



Original Article

Effects of kinesio taping and hot packs on premenstrual syndrome in females

JUNG-HYUN CHOI, PhD, PT¹⁾

¹⁾ Department of Physical Therapy, Institute for Elderly Health and Welfare, Namseoul University: 21 Maeju-ri, Sungwan-eup, Seobuk-gu, Chonan-si 331-707, Republic of Korea

Abstract. [Purpose] This study aimed to evaluate the effects of taping and hot packs on premenstrual syndrome, in an attempt to generate basic data for physical therapy intervention for premenstrual syndrome. [Subjects and Methods] Thirty-two females in their 20s with premenstrual syndrome were randomly assigned to a taping group (n=10), hot pack group (n=11), and taping with hot pack group (n=11). Premenstrual syndrome was assessed using the Menstrual Distress Questionnaire in each participant prior to intervention and was re-assessed after applying kinesio taping and/or hot pack from 10 days before the estimated date of menstruation until the first day of menstruation. [Results] Data revealed that the taping and taping with hot pack groups showed significantly reduced premenstrual syndrome following intervention. In terms of the differences in the Menstrual Distress Questionnaire total score among the groups, the taping with hot pack and hot pack groups showed a significant difference. [Conclusion] These findings indicate that kinesio taping is an easy, non-drug intervention for female college students with premenstrual syndrome.

Key words: Kinesio taping, Hot pack, Premenstrual syndrome

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INTRODUCTION

In general, females undergo regular menstrual cycles for about 35 years since menarche, followed by several months or years of irregular menstruation as a result of a natural ovarian involution, ultimately reaching menopause at an age of 45–55 years¹⁾.

Premenstrual syndrome (PMS) refers to a complex of physical and emotional symptoms that manifest in regular patterns in the late luteal phase, a period before menstruation²⁾. When menstrual cramps are measured with the visual analogue scale (VAS), 0 cm indicates no pain, 1–5 cm indicates mild pain, 6–7 cm indicates moderate pain, and 8 cm or greater indicates severe pain³⁾.

Drug therapy is used for severe PMS symptoms, such as severe abdominal pain, breast pain, and marked edema, but using one or two drugs is rarely effective in the long-term because PMS is a complex of approximately 95 mental, emotional, psychological, and physical symptoms. Furthermore, most females with PMS have mild to severe PMS, and drug therapies have been reported to produce various alarming adverse effects⁴⁾.

Recently, the use of a special non-drug taping technique, referred to as kinesio taping, has been gaining popularity for not only musculoskeletal disorders and pain control but also various medical disorders. When applied on the skin, kinesio taping relaxes the body and mind as well as reduces the symptoms of PMS by normalizing reduced muscle strength, muscular convulsions and tension through homeostasis and inducing muscular balance with the surroundings by improving lymphatic circulation^{5, 6)}. In a study on 34 single females, Lim et al. reported that kinesio taping and spiral taping reduced menstrual cramps and PMS⁷⁾.

Heat therapy, a type of non-drug intervention, may also be used as a supplemental means to mitigate pain and induce short-term muscle relaxation; this alleviates pain by increasing blood flow, eliminating pain-inducing metabolic substances, and

Corresponding author. Jung-Hyun Choi (E-mail: rightmind@nsu.ac.kr)

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Table 1. General characteristics

	TG (mean ± SD)	HG (mean ± SD)	THG (mean ± SD)
Height (cm)	160.01 ± 4.98	160.31 ± 5.49	161.17 ± 5.23
Weight (kg)	53.75 ± 10.87	55.22 ± 10.63	53.48 ± 5.15
Menstrual cycle	28.85 ± 0.89	28.85 ± 1.06	28.85 ± 0.89
VAS	6.14 ± 1.21	6.42 ± 1.51	6.42 ± 1.71
MDQ	71.28 ± 15.25	79.57 ± 17.11	80.28 ± 7.49

TG: taping group; HG: hot pack group; THG: taping with hot pack group



Fig. 1. Hot pack touching the patient's lower back and sacrum



Fig. 2. Tapes to the center of the subject's back above the cleft between the buttocks and the sacrum

temporarily elevating the threshold of pain-modulating fibers⁸). Furthermore, heat therapy regulates the autonomic nerves, where it regulates the balance between sympathetic and parasympathetic nerves by suppressing the sympathetic nerves when they are activated, and by activating the sympathetic nerves when the parasympathetic nerves are activated⁹).

Therefore, this study aimed to evaluate the effects of taping and hot packs on PMS to derive basic data for developing physical therapy interventions for PMS.

SUBJECTS AND METHODS

Thirty-two females in their 20s with PMS were enrolled in this study for a period from 10 days before their estimated date of menstruation until the first day of menstruation. The individuals included were as follows: females in their twenties who had a minimum of 3 months of regular menstrual cycle of 28–31 days; those who had a VAS score for menstrual pain of 4.0 or greater; those who had not been diagnosed with pelvic inflammatory disease or endometriosis in the past; those who had not used analgesics or alternative therapies such as hot massages during the study period; and those who had not used oral contraceptives during the study period.

