

Paw Injuries and Paw Protection in Working Dogs

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Following the terrorist attacks on September 11, 2001 the media response highlighted the role of detection dogs at the Pentagon and Ground Zero, and the hazardous conditions where they were working. Within days of the attacks, donations of dog booties came pouring in.

My veterinary team was in charge of caring for the military and federal government working dogs in the Military District of Washington, including the Pentagon, and we received thousands of donated booties for a couple dozen dogs under our care. We made them available to any canine teams that wanted them, but despite that, none of the handlers we worked with at the Pentagon ended up using any type of foot protection for their dogs during the response.

Since our canine teams were not using them, we donated the booties to a variety of organizations and dog enthusiast groups where hopefully they would come to good use. After 9/11, we had boxes of booties all over our office, and the whole subject of booties became a running joke. If nothing else, it was a small light of humor in otherwise rough times as we gave away booties wherever we could.

At military retirement ceremonies the retiring soldier got a plaque, well-wishes...and a pair of dog booties. Re-enlistment ceremonies; you got all the swag from the re-enlistment office...and dog booties. The commander gave them to us as an award for high score on a unit physical fitness test. When I traded in my pickup truck in 2005 for a new one, the service department found a bag of dog booties stuck up under the passenger seat with a note saying "Courtesy of the National Capital District Veterinary Command." I wasn't entirely sure if someone was playing a joke on me four years later, or if the booties had just somehow

migrated there on their own. In 2011 I found a bag of booties in a box of veterinary books when I unpacked after a move. They just won't go away.

Like the booties that never end, maybe it's not a coincidence that the injuries I seem to see in working dogs over and over are injuries to the paws. Paw pad abrasions, lacerations, broken toenails, and orthopedic injuries to the bones and ligaments of the paw keep us pretty busy both in the field and back home in the clinical setting. In dogs with no other underlying health issues, injuries to the paws probably account for more lost training time and time off duty than any other type of non life-threatening injury. That, by itself, makes paw injuries a significant condition of working dogs.

The Stats on Paw Injuries and Pad Protection

A handful of studies show that injuries to the paws are probably the most common injury of many types of working dogs during deployment. In a study of search and rescue (SAR) dogs used in response to the Oklahoma City bombing in 1995, 18 of 20 (90%) of the total injuries incurred in SAR dogs at the site



were to the paws. Six years later, a study on SAR dogs responding to the 9/11 terrorist attacks in New York and at the Pentagon showed that 70% of injuries incurred by the dogs were to the feet, pads, or limbs. Similar data is not currently available for military or police dogs, but experience has shown us repeatedly that these

types of injuries are very common. In my personal experience with military working dogs (MWDs), this is true in both combat and training environments.

Could those thousands of donated dog booties prevented these injuries? Possibly, but are they more of a hindrance to the dog than a help? Many dog handlers believe booties prevent the dog from being able to splay their toes and have the grip they need to climb and maintain balance on uneven and slippery surfaces.

Although no formal study has been performed on military working dogs, lessons learned from a multi-day training event with Special Operations Multipurpose Canines (SOF MPCs) showed that they had a lot of difficulty getting the booties to stay on the dogs' feet, as described in one after-action review comment:

"You needed 8 booties to make one set, because they'd keep losing them as they worked."

According to the report, this was the primary reason that the canine handlers chose not to continue using foot protection in their dogs.

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The studies on the Oklahoma City and 9/11 dogs revealed interesting observations about choice of foot protection. Although foot protection was available to them from the first day, less than 25% of the nearly 70 handlers at Oklahoma City chose to use foot protection with their dogs, and less than 10% used foot protection for the 9/11 response. As I already mentioned, none of the handlers at the Pentagon site used foot protection on their dogs. Of those handlers who used foot protection on their dogs in Oklahoma City, over half used foot protection for less than one day, and none of them used foot protection for more than 2 days.

A more recent study of SAR dogs used in response to the Haiti earthquake in 2010 did not specify whether dogs wore foot protection or not. However, this study noted that out of 8 wounds occurring in these dogs, 6/8 (75%) were to the limbs, but only two of these (25%) were specifically to the paws. The authors suspected that the difference in terrain probably played a role in the decrease in paw injuries compared to previous deployments.

The Oklahoma City study showed that handlers on that deployment had a clear preference for nylon booties over those made with rubber, leather, or cotton. Over half the handlers that started out with rubber or leather booties either stopped using foot protection altogether or switched to nylon booties by the second day. Even in those cases, they all stopped foot protection altogether by the next day.

