

CANINE TACTICAL FIELD CARE

PART ONE

THE PHYSICAL EXAMINATION AND MEDICAL ASSESSMENT

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ABSTRACT

Military and law enforcement agencies have seen a dramatic increase in the utilization of working canine officers both at home and in foreign deployments. Due to the fact that professional veterinary care is often distant from internal disaster or foreign deployment sites, the military medic, police tactical medic, or other first-response medical care provider may be charged with providing emergency or even basic, non-emergency veterinary care to working canines. The medical principles involved in treating canines are essentially the same as those for treating humans, but the human healthcare provider needs basic information on canine anatomy and physiology and common emergency conditions in order to provide good basic veterinary care until a higher level of veterinary care can be obtained. This article represents the first in a series of articles designed to provide condensed, basic veterinary information on the medical care of working canines, including police canines, federal agency employed working canines, and search-and-rescue dogs, in addition to Military Working Dogs (MWD), to those who are normally charged with tactical or first responder medical care of human patients.

As a result of the terrorist tactics of the enemy in the Global War on Terrorism, especially the use of improvised explosive devices and enemy combatants hiding themselves within a civilian population, the U.S. military and U.S. law enforcement agencies have seen a dramatic increase in the utilization of working canine officers both stateside and in foreign deployments.^{1,2,3} A recent article in the *JSOM* has offered a good overview of the care of the MWD and how the care of these valuable assets should fit into the operations of military medical personnel.⁴ A knowledge base is also developing in the standard veterinary literature as a result of the increase in utilization of working dogs by police and other federal and civilian disaster response agencies, and the care of these dogs by veterinary and non-veterinary medical personnel in the deployment location.

While the U.S. Army Veterinary Service is tasked with providing veterinary care to both MWDs and other U.S. government working dogs,^{4,5} the reality is that often these dogs and their handlers find themselves in situations far from the nearest available military veterinary care provider.^{4,6} Even within the United States, canine units are tasked for natural disaster response, terrorism incidents, and search-and-rescue missions that may take them hours to days away from the nearest practicing veterinarian.^{4,6} For police dogs owned by civilian agencies

or search-and-rescue dogs owned by private individuals, veterinary care is obtained according to the policies and budgets of the individual canine units. As a result, and as a result of the relative scarcity of the Veterinary Medical Assistance Teams provided to the continental United States (CONUS) disasters by the American Veterinary Medical Association and the Federal Emergency Management Agency, many units rely on the local “human” medical infrastructure to provide emergent care until the canine unit can return to its home base.⁷

Thus, in many cases, the military medic, police tactical medic, or other first-response medical care provider may be charged with providing emergency or even basic, non-emergency veterinary care to working canines, either to keep the dog healthy and working its mission, or to keep the dog alive and stable long enough to be transported to a higher level of veterinary emergency care.^{4,6,7}

This article represents the first in a series of articles designed to provide condensed, basic veterinary information on the medical care of working canines. These articles will discuss police canines, federal agency employed working canines, search-and-rescue dogs, in addition to MWDs, and canines who are normally charged with tactical or first-responder medical care of human patients. By reading these articles and

retaining the provided Canine Field Care Card (Table 1 pg. 59), military, police, and other first-responder medical personnel should be able to provide basic first-aid and trauma care to canine patients for up to one hour, or until direct care by a licensed veterinarian can be established.

Because only a handful of conditions are the major causes of morbidity and mortality in working canines, and only some of these conditions require intervention before standard veterinary care is available, the basic notions behind Tactical Combat Casualty Care (TCCC) training can be applied to Canine Field Care.^{4,6} For this reason, the number of conditions that this article series will cover is limited to those conditions that would be immediately life threatening in the field and yet amenable to medical intervention. Thus, the following topics will be covered in the series:

- *Part One:* Physical Examination and Medical Assessment of the Canine Patient
- *Part Two:* Massive Hemorrhage Control and Physiologic Stabilization of the Volume Depleted, Shock-Affected, or Heatstroke-Affected Canine Patient
- *Part Three:* The Canine Emergency Airway and Thoracic and Abdominal Trauma
- *Part Four:* Gastric Dilatation and Volvulus, Other Gastrointestinal Disturbances and Toxicoses
- *Part Five:* Common Orthopedic and Other Traumatic Injuries

EXTRACTION AND HANDLING OF THE CANINE CASUALTY

It is important for the canine caregiver to remember that injured or sick dogs may be experiencing fear and/or pain, and may not respond normally to verbal commands or handling situations. For this reason, it is critical that the care provider first ensure the safety of himself and the dog by placing a muzzle on the dog's head to restrain the mouth and a leash on the dog to keep him physically restrained prior to attempting extraction.

