InFocus

Fingertip Problems: Acute Paronychia

Part 2 in a Series

By James R. Roberts, MD

Author Credentials Financial Disclosure: James R. Roberts, MD, is the Chairman of the Department of Emergency Medicine and the Director of the Division of Toxicology at Mercy Catholic Medical Center, and a Professor of Emergency Medicine and Toxicology at the Drexel University College of Medicine, both in Philadelphia. Dr. Roberts has disclosed that he is a member of the Speakers Bureau for Merck Pharmaceuticals. He and all other faculty and staff in a position to control the content of this CME activity have disclosed that they and their spouses/life partners (if any) have no financial relationships with, or financial interests in, any commercial companies pertaining to this educational activity.

Learning Objectives: After participating in this activity, the physician should be better able to:
1. Distinguish the pathophysiology of an acute bacterial paronychia.
2. Apply the best clinical approach for treating early and developed paronychia.
3. Compose a differential diagnosis for chronic paronychia.

Acute paronychia (synonymous with perionychia) is a rather common and annoyingly painful digital infection that frequently steers patients to the ED in search of relief. Most infections are minor, and can be easily treated with conservative methods, but occasionally surgical intervention is required.

Surprisingly little objective data and no prospective controlled trials exist in the medical literature dealing with the treatment of this common problem, probably reflecting the fact that most patients do quite well. Despite the fact that such patients are frequent denizens of the ED, non-emergency medicine reviews predominate the literature. When dealing with a paronychia, as with any infection involving the hand, it is paramount for the clinician to know when to be aggressive and when to be conservative.

Paronychia
Randell P
Aust Fam Physician
1985;14(5):377

Although brief and quite superficial, this article discusses treating the common acute and chronic paronychia. (See *Am Fam Physician* 2008;77[3]:339 for a more in-depth review.) A paronychia is an acute (bacterial or herpetic) or chronic inflammation or infection of the periungual tissue. An acute bacterial paronychia generally begins as a red, hot, swollen, and tender area on the skin surrounding the proximal fingernail or toenail.

A classic paronychia with obvious pus in the eponychial space. Do not incise the skin to drain this, but proceed as demonstrated in the accompanying pictures.

Clinically, it first appears as a cellulitis, and if left untreated can progress to an abscess. Once pus has localized, drainage can be accomplished relatively easily, and the patient experiences a rapid cure. Many cases seem to develop spontaneously, but some patients can recall an episode of trauma, such as a puncture or hangnail.

Comment: Reading the current medical literature will leave the student with many unanswered questions, unproven therapeutic recommendations, and incorrect approaches. I could not find a single prospective study that compared various treatment modalities. Most of the articles in the literature are written by hand surgeons who see complicated or advanced cases or family practitioners who see mild or early cases. Both base their treatment recommendations on their skewed experience.

Theoretically, for a paronychia to develop there is a break in the skin, usually from a hangnail, puncture, or trauma, with local inoculation of bacteria. The infections are polymicrobial, involving a number of aerobic and anaerobic organisms. Bacteria that normally inhabit the skin or mouth are usually found if the infection is cultured. Many patients with paronychias bite their nails, suffer repeated minor trauma, or have chronic skin conditions or occupational predispositions.

In the ED, it's helpful to consider the common acute bacterial paronychia in two contexts. The first scenario is the subacute infection, characterized by minor pain, swelling, redness, and tenderness in the periungual area, and without obvious fluctuance, drainage, lymphangitis, or adenopathy. The history is usually not specific for an etiology, and the process insidiously develops for no apparent reason. At this point, the pathology is basically a cellulitis, but sometimes pus had drained spontaneously or the brave patient performs self-treatment, and the infection is already on the road to recovery.

Patients in this category will likely respond to conservative treatment, and the sagacious clinician defers drainage attempts unless there is obvious pus. A reasonable approach is to recommend three to four days of a broad-spectrum antistaphylococcal antibiotic (amoxicillin/clavulanate, dicloxacillin, clindamycin, or cephalexin) in addition to hot soaks. MRSA, a rampant skin infection, is usually not the culprit in these cases. When pus is absent, conservative home care is the most reasonable course, and it usually works. In fact, there is no surgery to recommend unless pus is present; one is dealing with a simple cellulitis. I advise patients to soak their affected finger in a coffee cup filled with very hot tap water (not boiled water or sterile saline) for 10 minutes four times a day, specifically eschewing the patient-popular peroxide or alcohol.

