



Evaluation and Treatment of Subungual Hematoma



By James R. Roberts, MD

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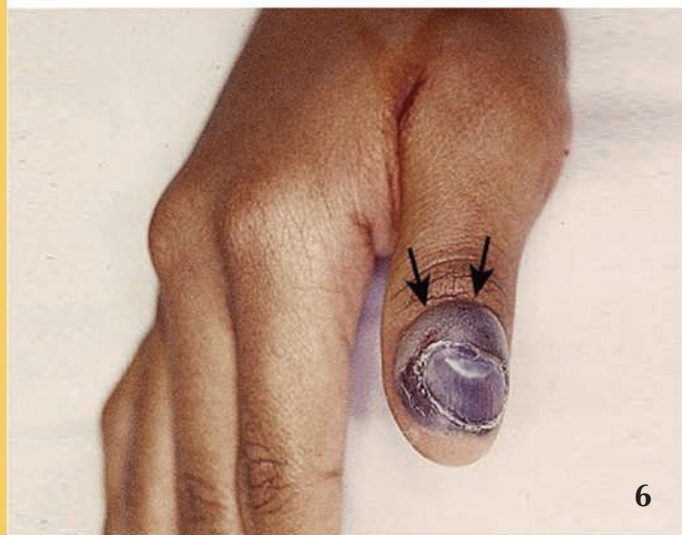
Learning Objectives: After participating in this activity, the physician should be better able to:

1. Formulate a plan to identify subungual hematomas that require simple nail trephination vs. nail removal.
2. Select the correct method of providing nail trephination.
3. Predict the need for prophylactic antibiotics after hematoma evacuation.

Emergency physicians frequently deal with patients who have suffered trauma to the digits. This month's column begins a series of discussions on a rational approach to fingertip problems by reviewing the ubiquitous subungual hematoma (SUH).

SUHs are rather common, and cause incapacitating and throbbing pain, prompting the hardiest of souls to seek relief. Even narcotics may fail to relieve the pain produced by an expanding subungual hematoma as it compresses the sensitive nailbed so some method to release the pressure is usually required, and is usually immediately curative. Few randomized controlled studies have critically evaluated therapeutic modalities, but clinical practice has identified the salient issues. Treatment recommendations vary, and unsubstantiated clinical dogma and waffling recommendations are extant.

SUH is usually not a digit-threatening injury, and rarely is even a cosmetic concern. But SUH is usually treated in the ED, and the emergency physician should be an expert in its



Part 1 in a Series

care. The key to a successful outcome of any fingertip injury is to know when to be conservative and when to be aggressive. House staff usually learns from on-the-job experience. Some continue to repeat the mistakes of a misinformed mentor because even

seasoned physicians are not cognizant of all the issues.

After reading this article, emergency physicians should be better able to identify which subungual hematomas require simple nail trephination vs. nail removal, select the correct method of providing nail trephination, and predict the need for prophylactic antibiotics after hematoma evacuation.

Treatment of Subungual Hematomas with Nail Trephination: A Prospective Study

Seaberg DC, et al
Am J Emerg Med
1991;9(3):209

This nicely done sentinel study was designed to determine if simple nail



trephination alone would adequately treat uncomplicated SUH without producing or fostering associated cosmetic or infectious complications. A subsequent evidence-based literature review (*Emerg Med J* 2003;20[1]:65) reached the same conclusions.

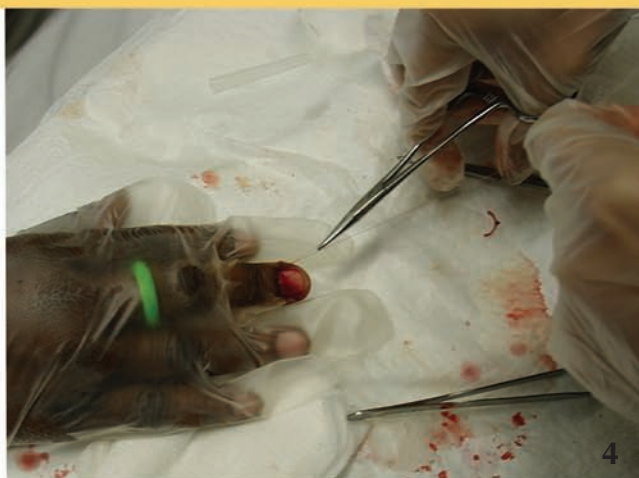
fracture did not exclude patients from the protocol.

