

Tips and Tricks in Nail Surgery

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Nail surgery is part of the dermatologist's armamentarium but it is often an afterthought in teaching dermatologic surgery. We will offer some practical hints about instruments and supplies, evaluation of pigmented lesions to determine whether a biopsy is needed, local anesthesia, and surgical techniques that should make procedures of the nail unit more efficient, less painful, and less likely to result in complications.

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Useful Instruments and Supplies

Surgical Loupes

Magnification is needed for nail surgery, Heine® or Zeiss teleloupes magnifying 2.5-4.2 times at 13-16 in. are adequate.¹

Syringes

A dental syringe mounted with a 30-gauge needle is my favorite way to perform distal anesthesia as well as nail unit intralesional injections. The grip provides one with the ability to exert the high pressure often necessary to perform injections effectively. The Becton Dickinson Ultra-Fine, short, 0.3 mL, 31 gauge × 5/16 used for cosmetic botulinum toxin injections is another useful adjunct. The needle is permanently attached to the body of the syringe.

Nail Plate Elevators

A 2–3 mm, curved (Lempert) or flat (Locke) nail plate elevator is essential for partial avulsions whereas the 5-mm curved blade model (Freer septum elevator) is useful for total nail plate avulsion. When a nail plate elevator is not available, the smooth side of the jaw of an opened Halstead or a blunt-tipped Stevens scissors may be substituted.¹

Dual-Action Nail Nippers

Straight 5-in. nail nippers may be used to section the nail plate during distal avulsions; dual-action nail nippers (Ruskin bone-cutting forceps) are invaluable in cutting thick toenails.¹

English Nail Splitter

The English anvil-action nail splitter (Fig. 1) is useful for laterolongitudinal toenail avulsions. The lower blade of the instrument has a flat and smooth undersurface that glides along the nail bed, and the spring action of the instrument cuts easily through the nail plate.¹

Surgical Gloves As a Tourniquet

A bloodless field is needed for nail operations. The assistant can apply pressure to the lateral digital arteries to facilitate hemostasis. A sterile rubber glove whose fingertip has been removed may be stretched over the digit.² The main disadvantage of the glove's finger technique is that the tourniquet can inadvertently be left in place at the end of surgery. When performing fingernail surgery, the use of a whole surgical glove offers safe and reproducible exsanguination and provides a sterile surgical field. The whole glove cannot be forgotten when applying the dressing at the end of the procedure.

Microcoated Surgical Blades

Microcoated surgical blades (Personna plus®) offer a superior cutting edge designed to glide smoothly with precision. These blades are extremely useful for nail matrix shave biopsy.

Surgical Hooks

Single- or double-pronged skin hooks are used to expose the posterior nail fold or to hold small pieces of tissue. If these instruments are missing from the instrument tray, they can be fashioned extemporaneously. A tiny skin hook can easily be made from a needle and a cotton tip applicator. The distal end of the needle is bent at right angles with a hemostat clamp. The cotton tip of the sterile applicator is forced into the proximal opening hub of the needle. Another alternative is to use sutures as retractors.³

Preoperative Assessment and Diagnostic Tips

Evaluation of Pigmented Lesions

Dermoscopy

Nail surface microscopy, a noninvasive procedure that enhances diagnostic acuity, facilitates the preoperative diagnosis of nail pigmentation, narrows the differential diagnosis of longitudinal melanonychia, and more accurately defines the subset of pigmentation requiring a nail biopsy.^{3,4} When confronted with monodactylous melanonychia (ML), clinical and dermoscopic findings suggestive of a benign lesion require regular dermoscopy monitoring or a biopsy