It sounds simple enough, but it's difficult for the layperson to soak religiously. If you give patients some colored antiseptic solution to add to the tap water, it may increase compliance because it focuses attention on a bona fide "medical procedure" of soaking in an antiseptic. Each time the finger is soaked, it should be for 10 minutes by the clock, and the patient could take an oral antibiotic four times a day. Long-acting antibiotics are usually more patient-friendly, but coupling the antibiotic with soaking makes the soaking more likely to be done. Soaking and antibiotics may be curative in this early stage of cellulitis.

Many physicians, however, question the need for antibiotics at this stage, but I tend to prescribe them unless the process is obviously minor. After soaking the finger, an antibiotic ointment and gauze dressing or small bandage are applied. Follow-up is not scheduled or required unless the condition worsens. X-rays, cultures, and lab tests are unnecessary, although you may want to check blood glucose.

The second scenario involves a more complicated or advanced condition where conservative measures fail, or the patient presents with frank pus. Often the purulence is obvious under the skin, appearing as cream-colored collection around the nail fold. In these cases, surgical treatment is indicated. I hesitate to use the word "surgery" because this means "skin incision" to most physicians. In this case, however, initial drainage can be accomplished without an actual skin incision. Some of the older textbooks erroneously recommend incising the skin rather than the more reasonable approach of draining this localized pus collection by simply lifting up the eponychium. A paronychia is not an actual subcutaneous abscess, like a boil or infected sebaceous cyst, but a skin cellulitis over a collection of pus in a cavity under the cuticle.

Incising the dorsal skin of the eponychium only compounds the injury, and is clearly not the way to drain pus from under the cuticle. Incising the skin in the fingertip of a diabetic can relegate him to four to six weeks of slow healing. Contrast this to the few days' healing time associated with more conservative procedures that avoid actual skin incision. Likewise, removing the fingernail, as suggested by some authors, is gross overtreatment for the first visit. Pus from a paronychia rarely makes its way underneath the fingernail. The presence of a true subungual abscess may be an indication for a nail removal, but this rarely occurs with a paronychia.

Some patients can tough out a physician gently lifting the cuticle, but I prefer to perform all drainage procedures under a digital block with long-acting bupivicaine. With a long-acting anesthetic, caution the patient that his finger should not be soaked in hot water until sensation returns, to avoid thermal injury. (Or advise soaking an adjacent unanesthetized finger at the same time.)

Following digital block, I prefer to use a finger tourniquet. The eponychium (cuticle) is separated or lifted from the underlying nail, exposing the potential space that is now filled with pus. This is done atraumatically by gently teasing a

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1. To drain a paronychia, perform a digital block with bupivacaine. Apply a tourniquet and advance a #11 blade parallel to the nail. Lift up the cuticle, avoiding an actual incision. Pus should flow freely.
2. Place a hemostat into the eponychial space, and spread the tip to free up all remaining pus. Some will irrigate with saline at this point.
3. Pack the eponychial space with a small amount of gauze. It goes in more easily if moistened with saline or antiseptic solution. The benefit of iodinated gauze and the antiseptic solution over plain saline gauze is questionable. The patient can soak the finger in a coffee cup of very hot tap water three times a day.
4. Apply an antibiotic ointment (not containing neomycin) to the gauze. The patient can remove the packing themselves (after it has been soaked and become wet) in 48 hours. After additional soaking, the cavity that has been created can be filled with antibacterial ointment for a few days. The value of ointment is likely minimal, but applying it focuses the patient's attention on dressing changes and frequent wound evaluation.
5. A nice protective dressing is fluffy gauze covered with the finger of a latex glove. No tape is necessary. Cut off the finger of the glove, and stretch it and pull over the dressing. Give the patient a few gloves to take home for dressing changes. Don't forget to remove the tourniquet!

scalpel blade, scissor blade, or 18-gauge needle into the nail fold. The instrument is always kept parallel to the nail; the skin is not actually incised. One merely gently lifts the eponychium until there is spontaneous flow of the pus. Once the eponychium is loose, a blunt instrument, such as a hemostat (not the scalpel) finishes the job by being swept from side to side to the base of the infection to break up loculations. Irrigation of the cavity is probably not necessary, but it's a popular intervention.

