EFFICACY OF LASER ACUPUNCTURE WITH MITCHELL'S SIMPLE PHYSIOLOGICAL RELAXATION TECHNIQUE IN ALLEVIATING PREMENSTRUAL TENSION

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Abstract: Premenstrual syndrome (PMS) is a condition of recurrent physical and psychological symptoms occurring in a cyclic fashion during the 1-2 weeks proceeding a woman's menstrual period, significant enough to cause disruption in family, personal, or occupational function. This study was conducted to determine the effect of laser acupuncture with Mitchell's simple physiological relaxation technique in alleviating premenstrual tension syndrome (PMS), thirty volunteer females suffering from PMS were selected from Faculty of Physical Therapy, Kafrelsheikh University. Their ages ranged from 17 to 22 years and their body mass index was < 30 Kg/m2. Volunteers were randomly assigned into two groups: a control group received vitamin B6 and Ca supplements once daily and a study group received the same medical treatment and participated in treadmill training three times per week for 3 months they were treated by laser acupuncture and Mitchell's simple physiological relaxation technique for 30 minute/session, 3-times/week during 2 weeks before menstruation for 2 menses. Assessments: Pulse rate, respiratory rate and EMG activity of Rt and Lt trapezius ms were recorded before and after intervention. Results: repeated measure manova revealed that there was significant reduction in EMG activity of (Rt and Lt trapezius ms), pulse rate and respiratory rate (p<0.05). Conclusion: There is positive biological evidence to support the empirical evidence for laser acupuncture and Mitchell's simple physiological relaxation technique in the treatment of premenstrual tension (PMT). They showed highly significant reductions in pulse rate, respiratory rate and EMG muscle activity with its minimal adverse effect profile and ease of application, laser acupuncture should be included in reducing symptom of premenstrual syndrome management strategies.

Keywords: Premenstrual tension- laser acupuncture- Mitchell's simple physiological relaxation- EMG.

Introduction

Premenstrual syndrome (PMS) is one of the most common disorders in women in the luteal phase of the menstrual cycle. (Balaha et al., 2010). It is characterized by the occurrence of physical and emotional symptoms such as anxiety, mood swings, sleep changes, breast tenderness, abdominal bloating and headache and general fatigue (Firoozi et al., 2012).

The severe form of PMS is the Premenstrual Dysphoric Disorder, which differs from PMS in respect to intensity of symptoms, predominance of mood symptoms, and the significant function impairment (Cubeddu et al., 2011).

Prevalence as high as 75–85% is mentioned if one or several symptoms is considered, 10–15% medical care is requested and 2–5% with social activities interruption (Reddish, 2006).

Risk factors of premenstrual syndrome include high caffeine intake, stress may precipitate condition, increasing age, history of depression, family history, dietary factors (low levels of certain vitamins and minerals, particularly magnesium, manganese, zinc, vitamin E and also vitamin D (Kwan and Onwude, 2009). There is recent evidence that levels of oestrogens and progesterone affect the transport of serotonin in the CNS, profoundly affecting the brain serotonegic system, conversely, serotonin might affect ovarian levels of oestrogens and progesterone (Cameron, 2004). Some evidence suggests that an underlying serotonin deficiency makes women more sensitive to progesterone (O'Brien 2000).

Treatments include administration of antidepressants and tranquilizers, hormonal treatments such as oral contraceptives, counseling and psychotherapy. Drug treatments can be effective at reducing premenstrual symptoms, but some are associated with significant adverse effects. (Kwan and Onwude, 2009).
Serotonin and gamma-aminobutyric acid (GABA) are chemicals that relay signals from one nerve cell to the next (neurotransmitters). Low levels of serotonin have been linked to depression, and low levels of GABA are associated with anxiety, both symptoms of PMS (Sherwin, 2005). Acupuncture treatments affect several of the body neurotransmitters. Changes in serotonin levels in both the brain and the spinal cord can be achieved with acupuncture (Lin and Chen, 2008).

Clinical research has shown that after electro-acupuncture, the release of β-endorphin into the peripheral blood. The release of β-endorphin represents a natural mechanism for the modulation of stress (Qu and Zhou, 2006). On a study done in Korean acupuncture technique, points SP6, CV6 were mainly used (Li and Chen, 2008). Physical symptoms such as headache, cramps, backache, cold sweats, hot flashes, breast pain, skin disorders, swelling of hands and feet, sensitivity to cold, abdominal pain and bulging improved as much as 50.5%. Psychological symptoms also improved (Kim et al., 2005; Shin et al., 2009).

