# Early physiotherapy rehabilitation after lower segment cesarean section delivery

## ABSTRACT

Lower segment cesarean section (LSCS) is one of the common modes of delivery carried nowadays to prevent complications during a normal delivery. It is a life-saving surgery for the mother and the child. LSCS is a surgical procedure wherein the abdominal wall and the uterus is incised to deliver the child. The recovery of a patient after LSCS is difficult and slow compared to that of a normal delivery due to mobility restrictions due to the scar and the incision. The functional capacity of the patient also gets limited due to incisional pain. Physiotherapy is a useful tool to fasten and enhance the recovery of such patients. Generalized physiotherapy protocols for patients after LSCS are available in the literature. But to there is lack of evidence of personalized protocols. Hence this chapter aims to explain how to form a personalized early physiotherapeutic rehabilitation for LSCS patients.

*Keywords: Cesarean section, Lower segment cesarean section, physiotherapy, post-natal exercises, delivery.*

**1. INTRODUCTION**

Lower segment cesarean section is one of the most frequently performed surgeries to prevent labor related complications and to save the mother and the child. During the past few years its prevalence has been increased distressingly [1]. Caesarean section is a surgical procedure where a baby is delivered by incising the abdominal wall and the uterus ~~instead of the vagina~~ [2,3]. It is generally performed when normal vaginal delivery would be risky for the mother or the child [4]. Some mothers also request for C-section to avoid the labor pain or complications following normal vaginal delivery [5]. But the World Health Organization (WHO) recommends that the C-section should only be performed if there is an emergency [6,7].

Lower segment incision is the most used incision for C-section where a horizontal cut is placed in the lower part of the uterus, also known as “pfannensteil incision”. Hence, it is also called Lower Segment Cesarean Section (LSCS) delivery. This incision heals better and is cosmetically considered better as it is less visible [8]. The traditional vertical incision over the uterus is used only during extreme emergencies where the placenta is lying very low or if the baby’s position is such that a horizontal incision cannot be used [9].

It usually takes 45 minutes to one hour for the whole surgical procedure. Spinal anaesthesia is commonly used compared to that of general anaesthesia in LSCS. A urinary catheter is inserted to empty the bladder after which the skin on the abdomen is prepared for the surgery by cleaning it with an antiseptic solution. A 15 cm long incision is made through the lower abdomen. Then the uterus is incised and the baby is delivered. Then the incisions are stitched [10,11,12].

**2. Reasons for cesearean section** [13,14,15]

* Fetal distress- abnormalities in the fetal heart rate.
* Breech presentation
* Non-progressive labor
* Baby weight and size too large (cephalopelvic disproportion)
* Placenta previa
* High risk pregnancy- gestational diabetes mellitus, pre-eclampsia, HIV infection, etc.
* Active infection in the region of pelvic outlet
* Multiple fetuses
* Previous history of LSCS

**3. COMPLICATIONS AFTER CAESEREAN SECTION** [16,17,18]

* Surgical site infection
* Respiratory complications
* Post-operative adhesion
* Incisional hernia
* Severe blood loss causing headache.
* Placenta accreta
* Post-natal depression
* Sacro-iliac joint dysfunction

**4. PHYSIOTHERAPY ASSESSMENT AND REHABILITAION**

The early physiotherapy assessment and management is explained here with the help of a case report.

A 23-year old woman was admitted to a tertiary care hospital with the complaints of water break and pain in the back and lower abdomen but as the labor progressed the patient started having pre-eclampsia. As a result of this emergency LSCS was done and the patient was referred for physiotherapy on the very 1st post-operative day (POD).

The general condition of the patient was fair. The patient had incisional pain and difficulty in transfer activities on the 1st POD. The incisional pain level was 6 on Numerical Pain Rating Scale (NPRS). The shoulder and hip ranges were terminally restricted because of pain, assessment of trunk ranges was not allowed, elbow, wrist, knee and ankle were full and free. The resisted isometric testing for shoulder, trunk and hip muscles were weak and painful.

