

Double right triangular shape full-thickness skin grafts technique for short rectangular or square shape donor site defect – original method with a case report

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Summary

Full-thickness skin grafts are essential tools for reconstructive surgery. Rectangular or square secondary defect usually occurs after performing a cross-finger flap or homodigital island flap. With the traditional fusiform ellipse design, trimming out excess graft tissue is necessary. Double right triangular shape full-thickness skin grafts are designed to correct the problem.

Key words

full-thickness skin graft – double – right triangular – secondary skin defect

Kosiyatrakul A, Luenam S. Double right triangular shape full-thickness skin grafts technique for short rectangular or square shape donor site defect – original method with a case report. Acta Chir Plast 2024; 66(1): 24–26.

Introduction

In the process of soft tissue reconstruction such as coverage of a fingertip injury with a cross-finger flap, reverse homodigital island flap, or heterodigital island flap can result in a short rectangular or a square shape donor site defect, which must be treated with a full thickness skin graft [1].

A 3 : 1 ellipse is the standard design for harvesting the full-thickness skin graft to cover the defect of the flap donor site [1]. Trimming out excess graft tissue is a routine procedure during suturing of the graft to the flap donor site. Thus, some part of the donor skin is wasted.

For instance, with a 3 : 1 ellipse design for a 2×2 cm² square shape skin defect of the flap donor site, the length and width of the full-thickness skin graft should be 6 and 2 cm, respectively. Both ends of the graft are trimmed to fit the

defect. With the principle of “donor skin-sparing full-thickness skin graft” described by Lane and Syming [2] or “full-use of donation” described by Wang et al. [3], a simple parallelogram design that converts to two right triangles can reduce the length and width of the graft to 4.50 and 1.50 cm, respectively. Trimming the graft is not necessary with this technique.

Description of the case

A 71-year-old male patient sustained a traumatic volar oblique amputation of the left thumb. A dorsal proximal phalangeal heterodigital island flap was performed for covering the thumb pulp defect leaving a dorsal rectangular skin defect in the left index finger.

For a defect at the dorsum of the finger, the width and length of the defect are measured. A parallelogram is drawn

on a paper to make a template for the full-thickness skin graft. The base length and height of the parallelogram are equal to the length and width of the defect, respectively. This parallelogram is composed from two identical right triangles. According to the template, the parallelogram and its shorter diagonal are drawn in an area of the prepared donor site for the full-thickness skin graft. Notice that the shorter diagonal line divided the parallelogram into two right triangles.

Full-thickness skin graft is harvested, and the donor site is closed. The graft is then defatted as needed and separated along its shorter diagonal to create two right triangular shape grafts. These grafts are joined at their hypotenuse to form a square or rectangular shape full-thickness skin graft and then sutured in place. Tie-over dressing is used to secure the graft in its place. The details of pre-

