

## Original Article

# EFFECT OF CONVENTIONAL TENS VERSUS SPINAL MOBILIZATION IN PRIMARY DYSMENORRHEA IN ADOLESCENT GIRLS: A COMPARATIVE STUDY

Manisha Mistry <sup>\*1</sup>, Vishnu Vardhan <sup>2</sup>, Tushar Palekar <sup>3</sup>, Rasika Panse <sup>4</sup>.

<sup>\*1</sup> MPT Pediatrics, <sup>2,4</sup> Assistant Professor, <sup>3</sup> Principal.

Dr. D.Y. Patil College of Physiotherapy, Pune, India.

## ABSTRACT

**Background:** Primary dysmenorrhea is a common debilitating factor in most of the adolescent girls. It is a major cause of inability to concentrate on their work or studies, class or school absenteeism, inability to perform in their academic activities. This study conducted to assess the effect of non-invasive treatments for pain relief during dysmenorrhea.

**Aim and Objectives:** To study the effect of Conventional TENS and Spinal mobilization on pain in Primary Dysmenorrhea in adolescent girls.

**Materials and Methods:** Fifty adolescent girls aged between 14-18 years were selected for the study that fulfilled the inclusion criteria. Quasi experimental study was done to compare the effect of TENS and Maitland's spinal mobilisation in Adolescent girls suffering from primary dysmenorrhea. They were randomly divided in two groups: Group A for TENS (n= 24) and Group B for spinal mobilisation (n= 26) and participant's menstrual history was recorded. Girls with severe dysmenorrhea, pelvic pathology and spinal pathology were excluded from this study. Treatment was given on 1<sup>st</sup> and 2<sup>nd</sup> day of menstruation period. Adolescent girls marked the Short form McGill Pain Questionnaire (SFMPQ) which includes PPI and VAS before and just after the treatment. Total scores were noted and subjected to statistical analysis.

**Result:** Data was analyzed using Mann Whitney U test which compared data between groups; results were not statistically significant ( $p > 0.05$ ) for SFMPQ, PPI and VAS. Pain relief was approximately the same for the two groups.

**Conclusion:** The study concludes that TENS and mobilisation both are effective reducing pain among adolescent girls who suffer from primary dysmenorrhea.

**KEY WORDS:** Adolescent girls, Dysmenorrhea, conventional TENS, Spinal mobilisation, Pain.

**Address for correspondence:** Dr. Manisha Mistry (PT), MPT Pediatrics, Dr. D.Y.Patil College of Physiotherapy, Pune, India. **E-Mail:** [manisha\\_mistry123@gmail.com](mailto:manisha_mistry123@gmail.com)

## Access this Article online

### Quick Response code



DOI: 10.16965/ijpr.2015.181

International Journal of Physiotherapy and Research

ISSN 2321- 1822

[www.ijmhr.org/ijpr.html](http://www.ijmhr.org/ijpr.html)

Received: 24-08-2015

Accepted: 14-09-2015

Peer Review: 24-08-2015

Published (O): 11-10-2015

Revised: None

Published (P): 11-10-2015

## INTRODUCTION

Primary dysmenorrhea is a major cause for disability in most of the adolescent girls which leads to inability to concentrate on their work or studies, class or school absenteeism, inability to perform in their academic activities like physical training or sports, thus it has a large

impact on daily life activities [1]. Dysmenorrhea has menstrual distress with symptom like Pain, Water retention, Autonomic reactions, mental distress, and impaired concentration, behavior change, and arousal [2]. It is of 2 categories: 1) Primary dysmenorrhea which occurs when there is no identifiable pelvic pathology and tends to

occur within 12 months of menarche.2) Secondary dysmenorrhea is associated with identifiable pelvic pathology [3]. Menarche is the onset of menstrual periods marks an important point in life for the adolescent girls. Adolescence is a transition period from childhood to adulthood and is characterized by a spurt in physical, endocrinal, emotional, and mental growth. In recent studies incidence rate in India for primary dysmenorrhea was found 69% adolescent girls suffering from dysmenorrhea around 36% of them experience dysmenorrhea was 48% in young college students [4,5].

