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Effect of Therapeutic Ultrasound Augmented by Sacro-Iliac Belt and Core Strengthening Exercises on Sacro-Iliac Joint Pain after Delivery

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Abstract--*This study was conducted to investigate the effect of therapeutic ultrasound augmented by sacro-iliac belt and core strengthening exercises on sacro-iliac joint pain after delivery. Thirty multiparous women suffering from sacro-iliac joint pain for at least 3 months after delivery were participated in this study. They were selected randomly from the physical therapy department in police authority hospital in Al Agouza. All the women were randomly divided into two groups equal in number, study group (group A) and control group (group B). Study group (group A): It was consisted of 15 patients each patient received continuous ultrasound on two SIJs for ten minutes (5 minutes for each SIJ), 3 times/week for 4 weeks. Additionally, to this, she was asked to perform core strengthening exercises for 30 minutes, 3 times per week for 4 weeks. Also, each patient was advised to wear a sacro-iliac belt all the day and take it off only during sleep and taking a shower throughout the treatment course. Control group (group B): it was consisted of 15 patients asked to perform core strengthening exercises for 30 minutes, 3 times/week for 4 weeks and wear a sacro-iliac belt throughout the treatment course (4 weeks). All patients in both groups (A&B) were evaluated by visual analogue scale (VAS) and plasma cortisol level before starting and after the end of treatment program. The results showed a highly significant (P <0.001) decrease in VAS as well as plasma cortisol level after treatment program in both group, yet this decrease was more pronounced and statistically significant (P <0.001) in the study group when compared to the control group. It could be concluded that therapeutic ultrasound augmented by sacro-iliac belt and core strengthening exercises on sacro-iliac joint pain after delivery was more effective than core strengthening exercises augmented by sacro iliac belt.*

Key words--*Delivery, Sacro-iliac joint pain, Therapeutic ultrasound, Sacro-iliac belt, Core Strengthening Exercises, Plasma cortisol level, Visual analogue scale.*

I. INTRODUCTION

Women are more prone to sacro-iliac joint (SIJ) pain during pregnancy and after child birth. The hormonal changes during pregnancy and lactation make all ligaments of the woman's body more lax and more flexible. Also, these hormones increase mobility of SIJs that are usually pretty stable, this in turn can leave the SIJs too mobile and can cause inflammation and pain in SIJ [1]**.** In general, women are 8 to 10 times likely to experience SIJ pain and dysfunction than men due to the differences in their anatomy and body chemistry. Also, some studies have shown that, the younger woman has a greater risk of developing SIJ pain than the older one [2]**.**

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On the other hand, the incidence of SIJ pain after delivery is very high and is more than we might think, since about 15-30% of postpartum women have SIJ pain. The pain starts when the mother's SIJs get inflamed. The SIJ Pain can increase risk of low back pain after delivery [3]. The main cause of SIJ pain after delivery is the hypermobility and instability of SIJs. Hypermobility of SIJs caused by the pregnancy hormones causes an alteration in the normal joint motion (too much movement) which in turn causes instability in SIJs. About 30% of SIJ patients have postpartum instability in their SIJs so, they experience SIJ pain after delivery [3].

Core weakness or muscle imbalances and sacro-iliac dysfunction can be also the main cause of SIJ pain and LBP after delivery [2]**.** Increasing body mass index during pregnancy and after child birth, preexisting back pain before pregnancy and carrying multiple babies are risk factors for SIJ Pain during Pregnancy and after delivery [1].

There are other factors causing SIJ pain additionally to hypermobility of the joints caused by pregnancy hormones like falling down. The mother might also get this problem, from an activity that gives the area a regular pounding like jogging or if she has one leg longer than the other that could be a cause of SIJ pain. Arthritis can also lead to SIJ pain (a type that affects the spine called ankylosing spondylitis can damage the SIJ. SIJ pain can also occur when the cartilage over the joint slowly wears away by aging [4]**.** SIJ pain may occur at any time during pregnancy and becomes more intense as the pregnancy progresses. This pain usually spontaneously resolves within 3 months after delivery. But, in some cases it can become chronic and disabling [5]**.**

SIJ pain could be a dull or sharp. It starts at SIJ but it can move to buttocks, thighs, groin or upper back. Sometimes, standing up triggers the pain and a lot of times the mother feels it only on one side of her lower back. The mother may notice that, it bothers her more in the morning and gets better during the day [4]. There are many choices for treating SIJ pain. The first step is simply to stop any activities that make the mother hurt. The doctor tells her to lay off any movements or sports that inflame her joints, he may also prescribe some pain drugs. Oral anti-inflammatory medications are often effective in pain relief. Anesthetics and steroidal injections into the SIJ are other alternative treatments that can help in pain relief but these two treatments are contra-indicated during pregnancy. In rare cases, if the mother is still hurting, the doctor may recommend surgery, in an operation called sacro-iliac fusion, a surgeon uses pins and implants to join the bones near the joints [6].

