

# Therapeutic Exercise in the Reduction of Diastasis Recti: Case Reports

Shmaila Hanif

Department of Physiotherapy, Faculty of Allied Health Sciences, College of Health Sciences, Bayero University, Kano, Nigeria.

## Abstract

**Background:** Diastasis recti is a significant musculoskeletal disorder usually found during pregnancy and postpartum; however, there is insufficient information on the efficacy of therapeutic exercise in the reduction of postpartum diastasis recti.

**Objectives:** The purpose of this study was to explore the efficacy of therapeutic exercise in the reduction of diastasis recti.

**Patients and Methods:** Three diastasis recti patients were recruited from a privately owned gymnasium and were initially diagnosed as having obstinate accumulation of fat around the abdomen. A gynaecologist from a privately owned hospital and the researcher were involved in the diagnosis of the condition (diastasis recti). A dial caliper was used to take the inter-recti distance pre and post administration of exercise. Diastasis recti correction therapeutic exercise was administered for an average of 15 sessions to two patients. The third patient did not receive any intervention. The study lasted for 6 weeks.

**Results:** The two patients that received therapeutic exercise had the inter-recti distance (IRD) reduced from an average of 9.2cm to 3.4 cm and still remain at 3.4cm without any intervention at 16 weeks follow up assessment. The third patient who received no exercise had her IRD 7cm throughout and at 16 weeks follow up slightly increased to 7.8cm.

**Conclusion:** It was concluded that therapeutic exercise (modified Noble's diastasis recti correction exercise) is effective in the reduction of postpartum DR.

**Key words:** Diastasis recti, inter recti distance, postpartum.

## Introduction

Diastasis recti, a common musculoskeletal condition, commonly found during and after pregnancy,<sup>1,3</sup> is a separation of the two bellies of the rectus abdominis muscles along the linea alba,<sup>1</sup> creating a ridge that runs along the length of the abdomen.<sup>4</sup> Pregnancy can distend the abdomen and cause an actual separation of the two rectus abdominis. As the right and left sides of the rectus abdominis muscles spread apart, the connective tissue that joins them stretches sideways.<sup>3</sup>

Diastasis rectus separation occurs due to the softening of connective tissues related to the hormonal release of progesterone and relax in prolonged stress of a

progressive weight gain and subsequent weakness of the abdominal muscles associated with pregnancy.<sup>5,6</sup> The degree of deformity due to the expansion of the abdominal wall may vary from practically unnoticeable to grossly disfiguring, cosmetically disturbing for women. It also has significant repercussions to the locomotors system.<sup>4</sup>

Common complications associated with separation of recti muscles are significant weakening of the support system for the back and abdominal organs causing lower back pain, postural problems and the appearance of a "mummy tummy" that women just cannot seem to flatten. This "mummy tummy" is actually the organs protruding as a result of the separated recti muscles' inability to protect them, creating the unsightly bulge in the belly.<sup>7</sup> The abdominal separation itself is not painful but the weakness in the abdominal muscles can lead to hernia if left untreated or if there is trauma to the abdominal area and the connective tissue is torn away from the muscle in this situation surgery will be required.<sup>8,9</sup>

Therapeutic exercise in the reduction of diastasis recti have been promoted in a number of studies.<sup>9-11</sup> Other researches on the treatment of diastasis recti range from 'doing nothing' to the surgical correction of this condition.<sup>12,13</sup> Attempts have been made to study the

### Corresponding Author:

Shmaila Hanif

Department of Physiotherapy  
College of Health Sciences, Bayero University  
Kano, Nigeria.

Email: [shellshell@yahoo.com](mailto:shellshell@yahoo.com)

**Received:** 06 March 2017, **Accepted:** 12 September 2017,

**Published:** 29 September 2017

### Authors Contribution

SH has done the conceptualization of project, data collection, literature search, drafting, revision and writing of the case series.

effect of exercise in the management of diastasis recti during pregnancy.<sup>1</sup> According to Noble,<sup>12</sup> exercise improves the tone and strength of the abdominal muscles. As a result, strengthening the abdominal muscles post partum should help to decrease the size of the diastasis recti. An exhaustive literature search reveals a paucity of scientific studies on the effects of therapeutic exercise in the management of post partum diastasis recti.