The participants were instructed to complete a questionnaire before the experiment and then were randomly assigned to a taping group (TG, n=10), hot pack group (HG, n=11), or taping with hot pack group (THG, n=11). The purpose and methods of the study were explained to the participants and informed consent was obtained from each individual in accordance with the principles of the Declaration of Helsinki (Table 1).

The PMS questionnaire was administered 2 weeks before the beginning of menstruation and on the day of the most severe pain during menstruation. The experimental groups underwent kinesio taping and/or hot pack therapy from 10 days before the estimated period date of menstruation until the first day of the period. The same interventions were re-administered 10 days before the estimated period date until the first day of the period in the subsequent month.

The application of tape (KINESIOLOGY TAPE, 3NS, Korea) was performed by a physiotherapist with 10 years of clinical experience using taping as a treatment method. The therapist attached one of the tapes to the center of the subject's back above the cleft between the buttocks and the sacrum. The tape should point obliquely upwards. The tape was then pulled, with minimal stretch, diagonally upwards and outwards, but should stay on the sacrum, within the prominent iliac bone. Above the sacrum, the tape should continue along the top of the iliac crest. Then, one end of the second tape was attached exactly over the base of the first tape. This tape was then applied in the same manner as the first tape, across the other half the sacrum¹⁰) (Figs. 1, 2).

A hot pack (40–45°C) was then applied for 30 minutes with the patient in the supine position, with the hot pack touching the patient's lower back and sacrum¹¹). As with the taping, hot pack therapy was administered 30 minutes a day from 10 days before the estimated period date of menstruation to the first day of the period.

PMS was measured using the Menstrual Distress Questionnaire (MDQ) prior to intervention and on the final day of the period based on the day of the most severe menstrual pain. This study used the MDQ modified by Kim¹²).

Table 2. Differences in pre- and post-intervention MDQ score within groups

Factor	TG		HG		THG	
	Pre- (mean ± S.D)	Post- (mean ± SD)	Pre- (mean ± SD)	Post- (mean ± SD)	Pre- (mean ± SD)	Post- (mean ± SD)
Pain	13.8 ± 5.6	12.5 ± 3.9	16.4 ± 3.7	14.7 ± 4.1	17.8 ± 2.0	8.0 ± 1.0 [†]
Concentration	14.8 ± 5.1	11.8 ± 3.3	15.8 ± 5.8	13.7 ± 5.3	17.85 ± 3.7	12.0 ± 4.6 [†]
Behavioral change	12.1 ± 3.7	12.4 ± 4.5	15.2 ± 4.3	15.8 ± 5.3	13.1 ± 2.4	10.8 ± 4.4
Autonomic reactions	6.4 ± 2.2	4.5 ± 0.7	6.7 ± 2.9	6.2 ± 2.9	6.4 ± 2.2	4.5 ± 0.7
Water retention	7.1 ± 1.8	7.4 ± 2.7	9.5 ± 2.8	10.2 ± 3.9	9.4 ± 3.2	9.2 ± 3.9
Negative affect	17.0 ± 2.5	13.5 ± 3.5 [†]	15.7 ± 4.6	16.0 ± 5.4	18.0 ± 6.2	14.0 ± 6.8
Total	71.2 ± 15.2	58.5 ± 13.9 [†]	79.5 ± 17.1	76.8 ± 19.1	80.2 ± 7.4	56.5 ± 15.3 [†]

Values are shown as the mean ± SD, [†]p<0.05, TG: taping group; HG: hot pack group; THG: taping with hot pack group

Table 3. Differences in MDQ score between the groups in relation to intervention

Factor	TG		HG		THG		Post-hoc
	Pre- (mean ± SD)	Post- (mean ± SD)	Pre- (mean ± SD)	Post- (mean ± SD)	Pre- (mean ± SD)	Post- (mean ± SD)	
Pain	13.8 ± 5.6	12.5 ± 3.9	16.4 ± 3.7	14.7 ± 4.1	17.8 ± 2.0	8.0 ± 1.0	TG, HG<THG [†]
Concentration	14.8 ± 5.1	11.8 ± 3.3	15.8 ± 5.8	13.7 ± 5.3	17.8 ± 3.7	12.0 ± 4.6	
Behavioral change	12.1 ± 3.7	12.4 ± 4.5	15.2 ± 4.3	15.8 ± 5.3	13.1 ± 2.4	10.8 ± 4.4	
Autonomic reactions	6.4 ± 2.2	4.5 ± 0.7	6.7 ± 2.9	6.2 ± 2.9	6.4 ± 2.2	4.5 ± 0.7	
Water retention	7.1 ± 1.8	7.4 ± 2.7	9.5 ± 2.8	10.2 ± 3.9	9.4 ± 3.2	9.2 ± 3.9	
Negative affect	17.0 ± 2.5	13.5 ± 3.5	15.7 ± 4.6	16.0 ± 5.4	18.0 ± 6.2	14.0 ± 6.8	
Total	71.2 ± 15.2	58.5 ± 13.9	79.5 ± 17.1	76.8 ± 19.1	80.2 ± 7.4	56.5 ± 15.3	HG<THG [†]

