



Fingertip Problems: Felons

By James R. Roberts, MD

Author Credentials and Financial Disclosure:

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

1. Select the best incision to drain a felon.
2. Plan the best empiric antibiotic choice for a felon.
3. Design an initial ED approach to a felon.

An infection of the fat pad of the finger is a particularly heinous entity, aptly termed a felon. There is precious little extant medical literature about it, and one is hard pressed to find true data or prospective studies. Its peccadilloes are almost a cult of intrigue among hand surgeons. Although managing a felon is not rocket science, and except for a few caveats, diagnosis and treatment recommendations in the literature have changed little in the past 30 years, this infection must be treated with clinical respect. When dealing with a felon, as with any hand infection, it is paramount to know when to be aggressive and when to be conservative.

The Natural History of a Neglected Felon

Watson PA, Jebson PJ
Iowa Orthop J
1996, 16:164

This is one of the few articles I could find that actually detailed the clinical course of a patient



1 This patient complained of seven days of a painful swollen thumb. It looks like it may be only a paronychia, an easy case for any EP. Initially, a felon can be an insidious smoldering process that is deceptively benign.



2 When examined more closely, the fat pad is clearly involved, indicating a felon, a much more formidable infection for the unwary EP. This patient had prior visits for IV drug abuse, was diabetic, and was a candidate for extra attention and clinical failure. Note that the infection does not extend proximal to the IP crease unless there is the more devastating suppurative flexor tenosynovitis.



4 The hemostat was used to probe laterally toward the fat pad, and copious pus was found as the hemostat entered the fat pad abscess. A more thorough drainage is mandated.



5 In some cases, a single lateral incision will suffice, but given the extent of this infection, a lateral through-and-through incision was made with a #11 blade. Incise above the neurovascular bundle. A hemostat was passed into the fat pad to break up loculations and separate longitudinal septae, and a Vaseline pack was grasped by the instrument.

Part 3 in a Series

with a felon, actually a felon gone bad. Although it's in an obscure journal, it's an illustrative case. The authors state that a felon is generally thought to be secondary to direct inoculation of a fingertip, with a subsequent closed space abscess of the distal pulp of a digit. (Note: We now know that penetrating trauma is not always a

prerequisite, and the anatomy of the fat pad allows for spontaneous invasion from the skin.) The offending organism is usually *Staphylococcus aureus* (always consider MRSA), and recognized complications include skin loss, osteomyelitis, septic arthritis, and flexor tenosynovitis. Therapy includes I&D of advanced infections and antibiotics.

In this article, a 51-year-old man had a one-month history of progressive pain

and swelling in his distal right thumb. The symptoms started in the fat pad, with a seemingly insidious onset without penetrating trauma. Eventually, the patient could not stand the pain, and sought medical care. Initial attempts to aspirate or drain the thumb were unsuccessful. The patient's immunologic status was compromised by diabetes, tobacco use, alcoholism, and intravenous drug abuse.



3 Following a digital block and the use of a tourniquet, the eponychium was raised with a hemostat (note that the skin over the cuticle was under prolonged tension and easily peeled off). No pus was found, ruling out a simple paronychia.



6 The pack was placed in the fat pad cavity. An x-ray and cultures were taken, IV antibiotics for MRSA (vancomycin) were started in the ED, a thumb spica splint was placed, and the patient was admitted for further treatment.



About a month after onset, the volar surface of the entire thumb, from the tip to the MCP crease, was exquisitely tender to touch. Passive extension of the IP joint was painful. There was no fever, lymphangitis, regional adenopathy, or swelling of the dorsum of the hand. A radiograph demonstrated osteopenia consistent with early osteomyelitis of the distal phalanx. The WBC count was elevated at 14.8 cell/mm³. The patient was admitted to the hospital with a diagnosis of osteomyelitis and suppurative tenosynovitis. Emergency incision and drainage was started, and fluid and necrotic material filled the pulp space. Infection of the bone was clinically obvious. The flexor tendon insertion to the distal phalanx was destroyed and ruptured proximally. Intravenous antibiotics (ampicillin/sulbactam) were initiated. Culture revealed a polymicrobial infection, including *S. aureus*, *Enterobacter*, and *Klebsiella*. The antibiotic regimen was changed to reflect sensitivities. Although the wound was left open, the infection remained unabated, and eventually required amputation of the thumb at the MCP joint.

