



Original Article

The relationship between pelvic alignment and dysmenorrhea

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Abstract. [Purpose] The purpose of this study was to investigate the relationship between pelvic alignment and dysmenorrhea in general women. [Subjects and Methods] One hundred two females participated in this study. They were divided into a dysmenorrhea group and a normal group based on the results of a Visual Analogue Scale (VAS) assessment of pain and the Menstrual Distress Questionnaire (MDQ). The survey data was collecting from 5th July to 20th September, 2014. Formetric 4D was used to measure the pelvic alignment, including the values of Trunk Imbalance, Pelvic Tilt, Surface Rotation, Lateral Deviation, Kyphosis Angle, Lordosis Angle. [Results] There was a difference in the spine alignments of each group. The value of pelvic torsion was 2.4 ± 1.8 degree in those with dysmenorrhea, while it was 1.7 ± 1.1 degree in those without. [Conclusion] In conclusion, the results suggest that there is a relationship between menstrual pain and pelvic torsion.

Key words: Alignment, Dysmenorrhea, Pelvic torsion

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INTRODUCTION

Dysmenorrhea is a gynecological disease which is most common among females with no relevance to ethnicity¹⁾. The prevalence of dysmenorrhea has been reported as 70% in women who menstruate and it is characterized by pain at the onset of menses which lasts for 48–72 hours²⁾. Anders C et al. reported that 15% of those who had dysmenorrhea experienced inconvenience in their daily life e.g. absence from school and work³⁾. In general, dysmenorrhea is related to early menarche, nulliparity, and stress^{4–6)}. It has symptoms of aching and numbness of the upper part of the pubis, the hip, the abdomen and thighs, as well as nausea, vomiting, diarrhea, headaches, and lethargy^{7, 8)}. Regarding physiological mechanism of dysmenorrhea, it is well-established that an increase of activity in the uterus which decreases blood flow, and prostaglandin and vasopressin hormones are also associated with dysmenorrhea as well⁹⁾. Excessive releases of prostaglandin cause excessive contraction of the endometriosis and excessive pressure within the uterus causing menstrual pain^{10, 11)}. Also, based on its etiology, Gender W et al.¹²⁾ proposed that the level of tension in the ligaments and nerves connecting the sacral vertebrae and the uterus is the cause of the pain. This was confirmed by Lim C et al.¹³⁾ who reported that Kinesio taping could alleviate the pain intensity of the subjects with painful menstruation. Despite these studies, there is a lack of research about whether pelvic alignment causes painful menstruation. Therefore the purpose of this research was to investigate the relationship between pelvic alignment and dysmenorrhea.

SUBJECTS AND METHODS

This research studied 102 females living in Busan City whose ages ranged from 10 to 40 years old. Women who had

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never had a disease of the uterus were specifically chosen. Moos' means of measuring premenstrual syndromes (PMS), and the Menstrual Distress Questionnaire (MDQ) were edited and complemented to fit the research purpose. A total of 40 questions were used to check various aspects of the menstrual pains experienced by: 3 categories referring to attributes related to menstruation (5 questions), PMS (23 questions), menstrual pain questions. The researchers directly explained the purpose of the research, and only distributed the questionnaires to those who agreed to cooperate. The criteria for inclusion in this study were: subjects who gave their informed consent and had a regular menstrual cycle (28 ± 7 days). The criteria for exclusion in this study were: a history of gynecological interventions and having received manipulative treatment within the 2 months before the beginning of the study, showing any stress or fear of the Formetric 4D camera. All participants signed an informed consent form before the beginning of the study, which was approved by the Institutional Review Board of the Catholic University of Pusan (CUPIRB-2015-013), and the study was conducted in accordance with the ethical principles of the Declaration of Helsinki, good clinical practices, and applicable laws and regulations.

To analyze the form of the spine, a Formetric 4D (Germany, 2010) was used to measure trunk imbalance, pelvic tilt, pelvic torsion, surface rotation, lateral deviation, kyphosis angle, and lordosis angle. Each subject was stood 180 cm from the Formetric camera facing away from it. The test was done with a bare chest, and in order to sense the C7 and PSIS accurately, the subjects slightly lowered their heads and maintained that position for 5 seconds while all the measurements were being taken.