Sacro-iliac joint instability occasionally requires additional passive support until muscles of the mother successfully control the joint. The Sacro-iliac joint belt is often beneficial during the initial pain reduction phase**.** Physiotherapy and exercises that focus on core stability of the trunk and pelvic girdle are considered the main line of treatment for SIJ pain. Sometimes a sacro-iliac belt is prescribed to complement the core stability exercises and to give quick pain relief [7].

The core stability exercises are very necessary and form a large part of the treatment, and in some cases, mobilization (a gentle form of manipulation) of hip, back or pelvis may be used to correct any underlying movement dysfunction. Other manual techniques can also be used to treat SIJ pain like muscle energy technique, myofacial release and massage therapy [8]. The stabilizing exercises and other treatment techniques usually prevent the dysfunction from escalating into a chronic condition [9].

Beside the core stabilizing exercises and sacro-iliac belt, the physiotherapist can use other physical therapy modalities to reduce inflammation and relieve pain in SIJ after delivery such as therapeutic ultrasound, laser therapy, shockwave therapy, cryotherapy, interferential current, transcutaneous nerve stimulation (TENS), electro-acupuncture, diathermy, diadynamic electric current, magnetic therapy, phonophoresis, iontophoresis, heat & cold therapies [10].

Therapeutic ultrasound is a marvelous intervention commonly used in physical therapy to reduce inflammation and relieve pain in so many cases such as L.B.P, carpal tunnel syndrome, coccydynia, myofascial pain, osteoarthritis, ligament sprains, muscle strains, bursitis, rheumatoid arthritis, planter fasciitis, metatareselagia, facet irritation, scar tissue adhesion, dequervain's tenosynovitis. Also, it is used to accelerate wound healing, increase range of motion and decrease muscle spasm [11]**.**

Therapeutic ultrasound is very effective physical therapy modality it has no side effects like other medications and usually gives marvelous results [12]**.** Therapeutic ultrasound can be used in two forms, pulsed mode or continuous mode. The physiotherapist can use continuous mode of U.S for its thermal effect to heat the target tissues and to increase blood flow in the treated area so it can relieve pain from the reduction of swelling and edema. The continuous mode of ultrasound with frequency 1 MHZ with intensity 1.5 W/cm^2 can penetrate deep tissues to the depth ranged from 5-6cm. The effectiveness of therapeutic ultrasound for pain, musculoskletal injuries and soft tissue lesions is unlimited, so it is usually used in physical therapy field everywhere around the world **[13].** This study was conducted to evaluate the effect of therapeutic ultrasound augmented by sacro-iliac belt and core strengthening exercises on sacro-iliac joint pain after delivery.

II. MATERIAL AND METHODS

This study was carried out on thirty multiparous women suffering from sacro-iliac joint pain for at least 3 months after delivery they were selected randomly from the outpatient clinic of obstetrics and gynecology in police authority hospital at Al Agouza. Their ages were ranged from 25-35 years old, their number of parity ranged from 2-4 children and their body mass index (BMI) was not exceed 30 kg/m^2. The type of delivered normal and caesarean section.

All participants were free from any gynecological diseases (uterine prolapse, retroversion flexion of the uterus or chronic pelvic pain), neurological diseases (lumbar disc prolapse, lumber spondylosis or spondylolithesis), leukemia or tumor (spinal or pelvic tumor), diabetes mellitus, hypertension, heart diseases, cardiovascular diseases and skin diseases. All the women were randomly divided into two groups equal in number, study group (group A) and control group (group B).