Based upon the above complaints a personalized early physiotherapy protocol was formed for the above patient for 7 days which is given in Table 1.

**Table 1. Physiotherapy rehabilitation protocol**

|  |  |  |
| --- | --- | --- |
| **Rationale** | **Treatment** | **POD wise dosage** |
| Patient education | Patient and her family members were educated about the surgery, patient was advised to keep all the belongings of the mother and child nearby to avoid any exertion.  Adequate water intake was advised to prevent dehydration, constipation and to meet the demand of breast feeding. | Continued all days. |
| To initiate breast milk supply | Breast massage | For the 1st and 2nd POD twice a day for 15 minutes |
| Auto splinting | Small pillow was used to support the incision site during transfers or straineous activities | Continued upto 3rd POD |
| Transfer activities | Transfer activities like rolling to one side, supine to sit, and sit to stand activities were trained | 1st POD |
| Prevention of deep venous thrombosis | Ankle pump exercises, alternate hip-knee flexion | 20 repetitions- 1 set- BD on 1st POD,  20 repetitions- 2 sets- BD on 2nd POD,  20 repetitions- 3 sets- BD from 3rd POD onwards |
| Prevention of chest complications | Thoracic expansion exercises,  Diaphragmatic breathing,  Segmental breathing and spirometry | 10 repetitions- 1 set- BD on 1st POD,  10 repetitions- 2 sets- BD on 2nd POD,  10 repetitions- 3 sets- BD from 3rd POD onwards |
| Pain relief | Infrared radiation therapy | Was given up to 3rd POD twice a day |
| Breast feeding ergonomics | Football hold was advised to protect the healing scar | Was asked to continue this position for 7 days |
| Kegel’s exercise | Contract the pelvic floor muscles | Start as soon as the catheter is removed.  10 repetitions- 5 sec hold- 1 set- BD on 1st day after the removal of catheter and progress to 3 sets till the day of discharge. |
| Muscle activation | Drawing-in-maneuver  Posterior pelvic tilt  Transverse abdominal bracing  Multifidus setting- side lying position | 10 repetitions- 5 sec hold- 1 set- BD on 4th POD,  10 repetitions- 5 sec hold- 2 sets- BD on 5th POD,  10 repetitions- 5 sec hold- 3 sets- BD from 6th POD onwards |
| Global stabilization exercises | Limb loading for abdominals - Level 2 | 10 repetitions- 1 set from 7th POD onwards |
| Dynamic exercises | Unilateral straight leg raise with the other hip and knee flexed, bridging | 10 repetitions- 5 sec hold- 1 set- BD on 4th POD,  10 repetitions- 5 sec hold- 2 sets- BD on 5th POD,  10 repetitions- 5 sec hold- 3 sets- BD from 6th POD onwards |
| Functional activities | Walking, stair climbing, slope walking | Progress at the patient’s own pace |
| Relaxation exercises | Jacobson’s relaxation exercise | Given in between the straineous exercises and at the end of the session to induce relaxation. |
| Home protocol from 8th POD onwards- as the patient was discharged | | |
| Global stabilization exercises | Limb loading for abdominals | Progress the levels of limb loading as the patient improves |
| Light aerobic activities | Walking, stair climbing, etc | Progress at the patient’s own pace as the condition improves. (2-4 weeks) |
| Strength training and functional training | Dynamic exercises for core, Kegel’s exercise in different positions, Progress aerobic exercises- stationary cycling | Progress at the patient’s own pace as the condition improves. (post 4 weeks) |

**Patient education:** Patient and her relatives were educated about the surgery, the dos and don’ts following the surgery. Patient was advised not to life heavy weight more than the weight of the baby and rest whenever possible. ~~Patient was advised~~ to keep all the belongings of the baby and the mother nearby. Patient was also advised to consume adequate fluid to prevent dehydration, constipation and to meets the demands of breast feeding. Diet rich in fiber, protein, and iron to avoid constipation, and iron-deficiency anaemia due to blood loss [19].

