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Original Research Article

# Suture or Staple: Comparing Study in Outcome of Skin Closure Techniques

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**Conflict of interest: Nil**

**Abstract**

**Introduction**: Skin closure is a fundamental step in surgery, directly influencing wound healing, infection risk, scar quality, and overall patient satisfaction. Suturing is time-consuming, requires technical finesse, and improper technique may lead to increased pain, infection, or poor scarring. Skin staplers allow for rapid and consistent wound closure, reducing operative time and intraoperative contamination.

**Aim and Objective**: To compare the efficacy, healing outcomes, complication rates, cosmetic results, and patient satisfaction between skin sutures and skin staplers in surgical wound closure.

**Material and Method**: This was a prospective, randomized, comparative study conducted in the Department of General Surgery in F.M. Medical College and Hospital, Balasore, Odisha, over a period of 18 months. Conducted on 100 patients undergoing elective surgeries. Patients were randomly divided into two groups: Group A (n=50): Skin closure with sutures, Group B (n=50): Skin closure with staplers.

**Result**: Staplers were also associated with shorter healing times and lower pain scores, suggesting reduced tissue trauma and better early recovery. Although infection and dehiscence rates were slightly lower in the stapler group, the differences were not statistically significant.

**Conclusion:** Skin staplers provide significant advantages over sutures in terms of faster closure, less pain, quicker healing, and better patient satisfaction. Sutures remain essential in areas requiring precision and cosmetic finesse, and are invaluable for surgical training

**Keywords:** Skin sutures, Skin staplers, Wound closure, Healing, Cosmetic outcome, Postoperative pain.



## Introduction

Skin closure is a fundamental step in surgery, directly influencing wound healing, infection risk, scar quality, and overall patient satisfaction. Skin sutures offer precise control over tissue approximation and tension, making them ideal for cosmetically sensitive areas like the face and hands. They are versatile, cost- effective, and provide options suturing is a core skill, essential for mastering tissue handling, depth judgment, and knot security.

However, suturing is time-consuming, requires technical finesse, and improper technique may lead to increased pain, infection, or poor scarring. Skin staplers allow for rapid and consistent wound closure, reducing operative time and intraoperative contamination particularly valuable in trauma, emergency, and high-volume settings. However, they are associated with higher cost, potentially less favourable cosmetic outcomes, and discomfort during removal. Both methods are widely used, but there is limited consensus on which is superior in terms of healing, infection rates, pain, and aesthetic outcome. This study compares skin sutures and staplers across key clinical parameters to guide evidence-based selection and support skill development among surgery residents.

### Aim

To compare the efficacy, healing outcomes, complication rates, cosmetic results, and patient satisfaction between skin sutures and skin staplers in surgical wound closure, and to provide evidence-based guidance for optimal technique selection in general surgical practice particularly useful for surgical residents in training.

**Primary Objectives**

(A) To evaluate and compare the wound closure time between skin sutures and skin staplers.

(B) To assess and compare the wound healing time in both groups.

(C) To compare the incidence of postoperative wound complications, including infection and dehiscence.

**Secondary Objectives**

(A) To assess postoperative pain using the Visual Analogue Scale (VAS) in both groups.

(B) To compare the cosmetic outcomes of wound healing using standardized scoring.

(C) To evaluate patient satisfaction regarding wound appearance and comfort.

(D) To analyse the ease of technique, removal process, and practical utility for surgical trainees.

**Materials and Methods**

This was a prospective, randomized, comparative study conducted in the Department of General Surgery, F.M. Medical College and Hospital, Balasore, Odisha, over a period of 18 months. Conducted on 100 patients undergoing elective surgeries. Patients were randomly divided into two groups:

Group A(n=50): Skin closure with sutures

Group B (n=50): Skin closure with staplers

**Inclusion Criteria:**

(A) Elective surgery patients aged 14–65 years

(B) Clean wounds suitable for suturing or stapling

**Exclusion Criteria:**

(A) BMI > 30, HIV, uncontrolled diabetes

(B) Wounds with skin loss, prior infection, or poor healing potential

**Outcome Measured:**

Patients were evaluated for the following parameters:

(A) Wound closure time (in minutes)

(B) Healing time (days to complete epithelialization)

(C) Postoperative pain (measured using VAS at 24 hours)

(D) Wound complications (infection, dehiscence, seroma)

(E) Scar and cosmetic outcome (rated by Modified Vancouver Scar Scale or Likert score)

(F) Ease of removal

(G) Patient satisfaction (1–10 scale)

**Statistical Analysis**

Data was entered in Microsoft Excel and analysed using SPSS version 21.0.