Group A: (study group)

It consisted of 15 multiparous women. Each woman in this group was received continuous ultrasound on two SIJs for ten minutes (5 minutes for each SIJ), 3 times /week for 4 weeks. Additionally, to this, she was asked to perform core strengthening exercises for 30 minutes, 3 times per week for 4 weeks. Also, each woman in this group

was advised to wear a sacro-iliac belt all the day and take it off only during sleep and taking a shower throughout the treatment course.

Group B: (control group)

It consisted of 15 multiparous women. Each woman in this group was asked to perform core strengthening exercises for 30 minutes, 3 times / week for 4 weeks and wear a sacro-iliac belt throughout the treatment course (4weeks).

Procedures

1- Evaluative procedures:

Before engagement to the study, a full history was taken careful from each patient and dynamic x-ray to confirm diagnosis. Then, by using visual analogue scale (VAS), she was asked to score intensity of pain as being, no pain = 0, mild pain = (1,2,3), moderate pain (4,5,6), severe or worst pain (7,8,9,10), Also, a morning (fasting) blood sample of about 5 cm^2 was drawn from anticubital vein and analyzed to estimate plasma cortisol level. The evaluative procedures were done before starting and after the end of the treatment program for all patients in both groups (A&B).

2- Treatment procedure:

For group (A): 15 patients were treated 3 times per week for 12 sessions. The duration of the treatment sessions was 40 minutes classified as follow:

A Therapeutic Ultrasound: cosmogava ultrasound device made in Italy. Each patient in this group were received continuous ultrasound on two SIJs for ten minutes (5 minutes for each SIJ) frequency 1 MHZ with intensity 1.5 W/cm^2. Treatment was carried out on alternate days for 12 sessions, 3 times /week for 4 weeks and time of sessions 10 minute. 10 minutes for ultrasound therapy: the patient was asked to lie in prone lying position, head turned to one side on the hands. The ultrasound head was cleaned with alcohol to avoid any infection transmitted to the patients, then the adaptor plug inserted to the device. After exposing and cleaning the treatment area, adequate amount sono gel was placed on the ultrasound head and machine was adjusted $1.5w/cm^2$. Ten minute of ultrasound (5 minute for each SIJS) right and left sacro iliac joint region was done. -Work exercises in clean Gym, good ventilator, suitable clothes and shoes, and under supervision physical therapist. Additionally, to this, she was asked to perform core strengthening exercises for 30 minutes.

Treatment was carried out on alternate days for 12 sessions, 3 times per week for 4 weeks and time of sessions 30 minute.

Wear a sacro-iliac belt for one month all the day and take it off only during sleep and taking a shower throughout the treatment course.

For group(B): 15 patients were treated 3 times per week for 12 sessions. The duration of treatment session was 30 minutes only core strengthening exercises and Wear a sacro-iliac belt for one month all the day and take it

off only during sleep and taking a shower throughout the treatment course by the same techniques as in group (A) but not use therapeutic ultrasound in this group.

3- Outcome measure

a- Visual Analogue Scale:

Graphic rating scale with numerical value placed equidistantly along aline. The descriptors and numbers help the subject to place her estimate of pain on the line ranged from 0 to 10 or to place a mark on a line indicating your level of pain. Zero indicates the absence of pain, (3-6) indicate moderate pain while (7-10) indicate to severe pain**.** The descriptors and numbers help all participants in two groups (A) & (B) to describe their level of pain before and after treatment course.

b- Blood sample analysis:

The sample of 5 ml of venous blood were taken from each participant at 9 am, put into a tube to measure the blood cortisol level. Cortisol is a steroid (glucocorticoid) hormone produced by the adrenal gland. Plasma cortisol level was evaluated before starting and after the end of the treatment program (8 weeks) for all patients in both groups (A&B). At the morning, normal level of serum cortisol is usually between 9 to 25 µg/ dl and patients with painful conditions usually have a higher serum cortisol level. The serum cortisol level estimation was done before and after 4 weeks of the treatment program. The 5 ml venous blood sample were drawn at the morning, centrifuged and put away at 200 C for further examination.

Data analysis

All statistical procedures were performed with the Statistical Package for the Social Sciences (SPSS) software, version 23 for Windows. The normal Q-Q plot was used to confirm normal distribution of data. Homogeneity of variances ($p > 0.05$) was observed by Levene's test. All these findings allowed the researchers to conduct parametric analysis. Descriptive statistics involved the calculation of the means and standard deviations for each of the variables measured. While, inferential statistics involved the calculation of differences between the two groups by using the independent samples t-test and paired t test within groups. A p-value of <0.05 was taken to represent statistical significance.

