

New Trends of Management of Post Burn Contractures in Head and Neck

Essay

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In General Surgery*

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Dedication

*To those who have always
been*

there for me

My Father,

*for his love and constant
encouragement*

My Mother,

*for her support and
dedication*

My sisters and my brothers

for their support,,,

*Thanks for Your Valuable
Support*

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John Fayek Foad

List of Abbreviations

CEA	Cultured epidermal autograft
CSS	Cultured skin substitute
ECA	The external carotid artery
ICA	The internal carotid artery
IL-γ	Interleukin- γ
INF	Interferon
RSTL	Relaxed skin tension lines
SMAS	Superficial musculo-aponeurotic system
TBSA	Total body surface area
TGF-β	Transforming growth factor β
VAC	vacuum-assisted closure
VEGF	vascular endothelial growth factor

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INTRODUCTION

The skin is considered the largest organ of the body, and it is a complex organ with many important functions .it serves as a mechanical barrier, it participates in the process of thermoregulation, it helps initiate immunologic functions, it is involved in melanogenesis, and it protects against the effects of ultraviolet light, to fulfill all these functions .the skin has many different structures and a diversity of cells with different properties. The skin is divided into two main regions, the epidermis, and the dermis, each providing a distinct role in the overall function of the skin (Christopher et al, ٢٠٠٧).

The epidermis is a stratified squamous epithelium composed of cells of the keratinizing system, sharing this environment is melanocytes, langerhans cells and Merkel cells. The dermis assumes the important functions of thermoregulation and supports the vascular network to supply the avascular epidermis with nutrients. The dermis is typically subdivided into two zones, a papillary dermis and a reticular layer (Carlos, ١٩٩٠).

Major Burns are amongst the worst injuries that a person may suffer with devastating functional as well as aesthetic effects. Even with the most advanced methods in the best specialized units in the most developed countries, the aesthetic

and functional outcomes after major burn injuries are highly disappointing with a long period for rehabilitation and commonly, many secondary procedures and revisions (**Alberto, ۲۰۱۰**).

The depth of the burn affects the healing of the wound, making assessment of burn depth important for appropriate wound management and, the decision for operative intervention; it is classified to superficial, partial-thickness, full-thickness burns. Superficial burns involve the epidermis only, best treated with topical agents.

Partial-thickness burns involve the entirety of the epidermis and a portion of the dermis, it further divided into superficial and deep based on the depth of dermal injury .superficial partial-thickness burns generally do not result in scarring, but could result in alteration of pigmentation, deep partial-thickness burns involve the entirety of the epidermis and extend into the reticular portion of the dermis, they will typically heal with contraction scarring and possible contractures.

Full-thickness burns involve the epidermis and the entirety of the dermis, best treated by excision and grafting. A variety of techniques have been described for precise determination of burn depth, including fluorescein dyes, ultrasound, laser Doppler, and magnetic resonance imaging (**Matthew, ۲۰۰۷**).

The head and neck are the areas mainly exposed to fire and suffer the consequences more severely. The hair is easily burned and so are the scalp and the eyebrows. Contractures and hypertrophic scars always represent an important and severe impairment of function and a variable loss of the normal appearance (**Alberto, ۲۰۱۰**).

Refers to the tightening of the skin after a second or third degree burn. When skin is burned, the surrounding skin begins to pull together, resulting in a contracture. Contraction of the wound is a normal physiologic process of every wound, retraction is the consequence of contraction over the surrounding tissues and contracture is the final result of a vicious process of healing over joint areas affecting the function as well as the aesthetics of the surrounding area. Contractures should be treated by surgery and assisted by physiotherapy (**Alberto, ۲۰۱۰**).

Contracture should be prevented by proper management. Proper dressings, splints, rational use of grafts or flaps, addressing the scars in a favourable direction referred to the joint axis, post operative splinting and addressed rehabilitation will mostly avoid contractures. The best way to avoid secondary contractures is to prevent those (**Alberto, ۲۰۱۰**).

Severe contractures after burns cause gross facial deformity and severe functional disability. Goals of reconstruction are to obtain full range of neck movements and

to restore the aesthetic appearance to the face and neck (**Perera et al., 2004**)

The goal is to change the axis of the contracture and the direction of the scars from a longitudinally orientation to transverse or diagonal (**Alberto, 2010**).

For Prophylaxis: Pressure therapy, Silicone gel sheeting, Flavonoids. Current therapies: Intralesional injections of Corticosteroids, Cryotherapy as (Contact/spray freezing with liquid nitrogen), Radiotherapy (Superficial x-rays), Laser therapy (Short-pulsed dye laser). Emerging Therapies: Interferon (Intralesional injection of INF- α 2b), 5-FU (Intralesional injection of 5-FU 50 mg/mL), Bleomycin sulfate, another antineoplastic agent (**Gerd et al., 2010**).

Sometimes a wide area of skin is needed to cover the full extent of an aesthetic unit of the face as usually happens with the forehead and the neck, and less often with the cheeks. Usually it is the case that even with tissue expanders, it is not enough to expand the skin to the full extent and shape required, so an excellent option is to expand the skin on an area similar in thickness and color to that of the face such as the supraclavicular region (the abdomen could be used as a second option specially for the neck). Only these types of full thickness skin grafts can result in an acceptable or even excellent result (**Alberto, 2010**).

Some of the most popular techniques are Z-plasty, V-Y-plasty and their analogues, The current study presents a new modification of the double-opposing Z- and V-plasty, called ‘K-M-N plasty’ (*Ilteris, ٢٠١٠*).

Microvascular free flaps could be an option when local and regional conditions made the use of local and regional flaps an impossible procedure (*Alberto, ٢٠١٠*).

This method allows the release of contracture, creates a natural skin cover of this part for the body, and provides good functional and cosmetic results (*V Moroz, ٢٠٠١*).

Tissue expanders not only give the opportunity to expand the skin and subcutaneous tissue to be used as a flap, but also the expanded skin can be equally used as a full thickness skin graft that will retain almost the same characteristics of the target area without deteriorating the donor region (*Alberto, ٢٠١٠*).

Recently, a new single layer skin substitute was developed. Integra dermal regeneration template single layer (IDRT-SL) allows one-stage surgery in combination with split thickness skin grafting (*W Koenen, ٢٠١١*).

The Use of a Collagen–Elastin Matrix as Dermal Regeneration Template for the Treatment of Full-Thickness Skin Defects, Dermal substitutes are used to improve the