



An Urgent Care Approach to Fishhook Removal

Urgent message: While fishhook injuries are common in urgent care centers located in or near recreation areas, especially during vacation season, their untimely presentation can cause pandemonium in the office. Management requires a thorough understanding of the mechanism of injury, the type of hook involved, and proper technique for removal.

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Introduction

Fishhook injuries are a common, underestimated occurrence presenting to emergency rooms, ambulatory care, and urgent care facilities, especially among those who participate in the sport of fishing with a rod and line (or “angling”). There are also multiple injuries in the commercial fishing industry. The vast majority of fishhook injuries occur to the head and hands.¹ What has been seldomly recognized is the occurrence of injury to bystanders, as well as to accompanying pets and wildlife. These types of injury are referred to as *collateral damage*.

U.S. data on actual incidence of fishhook injuries are scarce, as many such injuries are treated in the field without attention from a healthcare provider. However, the presumption is that patients who seek medical care do so in the emergency room, an urgent care center, or in an ambulatory care center. (The emergency department is the site for 28% of all acute care visits in the United States.²) From this author’s experience, pandemonium commences as soon as front desk personnel in the urgent care center announce there’s a fishhook injury in the waiting room.

Fishhook removal is a procedure comparable in

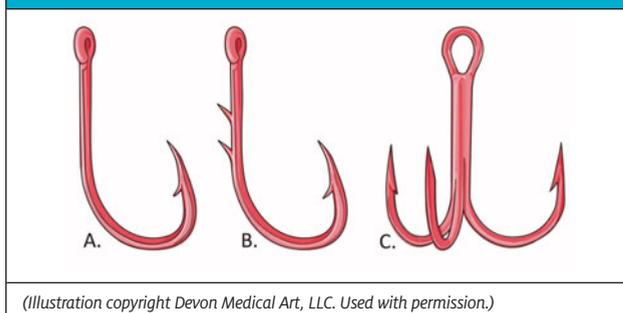


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difficulty to laceration repair of the skin with proper equipment. The fishhook removal system can be either disposable or a reusable sterile device similar to the standard suture tray. Here, we review the clinical approach to evaluation and removal of fishhooks, focusing on the six most common techniques of fishhook removal and injury management. To do so, it is essential to understand the anatomy of the fishhook,

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Figure 1. Classic types of fishhooks: A, single barbed fishhook; B, multiple barbed fishhook; C, treble fishhook.



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the injured area, and common techniques used to remove fishhooks in a timely and safe manner with minimal trauma.

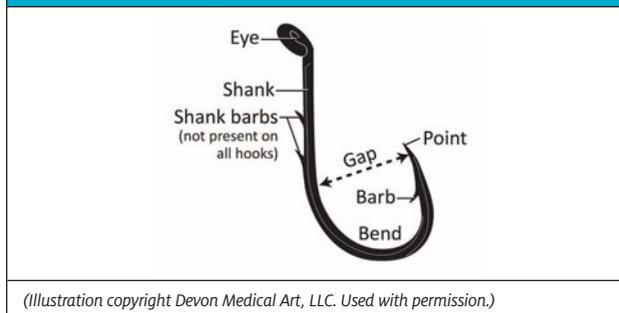
Anatomy of the Fishhook—and Why It Matters

The choice of the method for fishhook removal depends on the type of fishhook embedded, the location of the injury, and the depth of tissue penetration. Occasionally, more than one removal technique may be required for removal of the fishhook. Wound care following successful removal involves extraction of foreign bodies from the wound and the application of a simple dressing. Prophylactic antibiotics are generally not indicated, and should be left up to the discretion of the provider. Tetanus status should be ascertained.

There are three classic types of fishhooks: single-barbed, multiple-barbed, and treble (Figure 1). There are common features among them, however (Figure 2). In each, the “eye” connects the hook to the fishing line. The shank is the portion of the hook that connects the point and the eye. The “point” is the sharp end that penetrates the fish’s mouth or skin. The gape or gap describes the distance between the shank and the point.

When examining the patient, it is important to note whether the fishhook is single-barbed or multiple-

Figure 2. Anatomy of the fishhook.



barbed, as well as the number and location of the barbs; these details will help determine the optimal removal technique. Often, patients will know the type of hook they were using and, in many cases, they bring in a sample or photo of the embedded hook for viewing.

