

## Our Experience of Tie over Bolster and Quilting Sutures Versus Stapler fixation for Split Thickness Skin Graft in Post Burn Neck Contracture – A Comparative study

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### Abstract:

**Background:** Traditional method to fix Split thickness skin graft in post burn neck contracture is Tie over Bolster dressing and Quilting sutures. We used staplers to fix split thickness skin graft. **Methodology:** A comparative study conducted in 30 patients with post burn neck contracture at tertiary care hospital, Nashik over a period of 6 years. Time required for fixation of split thickness skin graft, outcome in terms of graft uptake and patients comfort level while removing sutures and stapler recorded. **Results:** Total 30 Patients were included in our study. Mean time required for Tie over and quilting suture was  $10.53 \pm 0.88$  min, significantly higher than the mean time in stapler fixation  $4.87 \pm 0.81$  min. ( $p < 0.001$ ). Graft take was 95% in stapler and 93% in Tie over and quilting suture. **Conclusion:** Fixation of Split thickness skin graft with stapler is more rapid, less time consuming also results in decreased surgical and anaesthesia time. More patient friendly while removing staplers with comparable skin graft uptake.

**Key words:** Stapler fixation, Quilting Sutures, Split thickness skin graft

### Introduction:

The care of patient from the onset of a major burn involving the head neck to a successful reconstructive outcome requires skill, patience, determination and enthusiasm from burn care team.

Post burn neck contracture is one of the disfiguring sequelae of burns in neck region. It affects patient functionally, psychologically, and socially.<sup>1</sup>

The most powerful treatment option for contracture release is surgical procedure. The principle of burn reconstructive surgery is to replace the defect with like tissues with similar color, texture.<sup>2</sup> The standard surgical method of achieving functionality is by release of contracture and coverage of resultant raw area with split thickness skin graft. Traditionally, the split thickness skin graft is fixed with Tie over dressing and quilting sutures.

In this study we compared results of stapler fixation

with tie over and quilting sutures with stapler fixation in post burn contracture of neck.

### Methodology:

A prospective comparative study carried out at Dr. Vasantrao Pawar Medical College, Hospital & Research Center, Nashik, during January 2015 to December 2020 on 30 patients.

### Aims & Objectives:-

- 1) To estimate Time required for fixation of Tie over and quilting suture and stapler fixation is recorded in minutes.
- 2) To estimate Graft uptake percentage in group A and B.
- 3) To estimate Time required and discomfort for removal of sutures and staplers.
- 4) To estimate Silk suture and stapler cost effectiveness.

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**Inclusion criteria:**

- 1) Patients of 18 years and above male and female included in study.
- 2) Post burn contracture of 6 months or more included,
- 3) Post contracture release raw area more than 50cm<sup>2</sup>.
- 4) Patients without Diabetes mellitus, Hypertension.

**Exclusion criteria:**

- 1) Post burn contracture with ulcer in same area.

After selecting the patients, divided them in two groups according to techniques used to correct burn contracture:

**Group A** - Tie over and quilting sutures (15 patients), used Silk (3-0) suture material

**Group B** - Stapler fixation (15 patients) (Pics 1 - 4) Sampling technique was convenience sampling. Data was collected using a semi structured questionnaire, collected data was entered in MS excel and analyzed by applying unpaired t test and using epi info version 7.2.1.

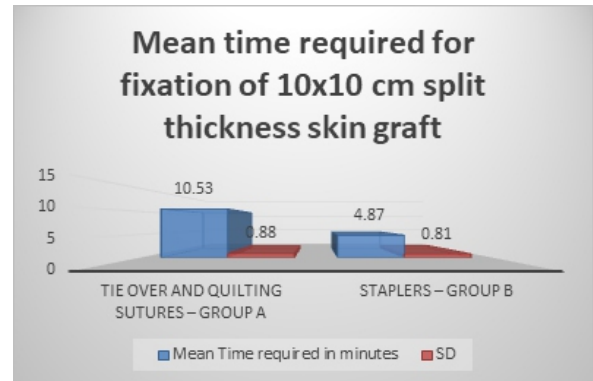
**Results:**

Thirty patients of post burn neck contracture included in our study. We had 15 patients in each group Tie over and quilting sutures – Group A and Skin Staplers – Group B. The mean age in Group A was 28.93 ± 11.14 years while in Group B it was 34.13 ± 6.39 years. There were 4 males (26.67%) and 11 females (73.33%) in Group A and 5 males (33.33%) and 10 females (66.67%) in Group B. The mean duration of contraction was 8.6 ± 2.65 months in Group A and 9.13 ± 4.45 months in Group B. Both the groups were comparable in terms of age and sex distribution and mean duration of contraction, there was no any significant difference in them (p>0.05).

