

Original article

Comparison Of Back And Abdominal Muscle Strength In Patients with Lower Segment Cesarean Section (LSCS) And Full Term Normal Delivery (FTND)

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ABSTRACT

BACKGROUND- During and after pregnancy 50%-70% of women experience low back pain due to hormonal changes, postural change due to shift in centre of gravity, stress etc. These problems may cause reduction in strength of back and abdominal muscles. Hence this study was taken to investigate comparative strength of back and abdominal muscles within first two months of postpartum.

METHODOLOGY- This study is a cross sectional where 32 subjects, 15- LSCS and 17- FTND within first two months of delivery were selected on the basis inclusion and exclusion criteria. Back and abdominal muscles strength was measured using pressure biofeedback was compared in both the groups.

RESULT-Our present study shows mean value of the strength of back muscles 3.13mmHg and abdominal muscles 1.86mmHg in women with LSCS; whereas strength of back muscles 3.82 mmHg and abdominal muscles 2.58 mmHg in women undergone FTND. Also, the p value shows a significant difference if strength of back muscles compared to abdominal muscles in both subjects undergone LSCS as 0.04* whereas; strength of back muscles compared to abdominal muscles in both subjects undergone FTND as 0.03*.

CONCLUSION- From the study it is concluded that, the strength of back and abdominal muscles was more in FTND group as compared to LSCS. Also back muscles strength was comparatively more than abdominal muscles in both groups.

KEY WORDS- Lower segment cesarean section, full term normal delivery, back muscles, abdominal muscles, pressure biofeedback.

INTRODUCTION-

Delivery also known as child birth is the procedure of giving birth to a baby, and is the ending of pregnancy. There are two ways in which the delivery is done, cesarean section and normal vaginal delivery. Cesarean section further mainly classified in 2 main categories- Classical cesarean section (CS) and lower segment cesarean section (LSCS). In LSCS a transverse cut just above the edge of bladder is given so that there is lesser blood loss and easier to repair. LSCS is considered safer than normal delivery as it reduces maternal and neonates morbidity rates. On the other hand, WHO states that 70%-80% of women going through labor and natural delivery are at low risk. It is the vaginal delivery where no incisions are made on abdomen. It is considered that normal progression of pregnancy and child birth helps mother and infant to initiate bonding also by breast feeding.

It is known that about 60%-80% of people in India experience lower back pain atleast once in a life time. There are many causes to it such as muscle strain, disc herniation, osteoarthritis, spinal stenosis, improper posture, scoliosis etc. During pregnancy; 50%-80% of women go through low back pain. This discomfort leads to its peak point during fifth and seventh of pregnancy. Causes of back pain are weight gain, hormonal changes, stress, postural change etc. A woman gains about 20-25 pounds of weight in her pregnancy span, the weight of baby and uterus leads to excessive pressure on vessels and nerves in back causing back pain. As the relaxin hormone secretes in pregnancy, all the ligaments become lax, causing loosening of joint, instability and eventually pain. With passing of time, the abdomen grows big and this causes shift in the centre of the gravity of the body. In order to maintain centre of gravity, body changes its posture leading to back pain. Emotional stress is also one of the factor that causes pain in the back.^(2,10) It is also seen that women experience lower abdominal pain during first trimester due to enlarging uterus, and in second trimester due to stretching of round ligament. Round ligament that passes around the uterus are stretched due to growth of uterus. It is dull, lingering type of pain⁽¹⁾ due to relaxin hormone secretion, strain on back, cramping in abdomen, all the muscle and ligaments become weak, causing reduced strength of lower back and abdominal muscle. Also a study done proved that there is more significant increase in joint laxity during the last trimester of pregnancy.⁽¹²⁾ In the human being, relaxin has been detected in the first part of pregnancy but not in the last trimester. A drop in the level of serum relaxin of women in the fifth month of pregnancy and a total absence (at 5–6 ml. of serum) by the eighth month was reported.⁽¹³⁾

