

# Experience Of Integra In Cervical Burn Sequelae

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## Abstract

**Introduction:** Morbidity related to hypertrophic scars and contractures which are well-known sequelae after burns remains high and has increased as more severely burned patients are surviving. The goal in management is to restore the function and form of the origin. The objectives of surgical intervention are releasing the scar, restoring cervical movements, appearance, and natural profile, and avoiding the recurrence of contracture.

**Methods:** This study was conducted on patients admitted to our institution with seven cases of post-burn neck contracture who underwent operative treatment using Integra and skin grafting.

**Results:** seven patients with post-burn neck contracture underwent Integra grafting. the time between integra placement and skin grafting was between 3 and 4 weeks. The functional and aesthetic results were satisfactory.

**Discussion:** The use of Integra has been evaluated in multiple clinical trials and studies, including randomized controlled trials and prospective clinical trials, for the treatment of burn injuries and the reconstruction of scar contractures. The indications for release in our study were limitation of movement besides disfigurement, unstable scar, and intolerable subjective symptoms. In our series, no infection of the artificial dermis was recorded. 85 % of our patients had acceptable neck function and aesthetics after 18 months of rehabilitation.

**Conclusion:** The use of skin grafts and Integra represents an evolution in the management of cervical burn contractures mainly in developing countries.

**Keywords:** Integra, burn scars, neck contracture

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Date of Submission: 04-03-2024

Date of Acceptance: 14-03-2024

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## I. Introduction

Since the original work published in 1981 by Burke et al. on the use of an artificial dermal template for the coverage of full-thickness burn defects, Integra (Integra Life Sciences, Plainsboro, N.J.) has established itself as an important treatment for patients with major burns and in reconstructive surgery for scar and contracture management [1][2][3]. Wound contracture is a natural biological response to heal the wound. In humans, the skin is firmly attached to the subcutaneous tissues. Therefore, contracture constricts the adjacent tissues resulting in physical disability [4]. Cervical burns are a source of disabling after-effects. Approximately 30-50% of patients suffering from severe burns may have a neck burn. When deep, and in the absence of adequate management, these burns will progress to retraction, which can have serious functional, aesthetic, and psychological repercussions [5]. Complete excision of platysma necessitates reconstruction of the neck. Typically, this is achieved by split skin grafting, although poor long-term results with reoccurrence of the contracture appear inevitable. The frustration of surgeons with poor results following skin grafting has led to a stream of alternative maneuvers, which have included large local flaps and free flaps, and local or distant flap raising after tissue expansion. Some of these techniques have yielded beautiful results in the literature. However, in the developing world like Morocco, most neck contraction is seen in the setting of very large burn injuries where such flap options are usually limited or nonexistent. A great deal of excitement followed the introduction of the Integra dermal matrix. A material that, when used appropriately, reduces wound contraction by “transforming” a split-skin graft into a full-thickness graft by “creating” a neo-dermis. We present our experience of the use of Integra for burns contracture of the neck and hypertrophic scarring in seven patients at the Burns Unit of Training Military Hospital Mohamed V of Rabat.

## II. Methods

All procedures were performed under general anesthetic. After a povidone-iodine solution wash, Integra was applied following excision of the burn contracture or hypertrophic scar to a depth that ensured placement on a non-scarred and vascularised bed. The Integra sheet was secured with skin staples. The size of the artificial dermis used, although depending upon the size of the wound, was larger than the actual wound size. Perioperative prophylactic antibiotics were prescribed in all cases until the first dressing change. Initial dressings were removed

after 5 days for inspection of the Integra. Patients underwent a twice-weekly dressing check, often with no anesthesia. With signs of neo-vascularisation, the silicone top layer was removed, generally, 3 weeks after the integra placement. A thin split-thickness autograft between 8 and 12/1000th inch thick was harvested, applied, and secured with standard dressings. A single-layer Vaseline gauze dressing was applied and the site was again immobilized. Dressings were removed 3 days after epidermal grafting and an appropriate dressing was applied based on the degree of take of the graft. if the graft was well settled, local lubricating creams were advised and a customized neck collar for 6 months was worn for 23 hours per day. In case of graft loss, the area was resurfaced with autograft or dressed regularly. As soon as the grafts were adherent after 2-3 weeks, an active and resistive dynamic and static self-exercise program was begun. The patients were then asked to attend the outpatient department regularly. During this period the results were evaluated concerning the range of extension and overall cosmetic appearance. The results were assessed and graded in the follow-up period.

