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Effect of Kinesio Taping and Antenatal Exercises Vs. Antenatal Exercises on Pain Intensity and Disability in Mothers with Pregnancy Related Low Back Pain: A Comparative Study

K Damanpreet[1], G Aarti[2]* and B Sudini[3]

[1]*MPT student, Faculty of Physiotherapy, SGT University, India*

[2]*Assistant Professor, Faculty of Physiotherapy, SGT University, India*

[3]*OBG Physiotherapist, Mumbai, India*

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***Corresponding author:** G Aarti, Assistant Professor, Faculty of Physiotherapy, SGT University, India

Summary

Objectives of the Study: To evaluate the effects of Kinesio-taping along with Antenatal exercises on pain intensity and disability in mothers with pregnancy induced low back pain (LBP)".

Patients and Methodology: A sample of 30 mothers who met the inclusion and exclusion criteria were recruited from SGT Hospital, Gurugram. Procedure and purpose of study was explained to them. A written informed consent form was obtained from the subjects. Demographic data of subjects was collected and examination was done. The subjects were randomly allocated into two groups by simple random sampling. Pre readings of the scores (Numeric Pain Rating Scale) NPRS and Roland-Morris Disability Questionnaire (RMDQ) were taken on 1st day of the first week before starting the interventions. The treatment protocol of 40min/day for 3 days a week for period of 4 weeks was given by the researcher in her supervision for both groups. Group A (Experimental group) was given Kinesio taping (KT) plus Antenatal exercise plus ergonomic care whereas the Group B (Control group) was given Antenatal exercises plus ergonomic care". Post readings were taken on the last day of the 4th week. "A

Result: The mean along with standard deviation of NPRS and RMDQ score for mothers in group A was 5.87 ± 1.24, 9.93 ± 1.25 respectively before treatment and 1.87 ± 0.64, 2.40 ± 082 respectively after four weeks of treatment. The mean along with standard deviation of NPRS and RMDQ score for mothers in group B was 5.93 ± 1.22, 11.00 ± 1.92 respectively before treatment and 2.80 ± 0.67, 2.93 ± 0.79 respectively after four weeks of treatment. Between group analysis of NPRS score showed notable improvement in the NPRS score before treatment and after 4 weeks exercise programme".

Keywords: Low Back pain; Kinesio taping; Antenatal exercises

Introduction

Pregnancy induced lumbago is a very common complaint of pregnant women mostly after the end of 1st trimester and starting of 2nd trimester. This generally characterized as discomfort and dull pain which can be located at the region of lumbar area which is muscular in characteristics. There are certain etiological explaining such mechanical, hormonals, circulatory and psychological factors change which take place during pregnancy. Mostly the uneasiness is felt around the posterior region of the pelvis along with sacroiliac joint which during pregnancy went under many visible changes. According to Morgen et al., the intended fertilization age is twenty-two weeks when pain starts to kick in. Sometimes the intensity started to become unendurable that it starts to encumber the regular household or the work place activities which in return hinders the siestas of the women and leads to excessive degree of leaves due to unwellness [1]. Although lumbago during the course of motherhood is very common complaint but the reasons and actual justification behind the same is still unprecedented and pathogenesis behind the same is also still inconclusive. There are many different disquisitions which deduced the key factors of risks involved with lumbago [2].

