms it is important to rule in or out piriformis syndrome⁶.

The sacroiliac joint (SIJ) is designed for functional stability including transitioning and alleviating loads from the trunk to the lower extremities, limiting excessive rotation around the "X" axis and facilitating childbirth⁷. The sacroiliac joint, has been under controversy as to whether it is a mobile or immobile joint. However, recent studies have indicated that the SIJ is formidable pain generator to chronic low back pain^{1,8}.

There are numerous factors that can lead to SIJD. Some of the most common are true and apparent leg length discrepancy, improper biomechanics, chronic strain or trauma, scoliosis and pregnancy². The sacrum functions as a keystone during movement leading to a force couple that decreases loading forces⁹. These force couples are involved in most functional activities essential for daily life. For example, during ambulation, when the pelvis swings on the weight bearing side, this causes the ipsilateral sacrum to flex posterolateral/caudal on the oblique axis and on the side of the trailing leg to flex anteriorly/cephalad⁹.

When diagnosing SIJD, by a physical therapist, the best method identified is to have a positive 3/5 pain provocation tests and accompanied with four-point palpation^{1,2,3}. With 3 or more positive SIJ pain provocation tests there is approximately 78% specificity and 85%-91% sensitivity that there is SIJD present³. However, attempting fewer tests or more than four tests can lead to inaccurate results.

The gold standard of diagnosing SIJD is with injection into the joint for pain provocation. This is outside the scope of physical therapy practice and cannot be performed in the clinic.

The sacroiliac joint is a mobile joint that is assessable and treated by physical therapists. The aim of this study is to educate and show efficacy on the diagnosis and treatment for SIJD by physical therapy.

CHAPTER TWO

Case Description

The patient, was an 71 year old Caucasian female with a history of osteoarthritis and osteoporosis. While retired, she was fairly active with her children and grandchildren, attended daily yoga class, enjoyed gardening and hiking. Living alone she required no caregiver and was taking no relevant medications. Her general health status was good given her age as she remained highly functional: psychologically, physically and socially. There is no pertinent behavioral health risk history. Family medical history reveals her brother and father were diagnosed with Dupuytren's contractures bilaterally.

Surgical history included Dupuytren's contracture of the left 3-5 fingers which has since resolved. She presented with anterior shoulder pain that was intermittent occurrence over the past year. Patient's history included hypothyroidism, rheumatoid arthritis, polymyalgia rheumatic, Basal cell carcinoma of the nose and bicep tendonitis. She is currently taking a multivitamin, Aleve (220 mg), prednisone (1 mg) and levothyroxine (90.075 mg) to treat current health conditions.

Prednisone, for her osteoarthritis, can cause headache, dizziness, nausea, bloating and stomach pain. Levothyroxine is a hormone replacement for underactive thyroid (hypothyroidism) which can have side effects such as vomiting, diarrhea, appetite and weight change, insomnia, fever, hot flashes, sweating and fast or irregular

heart rate. These side effects can alter the progress of therapy and needed to be monitored every session for exacerbation of symptoms.

Patient reported to physical therapy with complaints of left buttock and hamstring pain that was exacerbated with prolonged sitting. She stated that the pain began after a day of gardening. Four months prior and had progressed until treatment was administered. Her primary reason for seeking physical therapy treatment was that she could not tolerate sitting for more than fifteen minutes on a soft cushion or sitting on a hard surface. These conditions limited her ability to spend time with family, friends, and daily activities which decreased her quality of life.

Systems Review

Resting Heart Rate	68 BPM	Body Mass Index	19.97
Blood Pressure	125/75 mmHG	Edema	None
Weight	120 lbs	Height	5' 5"

Vital measurements can be seen in Table One. No prevalent cardiovascular or pulmonary conditions. Integumentary system screened negative for any disease or complication. Scar formation present on right side of nose from basal cell carcinoma. Musculoskeletal screen revealed abnormal posture of rounded shoulders and forwards head. Normal range of motion for cervical, trunk, upper and lower extremities. Strength was found to be normal for cervical, trunk and upper extremity. However, lower extremity evaluation revealed bilateral pain and weakness with hip abduction, adduction, internal and external rotation bilaterally. The patient demonstrated pain with sitting for extended periods of time. She was oriented in person, place, time and

circumstance. She was a hands on learner who presented with no barriers to communication or consciousness.

