

Nail Surgery Basics and Tips

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Goals



- Achieve minimally painless anesthesia for nail surgery
- Decide the correct area of the nail unit for biopsy of a specific lesion
- Perform an appropriate biopsy for pigmented nail streaks

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Nail Surgery– why not?

- Patient anxiety
- Physician anxiety
- Risk of permanent nail dystrophy
- Time consuming
- Lack of training/experience



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NAIL SURGERY is fun!



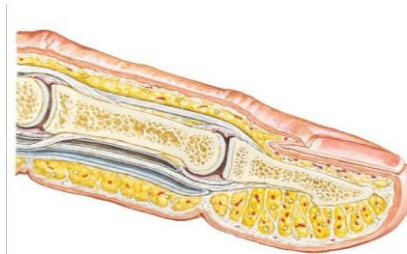
And it helps our patients.....!

5

Keys to Successful Nail Surgery



- Know your anatomy
- Minimize discomfort
- Be efficient
- Communicate – procedure, discomfort, risks



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Preoperative Considerations

Medical history and medications

Preoperative photos

Consent – permanent nail dystrophy

Patient counseling

Discomfort

Duration of regrowth

Risk of deformity

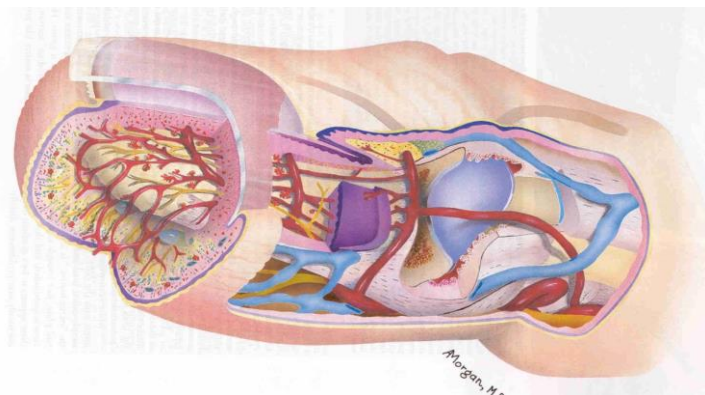
Difficulty with some activities, work

Appropriate shoe wear

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Anatomy

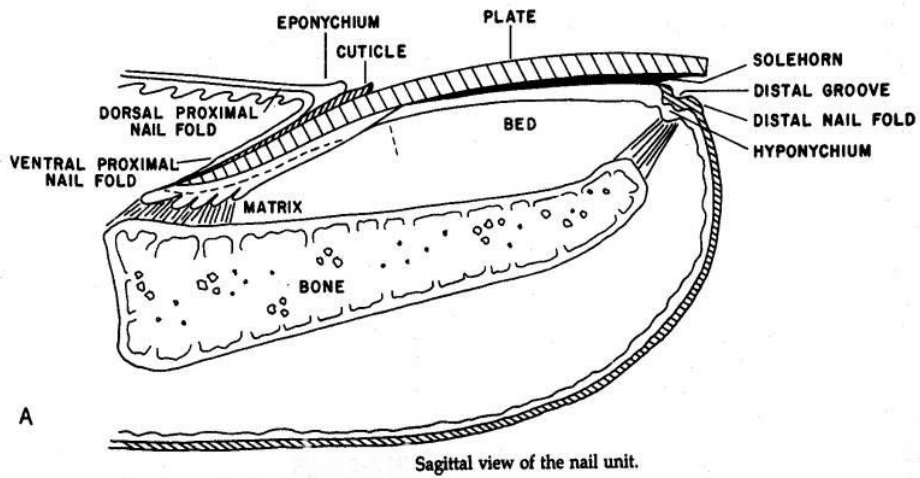
- Nail unit
- Nerves
- Vessels
- Tendon



Nail Surgery: A Text and Atlas
Krull, et al. Lippincott Williams & Wilkins 2001

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Nail Anatomy



From *Nails: Therapy, Diagnosis, and Surgery*

Scher and Daniel. WB Saunders 1990

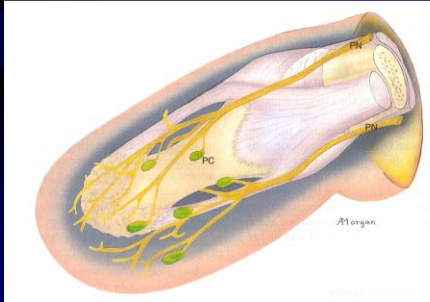
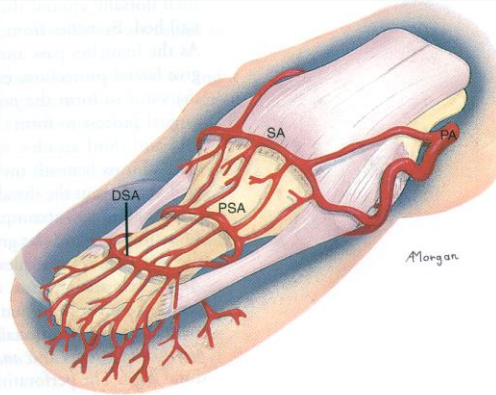
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Digital artery

- proximal arch
- distal arch
- dorsal branch

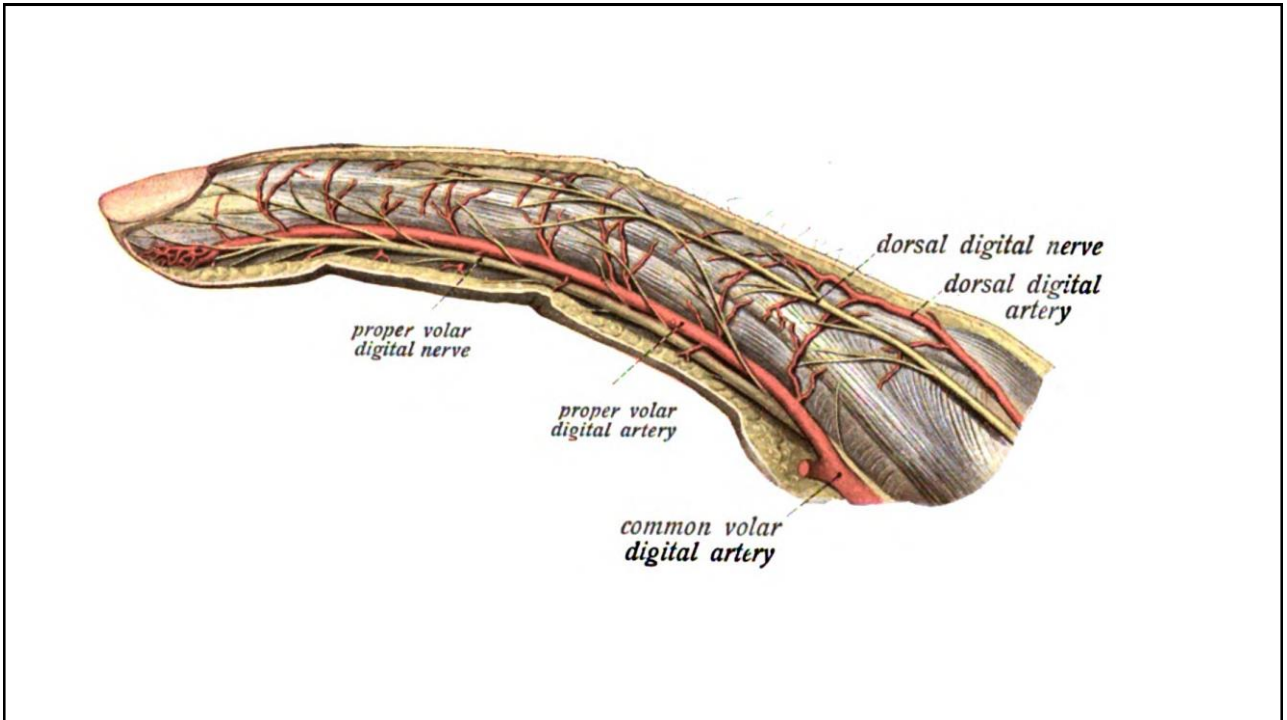
Digital nerve

- Paired palmar nerve
- Paired plantar nerve



Nail Surgery: A Text and Atlas Krull, et al.
Lippincott Williams & Wilkins 2001

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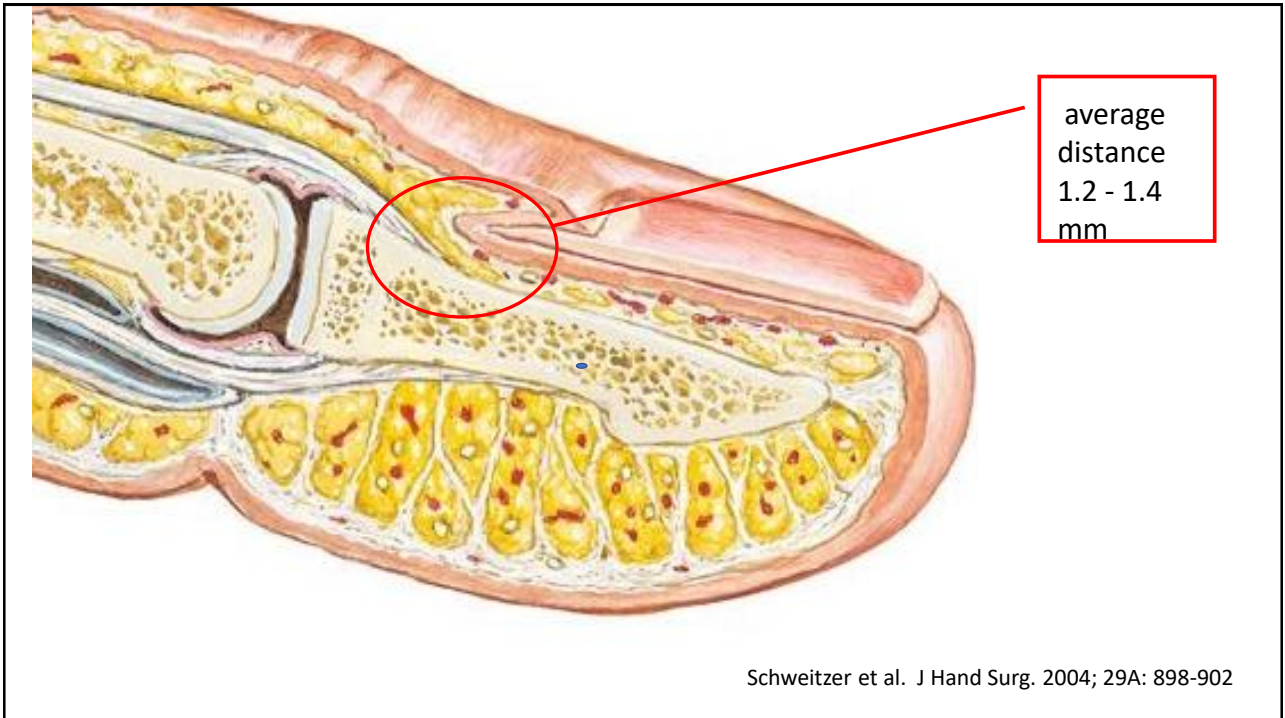
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Extensor tendon of the digit



Insertion approximately 12 mm proximal to the cuticle

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Nail Matrix

Thick epithelium with no granular layer

Proximal matrix forms the dorsal nail plate

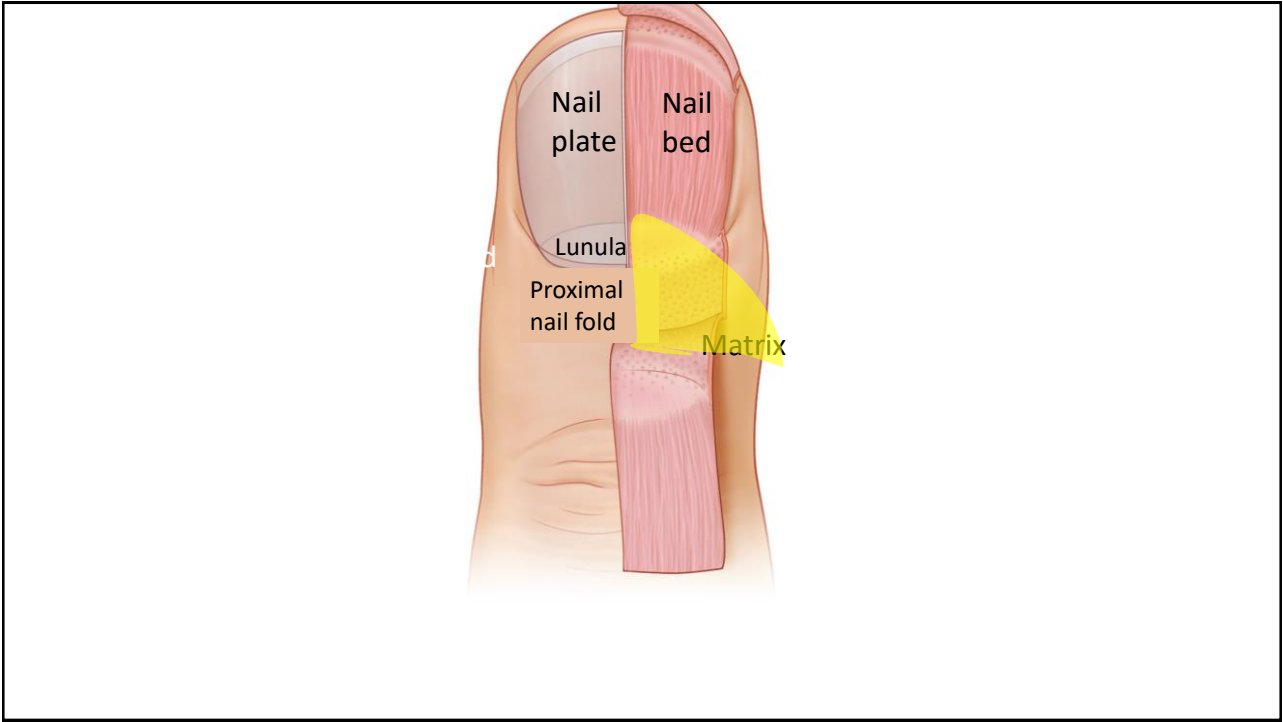
Distal matrix forms the ventral nail plate

Active melanocytes are more prevalent in the distal matrix

To minimize nail dystrophy, biopsies of the matrix should be performed in the most distal aspect of the matrix when possible, and be less than 3mm in width



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Anesthesia

- Lidocaine
- Epinephrine – ok
- Blocks
 - digital
 - wing
- Bupivacaine 0.5% at end
- Ropivacaine

- Positioning and relaxation!



