

Effect of Phonophoresis and Pelvic Brace on Symphysis Pubis Pain after Delivery

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Abstract

Background: Many women suffering from symphysis pubis pain after delivery. Phonophoresis combined with pelvic brace are effective in treating symphyseal pain.

Aim of Study: This study was conducted to investigate the effect of phonophoresis and pelvic brace on symphysis pubis pain after vaginal delivery.

Patients and Methods: This study was carried on forty multiparous women suffering from symphysis pubis pain for at least 4 months after delivery. They were selected randomly from the outpatient clinic of orthopedic at El-Kaser El-Ainy Hospital. Their ages were ranged from (25-35) years old, their body mass index (BMI) didn't exceed 30kg/m^2 . And their parity was ranged from (2-4) children. All patients were divided randomly into 2 groups equal in number, study group (A) & control group (B). Study group (A) was consisted of 20 patients. Each patient in this group had received phonophoresis on her pubic area for 10 minutes, 3 times/week for 8 weeks. Also, each patient in this group was asked to perform strengthening exercises for abdominal & pelvic floor muscles, posture correction and posterior pelvic tilting exercises for 60 minutes, 3 times/week for 8 weeks. Additionally to this, each patient was advised to wear a pelvic brace all the day except during sleeping or taking a shower throughout the treatment course. While control group (B) was consisted of 20 patients. Each patient in this group was asked to perform strengthening exercises for abdominal & pelvic floor muscles, posture correction and posterior pelvic tilting exercises for 60 minutes, 3 times/week for 8 weeks as in group (A). Also, each patient was advised to wear a pelvic brace all the day except during sleeping or taking a shower throughout the treatment course. Symphyseal pain was evaluated by visual analogue scale (VAS) and cortisol level in blood plasma before and after treatment.

Results: The result of this study revealed that, both groups study group (A) & control group (B) showed statically (p -value <0.001) significant decrease in VAS scores and decrease in cortisol level in blood plasma after treatment, but the percent of

decrease in VAS scores and decrease in cortisol level in blood plasma were more pronounced and more noticeable in study group (group A) when compared to control group (group B). This means that, phonophoresis combined with pelvic brace are more effective than exercises only in relieving symphyseal pain after delivery.

Conclusion: Phonophoresis and pelvic brace were effective in relieving symphysis pubis pain after delivery.

Key Words: Symphyseal pain – Phonophoresis – Visual analogue scale – Cortisol level.

Introduction

MANY women experience severe pain in the symphysis pubis joint after vaginal delivery. This condition could be extremely painful for the mother and this pain can significantly impact on her quality of life because it impairs her normal life activities. Also, this pain can lead to severe complications such as post-natal depression if it isn't treated [1].

The incidence of this pain among mothers after vaginal delivery is very high. In some women, this pain can resolve or heal on its own within 5 to 8 months after giving birth, but for other women it can become a lingering issue if it isn't addressed. About 20% of the women who experience this pain after delivery report continuing this pain for 2 to 3 years postpartum, and their pain becomes worse than before as well as their normal life activities are completely impaired [2].

Symphysis pubis joint pain usually happens due to severe overstretching of the symphysis pubis ligaments under the influence of pregnancy hormones that lead to hypermobility of the pubic joint, the widening of this joint or the gap created between the two pubic bones that normally occurs during pregnancy to facilitate the process of labor, the inflammation & swelling that happens in this joint, the pelvic asymmetry or the pelvis misalignment, increasing load & strain on the pubis joint and the impact of delivery on this joint particularly in oversized babies, shoulder dystocia and after forceps de-

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liveries. Accordingly, it could be said that, symphysis pubis joint pain is a complication of pregnancy and vaginal delivery [3].

