



RESEARCH ARTICLE

EFFECT OF KINESIOTAPING ON POSTPARTUM COCCYDYNIA

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ABSTRACT

This study conducted to investigate the effect of kinesiotape on pain and disability in postpartum women who suffering from coccydynia. Forty women suffering from postpartum coccydynia, their age ranged from 25 to 35 years old, also their body mass index (BMI) ranged from 25- 35kg/m². They were selected from outpatient clinic of Gynecology department of Kasr El Ainy University Hospital, duration of the study was 6 months, from January to May 2021. All women were randomly divided into two groups equal in number (20 for each); group A (Study group): received traditional medical treatment consists of non-steroidal anti-inflammatory drugs (ketoprofen-25 mg tablets twice daily) in addition to kinesiotaping on coccygeal region, once per day, 3 days per week for four week. While, group B (Control group) received traditional medical treatment consists of non-steroidal anti-inflammatory drugs only (ketoprofen-25 mg tablets twice daily). Pain intensity level was evaluated by visual analogue scale and Oswestry Disability Questionnaire Index was used to assess disability level. A statistically significant decrease in pain intensity and statistical significant improvement in functional performance levels in the study and control ($P < 0.001$) was observed in the findings of this study, but when compared between results of the two groups, we found that the study group (A) displayed a statistically significant decrease in pain ($P=0.001$) and statistically significant improvement in functional performance level ($P=0.0001$) than control group (B), which treated by traditional medical treatment only. Finally, based on the obtained results of this study, adding kinesiotape to the postpartum coccydynia treatment produced a statistically significant improvement in physical performance. So, kinesiotaping should be considered an adjunctive treatment method for postpartum coccydynia.

INTRODUCTION

The postpartum period is the period after delivery of concepts when maternal physiological and anatomical changes return to the non-pregnant state (1). The postpartum period, also known as puerperium, starts following the expulsion of the placenta until complete physiological recovery of various organ systems (2). The postpartum period divides into three arbitrary phases: acute phase extends for the first 24 hours after delivery of the placenta, early stage; up to 7 days, and late stage extends from six weeks up to 6 months. Each phase has its unique clinical considerations and challenges (3). Physiological changes is generalized physical fatigue immediately after delivery. The pulse rate may be elevated a few hours after childbirth due to excitement or pain and usually normalizes on the second day. The blood pressure could be elevated due to pain or excitement but is generally in the normal range (4).

The temperature is slightly elevated up to 37.2°C (99°F) along with increased shivering, sweating, or diaphoresis in the first 24 hours and normalizes within 12 hours (5). The respiratory rate also begins to fall back to the pre-pregnancy level within 2 to 3 days. A rise of temperature beyond the third day or over the upper limit is usually a sign of infection (6). Coccydynia is a term refers to painful condition in and around the coccyx. This symptom is typically a discomfort or pain which is felt when sitting, it may be worsened with other hip extension activities such as stair climbing. It may affect all ages and gender, but the prevalence is five times greater in women than men (7). The majority of cases were found to be aggravated by pregnancy and childbirth (postpartum). In postpartum coccydynia there is no free interval between childbirth and occurrence of the pain. It appears very soon after the childbirth, as soon as the sitting position adopted (8). Coccyx morphology, body mass index, vaginal delivery, instrumental delivery, multiparity, mature age and short perineum in women with difficult delivery are risk factor (9). Avulsion injury of the levatorani muscle, specifically of the pubococcygeal segment, is a common occurrence in postpartum women who had

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undergone a vaginal delivery (10). It showed that 90% of women experience low back pain during pregnancy, and almost of them report having low back pain after delivery. Majority of pregnant women report low back pain. Parity, low back pain and pelvic during previous pregnancy, body mass index, a history of hypermobility are factors influencing the risk of developing low back pain during pregnancy (11). Physiotherapy assessment aims to identify impairments that may have contributed to the onset of the pain, or increase the likelihood of developing persistent pain. These include biological factors (e.g. weakness, stiffness), psychological factors (e.g. depression, fear of movement and catastrophizing) and social factors (e.g. work environment). The subjective assessment (history taking) is by far the most important part of the assessment with the objective assessment (clinical testing) confirming or refuting hypothesis formed from the subjective (12).