The numerical value of pain of the subjects was assessed using a Visual analog scale (VAS). Subjects with a pain value of VAS 8 or over were classified as having menstrual pain ($n=44$), and those who had a value less than 8 as otherwise ($n=58$). For data analysis, SPSS v.19.0 was used. The independent samples t-test was used to compare the general attributes of the two groups of with and without menstrual pain. Menstruation attributes of the subjects were subjected to frequency analysis. Trunk imbalance, pelvic tilt, pelvic torsion, surface rotation, lateral deviation, kyphosis angle, lordosis angle were compared and analyzed using the independent samples t-test. Statistical significance was accepted for values of $p < 0.05$.

RESULTS

The general attributes of subjects with and without menstrual pain are shown in Table 1. The trunk imbalance of subjects who had menstrual pain was 8.8 ± 6.4 mm, and that of those who didn't have was 9.0 ± 10.2 mm. Those who didn't have menstrual pain had a greater degree of trunk imbalance, but statistically the difference was not significant. The pelvic tilt of the subjects with and without menstrual pain were, respectively 4.1 ± 3.7 mm and 3.9 ± 3.8 mm, but the difference was not statistically significant. However, the pelvic torsion of subjects with menstrual pain was $2.4 \pm 1.8^\circ$ and that of subjects without was $1.7 \pm 1.1^\circ$, significant ($p < 0.05$). The surface rotation of subjects with menstrual pain was $4.0 \pm 1.7^\circ$ and that of those without was $3.6 \pm 1.6^\circ$, with no significant difference. Also, the lateral deviation of subjects with menstrual pain was 5.3 ± 2.4 mm and that of those without was 5.0 ± 4.1 mm, with no significant difference. The kyphosis angle of the subjects with menstrual pain was $41.1 \pm 10.2^\circ$ and that of those without was $42.5 \pm 8.6^\circ$, with no significant difference; and the lordosis angle of subjects with menstrual pain was $37.4 \pm 8.0^\circ$ and that of those without was $35.6 \pm 8.6^\circ$, with no significant difference (Table 2). The percentages of the body regions experiencing pain of VAS 8.0 or higher were: lower abdomen, 61.4%; waist, 50%; pelvic floor, 9.1%; headache, 6.8%; and side, 2.3%.

Table 1. Characteristics of the subjects (N = 102)

	Group I (N=44)	Group II (N=58)
Age (years)	23.8±9.2	25.7±9.6
Height (cm)	154.6±34.4	160.3±21.8
Weight (kg)	50.0±11.9	52.9±8.7

Table 2 . Comparison of the trunk and pelvic alignment between the groups

	Group I (N=44)	Group II (N=58)
Trunk imbalance (mm)	8.8±6.4	9.0±10.2
Pelvic tilt (mm)	4.1±3.7	3.9±3.8
Pelvic torsion (°)	2.4±1.8*	1.7±1.1
Surface rotation (°)	4.0±1.7	3.6±1.6
Lateral deviation (mm)	5.3±2.4	5.0±4.1
Kyphosis angle (°)	41.1±10.2	42.5±8.6
Lordosis angle (°)	37.4±8.0	35.6±8.6

Mean±SD, * $p < 0.05$

DISCUSSION

This study compared and analyzed the pelvic alignment of 44 subjects who had menstrual pain and 58 subjects who did not. The results show that women with menstrual pain on average had an 8.8 ± 6.4 mm trunk imbalance, a 4.1 ± 3.7 mm pelvic tilt, a $4.0\pm 1.7^\circ$ surface rotation, a 5.3 ± 2.4 mm lateral deviation, a $37.4\pm 8.0^\circ$ lordosis angle, and a $41.1\pm 10.2^\circ$ kyphosis angle; and the subjects who did not have menstrual pain had a 9.04 ± 10.2 mm trunk imbalance, a 3.9 ± 3.8 mm pelvic tilt, a $3.6\pm 1.6^\circ$ surface rotation, a 5.0 ± 4.1 mm lateral deviation, a $35.6\pm 8.6^\circ$ lordosis angle, and a $42.5\pm 8.6^\circ$ kyphosis angle. None of the differences were statistically significant. However, the pelvic torsion of subjects who had menstrual pain was $2.4\pm 1.8^\circ$, and that of those who didn't was $1.7\pm 1.1^\circ$, and the subjects who had menstrual pain had a statistically higher value. Proctor et al. reported that due to the abnormal restriction of movement of the lumbosacral vertebrae, body fluid increases within the pelvis as well as contraction of the uterus leading to the intensification of the menstrual pain¹⁴). Similarly, women who showed an imbalance of the pelvis also experienced greater pain. A possible explanation for this is that the change in the position of the uterus, due to the imbalance of the pelvis, prompted an excessive amount of prostaglandin to be secreted. Maxwell et al. reported that when the spinal alignment of women who had intense menstrual pain was put back to normal, the pain was alleviated¹⁵). They speculated that somesthesia stimulated by spinal segment motion elicited changes in the activity of the internal organs which relieved the menstrual pain. Therefore, it is our opinion that subjects who had higher pelvic torsion had menstrual pain because their spinal alignment was maladjusted. Also, the subjects of this research had a high rate of pain in the waist and lower abdomen, respectively 50% and 61.4%. This was possibly due to an abnormal state of the pelvis eliciting an imbalance in the amounts of the hormones, oxytocin and prostaglandin. Despite the result, there are some limitations to this research. First, the factors of the subjects' everyday life habits, such as smoking, alcohol consumption, medication, and amounts of exercise were not controlled. Second, although the subjects comprised a diverse group of people aged from 20–40 years old, the distribution between the age groups was not even. This acted as a limitation factor of this research. In future research these limitations should be addressed to improve the quality of the data and the analysis.

