Secondary Procedures in Replantation

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Semin Plast Surg 2013;27:198-204.

Abstract

The success of replantation surgery is not judged by survival of the replanted part, but by the functional outcome attained. Hence, primary repair of all injured structures is the preferred aim. At times, constraints induced by the ischemia time and nature of injury preclude primary repair. In such situations, secondary procedures are inevitable. Secondary procedures are also frequently required to improve the function and appearance of the replanted extremity. The incidence of secondary procedures will vary with the level of replantation and the type of patient population. Secondary procedures are difficult because they carry risk of injury to the vital neurovascular structures that now lay at nonanatomical locations. Nevertheless, when indicated and performed with caution they could significantly raise the functional status of the individuals.

Keywords

- replantation
- secondary surgery
- tenolysis
- hand amputation

Primary reconstruction of all injured structures is the preferred aim in hand injury management. It is more important to practice this principle in replantation surgery because secondary procedures following replantation are more difficult to do and carry some risk of injury to the anastomosed vessels. Some replants remain dependent upon the primary anastomosis for a long time and hence protection of the arterial anastomosis during secondary procedures is safer.

At times, due to the nature of injury and the constraints dictated by the ischemia time, full formal repair of all structures may not be possible. This makes secondary reconstruction inevitable. The incidence will vary with the level of replantation and the type of patient population. Wang found that the incidence of secondary procedures addressing this topic in published series ranged from 2.95 to 93.2%. Yu et al. in a retrospective study found 32% of their cases with replants and revascularization distal to the wrist required secondary operations. Major replants may need even more secondary operations. Yaffe et al. in their series of 22 successful major replants found that six patients with arm replants required 17 operations and 16 cases of forearm replants required 50 secondary operations over 2 years.

We propose that secondary procedures in replantation surgery could be grouped under three headings.

1. Repair of structures that were not repaired during the primary procedure. This would mainly involve bridging gaps in tendons and nerves.
2. Procedures to promote healing or enhance function of tissues that were primarily repaired. This would involve surgeries like bony procedures for the correction of mal-unions and non-unions and tenolysis.
3. Procedures to enhance function like selective arthrodesis of joints, lengthening of bones, and tendon transfers to maximize the function of the recovered muscles.

General Considerations

Documentation of the Original Operation

Availability of good operation notes of the primary procedure can make the planning and execution of the secondary procedures less complicated. In a replant, the repaired vessels and nerves do not always lie in their regular anatomical location. Although it is possible to locate the position of the arteries by Doppler, there is no definite way to locate important venous anastomosis or the nerve repair routes. Although the site of the proximal end of the nerve can be identified by the Tinel sign, there is no easy way to preoperatively locate the distal end of the nerve. Knowing them will help us design safe access incisions. Documentation of the ends of the nerves...