Values are shown as the mean ± SD, [†]p<0.05, TG: taping group; HG: hot pack group; THG: taping with hot pack group

All data were statistically analyzed with SPSS 18.0 software. The general characteristics of the participants were analyzed as frequencies, means, and standard deviations (SD), and differences in pre- and post-intervention pain and inter-group differences in PMS score were analyzed by one-way analysis of variance (ANOVA) and the least significant difference Scheffe post-hoc test. The differences in pre- and post-intervention pain and PMS in relation to each intervention group were examined with paired t-tests. Statistical significance was set to $\alpha=0.05$.

RESULTS

Within the pre and post intervention group, the change in MDQ showed a statistically significant decrease in both the negative affect and total score. Furthermore, for the THG, there were statistically significant decreases in the pain and concentration categories as well as in the total score. The differences in MDQ between the groups, pre and post intervention, showed that for the pain category, there was a more statistically significant decrease in the THG group than the TG and HG group. Furthermore, for the total score, THG had a decrease of more statistical significance than HG (Tables 2, 3).

DISCUSSION

This study aimed at examining the effects of taping and hot packs upon PMS, a common condition among females in their 20s. According to Andersch and Milsom, during menstruation, females with dysmenorrhea may experience stress that is greater than that experienced during pain at labor¹³). Do et al. further reported that a two-week period of horizontal taping on the abdomen, and a 48-hour period of cross taping in the sacroiliac joint, reduced pre- and post-menstrual symptoms, and menstrual cramps, in the taping groups compared to a control group which did not receive taping¹⁴). Similarly, the present study found that the taping groups, with taping in the sacroiliac joint, showed reduced levels of menstrual pain, which are believed to be the direct result of elimination of muscle tension in the pelvic area by taping, thereby alleviating compression against the uterus and thus increasing blood flow⁷). As in transcutaneous electrical nerve stimulation, application of kinesiotaping gains evidence from the gate control theory which explains that at the place of adhesion, mechanoreceptors (A-beta fiber) are stimulated muting the surrounding menstrual pain^{10, 15}). Furthermore, stimulation from kinesiotaping on the skin increases blood circulation due to the effects of the vasomotor reflex of the spine and as such, the concentration of pain causing substances such as histamine and prostaglandin in the bloodstream are reduced aiding in the decrease of pain^{7, 16}).

Akin et al. reported that the regional application of low heat need not be prescribed and does not have any adverse effects; these authors stated that heat is useful in lowering menstrual pain by reducing uterine activity¹⁷). In the present study, applying heat upon the sacroiliac joint using a hot pack, a readily available item, significantly reduced the VAS pain score. Such effects are presumed to be produced through a mechanism in which the heat energy produced by the heat therapy led

to the expansion of capillaries and promoted blood circulation, producing various physiological effects, including metabolic stimulation, pain relief, and re-balancing of the autonomic nervous system¹⁸).

Hong further reported that heat therapy in the lower abdomen reduced menstrual pain and the symptoms of dysmenorrhea¹⁹). These authors suggested that heat stimulates blood circulation and metabolism by elevating temperature in the subcutaneous tissues, thereby reducing menstrual pain and dysmenorrhea. A similar physiological phenomenon is speculated to be involved in the reduction of pain after applying a hot pack in the present study.

In the present study, the THG ($p=0.000$) group showed a significant reduction in pain compared to that in the TG ($p=0.015$) and HG ($p=0.008$) groups ($p<0.05$). This may be attributable to a mechanism in which the hot pack, which simulates blood circulation and metabolism by increasing temperature in tissues, further heightens the effects of taping, which promotes muscular homeostasis through repeated muscle contraction and relaxation cycles and eventually induces muscular relaxation^{6, 18}). Further, the effects on stimulating muscle contraction and relaxation are thought to have been elevated by the hot pack stimulating metabolism and circulation by activating the sympathetic nerves of the autonomic nervous system⁹).

This study was limited to females in their 20s with regular menstrual cycles, so it is therefore difficult to generalize the findings of the present study to females in other age groups. Thus, additional studies should now examine a broader sample to substantiate the findings of the present study. In addition, as the intervention period was relatively short in this study, with 10 days before menstruation and 10 days before the subsequent menstruation, a long-term study is also needed to examine how long the effects of taping and hot pack can persist. Additional studies should also analyze the activities of the sympathetic and parasympathetic nervous systems using a heart rate variability measurement device.

Furthermore, although there is extensive data on the effects of taping on musculoskeletal disorders, only a limited amount of data is available on the effects of taping on medical or central nervous system disorders, as well as on menstrual pain, which undermines the reliability of the available data. Consequently, future studies should propose research studies to investigate the effects of taping upon various medical diseases, such as menstrual pain and PMS, which would ultimately strengthen the reliability of data.

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