The best muzzle to use for medical care would be a muzzle that is 1) easy to place; 2) allows for restraint of the mouth in as closed a position as possible; 3) allows for loosening without removal for as much examination of the mouth, muzzle, and head as possible; to avoid aspiration in case of vomiting; to facilitate panting for heat expulsion; or for placement of an emergency airway or mouth gag and stomach tube. Although a basket muzzle will achieve some of these objectives, it will not temporarily close the jaws for restraint of the teeth nor will it allow for easy airway or stomach tube manipulation. Finally, the leash can be passed through the strap of the muzzle to retain the muzzle on the head and neck. The

best leash for medical purposes is a leash with a noose function that will not allow the dog to "back out" of his collar, or a leash attached to a choker chain. If the working leash does not fit this description, one can be fashioned easily by placing a slip knot on the end of a piece of rope or cord and passing the other (free) end of the rope back through the slip knot.

As outlined in a previous article by COL Vogel-sang, CASEVAC would be the rule rather than the exception for the MWD, due to asset utilization restrictions and in-flight medical capabilities for MEDEVAC or STRATEVAC of the canine casualty.⁴ In the civilian sector, the individual canine unit is responsible for arranging canine casualty evacuation utilizing immediately available resources. Most commonly, the canine casualty must be moved in a non-medical vehicle due to the need to reserve medical vehicles for potential human casualties.

The canine casualty should only be moved in such a way as not to risk human casualties in the process, either by exposing the handler or caregiver to enemy fire or to significant hazards in the rescue or disaster environment. In many cases, a dog can be manually moved a sufficient distance to provide a safe place for canine tactical field care. Upon movement of the canine to a safe environment for the instigation of medical care, the available medical personnel can commence the physical examination and patient assessment.

In most cases where the handler or medical provider must transport the canine officer, the dog can be walked out or manually carried. Sometimes however, the dog will struggle significantly, require hoisting for extraction, or the distance may be too far for the dog to walk, in which case, an extraction harness would be beneficial. A harness that provides a secure extraction harness for one man to manually extract the canine officer may be constructed of 1" tactical webbing secured into a circle and fashioned around the dog's head and neck and extremities and through a shielded carabiner as in Figure 1.



Figure 1
Canine Extraction
Harness, on "Bear," a
95-lb canine officer.

In some situations, it may be beneficial to strap the canine patient to a backboard to facilitate evacuation with minimal movement of the spine.

THE PHYSICAL EXAMINATION AND PATIENT ASSESSMENT

The details of a thorough physical exam of the MWD have been previously described.⁴ For the purposes of completeness, to offer a second perspective on the emergency physical of the canine patient, and to associate the description of the physical examination with the photographs and references included in this article, the physical examination of the working canine will be described again here.

The body systems of most concern to the emergency veterinary care provider are the cardiovascular, respiratory, musculoskeletal, neurological, and gastrointestinal. Some deployment situations will also call for examination of the lymph nodes, skin, and hair-coat. For the purposes of this article, due to the limited number of conditions that will require medical intervention in the field, we will focus on the cardiovascular, respiratory, neurological, musculoskeletal, and gastrointestinal systems.

CARDIOVASCULAR AND RESPIRATORY SYSTEMS

Once the dog and its mouth are made safe for handling, the physical examination may commence. The best location for auscultation of the heart is just caudal to the left elbow, very low (ventral) on the chest, where one can, with slight pressure, feel the heartbeat on the fingertips (Figure 2).⁴ Normal canine heart sounds are very similar to humans, with two audible heart sounds in a typical “lub-dub” pattern. Working dogs will normally have a significant sinus arrhythmia at rest, which results in a more rapid heartbeat during inspiration and an easily detected slowing of the rhythm during expiration.⁸ Ar-



Figure 2 Heart Auscultation

rhythmias of medical concern in dogs will not change as a result of the respiratory pattern.

Pulses can be detected most easily at the femoral triangle, very proximal on the medial aspect of the pelvic limb and just over the femur.⁴ In most dogs, there is a slight depression in the tissues over the femoral triangle, where the femoral artery is palpated easily (Figure 3). The pulse should be strong and easily palpated and synchronous with the heartbeat.



Figure 3 Pulse Palpation

The normal heart rate and pulse rate will be 60 to 90 bpm at rest, and up to 120 to 140 bpm immediately after exercise or work.^{4,8,9} One can auscultate the heart while palpating the femoral pulse to attempt to detect pulse deficits, which can be an indication of cardiovascular shock or medically-significant cardiac arrhythmias.



