

# The Use of Medicinal Leeches for the Treatment of Venous Congestion in Replanted or Revascularized Digits

Amir Arami, MD,\* Shelly Gurevitz, MD,\* Ram Palti, MD,\* Shay Menachem, MD,\*  
Mina Berelowitz, BA,\* Batia Yaffe, MD\*

**Purpose** A noteworthy cause of failure in digital replantation is venous insufficiency. External bloodletting with medicinal leeches is a common treatment for venous insufficiency after distal digital replantations. The objective of this study was to evaluate the salvage rate of digits replanted proximal to the distal interphalangeal (DIP) joint that were treated with medicinal leeches for venous congestion.

**Methods** We retrospectively reviewed the charts of patients with complete or incomplete digit amputation admitted between January, 2008 and April, 2014. We included all patients with venous congestion in one or more digits replanted or revascularized at the middle or proximal phalangeal level, who were treated with medicinal leeches. Treatment initiation and duration were based on clinical judgment. Demographic, therapy, and surgical data were collected.

**Results** Of 145 patients with 205 digits that were replanted or revascularized, 25 digits were treated with medicinal leeches for venous congestion. Venous congestion was diagnosed later than 48 hours after operation in 24 of the 25 digits. Of the 25 digits, 11 survived (44.4%) (8 of 22 replanted digits and all 3 revascularized digits). No complications were recorded except for substantial blood loss requiring transfusion in one patient.

**Conclusions** External bloodletting with medical leeches might be less effective with late treatment or with a higher volume of congested tissue, as is characteristic of proximal finger replantation. (*J Hand Surg Am.* 2018; ■(■):1.e1-e5. Copyright © 2018 by the American Society for Surgery of the Hand. All rights reserved.)

**Type of study/level of evidence** Therapeutic IV.

**Key words** Finger replantation, hirudotherapy, leeches therapy, venous congestion.



From the \*Department of Hand Surgery, Sheba Medical Center, Affiliated to Sackler School of Medicine, Tel Aviv University, Ramat Gan, Israel.

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**Corresponding author:** Amir Arami, MD, Department of Hand Surgery, Sheba Medical Center, Affiliated to Sackler School of Medicine, Tel Aviv University, Emek HaEla St 1, Ramat Gan, Israel; e-mail: [dr.amir.arami@gmail.com](mailto:dr.amir.arami@gmail.com).

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CIRCULATORY INSUFFICIENCY IN THE early stages after microsurgical digit replantation remains a serious obstacle to finger survival. Failure rates of up to 32% frequently result from venous insufficiency.<sup>1,2</sup> During the critical postoperative period 4 to 6 days after injury,<sup>3</sup> venous outflow may not match arterial inflow, which can lead to venous congestion. Venous congestion in a digit can be identified clinically by the dusky purple appearance of skin, brisk capillary refill, and dark colored blood

after pinprick. If this complication is not treated, cell death results and the digit will likely be lost. Occasionally, the surgeon may decide not to reoperate on a congested digit after replantation because of intraoperative findings pertaining to the level of injury, the quality of the vessels, dorsal tissue damage, time after operation, and other factors.

External bloodletting is a common nonsurgical strategy for managing venous drainage problems.<sup>4–6</sup> Common approaches to external bloodletting are fingertip incision with the application of heparin or the use of medicinal leeches. Medicinal leeches (*Hirudo medicinalis*) may be helpful in treating tissues with venous insufficiency by establishing temporary venous outflow until angiogenesis gradually improves the physiological venous drainage. The aim of this study was to determine the overall salvage rate of digits, replanted or revascularized at the proximal or middle phalangeal level, which incurred postoperative venous congestion treated with medicinal leeches.

## MATERIALS AND METHODS

Our institutional review board approved this study. We reviewed all replanted or revascularized digits admitted between January, 2008 and April, 2014 that were treated with medicinal leeches after surgery because of venous congestion and in which no additional surgical treatment was performed. We included all digital replantations or revascularizations distal to the level of the metacarpophalangeal joint. Replanted or revascularized digits without at least one venous and one arterial anastomosis documented in the surgical report were excluded. Digits treated with leeches immediately after operation with no documented diagnosis of venous congestion and digits treated with leeches after secondary procedures were also excluded. Age, sex, level of injury, operative procedures, postoperative treatment, number of leeches used, and duration of treatment were recorded, as well as the final outcome. Outcome was determined as salvage of the replanted digit documented in outpatient clinic reports, with no subsequent surgical interventions or revision amputation conducted in the 2-week period after initiation of treatment.

All patients were treated according to a protocol that included aspirin (100 mg once daily), dextran (10% in normal saline; 500 mL/d for 3–5 days), continuous nerve block with bupivacaine hydrochloride (0.25%; 20 mL every 8 hours for 3–5 days), and warming. Once venous congestion was noted

clinically, leech therapy was started (UIC 202246458, Kern 06 Ltd, Varna, Bulgaria). Leeches were usually placed in the region of the removed nail or on darker locations of the replanted digit. After the leech detached, the bite areas were cleaned with gauze soaked in heparin solution (5,000 U/mL) to stimulate hemorrhage from the leech bites. After autodetachment, the leeches were killed in 70% ethyl alcohol and disposed. All patients were treated on each day of leech therapy with either ciprofloxacin or sulfamethoxazole-trimethoprim to cover *Aeromonas* species. Complete blood count was assessed daily in most patients who received leech therapy.

Treatment continued once to three times daily. Decisions regarding treatment initiation and cessation were based on clinical judgment after subjective appreciation of the color of the skin, capillary refill, and the color of bleeding after pinprick.

## RESULTS

From January, 2008 to April, 2014, 205 digits (145 patients) were replanted or revascularized. Of those digits, 25 (16 patients) were treated after surgery with medicinal leeches for documented venous congestion (Table 1). Average age of the patients was 41.5 years (range, 4–62 years). Of the 25 digits treated with medical leeches, 22 were replantations of complete amputations and 3 were revascularizations of partial amputations. In one digit, venous congestion was documented 32 hours after the operation; in the rest, venous congestion was documented later than 48 hours afterward. One to eight leeches were used for each digit (median, 3 leeches/digit). Each treatment lasted 1 to 5 days (median, 2 days/digit). Of the 25 digits, 11 survived (44.4%). All 3 revascularized digits survived. Eight of 22 (36.3%) of the replanted digits survived. No infections were recorded. One 4-year-old patient required a blood transfusion. Leech therapy was stopped in this patient because of a decrease in hemoglobin levels. The treated digit survived (incomplete amputation).

## DISCUSSION

Venous congestion in a replanted digit can be treated surgically or nonsurgically. There are few reports, with mixed results, regarding the outcome of surgical treatment for venous congestion after digit replantation. Typically, surgical treatment would include resection of the thrombosed vein and reanastomosis, or vein grafting. Chia and Tay<sup>7</sup> reexplored 7 digits with venous failure treated with reanastomosis in 3 digits, vein grafting in 3 digits, and amputation in

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