The lower back muscles are a pair of Erector Spinae and Gluteal muscles, extension of back, helping to stand upright and lift up objects. Low back extensor muscle strength is an important factor for low back health and because it is known that many people with low back pain have got weak low back muscles. The abdominal muscle, transverse abdominis, rectus abdominis, internal oblique and external oblique which helps flexing and stabilizing the trunk.⁽¹⁾

Pressure biofeedback is a device that is used to quantify the strength of muscles. There is a stabilizer cuff of the device that is inflated and pressure is applied on the cuff by the muscle and a meter attached to the cuff shows the deflection according to change in pressure on cuff. The use of pressure biofeedback will be done to measure the strength of lower back muscle and lower abdominal muscles. The strength of these muscles will be checked by placing the pressure biofeedback cuff accordingly in the position as action of muscle and contraction muscles will show the deflection on the meter.³ Reliability of pressure biofeedback is 0.74 (95% CI 0.54 to 0.85) and 0.76 (95% CI 0.58 to 0.86) inter-rater and intra-rater. The use of a pressure biofeedback unit during abdominal exercises is beneficial for the maintenance of constant pressure under external loads. The unit shows when the subject's pressure values have increased abnormally.⁽³⁾

Need for the study-Women undergone delivery experience in reduction strength of back abdominal muscles, as they go through the 9 months of postural change and back pain. This may also hamper their day to day activities. Also, no study has been done to quantify the strength of lower back and abdominal muscle of women after delivery. This study will be useful as a reference to quantify muscle strength in the postpartum period and will provide a clear picture about the status of the muscle strength in these 2 groups.

AIM of this study was to compare the strength of lower back and lower abdominal muscles in subjects(women) undergone lower segment cesarean section and full term normal delivery.

OBJECTIVES of this study was to measure strength of lower back muscle and abdominal muscle in subjects(women) undergone lower segment cesarean section and full term normal delivery and compare them individually.

METHODOLOGY

The aim of the study was to quantify the muscle strength using the pressure biofeedback device in subjects with LSCSand FTND.

The secondary objective of the study was to compare the abdominal and back muscle strength within the group.

Approval from the Institutional ethics review committee was obtained. A cross-sectional, comparative study, prospective same subject design required each participant to be assessed for measurement of lower back and abdominal muscle strength using pressure biofeedback. 32 women were selected according to the type of delivery- Lower segment Cesarean section and Full term Normal delivery. The detailed purpose of the study, study procedure, risks, and benefits were explained to the patient and requested for participation in this study. **Informed consent** was signed by the participant.

Subjects includedwere;Subjects undergone Lower segment caesarean section and Full term normal delivery, Primigravida women, Subjects between age group of 20-40 years, duration within 2 months of delivery.**Subjects excluded** were;Subjects with multi gravid, mentally retarded subjects, subjects with impaired cognition, subjects with musculoskeletal and cardiovascular disorder (back deformity, severe PIVD, recent injury/fracture, severe hypertension, angina and cardiac arrest.)

Demographic data on age and BMI was documented. The clinical examination was carried out at the first consultation done by the investigator / physiotherapist. Further, women were evaluated for measurement of lower back and abdominal muscles strength pressure biofeedback.

For assessing the strength of back muscles, subject was asked to lie down in supine position. She was then taught drawing-in maneuver "Draw the belly button in towards the spine to hollow the abdomen". Once she is able to do it correctly, place the pressure biofeedback cuff under the lumbar spine horizontally. Inflate the cuff up to 40 mmHg and ask the subject to perform drawing-in maneuver. The maneuver causes the cuff to inflate by 10 mmHg. More than 10 mmHg indicates pelvic tilting. A set of 3 trials were given and the best of 3 was considered.

For assessing the strength of abdominal muscles, subject was asked to lie down in prone position. Place the pressure biofeedback cuff under the abdomen horizontally, lower edge just below the ASIS. Inflate the cuff up to 40 mmHg and ask the subject to perform drawing-in maneuver. The maneuver causes the pressure to drop by 6-10 mmHg. A set of 3 trials were given and the best of 3 was considered.