So what does this tell us? Because of the small number of dogs overall that incurred paw injury during SAR deployments, and an even smaller number that wore some sort of foot protection, the studies on SAR dogs were not able to show definitively if using foot protection made a difference in preventing paw injuries. Also, none of these studies actually looked at whether wearing booties caused other injuries, such as slipping or falls, so the jury is still out on that one. But they do tell us that canine handlers will find the best way to do things by trial and error if needed, evaluating in the field what is working and what doesn't, and adapting to complete the mission. They showed us that there is no single or simple solution to this problem.

Other things that these studies tell us is the importance of documenting what may seem to be incidental, even non-important facts and figures during operations using working dogs. The authors of the Oklahoma City study dove deeply into minute details of the deployment, down to what type of booties were used, and for how long. To the average dog enthusiast, those sorts of details may seem pretty in-the-weeds, but this information, over time, becomes invaluable. Being able to analyze the available data and come back with answers that are based

on the solid evidence instead of a half-baked opinion on what I think might be true...now, that's amazing. It's what we strive for every day, but it is only possible when the people like you out there with boots and paws on the ground take the time to *document, and share* this information.

Which Bootie is Best?

What kind of bootie is best? "Best" is relative, and depends on the working environment, type of work, and even the individual dog. For sled dogs, booties are a vital piece of gear, protecting the feet from harmful effects of hundreds of miles of wear from ice and snow. Inspired by this, we tried using sled dog booties on Belgian Malinois-type MWDs, but these turned out to be like nylon doggie snacks. Off within a few seconds in a frenzy of "Malan-anger", then just...missing...before we could even react. I haven't had to surgically remove a bootie yet from the gastrointestinal tract, but I know it will eventually happen somewhere in my career. During our brief trial of these booties in our dogs, we found plenty of them in dog poo during morning kennel duty.



Sled dogs starting the 1000+ mile Iditarod wearing booties made with Cordura® nylon

There are many types of protective canine footwear and other products intended to either toughen up soft paws or condition them to prevent dryness and cracking. There's no real

evidence to show that these pad toughening or pad softening remedies work on dogs in military, law enforcement, or search and rescue environments, but there's no evidence to show they don't either. No one has ever studied this scientifically, so we have to rely on anecdotal evidence (instead of *scientific* evidence), our own trial-and-error experience, and what we learn from our mentors and colleagues. Simply, if it seems to work, keep doing it. If not, adjust fire and try something else.

Regardless of what you chose to use, the big lesson learned is to train with these products on your dog long before you need them for a real-life operation. Some dogs resent any kind of bootie and can be very distracted just trying to get them off their paws. In others it causes a change in gait and locomotion which, in theory, could lead slipping or falls. Think of professional football players training in cleats then switching to heavy hiking boots in the middle of the game: Their muscle memory has been finely tuned to feeling very fine details of grip, weight, stride length, and stability, and any sudden changes can have an effect during strenuous exercise where precision or powerful movements are required.

Do we know for sure that this actually happens in dogs? There are a lot of anecdotal accounts of this based on handlers observing their dogs work with booties, but to date, no one has actually studies this scientifically. (*Hint, hint...sports medicine colleagues...*)

Like many topics in working dog care, commercially available products can't be evaluated just by the manufacturer's description. Advertisements for canine booties make enthusiastic catch-phrase-ridden claims about their products that imply not only quality and function, but also status. "Built like human cross-training shoes." "Breathable upper mesh." "Grippy, nonmarking Vibram sole." They sound flashy and athletic, and marketers bank on the idea that we're used to seeing those descriptions on labels of our own outdoor clothes and gear. But are these qualities important for working dogs? And what do they mean by "built like human cross-training shoes?" Made in a factory on another continent by underage workers?

Using industrial sewing machines? Using the same material? Shaped like a human foot?

Other claims try to lure us with status: "Professional grade protection." As opposed to "amateur grade protection?" Surely anything "professional grade" is better, right?

The only way to know if booties will be the best protective option for your dog, and which ones work the best in your working environment, is to try them on your dog, in your working environment. Trying them all would probably be cost prohibitive for most canine teams, since there are so many out there to try, and many working environments. Product reviews online may be helpful, but it's hard to get a complete picture from a short online sentence or two from someone you don't know. And no one writes an online review to say "This is a perfectly adequate product." They take the time to log on to review sites to say how mad they are about having to pay a lot, or to let you know that the outdoor gear they bought worked very well on my latest trek up Denali or Everest and don't you wish you were as cool as me?

Considering the potential drawbacks already mentioned, complicated and expensive is not necessarily always the most effective. Something as simple as Moleskin® or Elastikon® bandage material placed over the great paw pads, leaving the toes exposed, may be enough to prevent injury. Self adhesive bandage material, (VetWrap®, Coban®, etc) is very thin and usually not strong enough to hold up as a paw bandage for long on rough ground. Duct tape is very durable but also very slick and doesn't grip well. We usually save that for emergency bandages, vs. injury prevention.