Kinesiotaping theory is based on the neurophysiological mechanisms and the effect of mechanical stimuli on various systems in the body: Central Nervous system (CNS): Kinesiotaping applied on the skin with varying degrees of stretch creates a mechanical stimulus and activates an afferent pathway to CNS (13), skin: Kinesiotaping produces pressure and stretch on the skin that may be able to stimulate mechanoreceptors. This stimulus interacts with CNS and modulates pain responses (14, 15), and Lymphatic and Circulatory System: the application of Kinesiotaping facilitates the opening of micro valves due to a dynamic pressure variation as a result of alteration in skin density. This decompression activates lymphatics in the dermis and improves lymphatic flow. The end result is tissue inflammation and swelling reduction (16, 17). Kinesiotape is used to lift the skin over tense, and knotted muscles. When the area is decompressed, pain receptors send a new signal to the brain, and tension in the pain was reduced and flexibility increased for people when kinesiology tape and manual pressure were used together (18). Kinesiology tape is also used to add extra support to muscles or joints that need it. If you have patella-femoral stress syndrome, iliotibial band friction syndrome or Achilles tendonitis, kinesiology taping might help you. Unlike white medical or athletic tape, kinesiotaping lets you move normally (19).

Efficacy of kinesiology tape are enhance athletic performance, relieve the pain, improve circulation, decrease the swelling, promote heal up, support soft tissue, relax soft tissue, exercise soft tissue, correct posture and protect muscle (20, 21). Kinesiology tape is also used to add extra support to muscles or joints that need it (22). Use Kinesiotaping to relieve coccydynia, lower back pain and pressure, provide proprioceptive support, increase circulation to promote the healing process, support soft tissue and correct posture. Relief is generally felt immediately and allows the body to return to a healthy posture and normal function (23). It is used to induce extra subcutaneous space, which changes posture gradient in the area underneath the skin. That change in pressure enhances the flow of lymphatic fluid (24). Kinesiotape has been widely used in: protect the joints, muscles, fascia and relieve pain during exercise, reduce the impact on joints and tendons, promote circulation of blood, ease muscle tension; Auxiliary correcting deformities, tendon contracture, acute or chronic tendon injury, muscle recover therapy (25). Applying the KT, physiological effects would include a decrease in pain by stimulating the neurological

system, restore correct muscle function by supporting weakened muscles, remove congestion of lymphatic fluid or hemorrhages under the skin, and correct misalignment of joints by reducing muscle spasms. After applying the tape, the taped area form convolutions, thus increasing the space between the skin and muscles. Once the skin is lifted, the flow of blood and lymphatic fluid is promoted (26).

SUBJECTS, MATERIALS, AND METHODS

This study was designed to study the effect of kinesiotape on pain and disability in postpartum women suffering from coccydynia.

SUBJECTS: This study was conducted on forty postpartum women suffering from Coccydynia diagnosed and referred by gynaecologist. The participants ages ranged from 25 to 35 years old. Their body mass index (BMI) ranged from 25 to 35kg/m². They were selected randomly from Kasr El Ainy University Hospital (Department of Obstetrics and Gynecology), duration of the study 6 months, from 27 January from 29 May. It was performed after the Ethical committee number P.T.REC/012/003221, faculty of physical therapy Cairo University.

Group design of patients: Randomized, controlled, experimental trial:

Study group (G1): It included 20 patients in 1st week after delivery. They received traditional medical treatment consists of non-steroidal anti-inflammatory drugs (ketoprofen-25 mg tablets twice daily), in addition to kinesiotape on coccygeal region, once per day, 3 sessions per week for 4 week (total 12 session).

Control group (G2): It included 20 patients in 1st week after delivery. They received traditional medical treatment consists of non-steroidal anti-inflammatory drugs only (ketoprofen-25 mg tablets twice daily).

MATERIALS (EQUIPMENT): The equipment of this study was divided into two different categories; measurement equipment and treatment equipment:

Measurement equipment: The following measurement instruments were used in this study:

Informed consent form: It's a freely and voluntarily written consent signed by each patient before participating in the research study.

Recording datasheet: It contains data and information about name, age, address, weight, height, blood pressure, and family history of hypertension.

Height and Weight scale: A Health scale was used to determine the height, weight, and body mass index for all women participants before the beginning of the study for both groups (A&B).

