



# GUNSHOT WOUND TO THE DISTAL PHALANX

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## Abstract

Background: This report describes the case of a Soldier who sustained a gunshot wound from a 9mm to the distal phalanx and presented to the authors while they were deployed on a recent joint training mission to Southwest Asia. A 29-year-old man presented to our role 1 aid station with a perforating gunshot wound to the left index finger. He sustained the wound while shooting an HK MP5 during a tactical shooting training exercise. He arrived holding a pressure dressing over the wound and was alert and oriented. He complained of sharp 10/10 finger pain and mild bleeding. His vital signs were stable. He appeared slightly pale and diaphoretic. He had normal distal sensation of the finger. Range of motion of the proximal interphalangeal joint was normal. There was an obvious perforation through the distal interphalangeal joint (DIP), which also had some decreased flexion and extension. The patient did not know his tetanus status; however, we found it easily by checking MEDPROS/AFCITA. His oral (PO) intake was one hour before the injury. He denied shortness of breath, lightheadedness, or other injury. An extensive review of systems failed to disclose any additional symptoms or injury. A more detailed examination was notable for a 1cm circular penetrating wound, entering from the volar plane through the dorsal plane of the second DIP and phalanx (Figure 1).

The entire nail was intact although pale and blue, and the wound hole was located where the nail matrix originated. The skin surrounding the exit wound was consistent with bullet blast injury with gunpowder residue present on and around the entrance wound (volar) (Figure 2). We also noted venous bleeding with a slow flow, 2+ radial pulse, gross sensory sensation intact medially and laterally along the volar DIP, and loss of DIP extension with digit naturally in 20 degrees of flexion. His capillary refill was <2 seconds. He was given cefazolin 1g intramuscular  $\times 1$ , fentanyl citrate 800 $\mu$ g PO  $\times 1$ , and ondansetron 8mg orally disintegrating tablet (ODT)  $\times 1$ . He described good pain relief with the PO fentanyl citrate. An 18-gauge saline lock was placed in his right antecubital, and 1L of normal saline was started at “to keep open” (TKO) rate. His hand was prepped with povidone-iodine solution, and a local digital nerve block was obtained with 1.5mL half lidocaine 1% without epinephrine and 1.5mL bupivacaine 0.5%. With use of a large basin, the patient’s wound was extensively irrigated with low-pressure irrigation using five 1000mL bags of normal saline and intravenous (IV) tubing. A casualty card was filled out. He was given a “combat pill pack” of Mobic, Tylenol 500mg, and moxifloxacin 400mg PO. Before being transported to a host nation facility, his IV line was discontinued and the wound was then wrapped in a bulky gauze dressing. At the host nation hospital, a radiograph was obtained, which showed a linear intermedullary fracture of the distal middle phalanx and a comminuted fracture with loss of osseous formation of the distal phalanx (Figure 3). A USAF orthopedic surgeon who was participating in the training exercise at a separate location met the patient at the hospital to provide his opinion. He recommended a routine distal phalanx amputation to be done at the theater USAF hospital. The patient verbalized understanding and elected for the amputation and the orthopedic plan of care. The patient was discharged for overnight care by the SOF medic (18D). The next day, the patient was routinely evacuated for definitive care (distal amputation) with a plan to return to his unit in 14 days for close observation and continued care by the 18D and physician assistant.

## Discussion

The basic management plan for tactical field care of bleeding includes assessing for unrecognized hemorrhage and control of all sources of bleeding.<sup>1</sup> In this case, a tourniquet was not clinically indicated. The next step recommended is to start an 18-gauge IV or saline lock if indicated or, if IV access is unobtainable, the intraosseous (IO) route is used.<sup>1</sup> The patient’s appearance and blood loss from the finger warranted the administration of IV fluids, and access with an 18-gauge IV line was obtained without difficulty. The lack of altered mental status and presence of strong peripheral pulses indicated the patient was not experiencing hemorrhagic shock. If the patient is not in shock, no IV/IO fluids are required and PO fluids are permissible if the patient is conscious and able to swallow.<sup>1</sup> Given the traumatic injury and possible need for urgent surgery, the patient was given IV resuscitation and advised to refrain from PO other than sips to swallow medications. It is recommended pulseless fracture extremities and dislocations be reduced; dislocations with a distal pulse may be reduced based on evacuation time and training/experience in procedure. In both situations, splint and recheck pulse are required.<sup>1</sup> In this patient, this was not applicable. Frequent reassessment of the casualty and use of available monitoring devices are advised, which was done every 15 minutes.<sup>1</sup> An argument could be made that more frequent assessment of vital signs should have been obtained, although the clinical picture did not warrant it.

The patient was given the recommended analgesia.<sup>1</sup> During reassessments, Mobic 15mg PO and Tylenol 1g PO were given. In theater, if the Soldier is unable to fight or there is need for opiate analgesia to control pain, Narcan should be available whenever administering opiates, especially due to challenges in monitoring for an overdose. It is recommended to administer oral transmucosal fentanyl citrate (OTFC) 400–800 $\mu$ g PO, starting with the lower dose if unsure of the patient’s response. Tape the OTFC lozenge to patient’s finger and reassess in 15 minutes, repeating the dose if necessary.<sup>1</sup> This procedure was followed, and it was noted that this form of analgesia provided mild pain relief after 15 minutes for the patient. He declined a repeat dose and was given Mobic and acetaminophen. The patient was also given ondansetron 4mg ODT every 8 hours for nausea, as recommended.<sup>1</sup> Prophylactic antibiotic use is recommended for all open combat wounds. It is not recommended for burns in the absence of other concomitant combat wounds. If the patient is able to take oral medications, moxifloxacin 400mg PO from combat pill pack is recommended. Given that the patient was to undergo orthopedic surgery, cefazolin 1g IM was given. If the patient is unable to take oral medications, ertapenem 1g IV/IO/IM is recommended. After a review of the tactical field assessment and management recommendations was conducted, the JSOM training supplement recommendations were followed. <sup>1</sup> As a result, a good treatment result and prognosis were expected for the patient. There is an important administrative note when dealing with traumatic injuries: An LOD DA Form 2173 (Yes) was completed. Also, the 18D was advised to document any loss of activities of daily living (ADLs). Loss of two or more ADLs qualifies the Servicemember for Traumatic Service Members Group Life Insurance.<sup>2</sup> If followed closely, it is possible that the Servicemember would qualify for a TSGLI payment. In addition, the SF 600 noted that the patient received a “combat-related” injury, which would qualify him for Combat Related Special Compensation (CRSC) after he retired.

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