LBP during the pregnancy is basically the same affliction starts is the area of back routinely the lumbar area in addition to this pain occurs above the area of sacrum which helps the medical professional to differentiate between the pelvic girdle pain (PGP) and LBP more accurately and easily. LBP sometimes diverge or emanate into the legs but not always unlike in PGP. Paravertebral muscles becoming frail is a familiar finding (Ostgaard et al., 1994). Other prodromes includes restriction of the motion and movements in back and legs. Some of the symptoms are abiding and may exasperate with changing positions and prolonged activities such as standing and prolong walking. According to some patients' feedback and reports about 1/3 of them reported that the intensity of the pain exasperates at the end of the day usually gets execrable during the night time and hinders the normal sleep rhythm of the would-be mothers (Fast A et al., 1987). During the pregnancy period there is sudden raised of the relaxin hormone which enables the laxness of the ligaments to increase significantly (Weiss M et al., 1979; Samuel CS et al., 1996). When LBP starts to appear, it is usually accompanied by the biomechanical factors, movements like forward flexion, and extension of the trunk. There are many studies which are conducted in both perfectly robust women and women with LBP about lumbar biomechanics during some specific movements like extension and forward flexion of the trunk. Howsoever not enough studies that present with the sufficient amount of data about and in pregnant women. To see the correlation between the lumbopelvic mobility with that of increasing the size of abdomen due to the growing baby there are sundry studies that were evaluated (Dumas et al., 1998; GGilleard et al., 2002; Biviá-Roig G et al., 2018). The tolerance capacity of the muscles of the back and the solidity capacity of the muscle is affected by the gradual increase in the abdominal during the course of pregnancy according to some studies presented (Dumas et al., 1998). Only one study has conducted till date which represents the actual data on relationship between average activities of the muscles (erecter spinae) which is activated during different trunk movements such as extension, flexion during pregnancy only, hence information related to the same after childbirth and women with first time pregnancy is still unknown (Sivhonen et al). To date up to now many different interventions have been bring forth to treat and manage LBP in mothers during pregnancy which includes the use of certain relaxation techniques, Antenatal yoga. Numerous studies have done to provide conclusive data about the use of pelvic and belly supporting belts, different techniques of massaging into the belly area include light stroking and same way at the lumbar back, acupuncture, certain herbs also provide pain relief mechanism, aromatherapy, art of chiropractices, hot and cool therapy, drug therapy (paracetamol), electrotherapeutic modalities which includes TENS and ultrasound therapy [3]. However literature assisting the evidence to their potency is slender [4]. But the application of k-tape is widely utilized by many chiropractioner and manual physical therapist in company with other therapies to treat the pain felt by the mother during pregnancy. Putting forward the use of KT tape has its own welfare which includes depletion of the pain during the course of interventions also underpinning the affected area when the tape is applied to the skin or the muscle belly it clones the physical properties of human skin which further helps in restoring the functions of different muscle. Also, it increases lymphatic seepage and the flow of vascular exudate. Other properties include aligning the misaligned structure also it represses pain through neurological means. There is abundant proof that has shown productive and negative conclusions as well as in the mother with LBP (Kase, K et al. 2003) [6-10].

Subects Materials and Method

Subject

A sample of 30 mothers who met the inclusion and exclusion criteria were recruited from SGT Hospital, Gurugram. Procedure and purpose of study was explained to them. A written informed consent form was obtained from the subjects. Demographic data of subjects was collected and examination was done. The subjects were randomly allocated into two groups by simple random sampling [11-15].

Inclusion Criteria

a) Maternal age over 18

b) Pregnant women with singleton pregnancy

c) Gestation age between 13th week to 36th week

d) Prime gravida

e) Self-reported low back pain

f) Volunteering to participate in the study

g) Not using analgesics for low back

h) Not using other methods for the treatment low back

i) Negative posterior pelvic pain provocation test (P4) [5].

Exclusion Criteria

a) Multiple / twin pregnancy

b) IVF pregnancy

c) Maternal physical abnormalities

d) Fetal abnormality on ultrasound scanning and

e) Participants with history of exercise before pregnancy, history of orthopaedic disease

f) Contemporaneous neck and other back related injury.

g) Mothers who were already involved in Antenatal exercises [6].

Nature Of the Study

The present study was an experimental study. The subject is divided into two groups i.e first an investigational group and other was control group.

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Equipment and Material Used

Kinesio tape, Mat, Questionnaire, Chair/couch, Sanitizer, Pen, Paper, Smartphone/Laptop, Sphygmomanometer.

Method

Group A: Experimental Group

Kinesio Taping

Position of the mother- the mothers were asked to comfortably sit on a chair and then was asked to forward bend as much as possible for her without any affliction. An H shape was created with the help of three I shaped strips; the ends of the tape was cut round so the end sustain more stability and last longer. Now while the mother bends forward the tape is measured for cutting, firstly started from the sacrum and then ending at the level of 12th vertebrae. Now the application process includes setting the sacrum as the base sand the tape is applied from downwards i.e., the caudal side below the pain area towards upwards direction till 12th vertebrae level with 10%tension. Identical application was made on the other side of the spine (Figure 1). Then a transverse application with tension correction (75%) of the pain area was done (Figure 2) (Kalinowski et al., 2007) Noted - For the tape to have smooth silky surface for application one should check that the skin surface must be clean properly for any oil excessive hair and lotions or else worth it will hinder the proper application of tape due to large amount of adhesive glue (Kase et al., 2003) [16-20].

