

Expanded occipito-cervico-pectoral flap for reconstruction of burned cervical contracture

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Abstract

Postburn neck contracture and hypertrophic scarring can cause functional limitation and aesthetic disfigurement. Reconstruction of severe deformities and scar of neck following healing from burns confronts the surgeon with some of the most challenging problems in reconstructive surgery. Through knowledge of available reconstructive technique accurate diagnosis of tissue deficiency and secondary distortion, imaginative planning and definitive, careful execution of ones surgical plan are the bare minimum items for achieving improvement in a burned deformed neck. The aim of this article is to assess the role of expanded occipito-cervico-pectoral (o-c-p) flap for reconstruction in a series of four patients with severe burn scar of neck and involvement of shoulder back but intact anterior aspect of chest. This is an alternative method of reconstruction burn scar of neck area.

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1. Introduction

For many years, treatment of extensive burn contractures of the neck has been troublesome to both patients and surgeons. The psychological and physical stress they constantly suffer from them is very great [1]. When the contracture is limited to a small area, Z-plasties and/or local skin graft offer a resolution.

Improvements in functional and aesthetic results in head and neck reconstruction continues with the advent of new flaps [2]. With a better understanding of the blood supply to the anterior chest wall [3] the reconstructive ladder of flap options continues to expand. This expansion in flap possibilities allows surgeons today to make a more appropriate choice of flap for reconstruction than ever before [4].

There remains a paucity of local flaps for the reconstruction of extensive burns of the neck [5,6]. The Tissue Expander (TE) is a versatile addition to the armamentarium of the burn reconstructive surgeon. This technique allows the surgeon to expand surrounding skin with appropriate color match, texture and minimize donor site deformity.

Tissue expansion techniques have proven particularly useful in the compliant tissue of the neck [4,7,8,9], offering an

alternative to skin grafting and distant flaps [10,11] and often yielding superior aesthetic results.

This study describes acceptable results using the expanded occipito-cervico-pectoral (o-c-p) flap. The evaluation of four patients treated with o-c-p flap revealed release of the contracture, satisfactory appearance, and no recurrence.

2. Materials and methods

Between July 1998 and April 2000, four patients were treated with expanded o-c-p flap and followed up retrospectively. There were three female and one male, and all suffered from severe contracture of neck.

These patients underwent two separate operations at an interval of 2–3 months. Prior to operation detection of flap nourishing vessels by Doppler sonography was performed. This flap is based on the occipital area to include descending branches of the occipital artery and the flap is designed to course toward the pectoral region and this type resembles the flap described in the case reported by Yang et al. [11].

After designing the flap, the TE was placed through an incision made in the medial border of the flap adjacent to scar tissue (a pocket larger than the dimension of the expander was created), then two layer closure of incision was done.

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Patients were always given intraoperative prophylactic antibiotics and a closed system drain was always used. Expansion began 2 weeks after insertion and then overexpansion of the recommended volume of tissue expander was achieved. In these cases expanders were always placed subcutaneously and only rectangular TE were used. Usually two TE were inserted simultaneously on both sides of the neck.

2.1. Case reports

2.1.1. Case 1

An 18-year-old girl, sustained a scald burn at 4 years of age with extensive scars of neck, shoulder and upper back.

Two TE were inserted and injection was performed on either side of the breast (injections are implemented to the point of mild discomfort and tightness and stop just short of tissue blanching). Expanders were inflated to at least 1.5 times their stated volume (300, 400 cm³ rectangular TE).

On completed expansion an first surgery two flaps were elevated with the dimensions of 22 cm length and 7 cm distal width and o-c-p flaps were transposed to the anterior aspect of the neck and donor sites were skin grafted. The only bulging was noted in the pivot region which was corrected by Z-plasty 2 months later (Fig. 1).

2.1.2. Case 2

A 21-year-old lady, sustained a scald burn at 7 years of age with scars of neck, shoulder and posterior aspect of chest wall. Two tissue expanders (350, 450 cm³ rectangular) were inserted on both sides above the breast, and after overexpansion, two expanded flap were elevated and transposed to the anterior aspect of the neck. Donor area was covered by STSG on the left side.

Distal portion of right o-c-p flap (1.5 cm × 2 cm) suffered from purple discoloration which healed fully with conservative management.

2.1.3. Case 3

A 24-year-old male, with burn scar of the neck was referred to our center. A rectangular tissue expander (400 cm³ volume) was inserted in the right upper portion of the anterior aspect of the chest wall and after overexpansion, an o-c-p flap was elevated and transposed to the anterior aspect of the neck. The donor site was closed primarily.

2.1.4. Case 4

A 19-year-old girl, with burn scars of neck, shoulder, posterior aspect of chest wall. One rectangular tissue expander was inserted on the right side of the neck, and after overexpansion, o-c-p flap was elevated and transposed to the anterior aspect of neck. The donor site was closed primarily, but after 1 week a small portion of the donor area opened which was covered by partial thickness skin graft.

Fig. 1. (A) Preoperative anterior view; (B) two tissue expander were inserted; (C) postoperative: after inset of flaps and skin graft of donor site; (D) 3 months after surgery.

3. Results

Contractures as neck burn sequelae have traditionally been treated by release and resurfacing with thick free skin grafts or local flaps. Microsurgical techniques have allowed free tissue transfer for difficult cases [9,10].

With the use of the tissue expander in o-c-p flaps in these four patients using the technique described above, our results were good and complications such as flap loss, hematoma, seroma, infection port problems and noncompliance were not seen. In one case only a small portion of donor site dehisced for which skin graft was performed. The good color match, texture and minimal donor site morbidity, encourage us to use this flap for burn scars of neck, shoulder and posterior aspect of torso.

4. Discussion

Anterior neck burns can result in a variety of functional limitation and postural deformities, that restrict activity of daily living. Prevention and correction of neck contracture is difficult. Surgical correction for an established contracture to improve the appearance is mandatory.

Broad areas of neck scarring with contracture are treated by transverse incision release and resurfacing by skin graft or a skin flap, our opinion is that regional flaps to the neck behave better in terms of appearance and function than skin graft and provide a good color and texture match with the unscarred area on the neck.

Sometimes there is an adequate amount of unscarred skin adjacent to the neck (lateral neck, upper chest, shoulder and upper back) to permit neck resurfacing with a matched and pliable skin. If the neck scarring is contained within the shoulder and upper back adjacent flaps such as supraclavicular or occipitocervicoshoulder (ocs) and occipitocervicodorsal (trapezius flap ocd) cannot be used [12].

Expanded neck flaps are best used for reconstruction of neck and advance unburned area to replace burned tissue. Any vertically directed suture lines produced by flap advancement might be redirected immediately or at a later operation to prevent linear contracture. In our patients anterior aspect of the upper chest wall was intact.

Current reports of the super thin flap encouraged the use of the expanded o-c-p flap based upon the descending branch of occipital artery. This gives us sufficient skin with minimal

donor site morbidity for reconstruction of the anterior aspect of neck [13–15].

5. Conclusion

The expanded o-c-p flap provides appropriate color match, texture and sensibility. It should be mentioned that tissue expander is not a panacea and carries a significant complication rate. With careful patient selection, surgical and postsurgical technique, tissue expansion can be an important tool in patients with limited donor site for coverage of large neck scar [10].

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