III. RESULTS

There were no statistically significant differences ($p > 0.05$) between subjects in both groups concerning age, weight, height and BMI (table 1).

Table 1. Demographic data of participants in both groups.

	Group A (n= 15)	**Group B (n= 15)**	**t value**	**p value**
Age (yrs.)	30.67 ± 2.55	31.20 ± 2.76	-0.550	0.587 (NS)

Weight (kg.)	84.32 ± 2.98	83.68 ± 3.27	0.560	0.580 (NS)
Height (cm)	170.27 ± 3.13	169.27 ± 3.13	0.876	0.389 (NS)
BMI (kg/m^2)	28.67 ± 0.90	28.80 ± 1.08	-0.367	0.716 (NS)

Data are expressed as mean ± SD, NS= not significant, = $p > 0.05$.

The comparison between the VAS scores before and after treatment program, according to paired t-test was conducted and revealed a highly statistical significant decrease ($p<0.05$) in the visual analogue scale at both groups. By comparing the two groups (A & B) after treatment regarding o VAS scores, it was found that, both groups showed a decrease in pain sensation after treatment, group (A) achieved 74.17% while group (B) achieved 32.82% but the percentage of decrease in VAS was more pronounced and more noticeable in group (A) when compared with group (B), this means that therapeutic ultrasound augmented by core strengthening exercises and sacroiliac belt was more effective than core strengthening exercises augmented by sacroiliac belt in relieving SIJ pain (Table 2).

Within groups comparison, the serum cortisol level before and after treatment program, according to paired t-test was conducted and revealed a highly statistical significant decrease in the serum cortisol level at both groups. By comparing the two groups (A & B) after treatment regarding o serum cortisol level, it was found that, both groups showed a decrease in serum cortisol level after treatment, group (A) achieved 52.26% while group (B) achieved 18.08% but the percentage of decrease in serum cortisol level was more pronounced and more noticeable in group (A) when compared with group (B), this means that that therapeutic ultrasound augmented by core strengthening exercises and sacro iliac belt was more effective than core strengthening exercises augmented by sacro iliac belt in decreasing blood cortisol level (Table 2).

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Table 2. Descriptive and inferential statistics of VAS and serum Cortisol level pre- and post-program at both groups.

		Group A (n = 15)	**Group B (n = 15)**	**P value***
VAS	Pre-program	3.60 ± 0.51	3.87 ± 0.35	0.736 ^{NS}
	Post-program	0.93 ± 0.59	2.60 ± 0.63	0.001^{HS}
	P value**	0.001 ^{HS}	0.001 ^{HS}	
Serum Cortisol level	Pre-program	17.89 ± 3.31	17.64 ± 3.52	0.342 ^{NS}
	Post-program	8.54 ± 1.88	14.45 ± 3.20	0.001 ^{HS}
	P value**	0.001 ^{HS}	0.001 ^{HS}	

* Inter-group comparison; ** intra-group comparison of the results pre- and post-program.
^{NS} P > 0.05 = non-significant, ^{HS} P < 0.01 = highly significant, P = Probability.

IV. DISCUSSION

Sacroiliac join (SIJ) pain refers to the pain arising from the SIJ joint structures; pain felt at or near the sacroiliac joints of your pelvis as a result of sacroiliac joint dysfunction. Pain is (stabbing, dull, shooting, burning) located at the general area of pelvic girdle, either posteriorly close to the sacroiliac joints and extending to the gluteal area or anteriorly to the vicinity of the symphysis pubis. It may radiate to the groin, perineum or posterior thigh, lacking a typical nerve root distribution. A precise localization of the pain is often impossible and may also change during the course of the pregnancy [14]**.**

The exact mechanisms that lead to the development of SIJ pain remain uncertain. A variety of approaches have been proposed that suggest hormonal, biomechanical, traumatic, metabolic, genetic and degenerative etiologic implications [15]**.**

On the basis of all of these hypotheses, the accumulated evidence advocates in favour of a multifactorial condition during pregnancy and postpartum. The effect of the levels of relaxin and progesterone to the pelvic girdle ligaments is established as relaxin, are increased leading to ligamentous laxity and joint hypermobility. Hypermobile sacroiliac joints in conjunction with the increased anterior weight of pregnancy and altered gait lead to sacroiliac joint pain.

