Introduction

Skin grafting is one of the oldest fundamental procedures of the field of plastic and reconstructive surgery. Tie-over dressing is the most widely used method to secure the skin graft to its recipient bed, reduce the size of dead space, and prevent hematoma formation under the graft. The traditional technique consists of the use of long silk sutures along the circumference of the graft that are tied over impregnated non-adherent gauze filled with a bolus of fluffy gauze. The tedious and time-consuming nature of its application has led to numerous modifications with different suturening [1].

Many modifications to the tie-over suture include the following: A simple tie-over-bolus dressing for skin grafts, the pressure button as a refinement of the traditional “tie-over” dressing, the use of collars and beads with the classic stitches, the “lacing suture” technique, which combines marginal staples with two running stitches that are tied in the middle, a spring-loaded clamp, tie-over sutures secured using a modified 10 ml syringe and its piston, “running” tie-over, multiple loop sutures, an elastic tape with silk threads to be for the tie over dressing, tie-over dressing with criss-cross lacing pattern tie-over bandage for treating raw areas in animals, tie-over dressing using multiple loop silk threads and a barbed suture tie over [1-13].

The purpose of our study was to establish a new modification in the already described technique of tie over in the form of multiple opposing simple loop stitches stitches tied by rubber bands to allow reaplication of tie over if indicated without anesthesia.

Methods

Between May 2015 and April 2016, a prospective study was conducted on 20 patients their age ranged (2-55 years) with Mean ± SD 22.6 ±17.14 presented by raw areas in various parts of the body were admitted at plastic surgery department, Minia University Hospital, Minia, Egypt. Of these, 17 were males and 3 females. The etiology of these raw areas was full thickness burn in 4 cases (20%), post traumatic in 5 cases (25%), post keloid excision in 3 cases (15%) and post excision of skin malignancies Basal Cell Carcinoma (BCC) and Squamous Cell Carcinoma (SCC) with safety margin in 2 cases (10%), post excision of hairy mole in 1 case (5%) and post fire arm injury in 1 case (5%). The patients or their guardians provided an informed consent.

All patients operated under general anesthesia. After application of the skin grafts either Split Thickness Skin Graft (STSG) or Full Thickness Skin Graft (FTSG) and its fixation by metal staples or vicryl a multiple opposing simple loop stiches using 2-0 vicryl in 10 cases (50%) and 2-0 prolene suture in 10 cases (50%) introduced from the graft to its adjacent wound edge and tied like a loop suture and repeated along the wound edges (Figure 1A). Dressing is prepared to fit the size and the length of the graft bed. Non adherent vaseline gauze is placed over the skin graft followed by the prepared sterile bolus dressing consisting of cotton. A rubber band is passed between the graft to its adjacent wound edge and tied like a loop suture and repeated along the wound edges (Figure 1A). Dressing is prepared to fit the size and the length of the graft bed. Non adherent vaseline gauze is placed over the skin graft followed by the prepared sterile bolus dressing consisting of cotton. A rubber band is passed between the graft to its adjacent wound edge and tied like a loop suture and repeated along the wound edges (Figure 1A). Dressing is prepared to fit the size and the length of the graft bed. Non adherent vaseline gauze is placed over the skin graft followed by the prepared sterile bolus dressing consisting of cotton. A rubber band is passed between

Abstract

**Purpose:** We use a modified technique for tie over in the form of multiple opposing simple loop stitches tied by rubber bands to allow re-application of tie over if indicated without anesthesia.

**Methods:** The study was conducted on 20 patients presented by raw areas of variable etiologies, treated with skin grafting and simple loop stitch tie over technique.

**Results:** The patients were followed up for 1-2 months. All grafts showed very good to excellent results as the skin graft take ranged from 75% to 100%. Complications were seen in 5 cases in one case was slipped one simple loop and the other 4 cases was local infection.

**Conclusion:** We documented a modified, simple, economic, time saving and applicable tie-over dressing that allows fixing and re-fixing of the skin grafts when needed to maintain a proper pressure dressing to the wound.

