ECRONICON OPEN ACCESS

EC GYNAECOLOGY
Research Article

The Effect of Perop Scar Revision on Patient Satisfaction in Pregnancy with Hypertrophic Scar

Ayça K Küçükyurt and Selma Atiye Kolcu*

Department of Obstetrics and Gynecology, Istanbul Training and Research Hospital, İstanbul, Turkey

***Corresponding Author:** Selma Atiye Kolcu, Department of Obstetrics and Gynecology, Istanbul Training and Research Hospital, İstanbul, Turkey.

Received: August 06, 2025; **Published:** August 30, 2025

Abstract

Objective: The goal of this study is to see if removing old hypertrophic scars during a caesarean section (CS) operation provides a significant improvement in terms of both cosmetic and patient satisfaction.

Materials and Methods: The study method is prospective. Patients who underwent repetitive CS operations with a pfannenstiel incision that took place at least 3 years before the initial examination in the Istanbul Training and Research Hospital Gynecology Service between 01.02.21 and 01.07.21, had significant scar tissue on the incision line, had not undergone scar revision previously, did not have comorbidities such as diabetes mellitus, hypertension, atopic skin lesions (or any other dermatological lesions around the scar), a family history of dermatological diseases, or morbid obesity, were chosen. The study included 103 patients between the ages of 18 and 40 who underwent scar revision and 50 who did not. In this context, it has been discussed whether scar revision is beneficial by evaluating the scar tissue subjectively using the Patient and Observer Scar Evaluation Scale (POSAS) during the 30th and 90th day post-op controls.

Results: The POSAS score of those who underwent scar revision on the 30th post-op day decreased significantly as a result of the evaluation. There was no statistically significant difference in the change in POSAS score in both groups at the post-op 90th day.

Conclusion: When the changes in POSAS values were compared between those who had scar revision and those who did not, it was discovered that while there was a continuous decrease in those who had scar revision, there was an increase and then a decrease in those who did not have scar revision.

Keywords: *Cesarean Section; Scar; Hypertrophy; Revision; Pfannenstiel*

Introduction

Cesarean section is one of the most common surgical procedures performed on women worldwide [1]. Several layers of the mother's abdomen are cut during the cesarean section to reach the baby. The cut layers are closed after the baby is born [2].

If a skin incision was made in an adult, a scar is formed. The only tissue that does not leave a trace in the human body is bone tissue. The problem here is the extent to which the scar is formed and its cosmetic appearance [3]. Various treatments have been used to improve the function, color, and contour of the incision tissue in the skin since the sixteenth century. There are different treatment models for

minimal scar appearance. Silicone gel sheets, electrosurgery, manual and mechanical dermabrasion, chemical peeling, surgery without a subcutaneous incision, intralesional steroid injection, and laser are all non-surgical procedures [4]. In the surgical field, various techniques have been used. Skin closure can be accomplished with subcutaneous sutures, skin sutures, or staples. Suture materials can be natural or synthetic, absorbable or non-absorbable, monofilament or braided [2].

A cochrane systematic review showed that there is no conclusive evidence on how to close the skin after cesarean section [5]. As a result, recovery processes may differ depending on the technique chosen and applied by the operator surgeon.

The effect of per-op revision on patient satisfaction and the evaluation of hypertrophic scars caused by various techniques and applications using the POSAS scale are discussed in this study.

POSAS is an evaluation system based on the physician and patient scoring of wound healing in the categories of pigmentation, vascularity, thickness, swelling, flexibility, surface area, and overview. A score of 1-10 is assigned, with 1 indicating the best recovery [6].

Materials and Methods

This work is made in accordance with the principles of Declaration of Helsinki. A randomized controlled trial. Patients aged 18-40 years, the study method is prospective. Patients who underwent repetitive CS operations with a pfannenstiel incision that took place at least 3 years before the initial examination in the Istanbul Training and Research Hospital Gynecology Service between 01.02.21 and 01.07.21, had significant scar tissue on the incision line, had not undergone scar revision previously, did not have comorbidities such as diabetes mellitus, hypertension, atopic skin lesions (or any other dermatological lesions around the scar), a family history of dermatological diseases, or morbid obesity, were chosen. (05/02/2021 IEAH Ethics Committee Approval Decision No: 2724).

Because the majority of the sample group is made up of people from similar ethnic groups who live in the same geographical area, their skin color falls between Fitzpatrick skin types 2-4 [7]. A total of 103 people, 53 with scar revision and 50 without scar revision, were included in the study. Patients in the sample group were recalled for 30th and 90th day post-op follow-up examinations and were evaluated using POSAS.