The authors note that the natural history of this untreated and neglected felon mirrors other reports in the literature. (*J Bone Joint Surg* 1949;31-b:499, *Am J Surg* 1975;130[2]:194, *Hand Clinics* 1989; 5[4]:515.) From a pathophysiological standpoint, the intense tissue pressure in the pulp space increases vascular congestion, producing ischemia of the adjacent structures, essentially a compartment syndrome. Septic joints and flexor tendon infections are occasionally seen. Rupture of the flexor tendon is an unusual aspect of this case, and was related to erosion of the tendon insertion from the infection. The patient's immunosuppressed state clearly added to the morbidity.

Comment: A felon is one of the most challenging hand infections presenting to emergency physicians. While a paronychia can be handled in your sleep, the cognition and skill required to successfully navigate the waters of an infected pulp space of the finger can be daunting. Even sagacious EPs will eschew involvement in such cases because of the high rate of complications, slow healing, copious follow-up consultations, and significant morbidity when full function of the thumb is compromised. Of course, a felon can affect any fat pad, but the thumb appears to have a special predilection to host this process. Perhaps this digit is more likely to suffer a puncture

7 After three days in the hospital, the patient was sent home with oral antibiotics appropriate for the culture results (always consider MRSA initially). This picture at 10 days demonstrates good results, but much can go wrong despite your best efforts. Osteomyelitis is a known complication, and can occur despite proper intervention. The tense tissue pressure of the felon likely facilitates early bone infection.

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.

wound or other penetrating trauma. In this case, no penetrating trauma was known, and although skin portals exist, one must consider a bloodborne etiology, such as endocarditis, especially in the setting of IV drug abuse. I see no consideration for this process, and no blood cultures or cardiac evaluation.

This patient is every clinician's nightmare: immunocompromised from diabetes, and dependent on drugs and alcohol. This is the quintessential perfect storm for noncompliance, and a recalcitrant infection-doomed failure with even pristine therapy. A few other caveats: Note that the patient had 14 days of pain before he sought medical attention. Perhaps drugs or alcohol numbed the pain, but this is a sneaky infection. A felon is indeed a slow-growing process that can be mistakenly labeled as benign, or it can lack clinical aggression. The initial attempt at draining this felon was a failure, but that's not uncommon. In the early stages, this is not actually a full-blown abscess, but a soft tissue infection that may fail to yield copious pus. Many an unwary clinician has incised a fat pad only to find gross pus evasive. I myself have cut a few fingertips expecting pus, and found nothing. It takes chutzpah, if not hubris or impudence, for an EP to incise a thumb, but this is definitive therapy. It's enigmatic when exactly a true abscess materializes; it's almost a choice between incising too early or too late. The lack of fever, lymphangitis, and adenopathy are common but contrary to a common-sense evaluation of the distal extremity infection.

Importantly, and of diagnostic and prognostic significance, the swelling of a classic felon does not extend proximal to the IP/DIP crease unless suppurative tenosynovitis, a huge problem, exists. Proximal swelling prognosticates certain surgery, a prolonged course, and a poor outcome.

While methicillin-sensitive *S. aureus* (MSSA) was the most common infecting organism, MRSA now dominates the floral spectrum. Any surgically drained hand infection should be cultured. The garden-variety cutaneous abscess, even a paronychia, does not always mandate a culture in the ED, but felons are a special breed. With

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these, a culture should be routine, particularly with the potential for six weeks of antibiotics for osteomyelitis, an intervention made infinitely easier when you know the organism and sensitivities. Cephalexin won't work if MRSA is the culprit, and vancomycin or linezolid are overkill for the run-of-the-mill MSSA.