Figure1: Identical applications of I tape on either side of the spine.

Figure 2: Transverse application over the pain area.

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Antenatal Exercises

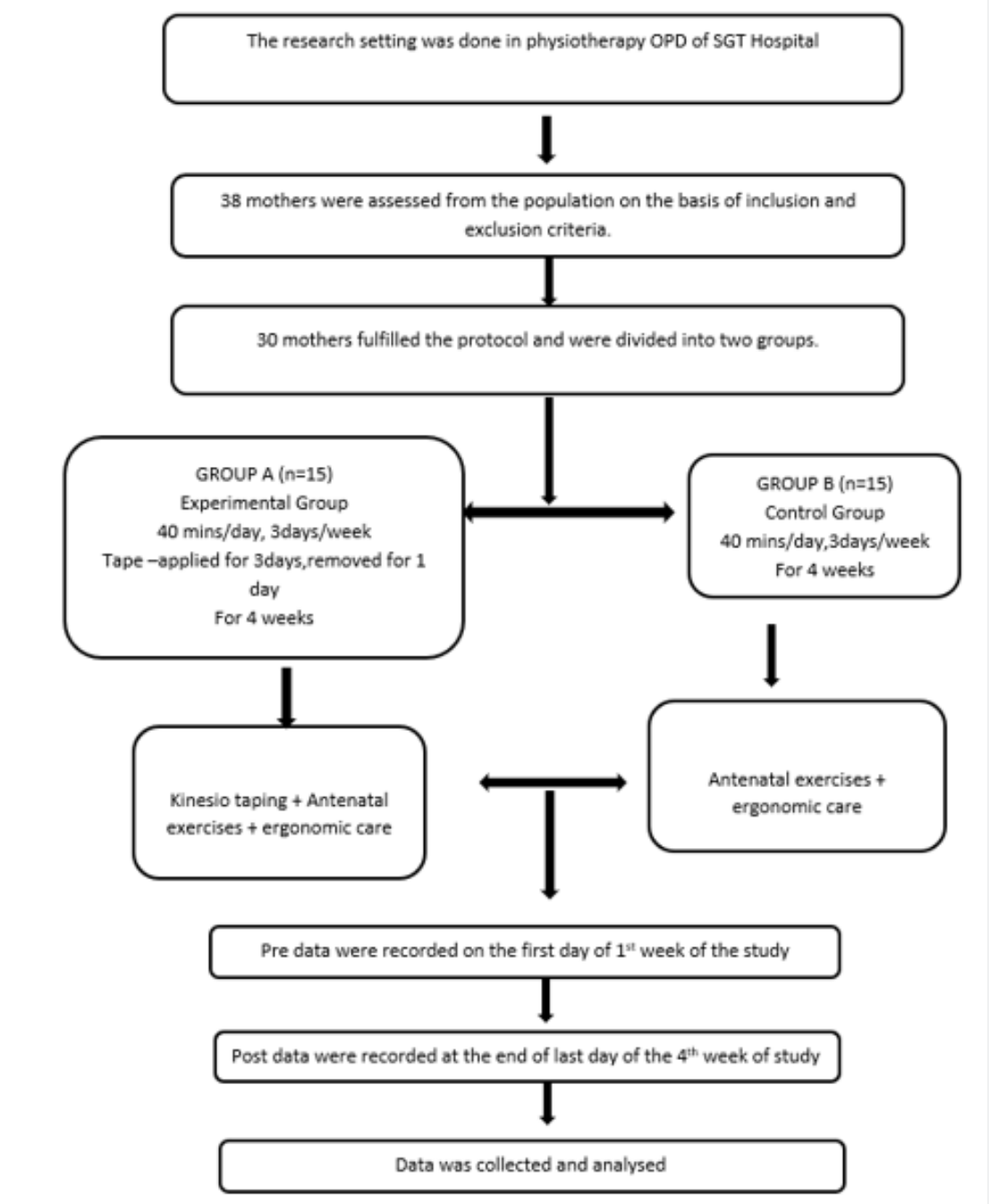
The Antenatal group practiced the standard Antenatal practices which included simple stretching exercises approved by the Executive Council of the society of Obstetrician and Gynecologists of Canada, and by the board of directors of the Canadian society for exercise physiology and ACOG (American college of Obstetrician and Gynecologist). Exercise protocol included 10min of loosening/ stretching exercises followed by 25min of Antenatal exercise and 5min of cool down [21-25].