Phonophoresis is a technique by which therapeutic ultrasound is used to introduce pharmacologic agents, usually anti-inflammatory or analgesic drugs, through intact skin into the subcutaneous tissues. Theoretically, phonophoresis can provide a safe and painless alternative to injections for treatment of common inflammatory conditions such as symphysis pubis pain, carpal tunnel syndrome, coccydynia, low back pain, bursitis, sprains, strains and tendinitis [4].

Pelvic belts in treating symphyseal pain after vaginal delivery. It is a tool to provide a good support to the pelvis. It can also reduce pain and prevent changes in pelvic alignment, pelvic support belt has a great efficacy in the management of symphyseal pain after childbirth. Pelvic belt helps to stabilize the pelvis and it is thought to be very effective in relieving symphyseal pain after childbirth, therefore, in clinical practice, it is typically used in conjunction with other treatments such as exercises [5].

Subjects and Methods

Subjects:

This study was conducted to investigate the effect of phonophoresis and pelvic brace on symphysis pubis pain after vaginal delivery. This study was carried on forty multiparous women suffering from symphysis pubis pain for at least 4 months after delivery. They were selected randomly from the outpatient clinic of orthopedic at El-Kaser El-Ainy Hospital during 2022 year. Their ages were ranged from (25-35) years old, their body mass index (BMI) didn't exceed 30 kg/m^2 . And their parity was ranged from (2-4) children. All patients were divided randomly into two groups equal in number as the following: Study Group (group A): This group was consisted of 20 patients. Each patient in this group had received phonophoresis on her pubic area for 10 minutes, 3 times/week for 8 weeks. Also, each patient in this group was asked to perform strengthening exercises for abdominal & pelvic floor muscles, posture correction and posterior pelvic tilting exercises for 60 minutes, 3 times/week for 8 weeks. Additionally to this, each patient was advised to wear a pelvic brace all the day except during sleeping or taking a shower throughout the treatment course. Control Group (group B): This group was consisted of 20 patients. Each patient in this group was asked to perform strengthening exercises for abdominal & pelvic floor muscles, posture correction and posterior pelvic tilting exercises for 60 minutes, 3 times/week for 8 weeks as in group (A). Also, each patient was advised to wear a pelvic brace all the day except during sleeping or taking a shower throughout the treatment course.

Materials:

Consent form: Each patient in both groups (A&B) was asked to sign on the consent form before participating in this study.

Recording data sheet: It was used to record all data of each patient in both groups (A&B) in it before starting the treatment course. It included: name, age, address, occupation, diagnosis, chief complain, type and date of delivery, number of parity, past and present history as well as family history.

Weight-height scale: It was used to measure weight and height of each patient in both groups (A&B).

Ultrasonic device: This device was used to treat all patients in study group (group A).

Ketoprofen gel (Fastum gel): It is non-steroidal anti-inflammatory analgesic drug. It was used during ultrasonic treatment.

Visual analogue scale (VAS): Used in assessment of pain intensity before and after treatment.

Syringes: They were used to withdraw blood samples from each patient in both groups (study group A & control group B) before and after the treatment course to measure cortisol level in blood plasma in the early morning.

Pelvic brace: It was used by each patient in both groups to be worn during treatment course.

Stop watch: It was used to determine the time of each treatment session.

Plinth: It was used by each patient in both groups to receive the treatment session.

White sheets, towels, stole, bottle of alcohol and cotton. Mirror: Used in postural correction exercises.

Condoms: They were used to cover treatment head of ultrasound before it's usage to prevent transfer of infection.

Methods:

(A) Evaluative procedures:

- 1- All data of each patient in both groups (study group & control group) were recorded in the recording data sheet before starting the treatment course.
- 2- Weight and height of each patient in both groups (study group & control group) were measured and BMI will be calculated before starting the treatment course.
- 3- A blood sample of 3cm was withdrawn from the antecubital vein of each patient in both groups before and after the treatment course and it was sent immediately to the laboratory center to measure cortisol level in the blood.