In conclusion, the results show that there was a significant difference in pelvic torsion between subjects who had menstrual pain and subjects who did not. This indicates that there could be effect of pelvic alignment on dysmenorrhea.

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REFERENCES

- 1) Proctor M, Farquhar C: Diagnosis and management of dysmenorrhoea. *BMJ*, 2006, 332: 1134–1138. [[Medline](#)] [[CrossRef](#)]
- 2) Baines PA, Allen GM: Pelvic pain and menstrual related illnesses. *Emerg Med Clin North Am*, 2001, 19: 763–780. [[Medline](#)] [[CrossRef](#)]
- 3) Andersch B, Milsom I: An epidemiologic study of young women with dysmenorrhea. *Am J Obstet Gynecol*, 1982, 144: 655–660. [[Medline](#)]
- 4) Ju H, Jones M, Mishra G: The prevalence and risk factors of dysmenorrhea. *Epidemiol Rev*, 2014, 36: 104–113. [[Medline](#)] [[CrossRef](#)]
- 5) Kollipaka R, Arounassalame B, Lakshminarayanan S: Does psychosocial stress influence menstrual abnormalities in medical students? *J Obstet Gynaecol*, 2013, 33: 489–493. [[Medline](#)] [[CrossRef](#)]
- 6) Raine-Fenning N: Dysmenorrhoea. *Curr Obstet Gynaecol*, 2005, 15: 394–401. [[CrossRef](#)]
- 7) Durain D: Primary dysmenorrhea: assessment and management update. *J Midwifery Womens Health*, 2004, 49: 520–528. [[Medline](#)] [[CrossRef](#)]
- 8) Morrow C, Naumburg EH: Dysmenorrhea. *Prim Care*, 2009, 36: 19–32, vii. [[Medline](#)] [[CrossRef](#)]
- 9) Åkerlund M: Modern treatment of dysmenorrhea. *Acta Obstet Gynecol Scand*, 1990, 69: 563–564. [[Medline](#)] [[CrossRef](#)]
- 10) Coco AS: Primary dysmenorrhea. *Am Fam Physician*, 1999, 60: 489–496. [[Medline](#)]
- 11) Yu J, Wu S, Li F, et al.: Vertical transmission of Chlamydia trachomatis in Chongqing China. *Curr Microbiol*, 2009, 58: 315–320. [[Medline](#)] [[CrossRef](#)]
- 12) Genders W, Hopkins S, Lean E, et al.: Dysmenorrhea and pelvic dysfunction: a possible clinical relationship. *Chiropr*

J Aust, 2003, 33: 23–29.

- 13) Lim C, Park Y, Bae Y: The effect of the kinesio taping and spiral taping on menstrual pain and premenstrual syndrome. *J Phys Ther Sci*, 2013, 25: 761–764. [[Medline](#)] [[CrossRef](#)]
- 14) Proctor ML, Hing W, Johnson TC, et al.: Spinal manipulation for primary and secondary dysmenorrhoea. *Cochrane Database Syst Rev*, 2006, 19: CD002119. [[Medline](#)]
- 15) Walsh MJ, Polus BI: A randomized, placebo-controlled clinical trial on the efficacy of chiropractic therapy on premenstrual syndrome. *J Manipulative Physiol Ther*, 1999, 22: 582–585. [[Medline](#)] [[CrossRef](#)]