

## **A Comparative Clinical Study of Collagen and Paraffin Gauze Dressing on Skin Donor Site in Shyam Shah Medical College Rewa, Madhya Pradesh**

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### **Abstract**

**Background:** The surgical treatment known as split-skin grafting (SSG) falls mainly under the purview of plastic surgery. Wounds, deficiencies after excision of cutaneous lesions, and donor sites of fascio-cutaneous flaps can all be covered by SSG. Partial thickness damage is sustained during the harvest of a split-thickness skin graft. Although the rate and length may be altered by local, systemic, environmental, and other factors, complete re-epithelialization occurs in 10-14 days.

**Aims and Objectives:** The goal of this study is to compare the healing, discomfort, secretion, infection, and expense of using conventional paraffin gauze dressing with collagen-based dressings on a donor-site split-thickness graft. Study was performed at Shyam Shah Medical College in Rewa, Madhya Pradesh, ran a one-year, hospital-based, non-randomized control experiment. Seventy patients participated in the research.

**Materials and Methods:** Two groups were created from the selected sample. There were two approaches taken to treat the donor site. A collagen sheet was used on one, while paraffin gauze was used on the other. Post-operative discomfort, complications, and recovery times were compared between the two groups. Mean, proportion and percentage were employed as descriptive statistics to present the findings. The correlation between the numbers was analyzed using the Chi-square test. The continuous variables were analyzed using the Student's t-test and the repeated measures ANOVA. The cutoff for significance was set at P0.05.

**Results:** According to the predetermined sample size, 70 patients participated in this research. Patients in the Case group had collagen dressings applied to their STSG donor sites, whereas those in the Control group had paraffin gauze dressings applied. Post-operative discomfort in patients treated with collagen dressings was rated as mild to severe. These patients had a decreased need for analgesics, allowing for earlier mobilization. Collagen has this key benefit when used as a donor site dressing. By reducing the likelihood of infection, which saves time and money for the hospital staff and minimizes patient discomfort, we observed that collagen modestly promotes epithelialization.

**Conclusion:** Collagen-based dressings, as opposed to traditional paraffin gauze dressings, were observed to improve healing time and post-operative pain scores at the donor site for split-thickness grafts in this study.

**Keywords:** Collagen Dressing, Paraffin Dressing, Skin Grafting.

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**Introduction**

In plastic surgery, split skin grafting (SSG) is quite prevalent. This procedure conceals granulating wounds, defects left behind after removing cutaneous lesions, contracture release, and Fascio cutaneous flap donor sites while they heal. SSG is typically taken from the back, thighs, legs, and buttocks. [1] Although skin grafting as a reconstructive treatment has numerous advantages, the epidermal and dermal layers of the donor site's skin are damaged during the harvest of a split-thickness skin graft (STSG).[2] Half-thickness damage is sustained after the removal of a split-thickness skin graft. Re-epithelialization is complete in 10-14 days, depending on the local wound environment. A partial thickness injury might progress to a complete thickness loss if the donor location experiences tissue desiccation or infection. Paraffin gauze and many layers of pads are commonly used to protect the donor site following SSG harvesting [3]. In the immediate post-operative phase, patients often experience severe discomfort. Wet pads require more frequent dressing changes and additional hospital days. There are several options for donor site dressings, but a clear winner has yet to emerge. Healing, comfort, protection from infection, lack of scarring, and low cost and complexity describe the perfect donor site dressing for split-thickness skin grafts. [4, 5]

Fibroblasts are responsible for producing collagen, the body's most prevalent protein. Collagen, a naturally occurring structural protein, has a role in all three stages of the healing process. It promotes the movement of cells and helps form new tissues. Wound healing can be improved and influenced by collagen-based biomaterials, which activate and recruit specific cells, such as

macrophages and fibroblasts, along the healing cascade.[5] Matrix metalloproteinase (MMP) elevation is a problem, and collagen-based wound dressings are ideally suited to alleviate this problem by serving as a "sacrificial substrate" in the wound. Collagen-based dressing can soak up wound exudates and keep the wound's surrounding area wet.[6]

We employed gamma-sterilized bovine collagen sheets, which were both wet and sterile. The study compared healing, discomfort, secretion, infection risk, and expense using conventional paraffin gauze dressing with collagen-based dressings on a donor-site split-thickness graft.

