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Effect of Kinesiotaping and Pelvic Tilts on Menstrual Symptom Questionnaire and Visual Analogue Scale in Primary Dysmenorrhoea in Females Aged 18-30 Years

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ABSTRACT

Background: Dysmenorrhoea is one of the most common problems faced by the females which affect them both physically and mentally. The purpose of this study is to find out the immediate and post one month effect of pelvic tilt in combination with taping on alleviating dysmenorrhoea.
Subject and method: The 42 subjects were nulliparous, unmarried women of age group 18-30.The subjects were randomly divided into 2 groups. Group A received taping only were as group B received taping and pelvic tilt exercise. Taping was given for 5-6 days of menstruation and exercises were done unsupervised throughout the menstrual cycle.
Result: The study revealed that both the groups had pain relief but the group which received taping with pelvic tilts had a higher level of pain relief.
Conclusion: Taping in conjunction with pelvic tilts was beneficial both immediately and in next consecutive menstrual cycle.

Keywords: dysmenorrhoea, taping, pelvic tilts.

INTRODUCTION

Menstruation can be defined as the visible manifestation of cyclic physiological uterine bleeding due to shedding of the endometrium. [1, 2] This occurs at most once a month from puberty until menopause, except during pregnancy. Commonly known as the menstrual cycle, it is considered to extend from the beginning of bleeding of one cycle to the beginning of the next one. The amount of blood loss is approximately 20-35ml throughout the menstruation period. [1]

Menstrual cycle occurs due to interplay between multiple hormones, mainly between pituitary gland and the ovaries. On the first day of menstrual cycle the levels of oestrogen and progesterone are low. This leads to secretion of follicle stimulating hormone (FSH) from the pituitary gland. FSH matures the follicle, which produce more oestrogen. Around day 12-14 increased oestrogen levels trigger rise in luteinizing hormone (LH). If the egg does not fertilize, oestrogen and prostaglandin levels fall and leads to menses on 28th day. [2]

Many variations can be found in the menstrual cycle, ranging from duration of the cycle to the presentation of menses. One of the variations is dysmenorrhoea, a term used to describe pain associated with menstruation. Dysmenorrhoea is the occurrence of painful cramps during menstruation. [2] There is a dull or throbbing pain in lower abdomen, radiating to back

and/or toward thighs. [1, 3] Dysmenorrhoea is of two types: 1) primary dysmenorrhoea and 2) secondary dysmenorrhoea.

Primary dysmenorrhoea is more common than secondary dysmenorrhoea, [2] with a prevalence of 79.67% in India. [4] The overall prevalence of dysmenorrhoea was found to be 73.9% with 74.4% girls in urban schools and 72.7% girls in rural schools. [4,5] Considered to be a common problem for females all over the world, the female has to suffer painful menses for years together. [6,7,8]

There is no structural pathology or abnormality associated with primary dysmenorrhoea. The pain is felt over the lower abdomen and sacral region. Pain can increase as blood loss increases over the days of the menstrual cycle. This pain is considered to be a result of ischemia of vigorously contracting uterine muscles or due to hyper tonicity of uterine isthmus, which leads to temporary retention of menstrual debris, causing pressure on a highly innervated zone of the uterus.[2]Some theories believe that primary dysmenorrhoea occurs due to increase in prostaglandin levels. Prostaglandins cause myometrial contractility that, if excessive, leads to uterine ischemia and pain. Other schools of thought say that oxytocin increases at menstruation and vasopressin levels significantly lower at ovulation in females with primary dysmenorrhea which causes the symptoms. [9,10]

Secondary dysmenorrhoea or congestive dysmenorrhoea is associated with a structural abnormality or pathology. The pain starts 3 days prior to menstruation. It may increase with activity. [2]

On the day before and during the period of menstruation, the most common symptoms seen in females are lethargy and fatigue, depression and inability to concentrate in work, tension or anxiety, changes in appetite, low back pain, headache, bloating or water retention and muscle pain. When the pain is very severe, the female may also experience nausea, vomiting and even diarrhoea. [1,2] Some other problems are decreased memory, anaemia, lowered motor control, dizziness, weight gain, and mood swings. Most of the times, dysmenorrhoea causes absenteeism at school or college or place of work. Even if they attend school/college/work, dysmenorrhoea can affect their quality of work and participation.