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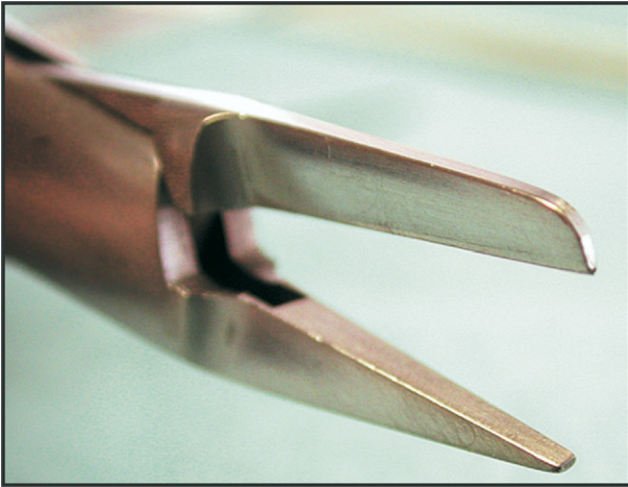


Figure 1 English nail splitter.

depending on the clinical context. A biopsy should not be delayed if the history or clinical setting includes melanoma in the differential. A biopsy should always be performed when the patient has an increased risk of melanoma (ie, ML appearing in the fifth decade, recently changing lesion, Hutchinson sign, dark-skinned patient). Dermoscopy is of great help in diagnosing nail pigmentation caused by hematomas, onychomycosis, and bacterial infections that do not require surgical intervention.

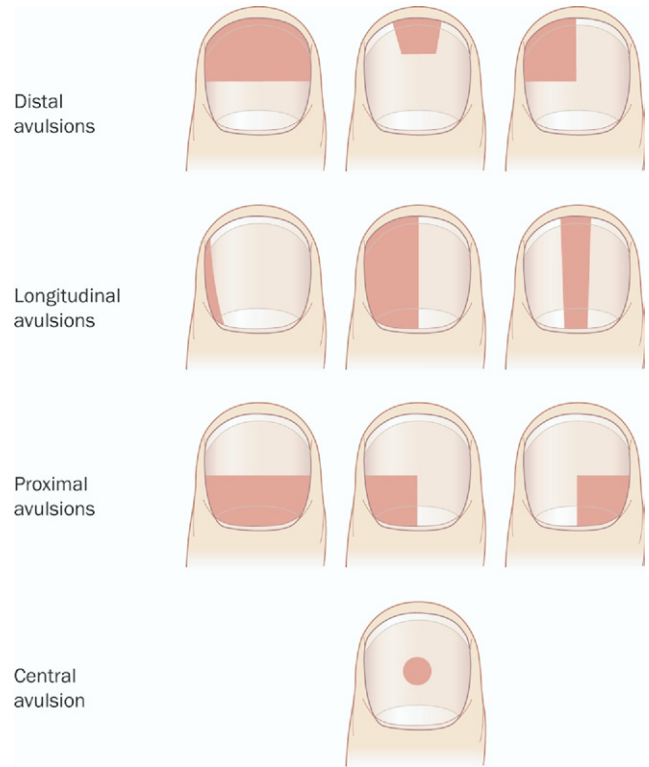


Figure 3 Partial nail plate avulsions.

Anatomic Location of the Lesion

Dermoscopy of the free edge of the nail plate helps determine the anatomic location of the lesion causing longitudinal melanonychia, which, in turn determines the site of the biopsy. When the pigment is localized in the upper part of the nail plate, the pigmented lesion originates from the proximal matrix. If the pigment is localized in the ventral part of the nail plate, the pigmented lesion originates from the distal matrix.⁴

Pseudo myxoid Cyst Puncture

Pseudo myxoid cyst is one of the most common nail tumors. The classical type presents with a proximal nail fold tumefaction associated with an irregular longitudinal groove of the nail plate. This lesion may be difficult to differentiate from an early evolving garlic clove fibroma. Magnetic resonance imaging will undoubtedly show the lesion, but a simple puncture may easily render the answer more quickly. Dermal anesthesia over the papule is necessary for a painless procedure. After meticulous skin prepping, a puncture is made over the tumefaction with an 18-G needle. The puncture test confirms the diagnosis if a jelly-like fluid comes out. False-negative tests are not infrequent.¹

Local Anesthesia

Distal Nail Blocks

Distal anesthesia works rapidly and well for biopsies, but there is limited duration of the anesthesia. Local infection and vasculopathy are contraindications for distal anesthesia techniques. Distal anesthetic injection is easier to perform with a dental syringe and plain 2% lidocaine is preferred. The injections are given very slowly beginning with the dermal papule to minimize pain. The injections can be performed as a wing blocks or through either the proximal nail fold or the hyponychium.