**Table 1:** Time required for fixation of 10x10 cm split thickness skin graft

| Mean Time   | Tie over and quilting sutures – Group A | Staplers – Group B |
|---|---|--------------------|
| Mean Time required in minutes   | 10.53 ± 0.88 min                        | 4.87 ± 0.81 min    |
| Unpaired t test, t = 18.33 , 95% CI = 5.027 – 6.29 , p <0.001, Significant Difference |   |                    |

The mean time required for fixation of 10x10 cm split thickness skin graft in Group A was 10.53 ± 0.88 min, significantly higher than the mean time in Group B of 4.87 ± 0.81 min. (p<0.001).

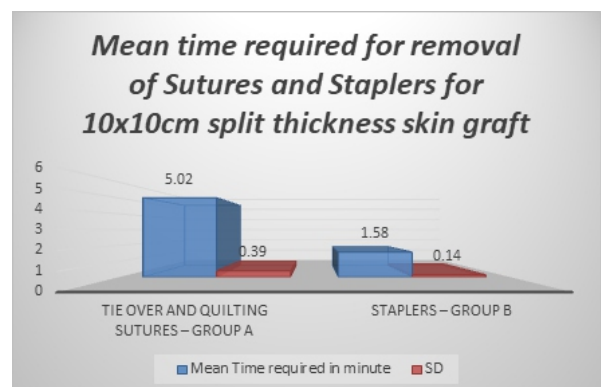


**Fig 1:** Time required for fixation of 10x10 cm split thickness skin graft

**Table 2:** Time required for removal of Sutures and Staplers for 10x10cm split thickness skin graft

| Time   | Tie over and quilting sutures – Group A | Staplers – Group B |
|--|---|--------------------|
| Mean Time required in minute   | 5.02 ± 0.39                             | 1.58 ± 0.14        |
| Unpaired t test, t = 32.15 , 95% CI = 3.22 – 3.65 , p <0.001, Significant Difference |   |                    |

The mean time required for removal of Sutures and Staplers for 10x10cm split thickness skin grafting Group A was 5.02 ± 0.39min, significantly higher than the mean time in Group B of 1.58 ± 0.14min. (p<0.001)



**Fig 2:** Mean Time required for removal of Sutures and Staplers for 10x10cm split thickness skin graft

**Table 3:** Split thickness skin graft uptake at 6th post-operative day

|  | Tie over and quilting sutures – Group A | Staplers – Group B |
|--|---|--------------------|
| Average percentage of graft uptake   | 93.8± 2.51                              | 95.53 ±2.44        |
| Unpaired t test, t = 1.91, 95% CI = 0.12 – 3.58 , p = 0.065, No Significant Difference |   |                    |

The Average percentage of Split thickness skin graft uptake at 6th post-operative day was comparable in both the groups without any significant difference (p=0.065).

**Table 4:** Cost Estimation

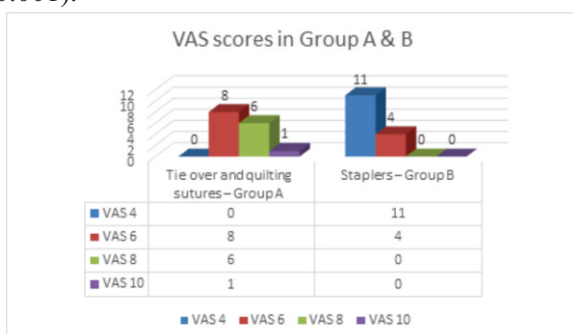
|               | Tie over and quilting sutures – Group A | Staplers – Group B |
|---------------|---|--------------------|
| Amount in INR | 380                                     | 1150               |

The cost required in Group A was Rs. 380/- INR, while in Group B it was Rs. 1150/- INR per patient for fixation material.

**Table 5:** Discomfort level on Visual Analogue Score

|   | Tie over and quilting sutures – Group A | Staplers – Group B |
|---|---|--------------------|
| VAS score   | 7.06± 1.23                              | 4.53 ±0.88         |
| Unpaired t test, t = 6.47 , 95% CI = 1.73 – 3.32 , p <0.001, Significant Difference |   |                    |

The mean Discomfort level on Visual Analogue Score in Group A was 7.06± 1.23, significantly higher than the mean time in Group B of 4.53 ± 0.88. (p<0.001).