This procedure was done as the following: Each patient in both groups (study group & control group) will be asked to sit on arm chair, the antecubital fossa was cleaned with a piece of cotton immersed in alcohol then a blood sample was withdrawn from the antecubital vein by a disposable sterilized syringe early in the morning. Then all blood samples of all patients were collected in sterilized tubes and they were sent immediately to the laboratory center for analysis. Also, each patient in both groups was asked to put a mark on VAS to estimate intensity of her pain in her symphysis pubis joint. This was done before and after the treatment course (8 weeks).

(B) Treatment procedures:

• *Study group (Group A):*

This group was consisted of 20 patients. Each patient in this group had received ketoprofen phonophoresis on her symphysis pubis joint for 10 minutes, 3 times/week for 8 weeks. Also, each patient in this group was asked to perform strengthening exercises for abdominal & pelvic floor muscles, posture correction and posterior pelvic tilting exercises for 60 minutes, 3 times per week for 8 weeks. Additionally to this, each patient was advised to wear a pelvic brace all the day except during sleep or took a shower throughout the treatment course.

Each patient was asked to Lie on the plinth, in a supine Lying position Then, she was covered with a white sheet except the treated area (symphysis pubis).

The physiotherapist cleaned the skin over symphysis pubis with a piece of cotton immersed in alcohol to decrease skin resistance. Then she covered the transducer head of ultrasonic device with a condom to prevent transferring of infection.

A sufficient amount of Ketoprofen gel (fastum gel) was placed over the skin of symphysis pubis. Then, the physiotherapist handled the transducer head from its hand and switched on the ultrasonic device.

After that, the physiotherapist started to move the transducer head over the skin of symphysis pubis in a circular movement continuously for 10 minutes, then the ultrasound device was switched off.

Later on, the patient was asked to perform strengthening exercises for abdominal & pelvic floor muscles, posture correction and posterior pelvic tilting exercises for 60 minutes.

At the end, the patient was asked to wear her pelvic brace. This procedure was repeated 3 times/week for 8 weeks.

Abdominal strengthening exercises:

(A) Static abdominal exercises:

The mother was asked to lie in crock lying position, the therapist stride standing, the mother was

asked to contract her abdominal muscles and press her back firmly on to the bed. Hold this position for five counts then relax.

(B) Dynamic abdominal exercises included:

Lateral flexion of the pelvis (Hip shrugging): The mother was asked to lie in half crock lying position, the therapist stride standing, the mother was asked to contract her abdominal muscles firmly, then draw the straight leg up towards the ribs to seem shorter, then push it down to seem longer, return to the starting position and relax.

Lateral flexion of the trunk: The mother was asked to lie in supine lying position, the therapist standing beside her, the mother was asked to pull her abdomen in firmly and slide her right hand down toward her right foot. Hold there for five counts then come back to the middle and relax. Then, the mother was asked to repeat the same movement to the left side and relax. This exercise can be done from different position such as: crock lying, sitting, stride standing, prone kneeling and side lying position.

Pelvic rotation exercise: The mother was asked to lie in crock lying position, the therapist stride standing beside her, the mother was asked to pull her abdomen in firmly, and press her shoulders down hard on the table, then roll her knees slowly to the right side until her thigh touches the table. Hold this position for five counts, then bring her knees up to the middle and relax. After that, the mother was asked to repeat the same movement to the left side and relax. Also, it can be done from half cock lying position.

Trunk rotation exercise: The mother in sitting position, the therapist standing beside her, the mother was asked to pull her abdomen in firmly, then rotate her upper trunk to the right side as far as she can, let her head follows the movement and her eyes looking behind her shoulder, while her knees & hips remain facing forward to avoid twisting the knees. Hold in this position for five counts then return to the middle and relax. After that, the mother was asked to rotate her upper trunk to the left side and relax. This exercise can be done from different positions as: Stride standing, prone kneeling and from crock lying position.