The subjects were 3 to 60 years old. All underwent radiographic analysis, and were treated with electrocautery trephination and expression of the subungual blood. Antibiotics were not prescribed. Postoperative treatment

associated fracture. Although most patients with underlying fractures had a greater than 50 percent hematoma, there was no close correlation between the size of the hematoma and the presence of a fracture. There were no complications directly related to the trephination, and there were no

of the size of the SUH or the presence of an underlying phalanx fracture.

The authors question the need for routine radiographs in all cases, and conclude that patients with uncomplicated SUH will have excellent results with simple nail trephination without removal of the nail or suturing of the nailbed. This conclusion is contrary to other authors who suggest routine removal of a nail to meticulously repair nailbed lacerations. The authors emphasize that their study examined only cases where the nail and nail margins were completely intact, and their conclusions may not be applicable to extensive crush injuries or complex nail disruptions. They also believe an electrocautery provides the most ideal method for rapid and painless trephination. If a fracture is present, routine protective extension splints also are suggested. There appears to be no role for routine antibiotic coverage, even if the phalanx is fractured and the nail has been trephined.



- 1. There is no SUH from this nail injury, but because the lateral nail margin and nailbed are obviously lacerated, they should be repaired. The nail has to be at least partially removed to accomplish this. Don't remove the entire nail, just enough to expose the injured nailbed. Do not avulse the base of the nail, and preserve the germinal matrix so a new nail will grow normally and cover the lacerated bed.**
- 2. This patient's fingertip was smashed in a car door, a very common injury that avulsed the nail at the base by flexion, and produced a nailbed laceration and SUH. This nail should be removed and the nail repaired.**
- 3. To remove the nail, use small scissors to tease the nail away from the nailbed. This will convince you how tenacious the bond is. There is no cutting involved. Hold the scissors horizontally in the plane between the bed and undersurface of the nail. Gently spread as the instrument is advanced, avoiding further nailbed injury. Note that a tourniquet is used anytime the distal finger is repaired. Keep the removed nail to use as a dressing.**
- 4. To obtain a clean field without annoying drapes, use a glove on the patient's hand. Meticulously repair the nailbed with 6-0 (always use absorbable) sutures. The goal is to produce an anatomically perfect nailbed to avoid ridges or nail deformities as the new nail grows back.**
- 5. Replace the nail under the cuticle and secure it with lateral sutures. Do not suture through the germinal matrix. As an option, drill a hole through the replaced nail so any new bleeding will drain. Be sure to remove the tourniquet before applying any dressing. In about two to three weeks, the new nail will begin to push out the replaced nail that was used as a splint and dressing. Then you can remove the sutures, and the replaced nail will fall off, exposing the repaired nailbed. Cover the nailbed with a nonadherent dressing. It will take many weeks (six to eight) for the new nail to completely cover the nailbed.**
- 6. This may seem like a simple SUH, but blood under the cuticle (arrows) is a tipoff that the base of the nail is likely avulsed, allowing blood from the nailbed laceration to collect between the skin and base of the avulsed nail, which is now sitting on top of the cuticle. Swelling prohibits this from being readily appreciated. The nail should be repositioned into its germinal matrix, and it may take hold and grow.**
- 7. To accomplish repair of the injury in Photo 6, first the SUH is totally drained with simple trephination. This avulsed nail may be manipulated back into the germinal matrix with a hemostat (longitudinal traction, pressure over the proximal nail base), avoiding total nail removal.**

Over two years, 48 ED patients with SUH entered the study. Patients were excluded if they had disruption of the fingernail itself, if the nail were loose, the nail border violated, or previous nail deformities existed, leaving only patients with a closed hematoma, an intact nail, and without external skin laceration or nail disruption or avulsion. Importantly, an underlying distal phalanx

included splinting of fractures in extension for one week. Patients were followed for at least six months after the injury for evaluation of deformities, dysfunction, or signs of infection.

The size of the hematoma was rated relative to the nail surface area. The SUH involved more than 50 percent of the nail surface in more than half of the patients while 30 percent had an

cases of soft tissue infection, osteomyelitis, or permanent significant nail deformity. A few patients initially had ridges in the nail at the site of trauma, but these had grown out, and the nails appeared normal after three months. It took an average of four months for a new nail to grow following trephination. Importantly, these excellent results were achieved regardless

COMMENT: It is certainly undesirable for any patient to end up with a permanently deformed nail, and major fingertip injuries require a cautious approach. While the burly construction worker may not worry about a funky fingertip, a woman showing off her engagement ring will. It's clear, however, that some physicians are truly in a clinical fog when it comes to evaluating and treating SUH. Because of this study and others, most EPs are enlightened, and opt for the conservative simple trephination of even a total SUH when the nail is intact. Hopefully the days are gone when SUH prompts routine nail removal in search of the nefarious nailbed laceration that requires meticulous suturing, repeat visits, and a bare nailbed for weeks.