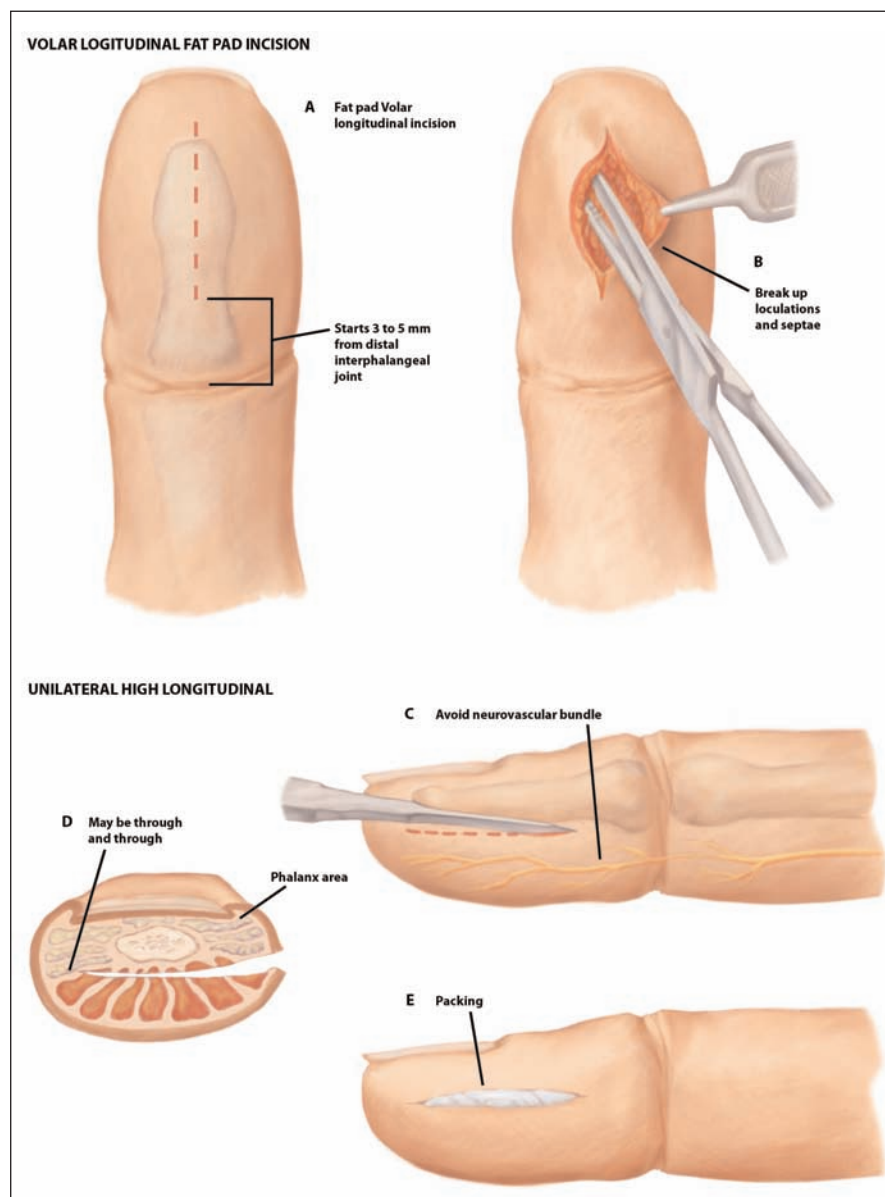
A quick check of the anatomy explains the proclivity of the fat pad to spawn a felon; it contains a complex latticework of multiple fibrous septae that attach the skin to the distal phalanx. Multiple interstitial compartments are created containing fat and sweat glands with openings to the surface. This construction gives integrity to the fat pad, makes drainage difficult, and provides a portal of entry for bacteria. Although foreign bodies may instigate a felon, and certainly one's searches diligently for glass, wood, or metal by inspection and by x-ray, often none is found. Parenthetically, it's prudent to routinely obtain radiographs.

