

WORKSHOP WOUND CARE

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INTRODUCTION

AS FAR AS occupations and avocations go, wood-working is reasonably dangerous. The Occupational Safety and Health Administration bluntly declares on its page dedicated to woodworking, “Workers operating woodworking equipment suffer the following common injuries: laceration, amputation, severed fingers, blindness.” I could argue that severed fingers and amputations are reasonably similar enough so as to not need to separate them out. But regardless, using extremely sharp blades in close proximity to extremely soft flesh is eventually going to result in some painful and sometimes life-altering injuries.

In this book, I’ve attempted to cover the major injuries that often occur in a woodshop. You may find utility for this text as an in-the-moment-oh-god-what-do-I-do reference (notably the chapter on amputations, subsection how to store an amputated body part). But this text is primarily intended to be used as background reference hopefully teaching not just how certain injuries are cared for in the setting of a home or medical facility, but also why they are managed in that way. Knowing how wound healing takes place

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gives a greater understanding of why you shouldn't keep dumping hydrogen peroxide on open wounds. And, knowing some basics of anatomy (location, form and function), gives a greater understanding of when to worry that a cut could have injured an important tendon or joint capsule.

For me, woodworking is an avocation, one of several that I have but also the one that provides me with the greatest joy and that lets me work on the things that I am not always good at in life (fine attention to detail and intent deep focus on a project). Emergency medicine is my occupation, one that also gives me great joy and presents me with new challenges every day. At the time of writing this, I have been in emergency departments helping care for patients in some form and capacity for 24 years. First, as an orderly where I, wide-eyed, assisted a physician in closing a laceration to the leg caused by a chainsaw. And, most recently, as an attending emergency medicine physician practicing in an urban trauma center and a suburban, community emergency department.

The two most enduring life lessons I have learned working in the emergency department are 1.) that life can indeed be, to quote Hobbes, "nasty, brutish and short" and 2.) that there are vanishingly few things in life that are certain - black and white, without an ounce of gray, or equivocation.

To the first lesson, life-altering injuries can happen in the blink of an eye and happen to anyone regard-

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less of how good or bad they are or how dutiful and attentive they are to their craft. Sometimes the world is random and cruel. As such, anyone who works in a dangerous environment is at risk for injury. However, most of the injuries that do occur in a woodshop, occur as a result of lack of attention to proper safety procedures and personal protective equipment. Safety glasses will save you from a sliver of wood that could embed in your eye and take your sight. Push sticks will keep your fingers away from the blade of a table saw and save you from a nasty cut or a lost finger. An ounce of prevention is absolutely worth a pound of cure.

To the second lesson, I was once asked to do a brief TV interview with local news after a local college basketball coach was diagnosed as having a carotid dissection. This condition is basically a small tear in the inner lining of one of the two main arteries that give blood supply to the brain. Now, I hadn't done many of these interviews and in the preparatory meeting with the public relations officer, she framed what the interview would be about, how they might want to know a little about the condition and how they will probably ask how serious it is and if he could die from it. To which, I reflexively said, "well he could." Seeing the blood drain out of her face, I knew that wasn't precisely what she was hoping to hear or the answer I was supposed to give.

There are a lot of possibilities in the universe of "could," particularly in medicine.

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Could he have died from it? Sure, the tear causes a blood clot to form, which causes a stroke, which causes severe swelling on the brain, and then in a couple of days - kaput. Is it a likely outcome? No, especially with some simple interventions like taking a blood thinner. But could it happen? Sure. The point is, that the outcome of any disease or any injury is not certain and terrible things can happen. Will a particular laceration heal just fine without stitches? Maybe? Will that same wound be fine if you don't clean it terribly well as early as possible? Maybe? Will it get terribly infected leading to a skin eating bacterial infection and your ultimate demise? Sure hope not, but I've seen stranger things happen.

Practice pattern variation is yet another example of uncertainty in medical care worth mentioning. The term practice pattern variation refers to the fact that two medical providers may approach the management of the same disease/condition/wound in completely different ways. One provider may choose to sew a wound closed where another might choose to close it with sterile tape and glue. One provider might choose to put a patient on antibiotics for certain wounds where another provider may not. Most of the time, both courses of action are entirely reasonable and right. Because medical training is a form of apprenticeship, each provider is an amalgamation of book knowledge and experiential knowledge. As such, where a provider trained, who they learned

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from, where they have worked, and the type of patients and injuries they routinely see will greatly influence how they care for the patient in front of them. This is all to say that, in this book, I have attempted to describe the usual care of wounds and injuries based on what book knowledge exists and based on my experiential knowledge. Undoubtedly, there are medical providers who may choose to manage an injury differently than I have described. However, I have attempted to describe, to the best of my abilities, the best practices for caring for the types of injuries sustained in a woodshop.