**Keywords:** Skin graft; Tie over

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two opposite loops. Lastly the rubber bands are tied over the dressings (Figures 1B & C).

Usually the first dressing was done at the 5th day, the graft was assessed and the tie-over dressing was performed again by passing the rubber bands between the opposite loops again (Figure 1) without anesthesia for another 5 days.

But if there were any signs of infection or soaked dressing, rapidly we remove the dressing as early as possible then repeated saline wash and topical antibiotic was added over the graft then the rubber bands were introduced between the opposite loops to take the advantage of the repetitive nature of our technique. This can be done daily until the infection subsides or the soaking of the dressing decreases.

The success rate of graft take was registered by the same surgeon using the formula:
\[
\frac{\text{Graft take surface area (cm}^2\text{) \times 100}}{\text{total graft area (cm}^2\text{)}}
\]

Usually all patients were discharged from the hospital after the 1st dressing then removal of all stitches or staples after the 2nd dressings unless the patient needed repeated dressings (infection or soaked dressing). The follow-up period ranges from 1-2 months after discharging the patient.

Statistical descriptive analysis was carried out by using SPSS 24.0 software.

Results

After surgery, as shown in (Table 1), among the 20 grafts in our study, all grafts showed very good to excellent results as the skin graft take ranges from 75% to 100%. STSG was used in 19 patients (95%) and FTSG was used in 1 patient (5%). We used simple loop stitch tie over dressing technique on different sites of the body. The chest wall 2 skin grafts (10%), leg 2 skin grafts (10%), upper limb 7 skin grafts (35%), groin 1 skin graft (10%), neck 1 skin graft (5%), face 2 skin grafts (10%), foot 4 skin grafts (20%) and scalp 1 skin graft (5%) (Figures 2-6). Complications were seen in 5 cases in one case was slipped one simple loop stitch and the cause was the stitch wasn’t well tied on itself and the patient needs no interference, and in the other 4 cases was the local infection that was treated by wash, topical antibiotic and re application of tie over until complete take of the graft.

![Figure 1: Schematic diagram showing the steps of simple loop stitch tie over technique.](image1)

![Figure 2: 8 years old child with post burn keloid on the l side of the face.](image2)

![Figure 3: 3 years old child with post burn contracture on the right side of the neck.](image3)
Discussion

In a skin graft, good postoperative care begins with the dressing, a bolus or tie-over dressing can be used. The bolus dressings minimize the risk of hematoma or seroma formation and also prevent shearing forces from disrupting the graft [14].

Although tie-over dressings are widely used when performing skin grafts, the difficulty in re-fixation after the dressing has been opened is the disadvantage of a conventional tie-over dressing. Many researchers have introduced various tie-over dressing methods; of them, those that are reproducible have also been introduced [1,3,11,12].

Table 1: Patients Data.
(STSG: Split Thickness Skin Graft; FTSG: Full Thickness Skin Graft; RTA: Road Traffic Accident; SCC: Squamous Cell Carcinoma; BCC: Basal Cell Carcinoma; Lt: Left; Rt: Right).
Before starting this series we anticipated some other complications such as skin necrosis between the ends of the loop sutures but it did not occur because we avoided excessive tension on the loop sutures. The application of the simple stitch tie-over dressing takes shorter time less than the classic tie over and can be done again and again without anesthesia which is not found in the classic tie over method.

**Conclusion**

We documented a modified, simple, economic time saving and applicable tie-over dressing that enables easily fixing and re-fixing the skin grafts when needed to maintain a proper pressure dressing to the wound and with this reliable method, the skin grafts were taken successfully.

**Conflict of Interest:**

None

**References**

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Advances in Industrial Biotechnology
Advances in Microbiology Research
Agronomy and Agricultural Science
AIDS Clinical Research & STDs
Alcoholism, Drug Abuse & Substance Dependence
Allergy Disorders and Therapy
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