Although most EPs approach SUH with that philosophy and simply trephine the nail, it's easy to get sidetracked with aggressive nail removal and fancy nailbed repairs after a cursory reading of the hand surgery literature. An SUH is clearly emergency medicine turf, and hand surgeons only see these minor injuries when there are later complications. Other discussions of fingernail injuries can be found. (*J Trauma* 1967;7[2]:177; *Hand Clin* 1990;6[1]:37; *Orthop Clin North Am* 1992;23[1]:149; *Emerg Med Clin North Am* 1992;10[4]:801).

Impressively, and despite much unreferenced paranoia about SUH, there were no signs of permanent nail deformities in any patient in this study. Only 48 patients were studied, but because my waiting room is not filled with fingers permanently deformed by this everyday injury, I am convinced that the authors' conclusions are valid. The lack

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of infectious complications, particularly in patients with underlying fractures, is also comforting. Although some physicians routinely prescribe antibiotics following trephination when there is a tuft fracture, reasoning that these are compound fractures after drainage, there are absolutely no data to support this protocol and credible data against the need for them.

Simply stated, freely draining nailbed hematomas do not get infected, and there is no evidence that prophylactic antibiotics are required. I believe one is on firm ground by withholding antibiotics post-trephination of an uncomplicated SUH, even with an underlying fracture. Many hand surgeons reflexively suggest prophylactic antibiotics, however. While antibiotics have never been a proven indication for hand lacerations in general (*Emerg Med J* 2007;24[3]:218), there is some mystique that all injured hands leave the ED with an antibiotic prescription. I have never seen osteomyelitis from an SUH, although it's theoretically possible. In a related scenario, numerous studies suggest no antibiotic coverage for other types of fingertip injuries, even those with partial amputations, exposed bone, or open tuft fractures. (*Ann Emerg Med* 1983;12[6]:358.) I would be slightly tempted to use three to five days of post-trephination antibiotics for a gnarly macerated tip, suspicion of nascent infection, an underlying fracture in immunocompromised patients, or for those with peripheral vascular disease. Nonetheless, it seems certain that routine antibiotics are overkill in the garden-variety SUH. Tetanus toxoid is a good idea, but I could find no cases of tetanus from nail trephination.

In a related earlier and frequently quoted study, Simon and Wolgin evaluated 47 adult patients with an SUH to determine the association between the hematoma, associated fractures, and occult lacerations of the nailbed.

Reader Feedback:

Readers are invited to ask specific questions and offer personal experiences, comments, or observations on InFocus topics. Literature references are appreciated. Pertinent responses will be published in a future issue. Please send comments to emn@lww.com. Dr. Roberts requests feedback on this month's column, especially personal experiences with successes, failures, and technique.



THE ED APPROACH TO SUBUNGUAL HEMATOMA

- Data and clinical experience support simple nail trephination in all patients with SUH when the fingernail is intact, and can serve as a splint for any underlying nailbed laceration. This is appropriate regardless of the size of the hematoma or the presence of a tuft fracture.
- Removing the nail to assess the integrity of the nailbed or to provide a field for surgical repair of the nailbed is unnecessarily aggressive. One can order x-rays dictated by the individual situation.
- Absent other significant fingertip injuries and if the nail and nail margin is intact, trephining gives a good cosmetic and functional result.
- Adequate holes should be made in the nail to ensure complete and continual drainage.
- Routine antibiotic coverage is unnecessary, even if there is a tuft fracture.
- If the nail is loose or split, or the laceration extends past the nail margin, the nail can be removed, the nailbed laceration repaired (always use absorbable sutures), and the nail reapplied as a dressing.
- Be careful to recognize a mallet finger injury (rupture of the extensor tendon) and proximal nail avulsion, manifested by blood under the cuticle. Both require additional intervention, such as prolonged splinting or repositioning of the nail respectively. All displaced fractures should be reduced and splinted as appropriate.

