

## Effect of Specific Exercise Program Augmented by Pelvic Support Belts on Symphysis Pubis Dysfunction

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### Abstract

**Background:** Symphysis Pubis Dysfunction (SPD) is a relatively common and debilitating condition affecting pregnant women. It is painful and can cause significant decrease in quality of life. SPD occurs where the joints become sufficiently relaxed which led to instability in the pelvic girdle.

**Purpose:** To determine the effect of specific exercise program augmented by pelvic support belts on symphysis pubis dysfunction in pregnant women.

**Methods:** Thirty pregnant women participated in this study. Pregnant women were assigned into two equal groups; Group A: Was the study group and Group B: Was the control group. Data of visual analogue scale, Oswestry Disability Index (ODI), and ultrasonography were collected from each woman pre and post-treatment.

**Results:** The results showed significant improvement in pain intensity, functional disability in the Group A compared with Group B.

**Conclusion:** It can be concluded that specific exercise program and pelvic support belts are effective physical therapy methods for treating symphysis pubis dysfunction in pregnant women and should be recommended in antenatal physical therapy program.

**Key Words:** *Symphysis pubis dysfunction – Pelvic support belt – Specific exercise program.*

### Introduction

**SYMPHYSIS** pubis dysfunction has been described as a collection of signs and symptoms of discomfort and pain in the pelvic area, including pelvic pain radiating to the upper part of thighs and perineum. Complaints vary from mild discomfort to severe and debilitating pain than can impede mobility [1].

Symphysis Pubis Diastasis (SPD) occurs due to the physiological pelvic ligament relaxation and increased joint mobility that is seen in pregnancy due to increased relaxin hormone levels which increased at about 10 weeks of pregnancy and relaxin hormone will return to normal level at 4 to 12 weeks post-partum [2].

Clinically, the woman complains of pain with swelling. In some cases it is possible to hear a clicking sound when the patient walks. The pain increases when manual pressure is applied to the pelvis in the antero-posterior direction. A small percentage of women can develop chronic pain requiring a surgical intervention to fuse symphysis pubis. Lesions along the genitourinary tract may also be present due to symphysis pubis diastasis [3].

In some studies reported that diastasis of the symphysis pubis was a serious and under diagnosed obstetric problem with increased incidence both antenatally and postnatally. Women present with inability to weight bear owing to severe suprapubic and groin pain [4]. They complain of inability to turn in bed or to perform any movement involves hip abduction and there is marked tenderness on palpation over symphysis pubis [5].

Most investigators had stated that "separation of more than 1cm is pathologic with rupture of the four symphyseal ligaments, symphysis pubis become unstable and symphyseal width above 10mm (1cm) was used as a definition of pelvic instability and cause symphyseal pain. The pelvic belt or the trochanteric belt is usually prescribed for sacroiliac and/or symphysis pubis pain. The pelvic belt fastens around the pelvic ring. The use of a pelvic belt reduces the ability of the pelvic bones of an indi-

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vidual to be pushed outwardly from each other during movement. The passive support mechanism of the pelvic belt can be effective in reducing the range of pelvic back and forward movement [6].

Maternity support belts were most preferred by pregnant woman because it was easy to wear, adjust and remove and it allowed a wider range to fit for the increasing abdominal girth. The maternity support belts are also known as pelvic supports, pelvic belts, sacroiliac or trochanteric support belts which are designed to alleviate pain in lumbar and pelvic regions. Application of a pelvic belt significantly decreases hyper-mobility of the symphysis pubis and sacroiliac joints [7].

*The aim of the study:* The study was to investigate the efficacy of specific exercise program and pelvic support belt on treatment of symphysis pubis dysfunction.

### Material and Methods

This study included 30 multiparous pregnant women having symphysis pubis dysfunction, their gestational age (24-32), they were selected randomly from out-patient clinic for Obstetrics and Gynaecology at Ain-Shams General Hospital from January 2016 to March 2017. The women were divided into two equal groups:

*Group (A) (study group):* 15 pregnant women were treated by specific exercise program and wearing pelvic support belt only.

*Group (B) (control group):* 15 pregnant women had advices only.

#### *Inclusion criteria:*

- Women age will range from 20 to 35 years.
- Women BMI will not exceed  $34\text{kg/m}^2$ .
- Have pain in the region of the symphysis pubis, with or without radiation to the groin.
- Have pain of insidious onset; that is, a specific injury (e.g., a fall, did not initiate the pain).
- Have tenderness on palpation of the symphysis pubis.
- Have a positive Active Straight Leg Raising (ASLR) test.

