

## The dermatotraction technique for closure of fasciotomy wound

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### ABSTRACT

Management of an open wound is a problem frequently encountered in the treatment of fractures. Skin grafting, rotational flaps, free flaps, and healing by secondary intention add a considerable amount of morbidity and cost to the patient. Therefore, it is ideal to obtain primary closure when possible. This communication describes a technique that uses 1-0 prolene suture material, skin stapler and the natural stretching ability of the skin to enable primary closure of wounds. The technique described uses dermatotraction to stretch the skin, is a cost-effective way to achieve primary closure of large wounds with supplies that are readily available in every operating room.

**Keywords:** *Dermatotraction, grafting, prolene, stapler*

### Introduction

Dermatotraction techniques for delayed primary closure of fasciotomy wounds have only been reported in the last two decades.<sup>[1]</sup> Fasciotomy wounds leaves patients with very large wounds which need skin grafting for closure and can be technically demanding. We describe a technique for closure of such wounds using prolene suture material dermatotraction. The technique is very simple, easy to learn and does not require sophisticated equipment and involves anchoring the tensioning material in this case, a prolene suture material to alternate sides of the wound approximately 2-3 cm apart keeping about 1cm from the edges. The tension is then adjusted manually before the last anchoring staples are inserted.

### Case Report

A '1-O' prolene suture material is used to provide traction to the wound edges to allow successful subsequent closure of the defect.

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#### DOI:

10.4103/2319-2585.155912

The technique involves fixing the suture material in a 'zig-zag' arrangement between the wound edges. The suture material is secured to the skin at the wound margin using skin staplers, kept at a distance of 2-3cm between adjacent staplers, before being manually tightened and secured [Figures 1 and 2]. The wound is cleaned daily and the suture material loops are tightened at 24-hr interval until primary closure can be achieved using interrupted mattress sutures.

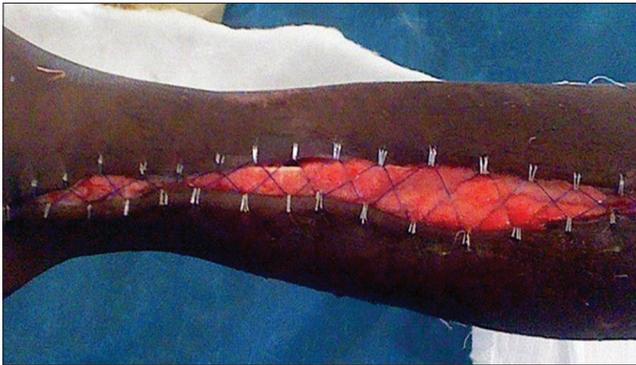
In our institution, we were able to use this technique to close wound defects in a patient with fasciotomy wound over left leg. The entire wound was managed with this technique alone [Figure 3].

### Discussion

The use of decompressive fasciotomy, in the setting of an acute compartment syndrome, is potentially a limb-saving procedure. Compartment syndrome, a situation where the compartment pressure is higher than perfusion pressure, occurs in both the upper and lower extremities and can result from insults such as fracture, ischemia, reperfusion, crush injury, burns and over-exertion.<sup>[2,3]</sup> The sequelae from an untreated compartment syndrome are devastating. Therefore, early recognition and treatment via surgical decompression are paramount. However, the fasciotomy incisions can lead to large, unsightly, chronic wounds after surgical intervention.



**Figure 1:** Fasciotomy wound over lateral aspect of leg intra-operative photo



**Figure 2:** Suture material in a 'zig-zag' arrangement between the wound edges. The suture material is secured to the skin at the wound margin using skin staplers, kept at a distance of 2-3 cm between adjacent staplers



**Figure 3:** Fasciotomy wound complete closure at 7<sup>th</sup> post operative day without skin grafting

The technique of dermatraction for closure of fasciotomy wounds was first described by Cohn in 1986.<sup>[4]</sup> The initial procedure was performed using vessel loops arranged in a shoelace pattern but since then several variations have been described including the use of heavy prolene sutures.<sup>[5]</sup>

Dynamic wound closure using the vessel loop or shoelace technique has also been described as a viable management option.<sup>[6]</sup> This method entails approximation of wound edges

using vessel loops anchored by skin staples and gradually tensioning them across the wound margins. Early versions of this technique used materials such as heavy prolene sutures and were claimed to lead to gradual closure of fasciotomy.

Studies have shown this technique to be cost-effective; decreases the need for skin grafts and its associated morbidity and mortality, and achieves skin closure with acceptable esthetic results.<sup>[6]</sup>

This technique allows easy access to the wound for inspection and toilet with maximal patient comfort and tolerance.

Indications for dermatraction are closure of fasciotomy wounds;<sup>[7]</sup> secondary closure of amputation stump,<sup>[7]</sup> whenever conventional primary closure of a skin defect is complicated by poor skin integrity; retractive forces, or infection;<sup>[8]</sup> specific surgeries that may require skin grafts for healing to occur - most commonly removal of skin cancers.<sup>[9]</sup>

## Conclusion

In its application to fasciotomy wound, it is cost-effective, provides good cosmetic results without the need for skin grafting. The procedure does not require additional equipment or training. Furthermore, this technique allows daily inspection of the wound and toilet if needed. Possible limitations include larger defects, wounds with irregular margins,<sup>[1]</sup> wounds over the joint wounds with significant skin loss and the risk of pressure-related necrosis to the tissues.

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How to cite this article: Venkataramana P, Padasali PS. The dermatraction technique for closure of fasciotomy wound. *J Orthop Allied Sci* 2015;3:17-8.

Source of Support: Nil, Conflict of Interest: None declared.