**Materials and Methods**

This hospital-based non-randomized control trial was conducted at Shyam Shah Medical College Rewa mp for one year, from December 2020 to November 2021. The study was done on all the patients who underwent a split-thickness skin grafting procedure.

Inclusion criteria were patients between the ages of 18 and 60 years. Exclusion criteria were (a) unwilling patients, (b) diabetes mellitus, (c) immunocompromised patients where wound healing may be affected, and (d) mentally ill patients. A total of 70 cases were selected as the sample size.

The chosen sample was split in half. There were two approaches taken to treat the donor site. A collagen sheet was used on one, while paraffin gauze was used on the other. Patients were randomly placed in either a therapy or control group. All patients had the same STSG thickness and donors at the same location.

Study variables (independent) were age, sex, place of residence, and religion.

Outcome measures were donor site pain, healing at day 21, hospital stay in days, complications, operation duration, and cost of operation. The Visual Analog Score (VAS) assessed post-operative pain with a score of 0–10. Pain level was recorded on days 1, 2, 3, 7, 14, and 21. Healing was documented by photographs and recorded after spontaneous wound epithelialization or spontaneous detachment of the gauze without any interference. Even if a patient had soakage between changes, deeper dressings were not opened to expose the collagen and petroleum gauze. Treatment with common antibiotics lasted for 5 days.

**Statistical analysis**

IBM SPSS version 21 was used for the statistical analysis; it was located in New Orchard Road, Armonk, New York, USA. The results were analyzed using descriptive

statistics, including mean, proportion, and percentage. To examine the correlation between the numbers, a Chi-square test was conducted. For the continuous variables, we utilized Student's t-test and repeated ANOVA. The threshold for statistical significance was set at P 0.05.

**Results and Discussion**

According to the predetermined sample size, 70 patients participated in this research. Patients whose STSG donor sites were treated with collagen dressing were of a similar age distribution to those whose STSG donor sites were dressed with paraffin gauze dressings, as verified by an independent t-test. Fisher's exact test showed no statistically significant variation in the distribution of patients based on their religion, gender, or whether they lived in an urban or rural area.

**Table 1: Comparison of age between groups**

Parameters	Total	Case	Control	P value
N	70	35	35	0.282
Mean (years)	35	37	33	
Standard deviation (years)	14	13	14	

**Table 2: Comparison of gender distribution**

Parameters	Total	Case	Control	P value
N	70	35	35	0.279
Male	56	22	21	
Female	14	13	14	

**Table 3: Comparison of the place of residence and religion of patients in the two groups**

Parameters		Total
Residence	Rural	38
	Urban	32
Religion	Hindu	60
	Muslim	8
	Christian	2

Burn and other wound healing times can be decreased, and scar contractures can be corrected with skin grafting as a reconstructive treatment. The skin is a physical barrier to keep harmful substances out and interstitial fluid in. Donor sites for split-thickness skin grafts experience loss

of epidermis and varying degrees of dermis after harvesting. The difficulty in treating these wounds comes from striking a balance between hastening recovery and preventing complications. A full-thickness loss, like a third-degree burn, can result

from an infection complicating a split thickness defect.

There is no consensus on which dressing is best for donor sites for split-thickness skin grafts. The mesh paraffin gauze dressing has long been the standard for covering split-skin donor sites in surgical procedures due to its simplicity of use, adaptability, low infection risk, and low cost [Figure 1].

However, it has been found wanting in other crucial respects; for example, it is a painful, adhesive bandage beneath which donor sites do not appear to recover

quickly. The usual mesh paraffin gauze dressing for donor sites was compared in this study with the collagen dressing. Natural wound dressings like collagen are preferred because they heal wounds more effectively than their synthetic counterparts. Antimicrobial, anti-inflammatory, anti-fibrotic, analgesic, and angiogenic effects can all be provided by collagen dressings [Figure 2]. Wound closure, local pain, treatment simplicity, and complication rates were among the variables examined.