Ergonomic Care

Ergonomic care was explained to the mothers of both the groups on the first day of the first week.

Group B: Control Group

Control group received the same Antenatal exercises as Group A along with ergonomic care (Flow Diagram).



Protocol:

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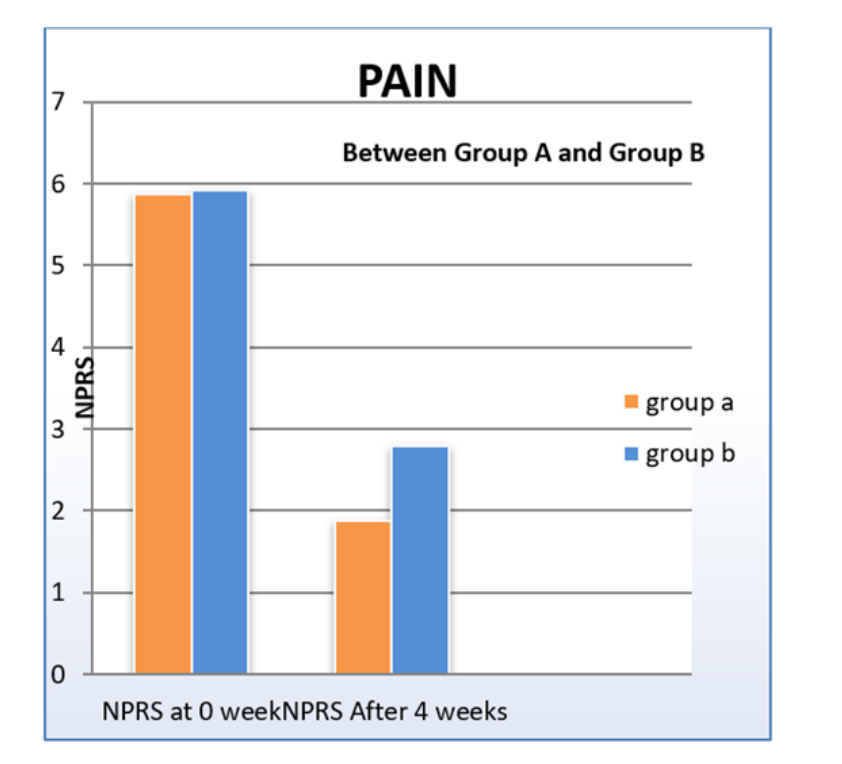
Result

Comparison of NPRS Scores between Group A and Group B

The mean along with standard deviation of NPRS score for mothers in group A was 5.87 ± 1.24 before treatment and 1.87 ± 0.64 after four weeks of treatment. The mean with standard deviation of NPRS score for mothers in group B was 5.93 ± 1.22 before treatment 2.80 ± 0.67 after four weeks of treatment (Refer Table 1 & Graph 1). Between group analysis of NPRS score showed notable difference in the NPRS score before treatment and after 4 weeks exercise programme [26].



Graph 1: Comparison of pain scores between Group A and Group B.

Table 1: Comparison of NPRS scores between Group A and Group B.

	Group	Mean ± SD	Z –value	P -value
NPRS (0 WEEK)	A	5.87 ± 1.24		
	B	5.93 ± 1.22	-0.021	0.983Ns
NPRS (4 WEEK)	A	1.87± 0.64		
	B	2.80 ± 0.67	-3.221	0.001s

Ns Non Significant (p > 0.05)
**P< 0.005(Highly significant)
SD= Standard deviation.

