

## Post-Burn Cervical Retraction: 2 Cases and a Survey of the Literature

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### Abstract

### Original Research Article

Burns are still a fairly frequent accident, affecting more children and women in our society. They generally lead to sometimes dramatic functional, aesthetic and psychological after-effects. Treatment in the acute phase, or at a later stage, conditions the patient's image. The neck, however, remains a high-risk area for the development of retractions, due to its anatomy. The skin is thin, the platysma directly subcutaneous, the hypodermis thin, and immobilization difficult. Once the flange has set in, it can be reconstructed using a variety of plastic and reconstructive surgery techniques, in conjunction with physiotherapy. However, the choice of treatment will depend on the quality and quantity of healthy skin tissue available in the neck. Skin grafting gives good results at a distance, when post-operative preventive measures are followed. Local plasty is a simple and effective solution for the treatment of simple localized bridges. Our work is a case study spread over a 2-year period from November 2021 to November 2023, which includes 2 cases of cervical sprains followed up in the plastic and reconstructive surgery and burns department of the Mohammed VI University Hospital in Tangier. Directed wound healing had been the initial treatment in both our patients, with good compliance in patient N2. Moderate and severe cervical sprains (according to Achauer's classification) were found in both our patients. In both patients, the flange had a functional impact, with limited neck extension and deformity of the cervico-chinese angle. Surgical treatment involved skin grafts in the 1st case, and local plasty in the second. Post-operative re-education remains a therapeutic pillar for obtaining satisfactory results.

**Keywords:** Burn, neck, local plasty, grafts, scar.

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## INTRODUCTION

The skin is both a sensory and a vital organ, something we are not necessarily aware of until we are confronted with a burn [1]. It bears the traces of our history, of our parentage. It protects us, differentiates us and puts us in communication with others and the world. Pathological scarring is the most serious complication for burn victims. The results of cervico-facial burns can lead to socio-professional exclusion, functional limitations and psychological suffering [2].

The neck is usually an uncovered part of the body, with considerable mobility. There is a high risk of retraction, particularly due to the presence of the platysma muscle. Immediately subcutaneous, it is highly sensitive to burns and retracts almost systematically [3, 4].

All immediate and correct surgical approaches can reduce scar formation: on the other hand, a rehabilitative program, both physical (compression bandaging) and chemical (silicone, steroids, zinc therapy), can improve scar and surgical outcomes. The surgical approach to pathological scar formation depends on the type of lesion, the anatomical site and the functional or aesthetic damage. It involves skin grafts, local plasty and flaps.

## MATERIALS AND METHODS

A retrospective review about 2 cases of post-burn cervical retraction in the Department of Plastic and Reconstructive Surgery, CHU Mohammed VI, Tangier, from November 2021 and November 2023. It could occur alone or associated to other burn related anomalies, worsening the prognostic and complicating the therapeutic decisions.

## RESULTS

### Epidemiological profile:

#### Case N1:

Patient N°1 is a 12-year-old boy with no previous medical history, victim of a thermal burn by flame in an open space, resulting in 2nd-degree both superficial and deep burn on the antero-superior face of the chest and neck (fig. 1).



**Figure1: Aspect of burns on admission**

The patient underwent a single dressing change at our facility, after which he was lost to follow-up for 1 year. This patient was self-medicating, and resorting to traditional medicine.

Examination revealed a large, thick, elongated scar on the neck, rigidly adhering to the anterosuperior part of the chest, more developed on the left side (Fig. 2).

A mandibular-sternal symphysis appearance according to the Vandenbussche classification:



**Figure 2: Lesion appearance and location**

### Surgical Management

The surgery was delayed 15 months after the burn occurrence day.

Surgery was performed under general anesthesia (GA), with difficulty of intubation given the patient's limited mouth opening.

A scalpel was used to free the scar tissue. Perpendicular to the retraction axis, 2 fingerbreadths below the mandibular margin. Excision of the fibrotic tissue, with opening of the platysma, is performed with Metzenbaum scissors, followed by an electrocautery to a healthy, well-vascularized tissue.

Neck release is verified intraoperatively by mobilizing the neck in extension in step 1 (fig. 3).



**Figure 3: Cervical defect after wide trimming**

After 2 weeks of dressings with protective and antibacterial topics and fatty tulle, we performed a split-thickness skin graft. Given the extent of the cruciate surfaces, we felt that split-thickness skin graft was the best way to cover our patient.

Three grafts were taken from the left thigh, to cover this extensive area. One graft covered the suprahyoid region and two grafts the subhyoid region.



**Figure 4: Intraoperative appearance**

#### **Post-operative follow-up and adjuvant treatment**

The operated patient was massaged with a healing topical and received cervical immobilization with a foam neck brace for 4 months. Compression garments were also prescribed after healing, to limit the appearance of hypertrophic sequelae.

#### **Evolution**

In the short term, the patient developed peripheral necrosis, accompanied by graft lysis and suture loosening (fig. 5).



**Figure 5: Appearance at 15 days' post-surgery**

The patient presented a hypertrophic scar recurrence due to poor compliance with postoperative treatment (Fig. 6).



**Figure 6: Aspect after 60 days of operation**

#### Case N2:

Patient N°2 is a 45-year-old woman with no previous medical history victim of a thermal burn caused by flames, resulting in superficial and deep 2nd-degree burns on the anterior face of the trunk, neck and 2 upper limbs.

#### Initial Burn Management:

The patient was treated at our facility for 4 weeks, with initial management involving directed

wound healing using dressings. She was also fitted with a flexible neck brace throughout her hospitalization to prevent retractive scarring.

After 6 months, the patient presented with a linear retractile scar on the left side. Involvement of two meridians according to the Vandebussche classification.