### Discussion:

In areas where burns allowed to heal by primary intention, neck contractures are common. The key to appropriate neck contracture release is total release of all scar bands. Release is either incisional release or excisional release. The resultant raw area is covered with split thickness skin graft or flap.

In this study, we used split thickness skin graft to cover raw area. Comparison in Tie<sup>3</sup> over dressing and quilting sutures and staplers carried out in 30 patients. Patients divided in two groups sutures (Group A) versus stapler (Group B) fixation. The mean time required for fixation of 10x10 cm split thickness skin graft in Group A was 10.53 ± 0.88 min, significantly higher than the mean time in Group B of 4.87 ± 0.81 min. (p<0.001). The Average percentage of Split thickness skin graft uptake at 6th post-operative day was comparable in both the groups without any significant difference (p= 0.065). The mean Discomfort level on Visual Analogue Score in Group A was 7.06± 1.23, significantly higher than the mean time in Group B of 4.53 ± 0.88. (p<0.001).

Use of suture or staples<sup>4,5</sup> are standard method for skin graft fixation. Fibrin has also been used to split thickness skin graft.<sup>5-7</sup> To use fibrin, autologous blood is collected and processed, or commercial products are diluted to prepare low-concentration fibrin glues, requiring substantial time and effort. For graft fixation, a fast-clotting fibrin sealant containing 400 IU/ml thrombin was used for all subjects. At 5 days postoperatively, and the graft hematoma/seroma incidence and graft dislocation rates were investigated. At 30 days postoperatively, the graft necrosis and graft-take rates were investigated. The surface area was calculated using ImageJ (US National Institutes of Health, Bethesda, MD, USA). The size of the defect area ranged from 3 cm×2 cm to 22 cm×5 cm. At 5 days postoperatively, the mean hematoma/seroma incidence and graft dislocation rates were 7.84% and 1.29%, respectively. At 30 days postoperatively, the graft necrosis and graft-take rates were 0.76% and 99.24%, respectively. When high-concentration fast-clotting fibrin sealants were applied to skin grafts without a dilution process,

no difficulty was experienced during the surgery, and the results were similar to those of slow-clotting fibrin sealants with excellent skin graft-take rates.

#### Conclusion:

This study suggests Fixation of Split thickness skin graft with stapler is more surgeon friendly in terms of ease in fixing split thickness skin graft, result in decreased over all surgical and anaesthesia time. More patient friendly while removing staplers than removing sutures. Graft uptake is almost comparable by both methods. So we strongly recommend fixation of split thickness skin graft with stapler over Tie over and Quilting sutures.

**Conflict of interest:** None

**Source of Funding:** None

#### References:

1. Achauer and Sood's Burn Surgery Reconstruction and rehabilitation. 1<sup>st</sup> edition, 2006, Mosby publication, Ch 15 Pg no. 254.
2. David Herndon. Total Burn Care, 3<sup>rd</sup> edition, 2007 Elsevier publication. Pg 701- 718.
3. Kaplan HY. A quick stapler tie-over fixation for skin grafts. *Annals of plastic surgery*. 1989 Feb 1;22(2):173-4.
4. Best T, Lobay G, Moysa G, Tredget E. A

prospective randomized trial of absorbable staple fixation of skin grafts for burn wound coverage. *Journal of Trauma and Acute Care Surgery*. 1995 Jun 1;38(6):915-9.

5. Han HH, Jun D, Moon SH, Kang IS, Kim MC. Fixation of split-thickness skin graft using fast-clotting fibrin glue containing undiluted high-concentration thrombin or sutures: a comparison study. *Springerplus*. 2016 Dec;5(1):1-6.
6. Kreis RW, Vloemans AF. Fixation of Skin Transplants in Burns with Surfasoftware and Staples. *Scandinavian Journal of Plastic and Reconstructive Surgery*. 1987 Jan 1;21(3):249-51.
7. Han HH, Kang IS, Mun SH. Skin graft fixation using fastclotting fibrin glue. *J Korean Wound Manag Soc*. 2014;10:14-9. Management Society 2014;10(1): 14-19.



Pic 1: Post Burn Contracture (PBC) of Neck



Pic 3: Post Burn Contracture (PBC) of Neck



Pic 2: Stapled skin graft in PBC of Neck released



Pic 4: Stapled skin graft in PBC of Neck released