Comparison of Change in RMDQ Scores between the Group A and Group B

The mean along with standard deviation of RMDQ score of mothers in groupaA was 9.93 ± 1.27 before treatment and 2.40 ± 082 after four weeks of treatment. The mean value ± standard deviation of RMDQ score of mothers in group B was 11.00 ± 1.92 before treatment 2.93 ± 0.79 after four weeks of treatment (Refer Table 2 & Graph 2). Between group evaluation of RMDQ score there was notable improvement in the RMDQ score before treatment and after 4 weeks exercise programme [27-30].

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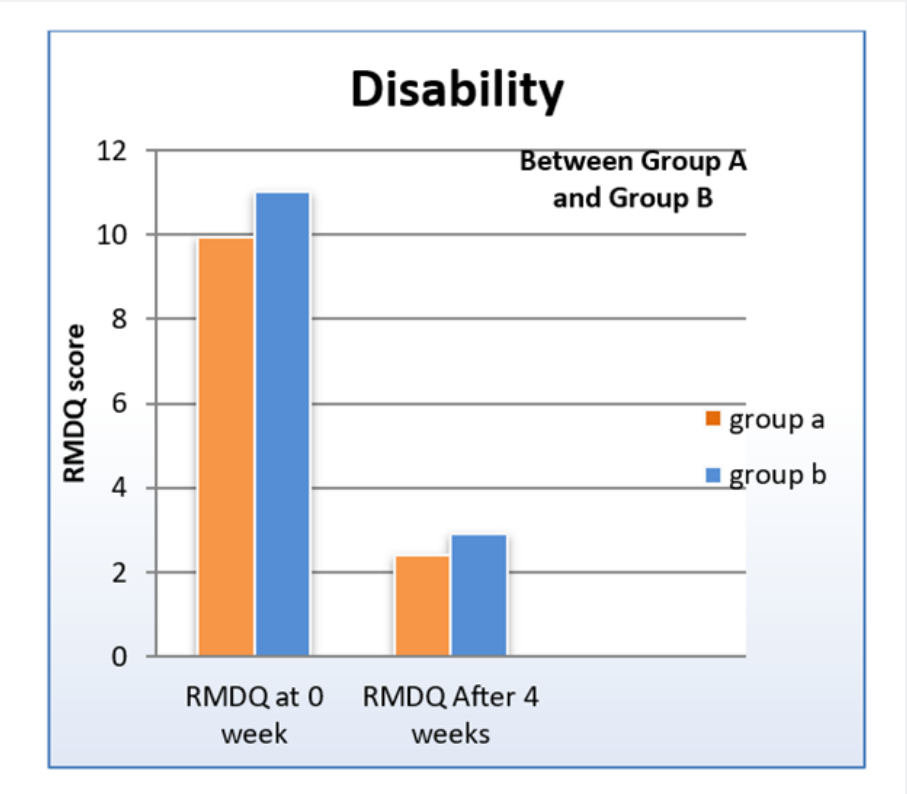

Graph 2: Comparison of change in RMDQ Disability score between Group A and Group B.

Table 2: Comparison of change in RMDQ scores between the Group A and Group B.

	Group	Mean ± SD	Z –value	P value
RMDQ (0 week)	A	9.93 ± 1.27	-1.41	0.159
	B	11.00 ± 1.92		
RMDQ (4 week)	A	2.40 ± 082	-2.887	0.004*
	B	3.60 ± 1.12		

Ns Non Significant (p > 0.05)
**p< 0.005(Highly significant)
SD= Standard deviation

Discussion

The purpose of this study was to investigate the effects of intramuscular tape and Antenatal exercise. Pain in both groups improved significantly, but in terms of all variables, the statistical results of group A i.e., experimental group were much effective than those of group B. A study (Saber et al.,2011) of 30 primiparous mothers was conducted in the second and third trimester of pregnancy in which 2 groups were made, the first group included pregnant mothers who had previously exercised to relieve spinal pain, and the second group included pregnant mothers who performed the same physical exercise along with the application of Kinesio tape .Pain intensity was assessed or evaluated with the help of the visual analogue scale (VAS), disability assessment was assessed using the Oswestry disability questionnaire scale, and anterior sagittal convex angle was measured with the help of flexible ruler. Evaluation of all measurements were done before and after giving the intervention. The results of the study and the results of this study all together have confirmed that the combination of Kinesio taping application and Antennatal exercises is an effective way to reduce low back pain, and can also be used as a safe adjunct to other therapies.

