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## COMPARATIVE ANALYSIS OF WOUND CLOSURE TECHNIQUES IN CAESAREAN SECTIONS

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### ABSTRACT

In this prospective, randomized study, we assessed the performance of wound closure techniques and their cosmetic outcomes in caesarean section procedures. A total of 122 patients undergoing primary caesarean sections were randomly assigned to receive wound closure either with traditional Prolene suture or a novel wound closure device. The cosmetic outcome was evaluated by the patients, the operating surgeons, and independent examiners who were blinded to the closure method at 3, 6, and 12 months post-surgery. Both closure methods yielded comparable high scores on the visual analogue scale for cosmetic evaluation across all follow-up periods. Our findings suggest that innovative wound closure techniques, offer excellent cosmetic results for both surgeons and patients when compared to traditional suture methods.

**Key words:-** Caesarean section, Wound closure, Prolene suture, Leukosan<sup>®</sup> SkinLink, Cosmetic outcome.

### INTRODUCTION

Since over 4000 years ago, sutures have been used to close wounds. Despite its effectiveness and safety, suture closure has some risks: it requires specialized tools, creates additional trauma, and must be removed afterward. In recent years, there has also been an increase in the use of adhesive strips, staples, and tissue adhesives which have been proven effective. In emergency rooms, adhesive strips are often used to treat lacerations, which offer both reliable wound closure and acceptable cosmetic results [1, 2]. A surgeon's preferences and experience determine how to use closure devices in the operating room. Besides reliable wound closure and cosmetic outcomes, duration and cost are also important factors to consider. As a result, tapes, staples, and tissue adhesives are also used [3-6]. Furthermore, innovative wound closure devices are still entering the market without reliable reliability [7, 8]. A commercially available wound closure device combines the advantages of wound closure strips with topical skin adhesives for additional fixation. It was a nonwoven strip anchored to intact skin using pressure-sensitive adhesive.

Aside from repairing trauma wounds [9], It may also be used for the closure of surgically inflicted wounds. These wounds are usually closed with sutures, so an experiment was conducted comparing skin-linking sutures with prolene sutures. Caesarean sections are common, but challenging surgeries [10-12]. There is no established way of closing a Pfannenstiel incision and any new method that provides excellent cosmetic results is welcome to offer women and their obstetrician alternatives. Cosmetic results are of utmost importance to patients, so the study focuses on cosmetic evaluation.

### METHODS AND MATERIALS

#### Patients

Patients with cyanoacrylates, formaldehyde or dressing strip allergies, skin conditions, keloid formation, obesity, and impaired blood clotting were excluded from this study.

This study involved 61 pregnant women scheduled to undergo primary section.

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After the wounds were closed using either the Prolene suture method or Leukosan SkinLink randomized number generators, the patients were randomly selected to receive either topical wound closure product. Statistical Analysis System (SAS) used the SAS function 'ranuni' to assign patient numbers at random to wound closure procedures prior to including the first patient. Allocations were made on both an electronic and a paper basis (random list). The investigator received the random list. Study participants had their patient numbers assigned to them at the lowest level. Following the random list, wounds were closed in accordance with the procedure.

**Surgical technique and wound closure**

Gramaxine was used as a perioperative antibiotic prophylaxis. The pubic hair was shaved using a shaving machine. Cutasept F and Octenisept were used to prepare the skin. The forced-air convection system achieved normothermia. Surgical sutures were placed in the subcutaneous fat in order to close the wound. Vicryl 2-0 absorbable sutures were used for deep sutures. There was a knot buried. The needle was also inserted between the dermis and subcutis. The needle exited the papillary dermis as it curled upward. Using small forceps and skin hooks, an atraumatic technique was used to handle the skin. It was decided to use a cutting needle. In order to close the wound with Prolene topically, horizontal bites were taken through the papillary dermis on both sides of the wound. There were no visible suture marks. By successively passing through the opposite sides of the wound, the suture looped through the subcuticular tissue. By knotting the long end of the suture material to the loop of the last pass that was placed, the opposite end of the wound was knotted. SkinLink was used for topical closure of the wound.