Various treatment options are available for dysmenorrhoea. Of the treatments available, medication and electrotherapy are commonly used. [1] NSAIDs, analgesic tablets which reduce menstrual pain by affecting the level of prostaglandins and oral contraceptive pills are common medications. These can show side effects such as nausea, breast tenderness, dizziness, hearing and visual disturbances etc. Physical therapy measures like hot packs, TENS, IFT, massage therapy, taping and exercises are also considered effective methods. [1,11,12] Females are likely to use medications and hot packs more than any other treatments. [12]

One of the available techniques is taping. Various conditions can be affected by taping, one of them being pain. Pain is said to be reduced when blood circulation improves at the sites where the tape attaches to the skin, or when a relevant muscle under the taped region contracts. It also produces sensory tactile impulses on the skin that can block or reduce the arrival of pain sensations to the brain: the counter-irritant effect. [13,14] The effects of taping have been described for conditions ranging from peripheral joint pain to spinal joint pain to ligament injuries. Effect of tape in improving muscle function has also been documented.

Only a few studies have as yet been performed to identify the effect of taping on dysmenorrhoea. Of these, one asked the participant to apply the tape by herself after instructing her about the use of the tape, one measured the effect of stretching exercises in conjunction with taping and one considered two different forms of taping. The effect of posterior pelvic tilts on low

back pain caused by primary dysmenorrhea has not been studied sufficiently. Also the effect of reducing dysmenorrhea by giving a pelvic tilt exercise in conjunction with taping is yet to be explored. This study aims to fill this gap in the available knowledge.

MATERIAL AND METHOD

Ethical clearance was taken from the institute's ethical committee for this experimental, intervention-based study.

Inclusion criteria: Age group-18-30years, with primary dysmenorrhoea, Nulliparous, Regular periods, menstrual cycle of 28-30 days, bleeding for 5-7 days, Can read and write English.

Exclusion criteria: Females with secondary dysmenorrhoea, endometriosis, PCOD, Skin disease, Allergies to tape.

Procedure: 42 females having primary dysmenorrhoea and fulfilling the inclusion criteria were taken in the study. The subjects were given information about the study, dysmenorrhoea and taping. Written consent was taken from them. Each of them was given a code number, using which they were allotted into 2 groups, A and B randomly (random number generation method). They were asked to fill the Menstrual Symptoms Questionnaire (MSQ), which is a quality of life questionnaire and their pain was documented using the Visual Analogue Scale (VAS). The study occurred over a period of 3 months for each subject. The pattern of their menstrual cycle was observed in the first month. In the second month interventions were given. In the third month, a follow up was done to identify the pain patterns and the MSQ responses.

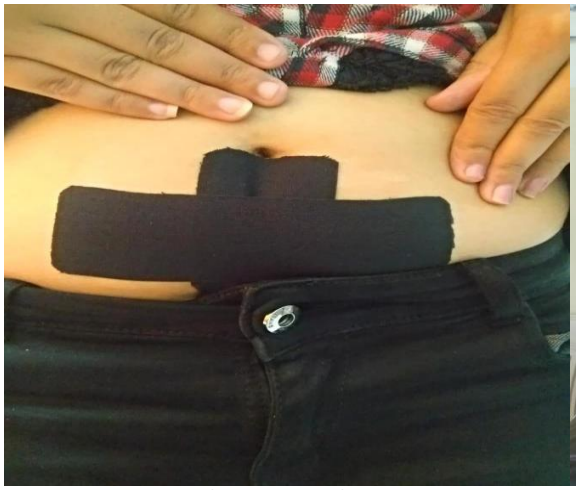


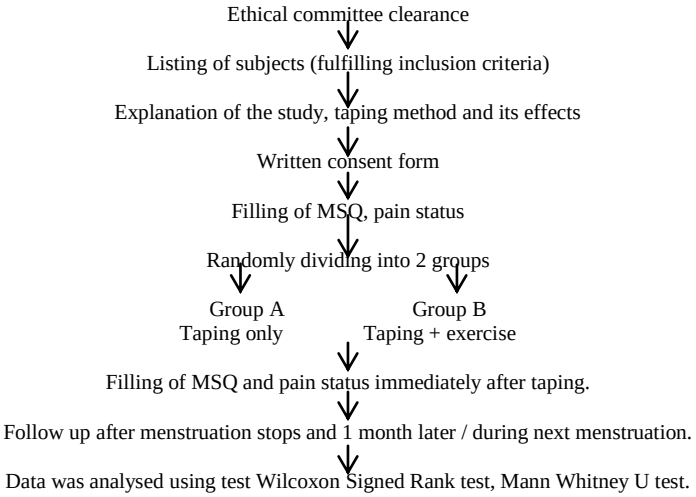
Figure 1 shows final pattern of taping

Figure 2 shows subject performing pelvic tilt.

