Treating Scars to the Neck

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KEYWORDS

• Scar • Neck • Morbidity • Face

KEY POINTS

- Scarring of the neck is a common complication of burns, surgeries, physical disorders/disease, and traumatic injuries, affecting millions of people every year.
- Scarring of the neck can be accompanied by additional morbidities caused by the limitation of functional motion of the neck by severe scarring, is the neck being more dynamic than the face.
- Many treatment options and modalities have been used for reduction and prevention of scar formation, including topical steroids, intralesional steroids, interferon, 5-fluorouracil, silicone gel, radiation, laser therapy, and surgeries.
- The most important aspect of patient care with regard to treating scars of the neck is that patients should have realistic expectations of the most likely outcome of the treatment; that is, that the visibility and problems associated with the scar will be lessened by the treatment but that the treatment is unlikely to result in elimination of the neck scar.

INTRODUCTION

Scarring of the face and neck are of great concern to patients because of their high visibility and the distortion of facial and neck features that become socially important in the overall appearance of the patient. The goal of any surgeon in the revision of neck scars should be improvement to the point of optimal camouflage,[1] and it should be noted that eliminating neck scars is highly unlikely. Unlike facial scars, the neck has a dynamic component in the motion of the face and neck, and correction of neck scars may be necessary to restore normal function of head and neck rotation; specifically, flexion, extension, and rotation. Patients presenting with neck scars or scar concerns in general should be advised that realistic expectations are necessary to establish a rapport with the patient in order to achieve a successful end point in the treatment. Discussion of neck scar treatment should emphasize that the treatment is to lessen the adverse effects that scarring has produced and that no treatment is capable of eliminating the scar.

CAUSES OF NECK SCARRING AND SCAR FORMATION

Neck scarring can occur as a result of trauma, burns, physical disorders/disease, or surgical intervention, either elective or emergent. Normal scar formation after ordinary wound repair usually results in acceptable postoperative appearance of neck scars. Unsatisfactory neck scarring can result from extensive tissue loss or damage, complications or infections of the wound, or poor technique in wound closure. Poor wound healing can also result from concurrent illness, poor nutrition, and immunosuppression. Abnormal wound healing, hypertrophic scarring, and keloid formation can also result as consequences of the wound healing process. Common surgical scars that may heal unfavorably include those for carotid surgery, thyroid surgery, tracheotomy,

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submandibular gland removal, or other more extensive head and neck surgery procedures.

CHARACTERIZATION OF UNFAVORABLE NECK SCARS

An ideal scar is thin and flat, has a good color match with the surrounding skin, is oriented along the relaxed skin tension lines (RSTLs), and does not produce any distortion of adjacent tissues.[2] A scar may impede function, as in the case of a contracture or limitation of motion. A scar may cause discomfort, tightness, or even pain. Frequently scars cause cosmetic deformity and patients may seek treatment merely to look more normal. Scars are often associated with an unpleasant memory or reminders of a traumatic past, and the patient may seek to erase the memories by erasing the scar. The causes of unsatisfactory neck scarring are similar to those of scars of the facial area, and can be directly related to the location of the wound, cause of the wound, and degree of tissue loss. Wounds that occur in areas of increased tension, like those overlying the mandible or those that are perpendicular to the resting skin tension lines, may heal with unfavorable consequences, particularly with increased width. Wounds with a large degree of soft tissue injury, such as avulsion injuries, deep thermal wounds, or gunshot wounds, and severe abrasions with epidermal or dermal loss, may also result in unfavorable scars. Unfavorable scars may be wide, have irregular contours, or be hypertrophied or retracted with uneven tissue contours. Uneven closure of surgical or traumatic wounds caused by poor layered approximation can also contribute to uneven contours with step-offs or distortion in which straight lines along the edge of a wound bulge toward the center, also known as a pincushion deformity. A version of the pincushion deformity is the trapdoor deformity.

TOPICAL AND INJECTABLE TREATMENT OF NECK SCARRING

Intralesional corticosteroids are a frequently used adjunctive treatment of hypertrophic scars and keloids. Their mechanism of action involves reduction of fibroblast proliferation and collagen synthesis as well as suppressing inflammatory mediators.[3] In addition, triamcinolone acetonide seems to cause a sizable decrease in antitrypsin and macroglobulin levels, both of which are increased in keloids and are inhibitors of collagenase.[4] Fluorouracil, a pyrimidine analogue with antimetabolite activity, has been used extensively in the treatment of cancer and as an adjunct to glaucoma surgery. More recently, it has been shown to have some efficacy in the treatment of hypertrophic scars and keloids. Fluorouracil has been shown to target rapidly proliferating fibroblasts in dermal wounds, thus inhibiting excessive collagen production.[5] More specifically, fluorouracil blocks the transforming growth factor beta (TGF-β)-2 gene in human fibroblasts, a known proinflammatory cytokine present in adult wounds that scar.[6] Imiquimod cream, 5%, is a topical immune response modifier that stimulates interferon, a proinflammatory cytokine that increases collagen breakdown. It has also been shown to enhance the local production of tumor necrosis factors and interleukins.[7] Bleomycin is a cytotoxic antibiotic isolated from a *Streptomyces verticillus* strain commonly used in the treatment of certain neoplasms as well as recalcitrant warts in dermatology. It acts by binding to both double-stranded and single-stranded DNA, leading to breaks in the structure. On histology, bleomycin has been shown to cause necrosis of keratinocytes and induces the expression of several adhesion molecules.[8] Silicone gel is a cross-linked polymer of dimethyl siloxane used as an impregnated elastic sheet, silicone gel sheeting (SGS), silicone cream, or a topical gel. It is noninvasive and has the advantages of being inexpensive, painless, and easy to use. The exact mechanism by which SGS exerts its effects remains unclear and continues to be a subject of controversy. Some investigators have suggested that it is the hydration of the stratum corneum rather than the inherent properties of the silicone that affects wound healing.[9,10] In 2004, Hanasono and colleagues[11] performed in vitro testing on human fibroblasts from various tissues, including normal, keloid, and fetal skin. Their results suggested that silicone gel is responsible for increased basic fibroblast growth factor levels in normal and fetal dermal fibroblasts and acts as a modulator in the expression of such growth factors.[11]

LASER AND RADIOFREQUENCY THERAPY FOR NECK SCARRING

Lasers were first used in the treatment of scars in 1978. Laser scar treatment can be performed with a multitude of devices and the energy-based devices are divided into the following 3 categories: ablative, nonablative, and fractional technologies (ablative and nonablative). The 3 types differ in their method and extent of thermal damage, length of downtime, adverse effect profiles, and degrees of efficacy. The first laser used to treat hypertrophic scars and keloids was the continuous wave argon.[12] Despite encouraging early reports,