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The Influence of Application of Kinesio Taping on Pregnancy-Related Low Back Pain

IKRAM I. ALYAN, M.D.* and MOHAMED M. YOUSEF, M.D.**

The Departments of Rheumatology & Rehabilitation and Obstetrics & Gynecology**, El-Galaa Teaching Hospital, Cairo*

Abstract

Background: Back pain in pregnant women can reduce daily activity and cause functional disability. The purpose of this study was to compare the effectiveness of Kinesio Taping (KT) and Transcutaneous Nerve Stimulation (TENS) added to paracetamol on pain intensity and disability in pregnant women suffering from back pain.

Patients and Methods: A total of 130 pregnant women treated with paracetamol because of their back pain were divided randomly into two groups, the 1 st group received KT (n=65), two bands of KT were applied vertically on each side of the lumbar spine and 2 applied horizontally. The 2 nd group (n=65) were treated by TENS. Visual Analog Scale (VAS) and the Roland-Morris Disability Questioner (RMDQ) were employed in the evaluation of pregnant patients with Low Back Pain (LBP) and disability before and after 3 weeks of treatment.

Results: Both groups showed significant improvement in pain intensity and disability after 3 weeks compared with baseline (for all $p<0.001$). Nevertheless, considering the change data from baseline to 3rd week, the KT group was significantly superior to the TENS group in all the outcome measures (for all $p<0.001$).

Conclusion: KT and TENS added to paracetamol can decrease back pain related to pregnancy and improve disability. KT was found to be superior to TENS.

Key Words: *Pregnancy related low back pain – Kinesio taping – TENS.*

Introduction

MORE than two-thirds of pregnant women suffer from Low Back Pain (LBP) and almost one fifth had pelvic pain and often accepted as a 'normal' part of pregnancy. Many women get little treatment, and yet pain disturbs sleep, daily activities and work. The actual pathophysiologic mechanism of pregnancy-related low back pain is not precisely known, it may result from changes in ligament laxity and posture during pregnancy [1].

Correspondence to: Dr. Ikram I. Alyan,
E-Mail: doc.ikramidris@gmail.com

Commonly suggested non-pharmacological treatment which can lead to pain reduction range from educational programs to behavioral cognitive therapy, electrophysical agents (Trans cutaneous electric nerve stimulation (TENS), manual therapy (e.g. joint mobilization/manipulation, myofascial release), general exercises, yoga, warm compresses, massage, acupuncture, herbs, aromatherapy, relaxation and Kinesio Taping (KT) [2].

Assumed that pregnant patients and their clinicians have a tendency to avoid medications, KT, which is a drug-free and non-harmful alternative, seems to be a appropriate treatment alternative for the management of their low back pain. Kinesio taping technique has originally developed by Japanese chiropraxy specialist Dr. Kenso Kase in 1973 and it is used commonly for musculoskeletal diseases [3-6]. It is claimed that application of KT stimulate mechanoreceptors thus providing a signal positional stimulus to the central nervous system, help to eliminate edema by directing exudates to lymphatic ducts, fascia alignment and expand the space above area of pain and inflammation by lifting fascia and soft tissues, offer sensory feedback to limit or assist motion [6,7].

TENS has proven to reduce different types of pain. It is the main mechanism of action is to induce analgesia in correlation with the pain gate-control theory and based on this theory, activation of both large and small diameter nerve that deliver a variety of sensory information to the central nervous system. An additional mechanism is the increasing endogens opioid release [8,9]. TENS is inexpensive and easy to apply to patients for self-management.

The aim of the present study was to compare the effects of Kinesio taping and Trans-cutaneous nerve stimulation added to paracetamol treatment in pregnancy-related back pain.

Patients and Methods

This prospective, randomized study was conducted from March 2017 through September 2017 among women with uncomplicated pregnancies, who presented at the Antenatal Care Unit of the Department of Obstetrics, El-Galaa Teaching Hospital, for routine antenatal care. Study participants had reported LBP during routine antenatal care. This study was approved by the Local Ethics Committee of the hospital and all participating women provided informed consent before being enrolled in the study.