Patient Evaluation

After obtaining a history of the injury and vital signs, a quick survey of the wound and surrounding structures should be made. Inspect distal and proximal to the injury site. Assess for deep injury involving penetration to tendons, nerves, and bone. Radiographs are seldom needed, but may aid in determining the type of fishhook and the depth of penetration.

Most fishhook injuries are penetrating soft-tissue injuries of the hand, face, head, or upper extremity but can involve other body parts. Injuries usually do not involve deeper tissue structures because of the linear forces applied along the fishing line to the curved shape fishhook that brings the point parallel to the skin and keep it from deep penetration.³ Any eye injury penetrating wounds should be stabilized and transported to the nearest ED.

Bear in mind that the cutting capacity of wire cutters is limited. In cases involving larger fishhooks, the patient may have to be referred to the ED where larger surgical cutting devices are available (ie, bolt cutter or an extensive surgical procedure may be required).

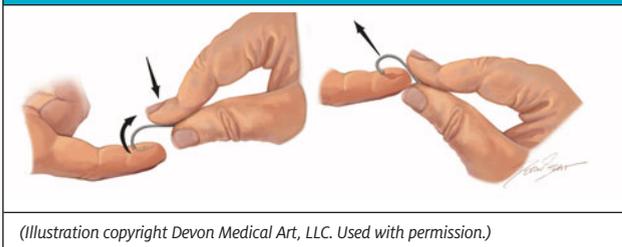
Principles of Removal

The six most common techniques for the removal of fishhooks are:

1. Retrograde
2. String-yank
3. Needle cover
4. Barb crush
5. Cut-it-out
6. Advance-and-cut

The method selected is based on the judgment of

Figure 3. Retrograde technique. Apply downward pressure to the shank of the fishhook while it's being pushed back out along the point of entry.



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the provider, the anatomic location of the injury, and the type and anatomy of fishhook. Before you get started make sure that you have of a fishhook removal system. At minimum, this will require:

1. Wire cutter
2. Hemostat or needle driver
3. Gloves
4. Wound cleanser
5. Protective eyewear (goggles or face shield)
6. Local anesthetic

The approach of removal is multifactorial. In the field with limited resources, the more robust methods are generally attempted commonly (string-yank methods). Often times, multiple techniques must be attempted before the fishhook is successfully removed.

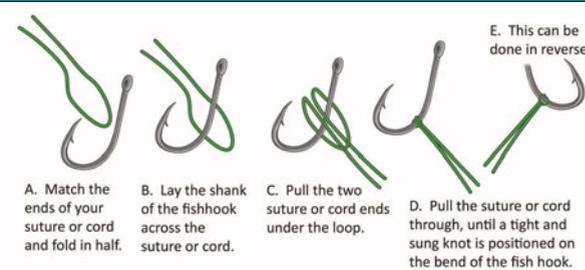
In the clinical setting, local wound care should be performed first. This typically involves cleaning the site with combination of povidone-iodine, hexachlorophene solution before attempting removal of the fishhook. Patients who contact the urgent care center before arrival can be advised to wash the wound with soap and water. Local anesthesia is typically lidocaine 1% (Xylocaine) without epinephrine. A nerve block or regional block may also be required depending on the injury site.

Hooks with more than one point like the treble fishhook should have the free barbs taped or cut to avoid additional embedded puncture wounds during the removal procedure. All items attached to the hook (eg, fish line, bait, and the body of the lure itself) should be removed. The provider and bystanders should take care not to be struck by the hook during removal. Anyone assisting with the procedure should have clean hands and gloves. Protective eyewear should be worn with all procedures, especially when performing the string-yank method and advance-and-cut method.

Retrograde Technique

Retrograde technique is considered the simplest of the removal techniques but has the lowest success rate. It

Figure 4. Applying a lark's head knot to a fishhook.



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works well for barbless and superficially embedded hooks. Downward pressure is applied to the shank of the hook. This maneuver pushes the hook deeper into the tissue bed and dislodges the barb from the resting tissue site. The hook can then be backed out of the skin along the path of entry (**Figure 3**). If there is any resistance or snagging sensation of the barb during the procedure, consider an alternate method.

