Short term effects of kinesio taping on pain and functional disability in young females with menstrual low back pain: A randomised control trial study

Mohammad Forozeshfard\textsuperscript{a}, Amir Hoshang Bakhtiary\textsuperscript{b,\ast}, Atefeh Aminifar\textsuperscript{b}, Sajedeh Sheikhian\textsuperscript{c} and Zeinab Akbarzadeh\textsuperscript{c}

\textsuperscript{a}Anesthesiology Group, Medicine Faculty, Semnan University of Medical Sciences, Semnan, Iran
\textsuperscript{b}Neuromuscular Rehabilitation Research Center, Semnan University of Medical Sciences, Semnan, Iran
\textsuperscript{c}Physiotherapy Group, Rehabilitation Faculty, Semnan University of Medical Sciences, Semnan, Iran

Abstract.

\textbf{BACKGROUND:} Menstrual low back pain (LBP) in young females can reduce daily activity and cause functional disability, while the progressive application of kinesio-taping (KT) on pain reduction and functional correction has been stated.

\textbf{OBJECTIVE:} This study has been designed to investigate the efficacy of the lumbar vertebral column KT in young female with menstrual LBP.

\textbf{METHODS:} Thirty-two young females with menstrual LBP participated in this crossover study and were assigned randomly in two separate groups. The first group received KT during their first menstrual cycle and No-KT in their next menstrual, while the other group had no KT during the first menstrual cycle and received KT during the next menstrual cycle. The primary outcome measurements included the visual analogue scale (VAS) of pain, Oswestry disability index and McGill pain questionnaire score which were planned to collect at the end of the third day of the menstrual cycle.

\textbf{RESULTS:} Comparing pain and disability between two conditions, of menstrual cycle with KT and menstrual cycle without KT, revealed significant reduction in VAS (mean change = 1.7; 95\%CI = 0.6 to 2.8; \( P = 0.005 \)), McGill pain score (mean change = 20.1; 95\%CI = 8.7 to 31.3; \( P = 0.001 \)) and functional disability (mean change = 12.3; 95\%CI = 7.2 to 17.5; \( P < 0.0001 \)) by using KT during menstrual cycle.

\textbf{CONCLUSIONS:} Results showed that KT may effectively reduce pain and disability. The findings may support the clinical application of kinesiotaping in young females with menstrual LBP.

Keywords: Kinesiotaping, low back pain, functional disability, menstrual cycle

1. Introduction

Menstruation is a periodic change which has an important role in women's physical, emotional and re-

\textsuperscript{\ast}Corresponding author: Amir Hoshang Bakhtiary, Neuromuscular Rehabilitation Research Center, Semnan University of Medical Sciences, Semnan, Iran. Tel.: +98 9123311892; Fax: +98 233 83654182; E-mail: amirbakhtiary@semums.ac.ir


2. Materials and methods

This crossover study was accomplished according to the Helsinki Declaration, approved by the Ethical Committee of Semnan University of Medical Sciences and run in the Neuromuscular Rehabilitation Research Center. Before starting the study, it was registered in the Iranian Registry of Clinical Trial site and received ID number as IRCT201312241254N9. Thirty-two unmarried and nonparous young females with a regular menstrual cycle and without any musculoskeletal or neuromuscular pathological findings and no complaining of LBP in between their cycles were invited to participate in the study. All subjects had experienced menstrual LBP during the last 6 consecutive cycles with reported LBP scores above 4 on a visual analogue scale (VAS) [20]. After signing a consent form, they were randomly assigned to one of two experimental groups A or B of the crossover study. Group A received KT in their first menstrual cycle and no KT in their next menstrual cycle, while group B had no KT during their first menstrual cycle and KT was applied in their next menstrual cycle (Fig. 1). The crossover design of study was used to control the effect of personal characteristics of participants on the reported values during KT and no KT period.

2.1. Measurements

All measurements were done at the end of three days of menstrual cycle by a blind assessor to the experimental groups and included: the pain perception by mean of visual analogue scale (VAS); the type and intensity of pain by means of McGill Pain Questionnaire (MPQ); and the level of disability by means of Oswestry Disability Index (ODI).