Pathophysiology of pain in Primary dysmenorrhea is due to Progesterone withdrawal, which leads to increase Myometrial Contraction, Vasoconstriction, Hyper sensitization of pain fibers. Symptoms during Dysmenorrhea are Pain in lower abdomen, loss of appetite, irritability, depression, lethargy and occasionally swelling in ankle and knee. Chief complain during dysmenorrhea is pain in lower abdomen during menstruation and may also be referred to hips, lower back, or thighs. The pain usually starts shortly before or during their menstrual period, peaks after 24 hours, and subsides after 2 to 3 days. Dysmenorrheic pain may be spasmodic in nature along with sharp pelvic cramps at the start of menstrual flow or congestive with deep, dull ache [6,7].

**Interventions:** Management of dysmenorrhea includes pharmacological and non pharmacological approaches. Drug treatment is the most widely used for pain relief in dysmenorrhea, which is Non steroidal anti-inflammatory drugs (NSAIDs) and Oral contraceptives. NSAIDs are prostaglandin inhibitors and have direct analgesic effect [6]. Non invasive methods treatments includes (a) Relaxation techniques like relaxation exercise with or without music and visual imagery for 20-minutes a day twice weekly or more can help relieve symptoms of menstrual cramps, nausea, irritability, and poor concentration [8]. (b) Acupuncture may be valuable for the treatment of menstrual cramping. In many cases complete elimination of pain may be possible [9,10]. (c) Transcutaneous electrical stimulation (TENS) is used for pain relief. In this method electrodes

are placed on the skin and electric current applied at different pulse rates and intensities to stimulate these areas in efforts to provide pain relief. Mechanism of pain relief is through potential Pain blocking at spinal level, which is stimulated by activity in small-diameter nociceptive fibers and closed by activity in large-diameter fibers [11,12]. (d) Exercises provide symptomatic relief. Studies have shown that exercise can result in reduced stress, fatigue and depressed mood [13,14]. (e) Mobilisation is a hands-on manual therapy designed to restore joint movement, power, and range of motion. Spinal manipulation alters central processing of innocuous, mechanical stimuli, because pain tolerance or threshold levels increase. Pain relief during mobilisation is due to stimulation of mechanoreceptors causing increased proprioceptive input to the spinal cord thereby inhibiting transmission of pain impulses to the anterior horn cells and higher centers [15].

## MATERIALS AND METHODS

Quasi Experimental Study was done and adolescent girls between 14 to 18 years with moderate primary Dysmenorrhea where included in this study. Girls with precocious puberty, severe primary Dysmenorrhea, pelvic pathology like PID, endometriosis and spinal pathology and deformity where excluded from the study. Materials were used short form Mc Gill's short form Questionnaire and TENS machine.

**Procedure:** This study was conducted in the region of Pimpri Chinchwad, Pune Maharashtra. Ethical clearance was taken from university. Adolescent girls from PCMC region schools were screened before taken in the study. A total 50 adolescent girls were participated in the study and randomly divided in the two groups by a simple random sampling. At the beginning of the first session, an orientation to the program was done its purpose, the pretest of adolescent girl's knowledge, content activities, time, location and resources. Demographic data and menstrual history were taken from girls who fitted in the study and informed consents were taken from them. Pre treatment Short Form Mc Gill Pain Questionnaire was explained to them explained to them and they filled it before interventions. There were three components Pain Questionn-

-aire, VAS and PPI in SFMPQ. Group A was given Conventional TENS during their menstrual pain period for 30 minutes in prone lying with pillow under the abdomen from T10 – L1. TENS was given with high frequency (80 -120Hz), narrow pulse width (40-75  $\mu$ s) and an intensity that produces a comfortable perceptible paresthesia without muscle contraction. Machine used was Striker Microcontroller 4 channel TENS [12].

Group B was given Maitland's Spinal mobilization from T10 to L1 vertebrae. A Postero-Anterior glide grade 1 and grade 2 will be given from T10 to L1 vertebrae. In Prone lying a pillow was given under the abdomen to make the patient more comfortable. Spinal mobilisation techniques were applied for each vertebral level. Both grade 1 and grade 2 was given for 2-3 per second for 30 secs [18,19]. Post treatment both groups have again filled Mc Gill's Questionnaire. Privacy of the participant was maintained. Both pre and post data were documented and compared.