Cesarean section operations were performed by two competent Obstetricians and Gynecologists, and the operation was started from the old cesarean section with a pfannenstiel incision. In the sample, 50 patients were sutured by reopening the incision line in the middle of the old incision line and suturing over the same line, while 53 patients were sutured by excising the old incision line and rescarring the scar. Suturation with 2-0 vicryl thread for the subcutaneous tissue and 3-0 vicryl thread for the skin was provided in both groups, and pressure dressing with 2 sandbags was applied to the incision site for the first 4 hours post-op. The patients' dressings were wet dressed with iodinated antiseptic every day for the first 72 hours after surgery, and they were left open after discharge. The patients were invited to the 30th and 90th day controls, where they were assessed using the POSAS scale. Among those who were invited, 2 patients in the group without scar revision were excluded due to the development of wound infection, and 5 patients were excluded from the study group because they did not show up to the control examination they were invited to and were not included in the statistical data.

Picture 1 and 2 pre-cesarean, picture 3 and 4 post-cesarean.

Statistical analyzes

Statistical analyzes were performed with the help of SPSS version 17.0 program. Histogram graphics and the Kolmogorov-Smirnov test were used to assess the variables' conformity to the normal distribution. Mean, standard deviation, and median values were used

Picture 1 - Pre-op incision scar

Picture 2 - Pre-op incision scar

to present descriptive analyses. The Pearson Chi-Square Test was used to compare categorical variables. When comparing non-normally distributed (nonparametric) variables between two groups, the Mann Whitney U Test was used. The change in POSAS values between groups was assessed using Repetitive Measures Analysis. Cases with a P-value less than 0.05 were considered statistically significant.

Results

A total of 103 people, 53 with scar revision and 50 without scar revision, were included in the study. The participants' mean age was 29.385.56 years, and their mean BMI was 30.153.71. The average number of old incisions was determined to be 1.75.83.

Table 1 shows a comparison of anamnesis and examination results.

Table 1 shows a comparison of anamnesis and examination results.

		n	%
Group	Those who underwent scar revision	53	(51,46)
	Those who did not undergo scar revision	50	(48,54)
Age		29,38±5,56	29,00
BMI		30,15±3,71	30,00
Number of old incisions		1,75±,83	2,00
POSAS score (pre-op)		13,11±6,78	12,00
POSAS score (30th day)		11,52±5,11	11,00
POSAS score (90th day)		9,44±5,17	9,00

There was no significant difference in age, weight, or the number of old incisions between those who had scar revision and those who did not.

Table 2 shows a comparison of groups with and without scar revision.

Table 2 shows a comparison of groups with and without scar revision.

	Those who underwent scar revision (n: 53)			Those who did not undergo scar revision (n: 50)			p
	Ave.	s.s.	Median	Ave.	s.s.	Median	
Age	29,30	±4,85	30,00	29,46	±6,28	29,00	0,968
BMI	30,32	±3,12	29,00	31,02	±4,09	31,00	0,063
Number of old incisions	1,85	±,77	2,00	1,64	±,88	1,50	0,101

Mann Whitney U Test

The POSAS levels and variations between individuals with and without scar revision were compared. As a result, patients who had scar revision had higher preoperative and 30-day values. When it comes to POSAS 90th day is concerned, there is no discernible difference.

When the differences in POSAS values between those who had scar revision and those who had not were compared, it was found that although there was a continual decline in those who had scar revision, there was an increase and then a decrease in those without scar revision.

Table 3 comparison of postoperative day 30 and day 90 during POSAS.

Table 3 depicts a comparison of postoperative days 30 and 90 during POSAS.

	Those who underwent scar revision			Those who did not undergo scar revision			p^1	p^2
	Ave.	s.s.	Median	Ave.	s.s.	Median		
POSAS (pre-op)	15,58	±4,69	15,00	10,48	±7,66	9,00	**<0,001**	
POSAS (30th day)	11,85	±3,25	12,00	11,18	±6,55	10,00	**0,008**	**<0,001**
POSAS (90th day)	9,13	±1,84	9,00	9,76	±7,20	9,00	0,556	

Mann Whitney U Test Repeated Measurements Analysis

Discussion

In this study, 50 patients who had pfannenstiel incisions and had scar tissue at the incision site had their wounds reopened in the middle of the old incision line and sutured over the same line. The old incision line was removed and the scar was sutured in 53 patients. The patients who underwent scar revision had higher pre-op POSAS scores, and it was noted that the evaluations performed at the post-op 30th day controls tended to be higher than the initial evaluation mentioned. The significant improvement in the pre-op evaluation at the post-op 30 day follow-up examination in the group having scar revision was viewed as a subjective evaluation under psychosomatic effects.

