Orthopaedics & Traumatology: Surgery & Research (2011) 97S, S16—S20

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Vein conduit associated with microsurgical suture for complete collateral digital nerve severance

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KEYWORDS
Vein conduit;
Digital nerve sensibility;
Microsurgical repair

Summary The aim of this study is to present the long term results of a series of 53 vein conduit grafts as first line therapy to repair complete severance of one or more collateral digital nerves. The surgical technique included an epi-perineural suture of the nerve under minimal tension, associated with a vein graft harvested from the back of the hand to cover the nerve. None of the patients presented with a neuroma, spontaneous pain or had stopped using the injured finger. Sensibility results were good or very good in 67% of cases. The scar at the donor site was very light or invisible. A total of 96% of patients were satisfied or very satisfied. This simple technique, by protecting the injured nerve, results in a rate of sensory nerve recovery that is comparable or better than that of other series in the literature, without neuroma and with minimal scarring at the donor site.

Introduction

Injury to collateral digital nerves represents a significant portion of hand traumas and is associated with a risk of neuroma and significant functional sequalae. As early as 1984 in a study in the dog, Calteux et al. [1] emphasized the small size of the anastomotic neuroma when it was contained by a venous sleeve, and the capacity of the latter to isolate the neuroma. We associated this technique with direct nerve suture as a first line treatment for severed digital nerves. The aim of this study was to evaluate the functional results, sensory recovery and residual pain and/or scarring with this technique.

Patients and methods

This retrospective monocentric multi-operator study included 48 patients (or 53 vein conduit grafts) presenting with recent complete severance of one or more collateral digital nerves with no substance loss or associated injuries. Complex multiple traumas including severe crushing or stretching were excluded (Fig. 1). All patients underwent emergency or semi-emergency surgery, and patients presenting more than four days after injury were excluded. The free mean interval between the trauma and surgery was 14.3 hours (1—90).

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doi:10.1016/j.otsr.2011.03.012

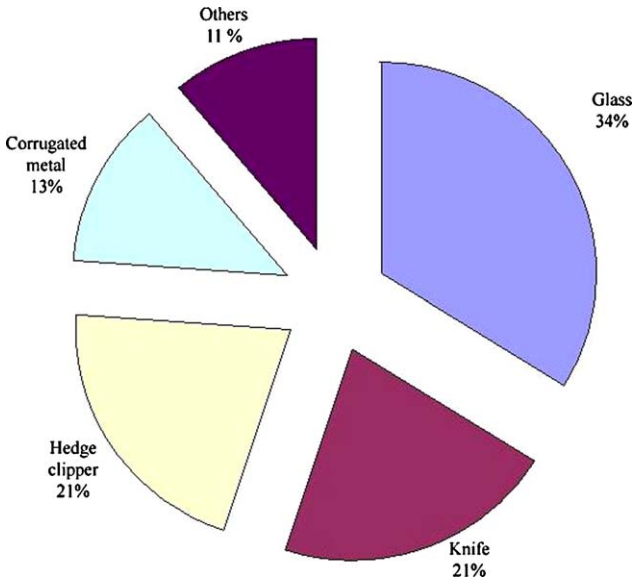

Figure 1 Distribution of the etiology of nerve lesions.

This series included 20 women and 28 men, mean age 40 years old (8—79). The mean follow-up was 25.75 months (16—39). The dominant hand was injured in 50% of the cases (24 patients). In 15 cases, the patient had been injured in a work related accident. The mechanism, location of the wound and the associated injuries were identified. Examination of the texture of the skin was performed to determine if it was thin or callous.

The results of sensory nerve recovery were evaluated by the Weber test (S2PD), the Dellon test (M2PD) [2] the 5-monofilament test and the Tinel test [3]. The presence of a neuroma, articular range of motion, feeling in and spontaneous use of the finger by the patient were noted. Sensitivity to cold was systematically investigated. Any medical history which might affect sensibility was noted: diabetes, carpal canal pathology. The size of the scar at the donor site, its appearance and the presence of adhesions were noted as well as the patient's feeling about the scar, both in relation to pain and appearance. The scar of the initial injury was also evaluated, and any retractile adhesions were searched for. In patients with a simple pedicled injury without any associated traumas, the length of surgery and the delay before day-to-day activities were again possible were evaluated. Any complications or revision surgery were noted. Finally the patient evaluated his/her level of general satisfaction in four stages: Very satisfied, satisfied, not very satisfied, dissatisfied.