Figure 4 Gums and Capillary Refill Time Evaluation

Mucus membranes can be observed at the gums over the tooth roots in areas that do not contain large amounts of black pigment (Figure 4). The gums should be pink, not pale or gray, or blue or bright cherry red. Upon the application of slight digital pressure, the gums should

blanch white then return to pink within two seconds of removing the pressure, which is known as the capillary refill time (CRT).^{4,9} In some aggressive dogs, evaluating the CRT at the gums can be difficult and dangerous.

This should only be attempted if the dog is wearing a well-fitted adjustable muzzle that clamps the jaws shut. Alternatively, the CRT can be assessed on the prepuce or vulva.

Pulse rates higher than 130 bpm, even after exercise, are warning signs of potential volume depletion and potential cardiovascular shock. If the pulse rate is high in the face of weakening femoral pulses, pale mucus membranes, and prolonged CRT, the canine is exhibiting signs of cardiovascular shock.^{4,9} The second article in this series will address volume depletion, hemorrhage, and the assessment and treatment of shock in the working canine patient.



Figure 5 Lung Auscultation

The nostrils should be unobstructed by debris or body fluids and should slightly open with each inspiration. The lungs are best auscultated higher (more dorsally) on the back, over the caudal ½ of the ribcage (Figure 5). It is this author's experience that normal lung sounds in the working canine are louder than in a human, especially immediately after working or other strenuous exercise. The normal respiratory rate is 10 to 30 breaths per minute,^{4,8,9} with panting occurring after even mild exercise or during any period of ambient temperature in excess of 80 to 85 degrees Fahrenheit.

Dogs cannot sweat and must pant and have moisture evaporation from the mouth and nares in order to be able to expel excess body heat. Conductive cooling through footpads and body surfaces against cooler objects can also aid in temperature regulation. The rectal temperature of a working dog at rest should be between 100.5 and 101.5 degrees Fahrenheit.⁹ In some dogs, rectal temperatures of 105 to 107 degrees Fahrenheit during exercise can be normal.¹⁰ However, the body

temperature should immediately begin to return to normal upon cessation of exercise. After 10 to 15 minutes of rest, the normal temperature should not exceed 104.0 degrees Fahrenheit during exercise. Temperatures lower than this range could be found in non-exercising dogs in colder climates, but in any case the rectal temperature should be higher than 99.5 degrees Fahrenheit, or hypothermia should be suspected.⁴

A rectal temperature higher than 105 degrees Fahrenheit is a critical indicator; this canine patient is likely unable to control his own body temperature and is at immediate risk of decompensation and disseminated intravascular coagulation secondary to heat stroke.¹¹ Rectal temperatures higher than this are evidence of severe fever or hyperthermia (heatstroke) and should be addressed with immediate cooling measures such as cool water baths or hyperthermia treatments systems, as well as evaluation of hydration and electrolyte status and general physical examination.^{4,11} A following article in this series will address the differentiation of fever (pyrogen-mediated) and heatstroke (hyperthermia) and their treatment in more detail (Part Two of this series).

MUSCULOSKELETAL AND NEUROLOGICAL SYSTEMS

The musculoskeletal and neurological systems can be assessed throughout the physical examination by observation of gait, posture, behavior, and cranial nerve function. A normal dog's gait will be brisk, with each limb being brought forward for weight bearing and each paw being placed on the ground with the pad-side down (Figure 6a).



Figure 6a. Normal Foot Placement

An exaggeration or deficiency of the forward motion of the limb, or the inability to place the pes (paw) in the correct position for weight bearing is usually an indication of traumatic injury or neurologic deficit. Fractures or significant ligamentous injuries will result in

disuse of the affected limb, either instantaneously, or as soon as the adrenergic surge from excitement is depleted (within a few minutes). In cases of non-displaced fractures or incomplete ligament tears, the dog will be able to bear some weight on the affected limb but will exhibit a significant limp.

Due to the quadrupedal gait of dogs, it can be difficult to detect which limb is affected in a mild orthopedic injury situation. However, in mild orthopedic injuries, the dog should still be able to place the pad side of the paw cleanly on the ground for weight bearing.



Figure 6b. Abnormal Foot Placement

If the canine is unable to place the pad side of the paw on the ground (Figure 6b), there is likely a peripheral or spinal nerve injury and the neurological system must be examined more closely. Spinal injuries or traumatic injuries to the hips will frequently result in dragging of the pelvic limbs and significant pelvic limb paresis (weakness). It is not uncommon for spinal nerve injuries in dogs to be asymmetrical, or more pronounced on one side of the body than on the other.