2.1.1. Pain perception

Pain was measured by means of a visual analogue scale on which the subjects could indicate their assessment along a 10 cm line ranging from 0 (no pain at all) to 10 (the most severe pain that I can imagine) [21].

2.1.2. Type and intensity of pain assessment

The Persian version of McGill Pain Questionnaire was used to assess the type and intensity of menstrual low back pain [22]. The questionnaires included 22 phrases about different types of pain in which the subjects could indicate their assessment from 0 (no sensation of that type of pain) to 10 (very severe pain). The sum of scores of all phrases indicated the pain intensity based on the types of pain that subjects perceived.
2.1.3. Functional disability assessment

The Persian version of Oswestry Disability Index (ODI) was used to assess the functional disability in females with menstrual LBP [23]. ODI is composed of 10 questions, each of which has verbal response alternatives. Ratings are summed to yield a score ranging from 0 (not disabled at all) to 100 (completely disabled).

2.2. Intervention

Kinesio tape was applied on the first day of menstrual cycle and it was emphasized that it should not be removed before measuring the outcome at the end of the third day of the menstrual cycle. Although low-allergic tape was used, all subjects were asked to report any skin complications due to applying KT. H technique was used to apply KT over the lumbar region [24]: the subject was asked to bend forwards from the waist and apply two vertical strips (facilitation effect) with anchors either side of the top of the buttock cleft upwardseither side of the spine to a mid-point with less than 25% stretch (Fig. 2A). Then a horizontal strip (inhibition effect) was attached across the left and right sacroiliac joints with a 50% stretch (Fig. 2B).

3. Statistical analysis

Kolmogorov Smirnoff was used to check the normality of data. As a crossover design was used for the study, paired sample t test, with 95% confidence level and α < 0.05, was used to investigate the mean of pain and disability between groups.

4. Results

Thirty-two young females with menstrual LBP completed all stages of study. Table 1 shows the demographic characteristics of participant females with menstrual low back pain. The analysis of normality showed normal distribution of data.

No skin complication was reported by participants, except one who complained of skin itching under the tape with no sign of irritation after tape removal. In
Increased pain with sport activity and stress was reported by 15.6% (5 of 32 subjects) in KT menstrual cycle compared to 56.2% (18 of 32 subjects) in No-KT menstrual cycle. In the group with KT during menstrual cycle, 9.4% (3 of 32 subjects) of participants took medication to reduce pain, while 34.8% of all participants took medicine in No-KT group.

Applying kinesio tape during the menstrual cycle in females with menstrual LBP showed significant alleviation of VAS pain (mean change and 95% CI: 1.7 and 0.6 to 2.8, \( P = 0.005 \)), McGill pain questionnaire (mean change and 95% CI: 20.1 and 8.7 to 31.3, \( P = 0.001 \)) and reduction in disability (mean change and 95% CI: 6.3 and 2.1 to 10.5, \( P = 0.004 \)) compared to the menstrual cycle without kinesio taping. (Table 2).

Comparison of the mean changes between group A and B showed no significant differences between groups in terms of changes in disability and pain by mean of VAS and McGill pain questionnaire (\( P > 0.05 \), Table 3).

5. Discussion

This study investigated the effect of using kinesio taping in young females with menstrual low back pain and showed that using KT may reduce pain and disability effectively. Painful menstruation can affect the lifestyle and daily activities of a large number of young females [5, 25]. One of the most annoying complications of painful menstruation is low back pain, which can disturb social activity and job performance [26]. This study was designed to investigate the efficacy of kinesio taping on pain and disability in young females with menstrual LBP.

The results of the present study showed that the application of KT in females with menstrual LBP can alleviate pain and reduce disability. These results are consistent with findings reported by other studies that kinesio taping can reduce low back pain [12, 14, 16]. Paoloni and colleagues showed that using KT may improve lumbar muscle function and alleviate pain in patients with chronic LBP [14]. Later, these findings were confirmed by Castro-Sanchez’s study on 60 adult patients with non-specified chronic LBP, who reported pain and disability declining after applying one-week KT compared to the sham taping [12]. However, in a recent study on a group of 34 unmarried women with menstrual pain and premenstrual syndrome, researchers showed that KT may not reduce menstrual LBP, although premenstrual symptoms and abdominal pain were alleviated significantly [9]. The reason for such a difference between their findings and our results may be due to the KT application technique protocols, as they used spiral taping techniques in front of the abdomen, pelvis and upper thigh. Our H technique for
KT was applied over the low back and left and right sacroiliac joints, so that it might support and improve the postural control [27]. Kinematics and muscle activity of lumbar and sacroiliac joints [28] and reduce disability and LBP [12].