(*Am J Emerg Med* 1987;5[4]:302.) The fingernail was removed to check for the presence of a "reparable laceration" in patients with an SUH greater than one-fourth of the nailbed. By today's standards, that is not indicated. Clearly, large hematomas were associated with a nailbed laceration, but so what? They discovered that 60 percent of patients with an SUH greater than half of the nail had a "laceration requiring repair." The incidence of reparable lacerations rose to 95 percent when there was an associated fracture. Patients were not followed for cosmetic results, and the authors did not define "reparable." I assume any obvious disruption of the bed was considered reparable.

These authors, however, suggest that if the SUH covers more than half of the nail surface or if there is a phalanx fracture, fingernails should be routinely removed, the nailbed explored, and lacerations sutured. In my opinion, this aggressive stance is not substantiated by that report or subsequent data, and seems to be overtreatment for a minor injury that will heal nicely with a more conservative approach. Once removed, it may take four to five months (1 mm per week) for a new nail to grow back. This is a long time to go without one's fingernail! And it's not easy to repair a fragile nailbed. One must use a bloodless field, very small absorbable sutures, and orchestrate follow-up.

The nailbed certainly must be lacerated if an SUH is present, and the hematoma is merely the consequence of physical disruption to highly vascularized tissue. The contention that all nailbed lacerations must be meticulously approximated to avoid future nail cosmetic abnormalities is, however, unproven. I believe this recommendation is clearly disproven by clinical experience, supplemented by literature. The intact nail is an ideal splint that provides integrity to the matrix, and ensures close approximation of any laceration. One need only try to remove a fingernail to be convinced that the nail is normally firmly attached to the nailbed. Such stabilization must be as good as possible with suturing the nailbed, and leaving the attached nail in place is less traumatizing in general. If the nail remains attached at its margins, it's best to let it be.

Significant crush injuries, those that involve lacerations of the nail itself or the nail margin, and injuries that avulse the nail are scenarios that should be approached differently. In cases where a nailbed laceration extends to the skin or the nail is split, disrupted, or avulsed, it is generally agreed that the nail be completely removed, and the nailbed inspected and carefully repaired.

I would order x-rays if specifically requested by the patient, if there were a gross deformity, or if it were important to predict accurately how

long the pain would persist. Usually a fracture can be ruled out by mechanism, and if there is no tenderness when longitudinally compressing the fingertip or carefully palpating the distal fat pad. Displaced phalanx fractures should always be reduced. The history usually gives you a clue. A fracture is unlikely if the fingertip were lightly tapped by a hammer, but more likely if the digit was slammed in a car door. The presence or absence of an underlying crack in the distal phalanx is of no importance to initial therapy. Laborers, typists, or musicians may require an x-ray because fractures may mandate light duty or time off from work because of pain. A computer operator needs to know if he has a fractured tuft. A documented fracture may mean the difference between a few days and weeks of disability compensation.

Although no one disagrees that an SUH requires trephination, there are a variety of personal preferences for the trephination device and variations on the actual procedure. The goal is to provide a large enough hole for immediate and continued drainage. I find it more desirable and easier to obtain proper drainage after a digital block with long-acting bupivacaine. I'll agree that the procedure can be done relatively painlessly if one gently uses the electrocautery, being careful not to exert downward pressure on the nailbed. If a cautery is used, a large hole (3-4 mm) or multiple drainage holes should be placed. A single small hole may close and the hematoma can reform. Twirling an 18-gauge needle between the thumb and forefinger is another popular method to put a hold in the nail.


I usually opt for the large paper clip (cheap and disposable) and butane lighter approach. Be sure to hold the heated paper clip with a hemostat. Two or three tries are usually needed before the nail is punctured. One generous hole will usually suffice if blood is easily evacuated, but some prefer multiple holes. Blood usually spurts out under pressure, and then slowly drains over the next few days. Gentle pressure while the finger is still anesthetized will initially squeeze out most of the remaining blood (it rarely clots), and the patient can soak the finger in cool salt water for a few days. It's a good idea to advise patients that the original nail may fall off if there was significant blunt trauma, but this is unusual or obvious at the time of injury. Follow-up can be "as needed" in most cases, with a caution about recurring hematoma and infection. A recheck at five to seven days for an injury with a tuft fracture is prudent.

Some SUHs are produced from injuries that cause excessive flexion to




the distal phalanx. A classic example is getting the fingertip slammed in a door. One should always check for avulsion of the extensor tendon (mallet finger), and look for an avulsed nail base. In the excitement of draining the hematoma, these injuries may be missed, and produce a noticeable cosmetic deformity if treatment is not initially correct. Blood should be seen only under the nail itself. If there is blood in the paronychia area, the nail has been avulsed, allowing egress of nailbed blood to that area. This may not be obvious to the neophyte. If that is present, one can usually relocate the avulsed nail with a hemostat, eschewing formal nail removal.