Visual analogue scale: Assessment of pain was performed before and after treatment. It is a measurement instrument for subjective characteristics or attitudes that cannot be directly measured

Oswestry Low Back Pain Disability Questionnaire: This questionnaire was used to assessment low back pain. It used to assess pain intensity for both groups (A & B) before and after treatment (27).

Treatment equipment: The treatment was achieved by the following equipment:

Kinesiotape: The definitive rehabilitative taping system of knowledge, is designed to facilitate the body's natural healing process while providing support and stability to muscle and joints without restricting the body's range of motion

METHODS (PROCEDURES)

All patients were given a full explanation of the study protocol and signed on an approved written consent before participating in this study.

Evaluative Procedures: Measurement and assessment were performed before the beginning of treatment and after completing five weeks of both groups' treatment.

History Taking: All data of each patient were recorded in a recording datasheet including name, age, weight, height.....etc.

Weight and height measurement: Weight, height, and BMI were measured by height and weight body scale. The patients wore a thin layer of clothes during the measurement.

Oswestry Disability Questionnaire Index:

This questionnaire was used for assessment low back pain. The questionnaire examined perceived level of disability in 10 everyday activities of daily living this questionnaire has been designed to give us information as to how your back pain has affected your ability to manage everyday life. There were 10 questions, each question has score from 0 to 5(28).

- I have no pain at the moment. Score = 0
- The pain is very mild at the moment. Score = 1
- The pain is moderate at the moment. Score = 2
- The pain is fairly severe at the moment. Score = 3
- The pain is very severe at the moment. Score = 4
- The pain is the worst imaginable at the moment. Score = 5

Ask women to answer each item in questionnaire. Each of the items in ODI is scored from 0 to 5. Answers closer to 0 reflect no or little impairment or inability to continue with the assessed activity. Answers closer to 5 reflect an increased severity in the pain related dysfunction. To obtain the ODI score, the individual points awarded to the chosen answers are summed and the overall score ranges between 0 and 50 or 0 and 100% (in order to obtain the percentage figure, the ODI score is multiplied by 2).

Treatment Procedures

Medical treatment: This procedure was applied for both groups (A&B), They received traditional medical treatment consists of non-steroidal anti-inflammatory agents (ketoprofen-25 mg tablets twice daily).

Kinesiotaping: This procedure was applied to the study group (A) only. Before starting the first treatment session, each patient was instructed briefly about the nature of the treatment to gain the patient's confidence and cooperation. Use Kinesiology tape to relieve lower back pain and pressure, provide proprioceptive support, and increase circulation to promote the healing process. Relief is generally felt immediately and allows the body to return to a healthy posture and normal function. Instruction to perform Kinesiotaping:

- The first step to taping a low back is making sure the skin is prepped and clean. So make sure use rubbing alcohol to clean the skin.
- To begin, cut two long-strips and round the corners of the tape so it doesn't catch on clothing.
- Therapist apply decompression strip first with higher tension. First rip the ends of the paper, and then use about 60% tension of the decompression strip, and then apply the ends with 0% tension.
- Most adhesives stick better with heat, so rubbing kinesiotape to warm it up with friction to activate the adhesive.
- Therapist repeat the same process with the second piece of Tape on the right side of back. The patient should curl forward to place the lower back muscles in a position of maximal stretch
- The Kinesio Tape Back Application includes two strips that are applied along either side of the spine, and other strip to apply directly over the most painful area.
- Repeat this session 3 sessions/week for 4 weeks.

STATISTICAL ANALYSIS: In this study, the descriptive statistics (the mean and the standard deviation,) will be calculated for all patients in both groups of the study for all variables. Comparisons will be made by independent sample t-test to compare the variables between all groups of the study. Paired t- test to compare before and after treatment in the same group. A value of $p \leq 0.05$ will be considered statistically significant. Nt values (pain, pain pressure threshold, ROM and modified Oswestry disability questionnaire) before and after the sessions. Data were analyzed using SPSS program version 24. Descriptive statistics about demographic data and the results were conducted using mean, standard deviation, mode, median and range. Normality test was conducted to determine tests to be used, also homogeneity tests should be conducted to ensure homogeneity of demographic data and pre-assessment values among groups. Also, Paired t test was conducted to show effect of treatment while unpaired t test was conducted to compare between groups. Intention to treat analysis should be used to treat missed data.