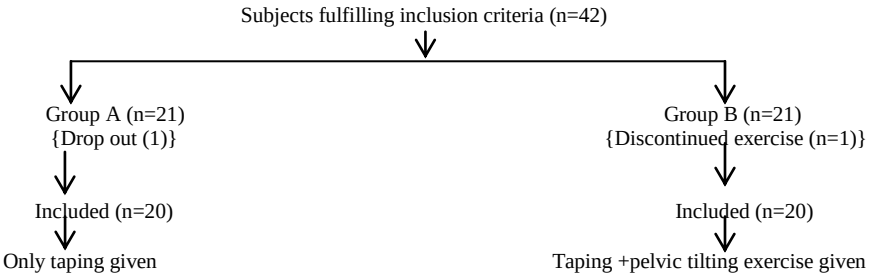
Group A was given only taping. A kinesio tape (A-tape tm) of 5 cm in width was applied right from below the navel to where the pubic hair began, and another piece of tape 10 cm in length was applied to make a cross shape with the first piece. The central part of the adhesive was removed and was fastened by the lateral anchors. The tension was 25%, which implies that the tape's length is increased by approximately 3 cm. When applying the tape, the participant inhaled and slightly bent backwards extending the torso. (Figure 1) The taping was done on the 1st day of the menstruation and was kept for till their last day of menstruation. [2,14]

Group B was given taping in addition with posterior pelvic tilts. The same taping technique as group A was used. For pelvic tilts, the participants were taken in quadruped position, posterior pelvic tilts were taught and 10 repetitions with 5 second holds were given. (Figure 2) Pelvic tilts were performed throughout the menstrual cycle.

Flowchart 1:



Flowchart 2:



RESULTS

For comparison between Group A and Group B, Mann Whitney U Test was used. It was observed that p-value for pain immediately post intervention was 0.323 and post 1 month was 0.015 and mean rank for Group B (22.33) is greater than Group A (18.68). Hence, it can be concluded that effect observed in Group B is more than Group A.

DISCUSSION

This study was done to find out the effects of taping alone and taping with pelvic tilts on primary dysmenorrhoea in nulliparous females aged 18-30. Primary dysmenorrhoea is said to be one of the most common gynaecological problem. It is so seen that females fail to report it to doctors even when their daily activities are restricted. [15] Females lack awareness about dysmenorrhoea and its treatment options, leading to substantial ignorance and misinformation among adolescent's females regarding the treatment of dysmenorrhoea. [16] Only a small number of adolescents with dysmenorrhoea seek help from physicians and self-medication is a common practice among these adolescents. [17] Dysmenorrhoea can decrease their everyday activities, affecting their daily lives.

According to studies dysmenorrhoea interrupts the educational and social life of females. Sickness, absenteeism and perceived quality of life losses are prevalent among adolescent girls, because of physical and social disability experienced during dysmenorrhoea.[18,19] In the United States, dysmenorrhoea has been estimated to be the greatest cause of time lost from work and school [18]. Menstrual cycle function and dysmenorrhoea also have an effect on depression and/or anxiety symptoms. As a result of negative effects of dysmenorrhoea on psychological status, women's quality of life may be significantly affected. [7]

It is seen that dysmenorrhoea is more prevalent in adolescent and nulliparous women. Indian females attain their menarche around the age of 16-17 and have their children in the age of 18-35.The major group of females suffering from dysmenorrhoea is between the age group of 18-30.

Along with home remedies and conventional physiotherapeutic modalities, taping is now being considered as an option in the treatment of dysmenorrhoea. Previous studies have tried to identify the effects of taping on dysmenorrhoeal pain. Taping, being a non-invasive treatment seems to have better compliance.

Table 1 shows, Pain pre-treatment and immediately after treatment in both groups

Pain	Median		Wilcoxon Signed Rank W	P-Value	% Effect	Result
	Pre	Immediate				
Group A	5.1	3.55	-3.418[a]	0.001	33.9	Sig
Group B	8	5.25	-3.828[a]	0.000	34.2	Sig

In this study, two groups were formed, one for taping alone and the other for taping with pelvic tilts as an exercise. The participants were young, nulliparous females. Their baseline parameters of pain on VAS and MSQ were comparable. These parameters were assessed immediately after application of tape and exercises and then one month later.

The analysis of this collected data, as seen in table 1, shows that the median pain scores on VAS reduced significantly from 5.1 to 3.55 on immediate application of tape.