#### *Exclusion criteria:*

- Medical conditions preventing the use of pelvic support belts, for example, some types of placenta previa.

- Posterior (sacroiliac joint or lumbar spine) pain that was considered by the woman to be worse than the symphysis pubis pain.

#### *Instruments and procedures:*

A- *Instrumentations:* Instruments used in this study were divided into an assessment and treatment.

##### 1- *Assessment instruments:*

- Visual Analogue Scale (VAS): It is a single item scale for pain intensity, it helps women to communicate how much symphysis pain they are experiencing [8].
- Oswestry Disability Index (ODI): It is a self-rating condition-specific measure for evaluation of disability, it consists of ten sections and each of them has six statements describing functional impairments in a series of daily activities.

For each section of six statements the total score is 5; if the first statement is marked the score equal 0; if the last statement is marked the score equal 5 [9].

- Ultrasonography: It is used to estimate the amount of separation between two symphysis pubis or symphysis distension. To monitor symphysis diastasis accurately, use a 7.5MHz linear array transducer [10].

##### 2- *Treatment instruments:*

- Pelvic support belts: Pelvic belt used was relatively simple, safe, durable and formed of a light weight for each pregnant woman in Group (A).
- Specific exercise program: 5 types of exercises were done by each woman in Group (A).

B- *Procedure: (Assessment and treatment):*

##### 1- *Assessment procedure:*

- Visual analogue scale: Each pregnant woman was asked to place a mark at the point on a line to show the intensity of her pain feeling between "no pain" to "unbearable pain".
- Oswestry Disability Index (ODI): Every woman was asked to circle one score in each item which most closely described his problem at the beginning of the treatment. Each item has 0-5 scores and the higher the score, the more disable the patient.
- Ultrasonography: Every woman was diagnosed by ultrasound to estimate the amount of separation between two symphysis pubis or symphysis distension.

2- *Treatment procedure:* Group (A): Each patient in this group received 3 sessions per week for 4 weeks; each session was last for 30 minutes and had the following:

1- *Specific exercise program:* Women were given the following exercises:

- *Abdominal stabilization exercise:* “In crock lying position, gently contract your abdominal muscles and press lumbar region down, hold for 5 seconds then relax, repeat 5 times and continuing to breathe normally.”
- *Pelvic floor exercise:* “Sitting tall, squeeze to close around your openings, hold for 5 seconds then relax, repeat 5 times and continuing to breathe normally.”
- *Gluteus maximus exercise:* “Sitting or standing, squeeze your buttocks together, hold for 5 seconds then relax and repeat 5 times.”
- *Latissimus dorsi exercise:* “Sit on chair in front of a table or a closed door, grasp the table or the door handle with both hands and pull towards you, holds for 5 seconds and repeat 5 times.”
- *Hip adductor exercise:* “Sitting down, put your fist or a rolled towel between your knees then squeeze knees together, hold for 5 seconds and repeat 5 times.”

2- *Pelvic support belt:* Fifteen women were advised to wear pelvic support belt aliened over symphysis pubis (low position) at waking hours at least 7 hours per day for 4 weeks.

3- *Advices:*

- Avoid activities which cause discomfort, e.g. lifting, carrying, prolonged standing, walking and strenuous exercise.
- Rest more frequently.
- Avoid straddling and squatting movements (hip abduction), e.g. when getting in and out of a car or bath.
- Adopt good posture, avoid bending and twisting.

It is essential that you tighten the muscles of your pelvic floor and lower abdomen before and during the activities of daily living.

*Remember to:*

- Sleep with a flat pillow between the legs.
- Take rest breaks.
- Move within the limit of pain.

*Avoid:*

- Sitting on soft sofas and chairs.
- Walking as an exercise.
- Active stretching and exercising with legs apart (e.g., squatting, sitting cross-legged, or breast stroke kicking when swimming).

*Group (B):*

Fifteen women received the previous advices only.

*Data analysis:*

The collected data will be statistically analyzed by using paired *t*-test for comparing each group before and after treatment and comparing between the two groups.

## Results

Thirty pregnant females participated in this study. They were divided randomly into two groups, fifteen in each group. The first group was the study Group (A) who received specific exercise program in addition to wear pelvic support belt, their mean age and BMI were  $27.4 \pm 3.81$  years and  $28.33 \pm 3.77$  kg/m<sup>2</sup> respectively, their mean gestational age was  $25.4 \pm 3.45$  weeks. The second group was the control Group (B) who received advices only, their mean age and BMI were  $28.93 \pm 4.25$  years and  $29.66 \pm 3.08$  kg/m<sup>2</sup> respectively, their mean gestational age was  $26.86 \pm 1.95$  weeks.