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Table 1
Common anesthetics in nail surgery

Dermatol Clin 33 (2015) 265–271

Anesthetic	Onset (min)	pKa	Duration Without Epinephrine	Duration with Epinephrine	Benefits
Lidocaine	<1	7.7	30–120	60–400	Near instantaneous onset
Bupivacaine	2–5	8.1	120–240	240–480	Longer duration
Ropivacaine	1–15	8.2	120–360	Not defined	Longer duration, Potential vasoconstrictive effects

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Lidocaine

Warm
Buffered
Small needle 30 gauge
****GO SLOWLY****

cold spray
vibrating machine
rub nearby skin
distraction



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Digital block

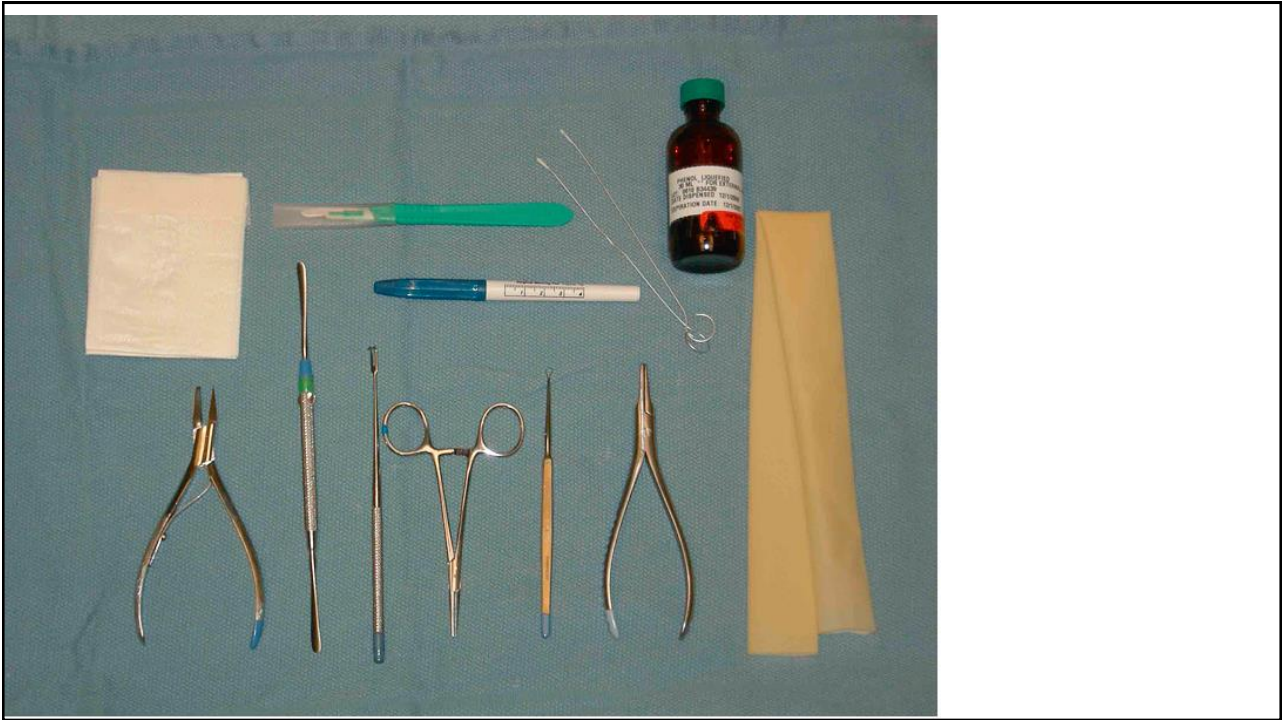
1.0- 1.5 cc per side
INJECT SLOWLY!
Allow enough time for effect



Wing block

Intradermal wheal
Advance along folds

23



25

English Anvil Nail Splitter



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Freer septum elevator

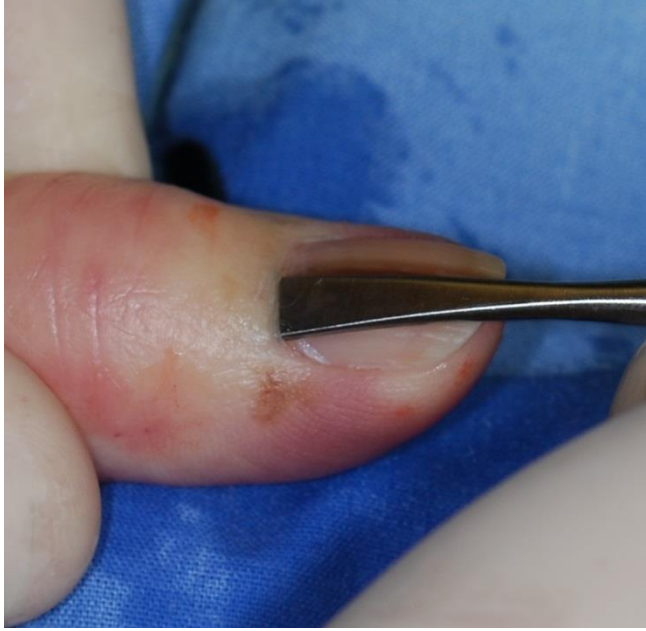


Nail Spatula



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Separate nail plate from the proximal and lateral nail folds



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Separate the nail plate from the nail bed

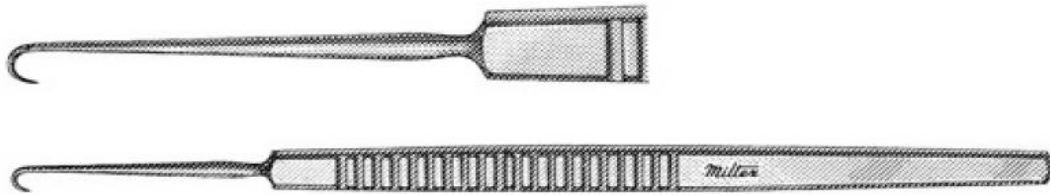


Aim toward underside of nail plate
Firm pressure until feel "give"



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Skin Hooks



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Antisepsis minimize risk of infection

- Sterile procedure ****
- Chlorhexidine prep
- Pre-op soak in chlorhexidine and warm water for 15-20 minutes (softens plate)
- Bristled brush scrub – several minutes
- Intraoperative irrigation after avulsion

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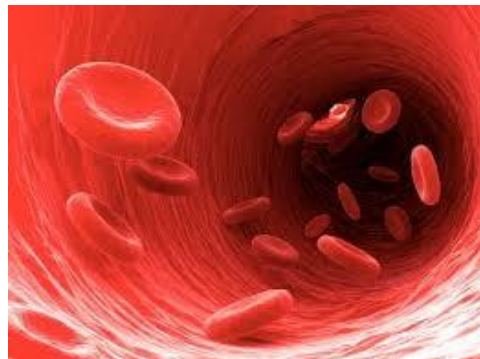
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Hemostasis

- Tourniquet / penrose drain
- Sterile glove

- Hyfrecator
- Gel foam
- Aluminum chloride

- Pressure
 - Lateral compression during surgery
 - Direct compression post-op



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Ingrown nail Onychocryptosis



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Chemical Matrixectomy

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Digital Block



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Matrixectomy Pearls

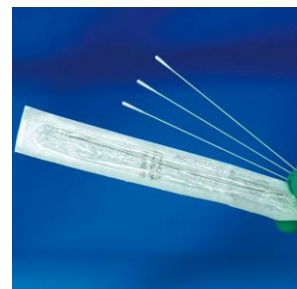
- Phenol is 88% carbolic acid
- Phenol must be fresh
- Blood inactivates phenol, field must be dry
- Phenol has antiseptic and anesthetic properties



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Nasopharyngeal Calcium Alginate Tipped Applicator used for chemical matricectomy

- Inexpensive
- Precise application of phenol/ NaOH
- Less postoperative discomfort
- Faster healing



Nasopharyngeal Swab Applicator for Chemical Matricectomy.

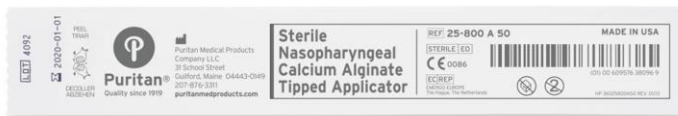
Lam C, Billingsley E. Dermatol Surg 2017 43(11):1400-1401

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Cotton –tipped applicators



41



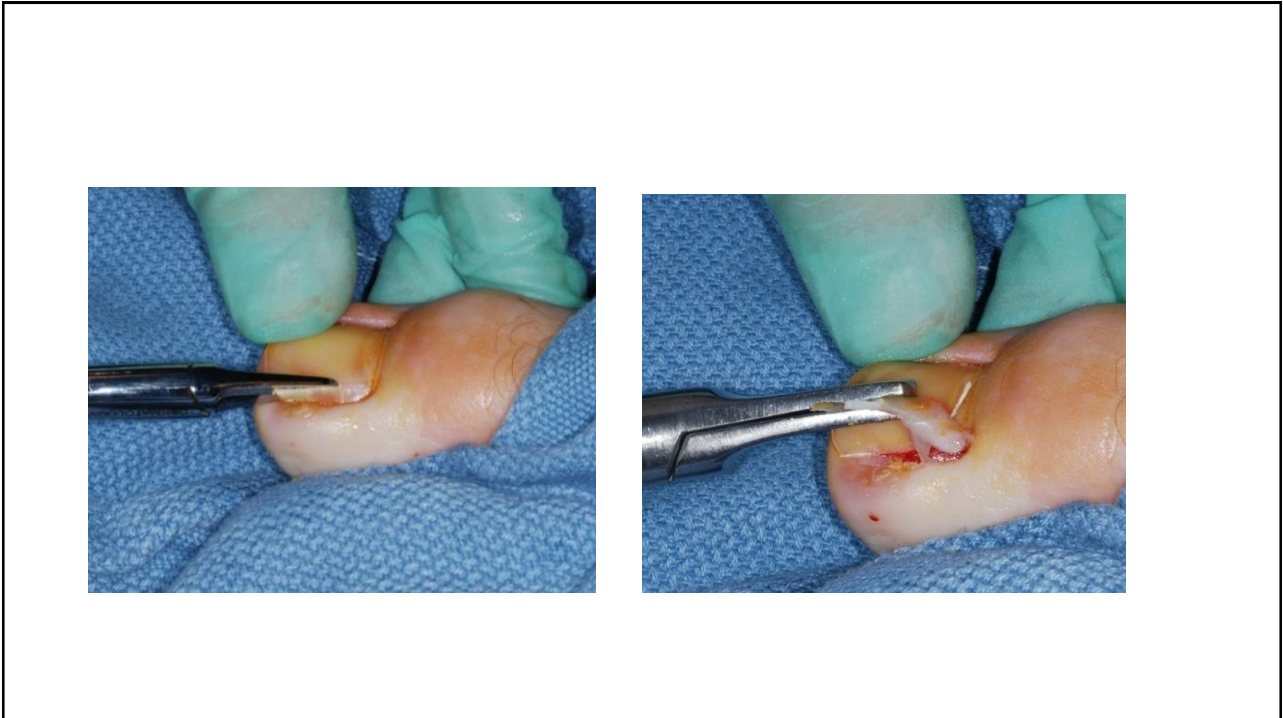
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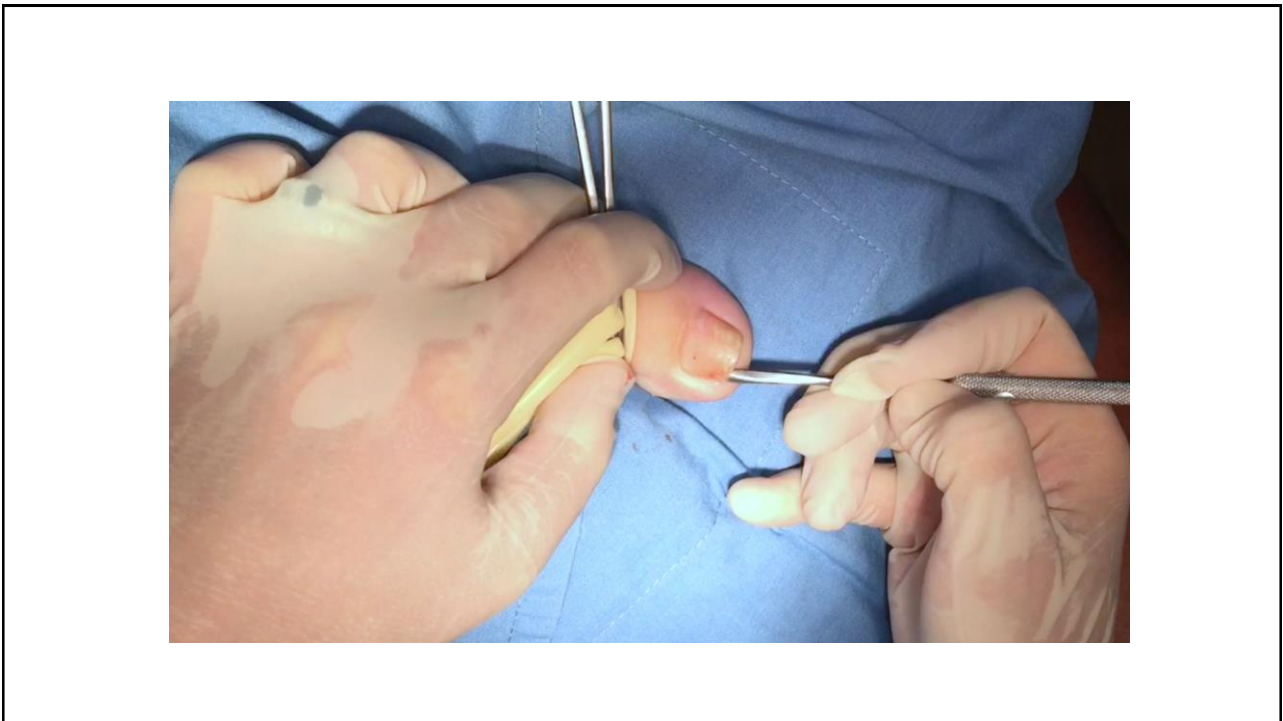
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Proximal Nail Avulsion



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Where's the pathology?

- Matrix
- Nail bed
- Nail fold
- Hyponychium



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What Type of Biopsy

Shave
Punch
Incisional
Excisional



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What about the Nail plate?

Punch through
1 step
2 steps
Partial removal
Complete removal
Reflect and replace
trap door
lateral plate
proximal curl

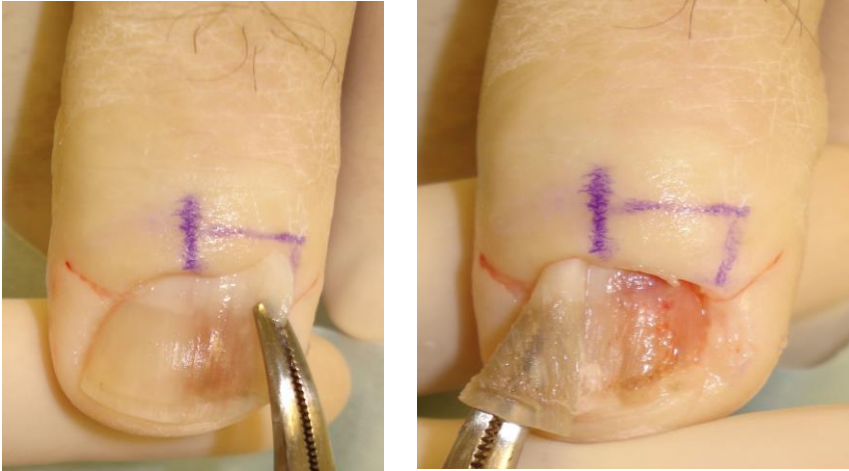


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Alternatives to complete nail plate avulsion

Collins S, Cordova K, Jellinek N

J Am Acad Dermatol 2008;59:619-26.



