

Original Research Article

Effectiveness of isometric exercises in patient with Sacroiliac Joint Dysfunction

Keyur Dobariya

Navodaya College of Physiotherapy, Raichur – 584 103, Karnataka, India.

*Corresponding Author: Keyur Dobariya, Navodaya College of Physiotherapy, Raichur – 584 103, Karnataka.

Abstract

The Sacroiliac Joint (SI) joint is one of the larger joints in the body having the wavy surface and fits together. The very mild motion that does occur is a combination of sliding, tilting and rotation. Sliding movement is probably only a couple of millimeters, and may tilt and rotate two or three degrees. By this case investigation the data suggest that Trans Cutaneous Electrical Nerve Stimulation, mobilization and isometric exercise program is a significant intervention to reduce the pain along with the beneficial improvement in disability level in a patient with sacroiliac joint dysfunction.

Keywords: Ortho, Sacroiliac Joint, Isometric Exercise, Physiology, TENS

Introduction

Sacroiliac Joint Dysfunction

The SI joint is one of the larger joints in the body. The surface of the joint is wavy and fits together. Very little motion occurs in the SI joint. The motion that does occur is a combination of sliding, tilting and rotation. The most the joint moves in sliding is probably only a couple of millimeters, and may tilt and rotate two or three degrees.

The sacroiliac (SI) joint is a large joint that connects the lower part of the spine to the pelvis. It is a true synovial joint, like the other joints in the body, but moves only a few degrees. It is implicated as the primary source of pain in 10% to 26% of patients with low back pain. SI joint pain occurs predominantly in women. During pregnancy, up to 80% of women experience pain from the SI joint.

There are following several factors that may contribute to the development of sacroiliac

joint dysfunction (Tingny, 1985). These factors need to be assessed and corrected with direction from a physiotherapist which are, Muscle weakness or tightness; Lower limb length differences; Biomechanical abnormalities; Poor posture; Sedentary lifestyle; Poor core stability; Inappropriate lifting technique; Trauma.

Common Symptoms

Pain over the PSIS, ASIS, and posterior iliac crest, in the posterior thigh, groin, and buttock, Pain while ambulating (walking), ascending and descending the stairs, and during transitional movements. Patient also complains pain in the coccyx which is known as coccydynia which is due to sacral rotation (Mirkin, 2006)

Sacroiliac joint is commonly treated by,

- (1) Electrical modalities like- Ultrasound, Electrical stimulation (Micro current),

Short Wave Diathermy (SWD) and TENS.

- (2) Exercise therapy includes the-Massage (both manual & mechanical), Stretching exercises, and spinal stabilization exercises.
- (3) Manual Therapy-Spinal Mobilization.
- (4) Others-whirl pool & hydrotherapy, Ice packs, hot packs, Correction of mattress & Foot wear.
- (5) Ergonomic advices.

Presenting symptoms include low back pain, posterior pelvic or gluteal pain, and groin pain. Aggravating activities include climbing stairs, getting up from a chair, or getting out of a car. The pain pattern is variable as the nerve supply to the SI joint is complex and varies from person to person.

The primary stabilizers of the SI joint are the ligaments of the pelvis. The secondary stabilizers are the muscles which surround the pelvis, the hip, and the spine. Strengthening these muscles can provide stability to the SI joint, as we cannot strengthen the underlying ligaments.

Natural history after an injury to the SI joint In the acute stage, which occurs one to four weeks after injury, abnormal motion of the joint can be seen. This may result in pain and muscle spasms. During the sub-acute stage, which occurs one to three months after injury, further disruption of SI joint mobility can occur.

This may lead to persistent pain, and a change in the way we usually walk known as gait disturbance. The chronic or final stage occurs after three months. This is characterized by degenerative changes in the joint which may be difficult to correct. This could ultimately lead to disability.

Causes

Sprain of the ligaments surrounding the SI joint from a twisting injury or a direct fall on the low back can lead to dysfunction or instability of the joint. Some people may

have loose ligaments due to hormonal changes (pregnancy, adolescence) or have more movement of the joint than normal. In some cases there may also be a restriction of movement.

These abnormal movements finally lead to instability and SI joint dysfunction. High risk people are those who are involved in activities that require asymmetric loading through the leg or pelvis. These activities include skating, gymnastics, dancing, or rowing.

Other causes are overtraining in athletes, differences in leg length, muscular imbalance around the hips or lower back, childhood hip problems, stress fracture of the pelvis, or gait disturbance.

Conditions that mimic SI joint pain need to be ruled out before focusing on the treatment of the SI joint. These are pain caused from a slipped disc in the back, degenerative arthritic joints in the spine that cause back pain, or a hip problem.

Management

Conservative management of SI joint dysfunction is the preferred treatment. This starts with physical therapy. In therapy, muscle length and flexibility are restored to shortened muscles. Strengthening the core muscles or muscles supporting the spine as well as stabilization of the SI joint is achieved.

