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IDEAS AND INNOVATIONS

Hand

Nail Bed Regeneration by Excision of Distal Scarred Matrix in a Patient with Porphyria Cutanea Tarda

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Summary: Onycholysis secondary to nail bed scarring can be a challenging problem for hand surgeons, given the relatively few techniques available for nail bed lengthening. Here, we present the case of a patient with upper extremity onycholysis, secondary to porphyria cutanea tarda. We used a technique first described by Lemperle et al in 2003 to successfully lengthen the nail bed and improve the appearance of the nail plate. This involved full-thickness excision of a crescent-shaped wedge of the distal nail bed in all five right sided digits in a single operation. We found this technique to be simple and effective, meeting our patient's goals after just one excision. *(Plast Reconstr Surg Glob Open 2024; 12:e6110; doi: 10.1097/GOX.0000000000006110; Published online 28 August 2024.)*

CASE PRESENTATION

Reconstructing nail bed deformities can be a challenge for hand surgeons, given the wide variety of presentations, with no consensus on the best approach to treatment. Reconstruction techniques range from excision and primary closure of the scarred portion of the affected nail bed, through to free transfer of healthy nail bed using microsurgical techniques.[1–3]

Lemperle et al introduced a surgical regeneration technique for patients presenting with distal nail deformities from partially destroyed nail beds exclusive of the lunula. This technique entails the excision of a 5-mm en bloc, crescent-shaped full-thickness portion of affected nail matrix.[4] The authors demonstrated successful regrowth of healthy nail bed and subsequent nail plate in 11 digits treated using this technique. Some patients required serial excisions to achieve better nail growth, but ultimately went on to achieve satisfactory results.[4] This reported technique appeared to offer a simple solution for patients, requiring only local anesthetic and achieving favorable outcomes in few serial excisions.

We were referred a 42-year-old male patient with a history of familial porphyria cutanea tarda, the most common human porphyria caused by hepatic deficiency of uroporphyrinogen decarboxylase which manifests clinically as fragile skin and blistering lesions in sun exposed areas.[5] In our patient, his most bothersome clinical manifestation was bilateral upper extremity onycholysis secondary to chronically scarred distal nail beds. On our examination, the patient had intact, healthy appearing nail plates just distal to, and including the lunula (Fig. 1). The patient was very keen to have all digits on his hand operated on at once, with the goal of improving the physical appearance of his nails without having to address each finger individually. Using the original technique outlined in the article by Lemperle et al,[4] along with some of our own modifications as described below, we performed distal excision of crescent-shaped, full-thickness scarring of the nail beds of the affected five digits on his right hand. The ultimate goal was to regenerate the scarred nail beds, to allow for growth of normal-appearing nail plates.

The patient was brought into our minor surgery suite and placed supine on the operating table, with his operative arm abducted at 90 degrees onto an arm board. Each digit was anesthetized using a digital nerve block with 1% lidocaine with epinephrine. After prepping and draping his hand, individual finger tourniquets were placed at the base of each digit. Working sequentially beginning with the thumb, the nail plate was removed from each operative digit. We then marked out our area of excision, which encompassed an approximately 3-mm-wide crescent-shaped wedge of the distal nail bed, extending from just distal to the lunula, to encompass most of the area of onycholysis (Fig. 2).

Using a 15-blade scalpel, we then excised the marked area on each digit, down to the periosteum of the distal phalanx (Fig. 3). Hemostasis was then achieved by direct

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pressure and elevation of the operative limb. To provide support for regrowth of the new nail plate, we then cut and sutured pieces of a 0.040-inch-thick Silastic silicon sheet onto each nail bed, securing them under the eponychial fold with 5-0 plain gut sutures to stent the folds open.

At the end of the case, the fingertips were covered with a thin layer of Polysporin ointment, and each digit was dressed with a nonadherent finger dressing. One-inch Coban wrap was used to secure each dressing. The patient tolerated the procedure well and was discharged home afterward with oral analgesics.

The patient was seen in follow-up 4 weeks after his procedure. By that time, new nail plates had already grown past the previous area of nail bed scarring and were much smoother in appearance than before the procedure. This has been maintained 2 years from his procedure (Fig. 4).

DISCUSSION

Growth of a normal nail plate depends on both the underlying nail bed as well as stability from the bony phalanx.[6] Conditions that affect either of these structures can lead to abnormal or absent nail growth, which can be of cosmetic concern for patients.[4] Many different techniques have been described in the literature for nail bed reconstruction. For the complete absence of a nail bed, procedures such as free nail bed grafts and resource-intensive microsurgical transfer have been successfully used.[2,7] For patients with traumatic distal amputations, nail bed lengthening can be achieved using the

Takeaways

Question: How can we reconstruct nail bed defects secondary to scarring in all digits on one hand in a single operation?

Findings: Using a technique originally described by Lemperle et al, we excised a crescent-shaped full-thickness wedge of distal nail bed in all five digits on our patient's right hand. By just 4 weeks postoperative, he developed normal appearing nails.

Meaning: A simple full-thickness excision of distal scarred nail bed can result in normal appearing nail plates in just a single operation.

Fig. 1. A photograph of the patient's right hand preoperatively. The patient had significant onycholysis affecting the nails with intact lunulae.

Fig. 2. A photograph of the preincision markings and set up. Individual finger tourniquets were placed, followed by the removal of each nail plate. Our area of excision was marked out, extending from distal to the lunula to encompass the distal nail bed.

Fig. 3. A photograph of the one of the patient's digits postexcision of scarred nail bed. This was carried out full thickness down to the distal phalanx.

Fig. 4. A photograph of the patient's right hand at 2 years postoperative. New, smoother nail plates had grown past the previous areas of onycholysis.

eponychial flap, first described by Bakhach and successfully replicated in further literature.[8–10] Although this technique is helpful to provide length in cases with missing distal nail beds, it does not address cases where the shortened nail plate is caused by distal scarring, rather than loss of the nail bed.

To our knowledge, the article by Lemperle et al is the first to address this issue, with the use of their distal wedge excision technique.[4] Here, we have successfully demonstrated the use of this technique in both a new context and in five digits simultaneously in one patient. We found this technique to effectively address both the appearance and functional concerns of a scarred nail plate presented by our patient. Our use of silicon sheeting to support the new nail plate growth resulted in normal appearing nails after just 4 weeks postoperatively. The patient, who was highly motivated, found the recovery quick and relatively pain free with the use of oral analgesics over the first week postoperatively and is currently undergoing the same procedure on his contralateral side.

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DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

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