Inclusion criteria: Pregnant women. Maternal age between 20-45 years, gestational age of 10-30 weeks and who are seeking treatment for their low back pain.

Exclusion criteria: Lumbar pathology before pregnancy. Participants with a history of diseases related to bony structures or lumbar intervertebral discs and those with pain caused by non musculoskeletal factors (e.g. urinary tract infection, obstetric complication) were excluded from the study.

Baseline Visual Analog Scale (VAS) evaluations were performed to assess the severity of pain on an intermittent scale from 0 ('no pain') to 10 ('worst pain imaginable'). Participants with VAS scores ›_5 underwent consultation in the Rheumatology & Rehabilitation Clinic. The VAS scores of the 2 groups were evaluated after resting for 5 minutes and after 5 minutes of movement. All participants completed the Roland-Morris Disability Questionnaire (RMDQ) for evaluation of disability. A clinical improvement over time can be graded based on RMDQ scores and VAS.

A total of 130 pregnant women with pregnancy-related low back pain were included in this study. All patients were given paracetamol 1500mg/day. Patients received additional therapy either Kinesio taping or TENS. They were randomly divided into 2 groups Kinesio taping group (n=65) (Group I) and TENS group (n=65) (Group II). Data including maternal age, gestational age, body mass index, parity, gravidas were recorded.

Group I: Kinesio tape was fixed to patients in standing position, in the lumbar flexion position. (Kinesio tape, K Active, Germany) with a width of 5cm and thickness of 0.5mm were used (Fig. 1). Four I shaped bands 0.5mm width were applied on clean, grease and cream free skin. The first 5cm was carefully removed from its paper backing and applied carefully to the skin. Two bands attached horizontally, the strain of tape attachment is not allowed on the beginning and end, but in the middle of tape, it was strain 1-2 inches (50% stretched). The remaining two bands, one on each side of the lumbar spine, were placed vertically, from the lower ilia crest to upper twelfth rib region. The tape was rubbed several times by hand to warm the adhesive film to achieve adhesion. Kinesio replaced every 3 days for 3 weeks. This technique was used in another clinical trial performed by Parreria et al., 2013 **[10]**. Application of Kinesio taping. Fig. (2).

Group II: This group was treated by TENS, it was applied by using ENRAF device (Myomed 932) in form of symmetrical biphasic rectangular pulses for 100ms. Frequency was 80Hertz with setting four $5cm^2$ surface electrodes placed on the painful lumbar region of each patient for 20min., the intensity was adjusted to produce a tingling sensation approximately 2-3 times above the sensory threshold. Patients received a total of 6 TENS therapy sessions (twice weekly) during 3 weeks. After 3rd week, the data of participants who completed the study were analyzed.

Fig. (1): Kinesio tape bands, K Active, Germany.

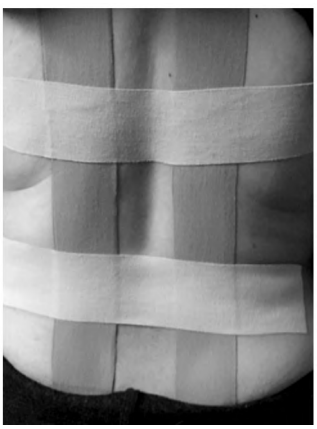

Fig. (2): Kinesio tape applied on lumbar region while patient in flexed position.

Data analysis:

The baseline and follow-up data were collected, tabulated and statically analyzed. Analysis of data was done by personal computer using SPSS (stastical program for social science) under Windows Version 17 as follows: Description of quantitative variables as mean, Standard Deviation (SD) and range, description of qualitative variables as number (n) and percentage. Chi-square test was used to compare qualitative variables. Unpaired *t*-test was used to compare two independent groups as regard a quantitative variables and paired t test was used to compare groups before and after follow-up. Pearson correlation co-efficient rank test was used to rank different variables against each other positivity or inversely. p-value <0.05 was considered statistical significantly and p<0.001 was highly significant.

