Distal Finger Amputation in the Rural Emergency Department: A Case Report

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Introduction:

Traumatic amputations contribute to thousands of emergency department visits annually. Physicians are trained to control hemorrhage, stabilize the patient, and consult surgery for further evaluation and management. However, there are some cases of amputations that are appropriate for patient management in the emergency department and avoid a trip to the operating room. Finger amputations, especially partial finger amputations, present a unique opportunity for the treatment course. In the emergency department setting, management and repair of the injury is possible and should be considered, especially in settings where surgical resources are limited. This case highlights a patient who presented with an acute crush injury with partial traumatic digit amputation. It explores the role of emergency physicians in treatment of these types of injuries, as well as considerations for rural, resource limited, and military facilities.

Case presentation:

A 23-year-old male presents to the ER following a crush injury to his left hand. The patient, an active-duty military service member, was moving heavy equipment in a military training environment when the equipment tipped and smashed his left ring finger. He was brought to the closest military hospital for pain and bleeding control within an hour of the injury. The patient had no other falls, injury, loss of consciousness, or numbness/tingling proximal to the crush injury. Exam demonstrated stable vital signs along with an amputation of the ventral aspect of the left fourth digit with bone visible through remaining tissue. The nail remained in

place, but was 80% detached, sensation and movement intact proximally, no other injuries, and minimal bleeding with movement, and no active hemorrhage.
Orthopedics consult was placed via Telehealth. The patient underwent debridement and amputation in the emergency department following the advice of consultant. Post procedure x-ray of the left fourth digit post procedure without notable defects.

Post procedure pain control included Dilaudid and ring finger nerve block with an additional 5mL of Lidocaine. Additionally, the patient's tetanus shot was updated and prophylactic Ancef was administered. The patient was instructed to keep the soft dressing in place for two weeks and follow up with orthopedics.
The distal phalanx was successfully removed, and the patient was able to be discharged back to the field training environment on Keflex BID for three days. Once the patient returned home from the training exercise, he was able to follow up in person with orthopedics and the determination was made he is eligible to stay as an active-duty service member and continue working.

Discussion:
Amputation presentations will largely depend on location of injury, mechanism of injury, length of time since injury to emergency department presentation, and presence of additional injury.

Distal Finger Amputations in the Emergency Setting
Physical exam should determine neurovascular status of the injured site upon arrival to the emergency department, level of bleeding, location of injury, and level of amputation, and repeat physical exam should be conducted post procedure.[3, 5] The diagnosis is made by direct visualization of the amputation and imaging should be obtained prior to amputation procedures to determine injury to bone and determine level of amputation required. [3, 5] Post procedure imaging is then used to ensure no bony fragments are retained. [3, 5]

When possible, consulting orthopedics and hand specialists help ensure proper outpatient follow-up is established. In this case, the early consultation of orthopedics from the emergency department allowed the patient to have close follow-up upon returning from training.

Providers should discuss with patient the treatment options and the impact on work and quality of life during the consent process. Possible complications of distal phalanx amputations include soft tissue infection, reduced mobility of the digit, persistent pain, and need for additional surgical correction.[5] Amputation beyond the DIP may produce less aesthetic outcomes. Additionally, functionality of the digit should be considered when determining level of amputation.[6]

Epidemiology and Risk Factors
Nearly 250,000 estimated emergency department visits from 2010 to 2019 were for finger amputations.[1, 4] A majority of those patients were male (79%) and identified as white (46.2%). [1, 4] Common mechanisms of injury include power tools, crush injuries in doors, and lawn mowers. [1,4] Finger amputations may require additional outpatient therapy, including occupational therapy. However, early treatment paired with approximately 6 weeks of short-term limited light duty work restrictions allowed for improved function and ability to fully return to work in patients treated in the emergency department. [2]

Emergency Medicine Considerations:
Military Considerations for Treatment
The Association of Military Surgeons conducted a study determining 235 service members suffered traumatic finger amputation from 2016 to 2019. Of those 235, 221 were able to return to full duty, and the remaining were medically separated due to the injury. [2] Contributing factors to long term disability included involvement of thumb or index finger, and tobacco use.[2] Efficacy in partial digit amputations is supported, specifically in the resource limited and rural emergency department setting to avoid long transport to higher level of care[3]. Partial digit amputations can be performed in the emergency department or in the operating room.[3] Treatment in the emergency department allows operating room resources to focus on higher acuity patients, which is vital in resource limited settings or in forward deployed military

settings. Treatment in the emergency department may also improve outcomes for patients. One study found procedures in the OR had a higher rate of extended hospital stay, higher rate of delayed healing, and higher postoperative therapy referrals. There was no difference in postoperative infection rate or need for additional procedures. [3] Additionally, treatment in the emergency department decreases the overall cost, patient burden, and utilization of resources in the healthcare system. [3]

Conclusion:

This case emphasizes the importance of considering partial digit amputation in the emergency department rather than sending all finger amputation cases to the operating room. A retrospective study of finger amputation from the NEISS database found over 70% of finger amputations were able to be successfully treated in the emergency department and discharged home.[4] Only 5% required transfer to a higher level of care. The remaining 22% of finger amputations required hospitalization for further management.[4] Transfer of care was indicated for complex traumatic amputations, specifically from table or bench saws and power lawn mowers. [4] Delayed treatment of an amputation may lead to soft tissue infection, increased pain, and post procedure complications, such as decreased mobility and sensation.[5]

The treatment of a partial finger amputation is possible in an emergency department and may improve overall patient outcomes while appropriately allocating resources. Increasing awareness of the capabilities of amputation treatment allows emergency physicians to provide appropriate care and prevent unnecessary hospitalizations.

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