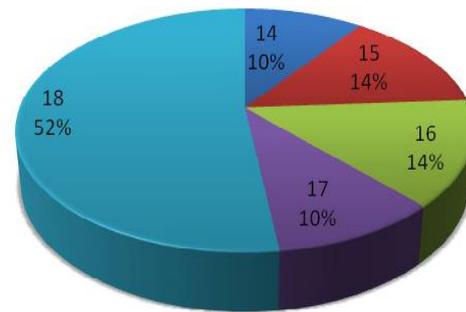
## RESULTS

Mean age of Group A was 17.042 and Group B was 16.58. Data was collected and analyzed using Mann Whitney sum Rank Test and following results were obtained:

1. 52% girls of 18 years, among the age group 14 – 18 years had complained of dysmenorrhea.
2. Comparisons of both interventions on SFMPQ score on Day 1 and day 2, was not significant,  $p = 0.712 > 0.05$ (Table 1). Grp B Showed significant pain reduction than Grp A on 2<sup>nd</sup> day.
3. Comparisons of group A and B on both day PPI score, was not significant,  $p = 0.206 > 0$ . Group B showed more marked pain reduction than Group A, on day 2 (Table 2).
4. No significant difference in Group A and B on 1<sup>st</sup> and 2<sup>nd</sup> day according to VAS score.  $P = 0.174 > 0.05$  (Table 3). Grp B Showed more marked significant pain reduction than Grp A on 2<sup>nd</sup> day. Comparisons between groups were not statistically significant for all SFMPQ, PPI and the VAS. Thus, pain relief was approximately the same for the two groups.

**Graph 1:** Demonstrate Age of Adolescent girls.

### Age Distribution



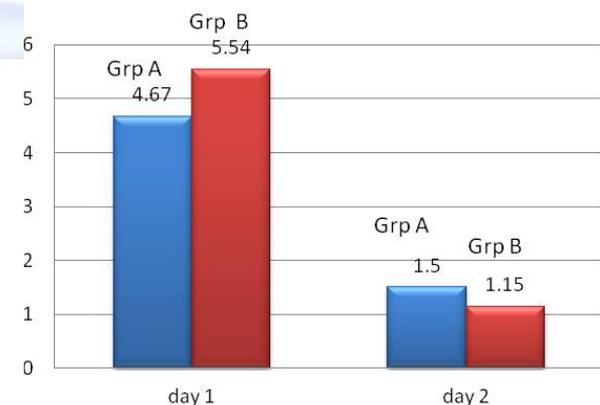
**Inference:** It shows that around 52% 18 years old girls have problem of Dysmenorrhea, while it is seen less in younger age group.

**Table 1:** shows comparison between difference in SFMPQ of Group A and Group B on Day 1.

	Group A		Group B		P value
	Mean (SD)	Median	Mean (SD)	Median	
DAY 1	4.67 ( $\pm$ 1.71)	5	5.52( $\pm$ 3.07)	4.5	> 0.05
DAY 2	1.5 ( $\pm$ 1.32)	1	1.15 ( $\pm$ 0.05)	1	> 0.05

**Graph 2:** shows comparison between SFMPQ of Group A and Group B on Day 1 and Day 2.

### SFMPQ

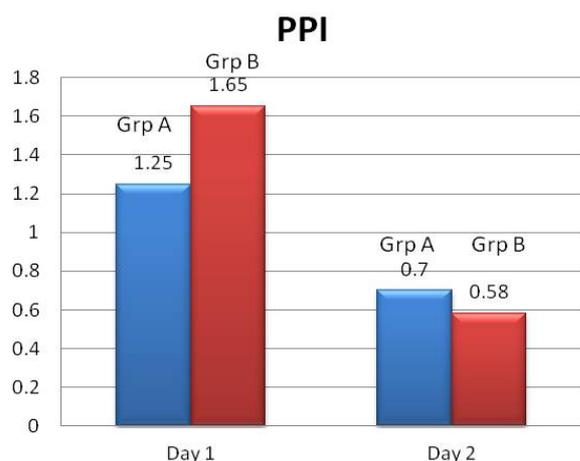


**Inference:** Shows comparison between groups, where  $p = 0.712$

**Table 2:** shows comparison between changes PPI of Group A and Group B on Day 1 and Day 2.

	Group A		Group B		P value
	Mean (SD)	Median	Mean (SD)	Median	
DAY 1	1.25 ( $\pm$ 0.53)	1	1.65 ( $\pm$ 0.98)	1	> 0.05
DAY 2	0.7 ( $\pm$ 0.89)	0.5	0.576 ( $\pm$ 0.58)	1	> 0.05

