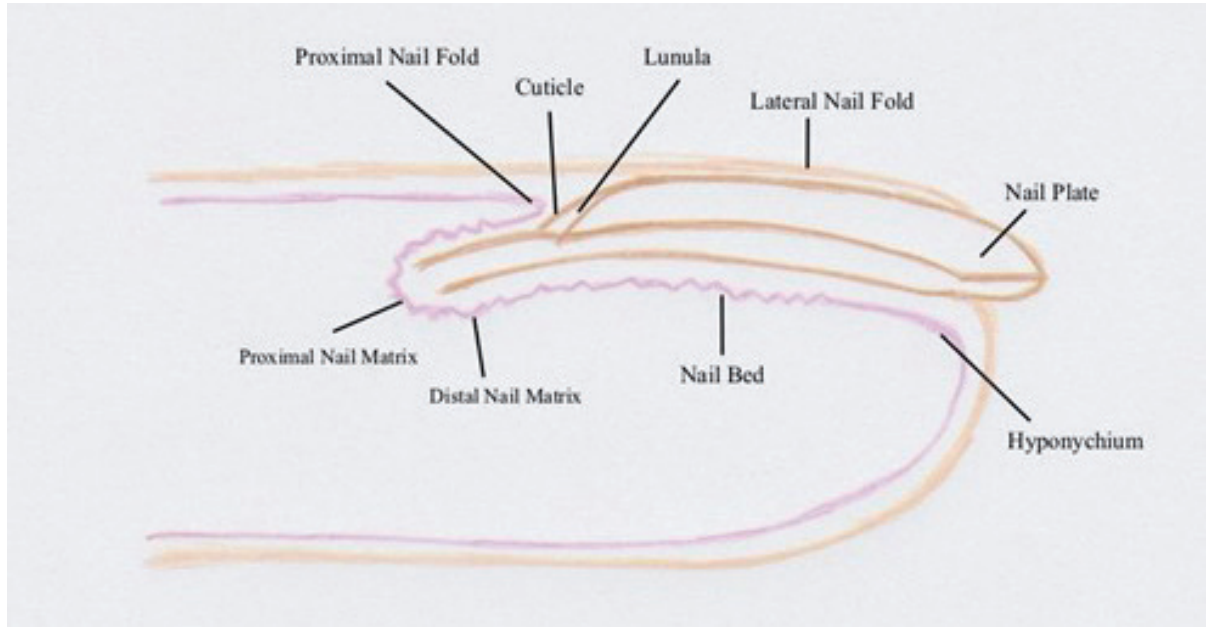


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Nail anatomy and procedures

By Brittany Valk, DO

Nail anatomy



Nail plate avulsion

Indication: Performed prior to most other nail unit procedures to allow for visualization of the nail bed and matrix

Distal nail plate avulsion

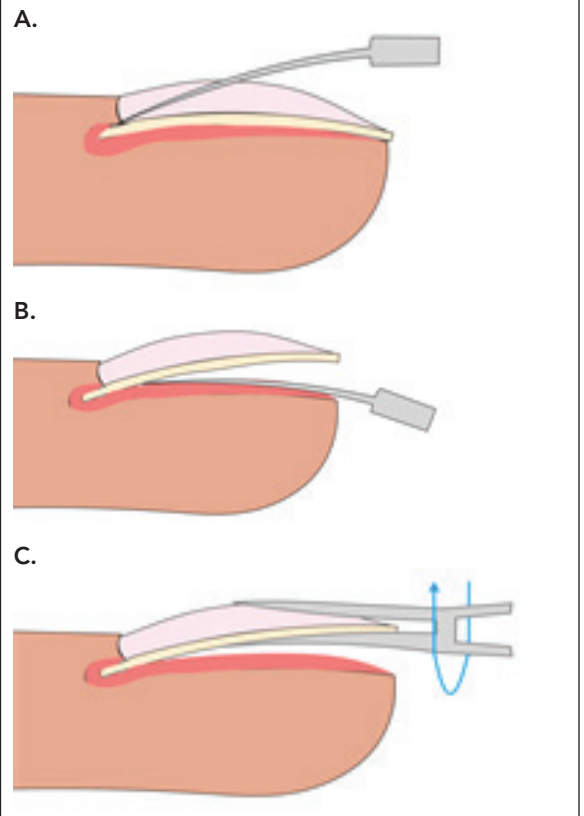
- A. Nail elevator inserted under proximal nail fold and lateral nail sulci and pushed until plate is loosened from folds
- B. Nail elevator then inserted under distal nail plate and pushed proximally until plate loosened from matrix
- C. Plate is grasped by hemostat or nail puller and rotated off nail bed

Proximal nail plate avulsion

Nail elevator inserted under proximal nail fold and rotated 180° pushing out nail plate
Used when there is significant subungual debris

Partial avulsion

Used when exact location of lesion is known
Total nail plate avulsion should be avoided when possible due to greater risk of distal embedding during nail regrowth compared to partial avulsion



Brittany Valk, DO, is a PGY-3 resident at Beaumont Farmington Hills, Michigan.