RESULTS

There were no statistically significant differences among groups regarding demographics at the baseline of study as represented in figure (1). Statistical analysis for group A, revealed statistically significant difference in pain intensity was 8 ± 1.3 pretreatment and recorded 3.8 ± 1.32 post treatment, for group B, revealed statistically significant difference in pain intensity was 8.2 ± 0.95 pretreatment and recorded 5.7 ± 1.92 post treatment. Regarding Change, the change in group (A) was DE-52.5% while the change in group (B) was DE-30.49%. The t value in group (A) was 14.658 with

p<0.0001 while the t value in group (B) was 6.824 with p<0.0001.

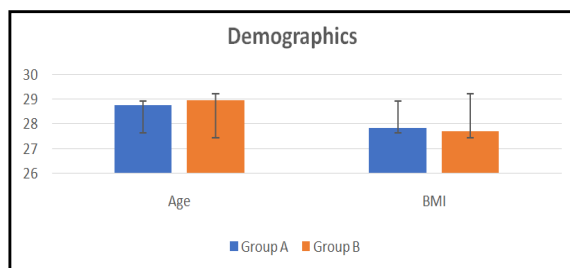


Figure 1. Current study population demographics

Table 1. Visual Analogue Scale (VAS) statistics within and between groups

	Group A	Group B	t	Sig.
Pre VAS	8 ± 1.3	8.2 ± 0.95	-0.556	0.582
Post VAS	3.8 ± 1.32	5.7 ± 1.92	-3.642	0.001
Change	DE-52.5%	DE-30.49%		
t	14.658	6.824		
Sig.	0.000	0.000		

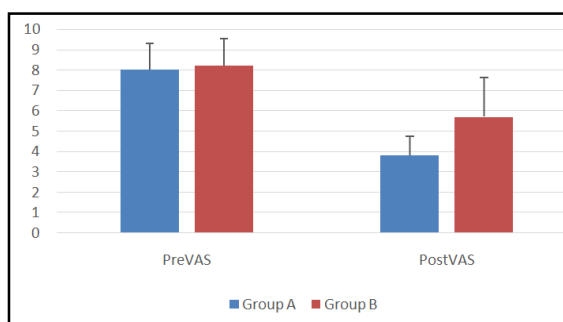


Figure 2. VAS mean and SD within and between groups

Table 2. Modified Oswestry Disability Questionnaire (MODQ) statistics within and between groups

	Group A	Group B	t	Sig.
Pre MODQ	50.45 ± 8.76	50.15 ± 9.86	0.102	0.92
Post MODQ	27.35 ± 9.21	36.4 ± 7.4	-3.425	0.001
Change	DE-45.79%	DE-27.42%		
t	14.342	10.236		
Sig.	0.000	0.000		

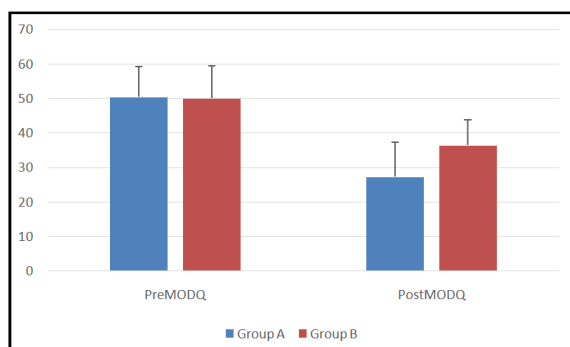


Figure 3. MODQ mean and SD within and between groups

The current study statistical analysis for group A, revealed statistically significant difference in MODQ outcome measure was 50.45 ± 8.76 pretreatment and recorded 27.35 ± 9.21 post

treatment, for group B, revealed statistically significant difference in MODQ outcome measure was 50.15 ± 9.86 pretreatment and recorded 36.4 ± 7.4 post treatment. Regarding Change, the change in group (A) was DE-45.79% while the change in group (B) was DE-27.42%. The t value in group (A) was 14.342 with p<0.0001 while the t value in group (B) was 10.236 with p<0.0001.