Several mechanisms have been reported for pain relief effect by using KT technique, such as the stimulation of skin mechanoreceptors that send afferent signals to the central nervous system and activate the pain gate control theory [29]. According to this theory, the stimulation of skin mechanoreceptors by the tension of applied KT may send afferent signals to the posterior horn of the spinal cord via Aβ fibers, whose collateral connections on the synaptic part of the pain pathway may cause presynaptic inhibition and reduce the transfer of afferent pain signals to the higher pain reception [30]. These reports may indicate the importance of clinical implication of KT application in subjects who may suffer pain and discomfort in their limb [31,32], and may indicate the facilitatory effect of KT to create pain free movement in joints in clinical situations. However, authors in a recent investigation showed that neither facilitatory nor inhibitory effects can be seen between different application techniques of KT [33].

Other suggested mechanisms for pain alleviation by KT are provision of additional support for lumbar segmental and sacroiliac joints. It has been suggested that hormonal changes during menstrual cycle may cause the laxity of supporting ligaments of joints such as sacroiliac joints, and cause sacroiliac joint dysfunction and pain [34]. It seems that applying KT over the low back region and sacroiliac joints may play an effective role in providing joint stability [13]. Lee and colleagues have shown that applying taping over the pelvic and sacroiliac joints may control and correct the movements of sacroiliac joints and reduce buttock pain [18]. However, Briem and colleagues demonstrated that KT may not have any effect on ankle muscle activation to prevent ankle sprain [35]. These controversies between the reports may indicate the importance of exploring the mechanisms of beneficiary effects of KT application in clinical situations such as pain relief, joint stability and muscle activation.

One of the other complaints in patients with LBP is functional disability that reduces their ability to manage activities of daily living [36]. For this reason, using the Oswestry Disability Index questionnaire is common to measure the disability level in patients with chronic LBP who participate in clinical trials or refer to physical therapy clinics [23]. In the present study, using the Persian version of Oswestry disability questionnaire showed that applying KT during menstrual cycle may reduce disability in females with menstrual pain by 37.13% compared to no-taping condition. Such an improvement in functional disability by applying KT has been reported in other studies on patients with chronic LBP [12,27,28]. Bae and colleagues showed that applying KT may improve functional ability by providing better postural control in patients with chronic LBP [27], although no significant difference was found between applying KT and placebo conditions on the postural control in young normal subjects [37]. However, this controversy could be due to the difference between participating subjects in these studies. While young pain-free subjects employ optimal postural control strategies, patients with chronic LBP may suffer deficits in neuromuscular control of posture due to the pathophysiological changes within the sensory-motor control mechanisms of the lumbar spine in the presence of muscle injury and pain [38]. Therefore, applying KT over the lumbar region may provide the central nervous system with additional proprioceptive information which may be useful to employ better postural control [27].

6. Conclusion

The present study on the effect of applying kinesio taping in females with menstrual LBP showed that KT may reduce pain and increase functional activity. These findings may support the clinical values of applying lumbar KT during menstrual low back pain to improve functional activity and pain free movement without any reported skin complications. These beneficiary effects of kinesio tape may be due to the additional proprioception information which may be used to employ better postural control and improve muscle function to control low back region. However, due to not evaluating functional activities, subjective evaluation of pain and disability and also not randomly selecting the participants from the population, further randomized clinical trials with a third group to control placebo effects are necessary to investigate the effectiveness of this technique on premenstrual syndrome pain.

Acknowledgment

We would like to thank the deputy of research and technology of Semnan University of Medical Sciences for the financial support of the project.
Conflict of interest

We certify that there is no actual or potential conflict of interest in relation to this article.

References

[26] Low back pain and your job: what you can do to get back to work. American family physician. 2007;76(10):1504.
[32] Thelen MD, Dauber JA, Stoneman PD. The clinical efficacy of kinesio tape for shoulder pain: a randomized, double-