Results

130 pregnant women with low back pain, met the selection criteria were randomly allocated to the Kinesio taping (n=65) or TENS group (n=65). The demographic characteristics of the groups were similar. There were no significant differences between the groups with regards to participant age, parity, gravidas, week of gestation, or body mass index at baseline (for all p>0.05) (Table 1).

At study entry, the pain intensity during rest, pain intensity during movement, and functional disability scores were comparable between the 2 groups (p=0.328, p=0.62, and p=0.085, respectively) (Table 2).

Table (2) showed that in both groups, all the outcome measures (pain intensity during rest, pain intensity during movement, and disability) were significantly reduced after 3 weeks compared with baseline (for all p<0.001). Nevertheless, considering the change data from baseline to 3 rd week, the Kinesio tape group was significantly superior to TENS group in all the outcome measures (for all p<0.001).

Table (1): Base line characteristics of patients.

	Kinesio taping group	TENS group	p-value
Age (in years)	28.76 (5.06)	29.07 (5.03)	0.515
Parity	1.02 (0.92)	1.04 (0.94)	0.264
Gravidas	3.36 (2.64)	3.72 (2.42)	0.457
Gestatation, weeks	21.97 (5.47)	21.91 (3.86)	0.785
Body mass index	27.40 (3.46)	27.20 (3.08)	0.568

Table (2): Pain intensity (VAS) and functional ability (RMDQ).

	Kinesio taping group	TENS group	p_1
VAS (rest):			
Baseline value	7.62 (1.49) (4-9)	7.37 (1.3)	0.328
After 3 weeks	1.45 (1.98) (0-8.2)		
Difference	6.26 (2.06)	3.52 (1.48)	<0.001
p_2	<0.001	<0.001	
VAS (motion):			
Baseline value	7.53 (1.18) (5-9)	7.26 (1.32) (5-9.9)	0.62
After 3 weeks	1.26 (1.81) (0-6.5)	3.25 (1.48) (1-7)	
Difference	6.27 (1.96)	4.01 (1.71)	<0.001
p_2	<0.001	<0.001	
RMDQ:			
Baseline	15.15	14.63 (3.56)	0.085
After 3 weeks	2.71	7.53 (2.95)	
Improvement (%)	86.79	48.53 (14.32) (16.7-7)	<0.001
p_2	<0.001	<0.001	

VAS : Visual Analog Scale.
RMDQ : Roland-Morris Disability Questionnaire.
p_1 : Difference at baseline or difference in change between groups.
p_2 : Difference in each group at base line and fifth day.
Values are given as mean (standard deviation) (min-max) when used the non-parametric test.

Discussion

Low Back Pain (LBP) during pregnancy is common and often accepted as a 'normal' part of pregnancy. Many women receive little in the way of treatment, and yet pain interferes with sleep, daily activities and works [11]. Mechanical strain from the enlarging gravid uterus and subsequent correcting lumbar lordosis are normal changes of pregnancy. In addition, progressive weight gain and ligamentous laxity can together hamper the neutral anatomical position. The end result of low back pain is decreases in the range of motion and long-term disability [1].

It was observed by researchers [12,13] that KT has multiple functions: Normalize muscle function, collecting fascia together to line up tissue in the desired position, triggering of circulation (blood and lymph) by lifting the skin over areas of inflammation, pain, edema and attenuating pain by stimulation of cutaneous mechanoreceptors. The aim of the present study was to compare one of the conventional modes of electrotherapy (TENS) commonly used in the acute and chronic painful conditions and the use of KT added to drug therapy (paracetamol) in the treatment of low back pain associated with pregnancy.

Our results showed that post-treatment pain intensity significantly was improved in both groups (KT & TENS group). The Kinesio tape group was significantly superior to the TENS group in all the outcome measures (for all $p<0.001$).

Although both treatment modalities decrease the pain by gate control theory, KT also has anti-inflammatory and anti-edema effects as well as muscle inhibitory effect depending on the technique used [14]. In the present study, KT was superior to TENS which might be resulted from these additional effects.