One of the major issues for women after CS is hypertrophic scarring at the incision site. They might exhibit signs including soreness and/or scratchiness. In addition to being unsightly, skin scars can also lead to severe mental discomfort in women [9]. Hemostasis, inflammation, proliferation, and maturation are the four processes that the stages of wound healing follow in an ordered manner. The proliferation phase is when angiogenesis, fibroplasia, and re-epithelialization occur [10,11]. Within the first two weeks of a wound healing process, the proliferation phase is over [12,13].

How to seal the skin following CS is not currently supported by any conclusive research in the literature. Numerous research have been done to either prevent scarring at the location of the Pfannenstiel incision or to reduce the amount of scar tissue that does form.

According to Kim., *et al*. (2022), when the scar revision is removed, early intervention with a pulsed dye laser (PDL) in conjunction with triamcinolone intralesional injection (TAILI) stops the hypertrophic CS wound from progressing or recurring. In our study, the scar revision was removed, and the area was then allowed to naturally recover [14].

The recurrence rate following scar tissue excision in CS was shown to be considerable in cosmetic recovery without additional treatment in the analysis done by Baal., *et al*. (2021). The rate of scar revision recurrence in emergency CS patients was reported to be high. Only elective CSs were assessed in this study [15].

In the study by Cromi., *et al*. (2022), individuals who had undergone recurrent cesarean sections were old and evaluated using the POSAS at 2 and 6 months after having the skin incision repaired with staples and tissue glue (2-octylcyanocrylate). The subjective and objective scar cosmesis grading did not differ significantly. In our study, the old incision line was excised and the scar was sutured by revision while the old incision line was opened up again in the middle of the old incision line in the first group. A POSAS evaluation was conducted after one and three months. There was no discernible difference between the two groups in our investigation [16].

Women who received repeated CS at the 23rd week at random and whose skin incisions were closed with subcuticular absorbable sutures or non-absorbable metal staples were graded using POSAS, according to Fleisher., *et al*. (2019). The group having sutures closed was found to have a higher POSAS score [17].

In their study, Napavichayanun., *et al.* (2022) split the patients who had a cesarean section into two half along the incision axis with the incision site entirely closed. Half of it received silicone gel with 5% onion extract, and the other half received silicone gel with vitamin C. At the 1 month, 2nd month, and 3rd months of evaluation, there was no discernible difference in the POSAS score. In our study, individuals with scar tissue had repeated CS and received POSAS grading [18].

In their study, Cromi., *et al*. (2010) analyzed patients 2 and 6 months following cesarean sections in which the skin was closed with staples or 3 different subcuticular sutures. A POSAS score evaluation was conducted, and no superficial differences were discovered. In our investigation, it was discovered that the group that received aesthetic scar revision was superior [19].

Women with CS were divided into groups in the Huppelschoten., *et al*. (2013) study depending on whether the subcutaneous tissue was closed or not, and whether or not the skin incision was stitched shut with staples or intracutaneous sutures. At one year after surgery, the POSAS score was used to grade it. At the incision site, all 3 groups had an identical cosmetic appearance. In our study, the POSAS score was used to assess the incision at 1 and 3 months [20].

In the study by de Graaf., *et al*. (2012), groups that had subcutaneous closure and those that had not, as well as those in which intracutaneous sutures or staples were utilized to close the skin, were assessed individually. It receives a POSAS grade. The cosmetic outcome of the CS incision site was unaffected by the use of staples or sutures, although subcutaneous CSs were negatively impacted. Subcutaneous suture was not used in our investigation [21].

Octylcyanoacrylate tissue adhesive (OCA) and standard wound closure methods (SWC) were compared on patients undergoing 383 traumatic lacerations, 235 scar revisions, 208 minimally invasive operations, and 98 general surgical procedures in a study conducted by Singer., *et al*. (2002). The first and third months were evaluated. OCA is faster than SWC for repairing traumatic lacerations and scar revisions, and there was no significant difference in cosmetic success at 3 months. Standard wound closure procedures (SWC) were utilized in both groups with and without scar revision in our study, and our patients' cosmetic results were evaluated at 1 and 3 months [22].

Conclusion

There was no significant difference between the two groups in the post-op 90th day examinations, and according to our sense clinique evaluations, the patients who underwent scar revision showed a more permanent and sustainable improvement in terms of quality of life and comfort in the long term. As a result, we advise scar revision during a repeat cesarean section in pregnant women with hypertrophic scars.