### **III. Results**

Seven patients with post-burn neck contracture underwent Integra grafting. The average age was 28 years. The patients comprised 2 males and 5 females. The mean hospital stay was 28 days (range, 26-36 days). The mean follow-up was 24 months. The mean take of the Integra was 90% (range, 80-100%) and of the epidermal graft was 80% (range, 10-100%). Two wound infections occurred due to *Acinetobacter Baumannii* and *Pseudomonas Aeruginosa*, respectively, resulting in 90% and 50% loss of epidermal graft, respectively, and necessitating repeat epidermal grafting in the case of 90% graft loss. In all cases of neck contracture, a good cosmetic result was achieved but recurrence of contracture of over 15 % of the surface area grafted occurred within the follow-up period in all cases. Long-term follow-up photographs show the resulting color and contour six months after Integra use. [fig 1 à 7]

### **IV. Discussion**

The use of Integra for wound management is a two-step process. The placement of the dermal matrix on top of a debrided wound bed, followed by the application of a skin graft. An interval period of three to four weeks is usually required between the two steps to allow ample time for the fibroblasts to proliferate and neovascularization to occur [6]. The wound is ready for skin grafting once the color underneath the silicone layer changes from tan to pink or peach [7]. The superficial silicone layer is then removed in the operating room, and the skin graft is placed. The use of Integra has been evaluated in multiple clinical trials and studies, including randomized controlled trials and prospective clinical trials, for the treatment of life-threatening burn injuries and the reconstruction of scar contractures [8]. Scars of the anterior cervical region are prone to be unusually severe because their skin is rather loose, thin, and thus easily destroyed, the area from the chin to the sternum is a concave flexor surface and the extreme mobility of the neck makes it prone to contracture formation. In our study, Females accounted for 71.4 % of patients. Ahuja [9] also, in his review of the management of burns in the developing world found that females are more prone suggesting that the domestic pattern of life has an important bearing on the problem. Contractures were caused by flame burns, in 85.8% of our patients. Wilson [10] observed that severe contractures are more commonly seen in the developing world, a result of both the widespread use of open fires and the inadequacy of primary and secondary burn care in these countries. 57 % of our patients were operated within a year of burns. The indications for release in our study were limitation of movement (present in all our patients) besides disfigurement, unstable scar, and intolerable subjective symptoms. C. Angrigiani [11] treated 86 patients and the interval from the initial injury to reconstruction was between 6 months and 3 years. In other cases, flaps were used after expansion prostheses for cervical contracture surgery with good results, however, patient follow-up for prosthesis filling was difficult because of the social status of patients. Integra and skin grafting which were used in the majority of cases evaluated also tend to hypertrophy and there was contracture in one of our patients requiring release [ Fig 8]. A review by Waymach [12] of 143 neck release procedures, documented a 17% rate of contracture recurrence following releasing incisions with skin grafting and the use of a neck hyperextension brace for over 1 year. in our series, no infection of the artificial dermis was recorded. high cost reduces the accessibility of artificial dermis use. 85 % of our patients had acceptable neck function and aesthetics after 18 months of rehabilitation. Functional deficit and aesthetic discomfort are also criteria used by Nath [13] to determine post-operative results and scar evolution.

### **V. Conclusion**

The use of skin grafts and Integra represents an evolution in the management of cervical burn contractures mainly in developing countries. it's a simple and effective technique despite its high cost and the risk of contracture recurrence, which implies regular follow-up and intensive reeducation.

#### **Disclosure of interest**

The authors declare that they have no competing interest.

**Figures**



**Figure 1:** Pre-operative neck contracture- frontal and profile view.





**Figure 2:** a/ Integra placement in the defect; b/ appearance 3 weeks after Integra removal; c/ silicone top layer removed.



**Figure 3:** Pre- and post-operative profile view. The post-operative result with a good mentocervical angle.



**Figure 4: Pre-operative severe mentosternal contracture- frontal view. Excisional release and Integra placement**



**Figure 5: Meshing of the graft and graft placement in the defect**



**Figure 6:** Post-op results with good mentocervical angle



**Figure 7:** thin skin graft on thoracoabdominal defect and artificial dermis on cervical defect following the excisional release of burn contracture



**Figure 8:** post-operative result following flap coverage of a cervical scar burn after expansion prosthesis

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