String-Yank Technique

The string-yank technique is a modification of the retrograde technique. It is commonly performed in the field and many fishermen believe it's less traumatic because it creates no new wounds and rarely requires anesthesia. This technique works best when removing small and medium-size hooks. It should not be attempted on deeply embedded fishhooks, for fear of damaging deep nerve and vascular structures, and when the fishhook is embedded in parts of the body that are not fixed (lips, nose, eye lids, ears).

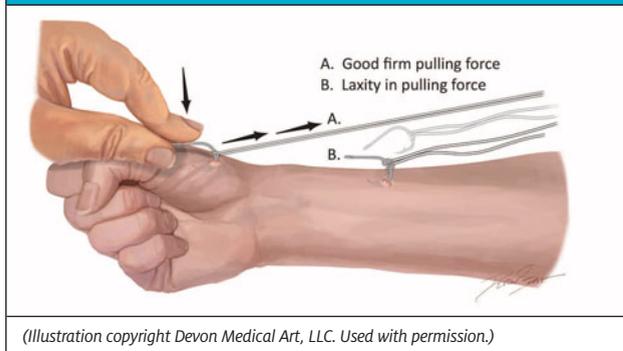
The tradition of counting 1,2,3, go (to give a reference point in time to start) prior to performing a yank-pull attempt is not advised as it may prompt patients to assume a flexed posture, which can cause more damage during the course of pulling. It can become a risky endeavor with improper technique, and may result in permanent tissue and structural damage. A heavy string material (eg, heavy suture cord, or a 20- to 30-pound test fishing line) can be used.

Wrap and position the string material around the midpoint of the bend in the fishhook to keep the string in a fixed position; use a simple knot such as a lark's head knot (**Figure 4**). Wrap the free ends around the index finger of the free hand.

A better grip on the string can be achieved by wrapping the ends around the gloved hand, grouped tongue depressors, or hemostat shaft.

The involved skin area should be well stabilized

Figure 5. String-yank method. A: Tie a string using a lark's head knot around the midpoint of the bend in the fishhook. B: Depress the shank of the fishhook against the skin. Press firmly and quickly yank/pull on the string while maintaining continued pressure to the shank of the hook.



against a flat surface as the shank of the fishhook is depressed against the skin. Continue to depress the eye and/or distal portion of the shank of the hook, taking care to keep the shank parallel to the underlying skin. A firm, quick jerk (with sustained forceful motion) is then applied parallel to the shank while continuing to exert downward pressure on the eye of the fishhook (Figure 5A).

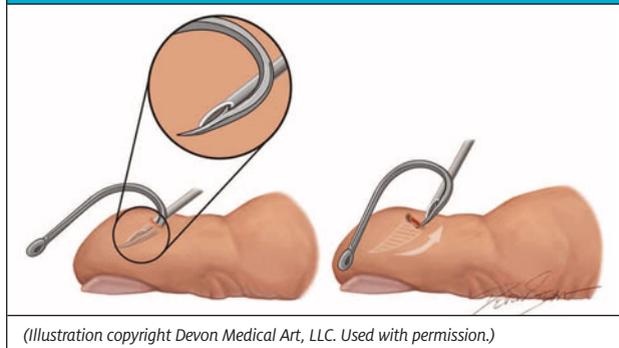
Fishhooks extracted with this technique will come out with significant velocity, so the provider and bystanders should remain out of the line of flight and wear protective eye wear (goggles or face shield). Caution should be taken when performing the yank procedure. Keep in mind Newton's third Law of Motion⁴; for every action there is an equal and opposite reaction. This is true when pulling. If there is laxity in the parallel pulling force, the hook can come out of its original position and be forcefully pulled back and become embedded into a new location (Figure 5B).

Needle Cover Technique

The needle cover technique requires great dexterity on the part of the provider (and a little luck). It works well for the removal of large hooks with a single barb, and when the point of the fishhook is superficially embedded in the skin (surface).

