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Original Research Article

Effect of Electrical Stimulation Followed by Exercises in Postnatal Diastasis Recti Abdominis

Rutuja Amit Lalingkar[1], Pranjali M. Gosavi[2], Vaishali K. Jagtap[2], Trupti S. Yadav[2]

[1]Intern, [2]Assistant Professor,
Department of Physiotherapy, Krishna Institute of Medical Sciences Deemed to Be University, Karad, Maharashtra, India.

Corresponding Author: Rutuja Amit Lalingkar

ABSTRACT

Introduction: Diastasis of Rectus Abdominis Muscle is the separation of rectus abdomini muscles as a result of widening of the linea alba most commonly occurring postnatally. Significant diastasis recti was seen in 62.5% of women postnatally within 92 hours of delivery, after 6 weeks postnatally with 50% to 60% and up to 6 months with a 39% to 45% prevalence rate. Conditions like altered trunk mechanics, impaired pelvic stability, changed posture, vulnerability of lumbar spine, pelvis injury, lumbo-pelvic pain and dysfunction are the most commonly occurring complications if diastasis recti abdominis goes untreated.
Objective: To compare the effects of electrical stimulation and exercises in postnatal diastasis recti abdominis.
Materials and Methods: 20 volunteers diagnosed with diastasis recti abdominis in their postnatal period participated in the study. Diastasis recti was measured using finger width method. 10 subjects included in group A received electrical stimulation and exercises while 10 subjects in group B received conventional exercises only.
Result: Inter recti distance was significantly reduced in women given electrical stimulation above umbilicus (2.000±0.4714), at umbilicus (2.000±0.6667) and below umbilicus (1.800±0.4216).
Conclusion: The present study provided evidence to conclude that electrical stimulation when given along with exercises for patients with diastasis recti abdominis in their postnatal period was more beneficial than conventional exercises alone.

Key Words: Diastasis recti abdominis, Neuromuscular Electrical Stimulation, inter recti distance, exercises, electrical stimulation.

INTRODUCTION

Women undergo progressive anatomical, physiological and biochemical changes during pregnancy not only confined to genital organs but also to all systems of the body. [1] Some muscular changes most frequently noted may result in pathologies during pregnancy as well as musculoskeletal disorders persisting into the postpartum period. Most commonly occurring condition is diastasis recti abdominis; as it is not painful it often goes unnoticed and untreated. Diastasis of rectus abdominis muscle (DRAM) is defined as separation of rectus abdomini muscles as a result of widening of the linea alba. [2] There are increased stresses on the abdominal muscles and connective tissue structures as the size of the uterus and baby increases and pregnancy progresses. [3] Due to these stresses and 'softening effects' of maternal hormones such as estrogen and relaxin,

there is stretching and sometimes splitting of the linea alba, resulting in a rectus abdominis diastasis. [4]

In pregnancy, there is 100% prevalence in third trimester and a prevalence of 18.75% in second trimester. [5] It is highly prevalent at the umbilicus (96.55%), 1cm above the level of umbilicus (68%), 1cm below the umbilicus (40.75%) during 1st, 3rd and 6th week of puerperium. [6] Significant diastasis recti is seen in 62.5% of women postnatally within 92 hours of delivery, after 6 weeks postnatally with 50% to 60% and up to 6 months with a 39% to 45% prevalence rate. [5]

Conditions like altered trunk mechanics, impaired pelvic stability, changed posture, vulnerability of lumbar spine, pelvis injury, lumbo-pelvic pain and dysfunction are the most commonly occurring complications if diastasis recti abdominis goes untreated. [7] These complications are most commonly attributed to weak abdominal muscles, prolonged stress of progressive weight gain, multiple births, large birth weight babies and history of connective tissue disease.

Diastasis recti vary between a small vertical gap 2-3 cm wide and 12-15 cm long, to a space measuring 12-20 cm in width and extending nearly the whole length of the recti muscle. [8] The diastasis is classified into three quantitative categories by Ranney, into: 'a mild diastasis with an observed separation of more than one and less than three centimeters between the medial fibers of the recti muscle; a moderate diastasis measuring three to five centimeters; and a severe diastasis measuring five or more centimeters.' [5]

According to the available literature, there are various treatments present for correction of diastasis recti abdominis like exercises and electrotherapy. Exercises include Noble's corrective exercises, Sahrmann progression of abdominal exercises, trunk sit-ups, reverse sit-up, trunk twists, etc. Electrotherapeutic modalities consist of neuromuscular electrical stimulation and electrical muscle stimulation. [9]

Previously study on effect of Neuromuscular electrical stimulation (NMES) on recovery of abdominal muscle strength in postnatal women with DRAM was conducted with the conclusion that NMES helps reduce DRAM. [10] The literature available on effect of electrical muscle stimulation and its application on inter recti distance is extremely limited and its prevalence is more, hence purpose of this study is to investigate the effects of electrical stimulation on inter recti distance in postnatal women.

