



Replantation of articular composite tissue masses severed from extremities

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KEYWORDS

Articular injury;
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Summary The techniques and outcomes of *in situ* replantation are discussed for managing 5 cases of articular composite tissue masses severed from an extremity (digit). All 5 cases treated with *in situ* replantation survived. Rehabilitation was performed after surgery. Follow-ups of 2–5 years showed good appearance, satisfactory functional and sensory recovery. *In situ* replantation is indicated for an articular composite tissue masses severed from an extremity (digit), if its structure is complete and a blood supply vessel in the mass is available for anastomosis. Replantation can achieve better outcomes than transfer or grafting of adjacent skin or osteocutaneous flaps, or transplantation of a metatarsophalangeal or interphalangeal joint.

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Introduction

Injury may sever a part of the composite tissues, including the joint, from the upper extremity or digit, so that although the integrity and function of the extremity is destroyed, its continuity still remains. In such cases, the main vessels that remain intact can still provide adequate blood supply to the distal end of the extremity, making its survival possible.

A violent external force causes this special kind of trauma when the joint is in flexion. The part which has been severed from the upper extremity or digit is referred to as a severed articular composite tissue mass. Such injuries are uncommon, and thus remain

a serious challenge to orthopaedic surgeons. After carefully investigating the articular blood supply, we performed 5 cases of *in situ* replantation of severed articular composite tissue masses. All 5 replants survived. The results showed that not only was the normal anatomic structure of the affected extremity or digit restored, but also satisfactory results in appearance and function were achieved.

Patients and methods

Patients

There were 4 males and 1 female, aged from 20 to 38 years. Injuries were caused by a fast spinning electric saw in three cases and a chopping knife in two.

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Injuries involved the elbow joint (1), the interphalangeal joint of thumb (1), the metacarpophalangeal joint of index finger (1), the proximal interphalangeal joint of index finger (1), and the proximal interphalangeal joint of middle finger (1). One severed articular composite tissue mass contained the entire joint and the other four cases involved a partial joint.

Operative procedures

The wound site and the severed articular composite tissue mass were routinely rinsed and sterilised, and thoroughly debrided under microscope according to the requirements for limb and digit replantation. Care was taken to preserve all living tissues. When a major vessel could not be identified in the mass, we tried to anastomose an anonymous arteriole that was thicker than 0.2 mm in diameter and had the potential to provide blood supply to the mass. The bone was shortened appropriately, but the periosteum was not stripped too much to avoid possible invasion to the branches of blood vessels that supplied blood to the mass.

Next, we repaired the tendon and joint capsule at the flexor aspect. In cases of digital injury, we repaired only the deep digital flexor tendon and left the superficial digital flexor tendon untreated. In the case of elbow joint injury, we carefully repaired the severed flexor group, and fixed the severed insertion of the flexor group onto the bone again.

The bone was fixed. When the digital mass involved the entire joint, cross fixation of the phalanx was performed with 2 Kirschner wires. When the mass included only a partial joint, fixation was performed with one penetrating Kirschner wire before the joint was set at its functional position. In defects of a half proximal joint, the palm was elevated to substitute the joint to retain the joint function as much as possible. In replantation of the severed composite tissue mass containing the elbow joint, internal fixation was conducted with plates, screws, Kirschner wires, or tension bands.

Arteries, such as a digital artery, radial and ulnar collateral arteries, were anastomosed to connect the severed composite tissue mass to its original limb or digit. The accompanying veins were sutured at the same time. Nerves, dorsal extensors (tendons) and lateral tendon bundles were repaired. The dorsal superficial veins were anastomosed. Skin was sutured, wounds were bandaged and external fixation was applied with plaster slabs.

Results

All 5 cases managed with *in situ* replantation of a severed composite tissue mass survived (Figs. 1–4). Appropriate rehabilitation exercises were performed for each patient after surgery. Follow-up ranged from 2 to 5 years and showed good appearance,

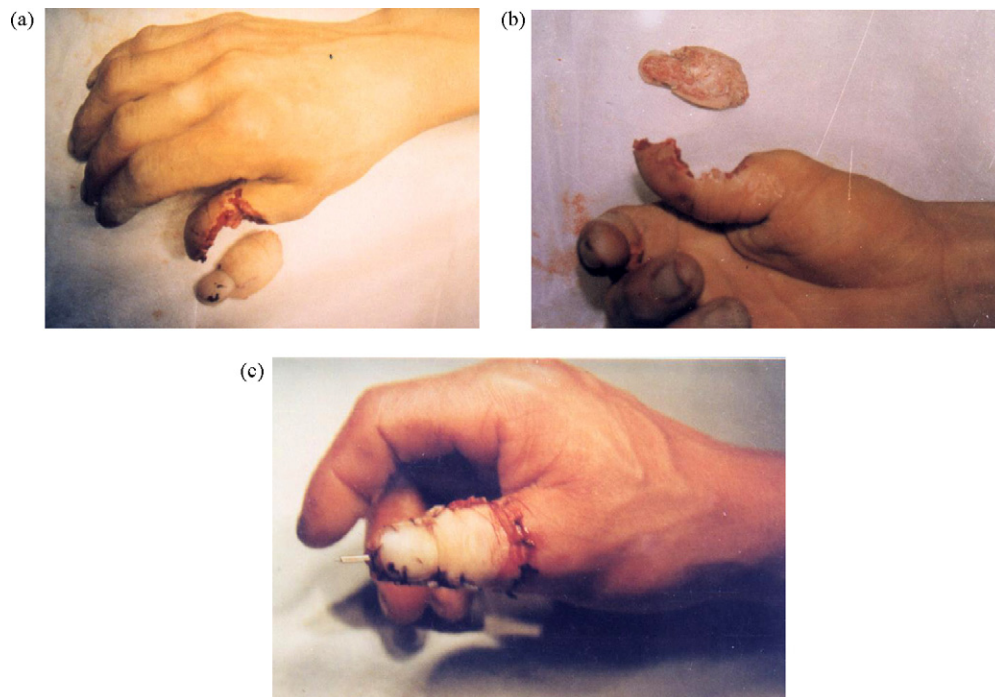


Figure 1 Preoperative views of the interphalangeal joint composite tissue mass severed out of the right thumb (a and b). Postoperative results (c).

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