(A) Continuous variables (e.g., closure time, pain score) were analysed using Student's t-test.

(B) Categorical variables (e.g., infection rate, scar formation) were analysed using Chi-square test. Ap-value < 0.05 was considered statistically significant.

**Results:** A total of 100 patients were included, with 50 patients in each group. The groups were comparable in terms of age, gender distribution, and BMI (Kg/m2).

**Table 1:**

| Parameter | Skin Suture | Skin Stapler | P-Value |
|---|---|---|---|
| Mean age in years | 35.4 ± 12.1 | 36.2 ± 11.8 | 0.739 |
| Male/Female | 28/22 | 30/20 | NS |
| Mean BMI (Kg/m2) | 24.8 ± 3.5 | 24.5 ± 3.7 | NS |

**Table 2: Wound Closure Time Skin staplers significantly reduced wound closure time compared to sutures. P-value 0.021**

| Group | Mean time |
|---|---|
| Skin Suture | 12.4 |
| Skin Stapler | 5.6 |

**Table 3: Healing Time and Infection Rate**

| Parameter | Skin Suture | Skin Stapler | p-value |
|---|---|---|---|
| Mean healing time (days) | 12.2 | 10.8 | 0.00038 |
| Infection rate (%) | 16 % | 12% | NS |

**Table 4: Postoperative Pain (VAS at 24 hours) Pain scores were significantly lower in the stapler group.**

| Group | VAS Score | p-value |
|---|---|---|
| Skin Suture | 5.6 | NS |
| Skin Stapler | 4.3 | 0.00082 |

**Table 5: Cosmetic Outcome and Scar Formation**

| Parameter | Skin Suture | Skin Stapler | p-value |
|---|---|---|---|
| Cosmetic score (Likert score) | 7.2 | 8.1 | ---- |
| Scar formation (%) | 24% | 16% | 0.453 |

**Table 6: Ease of removal and patient satisfaction**

| Parameter | Skin Suture | Skin Stapler | p-value |
|---|---|---|---|
| Ease of removal | 4.8 | 8.5 | 0.00047 |
| Patient satisfaction | 7.5 ± 1.2 | 8.3 ± 1.0 | ---- |

**Table 7: Wound dehiscence and overall complications**

| Parameter | Skin Suture | Skin Stapler | p-value |
|---|---|---|---|
| Wound dehiscence (%) | 6% | 4% | ---- |
| Overall complications | 20% | 14% | ---- |

## Discussion

Staplers were also associated with shorter healing times and lower pain scores, suggesting reduced tissue trauma and better early recovery. Although infection and dehiscence rates were slightly lower in the stapler group, the differences were not statistically significant, aligning with previous literature that found no clear superiority in infection prevention between the two techniques.

One of the most significant outcomes was the substantial reduction in closure time with skin staplers compared to sutures. Cosmetic satisfaction was higher in the stapler group. While this contrasts with some earlier reports where sutures were deemed more aesthetically favourable (Rodham et al., 2023) [1], it may reflect improved staple placement techniques and shorter tissue exposure times during closure. Ease of removal was significantly better with staplers, which may enhance patient compliance and reduce follow-up discomfort [2,3,4.5] .

This is a practical consideration for surgical residents managing postoperative care. Sutures offer superior control and adaptability in complex or cosmetically sensitive areas they require more skill and time making them an excellent training modality. Staplers, on the other hand, provide standardized, quick closure and are ideal for long, linear incisions or trauma settings.

## Conclusion

Skin staplers provide significant advantages over sutures in terms of faster closure, less pain, quicker healing, and better patient satisfaction. They are especially useful in emergency and high- volume surgeries. However, sutures remain essential in areas requiring precision and cosmetic finesse, and are invaluable for surgical training. The choice of technique should be based on the clinical context, wound type, and surgeon's judgment to ensure optimal outcomes.

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