Table Two - Functional Scales	Score	Percentages
Lower Extremity Functional Scale	47/80	60% Functionality
Shoulder Pain and Disability Index	55%	78% Pain 41% Disability

Patient completed two functional outcome assessments, because she was being treated for some recurring shoulder symptoms (bicipital tendonitis). The Lower Extremity Functional Scale (LEFS) and Shoulder Pain and Disability Index (SPADI) scores can be found in Table Two. Patient is unable to sit for extended periods of time due to pain from left posterior buttock that would radiate down left lower extremity to the level of the thigh. Patient cannot fully enjoy meals with friends, Zumba or Yoga classes without feeling discomfort. The LEFS was chosen to address the morbidity and pain the patient experienced in the left lower extremity. The SPADI was given to address the ongoing bicipital tendonitis and possible rotator cuff impingement. The scores, of both the LEFS and SPADI, indicated the patient had limited functionality, disability and pain which affected her quality of life and activities of daily living.

CHAPTER THREE

Examination, Evaluation and Diagnosis

The initial evaluation focused on both the buttock and shoulder issues. However, the focus of this article is the pain in the buttock and the shoulder issue will be omitted for the continuance. Lumbar, hip and lower extremity range of motion were all within normal limits. Bilateral gross lower extremity strength of 4-/5. One deviation of strength was the left hamstring, medial portion isolation, 3+/5 accompanied by pain. Myotomes and dermatomes were equal bilaterally. Reflexes of L4 and S1 reported normal (2+).

Table Three – Special Tests	
Test	Results
Straight Leg Raise	Negative Bilaterally
Faber	Negative on Right/ Positive on Left with SI pain
Sacral Rocking	Negative Right/ Positive Left
Sacral Spring	Negative Right/ Positive Left
Palpation (Iliac Crest, ASIS, PSIS, Medial Malleoli)	Left upslip/ Left on Left sacral rotation/ Bilateral anterior rotation/ Positive Drawer and Shotgun
Thigh Thrust	Positive
Sacral Thrust	Positive
Forten Finger Test	Positive on left

Special tests and pain provocation tests, specific to SIJD, were performed and can be seen in Table Three. Further physical examination revealed left sacroiliac joint (SIJ) and medial hamstring origin were tender to palpation. Her major disability was with activities of daily living and mobility that affected her quality of life. General health and

fitness were well managed. From the physical examination it was determined that the patient had SIJD which entailed a left on left sacral rotation, left upslip, and ipsilateral anterior rotation of the ileum. Following the evaluation, she was diagnosed with sprain of the sacroiliac joint and pain in the left leg (ICD-10 S33.6XXD, M79.605). Preferred practice patterns are 4B, 4C and 4D.

CHAPTER FOUR

Prognosis and Plan of Care

Initial plan of care consisted of three visits per week for four weeks. Once results of previous interventions were maintained; visits were decreased from three visits to two visits per week. Procedures involved were neuromuscular rehabilitation, therapeutic activity, manual therapy and patient education. Interferential electrical stimulation (IFC) was used to decrease inflammation, increase blood flow, improve tissue healing and manage pain. The patient was educated on piriformis and hamstring stretches to lengthen tight muscular tissues involved with the left hip posterior chain. Additional education was provided for home icing and heat. Heat was used when inflammation was nonexistent for at least three days and to be used for no longer than 15 minutes on the affected area. The patient preferred heat prior to stretching and mobilizations in order to relax musculature and loosed tissues. Ice on the affected area was encouraged at morning and night for 15 minute intervals and prescribed to use during times of inflammation or exacerbation of symptoms.

Prognosis was good considering the patient's functional mobility, strength, range of motion (ROM) and willingness to participate in therapy. Patient goals can be found in Table Four. Weekly interventions would begin with gentle stretching of posterior hip muscles, followed by sacroiliac mobilizations to correct SIJD. Then strengthening of the core, hip and lower extremities to increase static and dynamic stability. After each

session the patient received IFC for pain management. Discharge required the patient to be symptom free with ADLs, dynamic activity and prolonged sitting for no less than two weeks.

Table Four – Patient Goals	
Term (Weeks)	Goal
1	Patient will be competent with HEP independently.
2	Progress to 0% disability on Oswestery LEFS
2	Improved SI stability by level pelvis upon examination to further decrease pain and improve mobility
3	Sit for extended period of time with 1/10 or less discomfort in order to carry out ADLs
4	0% impaired, limited or restricted with mobility: walking and moving around
4	Tolerate 30-40 minutes of dynamic postural, core and total body strengthening program to allow for full return to all activities without pain

Patient was admitted as direct access requiring no collaboration with physician. Documentation of treatment was done every treatment per protocol. Progress notes were provided every ten visits to track patient response to treatment. The patient received individualized interventions with a physical therapist or physical therapist assistant. Categories of treatment were therapeutic activity, manual therapy and electrical stimulation. Therapy sessions followed a structured order of SIJ manual therapy, stretching, strengthening and pain modulation. Pain modulation was accomplished through electrical stimulation and dry needling.