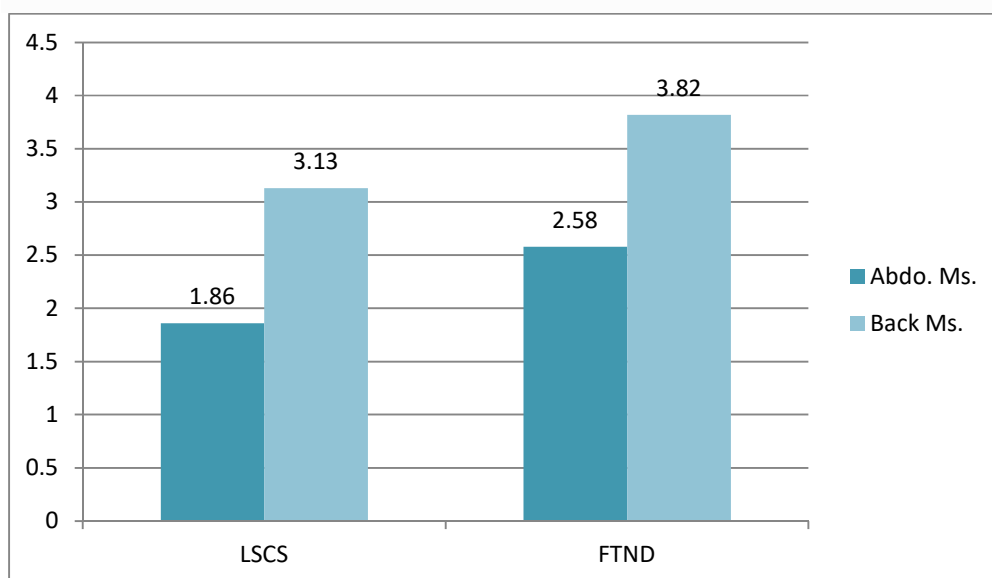
RESULTS-

The participants in the present study were with the mean age of 25 years in both the groups. Our present study shows mean value of the strength of back muscles 3.13 mmHg and abdominal muscles 1.86mmHg in women gone LSCS; whereas strength of back muscles 3.82mmHg and abdominal muscles 2.58mmHg in women gone FTND. Also, the p value shows a significant difference if strength of back muscles compared to abdominal muscles in both subjects undergone LSCS as 0.04* whereas; strength of back muscles compared to abdominal muscles in both subjects undergone FTND as 0.03*.

Table 1:- It shows mean values of abdominal and back muscles strength in mmHg for LSCS and FTND.

	ABDOMINAL MUSCLES		BACK MUSCLES	
	LSCS	FTND	LSCS	FTND
MEAN	1.86	2.58	3.13	3.82
STANDARD DEVIATION	±1.06	±0.87	±1.06	±0.27
P Value	0.04*		0.03*	

Graph 1-Comparison of abdominal muscle and back muscle strength,within the group of LSCS and FTND.



DISCUSSION-

The results revealed that back and abdominal muscle strength measured better in women undergone Full Term Normal Delivery (FTND) as compared to Lower segment Cesarean Section(LSCS). When individually compared in a muscle group, back muscle strength was better in both FTND and LSCS undergone women as compared to abdominal muscle strength. No previous study was done to measure and compare the post-pregnancystrength of back and abdominal muscles on women undergone FTND and LSCS.

