

# Evaluation of the effectiveness of the occipitocervicothoracic flap with distal microsurgical supercharging in reconstruction of post-burn chin-neck scar sequelae

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## Summary

**Objective:** To evaluate the effectiveness of the occipitocervicothoracic flap with distal microsurgical supercharging in reconstructing post-burn scar contractures in the chin-neck region. **Subject and method:** A combined prospective and retrospective cross-sectional study was conducted on five patients with post-burn chin-neck scars who underwent reconstruction using this supercharged flap at the National Burn Hospital from February 2020 to October 2025. **Result:** The mean flap length was 21.8cm and the mean width 6.4cm. All flaps survived completely with primary healing. Donor site healing averaged 20 days, while recipient site healing averaged 14.5 days. Most patients achieved good early outcomes, and all had good long-term outcomes. **Conclusion:** The occipitocervicothoracic supercharged flap is a highly safe and reliable option for reconstructing chin-neck post-burn scar sequelae.

**Keywords:** Occipitocervicothoracic flap, distal microsurgical supercharging, burn scar reconstruction.

## I. BACKGROUND

To date, several studies have been conducted on the treatment of burn scars in the chin and neck area using skin grafting, local flaps, distal skin flaps, free flaps, etc. However, these methods have not achieved high effectiveness due to the incompatibility of the skin surface and/or insufficient length to cover the defect. For example, skin grafting can cover a large defect, but the color and structure of the grafted skin piece are often not similar to the recipient area; using a tissue expansion flap requires a skin expansion bag and is time-consuming and expensive to perform; using a local flap can ensure similarity in color and skin structure, but is not sufficient in length to cover the defect<sup>1, 2, 3, 4</sup>.

Based on the above characteristics, when researching the treatment of burn scars in the chin

and neck area, surgeons and researchers aim to use a local flap with distal microvascular anastomosis. This flap not only ensures similar skin quality but also provides sufficient length and width to cover the defect after scar excision surgery.

Currently, reports on microsurgical anastomotic occipitocervical pedicle "ultrathin" flaps with narrow pedicles in Vietnam only cover occipitocervical-dorsal "ultrathin" flaps, while there are no separate reports on occipitocervical-thoracic "ultrathin" flaps with narrow pedicles. Therefore, we conducted this study with the aim of evaluating the effectiveness of applying a distal microsurgical anastomotic occipitocervical flap in reconstructive surgery for burn scars in the chin-neck region, hoping to contribute to the information base for optimizing clinical decisions..

## II. SUBJECT AND METHOD

### Study Population:

Patients with chin-neck post-burn scars requiring reconstruction with the

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occipitocervicothoracic supercharged flap (Feb. 2020 – Oct. 2025) at the center of Plastic, Aesthetic and Reconstructive Surgery, National Burn Hospital, from February 2020 to October 2025.

**Inclusion Criteria:**

Patients with long chin and neck scars that cover the entire length of the chin cannot be treated with conventional reconstructive surgery methods such as using local flaps, direct excision and suture, tissue expansion, etc.

Adequate health for surgery.

Healthy, intact donor-site skin.

**Exclusion Criteria:**

Comorbidities contraindicating surgery.

Anesthesia contraindications.

Patient refusal.

**Study Design:**

Descriptive cross-sectional (prospective + retrospective).

**Variables:**

Age and gender.

Size of the occipitocervical-dorsal fasciocutaneous flap with microvascular anastomosis at the distal end.

Condition of the flap after rotation and reconstruction of the chin-neck lesion.

Condition of the donor site.

Time to wound healing.

Post-operative outcome assessment.

Patient's subjective assessment of function and aesthetics.

Relationship of burn sequelae to work before and after surgery.

Data processing: SPSS 26.0 medical statistical software.

### III. RESULTS

The study was conducted on 5 patients, including 1 female and 4 males. One male patient was 16 years old and one was 55 years old, while the remaining patients were between 22 and 24 years old.

**Table 1. Dimensions of the occipitocervical-dorsal fasciocutaneous flap with distal vascular anastomosis**

| Parameter          | Value |         |         |
|--------------------|-------|---------|---------|
|                    | Mean  | Minimum | Maximum |
| Flap length (cm)   | 21.8  | 20      | 23      |
| Flap width (cm)    | 6.4   | 5       | 7       |
| Pedicle width (cm) | 4.8   | 4       | 5       |

Comment: A occipitocervical-thoracic flap with microsurgical vascular anastomosis at the distal end can reach up to 23 cm in length and 7 cm in width while remaining safe to use.

**Table 2. Flap Viability After Inset**

| Flap Status                        | Number | Percentage (%) |
|------------------------------------|--------|----------------|
| Complete survival, primary healing | 5      | 100            |
| Partial ischemia/necrosis < 1/3    | 0      | 0              |
| Necrosis > 1/3 or total loss       | 0      | 0              |
| Total                              | 5      | 100            |

Comment: Follow-up immediately after surgery and until the day the sutures are removed shows that 100% of cases have a completely viable flap.

**Table 3. Donor Site Outcomes**

| Features        | Direct Closure | Combined with autologous skin grafting | Total |
|-----------------|----------------|----------------------------------------|-------|
| Primary healing | 3              | 2                                      | 5     |
| Second surgery  | 0              | 0                                      | 0     |

*Comment:* All flaps healed in the prophase stage after surgery.