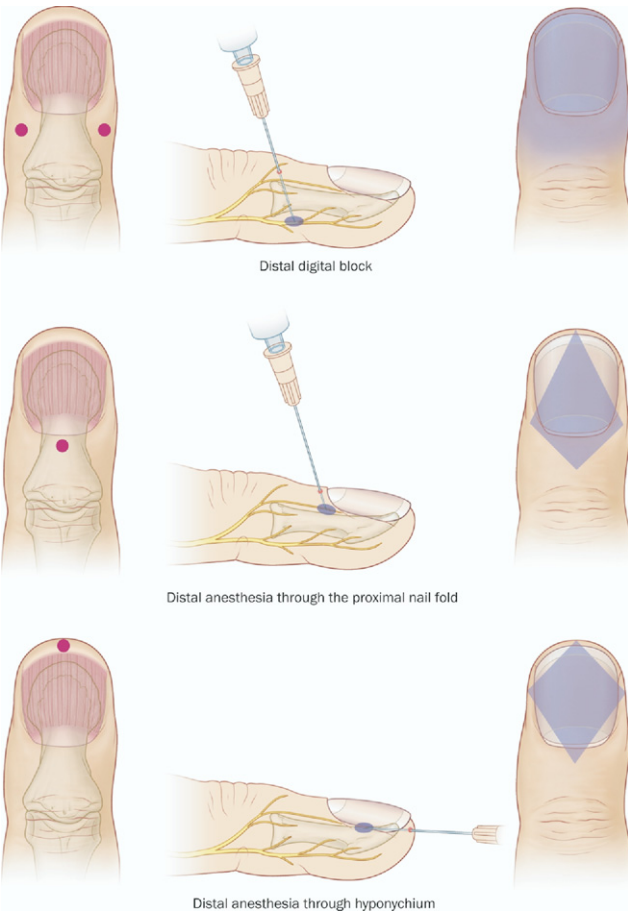


Figure 2 Distal nail blocks.

The Distal Digital Block

The distal digital block (wing block; Fig. 2)¹ offers immediate anesthesia of the total nail unit. The needle is inserted 3 mm proximal to the junction of the proximal and lateral nail fold. After a dermal papule is raised at the dorsal level, the needle is directed vertically and the injection carried out along the lateral aspect of the digit. We inject 0.5 mL of anesthetic. The opposite side of the digit is anesthetized in the same way.

Distal Anesthesia Through the Proximal Nail Fold

Distal anesthesia through the proximal nail fold is useful for anesthesia of the proximal nail fold, matrix, and the proximal nail bed. The needle is inserted in the middle of the proximal nail fold; a dermal papule of anesthesia is raised before penetrating the proximal nail plate and the matrix where most of the anesthesia is placed. The lunula and nail bed blanches as 0.5-1 mL of anesthetic is slowly injected. The blanched area roughly indicates the territory of anesthesia.

Distal Anesthesia Through the Hyponychium

Distal anesthesia through the hyponychium is rarely performed because it is more painful. The region of anesthesia may include the hyponychium, the bed, and most of the matrix. To avoid the prominent distal phalangeal ungual process, the needle is inserted in the lateral hyponychial area and directed horizontally in the nail bed while the anesthetic is injected. Here also, blanching roughly indicates the territory of anesthesia, which may include the hyponychium, the bed, and most of the matrix.

Surgical Techniques

Partial Nail Plate Avulsions

Avulsion of the nail plate (Fig. 3)¹ is necessary for nail bed and matrix approaches. Partial avulsions are always preferred when feasible because total nail plate removal may result in prolonged pain. Also, as the nail grows, the nail plate may become embedded at the free margin. Different techniques are presented that can be tailored to individual needs.

Distal Avulsions

These are used for the distal nail bed surgical approach. They may be central, lateral, or concern the distal half of the nail plate. Distal and central quarter avulsions offer the opportunity to explore the distal nail bed, remove a foreign body, or perform a biopsy. The portion of the nail plate to be avulsed is freed from its nail bed and attachment by inserting the nail elevator between the nail bed and the nail plate; which is sectioned to the desired size with a Stevens' scissors.