After standard wound prep and local anesthesia, a 16- to 18-gauge needle is advanced along the wound entrance of the fishhook (Figure 6). The direction of insertion should be parallel to the shank. The bevel should point toward the inside of the curve of the fishhook, enabling the needle opening to cover over (capping off) the barb. It is important to have the bevel

Figure 6. Needle cover method. Advance a 16- to 18-gauge needle along the fishhook until the needle opening covers or caps, the barb. The fishhook and needle are then pulled back and removed as a single unit.



pointed in the correct direction as shown so that the leading edge of the needle matches the angle of the fishhook barb. Advance the fishhook to disengage the barb, then pull and wiggle it so that the point enters the lumen of the needle. Once covered, back out the fishhook (similar to the retrograde technique), taking care to move the needle along the entry point of the fishhook.

A modification of this technique involves sliding a #11 scalpel blade along the wound to the point of the fishhook. The fishhook may then be backed out through the track of the incision line.

Barb Crush Technique

The barb crush technique is considered another modification of the retrograde technique, but with a higher success rate.

Often, there is no wire cutter available. In most cases the available wire cutter may not cut the diameter of the fishhook (shank). Using a pair of pliers or sturdy hemostat you can repeatedly crimp down and crush the fishhook barb flat. Carefully smooth all rough edges, and pull gently, backing the hook out the way it entered the skin. The hook can then be backed out of the skin along the entry path (Figure 7).

Cut-It-Out Technique

The cut-it-out technique is useful in penetrating fishhook injury of the fingers. It requires dissection along the shaft of the hook. This procedure is also used frequently by eye surgeons in fishhook injuries penetrating the sclera or cornea.⁵ However, this should be a procedure of last resort in the ambulatory care setting,

Figure 7. Barb crush method. Repeatedly crimp down hard crushing the barb on the hook until flattened. Next back the hook out the entrance holes.



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when there is no wire-cutting device available and there is an urgent need to remove the fishhook. This technique is best conducted in an area of superficial penetration, with no major surrounding neurovascular structures or tendons present.

To perform, take a hemostat and pull up gently on the shaft of the hook, in a vertical direction. Next, take a scalpel (preferable a standard #11 blade type) and gently cut along the shaft of the distal end of the fishhook toward the proximal end with the barb. The hook can be then extracted and discarded. (See **Figure 8**). This technique consequently causes lots of tissue damage, and the resultant scar will likely have a jagged wound edge appearance.

Advance-and-Cut Technique

This traditional method of fishhook removal has the best success rate, even when removing larger fishhooks; however, additional trauma to the surrounding tissue is caused by creating an exit wound (a slight disadvantage). The advance-and-cut technique is most effective when the point of the fishhook is located near the surface of the skin.⁶ It involves two methods of removal: one for single-barbed fishhooks (**Figure 9**) and one for multiple-barbed fishhooks (**Figure 10**) where the non-embedded hooks are cut off prior to attempting removal.

Infiltration with a local anesthetic is performed over the area where the fishhook has penetrated the skin; alternatively, a digital or regional block may be appropriate for various body site injuries.⁷ Using a hemostat or needle driver, with a strong grip and twisting motion of the wrist, drive the point of the fishhook (including the entire barb) upward through the skin, creating an exit wound. A modification of note is to open the skin with a #11 scalpel blade, slightly above the tenting point of the hook to allow easier exit. Once the distal shaft of the fishhook completely clears the skin surface, cut it with a medical wire cutter or another cutting

Figure 8. Cut-it-out technique. Using a #11 blade pull up and cut along the shaft of the hook in a vertical direction until free of entrapment.



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tool, allowing the rest of the fishhook to be backed out with little resistance. Protective eyewear should be worn by provider and bystanders. Fishhook fragments fly off with massive force and can cause bodily injury.

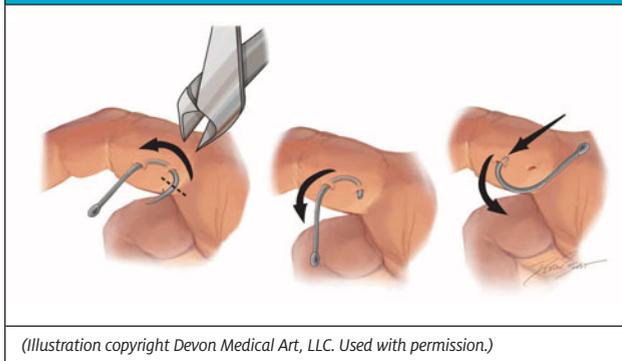
The advance-and-cut technique is likely to be the most universally accepted in the urgent care, ambulatory care, and ED settings as it is probably the most familiar to providers and least anxiety-producing for the patient. If by chance the fishhook has several barbs on the shaft, the distal end (eye) should be cut off with a cutter and the proximal end with the hook pulled forward through the exit wound. Devices specifically designed for this purpose are available. Bear in mind that all wire cutters have a limit of diameter cutting capacity and in cases involving larger fishhooks, patients may have to be referred to the ED or hospital where a bolt cutter or surgical procedure may be required.