These positive effects were seen because taping is a treatment that maximizes natural recovering ability and corrects the balance of the human body by directly stimulating muscles and fascia present under the skin. The technique used in this study is said to promote three effects:

1. To normalize muscular function;
2. To increase lymphatic and vascular flow; and
3. To diminish pain.

It has been hypothesized that the effects of taping are seen due to an increased neurofacilitation and a possible relationship between cutaneous afferents of the region where tape has been applied and the motor unit firing of the corresponding myotome. The mechanical restraint that can be felt after taping has also been considered to be another reason for the effectiveness of taping [(2).]

Tape decreases muscle tone and alleviates pain by inducing constant relaxation and contraction of the muscles through physical stimulation of cutaneous afferents. [(2,14)] Taping reduces the symptoms of dysmenorrhoea by normalizing reduced muscle strength, muscular convulsions and tension through homeostasis and inducing muscular balance with the surroundings by improving lymphatic circulation.[(20)]

The pain during dysmenorrhoea is majorly caused due to strong uterine contraction, interruption of blood supply and release of hormone prostaglandin. The pain is considered to be a result of ischemia of vigorously contracting uterine muscles or due to hyper tonicity of uterine isthmus, which leads to temporary retention of menstrual debris, causing pressure on a highly innervated zone of the uterus. Prostaglandins cause myometrial contractility that, if excessive, leads to uterine ischemia and therefore, pain. [(7,8,21 22)]

Taping works on the gate control theory by the counter-irritant effect, which explains that at the region of application of tape, mechanoreceptors (A-beta fiber) are stimulated, dampening the surrounding menstrual pain. Also, taping stimulates the skin, leading to increased blood flow. This increase in blood flow is due to effects of the vasomotor reflex of the spine, which causes a reduction in the concentration of pain causing substances, such as histamine and prostaglandin, in the bloodstream, thus helping in the decrease of pain.

Similarly in Group B the level of pain pre -treatment was 8 which reduced to 5.25. As compared to group A, group B

showed a greater level of reduction in pain. This effect can be due to the additional effect of posterior pelvic tilting exercise.

There are exercise related hormonal effects on the lining of the uterus. [23] Exercise leads to release of endorphin, counteracting possible declines in endorphin levels in the luteal phase. These in turn raise the pain threshold of the body. [23,24] Studies have proven that exercises increase the blood flow and metabolism of the uterus, which helps in the reduction of dysmenorrhoeal symptoms. [6] They act as a nonspecific analgesic for short-term relief of pain. Therefore it seems that women who exercise have a reduced incidence of dysmenorrhoea. Another cause for reduction in dysmenorrhoeal symptoms is decreased sympathetic over activity because of exercise. [6]

Table 2 shows, Pain levels pre-treatment and post 1 month of treatment in both groups.

Pain	Median		Wilcoxon Signed Rank W	P-Value	% Effect	Result
	Pre	immediate				
Group A	5.1	5.85	-1.067[b]	0.286	-4.2	NS
Group B	8	6	-3.921[a]	0.000	29.2	Sig

Table 2 shows that there is no significant difference in pre (5.1) and post 1 month (5.85) levels of pain in group A. This suggests that there was no carryover effect of taping. Taping has continuous effect as long as the tape remains attached to the skin. Hence, a pain reducing effect may not have been seen in the subsequent menstrual cycle. Group B showed better effects both immediately (8 to 5.25) and post 1 month (8 to 6). This shows that there was better carry over effect on group B than group A. The only difference in these two groups was the posterior pelvic tilting exercise component. Hence, this shows that the posterior pelvic tilting exercise could have had an effect in the modulation of pain in the second group.

The reasons for this are multiple. Posterior pelvic tilts could be reducing strain on the lumbar spine, therefore decreasing the sympathetic activity and hence providing pain relief. The posterior pelvic tilt causes the lumbar lordosis to reduce, hence reducing the stress on the interspinous ligaments. The erector spinae could be showing a post-isometric relaxation, hence leading to pain reduction. These exercises were also performed for the duration of the study period, which could have led to the conditioning of these muscles, hence improving their function and reducing pain in the subsequent menstrual cycle. [25]