Although no special skills were needed to apply KT, TENS seems to be more practical than KT as it can be applied any time as patient need. KT is superior to other modalities used to reduce pain as it is drug-free, its application does not restrict movement, and with no serious side effects. Kaplan et al., [15] demonstrated that KT for 5 days was generally well accepted by pregnant women, except for few allergic reactions resulting from the Kinesio Tape. They found that combination of KT and paracetamol was more effective than paracetamol in diminishing pregnancy-related low back pain. They recommended that adding KT to paracetamol optimizing chronic pain reduction.

Kelle et al., [16] shown that KT provided the significant improvement in pain and disability of patients suffering from acute low back pain and advocated that it can be used as a complementary method.

Similarly, Kanchanathu et al., [17] observed a highly significant improvement in low back pain measured using VAS and decrease of disability using the Roland-Morris Disability score.

Although Paolani et al., [18] reported no improvement in pain, they found significant improvement of disability.

TENS has been used widely to alleviate pain that is non-pharmacological, non-aggressive, safe, and inexpensive and can reduce pain in acute and chronic conditions. Safdar et al., [19] reported a marked difference in the pain threshold level in patients suffering from low back pain with the use of TENS.

In the present study, TENS added to paracetamol resulting in less pain intensity during rest and during movement and reduced disability after 3 weeks.

Our results showed that pain relief and reduction in disability were significantly superior in Kinesio group than the TENS group (for all $p<0.001$).

In contrast to our results, Wahyuni et al., [20] found that TENS is more potent to reduce back pain in the 3rd trimester of pregnancy compared with KT. Keskin et al., [21] research using 79 subjects on the third trimester displayed that TENS with exercise is more actual and harmless to decrease low back pain during pregnancy.

Conclusion:

Kinesio taping was found to be more effective in decreasing pain and improving disability compared to TENS of pregnant women suffering from low back pain and treated with paracetamol.

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تأثير تطبيق شرائط كنزو على آلام أسفل الظهر المصاحبه للحمل

تعمل آلام الظهر فى النساء الحوامل على قلة النشاط اليومى وتسبب العجز الوظيفى. كان الغرض من هذه الدراسة مقارنة فعالية كل من شرائط كاينزيو اللاصقة وجهاز تحفيز العصب عبر الجلد (تنس) إلى جانب عقار الباراسيتامول لعلاج شدة الآلم وتقليل درجة العجز عند النساء الحوامل الذين يعانون من آلام الظهر.

خطة\البحث: شملت الدراسة ١٣٠ إمرآة حامل تعالج بالباراسيتامول بسبب آلام الظهر. تم تقسيمهم بشكل عشوائى إلى مجموعتين، تلقت المجموعة الآولى (وعددهم ٦٥) شرائط كاينزيو حيث تم لصق إثنين شريط عموديا على كل جانب من العمود الفقرى القطنى و٢ شريط تم لصقهم آفقيا. تم علاج المجموعة الثانية (وعددهم ٦٥) بواسطة جهاز علاج اللالام (تنس). تم إستخدام مقياس الالام بالتناظر البصرى (فاس) وكذلك تقييم موريس رولاند لتقييم درجة العجز لآلم الظهر للمرضى الحوامل اللاتى يعانين من آلام آسفل الظهر ودرجة عجز قبل وبعد ٣ آسابيع من بدء العلاج.

وقد آظهرت النتائج آن كلتا المجموعتين حدث لهم تحسن ذو دلالة إحصائية كبير فى شدة الآلم وآيضا قلت درجة العجز بعد مرور ٣ آسابيع من العلاج مقارنة مع خط الآساس (لكل $p<0.001$) وبالنظر إلى بيانات التغيير من خط الآساس إلى الإسبوع الثالث، كانت مجموعة شرائط كاينزيو آعلى بكثير من مجموعة جهاز تنس فى جميع مقاييس النتائج (لكل $p<0.001$).

\الإستنتاج: إضافة شرائط كاينزيو وجهاز التنس إلى عقار الباراسيتامول يمكن آن يقلل من آلالام الظهر المرتبطة بالحمل وتحسين درجة العجز. وقد آثبتت إستخدام شرائط كاينزيو تفوق على جهاز التنس.