On first glance, it may appear that removing the shank barbs could obviate the need to drag them through the wound. However, it is difficult to stabilize the hook with a hemostat and try to remove the small multiple shank barbs (creating potentially multiple small flying objects as you try to snip them off). Cutting the tail end off, then pulling through, amounts to dragging the shank barbs intact through the tissue plane that has already been cut from the initial puncture wound. This results in less risk of injury to the provider, less anxiety to the patient, and saves time of procedure.

Postremoval Wound Care

After removal of the fishhook, the wound should be irrigated thoroughly with normal saline. All debris and foreign bodies should be removed. Finally, the wound should be covered with antibiotic ointment (mupirocin) and a sterile dressing. Wound care should include rou-

Figure 9. Advance-and-cut technique with a single barb fishhook. Advance the fishhook through the skin, creating an exit wound. Cut off the barb of the fishhook and back the remaining fishhook out the entry point.



“Risk recognition has to be appreciated to prevent injuries to patients and providers. The best approach is to be knowledgeable of the anatomy of the injured area and be prepared mentally to make adjustments in your procedural method.”

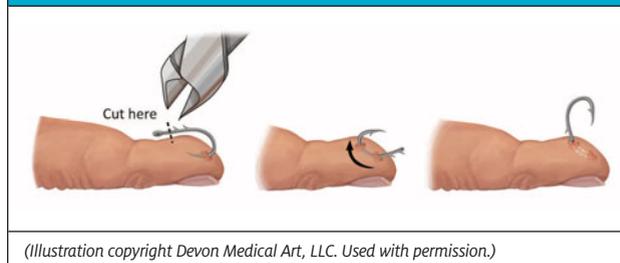
tine irrigation, cleansing (betadine), application of antibiotic ointment, and dressing change on a daily basis or every other day. Observations should be made for signs of infection such as edema, erythema, purulent drainage, etc. Healthy patients with uncomplicated skin injuries should be advised to soak the wound in warm water two to three times a day until healing is observed. Infections after fishhook removal are uncommon.¹ Therefore, routine use of antibiotics for uncomplicated superficial skin injuries is not indicated. For the rare cases in which there is reason for suspicion of infection and antibiotics are prescribed, consideration of coverage for water-borne organisms is reasonable.

Patients should also be evaluated for tetanus prophylaxis. Tetanus-diphtheria or tetanus-diphtheria-pertussis (Td or Tdap) vaccine should be administered if there is a history of less than three doses or unknown doses of tetanus toxoid administration. If the last dose of tetanus toxoid was received within the last 10 years, then no further vaccination is required.

Conclusion

Fishhook injuries can occur at any time—during angling, commercial fishing, or simply cleaning out the

Figure 10. Advance-and-cut technique with a multiple barb fishhook. Advance the fishhook through the skin creating an exit wound. Cut the eye of the fishhook off and pull the remaining fishhook forward through the exit wound created by advancing the point through the skin.



garage. There is a need to establish a basic minimal procedural understanding by all healthcare providers involved in ambulatory care, urgent care, and emergency rooms for quick assessment and swift removal of fishhooks. This is an area where risk recognition has to be appreciated to prevent injuries to patients and providers. The best approach is to be knowledgeable of the anatomy of the injured area and be prepared mentally to make adjustments in your procedural method. Always consider starting with the simpler removal techniques (ie, retrograde, needle cover) prior to the more robust methods mentioned in this article.

Further, there is a need to establish a standard fishhook removal system that is as universal as the suture tray, containing a medically approved cutting device, along with hemostat, protective eye wear, and other supportive care supplies.

Ensuring there is an established protocol, provider training, and a ready-to-use fishhook removal system on hand (ideally in close proximity to a laceration repair kit) will increase the likelihood of both a positive clinical outcome and high patient satisfaction. ■

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