**Graph 3:** shows comparison between PPI of Group A and Group B on Day 1 and day 2.

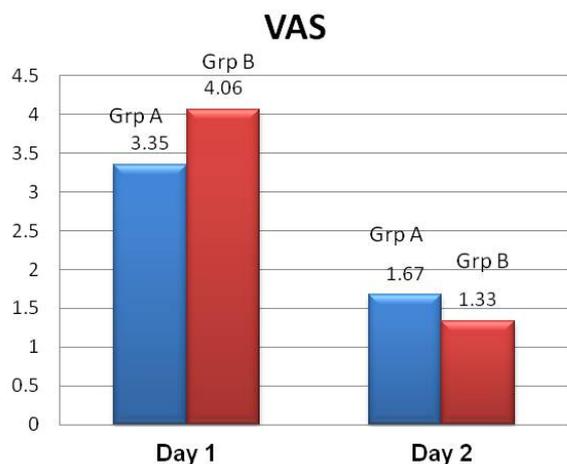


**Inference:** Suggest comparisons of group A and B on both day PPI score, which is  $p = 0.206$ .

**Table 3:** shows comparison between VAS of Group A and Group B on Day 1 and Day 2.

	Group A		Group B		P value
	Mean (SD)	Median	Mean (SD)	Median	
DAY 1	3.35(±1.34)	3.65	4.06(±1.87)	4.2	>0.05
DAY 2	1.67(±1.44)	1.9	1.33(±1.20)	1.4	>0.05

**Graph 4:** shows comparison between VAS of Group A and Group B on Day 1 and Day 2.



**Inference:** It shows comparisons of group A and B on VAS score, which is  $p = 0.174$ .

## DISCUSSION

Dysmenorrhea is the one of the cause for incapacitate to do or concentrate on day to day work and study. There are 48% to 69% girls in India who suffered from Dysmenorrhea [4,5]. Out of 250 girls screened out, total 50 adolescent girls were included for the study, which were divided into two groups. Group A were given Conventional TENS and Group B were given

Maitland's spinal mobilisation. Both the groups showed significant improvement in menstrual pain symptoms and distress.

Conventional TENS was found highly significant ( $p < 0.001$ ) for pain relief on both days of menses. Studies have shown that High TENS is effective in treatment of primary dysmenorrhea [16]. Physiological effect of conventional TENS is through Pain Gate Mechanism. Pain signals especially slow pain, diffuse burning pain, hyperalgesia, pass through the small diameter fibers which dominate upon large diameter fibers. High TENS stimulate large diameter A $\beta$  fibers and block the pain signals at spinal cord level which induce the pain relief [17,18].

The result found in this study are similar to previous researches where there was significant pain relief from TENS (frequency 120Hz) used in primary Dysmenorrhea. Another study in which TENS with frequency of 0- 100 Hz, was given in back region showed highly significant pain reduction among adolescent girls [20,21]. Study suggests that High TENS had 70% pain reduction and it was more effective in back T10 to L1 region. These results are similar to this study which strongly support that TENS in back region during Dysmenorrheic pain is beneficial [11]. Maitland mobilisation techniques have been applied (grade 1 and grade 2) for pain relief at the vertebral levels, such mobilisation techniques are not used frequently to reduce primary dysmenorrhea in day to day clinical practice due to lack of awareness. Passive oscillatory movement induces pain relief by mechanoreceptors stimulations in the joint region. It was found that Maitland mobilisation highly effective ( $P < 0.001$ ) in Primary Dysmenorrhea in pain relief. The neurophysiologic effects of spinal mobilisation techniques the small amplitude oscillatory movements are used to stimulate the mechanoreceptors that may inhibit the transmission of nociceptive stimuli at the spinal cord or brain stem level. Another reason could be small amplitude gliding movements the joint cause bringing of more nutrients to the avascular structures thus helping in nutrient exchange and faster pain relief [22].