Joint mobilization or manipulation to restore normal joint movements is also utilized. The therapist will focus on gait and posture retraining to prevent recurrence of instability and pain. Sometimes, a supportive SI joint belt is used to stabilize the joint.

In addition to therapy, medications such as anti-inflammatories are used. A cortisone injection can also be performed if pain persists despite therapy or medications, under fluoroscopy or X- Ray guidance.

Alternative treatments can be attempted such as prolotherapy, if all fails. It is a series of injections into the surrounding ligaments

to stimulate the body to repair or regenerate itself. Surgical fusion of the SI joint is rarely performed for pain relief.

Materials and methods

Patient Evaluation

Evaluation of a patient who presents with low back pain begins with a detailed history and a thorough physical examination. Imaging studies such as plain X-rays, MRI's or CT scans are recommended to rule out other causes of low back pain. Imaging studies are not a reliable test to diagnose SI joint pain because a painful SI joint may look normal and similar to the SI joint on the painless side.

Injection of an anesthetic into the painful SI joint is a more reliable test. This is because, if the injection does not give any relief, SI joint pain can be ruled out.

Isometric Resistance

Resistance in isometric exercises typically involves contractions of the muscle using:

- The body's own structure and ground
- Structural items (e.g., pushing against a fence)
- Free weights, weight machines, or elastic equipment (e.g., holding a weight in a fixed position)
- Pressure-plate-type equipment that has a digital display of maximal force.

Depending on the goal of the exercise, the exertion can be maximal or sub-maximal

Case Description

A 50 years old male farmer was referred to Muscular Skeletal Rehabilitation Unit, Dept. of Physiotherapy, Navodaya Medical College Hospital and Research Center, Raichur, with complaining of pain in low back area. He had to leave his work due to severe pain since last 3 months. He was diagnosed as Sacro-iliatis.

Because of pain, he was having much difficulty in his day to day life, the major

problem concerned with his functional activities like sitting for a long duration, standing for longer duration, while trying to lie, in walking, in traveling, lifting the object, problem in forward bending, and he also had problem in social function.

He gave history of fall during the stepping down from the stair before 3 months and from that day onwards he got the pain in lower back region.

Assessment

On pain assessment, Patient had mechanical (after fall) type of pain with sudden onset since last 3 months at the lower back and gluteal region.

Patient complaint that the pain was pin pricking type and was aggravated during the movement (ADL activities) especially while forward bending, and it reduces after taking rest. Irritability of the pain was moderate.

Severity of the pain is measured in the Visual analogue scale (VAS) and score was 6. On palpation, tenderness was present at the low back and gluteus region. On examination, Patient was able to bend forward and touch the ground with his finger but had extra pain on buttock region, backward movement was painful.

He was able to do very little movement, Side flexion was also less but left side having more movement compare to the right side. Patient was unable to stand / sit for longer duration which was decreasing his functional activities.

Special Tests

(1) Ganslen's test-positive:

Gaenslen's test is performed with the patient supine (on the back). The hip joint is maximally flexed on one side and the opposite hip joint is extended.

This maneuver stresses both sacroiliac joints simultaneously. Pain in the SI Joint indicating test is positive.

(2) Pelvic compression test- Positive:

Patient in supine lying with back support, therapist is holding both ASIS and apply

distraction force on pelvis, patient feeling pain at gluteus region indicates SI Joint Dysfunction.

(3) Sacral Thrust:

Prone. Anterior pressure on sacrum with palm.

Intervention

On basis of research evidence, we used TENS (Trans Cutaneous Electrical Nerve Stimulation) and Isometric exercise.

Isometric Exercise

Isometric exercise or isometrics are a type of strength training in which the joint angle and muscle length do not change during contraction (compared to concentric or eccentric contractions called dynamic/isotonic movements). Isometrics are done in static positions, rather than being dynamic through a range of motion.

Isometric exercises program:

- Procedure-Patient in prone lying and asked him to extend his both the lower limb.
- Procedure-Patient in prone lying and asked him to extend his neck.
- Procedure-Patient in supine lying with both knee flexed and foot is placed over the ground and asked the patient to lift his pelvis upward (bridging).
- Procedure-Patient in supine lying and placed the bed roll below the ankle joint and asked the patient to press.

These all the exercise are given at the rate of 10sec for each contraction, and 10 contraction is given in each set, these all exercises is given 2 sets daily for 15 days.

Results

Outcome Measures (Table 1)

The Oswestry Low Back Pain Disability Questionnaire we taken as a outcome measures because it is used to assess

patients with low back pain by determining its impact on the activities of daily living (Robert Jones and Agnes Hunt, 1980).