Oral antibiotics in lieu of surgery for the early felon are generally considered standard, although close follow-up is required. This patient obviously needed hospitalization, and don't be lulled into complacency by draining pus and expecting a patient to be compliant with outpatient therapy. Despite the best efforts of these clinicians, the patient ultimately lost his dominant-hand thumb.

Community-Acquired Methicillin-Resistant Staphylococcus aureus in Surgically Treated Hand Infections

Imahara SD, Friedrich JB
J Hand Surg Am
2010;35(1):97

This article emphasizes the change in bacteriology of hand infections over the past decade. Hand infections now harbor community-acquired MRSA infections with regularity. These authors reviewed 159 hand infections treated in the operating room from 1997 to 2007, and discovered that 48 (30%) harbored CA-MRSA. The incidence increased each year by an



Accepted surgical approaches to drain a felon are the unilateral or through-and-through high longitudinal and the volar longitudinal fat pad incision. Both are distal to the IP skin crease. A digital block and a tourniquet are used. With a lateral incision, aim high, just under the phalanx, and use the scalpel only to puncture the skin, minimizing neurovascular injury. A hemostat spreads open and explores the septal compartments. Always search for foreign bodies such as a splinter or piece of glass or metal. If one side of the thumb is cut, opt for the radial, non-oppositional surface so a scar is less painful when grasping; use the ulnar side of the index, middle, and ring fingers. And always take a culture. Most advocate a drain for 48 hours, either gauze or a Penrose, and irrigation of the cavity, but these are of unproven value. (See *Hand Clinics* 1998;14[4]:547 and *Am Fam Physician* 2003;68[11]:2176.)

amazing 41 percent per year. Intravenous drug use and felon as the type of infection were risk factors for CA-MRSA.

All patients were treated at the University of Washington in Seattle, and the demographics of the patient population require specific comment. Almost 40 percent of the MRSA-infected patients were homeless; 10 percent were inmates at a local jail; and eight percent had HIV infections. An amazing 54 percent were intravenous drug users. The infections most commonly seen were tenosynovitis and undifferentiated abscess, but about six percent were felons. The thumb accounted for 13 percent of all infections and 17 percent of MRSA cases. Only about 30 percent of the overall infections had methicillin-sensitive *S. aureus* as the culprit. Bizarrely, 17 percent of

cases yielded *Neisseria gonorrhoeae* (gonococcemia?)

Comment: This article is a reflection of what every EP knows: MRSA is rampant, and it targets our ED population. This patient profile describes denizens of every ED in this country: homeless, hapless, helpless, and addicted. Fat pads of the finger of this subgroup are now fair game for MRSA infections, and you can count on ubiquitous and omnipresent roadblocks to an easy cure: corresponding psychosocial issues, problems with follow-up and compliance, and the potential for significant complications. The mean length of stay in the hospital for these patients was five days, emphasizing the aggressive nature of the infections, the need for surgery, slow clinical response, and significant cost to patient and society.

One should not expect a homeless schizophrenic with HIV who is in and out of jail to be the ideal patient. Few hand surgeons will make a house call under an expressway bridge, so hospitalization is required merely because of the insurmountable non-microbiological issues. This population cannot afford expensive antibiotics, frequently don't understand how to take them, and do not appreciate the need for or cannot orchestrate follow-up or continuing care. While the Wall Street crowd might fare well as an outpatient, hospitalization and intravenous antibiotics are often the norm rather than the exception for an otherwise drainable infection in our patients.

Treatment of Felons

Kilgore ES, Brown LG, et al
Am J Surg
1975;130(2):194

This frequently referenced 1975 article discusses a variety of surgical approaches to drain a felon. The authors from San Francisco General Hospital are well known hand surgeons who proselytize that a longitudinal incision in the midline of the fat pad is the most effective surgical approach for a felon. It's not a formal study but an opinion with clinical examples. The authors say this approach reduces serious iatrogenic complications secondary to incisions, such as skin slough, permanent anesthesia, and unstable fat pad, persistent pain, and unsightly scars. The more traditionally used lateral incision is associated with neurovascular injuries because of the anatomy of the sensory nerves and arterial supply. Through-and-through lateral incisions can cause anesthesia of the entire tip of the digit. More aggressive incision, such as the fish-mouth or hockey-stick incision can create an unstable fat pad by severing the stabilizing longitudinal septal strands. The mid-volar longitudinal incision of the fat pad, the area where most abscesses point, is the preferred incision of these authors.