Research suggests that use of musculoskeletal manipulation to treat dysmenorrhea.

Parasympathetic and sympathetic pelvic nerve pathways are closely associated with spinal vertebrae especially T10 to L2, hence there is an effect over nerve supply which will help to reduce dysmenorrhea. Manipulation of these vertebrae increases spinal mobility and may improve pelvic blood supply through an influence on the autonomic nerve supply to the blood vessels [18].

Study suggests that dysfunction of the spine, at level of T10 and L5 is highest in women while suffering from primary dysmenorrhea and spinal mobilisation at these relevant vertebral levels will help reduction of the dysfunction at the spinal level and reducing the discomfort (stiff back) indirectly reducing dysmenorrhea. This study proved that there is dysfunction at the vertebral levels of T10 to L1 which can be the reason for dysmenorrhea [23]. In our study mobilisation was given vertebral level T10 to L1, and we found statistically significant pain reduction in adolescent girls. After first day mobilisation in dysmenorrhea few of girls have noted no pain at all on the second day of menses, while generally they were complaining of pain for at least two days.

However, intergroup comparison shows no significant difference in improvement of dysmenorrhea (Table 1, 2 and 3). This implies that both treatments are effective in Dysmenorrheic symptoms, especially back pain than abdominal pain. In our study only two three girls in both group found minimal pain reduction of dysmenorrhea, other than that significant pain relief. Both conventional TENS and Maitland's mobilisation grade 1 and 2 have same physiological effect of pain reduction, through stimulation of large diameter fibers and block pain sensation at spinal cord level. Moreover, pain sensation we found reduction of affective symptoms like Exhausting, in Mc Gill Pain Questionnaire, which may help the subject to concentrate in their study or work. In this study Maitland's mobilisation group obtained more beneficial result after 2<sup>nd</sup> day treatment.

Several treatments have been advocated for Dysmenorrheic pain, although research into Maitland's mobilisation efficacy remains sparse. Conventional TENS and grade 1 and 2 Mobilizations have been proved for pain relief

but very limited study in dysmenorrhea.

Dysmenorrheic symptoms of abdominal pain and others are due to increased sympathetic supply to the myometrium of uterine wall, which cause reduction in blood supply to the myometrium. When TENS and mobilizations are applied at T10 to L1 level, they stimulate mechanoreceptors and large diameter fibers which may block pain sensation at spinal level.

Comparison of both groups shows not much statistically significant, thus we are accepting null hypothesis. There is no difference in the effect of TENS and Spinal Maitland's mobilisation in primary dysmenorrhea in adolescent girls. There is a need to educate adolescent females regarding menstrual health, as majority of the girls almost always suffer the pain and discomfort of dysmenorrhea silently, due to lack of knowledge about reproductive health and to the stoppage of use of over the counter drugs as well as hormonal preparations including oral contraceptive pills.

## CONCLUSION

Study concludes that comparison between the groups where intervention given in form of TENS and Mobilisation in primary dysmenorrhea among adolescent girls did not show statistically significance but clinically was effective in reducing pain immediately after intervention.

**Conflicts of interest:** None

## REFERENCES

- [1]. Dr.Kavitha, Dr.Jamuna.B.L, Prevalence of dysmenorrhea and its impact on daily life activities in first and second year mbbs students. *Int J Biol Med Res.* 2014; 5(2):4062-4065.
- [2]. Huei-Mein Chen, Chung-Hey Chen. Related Factors and Consequences of Menstrual Distress in Adolescent Girls with Dysmenorrhea, *Kaohsiung J Med Sci. J Med Sci* 2005 Mar;21(3):121-7
- [3]. D.C Dutta, dysmenorrhea and other disorders of menstrual cycles, textbook of gynecology, edited by: Hiralal Konar, P, Jaypee brothers medical publishers, edn - 5, pg 174.
- [4]. Agarwal A. K, Agarwal A. A study of dysmenorrhea during menstruation in adolescent girls. *Indian journal of community medicine: official publication of Indian Association of Preventive & Social Medicine*, 2010;35(1), 159.
- [5]. Shah M, Monga A, Patel S, Shah M, Bakshi H. A study of prevalence of primary dysmenorrhea in young students-A cross-sectional study. *Healthline.* 2013;4:30-4.