**Figure 7: Cervical flange appearance**

#### Surgical management

The time between the burn and surgery was 6 months.

Surgery was performed under general anesthesia (GA), her intubation was also complex, for the

limitation of mouth opening necessitated a nasotracheal intubation.

#### Surgical Technique

Local Z or double Z plasty incised along the axis of the retractile scar, skin-fat detachment and transposition to release the retraction (fig. 8).



**Figure 8: Intraoperative view**

**Post-operative follow-up and adjuvant treatment:**

The operated patient was treated post-operatively by corticoid topics, pressotherapy and cervical immobilization with a flexible neck brace for 4

months to prevent from recidivism. Compression garments are also prescribed after healing, in this case a face mask, to limit the occurrence of hypertrophic sequelae.



**Figure 9: Aspect at D30 of the operation**

## DISCUSSION

The scarring evolution of deep 2nd degree burns and skin grafts is subject to inter-individual variability, which makes it difficult to estimate the extent of future sequelae at the acute stage, except for carbonization with damage to the underlying muscular planes.

The fragility of burn victims, who require intensive care that frequently threatens their vital prognosis (organ failure) [5], means that allotransplantation cannot be considered at the acute stage.

If poorly managed, deep burns will progress to retraction, with potentially serious functional, aesthetic and psychological repercussions [2].

As Achauer [6] points out, the treatment of burn sequelae is not an isolated phenomenon that begins after the burned area has healed, but rather a process that starts as soon as the burn victim is admitted to the acute phase, and involves all preventive measures to limit the severity of these sequelae as much as possible. Whether by early excision-grafting or directed healing, followed or not by secondary coverage, the key is to achieve burn healing before 3 weeks, as longer delays are associated with retractive scarring [7].

The patient in our study had followed our protocol for changing dressings and wearing a foam neck brace and compression garments, and these sequelae were less significant than in our patient, who preferred to self-medicate.

Local treatment must always be combined with physiotherapy to combat retraction and improve scar quality.

Moreover, the anterior cervical region combines all the factors conducive to the development of flanges: concavity, thinness of the skin, high mobility, difficulty of immobilization, thinness of the hypodermis in direct relation to the platysma. Immediately subcutaneous, it is highly sensitive to burns and retracts almost systematically [3, 8] Cervical retractions have a direct impact on the face, particularly on the chin and lower labial region.

Certain factors also favors the development of cervical burn retraction in children, namely: an extremely rapid regeneration capacity of the skin covering [9], a cervical skin that is more elastic and thinner than that of adults, and therefore more exposed to retraction [10], and greater mobility and less compliance with wearing a neck brace.

In women, a hormonal role can be envisaged, since studies have shown that estrogen plays a role in regulating certain growth factors released during the healing process.

Several classifications have been proposed in the literature, from that of Texier (1963), who classified cervical retractions into three groups according to the extent of burns [8], to that of Onah [11], who takes posterior cervical flanges into consideration.

But two classifications remain the most widely used by authors: The Lille classification proposed by Vandenbussche in 1978 [12] and that of Achauer 1991 [6].

Our patient had a major, extensive flange according to Achauer and a global retractile neck according to Vandenbussche's coded topographical description.

Our patient had a moderate flange according to Auchauer's classification and a partial (or intermediate) retractile neck according to Vandenbussche's coded topographical description.

Surgical treatment of cervical retractions must respect certain fundamental principles. The first is to restore the cervical-chin angle: this is 90° to 120° in the neutral position, with the hyoid bone at its apex. It thus delimits the two aesthetic and functional units of the neck: the submental unit above the hyoid bone (known as the "horizontal unit" of the neck) and the anterior cervical unit below (known as the "vertical unit") [13, 14].

In the case of a major retractile placard, the treatment of choice is debridement or release of the

placard, combined with skin grafting. Total skin grafting provides the best functional and aesthetic results, due to its lesser retraction, but the loss of substance (LOS) resulting from the release must not be too great [15,16]. As in the case of our patient, who benefited from this approach but with a semi-thick skin graft. Early excision represents the ideal treatment for deep cervical burns. According to Mimoun, early excision grafting (EGP) halves the duration of epidermization compared with local treatment alone [17].

Local plasty is the treatment of choice for localized flanges [18]. They are a simple and effective means of treating linear flanges, or retractions at a junction between healthy and pathological skin, using transposition or translation skin flaps.

The most commonly used autoplasties are Z-plasties and derivatives such as the trident plasty, VY-plasties and IC flaps. They allow the scar to be increased in length and broken up to achieve better aesthetic integration within the region concerned. These procedures can be used in combination, resulting in functional improvement without providing additional healthy skin [7].

In our patient, we performed a double Z-plasty.

Excision of the skincier.

As Texier advises, the skincier was excised in all cases operated on.

It is certain that excision of this muscle in older lesions and its wide horizontal incision in more recent lesions enable better hyper-extension of the head and a better defined cervicomental angle to be achieved [19].

## CONCLUSION

Burns, especially thermal ones, remain a fairly frequent domestic accident, affecting more children and women in our society. They generally lead to sometimes dramatic functional, aesthetic and psychological consequences. Treatment in the acute phase, or at a later stages, conditions the patient's prognostic.

The neck, however, remains a high-risk area for the development of retractions, due to its anatomy. The skin is thin, the platysma directly subcutaneous, the hypodermis thin, and immobilization difficult.

Once the retractive scar has set in, it can be treated using a variety of plastic and reconstructive surgery techniques, in conjunction with physiotherapy.

However, the choice of treatment will depend on the quality and quantity of healthy skin tissue available in its surrounding. Skin grafting gives good results, when post-operative preventive measures are

respected. Local plasty is a simple and effective solution for the treatment of simple localized retractions.

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