A study was conducted by Priya Soma-Pillay et al., who investigated the physiological changes taking place during pregnancy.It was found that exaggerated lordosis of the lower back, forward flexion of the neck and downward movement of the shoulders, joint laxity in the anterior and longitudinal ligaments of the lumbar spine and, widening and increased mobility of the sacroiliac joints and pubic symphysis are some of the musculoskeletal changes that take place.⁽⁴⁾

Another study by P Katonis,¹ A Kampouroglou et al.suggested, that low back pain during pregnancy is associated with the mechanical factors i.e. due to weight gaining during pregnancy, to the increase of the abdominal sagittal diameter and the consequent shifting of the body gravity center anteriorly, increasing the stress on the lower back. Postural changes may be implemented to balance this anterior shift, causing lordosis and increasing stress on the lower back.⁽¹⁸⁾ One external measure of lumbar convexity proved to be reliable. The effect that hip and trunk flexibility and back and abdominal muscle strength had on lumbar lordosis was significant.^(14,15)

In addition, a biomechanical process suggests that the abdominal muscles of the pregnant woman stretch to accommodate the enlarging uterus, causing muscle fatigue and resulting to an extra load on the spine, which is charged with the task of supporting the majority of the increased weight of the torso. It has been suggested that during pregnancy the female body is exposed to certain factors causing dynamic instability of the pelvis, and that LBP may be secondary to hormonal changes. Relaxin increases tenfold during pregnancy causing ligamentous laxity and discomfort, not only in the sacro-iliac joint⁽¹²⁾, but also generalized discomfort, pain of the entire back, instability of the pelvis and misalignment of the spine, leading to reduction in strength of lower back and abdominal muscles post-pregnancy.^(1,9,11)

Sihvonen T, Huttunen M et al. in 1998 proved thatpre-pregnancy LBP predicts renewed pain during pregnancy, and dysfunction of back muscles has been established in LBP. In this study, disturbance in the relaxation of the back muscles was linearly related to current, and also to later, pain scores. In addition, back muscle activity level was inversely related to the disability index, showing the reduction of muscle strength due to pain. It has been shown prospectively that the function pattern of back extensors seems to predict, and is related to, future back pain.^(5,10,11)

SerdarKesikburun, ÜmütGüzelküçük proved throught their study that,the enlarging gravid uterus, accompanying compensatory lumbar lordosis and shift of the center of gravity may increase strain on bones, muscles, ligaments of lumbar region. In addition, relaxed abdominal wall muscles, primarily the rectus abdominis, during pregnancy may not be able to maintain posture. As a compensatory effect, the paraspinal muscles are forced to undertake the whole function, become fatigued and thus, a cause of LBP.^(6,16)

Diastasis recti abdominis (DRA) is defined as an impairment with midline separation of the 2 rectus abdominis muscles along the linea alba.¹ The condition is highly prevalent during the last trimester of pregnancy^{2, 3} and in the postpartum period. Older age, multiparity, caesarean section, gestational weight gain, high birth weight, multiple pregnancy, and child care have been proposed. It has been postulated that DRA, may reduce low back and pelvic stability, cause low back and pelvic girdle pain, and be related to pelvic floor dysfunctions such as urinary incontinence, anal incontinence, and pelvic organ prolapsed.^(7,17)

Yu-Jeong Kwon, Eun-JuHyung et al. studied that compared to delivery by Cesarean section, the morbidity rate of mothers after vaginal delivery is less, and their recovery period is shorter. In addition, with vaginal delivery there is a decreased incidence of endometrial infection, and fewer complications due to anesthesia, or placenta accreta in future pregnancies. However, vaginal delivery can cause weakness of the pelvic floor muscles resulting in problems such as urinary incontinence

Delivery by Cesarean section generally decreases damages to the pelvic floor muscles (affecting urinary incontinence) but it damages abdominal muscles, and can cause intestinal obstruction, chronic pelvic girdle pain, infertility, or difficulties due to repeated surgery.⁽⁸⁾

These studies prove according to their investigations that, the complete course of pregnancy is involved in gradual increasing in back pain and reduction in back and abdominal muscle strength.

CONCLUSION-

Study concluded that the significant difference proved much better muscle strength in back and abdominal muscles in FTND as compared to LSCS. Individually, back muscle strength was better compared to abdominal muscles in subjects in both FTND and LSCS.

CLINICAL IMPLICATION-

This reduction of muscle strength can be regained through several fitness programs and strengthening regime for back muscles and abdominal muscles.

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