As indicated by the independent *t*-test, there were no significant difference ( $p > 0.05$ ) in the mean values of age, body mass, and gestational age between both tested groups.

The visual analogue scale mean values pre-treatment in both Groups (A & B), as shown in (Table 1): The mean  $\pm$  SD VAS pre-treatment of study group was  $6.6 \pm 1.35$  and that of control group was  $6.73 \pm 1.16$ . There was no significant difference.

The visual analogue scale mean values post-treatment in both Groups (A & B), as shown in (Table 2): The mean  $\pm$  SD VAS post-treatment of study group was  $3.4 \pm 1.5$  and that of control group was  $8 \pm 1.06$ . There was a high significant difference.

The oswestry disability index mean values pre-treatment in both Groups (A & B), as shown in (Table 3): The mean  $\pm$  SD ODI pre-treatment of study group was  $48.46 \pm 8.31$  and that of control group was  $46.26 \pm 12.21$ . There was no significant difference.

The oswestry disability index mean values post-treatment in both Groups (A & B), as shown in

(Table 4): The mean ± SD ODI post-treatment of study group was 26.8± 10.23 and that of control group was 54.46± 14.98. There was a high significant difference.

The diastasis of symphysis pubis mean values pre-treatment in both Groups (A & B), as shown in (Table 5): The mean ± SD diastasis of symphysis pubis pre-treatment of study group was 13.53± 1.79

Table (1): *t*-test for comparison between pre-treatment mean values of VAS of both groups (study and control).

	Study group X ± SD	Control group X ± SD	MD	<i>t</i> - value	<i>p</i> - value	Sig
VAS	6.6±1.35	6.73±1.16	-0.13	-0.29	0.77	NS

X : Mean.  
MD : Mean Difference.  
*p*-value : Probability value.

SD : Standard Deviation.  
*t*-value : Unpaired *t*-value.  
NS : Non Significant.

Table (3): *t*-test for comparison between pre-treatment mean values of ODI of both groups (study and control).

	Study group X ± SD	Control group X ± SD	MD	<i>t</i> - value	<i>p</i> - value	Sig
ODI	48.46±8.31	46.26±12.21	2.2	0.57	0.56	NS

X : Mean.  
MD : Mean Difference.  
*p*-value : Probability value.

SD : Standard Deviation.  
*t*-value : Unpaired *t*-value.  
NS : Non Significant.

Table (5): *t*-test for comparison between pre-treatment mean values of diastasis of symphysis pubis of both groups (study and control).

	Study group X ± SD	Control group X ± SD	MD	<i>t</i> - value	<i>p</i> - value	Sig
Diastasis of symphysis pubis (mm)	13.53±1.79	13.9±1.38	-0.37	-0.63	0.53	NS

X : Mean.  
MD : Mean Difference.  
*p*-value : Probability value.

SD : Standard Deviation.  
*t*-value : Unpaired *t*-value.  
NS : Non Significant.

### Discussion

In the present study, there was a highly significant improvement of Visual Analogue Scale (VAS) and Oswestry Disability Index (ODI) in response to specific exercise program and pelvic support belt.

The results of current study were supported by Depledge et al., who found that there was a significant reduction of pain and improvement in function in response to exercises, pelvic support belts and advices for pregnant women with symphysis pubis dysfunction [11].

One of the recent studies that support our results was applied by Joosoph et al., a conservative

management of symphseal pain by using pelvic corset or pelvic belt was very important to obtain the correct posture of pelvis in its position, which increases stability of pelvic joints [12].

The diastasis of symphysis pubis mean values post-treatment in both Groups (A & B), as shown in (Table 6): The mean ± SD diastasis of symphysis pubis post-treatment of study group was 13.57± 1.82 mm and that of control group was 14.38± 1.41mm. There was no significant difference.

Table (2): *t*-test for comparison between post-treatment mean values of VAS of both groups (study and control).

	Study group X ± SD	Control group X ± SD	MD	<i>t</i> - value	<i>p</i> - value	Sig
VAS	3.4±1.5	8±1.06	-4.6	-9.66	0.0001	S

X : Mean.  
MD : Mean Difference.  
*p*-value : Probability value.

SD : Standard Deviation.  
*t*-value : Unpaired *t*-value.  
S : Significant.