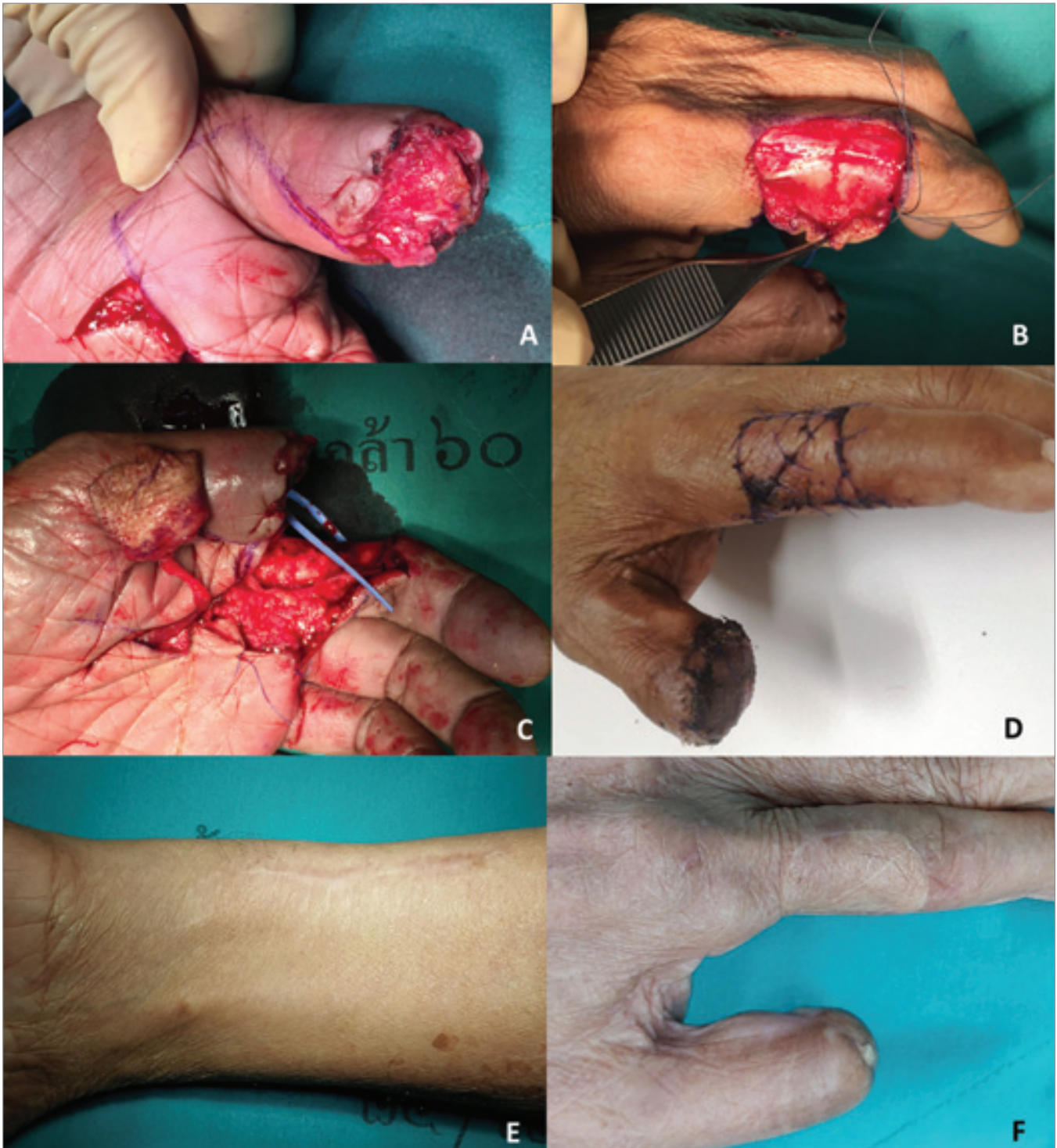


Fig. 1. A) A 72-year-old male patient with left thumb pulp loss. B) Secondary defect at the dorsal aspect of left index finger after dorsal proximal phalangeal heterodigital island flap harvesting. C) The flap receives blood supply from radial digital artery. D) The secondary defect is covered with double right triangular full-thickness skin grafts. E) Full-thickness skin grafts donor site at 2 years after surgery. F) Recipient site at 2 years after surgery.

sented case are demonstrated in Fig. 1. The principle of the double right triangular shape full-thickness skin grafts is shown in Fig. 2.

Discussion

Cross-finger flap, reverse homodigital island flap, and heterodigital island flap are used in the repair of a volar oblique

fingertip defect with the bone exposed. These procedures can result in a short rectangular or a square shape secondary defect in the donor finger. A full-