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Partial proximal reflection



Nail matrix biopsy of longitudinal melanonychia: Diagnostic algorithm including the matrix shave biopsy
Jellinek, N. J Am Acad Derm 2007;56:803-10

58

Trap door avulsion



Collins S, Codrova K, Jellinek N.
 Alternatives to complete nail plate avulsion
 JAAD 2008;59:619-26

59

Lateral nail plate curl



Collins S, Codrova K, Jellinek N.
 Alternatives to complete nail plate avulsion
 JAAD 2008;59:619-26

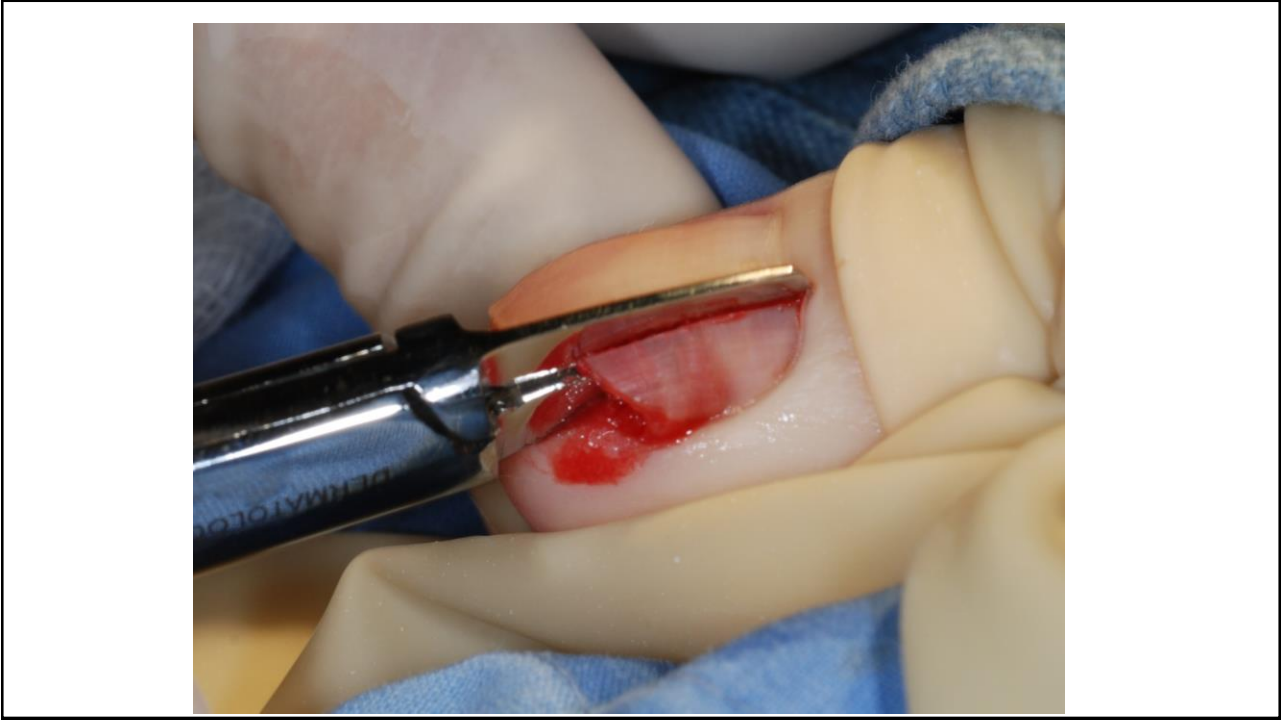
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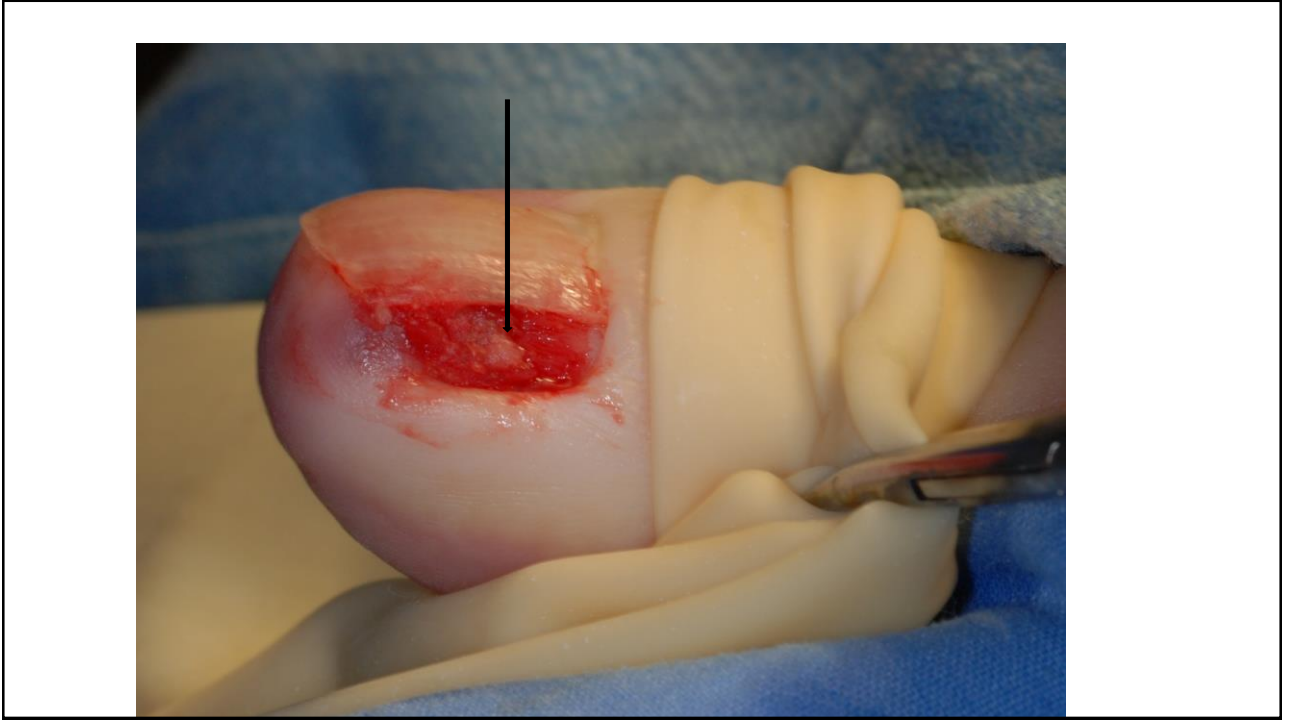
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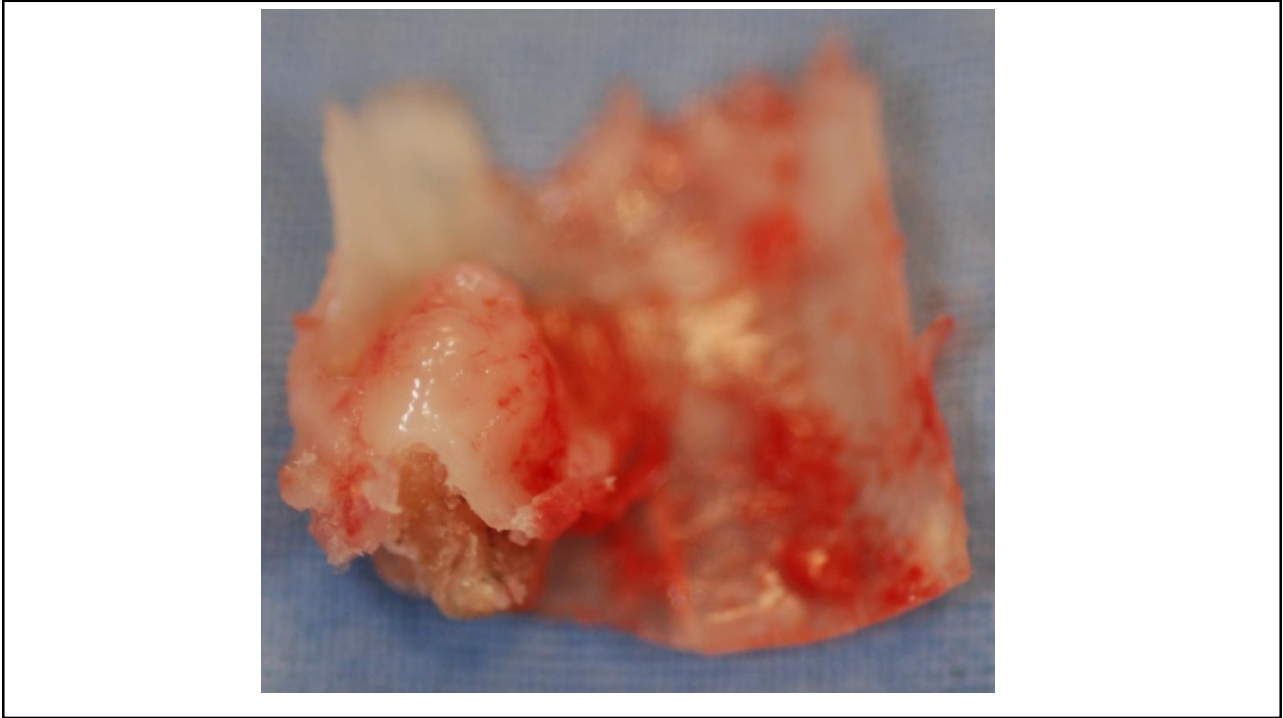
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Path: Keratoacanthoma

6 week post-op

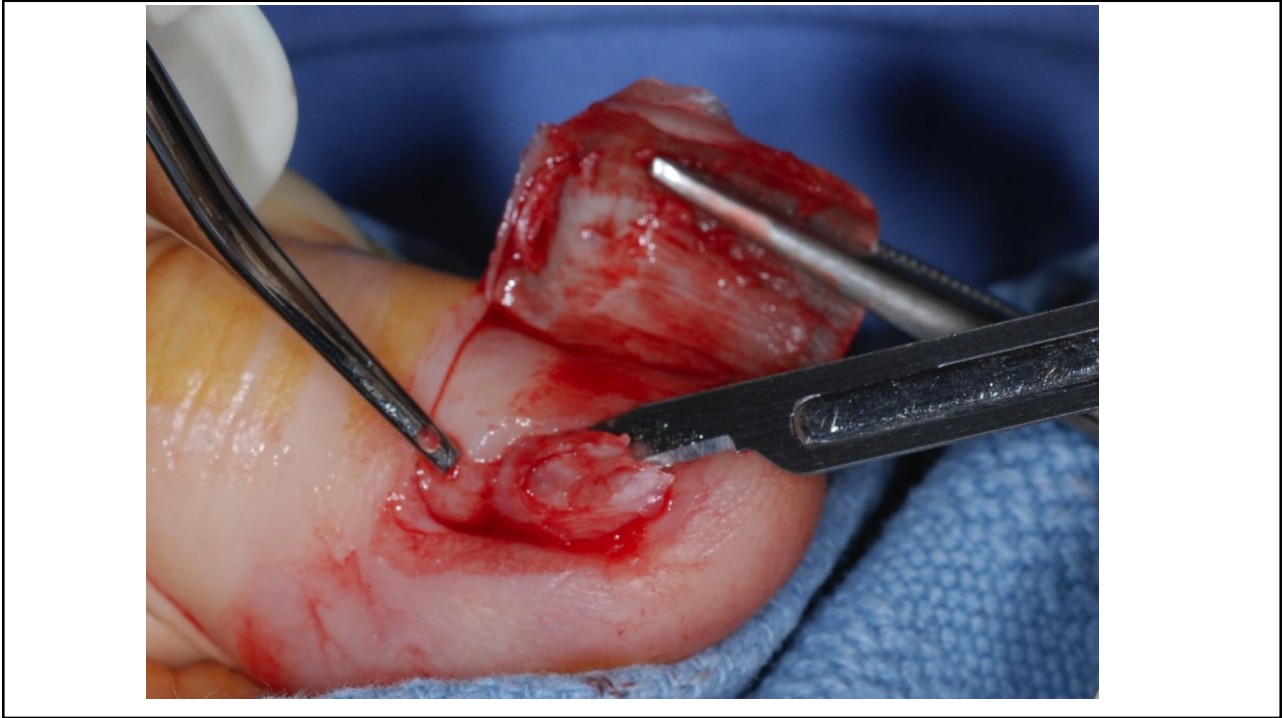
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Path: Squamous cell carcinoma