Noble<sup>12</sup> set the standard in the rehabilitation of a diastasis recti with the development of a specific muscle re-education exercise to reduce or correct diastasis recti. This particular exercise has been promoted in numerous studies pertaining to mostly pre-natal/antenatal exercises<sup>10,13-15</sup> and few of them to postpartum exercises,<sup>11,15-16</sup> the efficacy of this exercise has not been well documented. Previous and more recent literature advocated the use of abdominal binders for midline separations.<sup>17</sup> External support garments may provide compression and support to the abdominal and lumbo pelvic region by mimicking facial tension of the rectus abdominis muscle and may provide biofeedback for the rectus abdominis muscle to assist with its activation.<sup>18</sup> These external supports could be used in addition to transversus abdominis muscle exercises, but evidence is lacking about their use in the management of DRAM and further research is required.<sup>18</sup> Combined effect of Noble's exercise and abdominal binders has received little attention, thus, the purpose of this study was to highlight the efficacy of therapeutic exercise in the reduction of diastasis recti.

### Case Presentations

All subjects were recruited from a privately owned gym. This study was conducted in accordance with the Code of Ethics of the World Medical Association (Declaration of Helsinki). Informed consent was obtained from all subjects before administration of any intervention. The privacy rights of the subjects were duly observed.

#### Case 1

A 28 year old G1 P1001 (vaginal delivery) presented with abdominal protrusion. The woman noticed the protrusion following delivery. She is a recreational swimmer, and routinely plays tennis. She has been involved in fitness training in the gym which involves use of bicycle ergometer, treadmill, sit-ups for 7 months to reduce her abdominal protrusion. There was no significant change in her body mass (BM) following the exercise administration and no reduction in her abdominal circumference as well. Patient displayed signs of frustration; she recalled a much smaller abdominal circumference prior to involvement in the gym exercise program.

#### Case 2

A 33 year old G3 P3003, house wife, who had her 3rd child via cesarean section noticed abdominal protrusion after her 1st delivery which subsequently increased. She was managed as a case of abdominal obesity for the past 6½ months. She was also involved in exercises like sit-ups along with some weight reduction exercises in the gym. Patient from her previous records had her BM not significantly changed but her abdominal circumference had increased about 4.5cm.

#### Case 3

A 27 year old G1 P1001 had a vaginal delivery and noticed a protruded abdomen postpartum. She was also receiving sit-ups for abdominal toning and weight reduction exercises in the gym for 9 months aiming at reducing her abdominal protrusion. There was no significant change in her BM, however her abdominal circumference also increased by 5cm.

#### Examination and evaluation

Diagnosis of DR was first made by using the finger width technique to confirm presence of DR, after which the researcher made further evaluation of the inter-recti distance along with a gynecologist using a dial caliper to make precise measurements.

#### Finger-width technique

The patient lies supine with both knees flexed and feet supported on a flat surface. The patient is then asked to raise her head. The researcher measures for a diastasis recti by placing her fingers horizontally across the linea alba and determine how many fingers fit in the space between the medial borders of the two rectus abdominis.<sup>19</sup> Severity depends on the number of fingers that fit in. This test confirmed the presence of DR in all the 3 cases and it was visible as a midline bulge on exertion in Case 2 and 3.

#### Inter-recti distance (using Dial Calipers)

The patient lies supine with both knees flexed and feet supported on a flat surface, arms extended at her side. The patient is then asked to raise her head and maintain this position for approximately 10-20 secs to allow the examiner palpate the rectus abdominis muscles. The medial borders of the left and right rectus abdominis muscles, perpendicular to the surface of the muscles, are used for the end points for the measurement at the umbilicus, the area with the largest separation.<sup>10</sup> This was repeated twice and the average measurement recorded.

The inter-recti distance (IRD) of the 3 cases was recorded as follows and was categorized based on severity using the categories of DR provided by Ranney:<sup>20</sup>

Case 1: IRD = 8cm (Severe DR)  
Case 2: IRD = 10.4cm (Severe DR)  
Case 3: IRD = 7cm (Severe DR)

### Exercise intervention

#### Case 1 and Case 2

Case 1 and 2 were screened for contraindications to involving in this exercise as recommended by Canadian Society for Exercise Physiology [CSEP].<sup>21</sup> Case 1 and 2 did not respond "Yes" to any one of the questions in the Post Natal Physical Activity Readiness Questionnaire; all cases gave their consent to participation in the study. The cases had no history of abdominal hernia and any connective tissue disease. Pregnant women were excluded from the study.

#### Instructions

Case 1: To halt sit-ups, swimming, fitness training, and playing of tennis.

