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CASE REPORT

# Atypical arteriole anastomoses for fingertip replantations under digital block<sup>☆</sup>

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## KEYWORDS

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**Summary** Reconstructive microsurgery is now in a new stage of supermicrosurgery. With this technique, very tiny (0.3 mm) vascular anastomoses are possible. In this paper, we describe two cases of successful fingertip replantations employing arteriole (terminal branch of digital artery) anastomoses, the arteriole graft being obtained from the same fingertip defect, reverse arteriole flow to subdermal venule, and delayed venular drainage for venous congestion. These atypical tiny vascular anastomoses were successfully carried out under digital block.

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To date, many papers have reported on distal finger replantation.<sup>1–7</sup> However, there have been no reports on fingertip replantations with anastomosing arterioles (terminal branch of the digital artery) and venules. Fingertip amputation at the arteriole level distal to the digital arterial arch, has not yet been indicated for surgical

replantation, because of the difficult re-establishment of both arteriole and subdermal venule systems. With the recent development of supermicrosurgery, these distal tiny branches (arterioles of 0.3 mm) of the digital artery and drainage system with subdermal venules can be anastomosed with or without vein grafts under a digital block.

In this paper, successful fingertip replantations with atypical terminal vessel anastomoses are described. This is the first successful report on the fingertip replantations under digital block with the use of reverse arterial inflow of tiny arteriole, arteriole venular anastomosis using arteriole graft, and also delayed establishment for subdermal venular drainage.

<sup>☆</sup> This work was presented in part at the 47th Annual Meeting of the Japanese Society of Plastic and Reconstructive Surgery, in Tokyo, on 7 April 2004, and the 8th International Course on Perforator Flaps in Sao Paulo, on 6 September 2004.

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## Case reports

### Case 1: arteriole venular anastomosis and arteriole graft for venous drainage

A 47-year-old man sustained complete amputation of the left middle finger at the level of the nail bed. Replantation was performed under digital block. After exploring the defect, it was found that the digital arterial arch was preserved and four arterioles derived from the arch were transected. Therefore, two arterioles (terminal branch of digital artery, 0.3 mm each) in the proximal finger were anastomosed to the distal arteriole and the palmar subdermal venule in the volar aspect. The other distal subdermal venule (0.3 mm) was joined to the proximal subdermal venule in the ulnar aspect with an arteriole graft, which was one of the proximal four arterioles in the proximal stump. All vascular anastomoses were performed with 11/0 nylon with a 50-micron needle.

Postoperatively, the fingertip survived completely without any venous congestion or arterial insufficiency (Fig. 1).

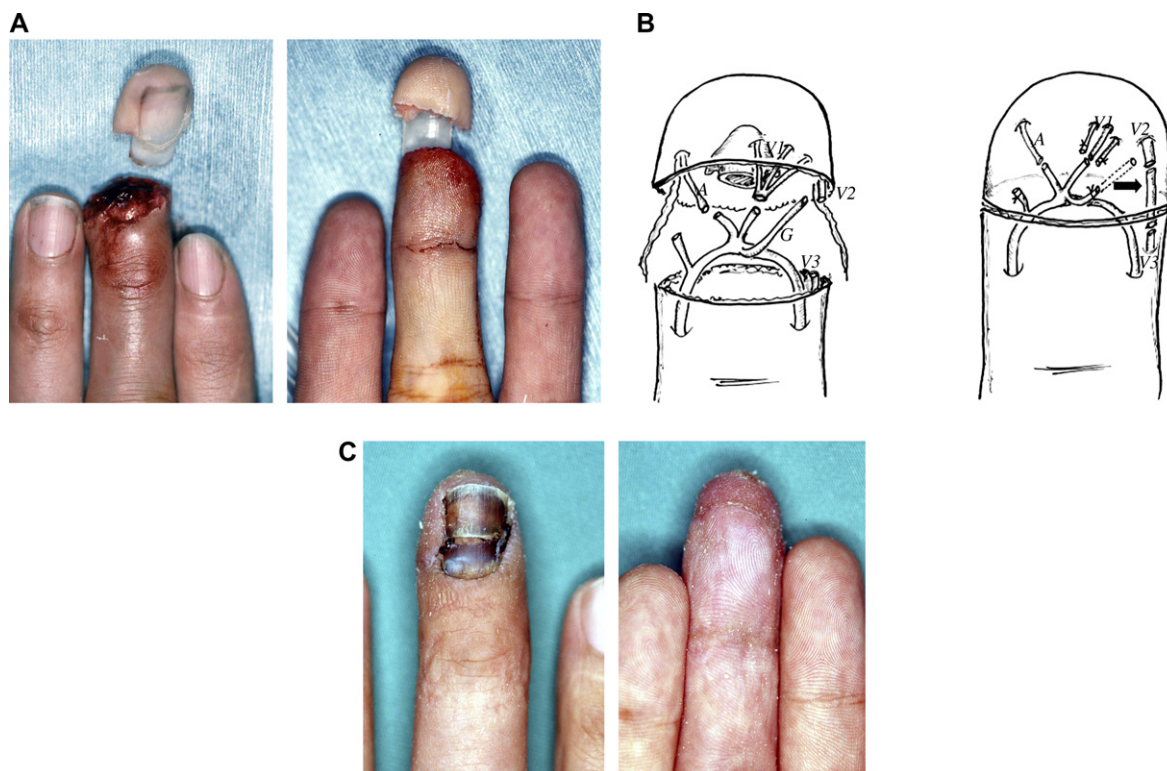
### Case 2: reverse flow of arteriole to venule and delayed venous drainage

A 28-year-old man sustained traumatic amputation of the left little finger at the level of distal interphalangeal joint

due to strong avulsion. The finger was attached only by the flexor tendon and the ulnar digital nerve, and the finger had no blood flow.

Replantation was performed under a digital block. As the ulnar digital artery was severely damaged as well as the ulnar digital nerve, it could not be used as a feeder for arterial inflow of the replanted finger. The radial digital artery was obstructed in a long length by thrombosis. Therefore, the tiny branch (arteriole, 0.3 mm in diameter) of the radial digital artery was transected to anastomose the distal subcutaneous venule as a source of reverse arterial inflow. However, as there was very little arterial inflow, little dermal bleeding of the replanted finger was detected after vascular anastomosis using 11/0 nylon with a 50-micron needle. Unfortunately, no other venule bleeding could be detected in the replanted finger. Therefore, no venous anastomosis could be achieved in the primary surgery. The replanted finger was pale and there was little bleeding with a pinprick test.

The next day after the primary replantation, the replanted finger was congestive and re-exploration was carried out under a digital block. As dilated subdermal venules were easily detected in the congestive distal replanted finger, venous drainage with a vein graft was achieved between the distal and proximal subdermal venules on the dorsal aspect of the finger. The vein graft (0.5 mm in diameter and 10 mm in length) was obtained from the dorsal foot under local anaesthesia.



**Figure 1** (A) Case 1. A 47-year-old man with the fingertip amputation of the left middle finger. Left: dorsal view. Right: volar view. (B) Left: preoperative schema (volar aspect). All the terminal arterioles and venules were completely transected at the distal end of the digital arch. A, distal side of the anastomosed terminal arteriole; V1, distal terminal venule used for arteriovenous anastomosis; G, terminal arteriole used as a graft for venous drainage between both venules (V2, V3). Right: after the completion of vascular anastomoses. The terminal arteriole (G) was grafted for venous drainage (V2, V3). (C) Left and Right: 2 months after surgery.

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