A relaxation technique (also known as relaxation training) is any method, process, procedure, or activity that helps a person to relax; to attain a state of increased calmness; or otherwise reduce levels of pain, anxiety, stress or anger. Relaxation techniques are often employed as one element of a wider stress management program and can decrease muscle tension, lower the blood pressure and slow heart and breath rates, among other health benefits (Daniel, 1986).

Relaxation by rhythmic breathing, promotes physical relaxation by reducing muscle tension, and promotes emotional relaxation by reducing anxiety (Fraser and Cooper, 2005). One method of relaxation often employed by physiotherapists in the United Kingdom for management of stress is the physiological relaxation technique described by Laura Mitchell (Salt and Kerr, 1997).

Mitchell's simple physiological relaxation is a standardized method for management of stress and is widely used especially in the field of obstetrics and gynecology. Salt and Kerr (1979), Wilson (2004), aimed to correcting nervous system imbalance by initiating a phenomenon known as the ‘relaxation response’. This response is caused by the release of hormones, which have a widespread effect on the cardiorespiratory system (Hoffman et al., 1992).

The relaxation response can be assessed by measuring diastolic and systolic blood pressure, oxygen consumption, heart rate or respiration rate; all of which have the potential to change (Benson, 1977; Salt and Kerr, 1997).

Subjects, Materials and Methods

Subjects
Thirty volunteer females suffering from PMS were selected from Faculty of Physical Therapy, Kaferelshiek University. Their age ranged from 18-22 years, and their Body Mass Index (BMI) <30 kg/m2, they had no past or present diagnosis of psychiatric illness, no traumatic life events such as death in family in the last 2 months, no history of participation in relaxation training within the previous 6 months, and have no prescriptive medications. They were divided in to two groups.

Materials
- Data collection sheet.
- Cotton and alcohol were used to clean the skin over upper fibers of trapezius before application of laser acupuncture and EMG electrodes placement.
- Pillows, cushions and sheets to support body parts in a comfortable relaxed position and to cover the subjects.
- Plinth was used for evaluation and treatment.
- Plusimeter (Tunturi TPM 400 Dc- 6V) was used to measure pulse rate at the beginning and end of treatment program.
- Stop watch was used for adjusting the duration of each relaxation session and to measure the respiratory rate.
- EMG neuroscreen was used before and after the treatment program as an evaluative tool, through 2 surface electrodes placed over upper fibers of trapeziums another one earth electrode.
- Laser acupunkturgerät AL10.; Gallium- arsenide laser diode , output wave length:630-70nm and maximum power:5 milli watts.

The acupoints were carefully circled with a skin-marking pencil (circumference slightly larger than the laser probe) prior to treatment.
Methods:

Evaluative procedure:
- Assessment of muscle tension

The subject was assumed a comfortable relaxed half lying position with the aid of soft pillow behind her head and small cushions placed under her knees and ankles to support and accommodate her body curves. Two adhesive surface electrodes EMG neuroscreen biofeedback were placed over the upper fibers of Rt and Lt trapezius and the reference electrode was placed over the right shoulder.

Treatment procedures:
Laser acupuncture

In the same position, Laser acupuncture was applied on SP6 (Sanyinjiao) - 3 cun directly above the tip of the medial malleolus on the posterior border of the tibia, LI14 (Binao) - 4 cun above LI13 at the inferior border of the deltoid, on the line connecting LI11 and LI15. CV6 (Qihai) On the midline, 1.5 cun inferior to the umbilicus and GB34 (Yanglingquan) - In a depression of anterior and inferior to the head of the fibula. The head of laser device was held perpendicular and with direct contact to each point each point was irradiated for 90 seconds.