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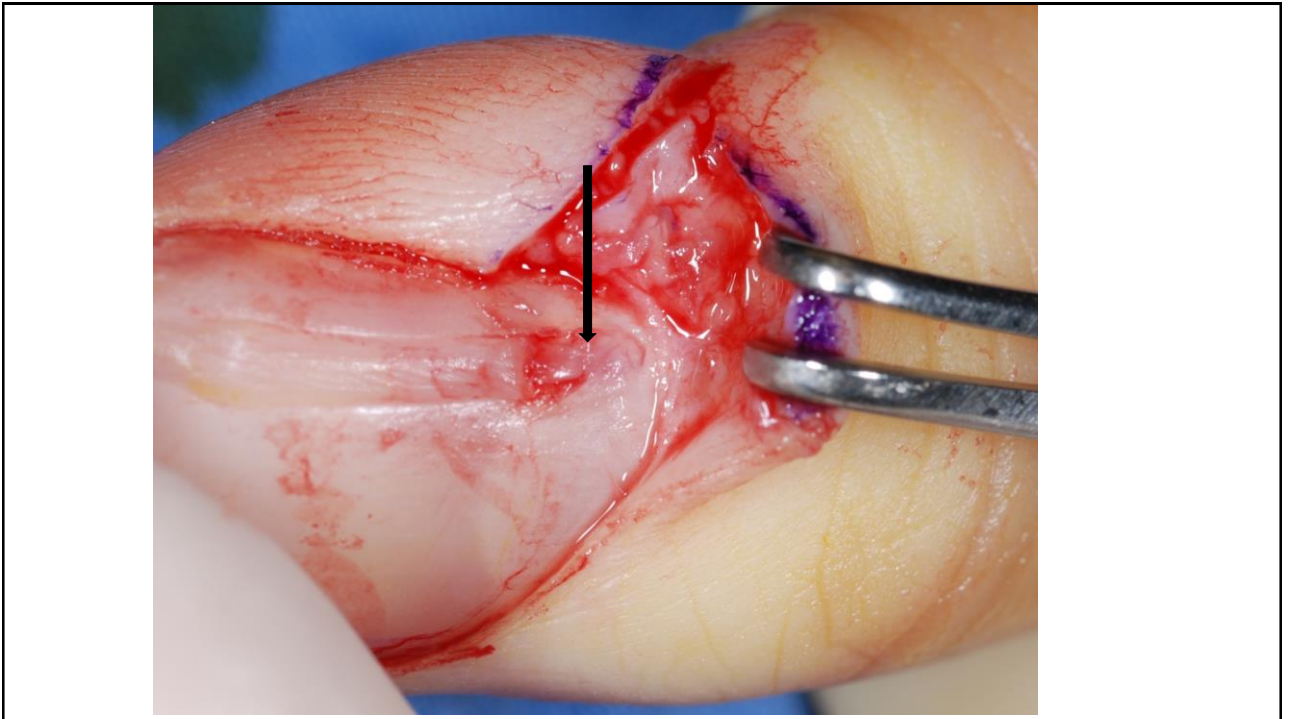
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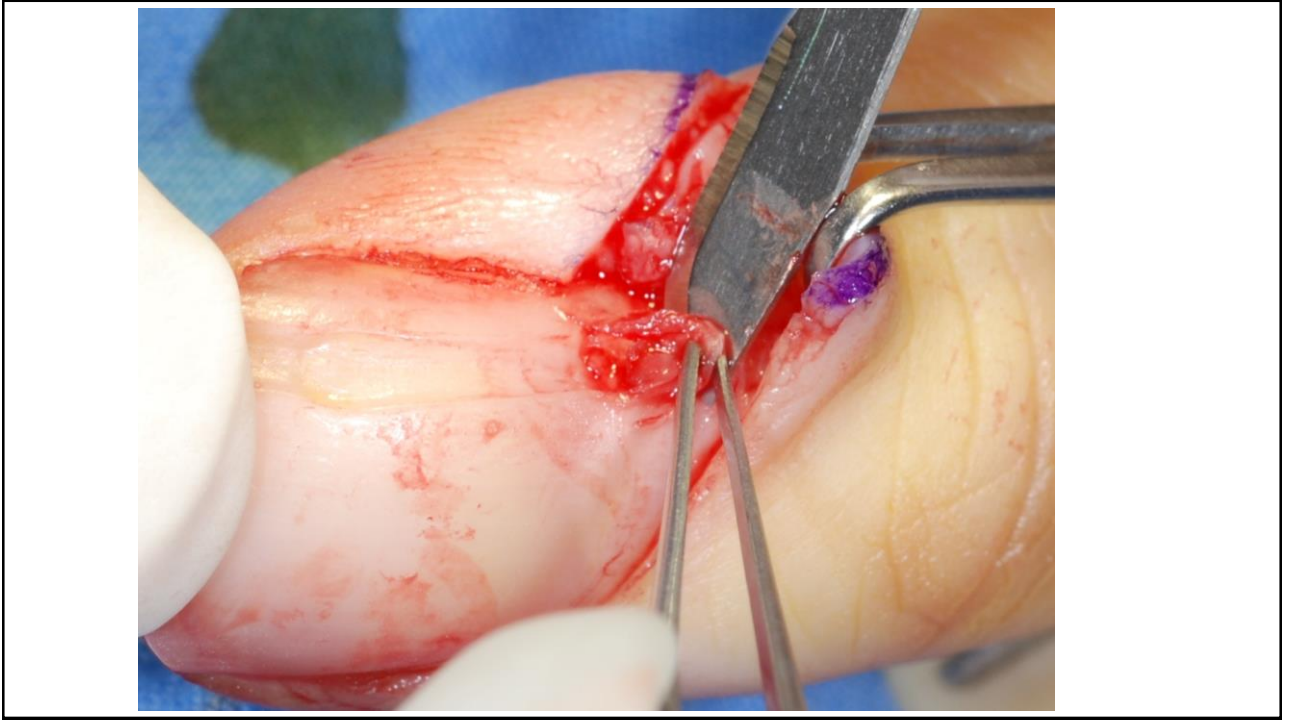
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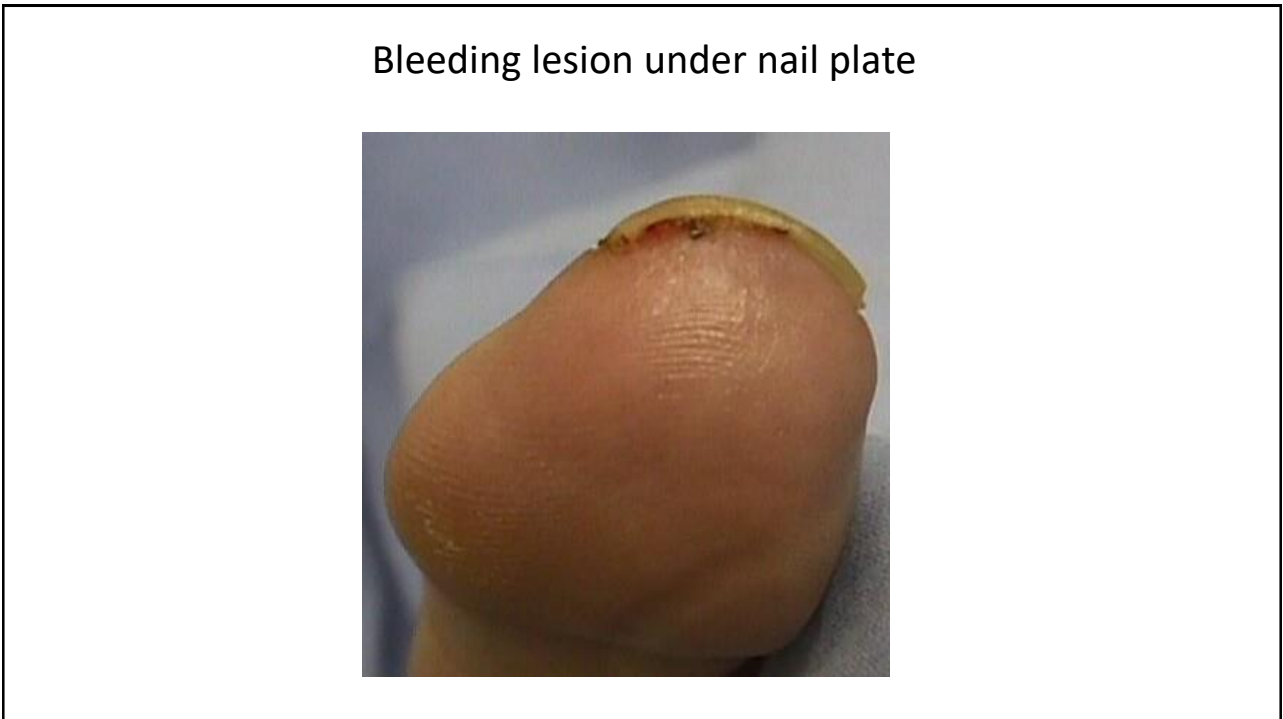
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Path: pyogenic granuloma

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Painful lesion 5th finger



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Path: glomus tumor

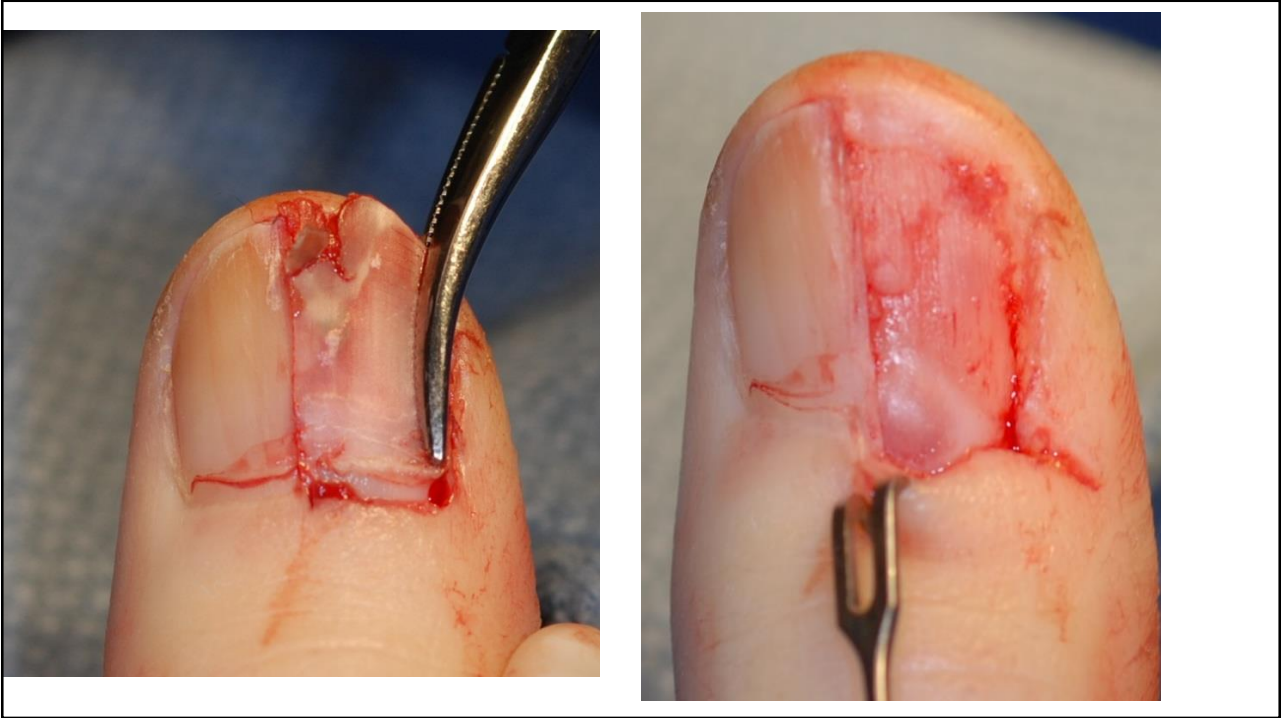
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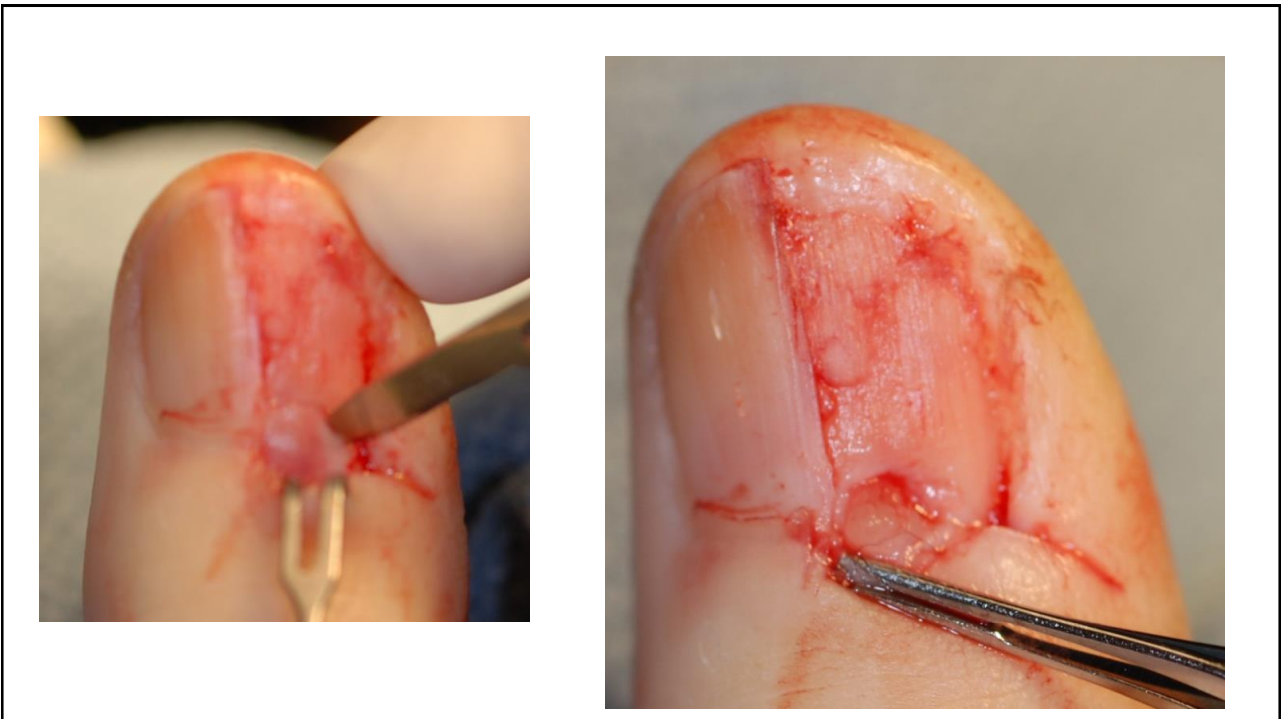
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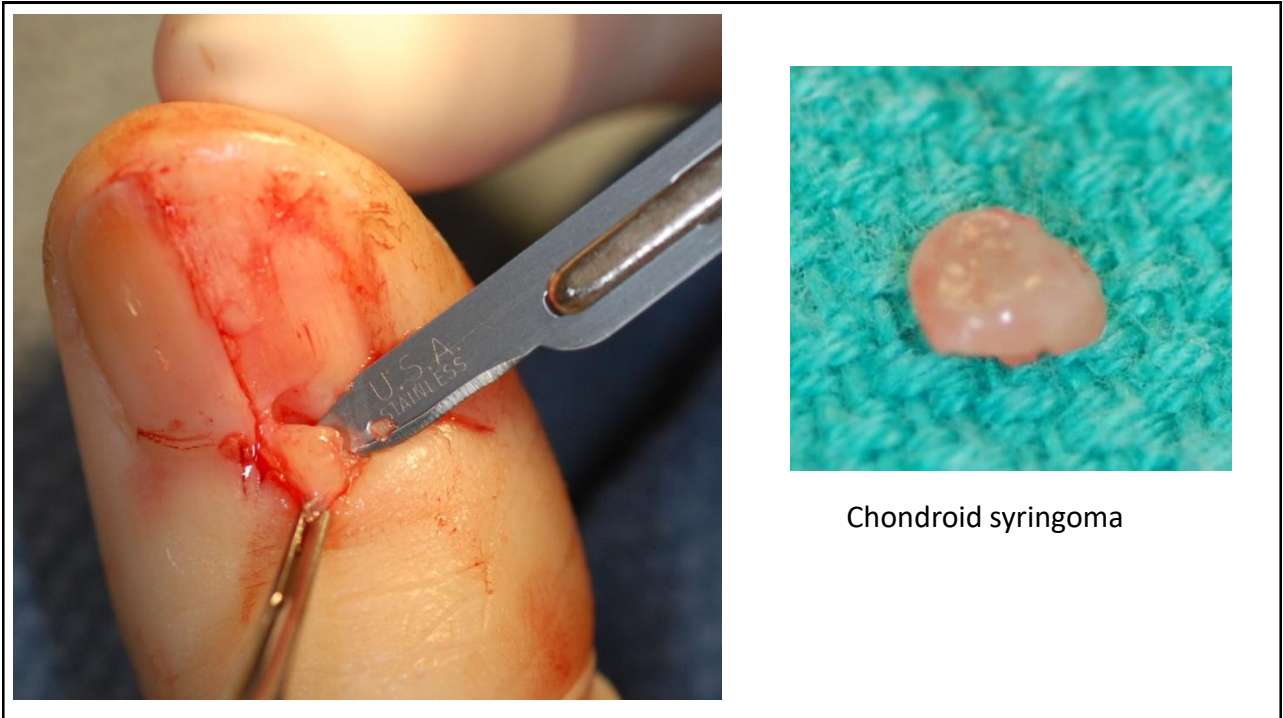
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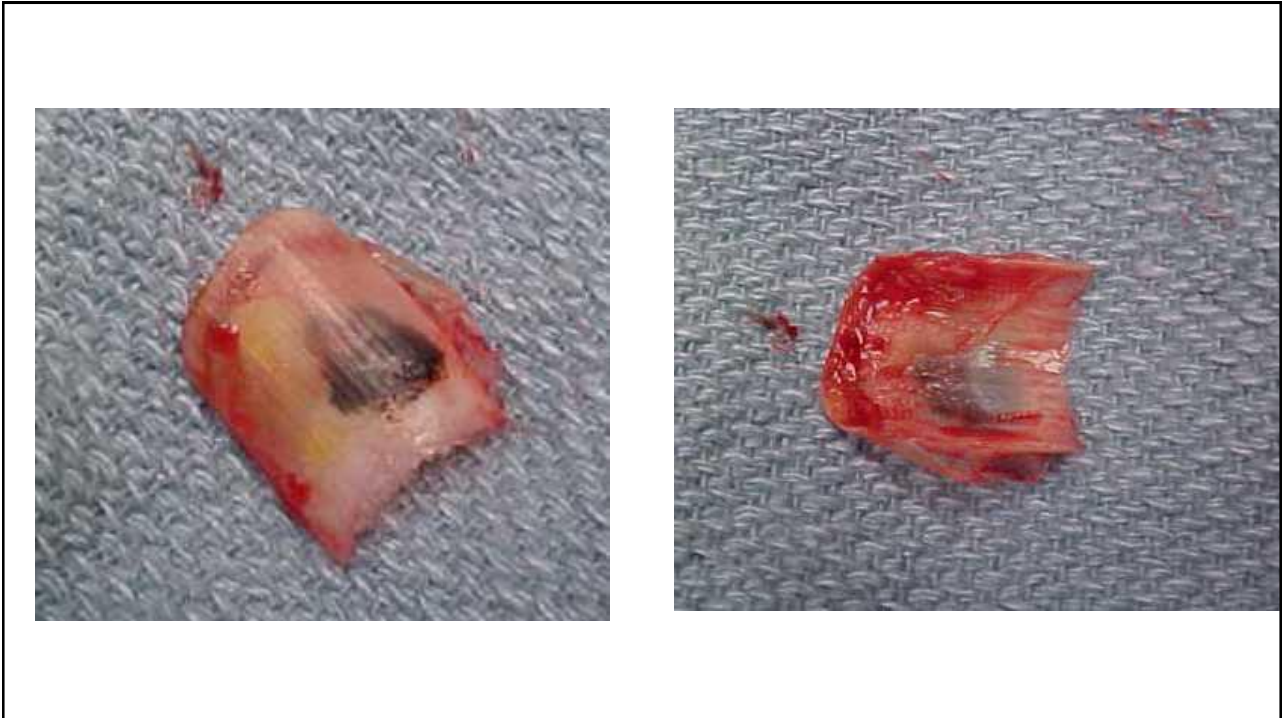