Proximal Avulsions

They are used to expose the matrix; they may concern the whole proximal nail plate, one third, one half of the nail plate or may be localized to a lateral portion. The nail plate is freed from its nail matrix and the proximal nail fold attachment by inserting the nail elevator between the proximal nail fold and the nail plate and then between the nail plate and the distal nail matrix laterally from the lateral nail sulcus at the level of the lunula. The nail plate, which may be a proximal hemi-avulsion or a quarter avulsion, is partially cut transversally with a Stevens' scissor and lifted up to perform the surgery. After the surgery, the nail plate is either removed or positioned back in place. If repositioned, a 2-mm transversal recut may be needed for drainage.

Longitudinal Avulsions

They may be used to expose nail bed or matrix in the lateral or central aspect. It is possible to avulse from 15%-80% of the lateral nail plate. The procedure, which is limited to the strip of nail plate to be avulsed, is divided into the following steps:

- a. Nail plate, proximal nail fold separation: the spatula of a 2- to 3-mm large elevator is pushed back toward the cuticle and gently introduced under the proximal nail fold. Lateral gliding of the instrument liberates the proximal nail fold from its nail plate attachments.
- b. Nail plate, nail bed separation: the elevator is introduced under the nail plate at the level of the hyponychium and pushed gently but firmly toward the lunula. The elevator is withdrawn and moved 2-4 mm laterally until the nail plate is detached.

The nail plate is sectioned with a Stevens' scissor when the nail plate is thin (digit), with an English nail splitter for a toenail, or with an anvil-action nail nipper for thick toenails. The nail plate is then removed with a mosquito hemostat or a nail-pulling forceps.

Circular Avulsions

These may be used for localized procedures of the central nail bed or distal matrix. This technique is useful to evacuate hematomas or remove foreign bodies, such as a splinter or gravel that may have penetrated the nail plate. Circular avulsions may be used at the nail bed or matrix. A 5-mm circular punch is used to drill the nail plate, which is removed as a lid. Partial nail plate avulsion is a versatile procedure that may be performed in many different ways.

Nail Plate Repositioning

After the surgery, the nail plate is positioned back whenever possible. Nail plate repositioning¹ is valuable because it protects the wound and the nail bed or matrix naturally and effectively for 3-12 postoperative weeks. When the avulsed nail plate is put back in place, openings should be made at the base, extremity, or laterally, to ensure drainage. For matrix surgery, the proximal avulsed nail plate may be repositioned after a transversal recut, which offers the necessary opening for drainage. Larger nail bed fusiform excisions may require large undermining and contralateral incisions in the lateral sulci. The nail plate is repositioned after an anterior triangular and/or lateral nail plate incision facilitates postoperative drainage. We avoid repositioning the nail plate when there is an infection or increased risk of surgical field contamination, and when we feel that there is a need for greater drainage.

Total Nail Plate Avulsion

After its removal, the plate is kept in povidone iodine. The nail plate is cut laterally (1 mm on each side) and proximally (3-4 mm) to facilitate postoperative drainage. The nail plate is then repositioned. One stitch is placed laterally on each side to secure the lateral nail plate to the lateral nail folds. The sutures are placed in the center of the lateral nail fold if the nail plate has been completely removed and placed disto-laterally if the plate has just been lifted up. Another technique that is more appropriate in traumatology and nail reconstructive surgery avoids suture placement through the nail plate and bed. A longitudinal suture is placed in both lateral pulps and crossed over the nail plate in a "X" fashion.