A loose gauze pack is then placed in the eponychial fold to ensure continued drainage. I advise the patient to begin soaking (with the pack in place) as soon as they get home. I have discovered that colleagues bandage this infected area, and tell the patient not to touch it for two days, but in my opinion, this is a big mistake that only enhances skin maceration and bacterial growth. Patients should be rechecked within 48 to 72 hours. The initial pack is then removed and the wound inspected. Packing can usually be removed without anesthesia after soaking in peroxide to soften the gauze. If the infection is well on its way to recovery, forego additional packing. If there is still considerable drainage, the nail fold may be irrigated, reopened, and packed a second time. This may require another digital block.

Some patients can remove the second pack themselves (after soaking at home) in another 24 hours, and follow-up is determined by clinical response or degree of patient anxiety. If the periungual skin has been under significant pressure, an outer layer of skin may blister or peel within 48 to 72 hours of drainage. This is not serious, but the dead skin should be debrided. Following removal of the packing, there is usually a small cavity that remains open. It can be easily filled with an antibiotic ointment, and covered with a gauze dressing. Soaking should continue for another 2-3 days after the pack has been removed. Once the paronychia has healed, the patient is advised to keep the periungual area dry and to use skin softeners to avoid cracking. I also advise against biting the fingernails or removing hangnails with the teeth.

Adenopathy and lymphangitis are not common, and if seen, may alter the routine. X-rays, lab tests, and cultures are not generally necessary, even if pus is obtained. Cultures may be supported if you suspect MRSA or immunocompromise. Complete cure is expected in a few days, so one fast-track visit usually suffices. Toe paronychias are treated similarly.

There is no evidence that oral antibiotics are necessary for the treatment of uncomplicated, easily drained paronychias in patients with normal immune systems. I may prescribe three to four days of antibiotic coverage to compliment local care if there is significant induration. Ten days of the newest third-generation cephalosporin or some similarly exotic, recently introduced antibiotic, is clearly unwarranted. Plain old penicillin appears to be a reasonable first choice in most cases, based on culture data, but in my experience, patients given any antibiotics seem to

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Acute Paronychia

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do well. The antibiotic debate is unresolved, but the key is to use reasonable clinical judgment and not be dogmatic.

Patients should be relatively asymptomatic in three to five days. Those who have recurrent problems or do not respond adequately, especially if pus was drained, should be considered to have complicated infections, possible foreign body, or an unusual organism, and should be referred to a consultant. It's probably a mistake to follow patients with numerous members of an ED group for a number of weeks trying to cure a smolderinginfection with each new doctor's favorite regimen. Complications of a paronychia are osteomyelitis, extension to the flexor tendon (tenosynovitis) or fat pad area (felon). Occasionally patients must be admitted for intravenous antibiotics or require more extensive surgery, but such cases should be the exception.

Aerobic and Anaerobic Microbiology of Paronychia
Brook I
Ann Emerg Med
1990;19(9):994

This report analyzes the microbiology of 28 adult patients who underwent surgical drainage for a paronychia. Aerobic and anaerobic cultures were obtained by either swabbing the wound or by directly aspirating fluid. Careful culturing techniques assured optimal anaerobic growth. Various culture media were used to promote maximum recovery of fastidious organisms. On average, 2.6 isolates per specimen were identified, with 72 separate organisms being recovered from the 28 specimens. A pure culture of a single anaerobic organism was present in only five (18%) patients, and a pure culture of a single aerobe in eight (29%). Mixed aerobic and anaerobic cultures were the norm, and were found in 54 percent. There was no consistent pattern or combination of organisms. In four cases *Candida albicans* was cultured, and *Eikenella corrodens* was isolated in three patients.

The authors conclude that paronychias are usually infected with a number of mixed aerobic and anaerobic organisms. The presence of aerobic bacteria is thought to be due to direct inoculation of the fingers with mouth flora, as can occur in biting the fingernails or sucking the fingertips. The organisms recovered commonly colonize the oral cavity or skin, and interestingly, a few cases of *E. corrodens* were discovered. This organism accounts for some cases of human bite infections, and is also normal flora of the mouth.

The author attempted to discuss the proper selection of antibiotics for these mixed infections, but could not recommend an ideal empiric choice. Most pathogens isolated should theoretically respond to cephalexin, clindamycin, or amoxicillin/clavulanate. The presence of anaerobic bacteria, some Gram negatives, and *E. corrodens* make first-generation cephalosporin a less than perfect choice. It is recommended that cultures be done if antibiotic therapy is contemplated.