**To initiate breast milk supply:** Breast massage was given using coconut oil as a medium, with one hand placed on the top and the other hand below, the breast was massaged in back-and-forth direction, again the same was repeated with hands placed side to side. Then circular motions were carried out. Then the patient was taught to express the milk manually or with the breast pump [20, 21].

**Breast feeding ergonomics:** Football hold or clutch hold was advised to the patient to avoid pressure on the scar and as the patient was having flat nipples. For this the patient was advised to sit with the back supported, then the baby was held beside with elbows bent, forearm supporting the baby’s back and the hand supporting the head. A pillow was kept under the arm. The breast was held with the other hand with a C-shaped grasp, as if holding a sandwich, and the nipples were guided to the baby’s mouth. Still the latching was becoming difficult, as the patient was having flat nipples, so furthermore she was advised manual massage techniques, and a nipple shield was provided. After this the latching of the baby improved and slowly the nipple shield was discontinued [22].

**5. RECENT EVIDENCES**

Karakaya IC et al. conducted a studied the effects of physiotherapy program on incisional pain and functional activities. Out of the 50 total participants, 24 received routine nursing care while 26 participants received physiotherapy additionally. This study concluded that participants who received physiotherapy were able to go for postoperative ambulation earlier and the return of bowel movements was also better compared to that of the control group. The incisional pain significantly reduced faster in the study group, as well as they were able to return to functional activities faster compared to the control group [23].

Velingkar KR et al. studied the effect of Transcutaneous electric nerve stimulation (TENS) on pain and functional activities in patients with LSCS. 50 patients were assigned into two groups, control group underwent routine hospital care whereas case group received TENS. This study showed that there was significant reduction in pain and improvement in the functional level in the case group [24].

CV Jadhav et al. assessed the effects of early ambulation and progressive exercises in patients with LSCS. In this study 110 patients were divided into two groups where the experimental group received progressive exercises and early ambulation was carried out. This study concluded that early ambulation and progressive exercises improves the postoperative recovery in the experimental group compared to that of control group [25].

Elsalous SH et al. studied the effects of post-natal exercises on mother’s recovery in 100 patients with LSCS. 50 subjects in the experimental group received the post-natal bundle exercises, whereas the rest of the subjects in the control group received the routine care. The post-natal bundle exercises included the deep breathing exercises, limb physiotherapy, transfer activities, etc. This study concluded that exercises are helpful in the post-natal recovery on mother’s with C-section [26].

Thakur J. conducted a study in the year 2019 on post-operative problems related to immobility in post-cesarean section. The effect of structured exercise session was given to the experimental group. This study concluded that immobility problems after a C-section was less in the experimental group compared to that of the control group [27].

**6. Conclusion**

This chapter concludes that early physiotherapeutic rehabilitation protocol personalized according to the need of the patient is helpful in early recovery of ~~the~~ mothers who have undergone a lower segment cesarean section delivery.