The antero-posterior flexion of the trunk (curl-up): The mother was asked to lie in supine lying position, the therapist stride standing beside her, the mother was asked to pull her abdomen in firmly, stretch her hands out in front of her, then raise her head & shoulders and look at her feet, then relax.

• *Control group (Group B):*

This group was consisted of 20 patients. Each patient in this group was asked to perform strengthening exercises for abdominal & pelvic floor muscles, posture correction and posterior pelvic tilting

exercises for 60 minutes, 3 times per week for 8 weeks as in group (A). Also, each patient was advised to wear a pelvic brace all the day except during sleep or took a shower throughout the treatment course.

Statistical analysis:

- Results are expressed as mean ± standard deviation. Comparison between variables in the two groups was performed using unpaired *t*-test.
- Comparison between before- and after-treatment data in the same group was performed using paired *t*-test. Comparison between after treatment data in the two groups was performed using unpaired *t*-test.
- Statistical Package for Social Sciences (SPSS) computer program (version 19 windows) was used for data analysis. *p*-value ≤0.05 was considered significant.

Results

By comparing the two groups (A & B) after treatment regarding to VAS, it was found that, both groups showed statistically (*p*<0.01) significant decrease in VAS score after treatment, group (A) achieved 81.58% while group (B) achieved 31.17% but the percentage of decrease in VAS was more pronounced and more noticeable in group (A) when compared with group (B), this means that Ketoprofen phonophoresis combined with pelvic brace, strengthening exercises for abdominal & pelvic floor muscles, postural correction and posterior pelvic tilting exercises were more effective than using pelvic brace, strengthening exercises for abdominal & pelvic floor muscles, postural correction and posterior pelvic tilting exercises only in relieving symphyseal pain after delivery.

- Comparison between the two groups (study group A & control group B).

Table (1): Illustrate mean ± SD for VAS score before and after treatment for both groups (study group & control group).

Variable	Group A		Group B	
	Before treatment	After treatment	Before treatment	After treatment
Mean ± SD	3.80±0.41	0.70±0.47	3.85±0.37	2.65±1.09
MD	3.1		1.2	
# value	31.00		6.439	
<i>p</i> -value	0.001		0.001	
% of in VAS scores	81.58%		31.17%	
Significance	Highly significant		Highly significant	

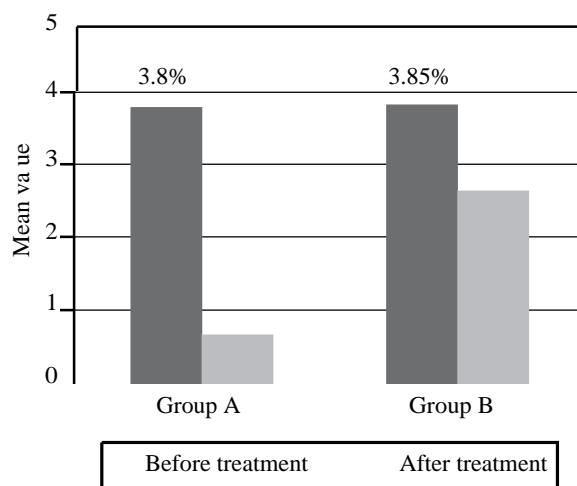


Fig. (1): Illustrates mean values of VAS scores before and after treatment in the two studied groups (A & B).

By comparing the two groups (A & B) after treatment regarding to cortisol level in blood plasma. It was found that, both groups showed statistically (*p*<0.001) significant decrease in cortisol level in blood plasma after treatment, group (A) achieved a percentage of decrease about 65.92% while group (B) achieved a percentage of decrease about 13.44% but the percentage of decrease in cortisol level was more pronounced and more noticeable in group (A) when compared with group (B), this means that Ketoprofen phonophoresis combined with pelvic brace, strengthening exercises for abdominal & pelvic floor muscles, postural correction and posterior pelvic tilting exercises were more effective than using pelvic brace, strengthening exercises for abdominal & pelvic floor muscles, postural correction and posterior pelvic tilting exercises only in relieving symphyseal pain after delivery.