**Evaluation**

The treating physician assessed the application ease and performance of wound closure following surgery on a scale of 1 to 10. Treatment physicians documented complications and unexpected events. Patients were asked to rate their levels of comfort and pain after having sutures or Leukosan SkinLink removed. Additionally, a physician evaluated the cosmetic appearance of the wounds with a 100-mm visual analogue scale (VAS) (17), where 0 represents a 'poor scar' and 100 represents a 'perfect scar'. Three, six, and twelve months after caesarean section, patients returned for wound photography. In terms of lighting, exposure, and distance from the subject, digital cameras were used. In each visit, the physician and patient evaluated the cosmetic appearance using the 100-mm

VAS. Three blinded examiners who were oblivious to wound closure independently evaluated scars at 3-, 6-, and 12-month postoperative visits. Generally, patients who undergo caesarean sections are hospitalized for seven days during the primary healing period, which is duly documented. During follow-up visits after 3, 6 and 12 months, we inquired about other potential infections.

**Statistics**

Only non parametric statistics were used to compare cosmetic results. A descriptive statistical analysis was conducted on the following parameters: weight, height, age, wound closure performance, ease of application, comfort during wear, and pain after removal. A Wilcoxon test was used to compare the two methods of wound closure. A P-value of 0.05 was deemed significant.

**RESULTS**

The trial involved 122 women who were randomly assigned to receive Prolene suture or Leukosan SkinLink. Demographically, the two groups were similar (Table 1). A total of 24 patients were lost to follow-up because of lack of contact. 46 patients completed the Prolene suture arm and 52 completed the Leukosan Skin- Link arm. Women in the study had caesarean sections performed by experienced gynecologists. According to the manual, SkinLink was applied.

Closure of wounds on surgery day performance was assessed by the surgeons with high ratings. Prolene suture scored slightly higher for ease of application.

Patient satisfaction with the comfort of wearing was comparable for both closure techniques. It was also shown that patients reported low pain when sutures were removed, as compared to Leukosan SkinLink. Complications were not different between Leukosan SkinLink and Prolene closure. There was one report of dehiscence with Leukosan Skin- Link. There were no reports of allergic reactions or infections. At 3, 6 and 12 months following surgery, the scar's cosmetic appearance was evaluated. Three gynecologists blinded to wound closure evaluated it along with the physicians and patients. Photographs taken during follow-up visits were evaluated by blinded examiners. The cosmetic outcome was assessed at any time point or by any group, no significant differences were found between the two closure techniques. Leukosan SkinLink performed equally well with the standard method. In both wound closure methods (Figures 4A–D), scars had similar cosmetic appearances.

**Table 1: Shows the demographic data of the patients**

Patient Data	Mean	SD	Median	Minimum	Maximum	n
Age (years)	33.1	5.7	34.0	25.0	43.0	60
	33.2	6.2	34.0	19.0	40.0	62
Weight (kg)	72.7	12.4	72.5	51.0	94.0	60

	71.5	9.9	71.0	53.0	89.0	62
Height (cm)	172.1	5.1	172.0	164.0	179.0	60
	172.9	6.1	171.0	165.0	182.0	62

**Table 2: Surgical wound closure and ease of application are two of the key features of this product).**

	Method	Mean	SD	Median	Minimum	Maximum	n
Wound closure performance	Prolene suture Leukosan	10.0	0.10	10.0	8.0	11.0	60
	±SkinLink	9.9	2.3	10.0	6.0	11.0	62
Ease of application	Prolene suture	10.2	0.8	10.0	9.0	11.0	60
	Leukosan ±SkinLink	9.7	2.3	10.0	6.0	11.0	62