The longitudinal volar fat pad incision is commonly thought to produce a painful scar in a sensitive place, and has been maligned by some and praised by others. While experts usually agree that an abscess should be drained where it points, some favor the traditional high lateral incision. This approach may be preferred as the most effective and safest approach by general clinicians.

Comment: From my review of the literature, I have gleaned that there is more than one acceptable way to drain a felon. The volar fat pad approach suggested in this paper was forbidden by the hand surgeons where I trained,

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but apparently is enthusiastically endorsed by the renowned hand surgeons who wrote this paper. Some reviewers did, however, recommend that the lateral approach also be considered as acceptable first-line therapy. I suspect that it doesn't really matter as long as one does not fillet the entire fingertip. Regardless of the surgical approach, avoid the flexor tendon sheath, neurovascular bundle, and the nail matrix.

Draining a felon is fair game for any talented EP, and standard for patients who won't be readily treated by colleagues. Nonetheless, the pensive and conservative clinician who does not want to become involved in the treatment of a felon has much support by hand surgeons. The easiest task includes ED diagnosis, with the clinician realizing the seriousness of the infection, and facilitating the right environment for a cure. A few days will likely not make much of a difference, but good luck ushering my ED patients into the office of the downtown hand surgeon. The community orthopedic surgeon may deem this condition a true pariah for his office. It appears prudent to consider a liberal admission policy, intravenous antibiotics effective against MRSA, radiographs looking for foreign bodies and osteomyelitis, and splinting and elevation. Draining a felon is an individual decision, but it is certainly within the realm of emergency medicine. The compliant and savvy patient without osteomyelitis or flexor tenosynovitis can be treated as an outpatient, but for those who lack the ability, resources, or common sense to follow a lengthy outpatient regimen, admission for at least a few days is a good option.

I could find no universally accepted standard of care with regard to the finer points of felon infections. Probably the best take-home message is to respect a felon as a serious and hard-to-cure infection on a body part that should be 100 percent functional whenever possible. Felons cannot be taken lightly nor approached cavalierly. Although a prescription for antibiotics and a proximate follow-up visit is likely in order for many early felons, a more aggressive approach should be embraced when the cases are advanced, or patient compliance is less than perfect.

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Questions:

- 1. All of the following are acceptable surgical incisions to drain a felon of the thumb except:
A. High lateral incision on the radial aspect of the fat pad.
B. Through-and-through high lateral incision of the fat pad.
C. Longitudinal incision in the middle of the fat pad, stopping distal to the IP crease.
D. Hockey-stick incision to fully expose the fat pad space.
2. The initial choice for empiric antibiotics for a felon should include coverage for:
A. MRSA.
B. Pseudomonas.
C. Fungal.
D. Oral flora.
3. Which of the following is associated with a poor outcome in a patient with a fully developed felon?
A. Copious pus is encountered and drained.
B. Immediate hospitalization is considered.
C. A foreign body is found upon incision.
D. The entire thumb to the palm is swollen.
4. The initial ED management of a felon should include all of the following except:
A. Obtain an x-ray.
B. Institute antibiotic therapy.
C. Obtain blood cultures, a CBC, and a sed rate for staging purposes.
D. Culture any pus obtained.
5. A patient presents with a minimally swollen and mildly tender distal thumb (fat pad) after being stuck with a toothpick five days before. Which is the most reasonable ED intervention?
A. MRI searching for a foreign body or osteomyelitis.
B. Incision and drainage via an aggressive lateral incision.
C. Oral antibiotics and follow-up in three days.
D. STAT consultation with a hand surgeon.

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