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Kaplan et al. also conducted a study in 2015 that included 63 subjects (mothers). They were all treated with paracetamol drug therapy. The Kinesio taping method was additionally applied in the intervention group. In this study, the RMDQ and VAS scales were used to assess or to evaluate the results. They showed that Kinesio-taping in combination with acetaminophen treatment (drug therapy) is more effective in decreasing pain intensity levels than drug treatment alone. Like this study, also showed that the Kinesio tape method is most effective when used with Antenatal exercises, so it can be used as an add-on additional treatment for mothers with low back pain during pregnancy. Compared to patients who received Antenatal exercises alone, patients who received the Kinesio tape significantly improved pain intensity and pain related to physical activity and disability during the study period.

According to Kase K et al.,2003, reasons for improving outcome measurement may include some physiological mechanisms, in which KT is assumed to have benefits, namely 1) assembling the fascia to place the tissues in the aspired position, 2) provide positional stimulation for applied muscles, improve pain, and areas of edema and swelling , 3) escalate invigorating of mechano-receptors to invigorating or inhibit certain movement, and 5) reduce pressure on lymphatic channels that provide pathways for lymphatic drainage to remove exudate'. These physiological mechanisms are still theoretical, because the research studies supporting these physiological concepts is very limited. There are two theories that could support the understanding of this discovery. One theory is that KT escalate blood circulation to the area which is taped. This change can influence muscle function and myofascial function after applying Kinesio tape. Another discovery from this study is that KT activates skin mechano-receptors in the treadmill area, and this stimulation can affect ROM. (Halseth et al., 2004; Hsu et al., 2009; Kase K et al., 2005).

However, some studies have also reported conflicting results. Morrissey (2000) pointed out in his research that the muscle size is reduced and shortened when the tape is enforced to active muscle, thus shifting the stretch curve to the one side during the rest phase. Alexander et al., 2008 pointed out the concept that when KT tape is enforced to the muscle fibres in the same direction it decreases the working of the motor neurons but according to (Tobin and Robinson, 2000 pointed out application of KT tape muscle to the muscle in a crossover pattern greater than will result in a significant reduction in muscle activity. On the contrary to these studies, Chen et al. 2007, Cools et al. 2002,Fu et al. 2008 stated that when the tape is enforced to the skin it has no upshot when it comes to working of the neurons in perfectly fit and normal people. One author (Cowan et al.2002) pointed out that since normal healthy adults do not have any pain, there is no decrease in muscle strength, so no changes in muscle strength are observed. Alexander et al. 2008 gave a conclusion to the above theory that the alpha motor neuron innervating the skeletal muscle and the gamma motor neuron further innervating the muscle spindle are not activated separately, but at the exact same time. But in case of skeletal muscles fibres when they contract the contraction of an afferent nerve fiber in groups Ia and II does not decrease or reduces, but remains in prolonged position of excitement. The work of motor neurons is not decreased or increased however they remain constant. The result is that the excitability of motor neurons neither increases nor decreases, but remains stable at the same level. Therefore, tape shortens subcutaneous skeletal muscle, there will be no change in the latency, amplitude, or velocity of motor neuron nerve conduction through the muscle spindle fiber. Therefore, Kinesio-taping does not increase or decrease motor nerve conduction speed. Skin irritation from kinesio-taping may not be enough to alter muscle activity. Furthermore, Morrissey, 2000 and Tobin and Robinson, 2000 used inelastic tape version and McConnell tape, so there may be consequences in the level of tactile stimulation.

Limitations of Study

a) Sample size was small and study duration was short.

b) Follow up of the mothers was not done after 4 weeks to see any recurrence of symptoms.

Future Research

Further study can be done to see the long-term effects of the KT and Antenatal exercises.

Conclusion

Low back pain in pregnant mothers, as evaluated by VAS and RMDQ after Kinesio taping, significantly improved when compared to Antenatal exercise alone legitimate consideration ought to be taken not to surpass the aggravation free roaming of developments in influenced moms, particularly during work. Individualized treatment as subjects training, works out, pelvic belts, analgesics, and needle therapy can be of advantage. Further exploration is required into the utilization of various types of treatment like needle therapy, TENS, and epidural absense of pain, either in segregation or as correlative mediations for the protected and powerful administration of these conditions.

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