CHAPTER FIVE

Interventions

Every abnormality pertaining to SIJD was addressed accordingly. If present, the next step was to correct the malalignment through manual therapy. Patient presented with a SIJD regularly which required correction of a left on left sacral rotation, left upslip, bilateral anterior rotation of the pelvis. The anterior tilt was corrected first with the patient in supine and a posterior force applied to left anterior superior iliac spine (ASIS) while the posterior superior iliac spine (PSIS) was held in place with the other hand. The therapist would apply the force in a rhythmic fashion until both ASIS were in alignment. A less rigorous anterior tilt treatment was performed based on patient presentation and tolerance. The patient's left and right leg were abducted, flexed at the hip and knee. This was done within a comfortable range in order to correct the bilateral anterior rotation (positive drawer) or a frog leg procedure. A manual distraction of the left leg was done to correct the upslip. She was then put in the hooklying position and was asked to squeeze her knees into adduction with therapist's overpressure into abduction (balance the pubic symphysis). In some instances, audible cavitation occurred indicating pubic symphysis imbalance correction. This was used in accordance with previous exercise to correct sacral rotation.

Dry needling was performed in order to target desired musculature, long and short sacroiliac ligaments and sacrotuberous ligament. The needles were left in situ for

10 minutes with low transcutaneous electrical nerve stimulation (TENS), attached directly to the needles, facilitated release of myofascial/myoligamentous tissue and pain relief. For prevention of further SIJD, the patient was informed to refrain from any prolonged bending and quick jarring hip motions.

Progression of therapy included therapeutic activity for stretching to target piriformis, iliotibial band, hamstrings and quadriceps. Stretching was done passively by the therapist and actively by the patient in her home exercise program. Stretches consisted of piriformis, hamstring, iliotibial band, gluteus maximus and lumbar paraspinal stretches. In addition, strengthening of the musculature of the lower extremity, see Table Five. The final intervention was low TENS applied to the left origin of the hamstring down through the calf for pain modulation. This method of low TENS was applied after every visit, where the patient experienced pain, for 15 minutes to increase the quality of life of the patient.

Table Five – Strength Exercises		
Exercise	Repetition	Indication
Hip Add Machine	3x15	Hip adductor strengthening
Hip Abd Machine	3x15	Hip abductor strengthening
Leg Press	3x15	Gross LE strengthening of hip flexor/extensors
Heel Raises	3x20	Gastrocnemius/Soleus strengthening
Single Leg Lateral Step Downs	3x15	Gluteus Medius/Minimus strengthening/ Dynamic stability and mobility
Sidestepping w/ Theraband	3x15	Dynamic strengthening of hip add/abd
Surfer Squats	2x1 min	Dynamic Stability of hip add/abd/IR/ER
Recumbent Bike	8 min	General warm up

CHAPTER SIX

Outcomes

The patient was diagnosed with a sacroiliac joint dysfunction that attributed to acute onset of piriformis syndrome causing radiating pain down her left leg. Lower Extremity Functional Scale score indicates that she was at 60% functional mobility; thus a 40% disability. The patient tested positive for sacral rocking, sacral springing and Faber on the left SIJ. Manual palpation indicated left upslip/ left on left sacral rotation/ bilateral anterior rotation/ positive drawer. Positive drawer indicates bilateral anterior rotation of the ileums. The patient displayed a positive fortin finger test and pointed to a localized region of pain infero-medial to the posterior superior PSIS^{1,8}.

She was limited in her ability to sit for extended periods of time and navigate obstacles, which reduced her leisure activities with friends, hiking and exercise routine. The evaluation and treatment outcomes reinforced the diagnosis of left upslip/ left on left sacral rotation/ bilateral anterior rotation/ positive drawer and unbalanced pubic symphysis. There were no significant changes in health, wellness and fitness. Overall the patient was satisfied with her plan of care and treatment. She was discharged pain free and without recurrence for two weeks.

Therapy interventions that worked well with the patient were manual therapy, modalities and strengthening exercises. Manual therapy consisted of dry needling and sacroiliac mobilizations. Dry needling provided subjective pain relief and release of tight

musculature. Mobilizations of the SIJ were painful upon performance but post mobilizations patient felt relief of pain in weight bearing. Modalities of hot/cold packs and low frequency electrical stimulation also provided adequate pain relief post mobilizations and after treatment sessions. The patient demonstrated gains in strength throughout the course of treatment; as shown by gains in her strength training program log.