Then the subjects asked to follow the instructions as
- Her mouth and eyes were gently kept closed. The voice of the instructor used during relaxation training was smooth and quiet. Gradually reduced in volume as session progressed. After that, she was instructed to perform the following:
  1. Dragging her jaw downwards. Then, she stopped this action and felt the new position.
  2. Pressing her tongue downwards in her mouth. Then, she stopped this action and felt it.
  3. Closing her eyes gently if they were opened, keeping her eyelids down, then she stopped and she was asked to feel and enjoy the peace of darkness.
  4. Pushing her head downwards against the bed, then stopped this action and noting the bed carried weight of her head.
  5. Pulling her shoulders towards her ears, feeling the space between her shoulders and her ears, then stopped this action and felt the new position.
  6. Sliding her elbows sideways away from her body until she reached a comfortable point. Then, she was asked to stop moving and feeling the space between her arms and her body.
  7. Abducting and extending (stretching and separating) her fingers and thumbs with the palmer surface of both hands rested on the bed. Then, stopping and noting how hands felt, spending one or two moment taking these sensation.
  8. Breathing slowly and deeply without putting any effort into her breathing or any change in its rhythm.
  9. Rolling her thighs outwards (external rotation). Stopping, letting her legs settled comfortably and noting how they felt in this position.
  10. Moving her knees until they were comfortable, adjusting their positions to enhance their comfort. Stopping and registering the sense of ease.
  11. Planter flexing her feet away from her face being careful not to induce cramp. Stopping and feeling the new position of her feet.
  12. Pushing her body downwards against the bed. Stopping, then, feeling her body weight being supported and noting the points where her body touch the bed.
  13. Thinking of a smoothing action which began above her eye brows, moved up into hair line, continued over the crown of her head and down to the back of her neck. Enjoying this effect.

Then, she was instructed to slowly return to the active state gradually to avoid fainting. She was asked to open her eyes, being aware of the room, give her limbs a gentle stretches and her body plenty of time to be adjusted to an active state. This technique was performed for thirty minutes / session, three times/ week for 4 weeks. In addition to home routine by using a recorded tape of relaxation instructions to extend the calm state achieved during session to other times of a day.

Statistical analysis. The collected data had been gathered and statistically analyzed. Repeated measure manova was used to compare between data before starting and after the end of the treatment program. Level of significance was P< 0.05.
Results

As shown in Table 1 these are the mean values and standard deviation in pre treatment and post treatment of EMG activity of Rt and Lt trapezius ms, pulse rate and respiratory rate.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std. Deviation</th>
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<tbody>
<tr>
<td>RTtrapeziuspre</td>
<td>104.9940</td>
<td>34.93173</td>
</tr>
<tr>
<td>RTtrapeziuspost</td>
<td>86.1456</td>
<td>27.66893</td>
</tr>
<tr>
<td>LTtrapeziuspre</td>
<td>100.8839</td>
<td>52.40717</td>
</tr>
<tr>
<td>LTtrapeziuspost</td>
<td>76.7142</td>
<td>24.25778</td>
</tr>
<tr>
<td>Pulseratepre</td>
<td>77.4375</td>
<td>5.17647</td>
</tr>
<tr>
<td>Pulseratepost</td>
<td>73.4375</td>
<td>4.44175</td>
</tr>
<tr>
<td>Respiratoryratepre</td>
<td>17.2500</td>
<td>1.52753</td>
</tr>
<tr>
<td>Respiratoryratepost</td>
<td>15.6875</td>
<td>1.88746</td>
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</tbody>
</table>

Table (2) represented the results of pairwise comparison in pre and post treatment of EMG values of Rt and Lt trapezius ms, pulse rate and respiratory rate. There were significant improvement of EMG values of Rt and Lt trapezius ms, pulse rate and respiratory rate (p<.002), (p<.064), (p<.011), (p<.000).

<table>
<thead>
<tr>
<th></th>
<th>Training periods</th>
<th>Mean Difference</th>
<th>Sig</th>
<th>95% Confidence Interval for Difference</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td>Lower Bound</td>
</tr>
<tr>
<td>RTtrapezius</td>
<td>Pre</td>
<td>post</td>
<td>18.848</td>
<td>.002</td>
</tr>
<tr>
<td>LTtrapezius</td>
<td>Pre</td>
<td>post</td>
<td>24.170</td>
<td>.064</td>
</tr>
<tr>
<td>Pulserate</td>
<td>Pre</td>
<td>post</td>
<td>4.000</td>
<td>.011</td>
</tr>
<tr>
<td>Respiratoryrate</td>
<td>Pre</td>
<td>post</td>
<td>1.563</td>
<td>.000</td>
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</table>
Discussion

Premenstrual syndrome (PMS), also called premenstrual tension (PMT) is a collection of emotional symptoms, with or without physical symptoms, related to a woman's menstrual cycle. While most women of child-bearing age (up to 85%) report having experienced physical symptoms related to normal ovulatory function, such as bloating or breast tenderness, medical definitions of PMS are limited to a consistent pattern of emotional and physical symptoms occurring only during the luteal phase of the menstrual cycle that are of "sufficient severity to interfere with some aspects of life. This condition is characterized by troublesome symptoms lasting even to 14 days before menstruation. These symptoms include tension, irritability, depression, headache, anxiety and loss of self control (Thwe, 2006).