Roser et al randomized children with a fingernail crush injury to simple trephination vs. nail removal or nailbed repair. (*J Hand Surg* 1999;24[1]:116.) As with adult data, they found that nail removal and nailbed repair was not indicated or justified for children with SUH with an intact nail or nail margin. Interestingly, these hand surgeons just could not keep themselves from prescribing routine antibiotics, an intervention never proven to be warranted. If antibiotics are opted, a first-generation cephalosporin is a reasonable choice, with MRSA not seemingly an issue.

Finally, exemplifying a continued conundrum for the clinician, despite substantial data and clinical experience, is a recent quite excellent emergency medicine textbook on potential errors in clinical practice. (*Avoiding Common Errors in the Emergency Department*. Philadelphia: Lippincott Williams & Wilkins; 2010.) Despite a cogent review, the author promulgates a somewhat less-than-decisive stance on the two primary interventions: simple trephination vs. nail removal. At this juncture, one can unequivocally recommend simple trephination. 

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October 2010 Questions:

- Which of the following best identifies an SUH that can be treated with simple nail trephination rather than nail removal?
 - A. Injury from a hammer blow to the thumb.
 - B. Nail is intact, and nail margins are firm.
 - C. A linear not horizontal fingernail laceration is present.
 - D. There is blood under the cuticle.
- Which of the following is an *unacceptable* way to evacuate an SUH?
 - A. Lift up the distal nail with a hemostat.
 - B. Burn a hole in the nail with a cautery.
 - C. Twirl an 18-gauge needle on the nail.
 - D. Burn a hole with a heated paperclip.
- Which of the following best summarizes the use of prophylactic antibiotics after SUH drainage?
 - A. Use antibiotics if the hematoma is more than 48 hours old.
 - B. Use antibiotics if there is an underlying tuft fracture.
 - C. Use antibiotics if the patient is a child under 10.
 - D. Use antibiotics only if there are signs of infection.
- What best describes the proper technique to repair a nailbed laceration?
 - A. Leave the remaining nail attached and suture directly through the nail.
 - B. Approximate the disrupted nailbed with adhesive strips or tissue glue.
 - C. Meticulously suture the nailbed with absorbable sutures.
 - D. Avoid sutures and allow for granulation to fill the defect.
- Following a fingertip crush injury, what does blood under the cuticle signify?
 - A. The nail has been avulsed from the base by a flexion force.
 - B. There was direct blunt trauma to the proximal nail.
 - C. The patient attempted prior drainage of an SUH.
 - D. There is an underlying coagulopathy.

Directions

Your successful completion of this activity includes evaluating it. Please indicate your responses below filling in the blanks or by darkening the circles with a pencil or pen.

Please rate your confidence in your ability to achieve the following objectives, both before this activity and after it: 1 (minimally) to 5 (completely)

	Pre					Post				
	1	2	3	4	5	1	2	3	4	5
Formulate a plan to identify subungual hematomas that require simple nail trephination vs. nail removal.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Select the correct method of providing nail trephination.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Predict the need for prophylactic antibiotics after hematoma evacuation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Please indicate how well the activity met your expectations: 1 (minimally) to 5 (completely)						1	2	3	4	5
Was effective in meeting the educational objectives						<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Content was useful and relevant to my practice						<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please address the practical application of this activity below

How many of your patients may be affected by what you learned from this activity? _____

Do you expect that the information you learned during this activity will help you improve your skill or judgment within the next 6 months? **1 2 3 4 5**

(1-Definitely will not change, 5-Definitely will change)

How will you apply what you learned from this activity? (Mark all that apply.)

- In diagnosing patients
- In monitoring patients
- In educating students and colleagues
- To confirm current practice
- For maintaining board certification
- In making treatment decisions
- As a foundation to learn more
- In educating patients and their caregivers
- As part of a quality/performance improvement project
- For maintaining licensure

Please complete these overall activity assessment questions.

Did you perceive any bias for or against any commercial products or devices? **Yes No**

If yes, please explain: _____

Compared with other educational activities in which you have participated over the past year, how would you rate this activity? **1 2 3 4 5**

(1-Needs serious improvement, 5-A model of its kind)

Future activities concerning this subject are necessary. **1 2 3 4 5**

(1-Strongly disagree, 5-Strongly agree)

My biggest clinical challenges related to this topic are: _____

Please use the space below to provide any additional information that will help the activity planners and faculty evaluate this activity.

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