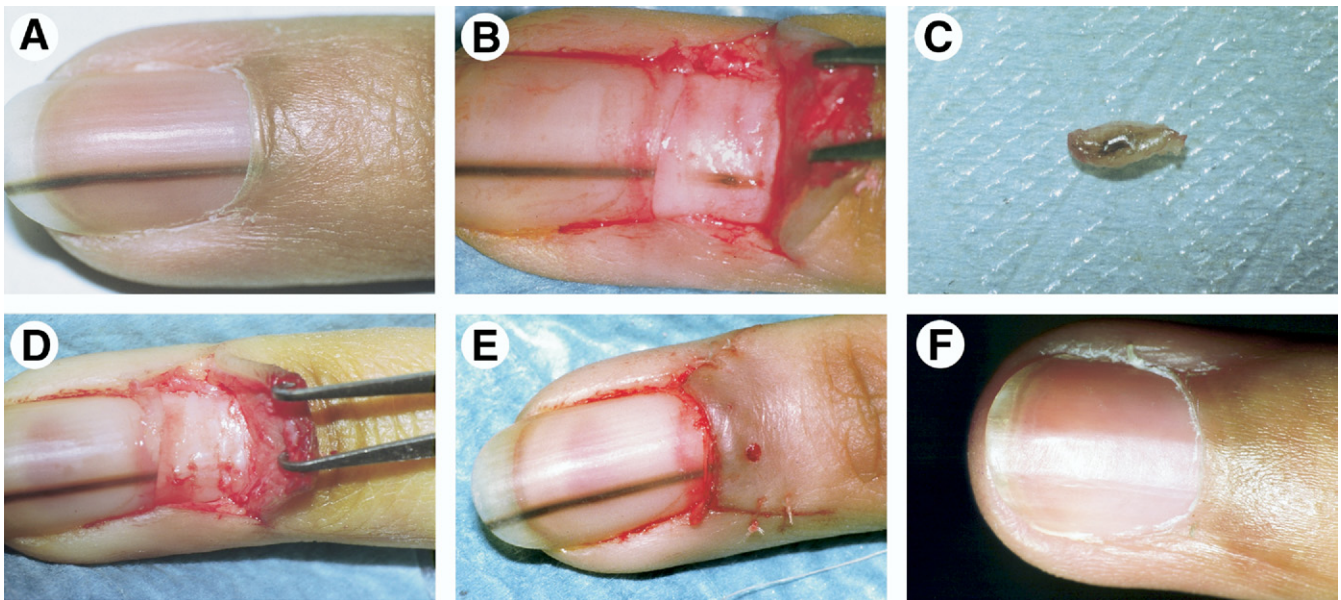


Figure 4 Longitudinal matrix excision. (A) Single longitudinal melanonychia, histology disclosed a junctional nevus; (B) proximal matrix exposed, showing the longitudinally oriented pigmented lesion; (C) longitudinally excised specimen; (D) the longitudinal wound sutured with 6-0 absorbable material, (E) the proximal nail fold wound is closed with 5-0 absorbable material, (F) Post operative results showing slight longitudinal plate thinning.

Partial Nail Plate Avulsion

After a proximal partial avulsion, the nail plate may be put back in place. A proximal (3-4 mm) and a distal cut (1 mm) are done to ensure adequate drainage.

Longitudinal Matrix Excision

Nail matrix pigmentation therefore, transverse excision is not feasible. The proximal nail matrix is exposed, a longitudinal elliptic excision of the lesion is done, and incisions are carried to the depth of the periosteum (Fig. 4).⁵ It is possible to excise lesions up to a width of 4 mm on the larger nails (thumbnail, big toenail). Undermining is done for lesions larger than 3 mm. The smallest lesions (up to 2 mm) may be closed without any undermining. Slightly larger lesions necessitate large undermining over the dorsal phalanx laterally and anteriorly. Closure is achieved without tension whenever it is possible. If tension is excessive, a simple or double Johnson's flap is developed.⁶ Closure of the surgical defect is performed with absorbable suture material. The nail plate is repositioned and the proximal nail fold is closed. This technique is most useful to excise lesions causing a longitudinal melanonychia that is less than 3 mm in width.