COMMENT: Most textbooks state that staphylococci are the most common pathogen found in paronychias. However, staph (*S. aureus or S. epidermidis; no MRSA*) was isolated in this study in only two of 72 cultures. Clearly such infections are polymicrobial, including aerobes, anaerobes, and both gram-positive and gram-negative cocci and bacilli. Most bacteria are along for the ride, not true pathogens. In a related study of the bacteriology of paronychia in children by the same author (*Am J Surg* 1981;141[6]:703), similar results were reported. Specimens from the paronychias of 33 children demonstrated a 20 percent incidence of pure anaerobic cultures, 27 percent pure aerobic cultures, and 46 percent mixed aerobic and anaerobic flora. In that report, there were 3.6 isolates per specimen. Numerous organisms were identified, including *Candida albicans*.

Creating a Differential Diagnosis for Chronic Paronychia

Chronic paronychia: A chronic paronychia is a complex, multifactorial inflammatory reaction that develops in individuals whose hands have repeated exposure to moisture, irritants, allergens, or minor trauma. It can be considered a hand dermatitis caused by environmental exposure. The initiating process separates the cuticle from the nail plate, rendering the area dry, irritated, and vulnerable to bacterial and fungal pathogens. The chronic form involves slow progressive swelling of the lateral or posterior border of the nail folds and scarring associated with discoloration or physical changes of the nail. Unlike the acute bacterial paronychia, which generally involves a single finger, chronic infection can affect a number of fingers simultaneously. Prolonged local treatment is generally curative, but referral is suggested. Once cured, attention to local nail care can help prevent recurrence.

A chronic paronychia is a complex multifactorial condition, not just a simple fungal infection. This is best handled by a consultant, but the EP can prescribe a steroid-antifungal cream from the ED, such as clotrimazole/betamethasone. Apply the cream and then an occlusive dressing, like the finger of a surgical glove.

A chronic paronychia often represents an occupational problem, seen in laundry workers, house cleaners, dishwasher, chefs, fish handlers, and swimmers. Repeated exposure to trauma, water, or irritating chemicals is the culprit. *Candida albicans* may be cultured, but the association between the organism and the paronychia is not strictly causative and likely minimal. Consider underlying diabetes or immunosuppression in patients with proven *Candida* paronychia. Topical steroids are often more effective than systemic antifungals (*J Am Acad Dermatol* 2002;47[1]:73.) Chronic inflammation is difficult to eradicate, taking months to affect a cure. It's best to refer such patients. In the ED, one can take a fungal culture, and start an antifungal like ciclopirox or a steroid-antifungal like clotrimazole/betamethasone cream twice a day. Initially, withhold antibiotics and systemic antifungal therapy.

Mimics: A chronic paronychia can resemble psoriasis or Reiter's disease. Tumors, such as squamous cell carcinoma or malignant melanoma, cysts, the primary chancre of syphilis, warts, or foreign body reactions, can occasionally mimic a chronic paronychia.

HIV-related paronychia: Paronychia, especially of the great toe and associated with ingrown toenails, has been linked to retroviral therapy. Some HIV drugs such as lamivudine have been reported to cause painful periungual inflammations of several nails during treatment with these HIV drugs, developing months after starting treatment. (*Br J Dermatol* 1999;140[6]:1165; *Clin Infect Dis* 2001;32[1]:140.) Pyogenic granuloma, onycholysis, and extreme dry skin are associated. Antibiotics and surgical treatment may be required.

This is not a bacterial paronychia but a herpetic whitlow, characterized by a painful, red, pruritic, burning, blistered area. They occur in children with cold sores who suck their thumb, herpes carriers, and medical personnel. Eschew the temptation to drain this surgically; prescribe oral antivirals instead.

Children: Pediatric patients can develop a paronychia from sucking their fingers. The infection usually involves the fingers (especially the thumb and index finger), but the toes also may be affected. (*New Engl J Med* 1970;283[15]:804; *Arch Derm* 1978;114[4]:567.) Thumb-sucking is a frequent predisposition of chronic paronychia in children. (*Clin Pediatr [Phila]* 1968;7[2]:104.)

Medical personnel: Medical personnel are at risk for herpetic paronychia (herpetic whitlow). Although of no great clinical consequence, herpetic infections are slower to resolve, and should not be treated with overly aggressive incision or antibiotics. Tuberculosis infections, characterized by chronic paronychial inflammation and lymphadenopathy, have been reported rarely in pathologists doing autopsies on infected cadavers. (*Arch Derm* 1978;114[4]:567.)

Final caveats: Failure to rapidly cure a paronychia should prompt specialized culture techniques, proper referral, or occasionally a biopsy. One considers exotic organisms, osteomyelitis, possible cancer, tuberculosis, occult foreign bodies, or immunocompromise (especially AIDS). For the EP, a paronychia can be easily cured with minimal follow-up required. If this is not the case, refer liberally for more in-depth evaluation.