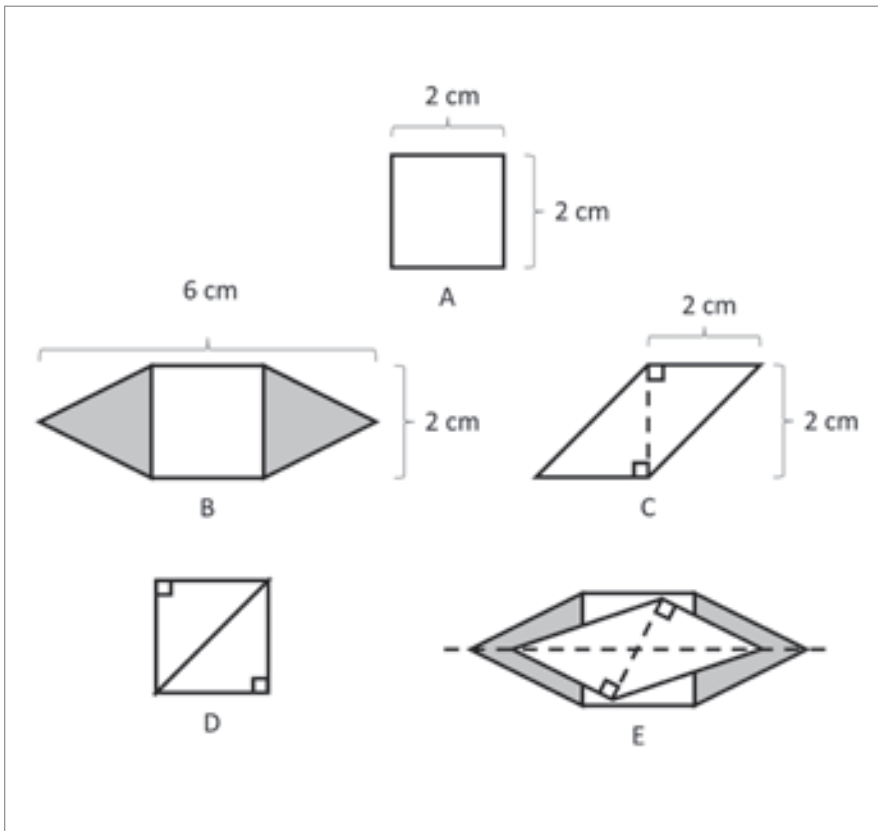


Fig. 2. A) A 2×2 cm² square shape soft tissue defect. B) Gray areas demonstrate the wasted part of a conventional full-thickness skin graft technique. C) Parallelogram shape full-thickness skin graft, dash line represents shorter diagonal for creation of double right triangular shape skin grafts. D) Combining two grafts create a square shape graft. E) Comparing the graft size between the conventional and the present technique.

-thickness skin graft is required for coverage of the secondary defect. The graft can be taken from the same limb or over the iliac crest [1]. To prevent the dog ear formation in the donor site after harvesting of the graft, a 3 : 1 fusiform donor skin graft is designed. However, the excess skin at both ends of the graft are discarded. Double right triangular shape full-thickness skin grafts technique was designed to correct the problem. However, extra sutures are needed to combine the two graft pieces.

The Burow's graft is a full-thickness skin graft harvested from the skin adjacent to the primary defect. This graft provides color and texture match to

the recipient skin. However, it may not be appropriate if applied on the finger [4].

For a circular defect, Lane and Symington suggest an alternative method in which the width of the fusiform graft is as small as the radius of the defect. The graft is then bisected at an angle between 15° and 25° to the short axis and placed into the defect [2]. Wang et al. used a mathematical formula to design a smaller donor incision. The width and length of donor skin are equal to 2/3 and 3/2 of the diameter of the primary defect, respectively. The graft is cut along to create two identical triangles before placement on the recipient site [3].

Conclusion

Double right triangular shape full-thickness skin grafts technique is a simple graft harvesting procedure for a square or short rectangular shape defect without wasting harvested tissue. The donor site skin defect can be reduced up to 50% when compared to the conventional method. According to the 3 : 1 principle, the donor site of the graft can close without the dog ear formation. However, extra sutures are needed to combine the two graft pieces.

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The authors listed above contributed equally to this article.

Disclosure: The authors have no conflicts of interest to disclose. The authors declare that this study has received no financial support. All procedures performed in this study involving human participants were in accordance with ethical standards of the institutional and/or national research committee and with the Helsinki declaration and its later amendments or comparable ethical standards.

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Submitted: 4. 10. 2023

Accepted: 28. 2. 2024