- Comparison between the two groups (A & B).

Table (2): Illustrates mean ± SD for cortisol before and after treatment for both groups (A & B).

Variable	Group A		Group B	
	Before treatment	After treatment	Before treatment	After treatment
Mean ± SD	20.60±2.44	7.02±1.48	20.02±2.46	17.33±3.87
MD	13.58		2.69	
# value	25.949		5.121	
<i>p</i> -value	0.001		0.001	
% of in cortisol level	65.92%		13.44%	
Significance	Highly significant		Highly significant	

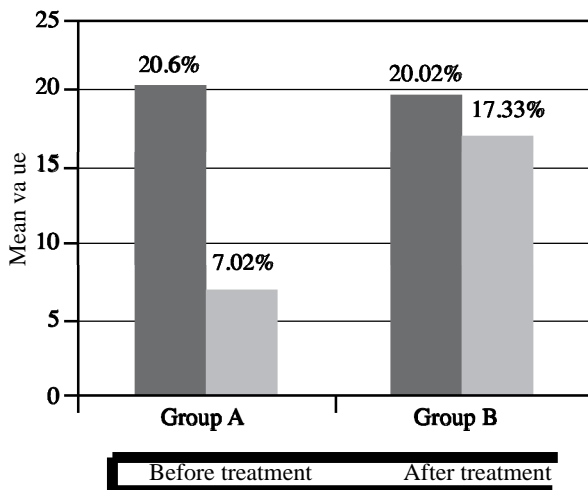


Fig. (2): Illustrates mean values of cortisol measured before and after treatment in the two studied groups (A & B).

Discussion

The results of this study come in agreement with the results of [1] who had made an experimental study to evaluate the effect of Ketoprofen phonophoresis combined with pelvic brace, strengthening exercises for abdominal & pelvic floor muscles, postural correction and posterior pelvic tilting exercises on symphyseal pain after delivery. The results of his study revealed that “Ketoprofen phonophoresis combined with pelvic brace, strengthening exercises for abdominal & pelvic floor muscles, postural correction and posterior pelvic tilting exercises were more effective than using pelvic brace, strengthening exercises for abdominal & pelvic floor muscles, postural correction and posterior pelvic tilting exercises alone in relieving symphyseal pain after delivery”.

The results of the present study are consistent with the results of [2] who stated that. “Phonophoresis is significantly more effective for pain relieve than medication or using ultrasound alone. phonophoresis helps the analgesic drug to penetrate the skin to reach up to 5 cm deep. Ketoprofen phonophoresis provides significant pain-relieving effect for symphysis pubic pain”.

The results of the present study come in agreement with the results of [3] who stated that “Phonophoresis is the method of using ultrasound waves to increase skin permeability in order to improve the effectiveness of transdermal drug delivery. Phonophoresis is able to achieve specific and efficient delivery of drugs through the skin and ensure that the drug reaches the target area in the tissue environment [4]. Stated that “Phonophoresis is a non-invasive procedure that is commonly, used in the physical therapy field to treat many musculoskeletal conditions because it has the ability to reduce inflammation, alleviate pain and improve the func-

tional performance of the patients. The experimental studies showed that Ketoprofen phonophoresis has great efficacy on symphysis pubis pain after vaginal delivery”. This agrees with the results of the current study.

The results of the present study are consistent with the results of [5] stated that. “Phonophoresis has become a very popular clinical technique for the management of musculoskeletal injuries. This technique has been widely used in physical therapy field to relieve pain & reduce inflammation in so many musculoskeletal conditions such as symphysis pubis pain, carpal tunnel syndrome and coccydynia” [4] reported that. “Ketoprofen gel is a nonsteroidal anti-inflammatory drug. Several studies demonstrated that “Ketoprofen phonophoresis provides significant pain-relieving effect in symphysis pubis pain and the results are amazing”. This agrees with the results of the current study.