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Certainly no single antibiotic will provide complete coverage for the array of bacterial and fungal pathogens cultured from paronychias. Because the vast majority of paronychias are easily cured with simple drainage procedures and local treatment, systemic antibiotics probably play little role in the cure. In fact, antibiotics are unlikely to be curative if one considers the polymicrobial nature of the infections. Because there are no prospective studies evaluating the true role of antibiotic treatment of a drained paronychia, and no antibiotic will cover 72 pathogens, this study clearly argues against the routine use of any antibiotic. Likewise, I see no reason to routinely culture paronychial pus; how does one interpret a report of three organisms, all with a different antibiotic sensitivity?

This infection is essentially an abscess, and there are good data demonstrating that antibiotics are of no additive value for treating cutaneous abscesses that are adequately drained. In immunocompromised patients, particularly diabetics or those with peripheral vascular disease or AIDS, cancer, or recurrent paronychia, a culture and antibiotics are probably warranted.

I would not routinely culture a paronychia just because I was prescribing antibiotics. Unless one does aerobic, anaerobic, fungal, and viral cultures, the full benefit from this laboratory investigation will not be gleaned, so why be only half-scientific? It is impossible to prospectively or empirically choose the proper antibiotic in all cases. Overall, amoxicillin/clavulanate seems like the best empiric choice for the garden-variety paronychia worthy of antibiotics.

E. corrodens is a gram-negative rod that is normal oral flora. It has been reported to cause nasty infections from human bites. Biting the nails or sucking that hangnail likely precipitates an *E. corrodens* paronychia. This organism has an unusual sensitivity. It is sensitive to penicillin and ampicillin, but resistant to oxacillin, methicillin, nafcillin, clindamycin, and often to cephalosporins.

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Questions:

1. What best distinguishes the pathophysiology an acute paronychia?
   - ○ A. An intense local immunologic response to trauma and chronic inflammation.
   - ○ B. An acute bacterial infection of the nail fold followed by abscess formation under the cuticle.
   - ○ C. A sterile abscess of the fat pad and subungual space.
   - ○ D. An idiosyncratic local response to chemical irritants and moisture.

2. What is the best clinical approach for treating an early paronychia without obvious abscess formation?
   - ○ A. Warm soaks and oral antibiotics.
   - ○ B. Preemptive incision and drainage.
   - ○ C. Systemic antifungals and topical steroids.
   - ○ D. Immediate referral to a hand surgeon.

3. What is the preferred treatment of a fluctuant acute paronychia?
   - ○ A. Lift up the cuticle, drain pus, and place packing.
   - ○ B. Warm soaks and oral antibiotics.
   - ○ C. Incise the abscess via a dorsal skin incision.
   - ○ D. Blood cultures, IV antibiotics, HIV testing, and admission.

4. Two weeks after his first autopsy, a pathology resident develops a low-grade chronic paronychia with lymphadenopathy, but does not respond to two weeks of oral antibiotics. Bacterial cultures are negative. Which of the following should be considered mandatory?
   - ○ A. Culture for mycobacterium.
   - ○ B. Culture for herpes virus.
   - ○ C. Test for HIV.
   - ○ D. Biopsy for melanoma.

5. What best describes the differential diagnosis for a chronic paronychia?
   - ○ A. A fungal infection cured by long-term systemic antifungals.
   - ○ B. A bacterial infection with MRSA.
   - ○ C. Chronic inflammation due to irritants treated with local corticosteroid cream.
   - ○ D. Most likely a low-grade squamous cell carcinoma.

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 1	2	3	4	5	Post 1	2	3	4	5
Distinguish the pathophysiology of an acute bacterial paronychia.	○	○	○	○	○	○	○	○	○	○
Apply the best clinical approach for treating early and developed paronychia.	○	○	○	○	○	○	○	○	○	○
Compose a differential diagnosis for chronic paronychia.	○	○	○	○	○	○	○	○	○	○

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	○	○	○	○	○
Content was useful and relevant to my practice	○	○	○	○	○

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-Definitely will not change, 5-Definitely will change) **1** ○ **2** ○ **3** ○ **4** ○ **5** ○

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: _____

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Future activities concerning this subject are necessary. (1-Strongly disagree, 5-Strongly agree) **1** ○ **2** ○ **3** ○ **4** ○ **5** ○

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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