Chondroid syringoma

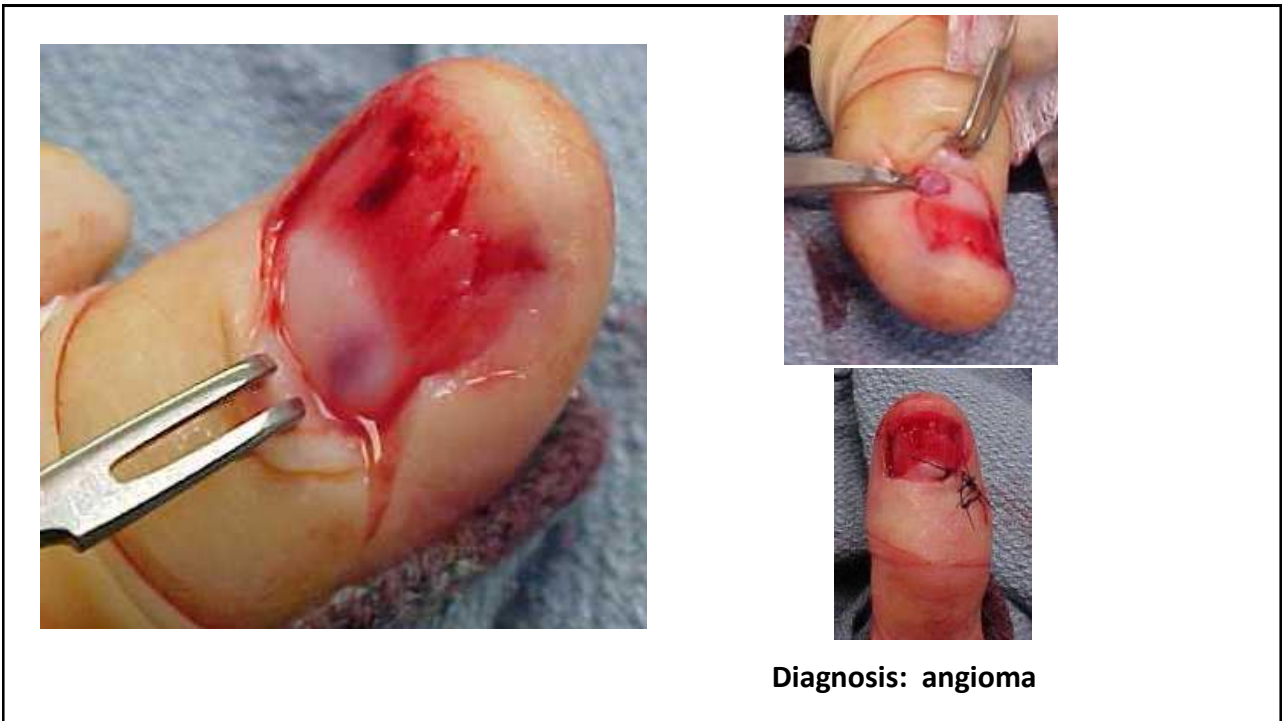
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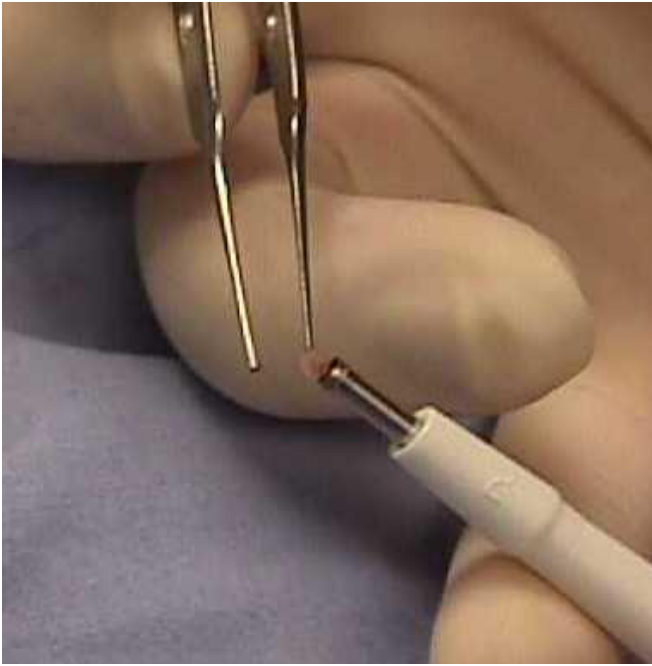


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Diagnosis: angioma

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Be kind to your dermatopathologist!

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Longitudinal erythronychia

- Longitudinal pink red nail discoloration
- Lucency in distal matrix
- Splinter hemorrhages
- Distal v shaped splitting, chipping,
- Onycholysis of free edge of nail plate
- Hyponychial hyperkeratosis
- Localized or polydactylous



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Longitudinal erythronychia

Localized

- Onychopapilloma
- Wart
- Warty dyskeratoma
- Glomus tumor
- LP
- SCC in situ
- Melanoma in situ
- BCC

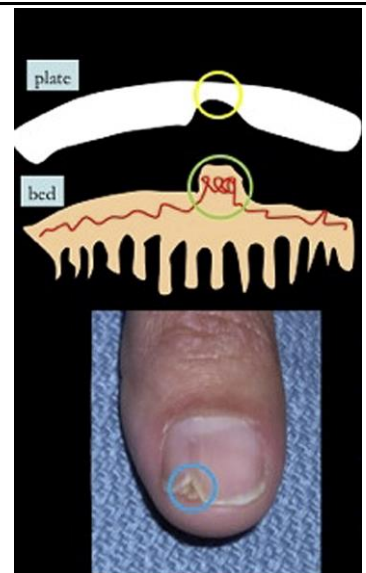
Polydactylous

- LP
- Darriers
- other

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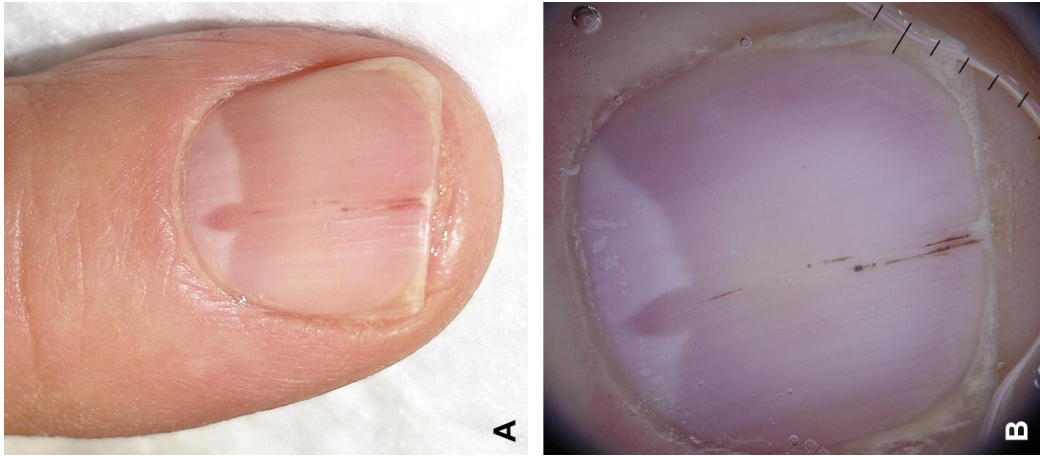
Longitudinal erythronychia

- Disease process of distal matrix
- Ventral nail plate has thin longitudinal strip
- Nail bed swells to fill the thinned strip of ventral plate
- Thinned nail plate is more transparent, and subject to trauma – splinter, chipping, onycholysis
- Hyponychium reacts with hyperkeratosis



Jellinek, N J Am Acad Dermatol 2011;64:167.e1-11

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Jellinek, N J Am Acad Dermatol 2011;64:167.e1-11

104

Longitudinal Erythronychia: Suggestions for evaluation and management

Jellinek, N J Am Acad Dermatol 2011;64:167.e1-11

105

Longitudinal Erythronychia: Retrospective Single – Center Study Evaluating Differential Diagnosis and the Likelihood of Malignancy

Jellinek NJ, Lipner SR
Dermatol Surg 2016;42:310-319

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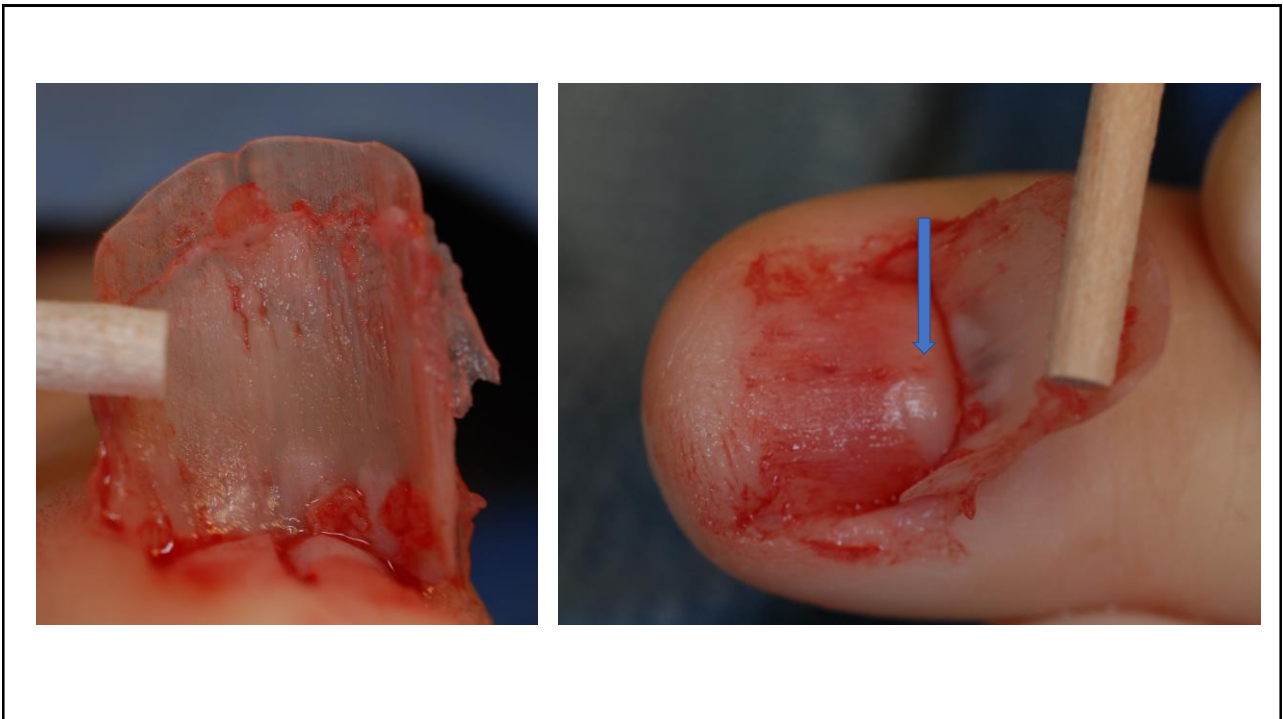
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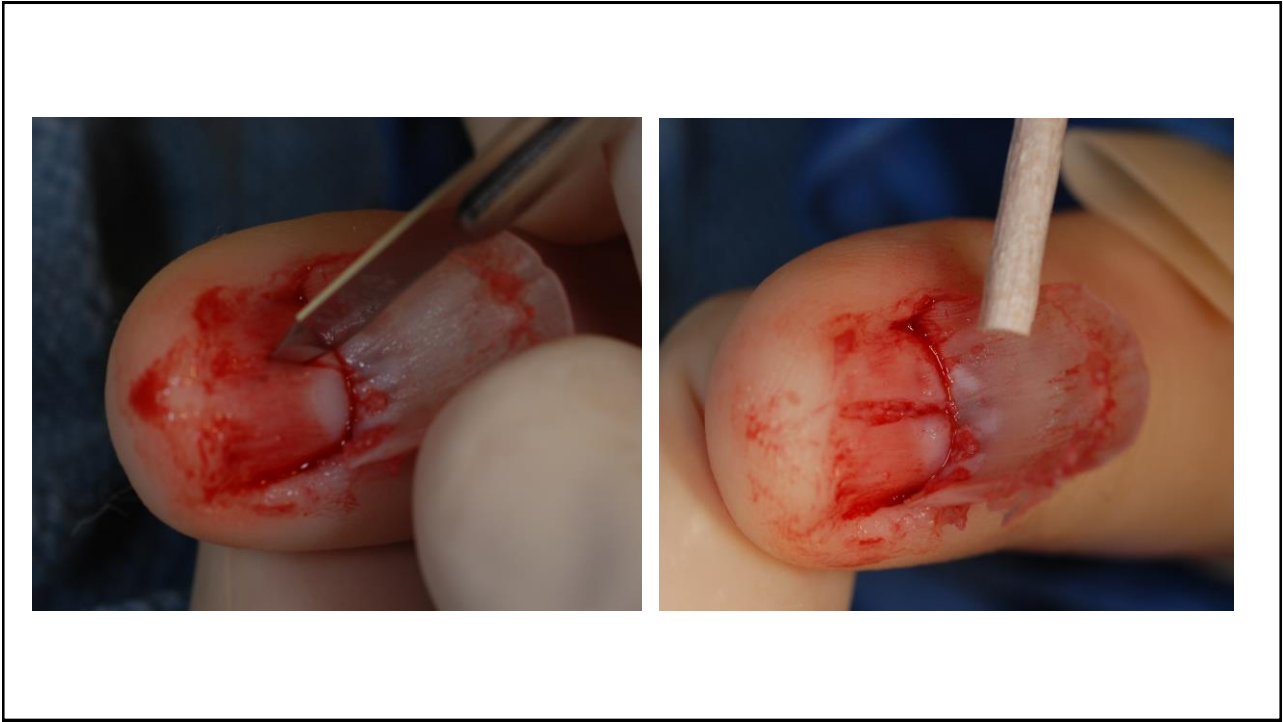
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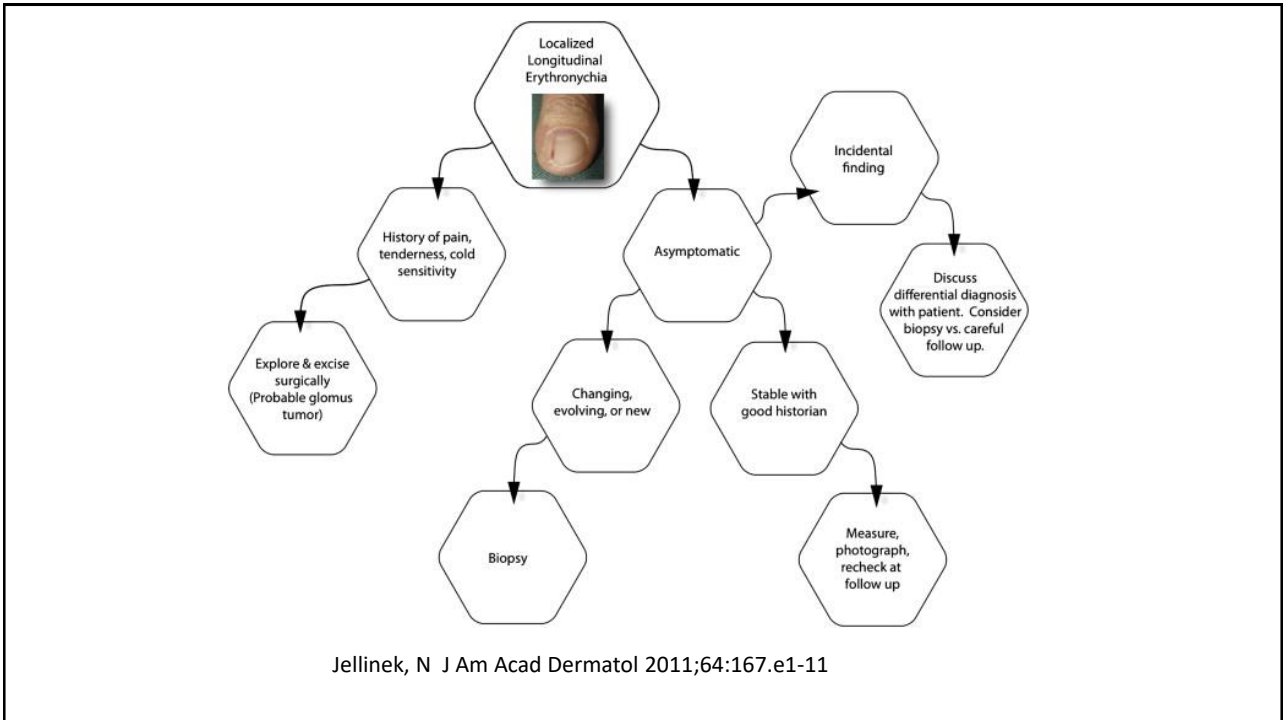