[6] reported that “Phonophoresis also known as sonophoresis or ultra sonophoresis, is when an ultrasound is used to maximize the effects of a topical drug. The ultrasound waves push particles of pain-relieving or anti-inflammatory drugs deeper into the subcutaneous tissue. For this reason, it is usually recommended to reduce inflammation and relieve pain in cases of symphysis pubis pain after vaginal delivery and the results are amazing”. This comes in agreement of the present study.

Phonophoresis is a safe and painless procedure with no side effects like medications. It is a good treatment option to relieve pain, reduce inflammation and swelling in cases of symphysis pubis joint pain after vaginal delivery [2]. This confirms the results of the current study.

The results of the present study confirm the results of [7] who stated that “Pelvic belts are commonly used as the primary option to treat women with symphyseal pain after childbirth. Pelvic belt is a tool to correct pelvic misalignment in addition to reduce joint pain. Pelvic belt helps to stabilize pubic joint and it is the key to support the pelvic bones, holding them firmly in their place”.

[8] reported that “Pelvic belt provides the mother with maximum comfort, improves her lifestyle and makes activities of daily living easier for her. In clinical practice, pelvic belt is usually used with other treatments such as Ice, Exercises and other physical therapy modalities”. This comes in agreement with the results of the current study.

All experimental studies confirmed that, “The pelvic support belt has a great efficacy in the management of symphyseal pain after childbirth. Pelvic belt helps to stabilize the pelvis and it is thought to be very effective in relieving symphyseal pain after childbirth, therefore, in clinical practice, it is typically used in conjunction with other treatments such

as exercises” [9]. This agrees with the results of the current study.

[1] demonstrated that “Pelvic belts are commonly used as the primary option to treat women with symphyseal pain after childbirth. Pelvic belt is a tool to correct pelvic misalignment in addition to reducing joint pain. Pelvic belt helps to stabilize pubic joint and it is the key to support the pelvic bones, holding them firmly in their place. Pelvic belt provides the mother with maximum comfort, improves her lifestyle and makes activities of daily living easier for her”. This comes in agreement with the results of the current study.

Conclusion:

Phonophoresis and pelvic brace were effective in relieving symphysis pubis pain after delivery.

References

- 1- JAIN, et al. (2022): Pelvic joint relaxation from an orthopedic point of view. *Acta. Orthop. Scand*, 2020.
2. REBECCA, et al. (2019): Pelvic girdle relaxation, suggested new nomenclature. *Scand J. Rheumatol.*, 2021.
- 3- NECOL, et al. (2020): Pelvic girdle pain during and after pregnancy. *Scand J. Rheumatol.*, 2022.
- 4- ASLAN, et al. (2022): Pelvic relaxation syndrome. In O’Grady J.P., Burkman R.T., eds. *Obstetric Syndromes & Conditions*. New York: Parthenon Publishing, 2023.
- 5- CHANDLER, et al. (2021): Understanding peripartum pelvic pain. *Spine*, 21: 1363-70, 2019.
- 6- CHIROP, et al. (2021): Pelvic joints pain after pregnancy: Pelvic arthropathy of pregnancy. *J. Obstet. Gynaecol. Br. Emp*, 47 (5): 493-524, 2020.
- 7- JOSEF, et al., (2022): Studies on insufficientia pelvis (gravidarum et puerperarum). *Acta. Obstet. Gynecol. Scand*, 28: 1-37, 2021.
- 8- MORES, et al. (2021): Persistent pelvic pain and pelvic joint instability. *Eur. J. Obstet. Gynecol. Reprod Biol.*, 41: 197-201, 2022.
- 9- BARBARA, et al. (2022): Pelvic joints pain in late pregnancy. *Surg. Gynecol. Obstet.*, 58: 595-613, 2023.
- 10- FREDRIC D.: Perinatal symphysis pubis dysfunction: A review of the literature. *J. Assoc. Chart Physiotherapists Womens Health*, 85: 11-8, 2018.
- 11- WELLOCK V.: The ever widening gap-symphysis pubis dysfunction. *Br. J. Midwifery*, 10 (6): 348-53, 2019.
- 12- DAVIDSON M.R.: Examining separated symphysis pubis. *J. Nurse-Midwifery*, 41 (3): 259-62, 2021.
- 13- ARENS R.A. and STEWART E.: Traumatic separation of the symphysis pubis during spontaneous labor. *Surg. Gynecol. Obstet.*, 55: 336-54, 2020.
- 14- NELSON D.R.: Separation of the symphysis pubis in association with childbearing: A case report. *J. Bone J. Surg. Am.*, 70A: 289-92, 2022.
- 15- GHARBEL R. and DEKEL S.: Traumatic separation of the symphysis pubis during pregnancy: A case report. *J. Trauma*, 38 (2): 255-6, 2023.