One final comment on uncertainty. Whenever I am working in the emergency department and a physician-in-training or advanced practice provider is describing a wound to me, laying out a plan on how they will manage it, I never commit to saying that their plan is absolutely correct without first seeing the wound. A verbal description of an injury is always, unfortunately, lacking subtle context clues which could greatly influence the way in which a wound should best be managed (in my opinion and experience). By extension, relying on a written description of an injury or wound is going to lack all the necessary information needed to decide how to best manage a wound. So, if you are injured and a simple adhesive bandage isn't doing the job, please seek out a medical provider to assess the wound.

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CRUSH INJURIES

CRUSH INJURIES are some of the most common injuries in the workshop. Whether it's a dropped workpiece or a misplaced blow of a hammer, at some point in time you're going to smash your thumb, drop something on your foot or get your fingers caught between heavy workpieces while fitting joints.

As opposed to lacerations, where injuries at the cellular level are located precisely along the track of the blade, crush injuries cause more widespread damage. The force of a crush injury causes cells and blood vessels at the point of impact to rupture, spilling blood and the cellular contents into the tissues and under the skin surface. This cellular death and rupture of blood vessels is greatest at the center of the point of impact with the severity decreasing as you travel away from the point of impact. Because the surface of the skin usually remains intact, the blood and cellular contents accumulate without an avenue of escape, forming a bruise.

Bruises are sometimes also referred to as hematomas ("blood tumor" by its Greek derivation). Hematomas can be quite small as in the case of subungual he-

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matomas under fingernails (more on those shortly). Or, they can be huge, a result of arterial injuries allowing large volumes of blood to accumulate in the tissues. Fortunately these large hematomas are more often seen with car accidents than injuries in the woodshop.

Particularly for large crush injuries, the story of the damage done doesn't always stop at the time of injury. As detailed in Chapter 4, *Wound Healing Primer*, the process of wound healing is one of inflammation, of drawing in of resources to remove dead tissue and repair damaged cells. This accumulation of resources leads to swelling in the tissues. When combined with extensive bleeding and cell death seen in big crush injuries, this swelling can lead to a condition called compartment syndrome. Muscles are bound into compartments by dense, tough connective tissue. Though there is a little bit of give in the connective tissue that surrounds these compartments, at some point, with the added volume of blood/dead cells/repair fluid, the space become indistensible (it can't expand) and pressure increases. The pressure can increase to a point where blood can no longer flow into the space. This effectively creates a tourniquet effect, leading to death to any tissues in that compartment and beyond.

The cardinal symptoms of compartment syndrome are known as the five Ps: pain, pallor (pale skin), paresthesia (numbness and tingling), pulselessness (lack of a pulse) and paralysis. Pain is typically the first of

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these symptoms to develop so if you have severe pain that can't be controlled with medications after a crush injury, you need to seek care for further evaluation. Numbness and tingling develops as pressure increases, causing dysfunction of the nerves traveling through the compartment. Pulselessness and pallor are later findings and definitely indicate a medical emergency.

Broken bones are a more common concern than compartment syndrome for the crush injuries you'll sustain in the woodshop. As I alluded to in Chapter 6, Red Flags, it's exceedingly difficult to tell whether or not something is broken by the external appearance alone. A broken toe or tip of a finger is unlikely to need any intervention apart from a temporary splint. Fractures to any other part of the finger, hand, wrist or foot may need more significant intervention - anything from a simple splint or cast to surgical pinning and repair. Any crush injury where you have significant bruising, pain, swelling and particularly severe pain with movement should be further evaluated for a possible fracture.

MANAGING CRUSH INJURIES

Assuming there isn't concern for a broken bone, most crush injuries can be treated with "RICE" therapy (Rest, Ice, Compression and Elevation). Each of these interventions are geared toward decreasing swelling over the first 24-48 hours post injury and thereby decreasing the pain you experience.

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Let's take a look at each intervention in detail.

Rest is pretty self-explanatory. If you can avoid using the injured body part, do so and give yourself a chance to heal.

Icing an injury seems simple but there are a couple of things to keep in mind. The goal of icing is to basically temper and slow the inflammatory response without causing additional injury to yourself. There is a very real danger of causing frostbite if the ice is applied directly to the skin or if it is in place for too long. If you are using ice in a plastic bag or an ice pack, wrap it in a thin towel before applying it directly to the skin. Keep the wrapped ice pack in place for approximately 20 minutes, then remove. You can repeat the 20 minutes of icing every hour or every couple of hours. The wrapped ice pack may cause some temporary redness to the skin and will temporarily numb the surface of the skin. Persistent redness or numbness would be concerning for a frostbite injury.