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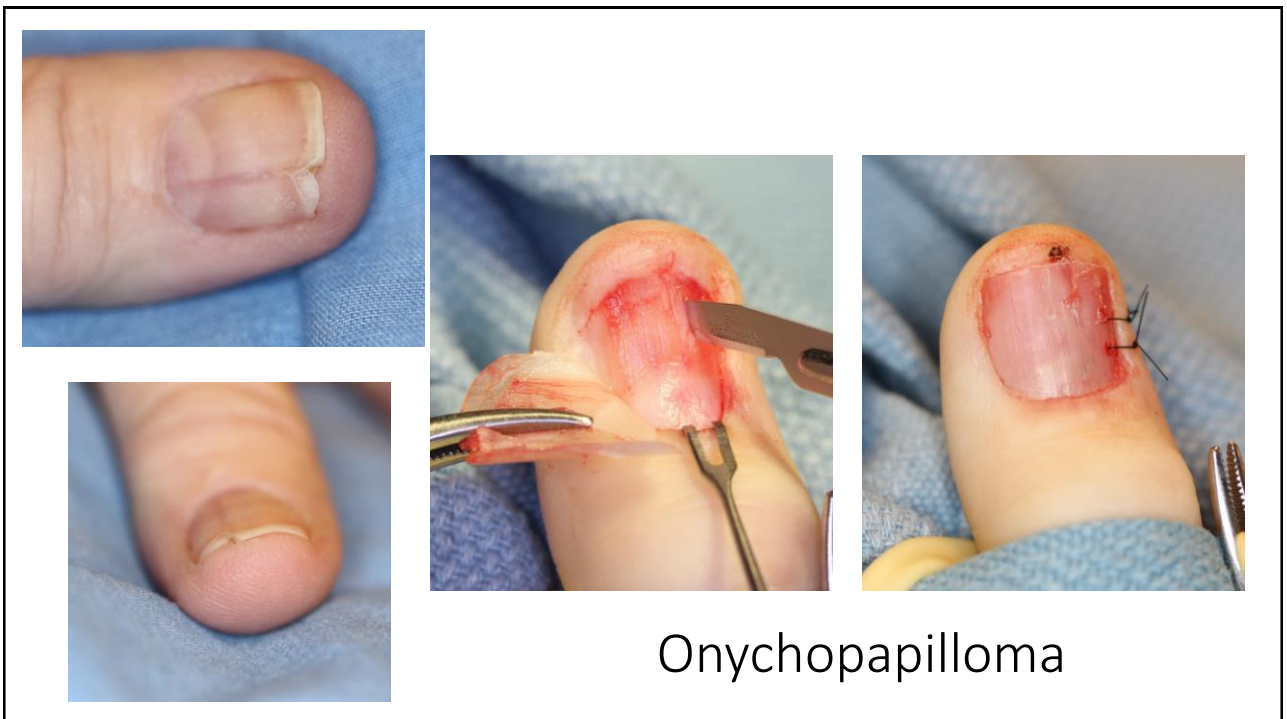


Verrucal keratosis 6 month followup

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Glomus tumor

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Amelanotic melanoma in situ

Jellinek, N J Am Acad Dermatol 2011;64:167.e1-11

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Onychomatricoma

- Rare benign fibroepithelial tumor of the nail matrix
- Yellowish discoloration of longitudinal segment of plate
- Splinter hemorrhages proximally
- Thickened nail with increased curvature
- Matrix tumor with filiform projections that extend into the plate



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onychomatricoma



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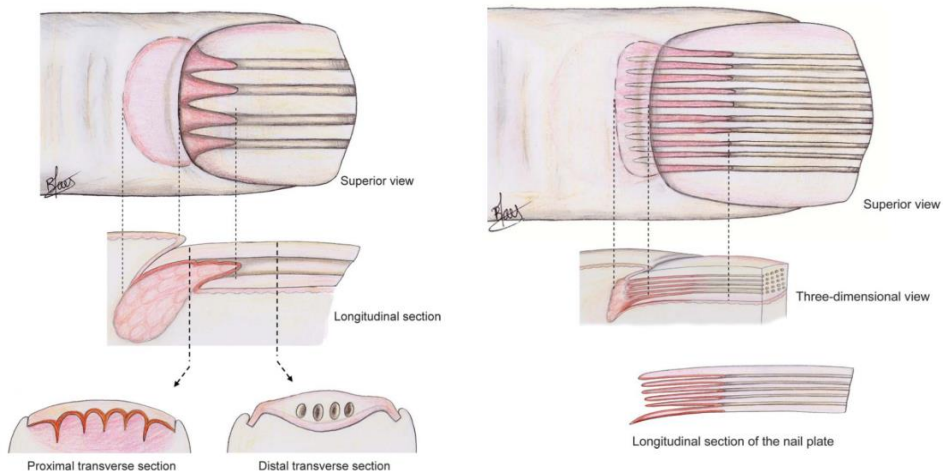
Onychomatricoma



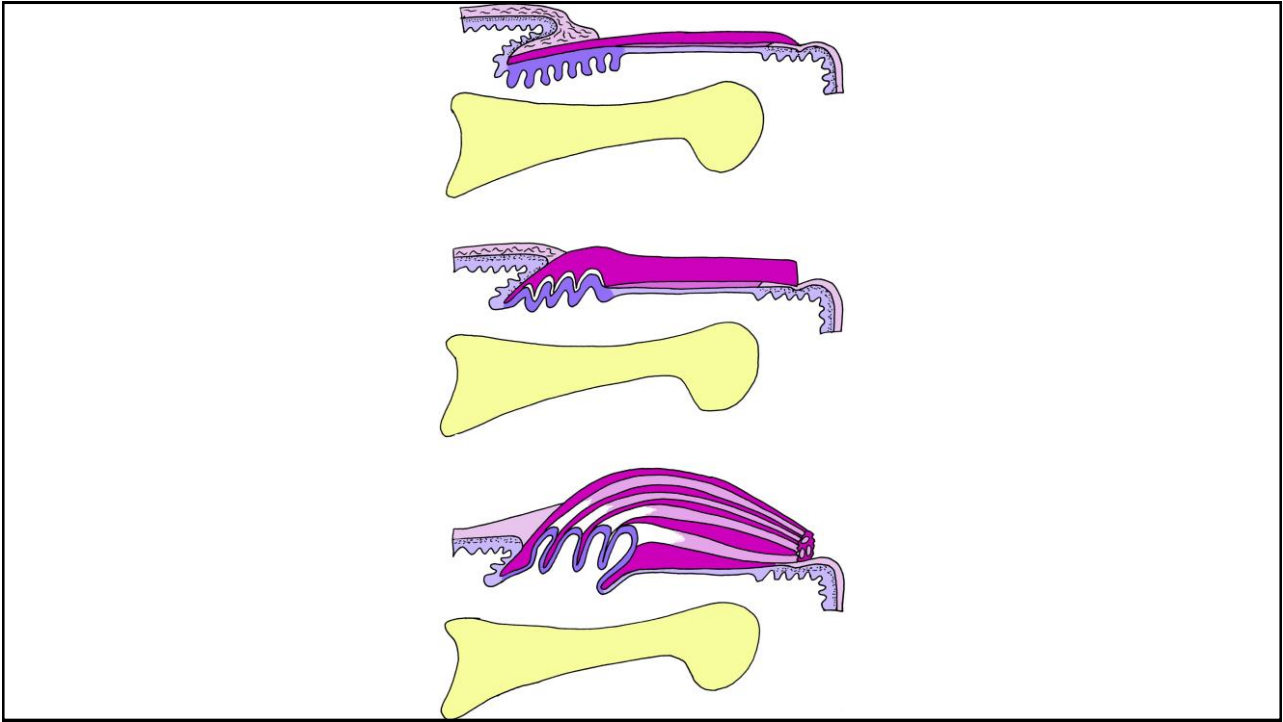
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Onychomatricoma: New Clinical and Histological Features. A Review of 19 Tumors

Christophe Perrin, MD, Robert Baran, MD,† Thierry Balaguer, MD,‡
Bérangère Chignon-Sicard, MD,‡ Giuseppe E. Cannata, MD,§
Tony Petrella, MD,¶ and Jean-François Michiels, MD**



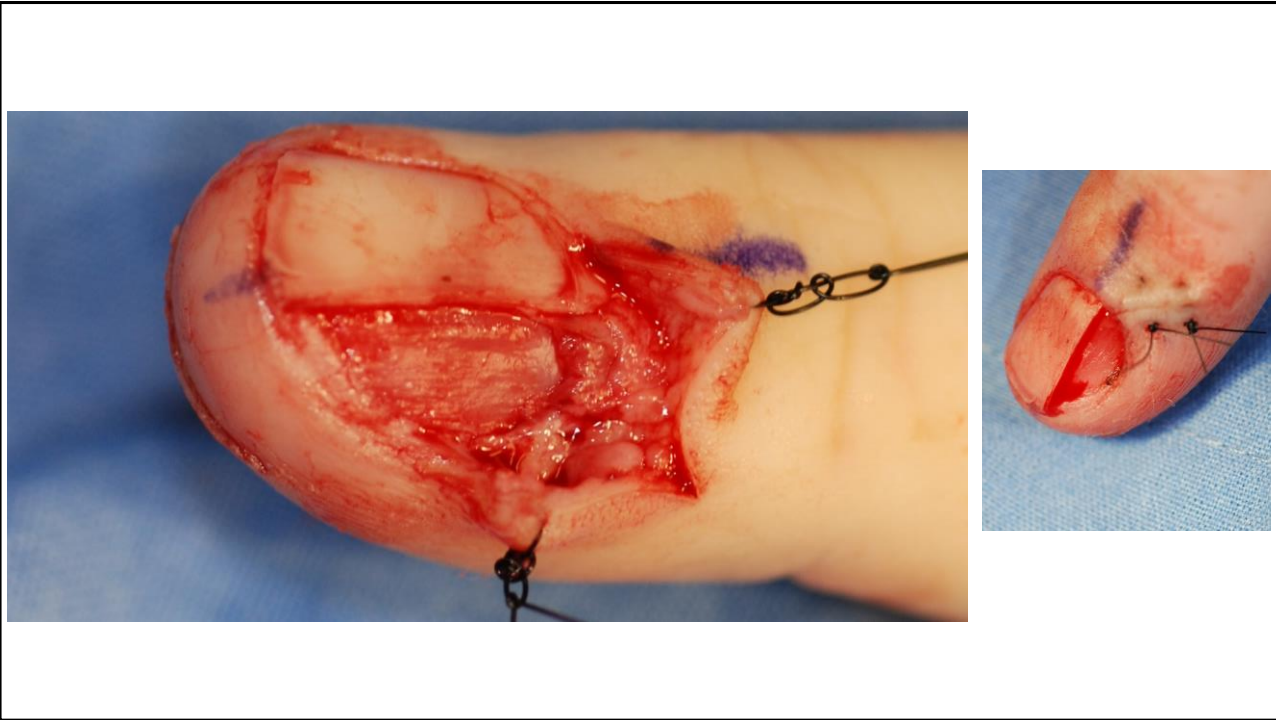
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3 month

8 month

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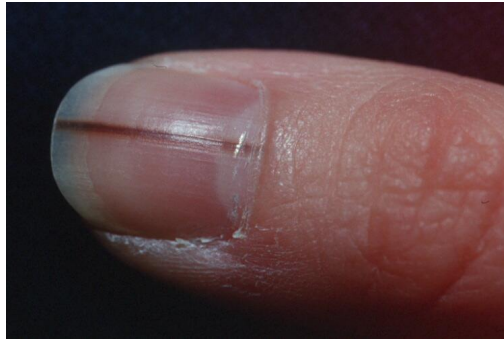
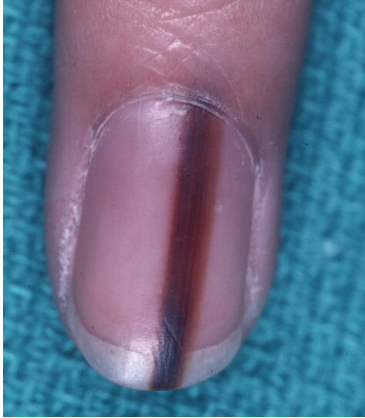
**Nail Clipping Diagnosis
of Onychomatricoma**

Mariya Miteva, MD
Débora Cadore de Farias, MD
Martin Zaiac, MD
Paolo Romanelli, MD
Antonella Tosti, MD



133

The pigmented streak.....