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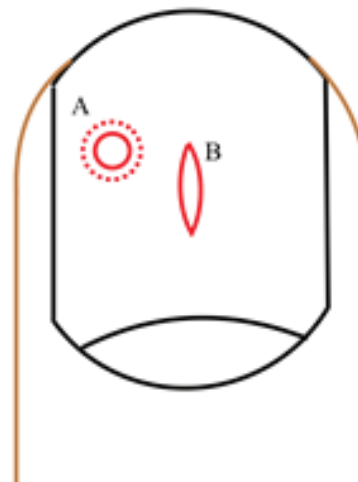
Nail bed biopsy

A. "Two punch" technique

Larger punch biopsy through nail plate followed by smaller punch biopsy through nail bed
If nail bed biopsy $\leq 3\text{mm}$, can let heal by secondary intention

B. Longitudinal excision

Orient vertically and extend down to periosteum



Nail matrix biopsy

Indications: Longitudinal melanonychia, diagnose nail matrix tumor

A. Partial nail avulsion + two 5mm, oblique releasing incisions
Reflect proximal nail fold
Choose appropriate technique (B-D)

B. 3mm punch to periosteum
Defect does not need to be sutured
Biopsy of **proximal nail** matrix may result in *split nail*

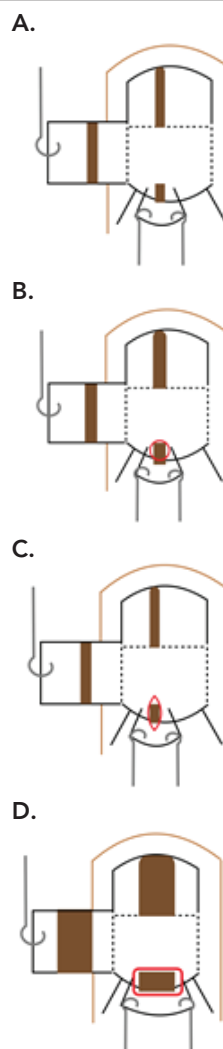
C. Elliptical excision
Oriented transverse or longitudinal
Close defect with 5-0 absorbable suture

D. Tangential biopsy
Pigment involves wide area
Superficial shave to decrease risk of nail dystrophy
Tangential excision of proximal nail matrix may lead to nail thinning

Proximal nail fold returned and sutured into place after biopsy

Complications: Matrix biopsies carry risk of nail dystrophy/thinning

Proximal matrix biopsy more likely to cause *nail scarring and dystrophy*



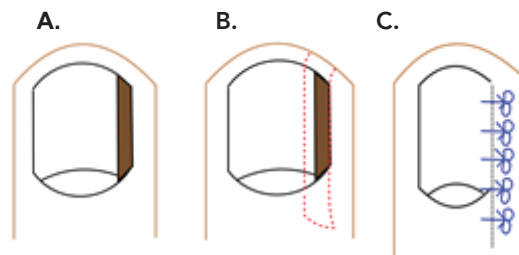
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Lateral longitudinal biopsy

- A.** Indication: Sample entire nail apparatus when there is longitudinal melanonychia in lateral 1/3 of nail
- B.** Curve proximal incision laterally to include lateral horn of matrix
- C.** Closure: Pass suture from lateral nail fold to nail bed to nail plate and tie knots away from incision

Complications: Permanent nail narrowing, **nail spicule**, cyst, malalignment



Chemical matricectomy with phenol (88%) for ingrown toenail

Indication: onychocryptosis

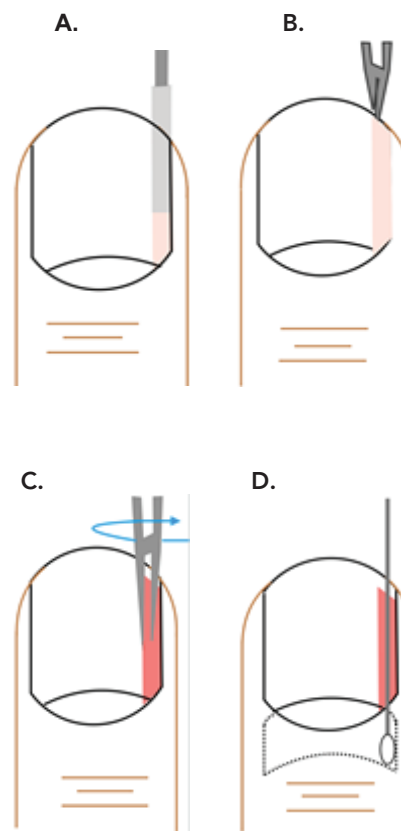
- Phenol properties: Necrotizing, a disinfectant, and an anesthetic
- Phenol mechanism of action: denatures proteins and prevents new nail growth

A-C. Lateral strip of nail plate 3-5mm in width is avulsed

D. Full-strength phenol applied to lateral part of nail matrix with cotton swab and rotated away from remaining nail plate

- Ideal application time is 2-3 minutes total time
- Flushing with alcohol not necessary
- Success rate $\geq 95\%$

Complications: Oozing, post-operative infection is rare



References:

1. Mariwalla K, Leffell DJ. Chapter 15: Nail surgery. In Mariwalla K, Leffell DJ. *Primer in Dermatologic Surgery: A Study Companion*. 2nd Ed. American Society for Dermatology Surgery; 2011; 91-96
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