Disclosure

This study was not supported by any third party, and the work did not received any financial support.

Bibliography

1. Tully L., *et al*. "Surgical techniques used during caesarean section operations: results of a national survey of practice in the UK". *European Journal of Obstetrics, Gynecology, and Reproductive Biology* 102.2 (2002): 120-126.

2. Mackeen AD., *et al*. "Techniques and materials for skin closure in caesarean section". *Cochrane Database of Systematic Reviews* 11.11 (2012): CD003577.

3. Hom DB. "Scar revision in the 21st century". *Facial Plastic Surgery* 28.5 (2012): 471-472.

4. Ward RE., *et al*. "Surgical and noninvasive modalities for scar revision". *Dermatologic Clinics* 37.3 (2019): 375-386.

5. Alderdice F., *et al*. "Techniques and materials for skin closure in caesarean section". *Cochrane Database of Systematic Reviews* 2 (2003): CD003577.

6. Huang Y., *et al*. "Comparison of the effect of skin closure materials on skin closure during cesarean delivery". *PLoS One* 17.6 (2022): e0270337.

7. Van de Kar AL., *et al*. "Reliable and feasible evaluation of linear scars by the patient and observer scar assessment scale". *Plastic and Reconstructive Surgery* 116.2 (2005): 514-522.

8. D'Orazio. "UV radiation and the skin". *International Journal of Molecular Sciences* 14.6 (2013): 12222-12248.

9. Kelly A. "Keloidler ve hipertrofik yara izleri". İçinde: Parish L, Lask G, editörler. Estetik Dermatoloji. New York: McGraw-Hill (1991): 8-69.

10. Greaves NS., *et al*. "Current understanding of molecular and cellular mechanisms in fibroplasia and angiogenesis during acute wound healing". *Journal of Dermatological Science* 72.3 (2013): 206-217.

11. Li J., *et al*. "Pathophysiology of acute wound healing". *Clinics in Dermatology* 25.1 (2007): 9-18.

12. Gonzalez ACDO., *et al*. "Wound healing - A literature review". *Anais Brasileiros de Dermatologia* 91.5 (2016): 614-620.

13. Kaban A., *et al*. "Comparison of cutting diathermy and scalpel in terms of delay in wound healing and scar appearance in skin incision: a prospective observational study". *İstanbul Medical Journal* 20.4 (2019): 338-341.

14. Kim JW., *et al*. "Evaluating outcomes of pulsed dye laser therapy combined with intralesional triamcinolone injection after surgical removal of hypertrophic cesarean section scars". *Journal of Cosmetic Dermatology* 21.4 (2022): 1471-1476.

15. Bağlı İ., *et al*. "Predictors of the recurrence of surgically removed previous caesarean skin scars at caesarean section: A retrospective cohort study". *Scars, Burns and Healing* 7 (2021): 20595131211023388.

16. Cromi A., *et al*. "Cosmetic outcomes of skin closure with tissue adhesive or staples in repeated cesarean section: A randomized controlled trial". *European Journal of Obstetrics and Gynecology and Reproductive Biology* 271 (2022): 112-116.

17. Fleisher J., *et al*. "Patient satisfaction and cosmetic outcome in a randomized study of cesarean skin closure". *Journal of Maternal-Fetal and Neonatal Medicine* 32.22 (2019): 3830-3835.

18. Napavichayanun S., *et al*. "Evaluating efficacy and safety of the topical silicone gel containing onion extract in the treatment of post-cesarean surgical scars". *Journal of Cosmetic Dermatology* 21.7 (2022): 2908-2915.

19. Cromi A., *et al*. "Cosmetic outcomes of various skin closure methods following cesarean delivery: a randomized trial". *American Journal of Obstetrics and Gynecology* 203.1 (2010): 36.e1-8.

20. Huppelschoten AG., *et al*. "Different ways of subcutaneous tissue and skin closure at cesarean section: a randomized clinical trial on the long-term cosmetic outcome". *Acta Obstetricia et Gynecologica Scandinavica* 92.8 (2013): 916-924.

21. de Graaf IM., *et al*. "Techniques for wound closure at caesarean section: a randomized clinical trial". *European Journal of Obstetrics and Gynecology and Reproductive Biology* 165.1 (2012): 47-52.

22. Singer AJ., *et al*. "Closure of lacerations and incisions with octylcyanoacrylate: a multicenter randomized controlled trial". *Surgery* 131.3 (2002): 270-276.

Volume 14 Issue 9 September 2025