The biomechanical theory and its advocates have highlighted the separation of the pubic symphysis (<10 mm) as an important threshold. Other mechanical theories based on body habitus and lumbar spine stance, as well as foetal size and weight, have also been proven incompatible with all the cases. The role of genetics is still largely unknown, and current knowledge is based on epidemiological indications between first-degree relatives [16].

Pregnant women move into their second and third trimesters, their centres of mass shift anteriorly, causing an increase in lumbar lordosis. This in turn causes over activity of the low back and pelvic muscles, and hypermobility of the thoracic joints, typically at the T6 to T8 levels of the spine, lumbar spine, and pelvis. This leads to increased activity in the paraspinal musculature, as well as in the rectus femoris, external oblique, psoas major, and adductor longus muscles bilaterally. This suggests that the root cause of much pelvic pain during pregnancy might be mechanical [17].

The onset of pain varies significantly and has been recorded at stages between the end of the first trimester to the first month post-delivery, including the labour stage. It may be insidious or sudden. A general consensus exists regarding a peak of symptoms closer to the third trimester between the 24th and 36th weeks of pregnancy. In the majority of cases (up to 93%), Pain settles and spontaneously disappears after the sixth month postpartum. In the rest of the cases, it persists, acquiring a chronic character [18]. The pattern of pain from the sacroiliac joint is more frequently, located below the territory of L5 radiating to buttock, thigh, and groin and eventually extending to leg, and sometimes imitating sciatic. The condition can be bilateral, but when unilateral, it more frequently favors the right side.

- Characteristics such as exacerbations related to a change of position from sitting to standing or during prolonged sitting or standing, during sexual intercourse, and increased intra-abdominal pressure (coughing, sneezing, micturition, defecation) should be explored. On the basis of the medical history, changes and significant difficulties in performing activities of daily living are usually apparent [19].
- Tenderness to deep palpation of the suprapubic and sacroiliac area along the course of the long posterior sacroiliac and sacrotuberous ligaments, difficulty in performing single leg stance and painful, limited active straight leg raising as well as a palpable step of the pubic symphysis joint, may be evident. Signs of local inflammation (erythema, oedema, warmth) may exist in a small percentage of the cases [20].
- Alteration of gait patterns has also been associated with the syndrome regarding the inability of these patients to cover long distances or a temporary "catching" sensation or clicking on hip flexion, located mostly anteriorly or unilaterally posteriorly. The gait coordination of these patients is distinctly characterized by slower walking velocity, an increase in the amplitude of the horizontal rotation of the pelvis to the thorax and a reduced relative phase between these rotation [21].

This study was conducted to investigate the effect of therapeutic ultrasound augmented by sacro-iliac belt and core strengthening exercises on sacro-iliac joint pain after delivery. Thirty multiparous women suffering from sacro-iliac joint pain for at least 3 months after delivery were participated in this study. They were selected randomly from the physical therapy department in police authority hospital in Al Agouza. Their ages were ranged

from 25-35 years old, their body mass index (BMI) was not exceed 30 kg/m^2 and their number of parity were ranged from 2-4 children. The type of delivery was normal and caesarean section.

They were divided into two groups equal in number. **Study group (group A):** it was consisted of 15 patients each patient received continuous ultrasound on two SIJs for ten minutes (5 minutes for each SIJ), 3 times/week for 4 weeks. Additionally, to this, she was asked to perform core strengthening exercises for 30 minutes, 3 times per week for 4 weeks. Also, each patient was advised to wear a sacro-iliac belt all the day and take it off only during sleep and taking a shower throughout the treatment course. **Control group (group B):** it was consisted of 15 patients it patients asked to perform core strengthening exercises for 30 minutes, 3 times/week for 4 weeks and wear a sacro-iliac belt throughout the treatment course (4 weeks)**.**

Low back pain was assessed by Visual analogue scale and draw plasma level cortisol before and after treatment for both groups (A&B). The results of this study found that, there was a significant decrease in pain intensity and significant decrease plasma level cortisol level in both groups after treatment. When both groups compared together, there was significant difference between both groups after treatment (more decrease in pain intensity in SIJs and decreasing plasma level cortisol in group A).