This current study was conducted to determine the effectiveness of laser acupuncture and Mitchell's physiological relaxation technique in alleviating premenstrual tension syndrome.

The measurement of, EMG activity, pulse rate and respiratory rate had been collected before starting treatment and after treatment session for 4 weeks.

The results of the study demonstrated that laser acupuncture and Mitchell's physiological relaxation technique improve premenstrual tension syndrome. The current study has improvement in EMG values of Rt and Lt, pulse rate and respiratory rate as a parameter in physiological changes occurred in premenstrual tension syndrome, the result showed a significant decrease (p<0.002, 0.046), the decrease was 18.848, 24.170 µv than base line mean in Rt and Lt rapezius, in pulse rate (P<0.011). The decrease was 4b/min than base line mean value of 77.34b/min and significant decrease in respiratory rate (P<0.0001).

The decrease was 1.53 breath/minute than base line mean value of 17.25 breath/minute. This result is explained with Qu and Zhou (2006) who stated that acupuncture was found to be an effective alternative or complementary therapy in relief of pain. The benefit of electrical/acupuncture for relieving pain may based on the mechanism of producing a synergism of the central nervous system (CNS) leading to increasing the release of β-endorphin and serotonin into the peripheral blood, another explanation for the apparent analgesic effect of acupuncture suggested as the gate control theory which depend on stimulating the large mylinated fiber that block the smaller fibers from reaching the hypothalamus center of pain.

The result is agree with Berger et al. (2009) who stated that Serotonin also mediates several important CNS behaviors including the stress response, immune strength, and the predilection for violence toward property, others (homicide), or oneself (suicide). Thus, it is central to the production and treatment of several stress disorders including mania-depression, dysthymia, obsessive compulsive disorder, pre-menstrual syndrome, anorexia-obesity, and several others, such as autism and schizophrenia. Also, Green (2004) stated that the use of acupuncture is thought to reduce local muscle tension or release pain-killing endorphins.

In addition to laser effect on the level of serotonin and acetylcholine which play an important role in the analgesic effect (Zarkovic, Manev and Pricic, 1989). Also, Walker (1983) who mentioned that the level of 5-hydroxy indoleacetic acid (5-HIAA) which is a metabolite of serotonin (5-HT) excreted in high level in those patients experiencing pain relief as a result of laser treatment.

Relaxation training, including progressive muscle relaxation and autogenic training, teaches patients to become physically and mentally relax through its physiological effects. It may slow heart rate, respiratory rate, and increase extremity temperature. It also, enhances coping ability by decreasing anxiety and increasing self-control (Edward, 1999).

Many findings suggest beneficial effects of relaxation on reducing anxiety and perceived stress in pregnant women, so teaching relaxation techniques could serve as a source for improving maternal psychological health (Bastani et al., 2005). Deep breathing exercises may increase the rate at which serotonin neurons in the brain fire, which may stimulate the production of this mood-elevating chemical. Aerobic exercise, such as walking, swimming or jogging--aerobic activity may have a more significant effect on serotonin levels (Young, 2007).

This result is agree and confirmed by that of Sivasankaran et al. (2006), who conduct a study to examine the effects of yoga and meditation on hemodynamic and laboratory parameters, and found significant reduction in HR.

This reduction in HR could be attributed to a suggestion of an additional linkage between neural centers controlling both breathing and heart rate (Millhorn et al., 1990).
Conclusions

There is positive biological evidence to support the empirical evidence for laser acupuncture and Mitchell's simple physiological relaxation technique in the treatment of premenstrual tension (PMT). They showed highly significant reductions in pulse rate, respiratory rate and EMG muscle activity and ease of application, laser acupuncture should be included in reducing symptom of premenstrual syndrome management strategies because it was found to be an effective, non invasive, safe, cheap, easy to perform and successful treatment method in reducing symptom of premenstrual syndrome.

References