MATERIALS AND METHODS

This study was conducted in Krishna Institute of Medical Sciences Deemed to Be University, Karad, Maharashtra and a total of 20 cases selected according to the inclusion criteria were enrolled in the study from March 2018 to May 2018. All cases were diagnosed as Postnatal Diastasis Recti Abdominis by finger width method and further by skin tone caliper for confirmation of the inter recti distance. An informed consent form was signed by the subjects who were volunteering to participate in the study. These subjects were equally allocated into 2 groups i.e. Group A and Group B by simple random sampling method. Pre-treatment Waist-hip ratio, Waist circumference and Inter recti distance were recorded by an outcome assessor. Intervention period of 3 days/ week for 4 weeks was carried out. All the exercises were performed and showed to the subjects before starting with the intervention. Group A subjects underwent Exercise Protocol along with Electrical stimulation; [11] where Group B subjects were treated conventionally by giving exercises only. Exercises included Nobel's corrective exercise and Sahrmann progression of abdominal exercises. [4,9] After 4 week's protocol post intervention measurements of Waist-hip ratio, Waist circumference and Inter recti distance were recorded and compared with previous measures.

Statistical Analysis

Statistical analysis was done manually and by using the statistics software INSTAT so as to verify the results derived. The statistical analysis between the intra group value of WHR, Waist circumference and inter recti distance at all three levels was done by Paired 't' test. Independent 't' test was used for interpretation of post interventional values between Group A and Group B. Fisher's Exact test was used for calculating the difference in the age groups and occupation.

RESULTS

Intra group analysis of all pre and post interventional values was done by Paired 't' test. Inter group analysis of all values was done by using Independent 't' test. Post intervention analysis of WHR showed non-significant difference between both groups (p=0.1773). Post intervention analysis of Waist circumference showed non-significant difference between both groups (p=0.2531). Post intervention analysis of inter recti distance above umbilicus showed very significant difference between both groups (p=0.0142). Post intervention analysis of inter recti distance at umbilicus showed very significant difference between both groups (p=0.0002). Post intervention analysis of inter recti distance below umbilicus showed very significant difference between both groups (p=0.0239)

Table 1: comparison of baseline parameters

Parameters	Group A	Group B	t value	p value	Inference
Waist Hip Ratio	0.7590±0.01663	0.7490±0.01101	1.464	0.1773	Not significant
Waist Circumference (cm)	94.800±1.476	93.900±1.524	1.221	0.2531	Not significant
Inter recti distance above umbilicus	2.000±0.4714	2.600±0.5164	2.714	0.0142	Very significant
Inter recti distance at umbilicus	2.000±0.6667	3.100±0.3162	4.714	0.0002	Very significant
Inter recti distance below umbilicus	1.800±0.4216	2.300±0.4830	2.466	0.0239	Very significant

DISCUSSION

Diastasis recti is often not painful hence many times is unnoticed and untreated. Electrical stimulation used for reducing the inter recti distance is a new and rarely used method of treating diastasis recti abdominis. Measuring diastasis recti in postnatal women using proper technique is very important. Methods used for measuring inter recti distance are finger width method, caliper method, tape measure, ultrasound, CT and MRI.

We studied subjects of age group 20 to 30 years and concluded that prevalence of DRAM is common and equal for all ages.

Currently Noble's correction exercises are the conventional measures taken to overcome diastasis recti along with Sahrmann's progression of abdominal exercises. Various authors also studied the effect of abdominal muscle strengthening exercises on diastasis recti abdominis and found positive results by noting reduction in the inter recti distance. Abdominal corset for reduction in inter recti distance is also a prescribed method of treatment.

Electrical stimulation is the application of long duration interrupted direct current i.e. faradic current to a motor nerve to produce contraction of the muscle which it supplies. It is applied using an electrical stimulator and two pad electrodes placed on the abdominal wall. [12] Recent studies on the effects of electrical stimulation for muscle re-education and strengthening along with exercises of abdominal muscles have also been conducted with results stating that electrical stimulation and exercises when given in combination helps improving muscle strength faster. Application of repetitive electrical stimulation increases muscle contraction along with the recruitment of the non-contractile tissue thus increasing the strength of the muscle. [13] By using different electrical stimulation units and highly variable parameters, most of these studies demonstrated an increase in

abdominal strength with the use of electrical stimulation. [5]

There is no literature on application of electrical stimulation in reducing inter recti distance in Postnatal Diastasis Recti Abdominis Muscle. Hence, this study was conducted to find out the effect of electrical stimulation in reducing inter recti distance in Postnatal Diastasis Recti Abdominis Muscle. This study provided evidence to support the use of electrical stimulation followed by exercises in reducing inter recti distance in postnatal diastasis recti abdominis. There was significant change in subjects given electrical stimulation at all the three levels (above umbilicus, at umbilicus and below umbilicus).

Studies regarding neuromuscular electrical stimulation are demonstrated and found beneficial in diastasis recti patients with positive effects on waist hip ratio and inter recti distance. Giving electrical stimulation along with exercises will help to decrease the inter recti distance in postnatal diastasis recti patients earlier than exercises alone. This study will help in creating awareness and importance of physiotherapy intervention in preventing the complications of diastasis recti in postnatal women.

As study duration of treatment was short, complete recovery of diastasis recti was not seen. The study was limited to one geographic area and accurate method for assessment of IRD in subjects was not used. Studies with longer duration of treatment are recommended with longer follow-up periods. Assessment of IRD should be done by more reliable and accurate objective method in future studies.

CONCLUSION

In this study majority of the cases showed significant increase in inter recti distance at umbilicus postnatally, followed by above umbilicus and below umbilicus. After intervention changes in the inter recti distance were also noted to be extremely significant at umbilicus when compared to above and below umbilicus. Though both treatment groups showed changes, the group which underwent electrical stimulation followed by exercises showed greater changes in reduction of inter recti distance.

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