

Availability of Reduction Mammoplasty for Neck Burn Scar Contracture in Women

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ABSTRACT

Severe scar contracture can easily occur after a burn injury in the neck region, resulting in a functional decline that affects daily living. Because a hard scar tissue in the neck widely extends into the anterior chest wall in patients with severe burns, excessive forces should be exerted to extend the neck. We found that the impact force by the weight of the breast sometimes intensifies contracture tendency and leads to the recurrence of the contracture in women. To date, medical reports have paid little attention to this. We performed reduction mammoplasty on 3 female patients with neck burn scar contractures before the release of neck scar. About 200 g of tissue were removed from each breast according to the McKissock technique. In 1 case, the skin was moved to the axilla as a skin flap to release the contracture. The remaining neck scar contracture was then reconstructed with a local flap or free flap. In all 3 patients, mammoplasty and neck reconstruction were performed without complications and with good results. No recurrence of contracture occurred. Reduction mammoplasty in advance reduced the level of neck scar contracture and allowed for a variety of reconstruction options, including local skin flaps, and was also effective in preventing postoperative recurrence.

KEY WORDS: *Contracture release, McKissock technique, Reconstruction*

INTRODUCTION

Neck burn scar contracture is a common complication after severe burn injury. Severe neck contracture limits activities of daily living, such as speech and eating; it frequently leads to the inability to close the mouth, drooling, and poor oral hygiene.^{1,2} Various reconstructive methods such as skin grafting, Z-plasty, local flaps, and pedicled or free skin flaps have been developed for the treatment of neck scar contracture and deformity.¹⁻⁸

Conversely, we found that the impact force by the weight of the breast sometimes intensifies the neck contracture and leads to contracture recurrence after reconstruction in women, whether the breast was affected by burns or not and regardless of which type of surgical procedure was performed. To date, however, the medical literature has paid little attention to this. We performed reduction mammoplasty before the procedure for neck contracture release; reduction mammoplasty allowed contracture reduction and prevention of contracture recurrence.

CASE REPORT

Patient 1

A 35-year old woman had a flame burn with 35% of total body surface area (TBSA), including the face, neck, anterior chest wall, both breasts, both upper limbs, and abdomen. All wounds were treated using skin grafting 4 times and healed. However, subsequent severe neck contracture accompanied by mentosternal adhesion led to her inability to close the mouth (Figure 1, A and B). Full-thickness skin grafts for the lower lip (at 6 months after injury) and free latissimus dorsi musculocutaneous flap transfer for the neck (at 10 months after injury) were applied. Although the neck contracture improved, it gradually recurred. Another attempt to treat the contracture was conducted by applying skin grafts to the chin, 1.5 years after injury, but contracture recurred, and neck extension was inhibited.

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The patient's contracture improved when the patient was kept in the supine position or the breasts were supported with underwear. In addition, when breasts were supported, this allowed neck extension. We compared the position of the breasts before and after skin grafting for the chin by photographs; the breasts obviously dropped postoperatively (Figure 1C). We concluded that the weight of the breasts was the reason for recurrence of the contracture.