- [6]. Dawood MY. Primary dysmenorrhea advances in pathogenesis and management. *Obstet Gynecol.* 2006 Aug;108(2):428-41.
- [7]. Andrew .S. Coco. Primary dysmenorrhea, *Journal of American family physician* 1999;23:476-81.
- [8]. Thomas .F. Dietvorst, David Osborne, biofeedback assisted relaxation training for primary dysmenorrhea: a case study, *journal of biofeedback and self regulation.* September 1978;3(3):301-305.
- [9]. Helms JM. Acupuncture for management of primary dysmenorrhea, *journal of obstetrics and gynecology* 1987;69:6-51.
- [10]. Smith C., Crowther. C, Petrucco O., Beilby J. and Dent H. Acupuncture to Treat Primary Dysmenorrhea in Women: A Randomized Controlled Trial. *Evidence-Based Complementary and Alternative Medicine-* Volume 2011 (2011), Article ID 612464, 11 pages <http://dx.doi.org/10.1093/ecam/nep239>
- [11]. Lundeberg T., Bondesson L. and Lundstrom V. Relief of primary dysmenorrhea by transcutaneous electrical nerve stimulation, *ACTA, OBGYN.* 1985;64:461-497.
- [12]. Proctor M, Farquhar C, Stones W, He L, Zhu X, Brown J. Transcutaneous electrical nerve stimulation for primary dysmenorrhea. *Cochrane Database of Systematic Reviews* 2002;1.
- [13]. Aganoff J. and Boyle G. Aerobic exercise, mood states and menstrual cycle symptoms. 1994. [[http://epublications.bond.edu.au/hss\\_pubs/37](http://epublications.bond.edu.au/hss_pubs/37)].
- [14]. Shahr-jerdy S., Sheikh Hosseini R., Eivazi M, 2012, Effects of stretching exercises on primary dysmenorrhea in adolescent Girls. *Biomedical Human Kinetics* 2012;4:127-132.
- [15]. Proctor M. Hing W, Johnson TC et al. Spinal manipulation for dysmenorrhea, *The Cochrane Library* 2010;1.
- [16]. Mannheimer J. and Whalen E. The efficacy of transcutaneous electrical nerve stimulation in dysmenorrhea. *The clinical journal of pain.* 1985;1(2):75-83.
- [17]. Melzack R. The short-form McGill Pain Questionnaire, *Pain.* 1987;30:191-197.
- [18]. Proctor M., et al, spinal manipulation for dysmenorrhea, *Cochrane Database of Systematic Reviews* 2006, Issue 3.
- [19]. Maitland G., Hengeveld E., Banks K. et al, Maitland's vertebral manipulation, edn - 6 , 3-4, 216-218.
- [20]. Parsa P, Bashirian S. Effect of transcutaneous electrical nerve stimulation (TENS) on primary dysmenorrhea in adolescent girls. *J Post grad Med Inst* 2013;27(3):326-30.
- [21]. Tugay N, Akbayrak T, Demirtürk F, Karakaya IC, Kocaacar O, Tugay U, Karakaya MG, Demirtürk F. Effectiveness of Transcutaneous Electrical Nerve Stimulation and Interferential Current in Primary Dysmenorrhea. *Pain Med.* 2007 May-Jun;8(4):295-300.
- [22]. Kisner, Colby, textbook of therapeutic exercise, Jaypee Brothers Medical Publishers, edn- 4;216-17.
- [23]. Thomason PR, Fisher BL, Carpenter PA, Finke GL 1979 Effectiveness of spinal manipulative therapy in the treatment of primary dysmenorrhea: a pilot study. *J Manipulative Physiol Ther.* 1979;2:140-5.

#### How to cite this article:

Manisha Mistry, Vishnu Vardhan, Tushar Palekar, Rasika Panse. EFFECT OF CONVENTIONAL TENS VERSUS SPINAL MOBILIZATION IN PRIMARY DYSMENORRHEA IN ADOLESCENT GIRLS: A COMPARATIVE STUDY. *Int J Physiother Res* 2015;3(5):1227-1232. **DOI:** 10.16965/ijpr.2015.181