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# Original and modified technique of tie-over dressing: Method and application in burn patients

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ABSTRACT

In burn patients, meshed split thickness skin grafts are commonly used on large and non-flat areas whom immobilization is difficult to achieve. The frequent mobilizations of burn patients can make the graft slip and prevent the revascularization and therefore the taking of the skin graft. In order to prevent this pitfall, we modified and adapted the tie-over dressing procedure. The giant running tie-over dressing enables large skin grafts to be applied to their wound bed and therefore helps revascularization. Some cautions are necessary in order to avoid any infection. This original and easy-to-perform procedure answers to the difficulties of large split-thickness skin grafts in burn patients.



## 1. Introduction

When soft tissue defects are too extended to heal spontaneously by inward epidermization, skin grafting is a most commonly used method for reconstruction. Depending on the situation, two main types can be realized: full-thickness or split-thickness graft (meshed or not). The success of the skin graft is dependent on many factors such as an even pressure applied to the graft associated with adhesion to the wound bed. These factors are decisive, especially in the early post-operative days, because they favor tissular and vascular bonds [1], essential to the success of the graft take. Indeed, the revascularization of the graft occurs from the depth of the wound bed in the five post-operative days.

Tie-over dressing is a commonly used technique to secure stabilization, immobilization and pressure on the skin graft. The original technique was first described in 1929 by Blair and Brown [2] and many changes of the procedure have been suggested since then to adapt it to several situations. This kind of dressing is mostly performed on full-thickness skin grafts [3] because they are thicker and therefore require perfect application of the graft to the wound bed in order to obtain an adequate vascular in-growth.

In burn patients, skin grafting is more specific. Indeed, these patients require split-thickness grafts on large and relief areas. The grafts are frequently meshed with a ratio 3/1 or 4/1, making them fragile and subject to shear forces with the wound bed.

Besides, these patients often require several mobilizations a day especially during the body dressings, which can bring the grafts to swipe inadvertently. Immobilization remains easy on the limbs thanks to splints or Dujarrier, but is more problematic on certain anatomic locations such as the back of the body, bottom, breast, etc.

The main goal in these burn patients is to secure the skin grafts in good position on large, curvy and subject to movements areas. In order to answer these points, we decided to use the tie-over dressing technique by adapting it to meshed split-thickness skin grafts fixed on large areas like back, thorax, abdomen . . .

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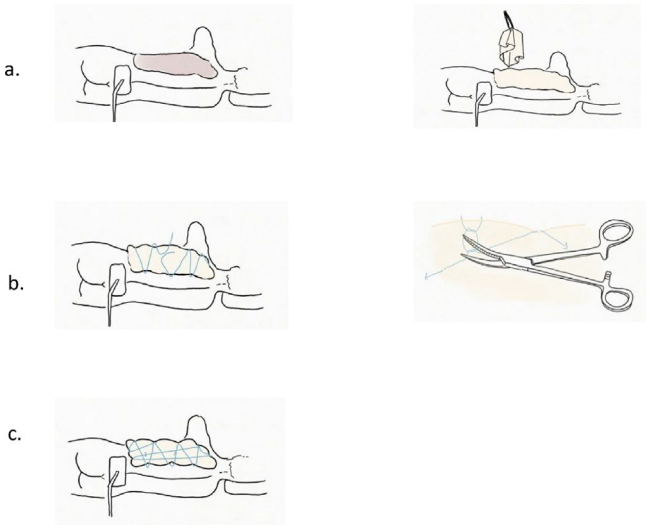


**Fig. 1 – Hand drawn of the technique of giant tie-over dressing.**
**(a) Skin defect covered by meshed split-thickness skin graft and tie-over dressing made with paraffin tucked and pad of gauze soaked with topical antibiotics.**
**(b) Beginning of the running tie-over fixed to the healthy skin with two (or more if needed) braided absorbable threads and knotting of the different threads with the help of an assistant maintaining the pressure.**
**(c) Final result.**

## 2. Material and methods

We realize the giant tie-over dressing at the end of the surgery, once split-thickness grafts are fixed to the wound bed with staples. The dressing is composed of steril pads soaked with local antibiotics and is then tucked into paraffin tulle. The use of local antibiotics is a specificness of burn patients: either rifadine or colimycine or sulfamylon in form of a solution is used depending on the skin colonization of the patient.

The tie-over dressing is then placed upon the graft area requiring immobilization (Fig. 1a). Absorbable braided thread such as Vicryl 1 is used and the running suture crosses over the bolster each pass, always taking a solid grip on healthy skin. The main goal is to obtain an even pressure all along the suture in order to properly apply the graft to its wound bed. Several sutures might be necessary depending on the number of passes needed regarding the size of the grafted area (Fig. 1b and c). The threads are then knotted together always maintaining the same pressure with an assistant help.

## 3. Results

The tie-over dressing is gently removed four days post-operatively by cutting the different threads. The necessity to remove the dressing might arise sooner if symptoms of local or systemic infection appear.

We present here 3 different cases of patients who needed a giant tie-over dressing and obtained excellent results.

Fig. 2: The first patient presented extensive burns of 65% Body Surface Area and was grafted with split-thickness meshed 3/1 skin grafts on the back and buttocks (approximately 10% BSA).

Fig. 3: The second patient presented 62% BSA 3rd degree burns. We used sandwich graft: meshed 6/1 autograft protected by allograft.

Fig. 4: The third patient presented 46% BSA burns. We used meshed 3/1 split-thickness skin grafts on the back and left flank.

These three different patients underwent the procedure of the giant running tie-over dressing because they had daily mobilizations due to nursing and frequent dressings. The technique prevented the graft from moving, favored a good adhesion to the wound bed and thus accelerated tissue healing.

## 4. Discussion

Regarding large split-thickness skin grafts, the giant bolster presents itself as an effective technique to immobilize the graft, prevent the swiping during mobilization and maintain constant pressure on the graft and its wound bed.

However, one of tie-over dressing drawback is the risk of local or systemic infection related to the skin maceration under the greasy dressing, and can thus jeopardize the take of the skin graft. Even if some studies do not find a higher risk of infection with tie-over dressing [4], the bolster limits supervision of the grafts and the detection of the first local signs is crucial in order to remove the dressing and prevent septic lysis of the graft. The use of paraffin tulle favors the maceration with no window to cleanse or closely watch the skin for a four-days lap of time.

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