**References**

**Reference to a journal**:

1. Singh N, Pradeep Y, Jauhari S. Indications and Determinants of Cesarean Section: A Cross-Sectional Study. Int J Appl Basic Med Res. 2020 Oct-Dec;10(4):280-285. doi: 10.4103/ijabmr.IJABMR\_3\_20. Epub 2020 Oct 7. PMID: 33376704; PMCID: PMC7758786.
2. Al-Zirqi I, Stray-Pedersen B, Forsén L, Vangen S. Uterine rupture after previous caesarean section. BJOG. 2010 Jun;117(7):809-20. doi: 10.1111/j.1471-0528.2010.02533.x. Epub 2010 Mar 24. Erratum in: BJOG. 2010 Jul;117(8):1041. PMID: 20236103.
3. Anderson GM, Lomas J. Explaining variations in cesarean section rates: patients, facilities or policies? Can Med Assoc J. 1985 Feb 1;132(3):253-6, 259. PMID: 3967160; PMCID: PMC1346706.
4. ["Pregnancy Labor and Birth"](https://www.womenshealth.gov/pregnancy/childbirth-and-beyond/labor-and-birth)*. Office on Women's Health, U.S. Department of Health and Human Services. 1 February 2017.* [Archived](https://web.archive.org/web/20170728021055/https:/www.womenshealth.gov/pregnancy/childbirth-and-beyond/labor-and-birth) *from the original on 28 July 2017*. Retrieved 15 July 2017*.*This article incorporates text from this source, which is in the [public domain](https://en.wikipedia.org/wiki/Public_domain).
5. Lakshmikanthan C, Gayathri B, Ramani S, Balasubramanian N. A Randomized Controlled Trial Comparing the Effect of Phenylephrine by Intramuscular Route With Intravenous Infusion in Maintaining Haemodynamic Stability During Elective Lower Segment Caesarean Section Under Spinal Anaesthesia. Cureus. 2023 Jan 23;15(1):e34118. doi: 10.7759/cureus.34118. PMID: 36843684; PMCID: PMC9949751.
6. ["Safe Prevention of the Primary Cesarean Delivery"](https://www.acog.org/clinical/clinical-guidance/obstetric-care-consensus/articles/2014/03/safe-prevention-of-the-primary-cesarean-delivery). American Congress of Obstetricians and Gynecologists and the Society for Maternal-Fetal Medicine. March 2014. Retrieved 23 January 2022.
7. ["WHO Statement on Caesarean Section Rates"](http://apps.who.int/iris/bitstream/10665/161442/1/WHO_RHR_15.02_eng.pdf)(PDF). 2015. [Archived](https://web.archive.org/web/20150501002853/http:/apps.who.int/iris/bitstream/10665/161442/1/WHO_RHR_15.02_eng.pdf) (PDF) from the original on 1 May 2015. Retrieved 6 May 2015.
8. Visconti F, Quaresima P, Rania E, Palumbo AR, Micieli M, Zullo F, Venturella R, Di Carlo C. Difficult caesarean section: A literature review. Eur J Obstet Gynecol Reprod Biol. 2020 Mar;246:72-78. doi: 10.1016/j.ejogrb.2019.12.026. Epub 2020 Jan 7. PMID: 31962259.
9. Gosset M, Ilenko A, Bouyou J, Renevier B. Emergency caesarean section. J Visc Surg. 2017 Feb;154(1):47-50. doi: 10.1016/j.jviscsurg.2016.09.012. Epub 2017 Feb 3. PMID: 28162986.
10. Liabsuetrakul T, Peeyananjarassri K. Mechanical dilatation of the cervix during elective caeserean section before the onset of labour for reducing postoperative morbidity. Cochrane Database Syst Rev. 2018 Aug 10;8(8):CD008019. doi: 10.1002/14651858.CD008019.pub3. PMID: 30096215; PMCID: PMC6513223.
11. Haliloglu M, Ozdemir M, Uzture N, Cenksoy PO, Bakan N. Perioperative low-dose ketamine improves postoperative analgesia following Cesarean delivery with general anesthesia. J Matern Fetal Neonatal Med. 2016 Mar;29(6):962-6. doi: 10.3109/14767058.2015.1027190. Epub 2015 Sep 25. PMID: 25845277.
12. Branger B, Dochez V, Gervier S, Winer N. Césarienne après déclenchement du travail : facteurs de risque et score de prédiction [Cesarean after labor induction: Risk factors and prediction score]. Gynecol Obstet Fertil Senol. 2018 May;46(5):458-465. French. doi: 10.1016/j.gofs.2018.03.008. Epub 2018 Apr 12. PMID: 29656953.