DISCUSSION

Postpartum is the period after delivery (29). Starts following the expulsion of the placenta until complete physiological recovery of various organ system (30). There is a relationship between coccyx pain and difficult vaginal delivery of the foetal head. During labour, the coccyx is pushed backwards by the head of the foetus, forcefully in some cases, causing luxation and/or fracture (31). Women developing coccydynia postpartum being unable to perform their activities of daily living, which has a great functional impact on their quality of life. Pain has physical, social and behavioural effects on sufferers and their family (32). This study was conducted to study the effects of kinesiotaping on pain and disability in postpartum women who are suffering from coccydynia. Forty women suffering from postpartum coccydynia, their age ranged from 25 to 35 years old, also their body mass index (BMI) ranged from 25- 35kg/m². They were selected from outpatient clinic of Gynecology department of Kasr El Ainy University Hospital, duration of the study 6 months, from January to May 2021. All women were randomly divided into two groups equal in number (20 for each); group A (Study group): received traditional medical treatment consists of non-steroidal anti-inflammatory drugs (ketoprofen-25 mg tablets twice daily), in addition to kinesiotaping on coccygeal region for, once per day, 3 days per week for four week. Group B (Control group) received traditional medical treatment consists of nonsteroidal anti-inflammatory drugs only (ketoprofen-25 mg tablets twice daily).

All women were assessed Visual Analogue Scale (VAS), also assessed by Modified Oswestry Disability Questionnaire (MODQ) before and after end of the treatment program period. The results revealed statistical significant improvement in pain intensity and physical performance at the end of treatment program period for both groups (A&B), there was a statistically significant decrease in the values of Modified Oswestry Disability Questionnaire (MODQ) in group A (mean ± SD was 27.35 ± 9.21) which treated with kinesiotaping on coccygeal region, when compared with its corresponding value in group B (the mean ± SD was 36.4 ± 7.4), which treated by traditional medical treatment only. The observed improvement in the performance in this study is supported by Yoshida and Kahanov (33) had reported that range of motion increased as a result of kinesiotaping application. The increase in trunk range of motion was proposed to be a consequence of decreasing in pain intensity. Our results agreed with Dawood *et al.* (34) who had reported improvement of disability as a result of kinesiotaping application. Also the result of the study supported by the study of Abdel-Aal *et al.* (35) who concluded that experimental kinesiotape intervention and exercise program provided significant improvements in pain, range of motion, and disability. Gak Hwang-Bo *et al.* (36) suggested

that application of Kinsiotape on trunk may be supplementary treatment method for acute low back pain and enable patient handing without any loss of work time due to occupational low back pain. Kinsiotape also be applicable for prevention and treatment of occupational low back pain in other professions involving lifting heavy objects. Nicole and Nelson (37) found that Kinsiotaping has become of interest in the management of chronic pain. Kinsiotaping is not a substitute for traditional physical therapy or exercise. Rather, it may be most effective when used as an adjunction therapy, by improving range of motion, muscular endurance, and motor control. Paoloni *et al.* (38) found that Kinsiotaping represent an effective adjunct therapy rehabilitation for immediate and acute pain control. When applied to patient, it leads to pain relief and lumbar muscle function normalization shortly after its application; these effects persist over short follow-up period. Seyhmus Kaplan *et al.* (39) reported that pregnancy-related low back pain is a common condition during pregnancy, Kinsiotape is a drug-free therapeutic tape used for treating various musculoskeletal problems. Kinsiotaping can be used as a complementary treatment method to achieve effective control of pregnancy-related low back pain. In contrast to the present study, Schiffer *et al.* (40) stated that the application of kinesiotaping had no effect on improving functional performance in healthy athlete females. Also, Castro-Sanchez *et al.* (41) explained that kinesiotaping has no effect and this difference from the current study because that they used kinesiotaping only without any other active forms of interventions. The significant reduction in pain and significant increase in the physical performance in the current study may be related to many possible mechanisms that have been studied. Lee *et al.* (42) reported that Whenkinesiotape is applied for coccydynia, it creates extra subcutaneous space, which changes posture gradient in the area underneath the skin. That change in pressure enhances the flow of lymphatic fluid. The previous studies showed that the application of kinesiotapingon coccyx affects both the physiological and automatic functions of patients with coccydynia. So, we can consider the use of Kinesiotaping on coccyx in the present study as one of the methods that treat coccydynia in addition to the medical treatment aiming to decrease the complications of coccydynia.

CONCLUSION

Based on the obtained results of this study, the most notable conclusion is:

The results of this study supported that adding kinesiotaping to postpartumcoccydyniatreatment produced a statistically significant improvement in pain and physical performance. So, Kinesiotaping should be considered an adjunctive treatment method for postpartum coccydynia.

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