A reason for the better pain reduction in the group having taping and posterior pelvic tilts together could be because of the effect of these two techniques on correcting alignment of the spine. Studies have shown that females with higher pelvic torsion have higher rate of dysmenorrhoea, because their spinal alignment is maladjusted. This leads to an imbalance in the amounts of the hormones, oxytocin and prostaglandin.[26] Posterior pelvic tilts and taping together can help in correction of an imbalance of the pelvis and the abnormal restriction of movement of the lumbosacral vertebrae, which is due to increased body fluids within the pelvis, in addition to contraction of the uterus leading to the intensification of the menstrual pain. A possible explanation for the imbalance of pelvis is the change in the position of the uterus, brought about by an excessive amount of prostaglandin that is secreted. [27] It is suggested that if the spinal alignment of females with dysmenorrhoea was to return to normal, the pain can be reduced. It is speculated that cutaneous sensations stimulated by spinal segment motion, which occurs with pelvic tilts, can elicit changes in the activity of the internal organs, hence relieving dysmenorrhoea. [22]

The pain felt in the low back during dysmenorrhoea which is referred from the abdominal region, may be due to traction on or inflammation of the pelvic peritoneum and because of the release of hormone prostaglandin and strong contraction of uterine musculatures. [2,28] As the lower

abdomen and the low back are supplied by the same dermatomes, an intervention in one of these regions could produce effects in the other. [29] Hence, taping the abdomen can lead to stimulation of muscles of the low back as well, leading to an augmented effect of taping and posterior pelvic tilt exercises.

Pelvic tilts are particularly effective in relieving lumbar pain and taping augmented with pelvic tilting exercises is an effective method in treatment of low back pain during pregnancy. [30] Similar results were found in the present study, that is, posterior pelvic tilts and taping together can help in reduction of dysmenorrhoeal pain.

Table 3 shows, MSQ pre-treatment and immediately after treatment in both groups.

MSQ	Median		Wilcoxon Signed Rank W	P-Value	% Effect	Result
	Pre	immediate				
Group A	77	77	.000[c]	1.000	0.0	NS
Group B	79.5	79.5	-1.000[b]	0.317	0.1	NS

Thus, the females who receive high scores will be suffering from spasmodic dysmenorrhoea while those with congestive dysmenorrhoea will score lower scores. Taping has an effect in spasmodic as well as on congestive type of primary dysmenorrhoea, as it helps relieve the muscular tension and also helps to increase the blood flow of the area on which it is applied. [2] This physiological change may affect the muscle and myofascial functions after the application of tape. Taping also stimulates cutaneous mechanoreceptors at the taped area, and this stimulation may affect the pain perception. As seen in table 3 the values of MSQ in both the groups A and B did not change pre-treatment (group A=77, group B= 79.5) and immediately after treatment (group A=77, group B= 79.5).This shows that there was no change in MSQ values immediately after treatment.

Table 4 shows, MSQ pre-treatment and post 1 month in both groups.

MSQ	Median		Wilcoxon Signed Rank W	P-Value	% Effect	Result
	Pre	immediate				
Group A	77	77	-.543a	0.587	0.2	NS
Group B	79.5	79.5	-1.021a	0.323	3.2	NS

Likewise in table 4, the values of MSQ pre- treatment (group A=77, group B= 79.5) and 1 month post treatment (group A=77, group B= 79.5) did not change. Hence there was no change seen in MSQ values immediately after treatment.

This shows that the MSQ showed no to minimal change in both the groups at all points of assessment after application of tape and exercise. A significant difference was not found in our study maybe because a higher MCID (minimal clinically important difference) is required by MSQ to show a change in the status of the individual than were obtained in our study. An instrument sensitive to small changes would have been a better option for the present study.

Table 5 shows Comparison between Group A and Group B

	Group	N	Mean Rank	Sum of Ranks	Mann-Whitney U	P-Value
Pain Immediate	Group A	20	18.68	373.50	163.500	0.323
	Group B	20	22.33	446.50		
	Total	40				
Pain Post	Group A	20	16.00	320.00	110.000	0.015
	Group B	20	25.00	500.00		
	Total	40				
MSQ Immediate	Group A	20	20.00	400.00	190.000	0.317
	Group B	20	21.00	420.00		
	Total	40				
MSQ Post	Group A	20	17.05	341.00	131.000	0.055
	Group B	20	23.95	479.00		
	Total	40				

The between group analysis (Table 5) reflects that taping and pelvic tilts together produce better pain relief as compared to taping alone. This study, hence, demonstrated that taping and pelvic tilts together relieve dysmenorrhoea.

CONCLUSION

The study shows that only taping was effective immediately on primary dysmenorrhoea, but did not show effects in the next consecutive menstrual cycle, whereas taping in conjunction with pelvic tilts was beneficial both immediately and in next consecutive menstrual cycle.

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