Compression is more important for larger hematomas (and for sprains and strains of joints). Compression is best applied with an elastic bandage wrapped lightly around the injured body part. The amount of compression to apply with the elastic wrap is a bit of a Goldilocks situation. Too loose and it won't do any good. Too tight and you'll end up with causing a tourniquet effect and worsening swelling and pain. A good starting point is to unroll a short segment (about 6"-8") of the elastic bandage. Hold its end in place in

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the area of the injury. Stretch the unrolled section of bandage by 25-50 percent (what was 6" in will now be 8"-9" in length). Wrap the stretched length of bandage around the wound and hold in place. Repeat until the elastic wrap is fully applied. If your pain increases after applying the compressive dressing, unwrap it and apply it more loosely. If you notice swelling developing beyond the site of the wrap, unwrap it and apply it more loosely.

Elevation also seems straightforward but can be challenging to maintain depending on the injured body part. The goal of elevation is to use gravity to help passively drain blood and other fluids out of an



Fig. 67. Light elastic wrap.

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injured area. To do this, keep the injured body part above the level of the heart as much as possible, both while awake and asleep.

All of these interventions are most important in the first 48-72 hours after the initial injury. If they are all done assiduously, swelling and pain will be minimized. Any additional pain should be able to be treated with over-the-counter medications such as acetaminophen or ibuprofen. After the first 72 hours, there should be minimal additional swelling and these interventions are no longer as important. In fact for some hematomas, following this initial period, warm heat may be more effective in helping resolve the hematoma as opposed to ice.

SUBUNGAL HEMATOMAS

Subungual hematomas are pockets of blood that collect under a fingernail (or toenail) after it's been crushed. These can be painful and can disrupt nail growth, causing nails to fall off and/or grow back abnormally. They can be associated with fractures of the underlying bony fingertip and occasionally lacerations to the nail bed (the specialized skin surface on which the nail grows). Removal of the nail and repair of the nail bed used to be recommended if the subungual hematoma was greater than 50 percent of the surface of the nail (or greater than 25 percent if there was an associated fracture). Fortunately, we have found that simply poking a hole through the nail to

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drain the blood (a procedure called nail trephination) has equivalent outcomes to removing the nail. (I say "fortunately" because I rank removing a nail amongst the more gruesome procedures I do - and the less I have to do it the better.)

Nail trephination (poking a hole in the nail to let out the blood) can be performed with a variety of instruments. In the emergency department, we have battery-powered electrocautery devices. Press a button and the tip heats up to near 1,000F°. Touching it to the nail burns a hole through the nail allowing the blood to drain out.

If the electrocautery is not available, an 18-gauge needle can be used. Hold the needle at 90° to the surface of the nail, press down lightly but firmly, and spin the needle to essentially drill a hole through the sur-

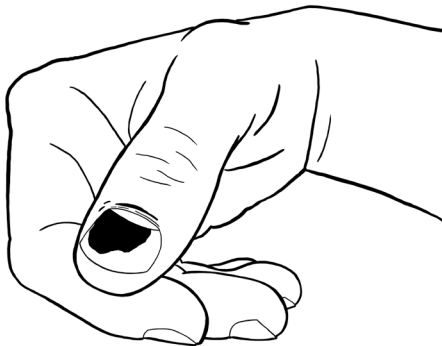


Fig. 68. Subungual hematoma.

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face of the nail (kind of like a spoon bit except you're working your way through a nail instead of wood). I prefer 18-gauge "blunt fill" needles for this procedure. They have a less acute cutting angle and are less likely to accidentally stab through to the nail bed as you drill out the hole in the nail.

Having neither needle nor electrocautery, you can make this work provided you have some office supplies and a lighter. Straighten out a paperclip and use the lighter to heat the tip until it is red hot. After it is appropriately heated, press it into and through the nail at a 90° angle.

If successful, the majority of the blood that has accumulated under the nail will ooze through the surface of the nail, relieving a tremendous amount of pain and pressure. The procedure itself ranges from

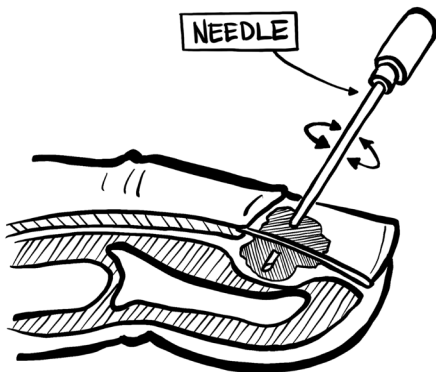


Fig. 69. Nail trephination with needle.

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painless to as painful as getting an I.V. You can expect the remaining bruise under the nail to stay there for some time, slowly making its way to, and out of, the tip of the nail as the nail grows (a process measured in months, not days or weeks).