Table (4): *t*-test for comparison between post-treatment mean values of ODI of both groups (study and control).

	Study group X ± SD	Control group X ± SD	MD	<i>t</i> - value	<i>p</i> - value	Sig
ODI	26.8±10.23	54.46±14.98	-27.66	-5.9	0.0001	S

X : Mean.  
MD : Mean Difference.  
*p*-value : Probability value.

SD : Standard Deviation.  
*t*-value : Unpaired *t*-value.  
S : Significant.

Table (6): *t*-test for comparison between post-treatment mean values of diastasis of symphysis pubis of both groups (study and control).

	Study group X ± SD	Control group X ± SD	MD	<i>t</i> - value	<i>p</i> - value	Sig
Diastasis of symphysis pubis (mm)	13.57±1.82	14.38±1.41	-0.81	-1.36	0.18	NS

X : Mean.  
MD : Mean Difference.  
*p*-value : Probability value.

SD : Standard Deviation.  
*t*-value : Unpaired *t*-value.  
NS : Non Significant.

management of symphseal pain by using pelvic corset or pelvic belt was very important to obtain the correct posture of pelvis in its position, which increases stability of pelvic joints [12].

This also come in agreement with one pilot study done by Carr, (2003) using a prospective, two group design showed appositve effect in pain scores and on daily activities after using a maternity support belts for relief of pregnancy related back and pelvic pain [13].

The results of the study come in opposite direction with the study of Yoo et al., who described that an wide separation >4cm is usually associated with skin-rupture of sacroiliac joint, instability of the pelvic ring and symphysis pubis which neces-

sitates a surgical intervention with open reduction and internal fixation due to unendurable pain because conservative treatment as analgsics and pelvic belts had no effect on relieving symphyseal pain or symphyseal dysfunction [14].

#### Conclusion:

From the statistical point of view, the obtained results showed a statistically significant decrease in VAS and ODI of study group compared with control group post-treatment ( $p=0.0001$ ).

But, the obtained results showed no significant difference in mean values of diastasis of symphysis pubis between both groups post-treatment ( $p=0.18$ ). Nevertheless, there is a percentage of improvement in values of diastasis in study group post treatment compared with control group.

Accordingly, it could be concluded that the use of specific exercise program augmented by pelvic belt appeared to be effective in relieving antenatal symphyseal pain which led to improvement in activities of daily living.

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## تأثير برنامج تمارين محدد تضاف إليه الأحزمة الداعمة للحوض على ضعف وظيفة مفصل الإرتفاق العانة

المقدمة: يعد خلل وظيفة مفصل الإرتفاق العانى لدى السيدات الحوامل من أكثر المشكلات شيوعا والتي تؤثر على أداء كافة الأنشطة اليومية.

الهدف من الدراسة: هو معرفة مدى تأثير برنامج التمارين المحدد بالإضافة إلى إرتداء الحزام الداعم للحوض على وظيفة مفصل الإرتفاق العانى.

منهج البحث: وقد تضمن البحث ثلاثين سيدة تعانى من خلل وظيفى لمفصل الإرتفاق العانى أثناء الحمل، وقد تم إختيارهم من العيادة الخارجية لقسم النساء والتوليد بمستشفى عين شمس العام، وتقسيمهم إلى مجموعتين (أ) ، (ب) متساويتين فى العدد، تلقت مجموعة الدراسة برنامج تمارين محدد لعضلات البطن والحوض والفخذين بالإضافة إلى إرتداء الحزام الداعم للحوض، فى حين تلقت المجموعة الضابطة النصائح العامة فقط، وذلك من خلال ثلاث جلسات أسبوعيا لمدة أربعة أسابيع، وقد تم إختبار الألم البصرى وإختبار أوسويستري بالإضافة إلى الموجات الصوتية التشخيصية مرتين قبل وبعد العلاج.

النتائج: كان هناك فرق كبير بين المجموعتين بعد العلاج فى متغيرين وهما إختبار الألم البصرى وإختبار أوسويستري لصالح مجموعة الدراسة، بينما لم يكن هناك فرق كبير فى نتائج الموجات الصوتية التشخيصية، ومع ذلك كانت هناك نسبة من التحسن لصالح مجموعة الدراسة.

الإستنتاج: يعتبر برنامج التمارين المحدد المضاف إليه الأحزمة الداعمة للحوض عاملا فعالا فى تحسين حالات خلل وظيفة مفصل الإرتفاق العانى لدى السيدات الحوامل.