So, it could be concluded that this means that therapeutic ultrasound augmented by core strengthening exercises and sacro-iliac belt was more effective than core strengthening exercises augmented by sacro-iliac belt in relieving SIJ pain and decrease plasma level cortisol.

Results of this study agreed with those of **Monticone et al. [22]** Who compare Beside the core stabilizing exercises and sacro-iliac belt, the physiotherapist can use other physical therapy modalities to reduce inflammation and relieve pain in SIJ after delivery such as therapeutic ultrasound, laser therapy, shock wave therapy, ice application, interferential current, transcutaneous electrical nerve stimulation (TENS), electro acupuncture, diathermy, diadynamic electric current, magnetic therapy, phonaphoresis, iontophoresis and high voltage galvanic current

Results of this study agreed with those of **Seco et al. [23]** who found Therapeutic ultrasound is an effective modality commonly used to relieve pain, reduce inflammation and accelerate healing process in soft tissue injuries. These soft tissues include ligaments, tendons, joints, muscles and nerves. So, it is commonly used to treat low back pain, symphyseal pain, pelvic girdle pain, carpal tunnel syndrome, bursitis, osteoarthritis, capsulitis, tenosynovitis, tendonitis, myofacial pain, sprain or strain, myositis ossificants, nerve entrapment, pressure sores, femal breast engorgement, joint contractures and to break down adhesion.

Results of this study agreed with those of **Morrisette et al. [13]** Ultrasonic waves have the ability to penetrate layers of the skin and cause vibration to soft tissue structures beneth the skin, this vibration causes friction between molecules so much heat is produced, this heat increases blood flow in the treated area and this can relieve pain and reduce inflammation and swelling.

Results of this study agreed with those of **Srbely et al. [24].** Continuous U.S can relieve pain via increasing blood flow in the treated area. This increase in blood flow accelerates inflammatory process and promotes absorption of debris and all waste products of the inflammatory phase so, inflammation is decreased, and once inflammation is decreased, pain is relieved. Also, physiological heat generated by ultrasonic waves in the tissues stimulates mechanoreceptors in the tissues, this in turn stimulates large mylinated afferent nerve fibers (A beta fibers) which carry touch sensation and vibration. The beta fibers stimulate S.G.R in dorsal horn of spinal cord which in turn inhibits T-cells, so pain gait is closed and A delta and C fibers can't transmit pain sensation or pain signals to continuous level (cerebral cortex). So, pain is relived.

The results also agreed with those of **Sung et al. [25]** In fact, U.S has several benefits, it can relieve pain, reduce inflammation & swelling, stimulate tissue repair and accelerate healing process in soft tissue injuries, it can decrease muscle spasm and make relaxation in muscle, it can increase range of motion and break down adhesions.

The results of this study agreed with those of **Slipman et al., [26]** Thus, if these imbalances actually are detected, a physical therapy program concentrating on stretching and strengthening of the weak muscles is an important element in treatment of a sacroiliac joint dysfunction. The results of this study are supported by **Ribeiro et al. [19]. T**here are no prospective trials that have evaluated the effect of physical therapy, aerobic exercise, stabilization exercises or restoration of range of motion in sacroiliac joint syndrome. However, exercises have been an important aspect in the treatment of sacroiliac joint syndrome, along with stabilization rather empirically.

The results of this study also agreed with those of **Vleeming and Stoeckart. [27]** pelvic stabilization orthoses have been employed in an attempt to limit SIJ motion and improve proprioception. The results of this study disagreed with the results of **Kim et al. [28]** who There are other alternative treatments to treat SIJ pain, this include: anesthetic and steroidal injections into SIJ that can help in pain relief oral ant inflammatory medications are often effective in pain relief as well compare between corticosteroid injections and therapeutic ultrasound , core strengthening and sacro-iliac belt a have been subjected to many clinical trials for sacro-iliac joint, these studies seemed to indicate that therapeutic ultrasound , core strengthening and sacro-iliac belt, although more time consuming and possibly more delayed in its effect than corticosteroid injections, is at least as effective. Although, the current study presents objective data with statistically significant differences, there are some limitations that include short duration of follow up and the mechanism explaining the findings of this study. So, further studies are needed to examine the long-term effect.

V. CONCLUSION

It could be concluded that therapeutic ultrasound augmented by sacro-iliac belt and core strengthening exercises on sacro-iliac joint pain after delivery was more effective than core strengthening exercises augmented by sacro iliac belt

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