**DISCUSSION**

The closure of simple, low-tension lacerations can be achieved with noninvasive devices such as adhesive tapes [13]. More challenging surgically inflicted wounds, such as those with longer or higher tension, have limited data. Many surgeons use a technique based on their own experience and preference in many surgeries for closing the skin. Alternatives to traditional noninvasive wound closure devices may be available in the form of newly developed devices. This study examines the effectiveness of a new wound closure device, Leukosan® Skin Link, can effectively close wounds after surgery. Wounds following primary section were targeted. Pfannenstiel incisions remain controversial despite caesarean sections being common [14]. Skin closure materials and techniques are still being developed. During a caesarean section, several layers of the mother's abdomen must be cut and reclosed. A comparative study found that Leukosan® SkinLink was comparable to suturing on all counts. In addition to suturing being a technical skill, one, can also be mastered with some instruction and practice. According to the surgeons who participated in this study, both wound closure methods were highly satisfactory in terms of ease of application and wound closure results. Infection was reported in this study. According to published international data, caesarean section SSI rates range from 29% to 179%, depending on body mass index (BMI), age, blood loss, wound closure method, and emergency procedures. Since emergency cases and high-risk patients are excluded, the incidence is low. The patient is concerned about the comfort of the wear and the pain of removal. Due to the need for removal, suturing and stapling can cause anxiety [9, 13]. Based on patient assessments, Prolene suture was no different from Leukosan® Painless removal and comfortable wearing with SkinLink. In spite of the higher pain scores associated with Prolene sutures, patients' anxiety about suture removal is likely to be higher when it comes to adults. Both wound closure methods were found to be acceptable in terms of wearing comfort. There were no reports of allergic reactions or infections. Also, Leukosan SkinLink has been tested for biocompatibility (ISO 10993). According to tests, Leukosan SkinLink is not cytotoxic, irritating, or sensitizing. In addition to the atraumatic wound closure, no additional materials are

required, the doctor can close the wound independently of a nurse or assistant, and the procedure is very easy to learn. Patient comfort is high, and there is no need for a repeat visit to remove stitches. BSN medical's commercial politics determine comparative costs. Atraumatic devices find their financial expression in the fact that they do not require local anaesthesia, additional sterilization of instruments, additional nurses, or repeated visits to remove stitches, which can add weight to ambulatory surgery.

Compared to continuous sutures, the new method also reduces wound closure time. The device 'SkinLink' was tested on pig skin to determine its time efficiency, according to BSN medical records. Pig skin was incised between 4 and 8 cm. By using separate stitches, continuous sutures, and SkinLink, these were treated in parallel. According to the results, it is 45–65% faster than sutures. Women, in particular, place a great deal of importance on the cosmetic acceptability of a scar after caesarean sections. We assessed the cosmetic outcome of both closure methods in detail. To minimise bias, the surgeon, patient, and three gynecologists blinded to wound closure method assessed scar appearance. It was decided to follow-up at 3, 6 and 12 months for scar assessment since shorter follow-up periods may limit validity [2]. According to surgeons, patients, and blinded observers, Leukosan® SkinLink was equally effective as suturing according to a blinded observer, a patient, and both surgeons. It is a pilot study with 61 patients and therefore has limited statistical power. Although the sample size is small, the results remain valid since caesarean wounds are quite homogeneous and standardised among women (see demographic data). Additionally, digital photographs are substituted for live follow-ups by blinded examiners. The images were taken in a standardised manner, and the patient and physician assessed them live to support evaluation of the photographs. The blind observers validated the patient's and physician's potentially subjective assessments.

**CONCLUSION**

According to the results of this study, Leukosan® Skin-Link is an effective alternative to traditional suturing. Leukosan® SkinLink was comparable to invasive suturing on all levels studied. Patients and physicians now have an

additional non-invasive surgical wound closure option with performance.  
comparable cosmetic outcomes and wound closure

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