Paw Injuries: Treatment in the Field

Immediate treatment of paw injuries in the field should be in accordance with Canine Tactical Combat Casualty Care (C-TCCC) or Canine Tactical Emergency Medical Support (C-TEMS) guidelines. Using the MARCHE algorithm (Massive Hemorrhage, Airway, Respiration...etc) paw injuries that result in massive bleeding should be treated with direct pressure, first in priority of other non-bleeding injuries.

If bleeding is minor, the wound is treated later following massive bleeding, airway obstruction, or respiratory compromise, if present. Tourniquets are rarely needed to stop bleeding from the paw, but should be considered if partial or full amputation of the paw has occurred. Most paw injuries will not have massive bleeding, and are usually the only injury present, resulting from wear and tear vs. a sudden traumatic incident. Minor bleeding can be controlled with direct pressure to the paw with gauze or other absorbent material. Follow this with a bandage wrapped around the paw over the injury that applies slight

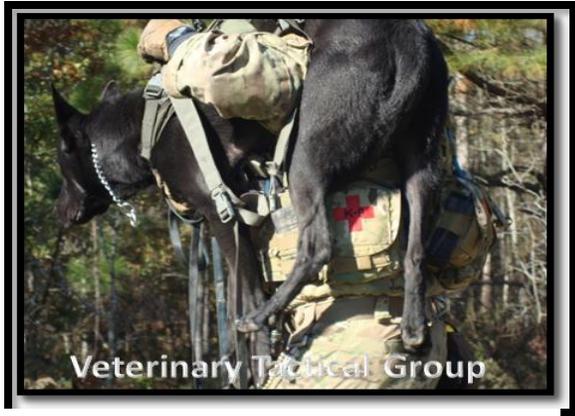


Elastikon® bandage material used to make field-expedient bandages for paw injuries

compression. Bandages that are too tight can cut off the circulation and also cause pressure wounds to the limb. Because if this, you should check the bandage for tightness every hour or so, and re-bandage at least once a day if access to veterinary care is delayed due to your operational environment. Paw and foot bandages can take you from "hero to zero" within a matter of hours, use caution and frequent monitoring when bandaging your dog.

Impact on the Mission

Severity of the injury will be a factor not only in what immediate treatment you provide, but can have an impact on the entire mission. Once bleeding is controlled, estimate the severity of the injury to determine the urgency of evacuating the dog to veterinary care. In



Carrying a heavy working dog to care on a foot patrol may be difficult. Field-expedient paw bandages may allow the dog to walk out on his own power.

some situations, this must be weighed with the overall impact to the mission, including the safety of the team on that particular operation.

If tendon, ligament, or bone is exposed, or the injury is deep enough to possibly reach these structures, surgical cleaning and repair of the injury will be needed. Involvement of these structures doesn't make it an immediately life-threatening injury, but definitely need veterinary care as soon as possible from a tactical and operational standpoint to help reduce chances of infection and increase chances for full return to duty. Less severe and superficial wounds may be triaged for routine or delayed evacuation, depending on the operational setting and evacuation.

Determine if the dog can be treated at the point of injury and allowed to continue the mission. A team on a long foot patrol in a hostile area may have to determine if the dog can safely continue to move under his own power for the remainder of the mission, or if he can be safely carried. While this is not ideal, it may be the only option other than compromising the entire mission by calling in medical evacuation resources. For superficial abrasions and lacerations, allowing him to continue under his own power may be a reasonable or even necessary option. While the health and welfare of the dog is extremely important and should

always be given high consideration, you also have to consider that removing the dog from the situation for a minor injury may completely eliminate the force protection capability the dog provides the team.

So unfortunately, there are no hard-and-fast guidelines regarding canine paw protection or management of paw injuries in the field. No one product or method will work with all types of dogs and operational situations. Talk with your colleagues, share information with each other about what has worked and what has not in your particular setting to help prevent these minor injuries from having a major impact on your mission. And given the advertising and media hype, don't believe everything you read about canine booties. Oh, wait, you're reading *this*. Believe *some* of what you read. Whatever you do, please don't send us any more booties.

About the Author:

Dr. Janice Baker is Chief of Veterinary Operations at Veterinary Tactical Group. She has served 11 years on active duty in the US Army, the majority of this time with Special Operations medical and canine units. She has multiple deployments to Afghanistan and Iraq and other areas of the world. Dr. Baker continues to serve in the US Army Reserve.