**Figure 1: Dressing with paraffin**



**Figure 2: Collagen dressing**

Patients in the collagen dressing group and the paraffin gauze dressing group had similar demographic and clinical profiles in this study.

A common post-operative complaint is pain, typically at the donor rather than the grafted site. This research shows that collagen dressing significantly reduces pain more effectively than paraffin gauze. After the first post-operative day, dressing sites were less uncomfortable than those with

paraffin gauze. Similar to the study of 55 patients by Pontén and Nordgaard, the case group had a lower mean of VAS on all 6 evaluated days (days 1, 2, 3, 7, 14, and 21).[7]

Collagen dressing promoted more complete wound healing than paraffin gauze dressing, as determined by the percentage of the epithelialized dermis. The physical features of the collagen dressing help explain why it sped up the epithelialization

process. Here we have [Figure 3]. Collagen, a naturally occurring structural protein, is essential in all three wound-healing cascade stages. The chemotactic effects of the dressings on wound fibroblasts promote cellular migration, collagen deposition, and collagen organization, all of which contribute to an environment conducive to healing. On day 21, all case patients had fully recovered, but just three control patients had done so. Similar results were found in an investigation by Horch and

Stark. Two patients in the case group and three in the control group developed an infection at the graft donor site while it was healing. [8] When compared statistically, however, the variations in healing by day 21 and infection rates were not noteworthy. Both groups had similar mean operating times ( $P = 0.614$ ). Applying a collagen dressing is a straightforward process that doesn't call for any specialized training or knowledge.



**Figure 3: Complete re-epithelization after 21 days**

The case group had a significantly lower period of hospital stay (mean = 4.4 days) than the control group (mean = 5.47 days) with  $P = 0.003$ , probably due to decreased post-operative pain levels between the groups.

### Conclusion

Post-operative discomfort in patients treated with collagen dressings was rated as mild to severe. Patients in this category had a lower need for analgesics, allowing for earlier mobilization. Collagen has this key benefit when used as a donor site dressing. By reducing the likelihood of infection, which saves time and money for the hospital staff and minimizes patient discomfort, we observed that collagen modestly promotes epithelization.

### References

1. Sreekumar NC, Bhandari PL, Praveen N. Comparative study of collagen and paraffin gauze dressing on skin graft donor site. *Indian J Burn.* 2015; 23:81-3.
2. Hassanpour SE, Moosavizadeh SM, Yavari M, Hallaj Mofrad HR, Fadaei A. Comparison of three different dressing methods for partial thickness skin graft donor site. *World J Plast Surg.* 2013; 2:26-32.
3. Weber RS, Hankins P, Limitone E, Callender D, Frankenthaler RM, Wolf P, et al. Split-thickness skin graft donor site management. A randomized prospective trial comparing a hydrophilic polyurethane absorbent foam dressing with a petrolatum gauze dressing. *Arch Otolaryngol Head Neck Surg.* 1995; 121:1145-9.
4. Porter JM. A comparative investigation of re-epithelialisation of split skin graft donor areas after application of hydrocolloid and alginate dressings. *Br J Plast Surg.* 1991; 44:333-7.
5. Cynthia AF, Richard S. Modern collagen wound dressings: Function

- and purpose. *J Am Col Certif Wound Spec.* 2011; 2:50-4.
6. Brett D. A review of collagen and collagen-based wound dressings. *Wounds.* 2008; 20:347-56.
  7. Pontén B, Nordgaard JO. The use of collagen film (Cutycol) as a dressing for donor areas in split skin grafting. *Scand J Plast Reconstr Surg.* 1976; 10:237-40.
  8. Horch RE, Stark GB. Comparison of the effect of a collagen dressing and a polyurethane dressing on the healing of split thickness skin graft (STSG) donor sites. *Scand J Plast Reconstr Surg Hand Surg.* 1998; 32:407-13.