The Shave Biopsy

Eckart Haneke⁹ described the shave technique (Fig. 5),⁷⁻⁹ which is used to sample wide pigmented bands that are considered benign. Reflection of the proximal nail fold and proximal nail plate hemi-avulsion give access to the matrix. A shallow vertical incision is made with a # 11 blade to circumscribe the lesion to be sampled with 2-mm margins. The scalpel is held parallel to the nail matrix epithelium and the lesion is shaved with a tangential movement of the blade. An assistant applies counterpressure over the patient's pulp to facilitate firming the area of the incision. The tiny specimen should be transferred flat to a piece of cardboard, such as that included in the cardboard suture packing sleeve. Superficial exci-

sions of this type heal with minimal scarring, i.e. longitudinal erythronychia or superficial nail plate longitudinal thinning.

Segmental Phenolization

Selective nail unit destruction with phenol is used to correct lateral ingrowing nails of both juvenile and pincer nail types (Fig. 6). Selective phenolization is our preferred method because it is a sim-

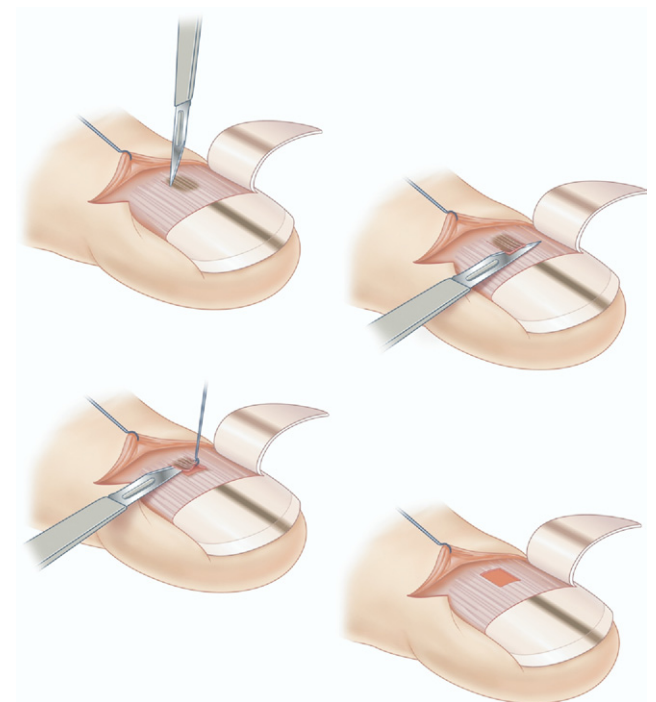


Figure 5 The shave biopsy.