Case 2: To halt sit-ups.

#### Procedure for modified Noble's DR reduction exercise

The patient is positioned supine with both knees bent and feet flat on a firm surface. The patient then wraps a triple folded crepe bandage (6 inches) around her midsection having her hands crossed over her abdomen and gently pulls the two ends of the crepe bandage taut across the body. This technique acts much like an abdominal binder and may in fact provide more support than just the hands as described by Noble.<sup>12</sup> As she exhales, she is asked to slowly raise her head without raising her shoulders until a slight contraction is felt in the abdomen, holding for 3-5 seconds and repeating the exercise up to 50 times a day. Raising the head activates only the recti muscles. Other motions, such as raising the shoulders, activate additional abdominal muscles, creating an imbalance that further separates the recti muscles. Electromyographic studies support this particular exercise, that is, the head raise, in isolating the rectus abdominis muscle.<sup>22</sup>

Exercise frequency and duration of exercise intervention: The exercise regime was performed 3-times weekly under supervision for a 6 week period as recommended by Noble.<sup>12</sup>

#### Case 3

Case 3 did not receive any exercise intervention. She was instructed to stop sit-ups and to avoid any activity which would balloon the abdomen.

#### Results

Following a 6 weeks period, the cases were re-evaluated for the IRD and measurements are as follows:

Case 1: IRD = 2.0cm (Normal)  
Case 2: IRD = 4.8cm (Moderate DR)

Case 3: IRD = 7cm (Severe DR)

Case 1 had her IRD categorized as normal.

Case 2 had an obvious reduction in the DR but can be categorized as having a moderate DR.

Case 3 had no change in the IRD and remained as having severe DR.

Following the 6 weeks intervention, Case 1 continued her gym and other activities, having achieved her flat tummy. Cases 2 and 3 were told to keep her instructions with explanations for the need for follow-up assessment.

#### Follow-up assessment

Sixteen weeks follow-up assessment was conducted on all the 3 cases.

Cases 1 and 2 had no change in their IRD.

Case 3 had her IRD increased from 7cm to 7.8cm.

### Discussion

The primary purpose of this study was to determine the therapeutic efficacy of modified Noble's exercise with an abdominal binder in the reduction of postpartum diastasis recti. The finding of this study supports the work of Noble,<sup>12</sup> Davies, Wolfe, Mottola and MacKinnon,<sup>23</sup> who reported an effective use of the protocol (without binding/ approximating). However, the subjects of their study did not have close to normal IRD values as compared to what was obtained in this study. This could be related to the approximation of the recti muscles during the exercise in the present study.

The reduction of DR of Case 2 to just moderate from severe DR could be attributed to the fact that she had two previous deliveries and had not had any DR reduction intervention. This can be explained by the outcome of previous studies<sup>1,2</sup> which suggest that better recovery following exercise intervention may be associated with lower parity.

Case 3 did not receive any exercise intervention and thus, had no change in her IRD. This finding is in line with the report of Noble<sup>12</sup> and Chiarello et al.<sup>1</sup> On follow-up, Case 1 and 2 had no change in their IRD, while case 3 had an increase in IRD and the result of Boissonnault and Blaschak,<sup>16</sup> O'Connor and Gourley<sup>11</sup> support the result of the present study.

This study found closure of diastasis of the recti muscles, it suggests that abdominal binding during exercise could be successful for the reduction of DR.

This study concluded that modified Noble's exercise is effective in reducing postpartum DR. Postpartum DR should not be left untreated as it may worsen. Parity may possibly affect the complete closure of DR.

Obstetrics & Gynaecology departments need to routinely assess for diastasis recti postpartum and patients diagnosed to have diastasis recti should be referred for physiotherapy for management. All postpartum women presenting with any form of musculoskeletal pains or discomfort of the back should be evaluated for diastasis recti. The role of a physiotherapist in the management of this musculoskeletal dysfunction should also include education to the medical community on the problems associated with diastasis recti. Women involved in sports should be thoroughly evaluated for the presence of diastasis recti to prevent occurrence of complications, as it has been reported that some sports aggravate the diastasis further.

Most researches have reported the effect of exercise on diastasis recti in pregnant women. However, very few have focused on postpartum women. It is further recommended that, research should focus on this area also. Lastly, future research should investigate larger and more diverse sample of women to make generalization on the efficacy of modified Noble's correction exercise.

**Conflict of interest:** None declared.

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