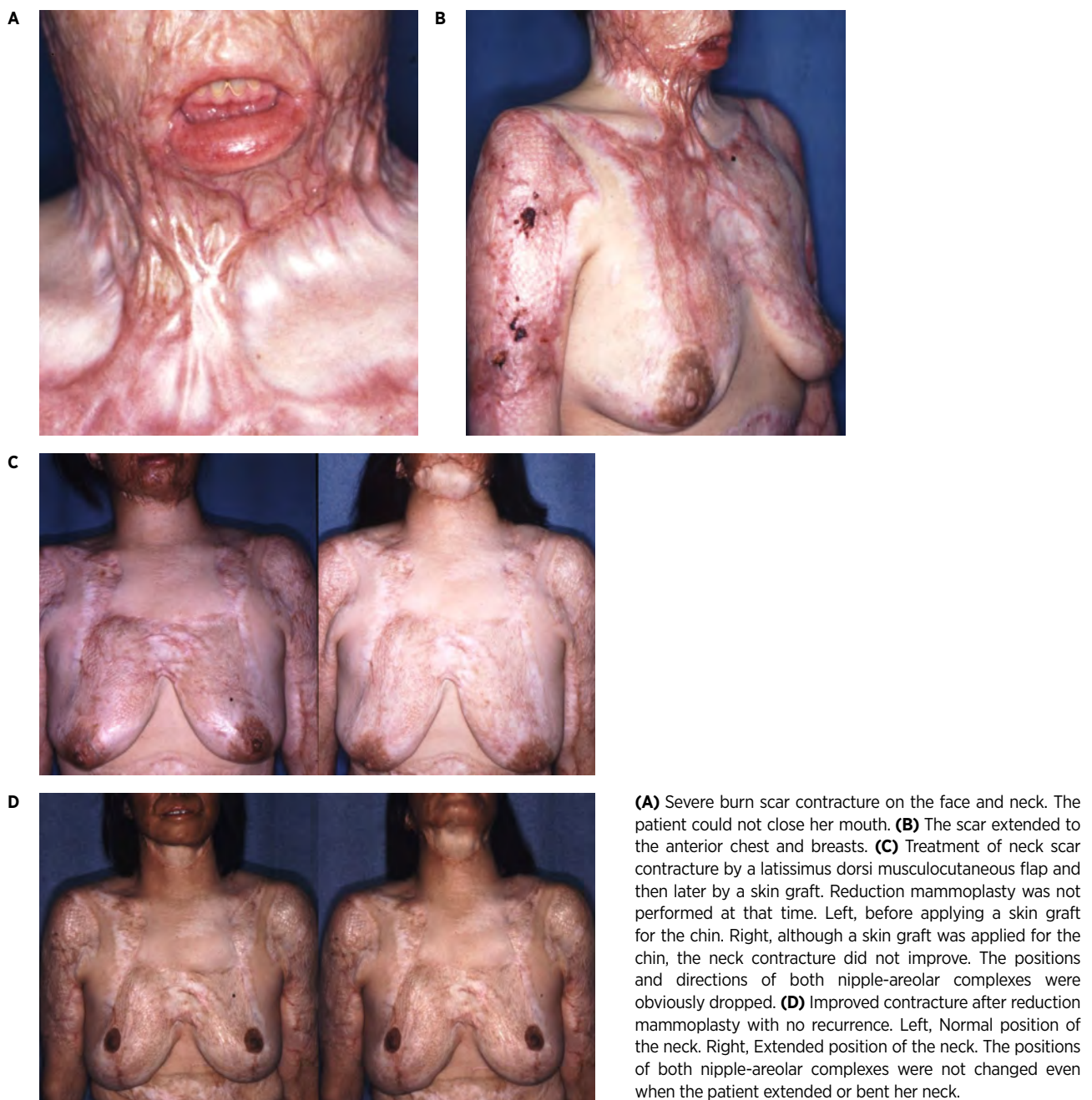
Reduction mammoplasty using the McKissock technique was performed; 220 g and 230 g were removed from the left

and right breasts, respectively. Afterward, the contracture improved, and no recurrence appeared within a 10-year postoperative follow-up (Figure 1D).

Patient 2

An 81-year old woman had a flame burn with 14% of TBSA, including the face, neck, and right upper limb. Injuries of the anterior chest wall and breasts were averted. Debridement and split-thickness skin graft (STSG) procedures were performed on the neck 18 days after injury; severe scar contracture later occurred. Although the

FIGURE 1. Patient 1: 35-Year-Old Woman With 35% of Total Body Surface Area Burn Injury