CHAPTER SEVEN

Discussion

The sacroiliac joint (SIJ) has a primary function of stability, transmission and dissipation of trunk loads to the lower extremity, facilitate x-axis rotation and facilitate child birth^{2,3}. The SIJ is surrounded by various tendons, ligaments and musculature to allow for dynamic mobility and stability. For example, during gait the sacrum flexes in a superior-lateral direction towards the weight bearing foot to provide a force couple. This force couple drives counter rotation of the trunk and decreasing the forces on the load bearing foot². The SIJ is a crucial element in gait, mobility and stability. Injury to the SIJ is primarily achieved through axial loading and sudden rotation^{1,2,7}. Proper diagnosis is important for SIJD to allow for proper treatment. However, the efficacy of SIJD is of low quality due to lack of evidence and researcher bias. However, diagnosis may be difficult because of the size and lack of mobility of the individual; this requires a large amount of force in the correct direction giving a higher likelihood of a false negative⁸.

The patient was seen for twenty-one visits for an hour each visit. Upon discharge the patient was pain free without reoccurrence of symptoms two weeks post discharge. Manual therapy, strength training, stretching and modalities were used in her treatment sessions. Patient felt relief with myofascial release using dry needling. Dry needling not only can release myofascial tissue but can increase blood flow, endorphin release, decreased cortisol and decrease pain through the gating mechanism¹⁰. Manual treatment of the SIJ is not well documented because of the differences in approaches from therapist to therapist. However, with this patient, manual SIJ mobilizations

provided immediate relief directly after execution. A recent study showed significant improvement with both SIJ only and SIJ/lumbar manipulations immediately, 48 hours and one month after one treatment⁵.

Alternative methods of diagnosing SIJD are injection of fluid into SIJ to provoke SIJ pain, skilled x-ray and magnetic resonance imaging examination^{3,4}. The pain provocation tests correlated well with PT diagnosis^{11,12}. In that the special tests provided the correct diagnosis, treatment and led to good outcomes. She tested positive for three of the five tests: sacral rocking, thrust and thigh thrust tests, reproducing the pain previously reported. Pain provocation tests have a higher reproducibility than other SIJ physical exam methods^{2,11}.

Strength training showed improvements from her exercise log. Patient displayed strength gains in all of the exercises she performed in Table 5. The main target muscles of the strength training exercises were the gluteus maximus, piriformis and biceps femoris. These muscles are functionally connected to the SIJ and affect movement⁷. Stretching, both actively and passively, was incorporated into the patient's treatment session as mentioned in interventions. Strength and flexibility training can be applied to correct maladaptive biomechanical imbalances associated with injury that can worsen the injury and prevent return to normal activities^{2,13,14}. Stabilization exercises along with a SI belt show improved patient outcomes¹. However, with our patient she declined to wear the belt and performed the exercises instead.

The treatments provided effectively treated the sacroiliac joint dysfunction due to the relief of pain following treatments with manual therapy, dry needling techniques and strength training of the muscles surrounding the joint. The patient was discharged

with no occurrence of symptoms and pain free. A drawback of this case report is that no periodic or discharge strength or functional assessments were performed at discharge. Future directions of research should screen for the efficacy with manual mobilizations of the SIJ. It can be said that SIJ dysfunction is a plausible dysfunction and can be corrected with skilled physical therapy; encompassing physical examination for diagnosis, strength training, stretching, modalities and manual therapy.

Reflection

The plan of care for treatment worked very well for the patient. The patient was very engaged and felt that the exercises helped her instead of hinder her progress and performance. The exercises were not complicated. Manual therapy worked well and the patient felt instant and prolonged relief upon weight bearing after pelvis mobilizations.

For future research, I would suggest following through with functional scales by performing them more periodically. This would allow for better tracking of progress and be a better representative of patient outcomes. Also a more detailed muscle screening before and after the plan of care would be adequate to show strength deficits and gains after treatment.

Overall, this patient was a good candidate for sacroiliac joint dysfunction. Having three positive SIJ pain provocation tests and a positive Forten Finger test upon examination led us to a physical therapy diagnosis of sacroiliac joint dysfunction. Having a positive response to treatment adds further evidence of proper diagnosis and treatment of sacroiliac joint dysfunction.

The reason I chose this case is because before this case, and others, I did not believe in SIJ movement. When treatments began and patients started to feel better I changed my point of view. When patients see relief from these treatments it led to the conclusion that the SIJ is a moveable joint and has a profound effect on quality of life.

My personal opinion of the case report is that it was a learning experience. The information gained through the research and reading of articles is a valuable asset. However, the amount of work involved does not match the overall purpose.

I understand a scholarly project is necessary for graduation but there is minimal use going through the loops, jumps and wasting copious amounts of time. All to write a case that will just sit on a shelf and never be read again. Perhaps if it were to be read, by first or second year students it would be worthwhile. If I felt that I was to go into the research field it would be more useful as well. As it stands, this scholarly project appears to be laborious and frivolous. In the end, it will amount to nothing more than a consuming paper. There is no end game, besides filling a requirement that someone deemed important.

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