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Decision to Biopsy



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Longitudinal melanonychia

Melanocytes are present throughout the nail matrix

Melanocytes in the proximal matrix are less active and produce less melanin

More active melanocytes are present in the distal matrix, giving rise to pigmented streaks

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Longitudinal Melanonychia

CAUSES OF LONGITUDINAL MELANONYCHIA	
Melanocyte activation	Racial Trauma <ul style="list-style-type: none"> • manicure • nail biting/onychotillomania • friction, primarily in toenails Drugs <ul style="list-style-type: none"> • cancer chemotherapeutic agents • zidovudine (AZT) • psoralens Radiation Pregnancy Laugier–Hunziker syndrome Peutz–Jeghers syndrome Addison disease HIV infection Postinflammatory <ul style="list-style-type: none"> • lichen planus • pustular psoriasis • onychomycosis (<i>T. rubrum</i> and <i>Scytalidium</i> spp.)
Non-melanocytic tumors	Bowen disease Onychopapilloma Onychomatricoma
Melanocyte hyperplasia/neoplasia	Nail matrix lentigo Nail matrix nevus Nail matrix melanoma

Bolognia, J. L., Schaffer, J. V., Cerroni, L. (2018). Dermatology. Elsevier Saunders. Online resource.

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Questions to ask

Is it new?

Has it changed?

History of trauma?

Medications?

Family history of melanoma?

Medical history – addisons, HIV, Peutz-jegher synrome,
Laugier- hunziker syndrome

Pregnancy?

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Things to Observe

Single or multiple

If multiple - ugly duckling?

“streaky” streak

Hutchinson sign

ABCDE

d – digit

e – evolving, extension

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If Decide NOT to biopsy

Photograph

Follow-up

Educate

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If decide YES to biopsy

.....

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WHERE to biopsy?

Visualize the most proximal aspect of pigment.

Proximal nail fold may need to be reflected

End on view may be helpful



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WHERE to biopsy?

Locate the pigment within the nail plate

Pigment on the top surface of the plate - likely from proximal matrix

Pigment on underside of nail plate - likely from distal matrix

Dermatoscope may be helpful - end on view



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What about the Nail plate?

Punch through
1 step
2 steps
Partial removal
Complete removal
Reflect and replace
trap door
lateral plate
proximal curl



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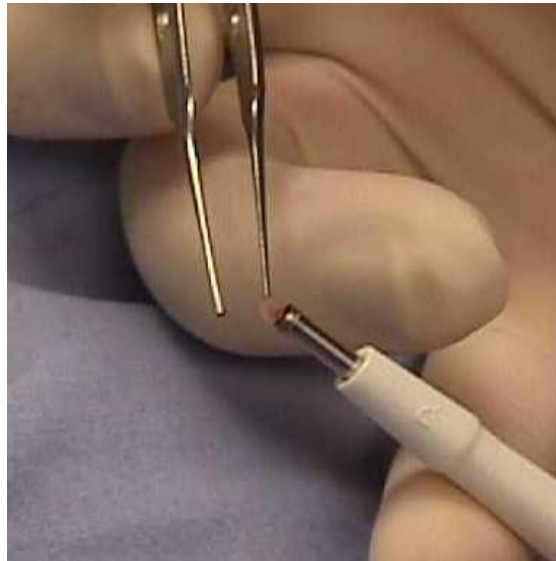


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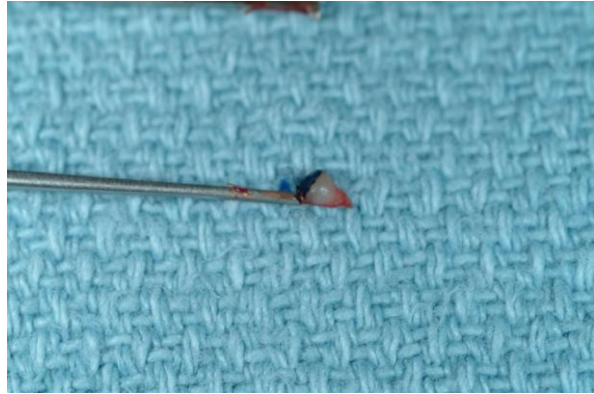
Path: lentigo

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Be kind to your dermatopathologist!

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Consider inking specimen to help with orientation

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Matrix Shave Biopsy

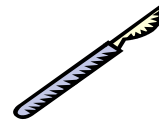
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- Matrix shave biopsy
- Tangential matrix excision
- Tangential matrix biopsy
- Matrix saucerization biopsy

GOAL IS PARTIAL THICKNESS MATRIX WOUND
MINIMIZE SCARRING AND NAIL DYSTROPHY

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Matrix shave biopsy



Helpful for pigmented streaks that originate in proximal matrix

Helpful to adequately sample lesions >3mm anywhere in the matrix

Partial thickness wound may help minimize permanent nail dystrophy.

When there is high suspicion of melanoma, an excision may be better option to obtain depth of invasion

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Keys to success



- Bloodless field
- Partial plate avulsion or reflect nail and replace
- Reflect proximal nail fold to visualize proximal aspect of lesion
- Score around lesion 1-2 mm
- Superficial removal – silicon coated blade
- Return nail plate and fold
- Protect the specimen
- Trust your dermatopathologist!

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Nail matrix biopsy of longitudinal melanonychia: Diagnostic algorithm including the matrix shave biopsy

Jellinek N. J Am Acad Dermatol 2007;56:803-810

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Jellinek N. J Am Acad Dermatol 2007;56:803-810

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Jellinek N. J Am Acad Dermatol 2007;56:803-810

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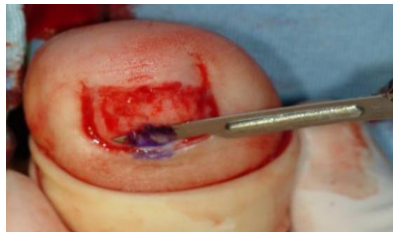
Jellinek N. J Am Acad Dermatol 2007;56:803-810

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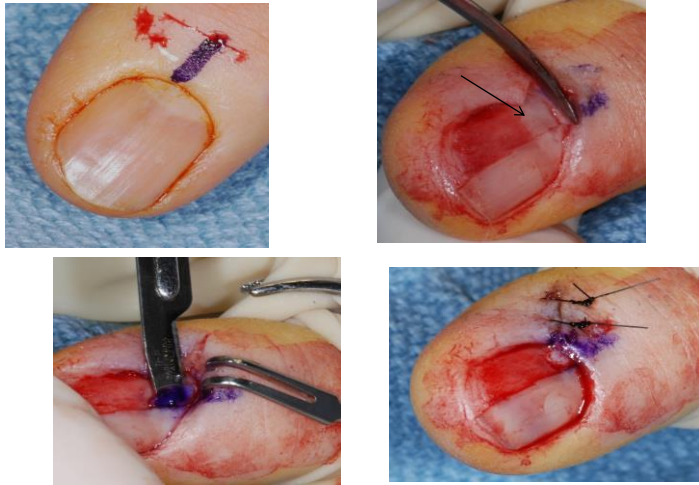
Shave Biopsy



Dx: lentigo



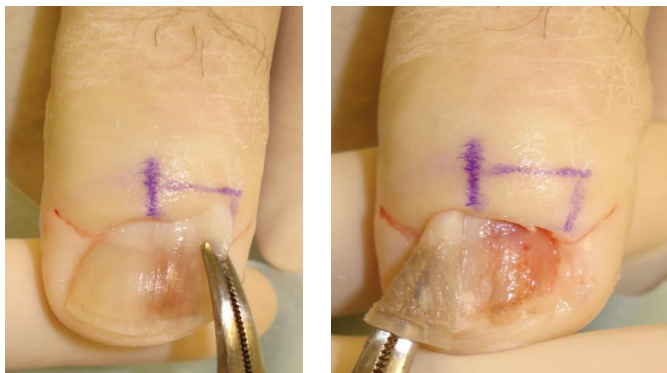
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Path: Lentigo

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Alternatives to complete nail plate avulsion
 Collins S, Cordova K, Jellinek N
 J Am Acad Dermatol 2008;59:619-26.



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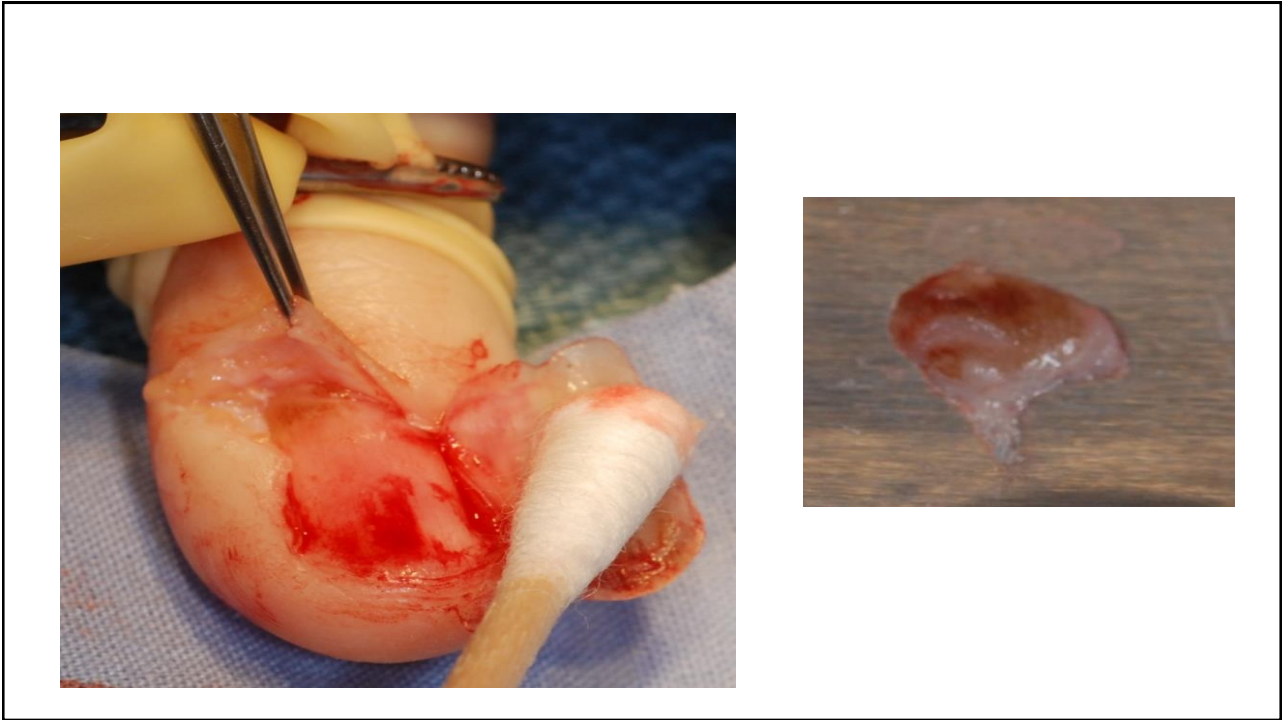
Nurse with 8 year history of changing streak
right 5th finger



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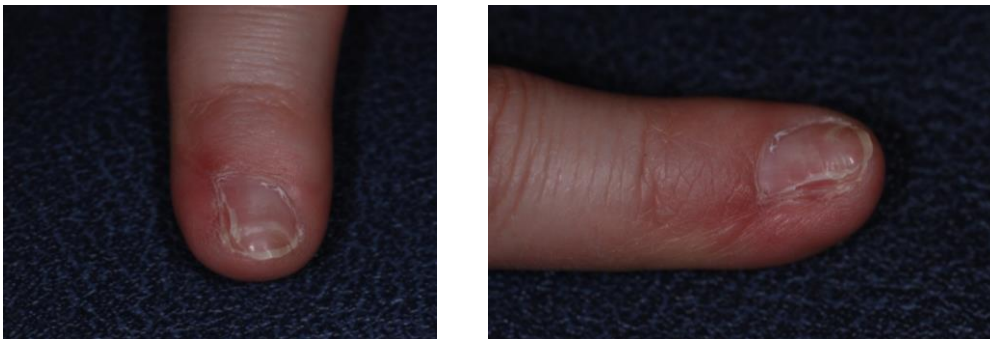


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3 month follow-up



Path: compound melanocytic neoplasm with site related atypia
Close clinical follow-up for recurrence

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9 month follow-up



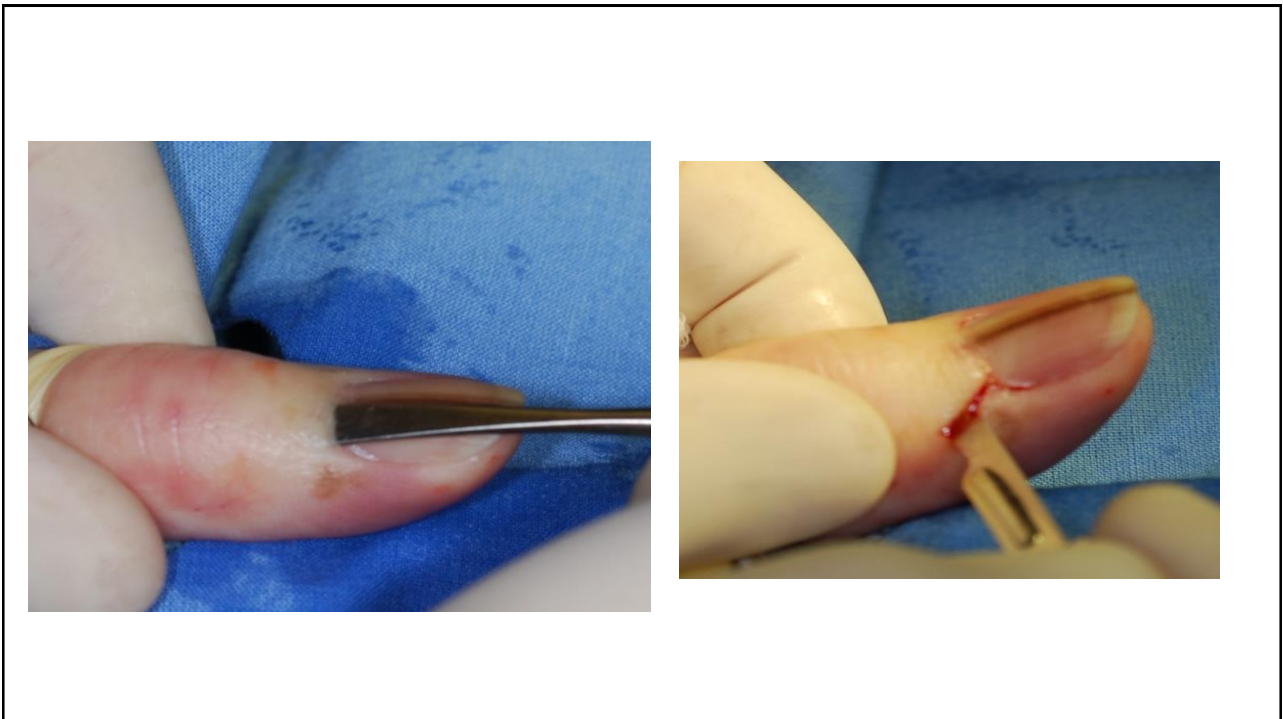
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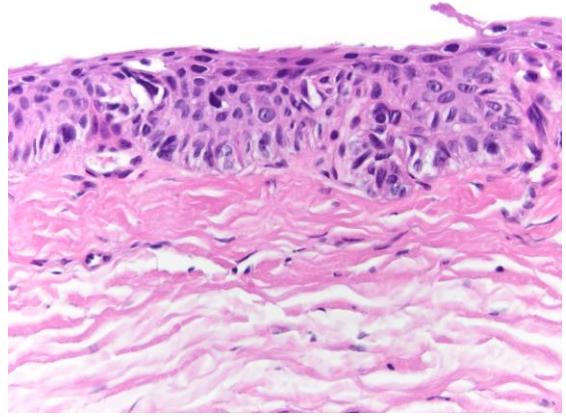
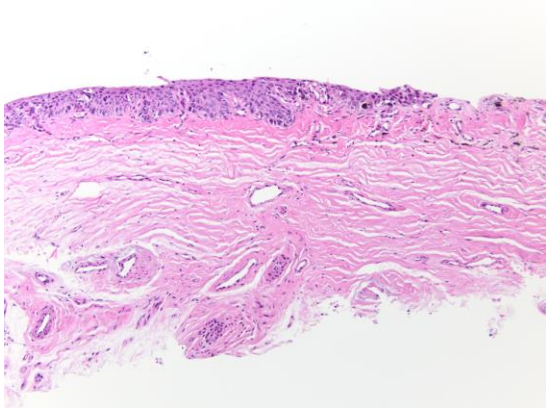
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Path : melanoma in situ