**Table 4. Wound Healing Time**

| Incision healing time (days) | Minimum | Maximum | Mean |
|------------------------------|---------|---------|------|
| Donor site                   | 26      | 12      | 20   |
| Recipient site               | 16      | 12      | 14.5 |

*Comment:* The average wound healing time for the donor site is 20 days, while for the recipient site it is 14.5 days.

**Table 5. Postoperative Outcomes**

| Outcome        | Short-term results |      |      | Long-term results |      |      |
|----------------|--------------------|------|------|-------------------|------|------|
|                | Good               | Fair | Poor | Good              | Fair | Poor |
| Number         | 4                  | 1    | 0    | 5                 | 0    | 0    |
| Percentage (%) | 80%                | 20%  | 0%   | 100%              | 0%   | 0%   |

*Comment:* The majority of patients had good outcomes in the short term, and all patients had good outcomes in the long term after surgery.

**Table 6. Patient Satisfaction (Function & Aesthetics)**

| Assessment    | Short-term results |           | Long-term results |           |
|---------------|--------------------|-----------|-------------------|-----------|
|               | Function           | Aesthetic | Function          | Aesthetic |
| Satisfied     | 5                  | 4         | 5                 | 5         |
| Acceptable    | 0                  | 1         | 0                 | 0         |
| Not satisfied | 0                  | 0         | 0                 | 0         |
| Total         | 5                  | 5         | 5                 | 5         |

*Comment:* All patients were satisfied with the functional outcome in the short and long term. The majority of patients were satisfied with the cosmetic outcome after surgery in the short term, and all patients were satisfied with the cosmetic outcome in the long term.

**Table 7. Occupational Impact After Surgery**

| Status         | Job               |             |                |
|----------------|-------------------|-------------|----------------|
|                | Keep your old job | Changed job |                |
|                |                   | Another job | Quit one's job |
| Before surgery | 5                 | 0           | 0              |
| After surgery  | 5                 | 0           | 0              |

*Comment:* All patients showed no change in their ability to work after surgery.

#### IV. DISCUSSION

Regarding flap size:

The maximum size of the flap that can be achieved within safe limits depends on many factors such as the size of the vascular pedicle, perfusion pressure in the lumen, flap location, vascular pedicle supply area... In the study of author Nguyen Gia Tien with distal vascular anastomosis [5], the length of the flap can reach up to 27.5cm and the width can reach 5.5cm, in this case the skin flap survives well. Other authors such as Ono, Vu Quang Vinh, Noda and colleagues [6][7][8] also gave similar results with flaps achieving good length.

In our study, the average flap length achieved was 21.8 cm, maximum 23cm; average flap width 6.4 cm, maximum 7 cm. The flap achieved good length, which can provide enough material to cover long defects, especially defects after total excision of the chin scar. The use of a distal vascularized fasciocutaneous flap is more effective than delayed flaps or simple occipitocervical flaps because the flap is longer, has good viability, and can be designed with a narrower pedicle; the mid-flap area can be further thinned by removing the subcutaneous fat layer during the first surgery. Because the pedicle is narrow, flap rotation is easier, the range of rotation is wider, and there is less bulging at the base of the flap.

The proposed idea of enhancing the blood supply to the distal end of a skin flap using distal vascularization is highly effective in expanding the size of the flap. The results of using a distal vascularized occipitocervical flap are evident, with 5 out of 5 cases achieving good results, demonstrating the high safety and reliability of this method.

Immediately after surgery and until suture removal, 100% of the flaps were completely viable.

Two-thirds of patients required autologous skin grafting. The reason is that the flap is too large, and the skin at the donor site has poor elasticity, making it impossible to separate and close the two edges of the skin at the donor site, potentially causing nipple retraction. Therefore, a thin layer of autologous skin

from the thigh must be grafted onto the remaining area. In all cases, the flaps survived well. The average wound healing time for the donor site is 20 days, and for the recipient site is 14.5 days.

Regarding surgical results:

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Post-operative outcome evaluation:

Most patients had good outcomes in the short term, and all patients had good outcomes in the long term after surgery. Functionally, we observed significant improvement in chin and neck movements; patients were no longer restricted from tilting their chin and neck to one side. Aesthetically, there was a clear improvement; keloid, hypertrophic, and fibrotic scars were removed and replaced with a flat, soft skin flap that matched the surrounding skin color. Good functional and aesthetic results accounted for the majority, with the remainder being average, and no cases had poor results.

All patients were satisfied with functional outcomes in the short and long term. The majority of patients were satisfied with the aesthetic results in the short term, and all patients were satisfied with the aesthetic results in the long term.

All patients showed no change in their ability to work after surgery. Since all the patients in the study

were of school age, there was almost no change in their ability to work. One 55-year-old patient, a farmer, also experienced no change in occupation after surgical treatment.

## V. CONCLUSION

Based on a study of 5 patients with residual burn scars in the chin and neck area who underwent surgery using a occipitocervical-thoracic flap with distal vascular anastomosis at the center of Plastic, Aesthetic and Reconstructive Surgery, National Burn Hospital, from February 2020 to October 2025, we draw the following conclusions:

The average flap length was 21.8 cm and the average flap width was 6.4 cm.

All flaps were completely viable and healed proximally after surgery. The average wound healing time for the donor site was 20 days, and for the recipient site was 14.5 days.

The majority of patients had good short-term results, and all patients had good long-term results after surgery.

All patients were functionally satisfied both short-term and long-term. The majority of patients were satisfied with the aesthetic results in the short term, and all patients were satisfied with the aesthetic results in the long term.

All patients showed no change in their ability to work after surgery.

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