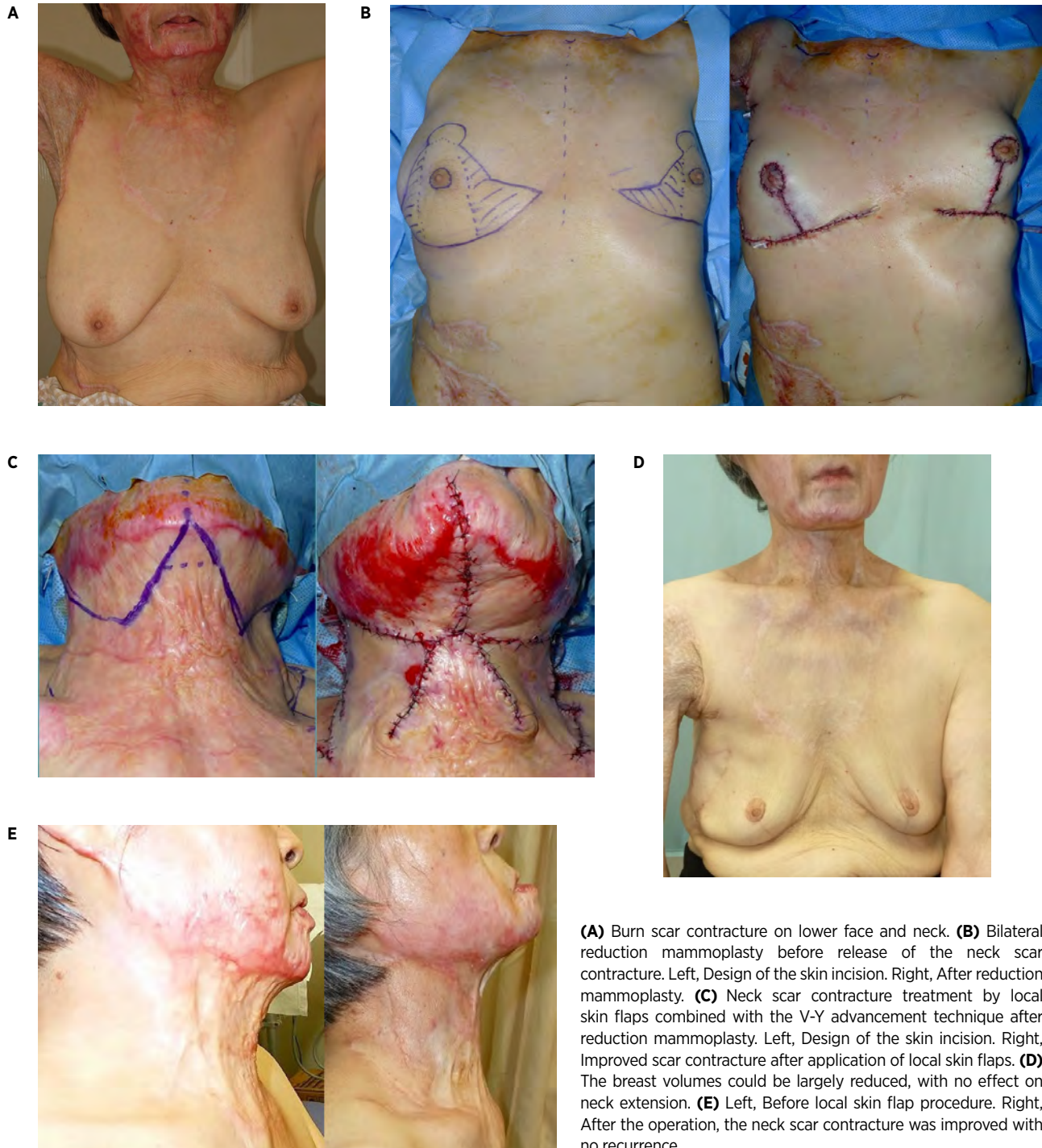


patient did not have an injury to the anterior chest wall, the breasts remarkably dropped because of advancing age, and the degree of the contracture increased (Figure 2A). When the breasts were supported with underwear, the contracture remarkably improved.

The patient received simultaneous bilateral reduction mammoplasty and skin grafting to release the axillary

contracture in an attempt to release the neck scar contracture; 250 g and 240 g were removed from the left and right breasts, respectively, using the McKissock technique (Figure 2B). The neck scar contracture improved and could be treated with local skin flaps combined with the V-Y advancement technique at a future date (Figure 2C). The patient had no recurrent neck contracture during a 3-year postoperative follow-up (Figure 2, D and E).

FIGURE 2. Patient 2: 81-Year-Old Woman With 14% of Total Body Surface Area Burn Injury



(A) Burn scar contracture on lower face and neck. **(B)** Bilateral reduction mammoplasty before release of the neck scar contracture. Left, Design of the skin incision. Right, After reduction mammoplasty. **(C)** Neck scar contracture treatment by local skin flaps combined with the V-Y advancement technique after reduction mammoplasty. Left, Design of the skin incision. Right, Improved scar contracture after application of local skin flaps. **(D)** The breast volumes could be largely reduced, with no effect on neck extension. **(E)** Left, Before local skin flap procedure. Right, After the operation, the neck scar contracture was improved with no recurrence.

Patient 3

A 37-year old woman had a flame burn with 26% of TBSA, including the neck, chest, abdomen, and both upper limbs. Debridement and STSG were performed 4 times, and all of the wounds healed. However, severe extensive contracture appeared in the neck and anterior chest wall (Figure 3A). Contracture remarkably improved when the breasts were supported with underwear.