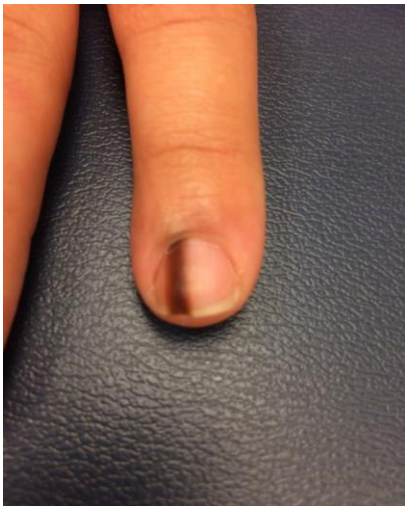
175

Melanoma in situ - matrix



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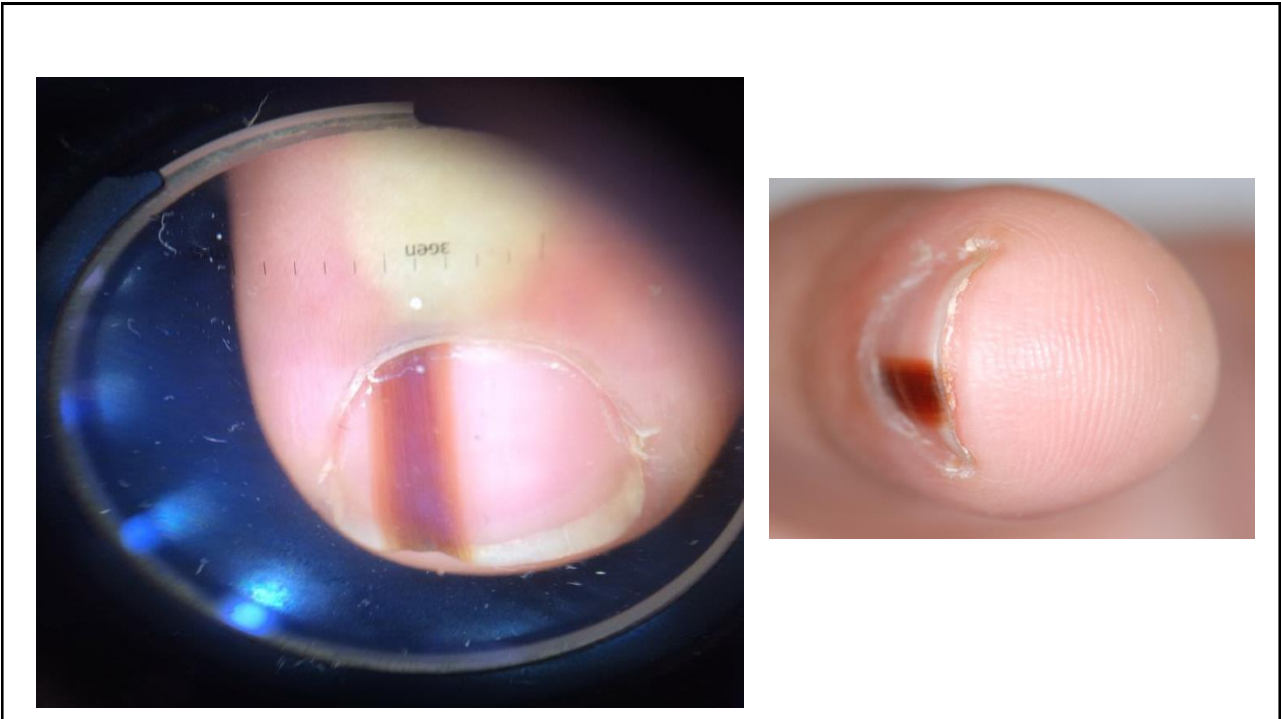
28 year old with longitudinal melanonychia



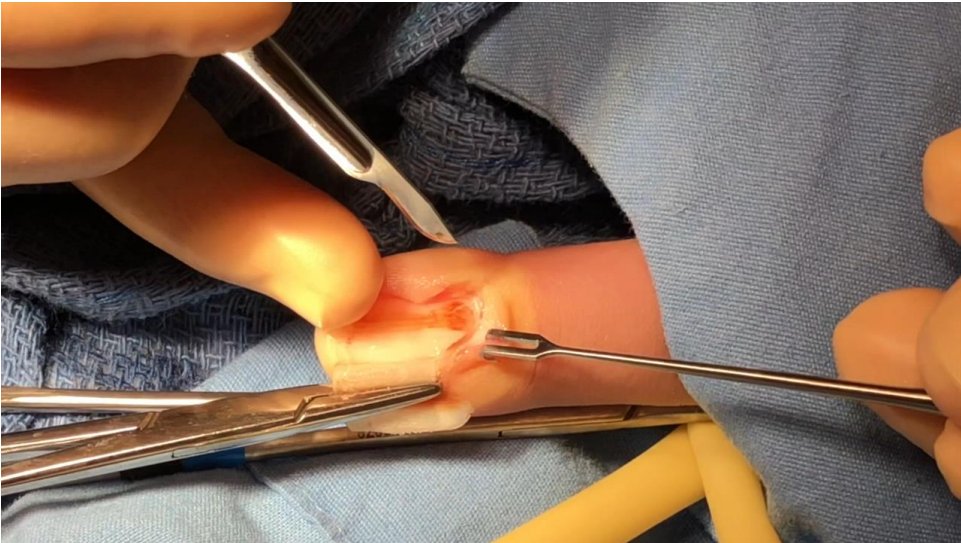
177



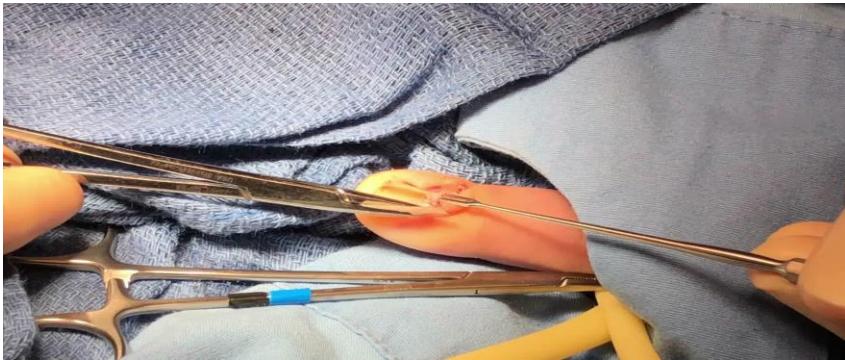
178



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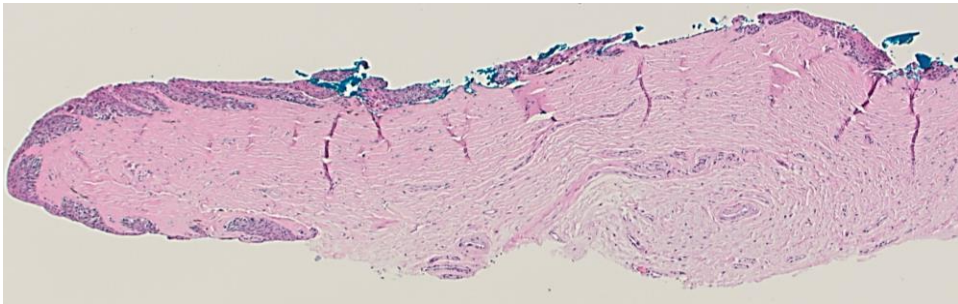
180



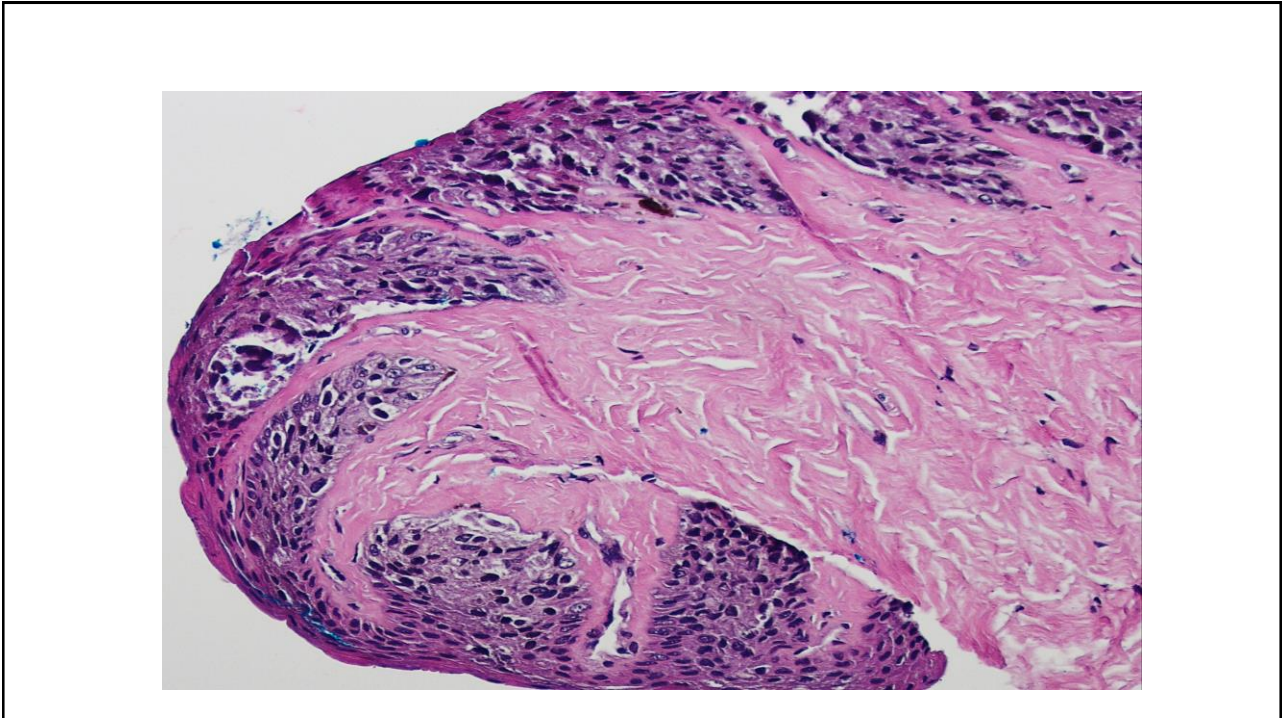
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Melanoma in situ



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*Research Article***Tangential Biopsy Thickness versus Lesion Depth in Longitudinal Melanonychia: A Pilot Study**

**Nilton Di Chiacchio,¹ Walter Refkalefsky Loureiro,¹
Nílceo Schwery Michalany,² and Felipe Veiga Kezam Gabriel¹**

¹ Dermatologic Clinic, Hospital do Servidor Público Municipal de São Paulo, Rua Castro Alves 131, 01532-001 São Paulo, SP, Brazil
² Laboratório Patologista de Dermatologia Avenida Brigadeiro Luís Antônio 4315, Universidade Federal de São Paulo, 01401-002 São Paulo, SP, Brazil

22 cases of longitudinal melanonychia biopsied with tangential technique.

Mean thickness of specimen: 0.59mm

Mean lesion depth: 0.08mm (ratio 7.35:1 -- biopsy depth: lesion depth)

No transection or missed diagnoses.

the most complete evidence to date supporting the utility, practicality, and safety of the matrix shave/tangential biopsy for diagnosis.

Chiacchio ND et al Dermatol Res Prac 2012 Epub 201 March 14

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■

**Tangential excision of pigmented nail matrix lesions
responsible for longitudinal melanonychia: Evaluation
of the technique on a series of 30 patients**

Bertrand Richert, MD, PhD,^{a,c} Anne Theunis, MD,^{a,b} Sarah Norrenberg, MD,^a and Josette André, MD^a
Brussels and Liège, Belgium

- 30 patients with shave (tangential) excision
- Diagnostic in all cases
- 23/30 followed up
- 17/23 (74%) no nail dystrophy
- 16/23 (70%) recurrence of pigment

Richert B, et al. J Am Acad Dermatol 2013;69:96-104

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Matrix shave biopsy - key points

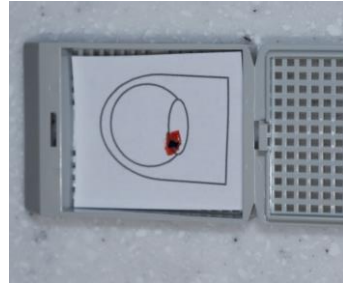
- Thin saucerization
- Score 1-2 mm around lesion
- Protect the specimen
- Just do it!

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Facilitates histology lab processing
 Orients specimen for tech who may be unfamiliar
 with nail specimens
 prevents curling/rolling of thin specimens
 keeps epithelium up
 Inking is helpful



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IT'S OVER!!!!
 YOU DID IT!!!!

THE BIOPSY IS DONE!!!!

NOW WHAT?



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Post-operative care

- Bandaging
- Wound care
- Pain management
- Elevation, support, protection
 - Sling
 - Finger splint
 - Open toe boot

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Post-operative management

Wound care

written instructions

bandaging - petrolatum and non stick gauze
gauze for cushioning
once or twice daily

soaks – daily at first

+/- antibiotics

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Pain management

- Elevation!!!
- Acetaminophen – end of procedure, every 4-6 hours for 1 day then prn
- Ibuprofen between doses
- Ice on blood supply, not on bandage

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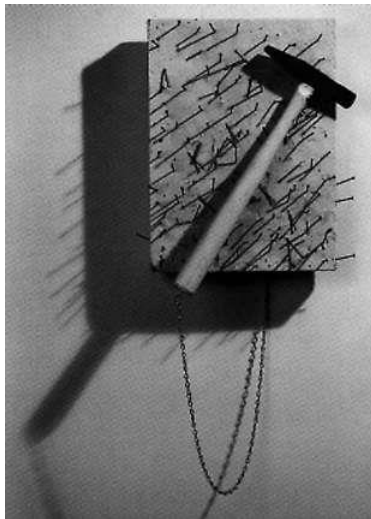
Key Points for successful nail surgery

- Recognize and address the patient's (and your?) anxiety
- Know your anatomy
- Minimize discomfort
- Where's the pathology?
- Be efficient
- Experienced dermatopathologist
- Just do it!



ENJOY!

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Thank you for your attention!

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