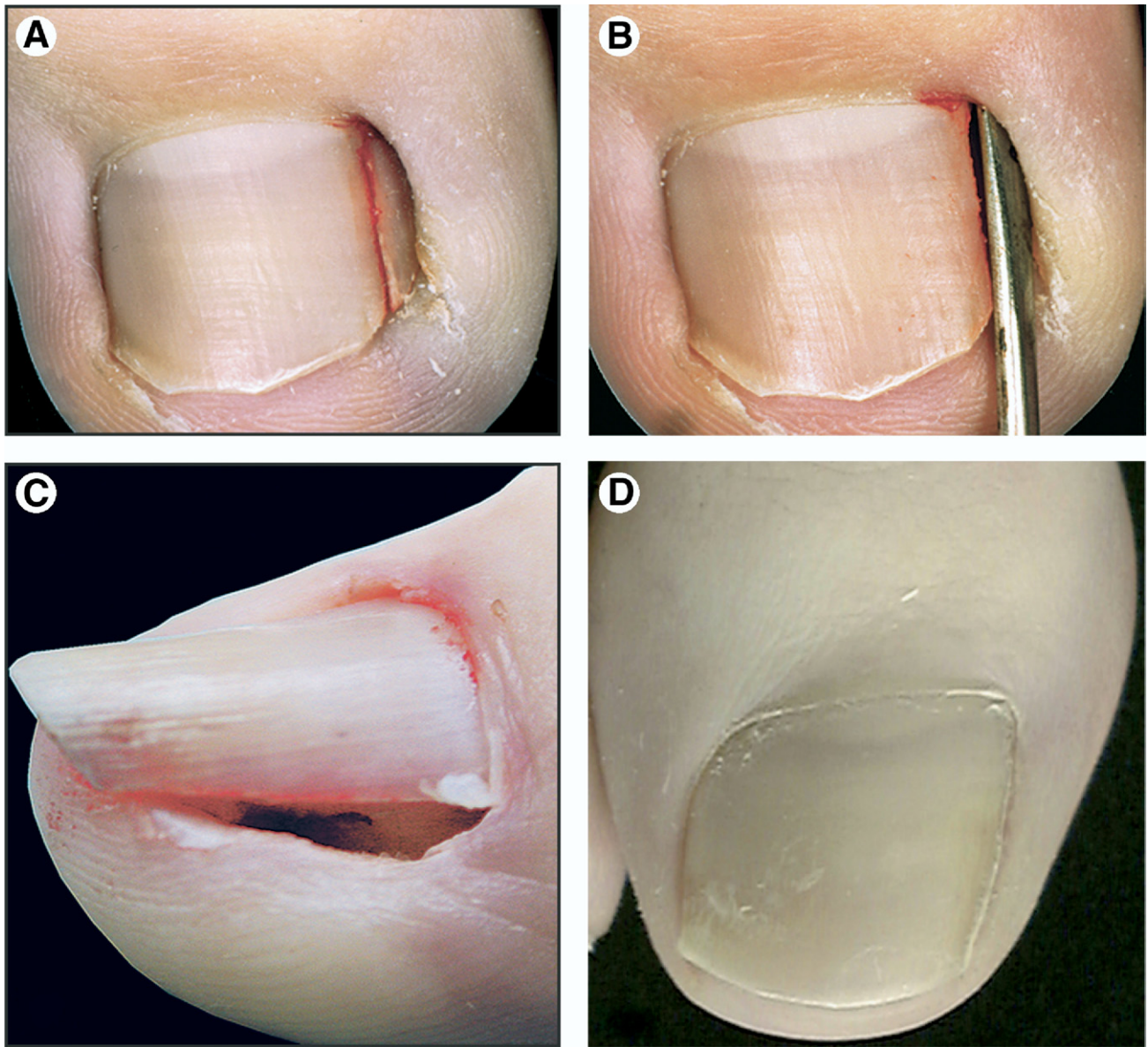


Figure 6 Segmental phenolization. (A) Lateral nail plate section; (B) phenol application with a 3 mm large Lempert elevator (C) lateral nail bed and matrix darkening after three phenol applications; note a tiny proximal leuconychia due to inadvertent phenol spill which will have no consequence: (D) result of a selective phenolization.

ple technique with a high success rate (94.7%).¹⁰ The procedure begins with a unilateral or bilateral 3-mm longitudinal avulsion. The lateral nail bed and matrix are carefully dried with a piece of gauze introduced along the lateral nail bed and under the proximal nail fold. The inferior (concave) side of the 3-mm large Lempert elevator is soaked in full-strength phenol (88%). Any excess phenol is absorbed on a piece of gauze. The tiny phenol layer covering the inferior part of the elevator is applied to the lateral matrix, ventral part of the proximal nail fold, and corresponding nail bed. When a pyogenic granuloma is present, a drop of phenol is also applied over the granulation tissue. Generally, this procedure is repeated three to four times with meticulous application of phenol until the epidermal layer slightly blackens. A total phenol application time of 60 seconds is sufficient.

It is important to take great care to treat the lateral horn(s) of the matrix(ces). Phenol is toxic to surrounding skin, so care must be taken to avoid any exposure of the surrounding skin and nail tissue.

Our habit is to slightly rotate the digit toward the side that the phenol is applied to, thus avoiding any accidental wicking along furrows to any part of the matrix that is not to be treated. Patients should be informed that serous drainage can be observed for 4 to 6 weeks after a phenol matricectomy. Postoperative pain is limited; if walking is impaired, analgesia can be obtained with acetaminophen or nonsteroidal anti-inflammatory drugs. Office work is possible on the day after surgery. Patients are told to wear large, low-heeled shoes and to avoid excessive walking for the first 3 postoperative weeks. The recurrence rate after selective phenol matricectomy has been reported to be between 1.1%¹⁰ and 3.9%.¹¹

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