13. Branger B, Dochez V, Gervier S, Winer N. Césarienne après déclenchement du travail : facteurs de risque et score de prédiction [Cesarean after labor induction: Risk factors and prediction score]. Gynecol Obstet Fertil Senol. 2018 May;46(5):458-465. French. doi: 10.1016/j.gofs.2018.03.008. Epub 2018 Apr 12. PMID: 29656953.
14. Wang CB, Chiu WW, Lee CY, Sun YL, Lin YH, Tseng CJ. Cesarean scar defect: correlation between Cesarean section number, defect size, clinical symptoms and uterine position. Ultrasound in Obstetrics and Gynecology. 2009 Jul;34(1):85-9.
15. Rafiei M, Ghare MS, Akbari M, Kiani F, Sayehmiri F, Sayehmiri K, Vafaee R. Prevalence, causes, and complications of cesarean delivery in Iran: A systematic review and meta-analysis. International journal of reproductive biomedicine. 2018 Apr;16(4):221.
16. Visconti F, Quaresima P, Rania E, Palumbo AR, Micieli M, Zullo F, Venturella R, Di Carlo C. Difficult caesarean section: A literature review. Eur J Obstet Gynecol Reprod Biol. 2020 Mar;246:72-78. doi: 10.1016/j.ejogrb.2019.12.026. Epub 2020 Jan 7. PMID: 31962259.
17. Hiramatsu Y. Lower-Segment Transverse Cesarean Section. Surg J (N Y). 2020 Jun 9;6(Suppl 2):S72-S80. doi: 10.1055/s-0040-1708060. PMID: 32782927; PMCID: PMC7412711.
18. Dellino M, Crupano FM, He X, Malvasi A, Vimercati A. Uterine rupture after previous caesarean section with hysterotomy above the lower uterine segment. Acta Biomed. 2022 Sep 21;93(S1):e2022269. doi: 10.23750/abm.v93iS1.12872. PMID: 36129411; PMCID: PMC10510962.
19. Wilson RD, Caughey AB, Wood SL, Macones GA, Wrench IJ, Huang J, Norman M, Pettersson K, Fawcett WJ, Shalabi MM, Metcalfe A. Guidelines for antenatal and preoperative care in cesarean delivery: enhanced recovery after surgery society recommendations (part 1). American journal of obstetrics and gynecology. 2018 Dec 1;219(6):523-e1.
20. Ulfa Y, Maruyama N, Igarashi Y, Horiuchi S. Women's experiences of breastfeeding after a cesarean section: A meta‐synthesis. Japan Journal of Nursing Science. 2023 Jul;20(3):e12534.
21. Kronborg H, Foverskov E, Nilsson I, Maastrup R. Why do mothers use nipple shields and how does this influence duration of exclusive breastfeeding?. Maternal & child nutrition. 2017 Jan;13(1):e12251.
22. Ezeukwu OA, Ojukwu CP, Okemuo AJ, Anih CF, Ikele IT, Chukwu SC. Biomechanical analysis of the three recommended breastfeeding positions. Work. 2020;66(1):183-191. doi: 10.3233/WOR-203162. PMID: 32417825.
23. Çıtak Karakaya İ, Yüksel İ, Akbayrak T, Demirtürk F, Karakaya MG, Özyüncü Ö, Beksaç S. Effects of physiotherapy on pain and functional activities after cesarean delivery. Archives of gynecology and obstetrics. 2012 Mar;285:621-7.
24. R. Velingkar K, Ramachandra P, V Pai M, Krishna Rao B. Influence of transcutaneous electrical nerve stimulation on pain intensity and functional activities following lower segment cesarean section. Physiotherapy Theory and Practice. 2023 Oct 3;39(10):2099-105.
25. Jadhav CV, Gosavi A. To Assess the Effect of Early Ambulation and Progressive Exercise on Post-cesarean Section Recovery among Women at Selected Hospitals of the City. International Journal of Nursing Research. 2023 Jul 21:22-8.
26. Hashem Elsalous S, Khalaf Gooda W, Ibrahim Hamdy Aboraiah M, Hamed Kamal Elshafie W, Mahmoud Mahmoud Salem N. Effect of Post-natal Exercises Bundle Sessions on Mothers’ Recovery after Caesarean Section. Egyptian Journal of Health Care. 2025 Mar 1;16(1):175-89.
27. Thakur J. Effect of structured exercise sessions on post-operative problems related to immobility in post-caesarean patients. Indian Journal of Continuing Nursing Education. 2019 Jul 1;20(2):144-8.

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