

Correction of Cord Like Scars Using Running Opposing Y-V Plasty

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ABSTRACT

Linear scars are a common problem in the plastic surgery practice. Release is the first step in surgical treatment. Skin grafts, Z-plasty, local, regional or free flaps are used to lengthen the scar. In this article, we will use running y-v flaps for scar lengthening. From January 2016 to April 2017, 20 linear burn contractures of 15 patients were corrected using multiple Opposing Y-V plasty. Patients were followed-up for a period of 6 months at least. All scar contractures were corrected successfully in all cases. One partial flap necrosis was observed and managed successfully with dressing changes. During the follow up period, only one case showed recurrence of contracture and required release and local advancement flap. linear scar contracture treatment modalities vary largely. Options for reconstruction include skin grafts, Z plasty and Y-V flaps. Skin grafts carry the risks of recurrence of contractures. Z plasty should include flap undermining before flap transposition which carries the risks of flap necrosis especially in burned skin. Multiple Y-V flaps carry the advantages of low rate of scar recurrence and secondary contractures and have the merits of being a safe technique with low incidence of flap necrosis. Running Opposing Y-V-plasty is an option for correction of linear cord-like burn scar contractures. It has the advantages of being a safe and effective method with low morbidity.

Key Words: Y-V plasty – Scar – Contractures.

INTRODUCTION

In spite of great advances in surgical management of deep burn wounds, delayed complications like hypertrophic scars, keloid and contracture scars may occur [1]. Skin contracture is a frequent complication, which may occur after deep burns either healed by secondary intension or skin grafts [2].

Scars over moving areas like face, neck [3] or upper extremity joints [4] may result in limitation of movement and creation of contracture scars. Many surgical options were used for the correction of burn scar contractures like partial thickness skin grafts [5], local flaps [6], regional flaps [7], distal flaps [8] and free flaps [9].

Linear post-burn scar contractures are usually corrected by surgical release of the scar and recon-

struction of the created skin defect by single Z-plasty, multiple Z-plasties [10] or W-plasty [11] to overcome scar contracture with the aid of interposition of healthy skin into the longitudinally arranged fibrous tissue of the contracture bands. Nevertheless, these techniques need separation of cutaneous flaps from its bed and moving it in an angled direction through the previously scarred skin and by doing this, the flaps become more liable to ischemic complications [12].

In this article, we used the running opposing Y-V plasty technique for correction of post-burn contracted scars. Using this technique, we did not perform either flap undermining nor flap transposition; thus, we preserve the integrity of the blood supply regarding such compromised flaps.

MATERIAL AND METHODS

From January 2016 to April 2017, we used multiple Y-V plasties for correction of 20 contracture scars in 15 patients. We obtained the approval of the Institutional review board for this study.

Patients included in this study were complaining of post burn linear scars affecting a moving part of the body and causing limitations of movement.

There was enough lateral tissue laxity in all cases that allow tissue mobilization. Patients with extensive scaring or who had comorbid conditions like Diabetes Mellitus or vascular diseases were excluded from the study.

Surgical technique (Fig. 1):

After the patient was anaesthetized, exposure of scar was done and the surgical field was sterilized and draped. First, we marked the contracted scar. Then, the lateral margin of the contracture band was identified and outlined. Then, a zigzag line is drawn along the length of the scar in the form of multiple connected V shaped lines (Fig. 1 A).

The angles of the V flaps ranges from 60 degrees to 90 degrees. From the tip of the V flaps, a line is drawn converting the shape of the flaps from the V pattern to Y pattern. The length of this line is usually kept at one third of the length of the limbs of the V flaps, but it can be extended in a 'cut-as-you-go' technique during surgery to accomplish maximal advancement regarding the V flaps.

Note that these flaps were marked while the limb in a relaxed position to avoid the occurrence of marked primary flap contraction if the flaps were marked in an extended limb position.

We start by skin incision throughout the epidermis and dermis in all of the already marked flaps. Deep incisions are avoided because it results in marked primary contraction of the flap and marked distortion of the other flaps' markings. Then, the incision is deepened into the scar and the underlying subcutaneous fatty tissue. After minimal undermining, the apex of the V flaps advance in the bottom of the congruent limbs of the Ys shaped flaps, thus continuous running V flaps are created (Fig. 1). Atraumatic manipulations of the tips of these flaps were needed. Bleeding points were cauterized. If the contracture were in an extremity, an inflated tourniquet was applied until complete wound closure was accomplished and a compression bandage was applied.