Patients were evaluated by an independent observer.

Surgical technique

All patients (except one) underwent surgery with locoregional anaesthesia (Figs. 2—6). After exploring, debriding and cleaning the wound, several millimetres of the injured nerve were freed proximally and distally. The venous conduit graft was harvested, usually on the dorsal side of the hand, with a short incision. If the diameter was large, the segment could be harvested from the forearm. The vein segment was slipped on one of the ends of the nerve ''like a sock''. The

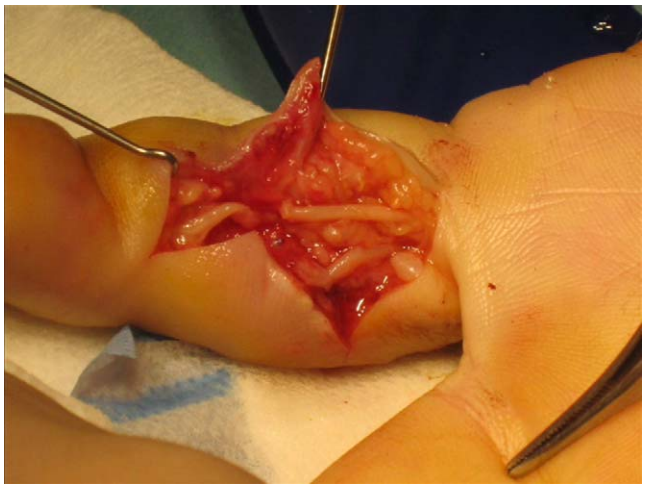

Figure 2 Total severance of the radial digital collateral nerve pedicle of the 5th finger of the left hand.

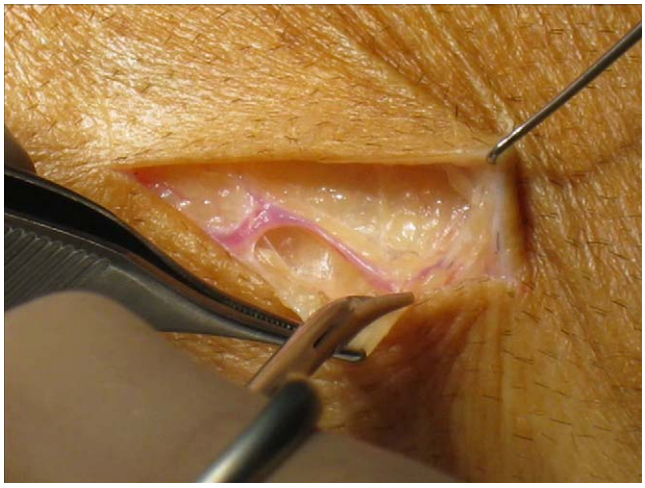

Figure 3 Harvesting of the vein conduit from the back of the hand.

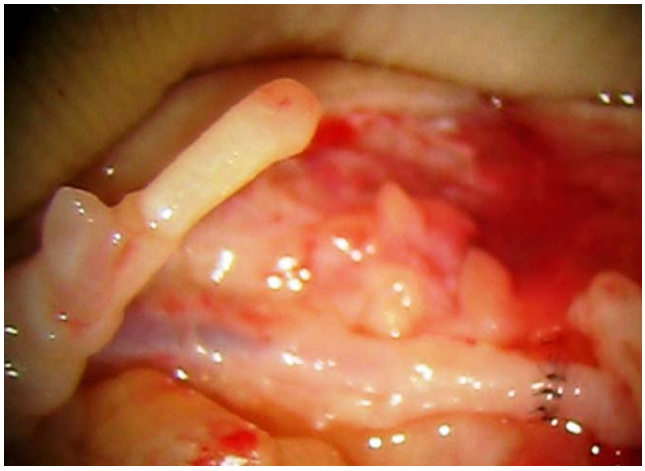

Figure 4 Slipping the vein conduit over the ends of the nerve ''like a sock''. (Inset: sutured artery).