تأثير مادة الكيتوبروفين المدخلة بواسطة الموجات الصوتية وحزام الحوض على آلام ارتفاق العانة بعد الولادة

يهدف هذا البحث إلى معرفة تأثير مادة الكيتوبروفين وحزام الحوض على آلام ارتفاق العانة بعد الولادة الطبيعيه. أجريت هذه الدراسة على أربعين امرأة يعانين من الام ارتفاق العانة استمر على الاقل لمدة اربعة اشهر بعد الولادة تراوحت أعمارهم ما بين ٢٥ و ٣٥ عاماً، لم يتعدى مؤشر الكتلة ٣٠ كجم / م، وتراوحت عدد الولادات بين (٢-٤) طفل تم توزيعهم عشوائياً فى مجموعتين متساويتين:

المجموعة (أ): اشتملت هذه المجموعة على عشرين مريضة تلقين العلاج عن طريق مادة الكيتوبروفين المدخلة بواسطة الموجات الصوتية لمدة ١٠ دقائق، ثلاث مرات أسبوعياً، لمدة ٨ أسابيع بالإضافة الى التمرينات العلاجية مثل (تمارينات تقويه عضلات البطن وتمارين الحوض وتمارين تصحيح الوضع وتمارين العضله الداخليه لاسفل الحوض) ولمده ٦٠ دقيقه. ونُصح كل فرد بداخل هذه المجموعة بارتداء حزام الحوض طول الوقت ماعدا اثناء النوم او الاستحمام.

المجموعة (ب): اشتملت هذه المجموعة على عشرين مريضة تلقين العلاج عن طريق التمارين العلاجية مثل (تمارينات تقويه عضلات البطن و تمارين الحوض وتمارين تصحيح الوضع وتمارين العضله الداخليه لاسفل الحوض) وذلك لمدة ٦٠ دقيقه ولمده ٨ اسابيع . ونُصح كل فرد بداخل هذه المجموعة بارتداء حزام الحوض طول الوقت ماعدا اثناء النوم او الاستحمام.

وقد تم تقييم المرضى عن طريق - اختبار مقياس النظرى البصري وقياس مستوى الكورتيزون فى بلازما الدم وقد أظهرت نتائج البحث وجود فرق ذو دلالة إحصائية فى كل من المجموعتين بعد العلاج. وبمقارنه نتائج المجموعتين وجد التالى:

- وجود نقص ذو دلالة إحصائية فى المؤشر البصرى للألم الصالح للمجموعة (أ).
- وجود زيادة ذو دلالة إحصائية فى مستوى الكورتيزون فى الدم لصالح المجموعة (أ) .

نستخلص من نتائج البحث أن مادة الكيتوبروفين المدخلة بواسطة الموجات الصوتية ذو فاعليه فى تحسن الألم لدى السيدات اللاتى يعانين من الام ارفاق العانة بعد الولاده.