Postoperative care included stiches removal after 2 weeks followed by application of Pressure garments which were used for at least 3 months.

RESULTS

During this study, we operated upon 20 contracture scars in 15 patients. The average age was 28 years (range from 10 to 55 years). Nine cases were males and six cases were females. The causes of burn injuries were flame, scald and contact with hot objects. Table (1) shows various sites of post-burn contractures.

All contracture scars were released using multiple Y-V flaps. All flaps but one survived completely (Fig. 2). In 2 cases, venous congestion was noted and improved over days. In one case, there was partial flap necrosis which was managed by dressing changes and application of local antibiotics.

All patients were followed-up for a period of 6 months at least. Scars lengthening were obtained. Two cases developed hypertrophic scars at the incision site and were managed conservatively by compression garments and local steroid therapy. During the follow-up period, only one case showed recurrence of contracture and required release and local advancement flap.



Fig. (1): A 10 year old boy with postburn contracture scar of the neck, anterior axillary fold, elbow and forearm where preoperative marking was done in the form of a zigzag incision (A) postoperative view after making multiple Y-V flaps and release of the contractures (B).



Fig. (2): A 14 year old female with postburn contracture scar of the elbow and wrist where preoperative photograph was obtained (A) postoperative view after making multiple Y-V flaps and release of the contractures (B).

Table (1): Sites and numbers of postburn contractures.

Site of post burn contracture	Number of Contractures
Hand and wrist	10 (50%)
Elbow	4 (20%)
Axilla	3 (15%)
Neck	3 (15%)

DISCUSSION

In this case series, we used running Y-V flaps for reconstruction of 20 cord-like contracture scars in 15 patients. All flaps survived completely except one flap which showed partial necrosis at its tip and was managed conservatively. All cases were followed-up for at least six months with satisfactory results as scar lengthening was achieved.

The technique of running Y-V-plasty was a safe and reliable option for treatment of cord like scars. It also was associated with few complications [13]. It was used by many surgeons for correction of contracture bands resulted from burns [14], congenital cutaneous defects, traumatic wounds [15] and Dupuytren's contracture [16].

Some lateral skin laxity frequently exists on both sides of the contracture band; the gained extra length of the scar could be obtained by the advancement of the nearby skin for reconstruction of the defects created after scar incision [17].

One of the advantages of running opposing Y-V-plasty technique is that the surgeon can adjust the extent of the flap advancement during surgery by modifying the length of the stems of the Y flaps. Usually the length of the stems of the Y flaps is longer than the width of the scar in order to achieve complete interruption of the scar fibrous tissue. So, the extent of advancement of the V flap is conducted in a 'cut-as-you-go' technique during surgery [18].

The presence of lateral skin laxity on the lateral borders of the scar is the major determinant of the technique used to reconstruct the released scar bands. If there is no skin laxity, skin grafts [19] or large flaps may be needed [20], but if there is an abundant lateral skin laxity, which can be determined by pinch test, on the lateral border of the scar bands, the technique of running Y-V flaps can be used safely and effectively. Thus, if we can grasp the contracture scar with the thumb and index fingers and these two fingers can meet together, we can conclude that there is an adequate lateral skin laxity around the scar and the technique can be utilized safely [21].

The second determinant of the choice of the running opposing Y-V flap technique is the required extent of scar lengthening which is measured by comparing the length of scarred tissue with contralateral healthy unscarred tissues. If the required scar lengthening is not more than twice the actual scar length, the running opposing Y-V flaps can be beneficial for this case. There are numerous minor factors which affect the extent of extra-length gained by the running opposing Y-V-plasty technique. These factors include flap number, flap size, angle of the v flaps and the length of Y stem [22].

In this study, one case out of 20 scars reconstructed showed partial flap necrosis. We think that this low complication rate is due to minor need for flap undermining or transposition during flaps elevation and flap necrosis secondary to compromised blood supply is avoided.

One of the shortcomings of this technique is that some residual thick scar band is present after scar release. However these remnant bands could be flattened over time after tension release and the application of external pressure by pressure garments and local scar therapy like steroid injection and silicone sheets.

Conclusion:

The running opposing Y-V-plasty have many benefits like being simple and safe technique with minimal donor site morbidity nor skin distortion. it is effective in treatment of cord like scar bands with favorable results.

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