We performed bilateral reduction mammoplasty before the release of the neck scar contracture; 210 g and 200 g were removed from the left and right breasts, respectively, and sutured using rotation flaps. Some of the skin area of the breasts was simultaneously elevated as local skin flaps were transplanted, resulting in a skin defect after both folds

of the axillary contracture were released (Figure 3B). The neck scar contracture was treated with free anterolateral thigh flap 10 months after the reduction mammoplasty; the patient had a good recovery with no recurrence during a 5-year postoperative follow-up (Figure 3, C and D)

DISCUSSION

A skin graft is the most popular technique for treating neck burn scar contracture.^{2,3} In addition, Z-plasty and local flaps can be used for minor contracture⁴⁻⁶; pedicled or free skin flaps are used for severe or extensive contracture.^{1,7} Furthermore, various thin flaps have recently been developed, resulting in improved aesthetical quality.⁸ Other well-examined strategies for neck burn scar contracture have also been reported.^{9,10} However, the medical literature

FIGURE 3. Patient 3: 37-Year-Old Woman With 26% of Total Body Surface Area Burn Injury



has paid little attention to the influence of the impact force by the weight of the breast on neck contracture. To our knowledge, there have been some cases where contracture could be improved by skin grafting or skin flaps, but contracture repeatedly occurred. We found that tendency for recurrence in women is higher.

As described in patient 1, neck contracture in women can improve when the patient is in a supine position or when the breasts are supported with underwear. When the breasts were supported, the neck could be extended. In addition, once the neck contracture was released by skin graft or various skin flaps, contracture recurred, and the breasts just dropped again. Dropping of the breasts can occur regardless of whether they are affected by burn injury. Thus, we concluded that the effect of the breasts should be assessed by the degree of the contracture when underwear is supporting the breasts or when the patient is in a supine position. The decision to perform reduction mammoplasty should be made before or when releasing the neck contracture.

With regard to reduction mammoplasty, various techniques, including inferior, lateral, superior, and medial pedicle patterns, have been developed as a single pedicle or bipedicle flaps, considering vascular reliability.¹¹⁻¹⁵ There are also diverse incision designs and resulting scars; when we perform reduction mammoplasty on a patient, we determine the technique by considering the sufficient amount of volume of the adipose tissue to be removed, the ease of the procedure, and the length of the operation time. Moreover, consideration should also be given to the compromised vascular reliability of the breast skin if burn injuries and scars occur.¹⁶⁻¹⁸

Risk of poor blood circulation includes necrosis of the flap and nipple-areolar complex and poor wound healing. Some reports have indicated points to be noted when performing reduction mammoplasty for postburn breast deformities.^{17,18} Making the pedicle as wide and safe as possible helps to preserve maximum blood supply. Limited undermining of the deep layer secures blood flow.¹⁶ Although we usually use the McKissock technique for our patients, techniques should be used properly, depending on each situation and degree of contracture, injured body surface area, and volume of the breasts. In addition, most patients also have postburn scar contractures on other adjacent body surface areas, such as the anterior chest wall or axillae. We recommend that the skin removed by reduction mammoplasty can be used as a skin flap or skin graft when these scars are released simultaneously.

The weight of large breasts in patients 2 and 3 made the contracture worse. Thus, we first performed reduction mammoplasty and then released and reconstructed the

neck scar contracture. In patient 2, we estimated that the skin defect after the release of the neck contracture would become large, and some type of free flap would be required first. However, the contracture degree was greatly reduced after reduction mammoplasty. Hence, we used only local skin flaps to achieve a satisfactory result. This indicates that the selection of surgical methods can be extended, and a minimally invasive method can be useful when reduction mammoplasty is performed earlier than the scar contracture release. In patient 3, some of the skin, which was planned to be removed by reduction mammoplasty, could be used as a local skin flap and transplanted to the resulting skin defect after releasing both folds of the axillary contracture simultaneously. Therefore, we recommend using the excess skin resulting from reduction mammoplasty effectively.

CONCLUSIONS

We concluded that severe scar contracture in the neck and anterior chest wall easily recurred once the contracture was completely released and reconstructed. This tendency is shown in women, with dropping of the breasts considered as the cause. In conclusion, a combination of reduction mammoplasty and neck contracture release seemed to be effective to prevent recurrence of the contracture, and surgery for neck scar contracture could be minimized in some cases.

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