Table 1: Outcome measures

Section	Measure	Treatment Score	
		Pre	Post
Section-1	Pain intensity	2(40%)	1(20%)
Section-2	Personal care	2(40%)	1(20%)
Section-3	Lifting	4(80%)	3(60%)
Section-4	Walking	3(60%)	1(20%)
Section-5	Sitting	3(60%)	2(40%)
Section-6	Standing	3(60%)	1(20%)
Section-7	Sleeping	2(40%)	0
Section-8	Sex life	3(60%)	2(40%)
Section-9	Social life	2(40%)	2(40%)
Section-10	Travelling	3(60%)	2(40%)
Total		54%	30%

Questionnaire Description

10 sections describing the pain and its impact and each section scored from 0 to 5 with higher values indicating more severe impact. Every section has 5 score starting from score 1 to score 5, indicating that 20% of disability to 100% of disability.

Interpretation

0% to 20%:

Minimal disability: The patient can cope with most living activities. Usually no treatment is indicated apart from advice on lifting sitting and exercise.

21%-40%:

Moderate disability: The patient experiences more pain and difficulty with sitting, lifting and standing. Travel and social life are more difficult and they may be disabled from work. Personal care, sexual activity and sleeping are not grossly affected and the patient can usually be managed by conservative means.

41%-60%:

Severe disability: Pain remains the main problem in this group but activities of daily living are affected. These patients require a detailed investigation.

61%-80%:

Crippled: Back pain impinges on all aspects of the patient's life. Positive intervention is required.

81%-100%:

These patients are either bed-bound or exaggerating their symptoms.

According to Visual Analogue Scale (VAS) the pain reduced from the score of 6 to 2 and According to The Oswestry Low Back Pain Disability Questionnaire, the disability level reduced from 54% to 30% after 15 days of treatment plan.

Discussion

Spinal stabilization exercises (including isometric exercises) are more effective in decreasing pain and disability compared to conventional physical therapy alone in patients with low back & sacroiliac joint pain (R. Sylvia et. al., 2007).

Conclusion

Tens, mobilization and Isometric exercise program is an effective intervention for reduction in pain as well as decrease in the disability level in a patient with sacroiliac joint dysfunction.

Acknowledgement

Sincere thanks to Navodaya Medical College Hospital & Research Center for providing all the facility for the same study.

References

[1] B. A. Zelle, G. S. Gruen, et al. Sacroiliac Joint Dysfunction. Evaluation and Management. Clin J Pain 2005;21:446-455.
[2] G. Mirkin, "Isometric exercise background".. Retrieved 2008 - 11 - 10. Strength Training - Isometric Exercise". SPMESSINGER.com. Archived from the original on 2008-01-29.
[3] H. Merskey, N. Bogduk. Classification of chronic pain: descriptions of chronic pain syndromes and definitions of pain terms. 2nd ed. Seattle: IASPPress; 1994.

[4] H. Prather. Pelvis and sacral dysfunction in sports and exercise. Phys Med Rehabil Clin North Am. 2000;11:805-836.
[5] H. Prather. Sacroiliac joint pain: practical management. Clin J Sport Med. 2003;13:252-25
[6] J. Duchateau, K. Hainaut. "Isometric or dynamic training: differential effects on mechanical properties of a human muscle". Journal of applied physiology: respiratory, environmental and exercise physiology, 1984; 56 (2): 296-301
[7] J. Robert and H. Agnes. "Orthopaedic Hospital in Oswestry Shropshire England. Fairbank JCT Davies JB. The Oswestry low back pain disability questionnaire". Physiotherapy. 1980; 66: 271-273
[8] K. E. Timm. Sacroiliac joint dysfunction in elite rowers. J Orthop Sports Phys Ther. 1999 May; 29(5):288-93.
[9] K. Motta-Valencia. Dance-Related Injury. Phys Med Rehabil Clin N Am. 17 (2006) 697-723.
[10] L. Manchikanti, V. Singh, et al. Evaluation of the relative contributions of various structures in chronic low back pain. Pain Physician. 2001;4: 308-316.
[11] M. Laslett, C. N. Aprill, et al. Diagnosis of Sacroiliac Joint Pain: Validity of individual provocation tests and composites of tests. Manual Therapy 10 (2005) 207-218.
[12] P. G. Brolinson, A. J. Kozar, G. Cibor. Sacroiliac Joint dysfunction in athletes. Curr Sports Med Rep. 2003 Feb; 2(1):47-56. Review.
[13] P. Dreyfuss, M. Michaelson. et al. The Value of Medical History and Physical Examination in Diagnosing Sacroiliac Joint Pain. SPINE 1996; 21:2594-2602.
[14] R. L. DonTigny. "Function and pathomechanics of the sacroiliac joint: A review". Phys Ther, 1985; 65:35-44.
[15] R. Sylvia and A. Jeff. "The Efficacy of Spinal Stabilization Exercises as Intervention for Lumbar and Sacroiliac Joint pain". School of physical Therapy; 2007; 5.