It is important to note that one of the most common injuries to working dogs is lameness due to a laceration or a small foreign body embedded in one of the pads of the pes. Foreign bodies can also be stuck between the digital pads or the digital and carpal pads resulting in lameness without a true injury.

The posture of a normal dog will be with the head held high and above the shoulders, with the tail held level, or held low and loosely but not against the perineum (Figure 7). If the head is held even with or below the shoulders, the dog is either experiencing significant pain and/or fear and should be handled with extreme care for the safety of the dog and the personnel involved. The same assessment can be made if the tail is tucked tightly against the perineum, or between the legs.

A low-held head posture or a significantly hunched posture in the thoraco-lumbar spine can be an indication of severe neck or back injury, possibly including injury to the spinal cord or spinal nerve roots. Peripheral nerve injuries can be evaluated by the placement reaction noted above (Figures 6a & 6b) and by performing a toe-pinch withdrawal test on each digit. If the dog does not respond to toe pinch by withdrawing the foot after pinching each toe, peripheral nerve damage or spinal nerve damage is suspected. A skilled and experienced veterinary care provider can assess patellar and other spinal reflexes, but these are difficult to assess in a field care situation. If a spinal injury is suspected, the patient should be restrained, i.e., placed on a backboard, in a comfortable position to limit mobility during transport and exacerbation of injury.

The care provider can assess cranial nerve function by observing spontaneous or intentional movement of the eyes, ears, jaw, head, and tongue. The normal head posture is with the axis of the eyes parallel to the ground, with no spontaneous horizontal or vertical nystagmus of the eyes and no bobbing of the head (discounting movement related to panting).

The normal canine will be able to move the ears up and down, forward and back in response to pinching or tickling. The eyes should move easily side to side and should exhibit normal positional nystagmus when the head is placed in various positions. The tongue should be able to move to either side of the mouth when stimulated, and should be withdrawn quickly if pinched. The eyelids should be bilaterally symmetrical and the dog should be able to blink both eyes if approached by the index finger.

Canines have a membrane-covered cartilaginous flap that normally rests in the ventromedial aspect of each conjunctival sac. This membrane is normally not visible or only partially visible, but can start to protrude across the cornea in a dorsolateral direction in cases where the dog is sedated, depressed, intoxicated, se-

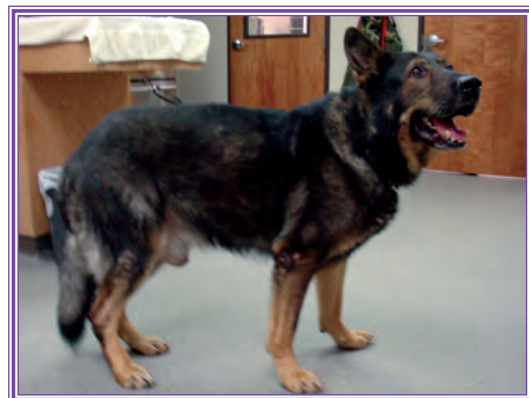


Figure 7 Normal Posture

verely dehydrated, has Horner’s syndrome, or has had a traumatic injury or other inflammatory event in the affected eye.

GASTROINTESTINAL SYSTEM

The gastrointestinal system of the canine officer is susceptible to rapidly developing medical problems. Among the problems most commonly seen in working canines are vomiting, diarrhea, and bloat, or gastric dilatation and volvulus (GDV). In a recent study of working dogs deployed to terrorism-affected sites during the response to the September 11, 2001 attacks in New York and at the Pentagon, 21 of the 96 (22%) dogs evaluated had gastrointestinal tract signs while deployed, including vomiting and diarrhea.⁷ MWDs also experience significant morbidity and mortality from gastrointestinal diseases, including GDVs.⁴

Dogs experiencing nausea will frequently hypersalivate prior to the onset of vomiting. They also will frequently exhibit a hunched posture and tension of the stomach prior to vomiting. Many substances when ingested will stimulate a vomiting response from a dog including bacteria-contaminated water, animal carcasses or feces, many plants, foreign objects, organic solvents, petroleum products, heavy metals, caustic substances, and the exudate from the skin of a toad.

Most of the substances that cause vomiting will also cause diarrhea within a few hours. Additionally, stress-induced diarrhea is common in dogs undergoing tremendous work stress or emotional stress (such as separation from the owner or a natural disaster).⁷

While vomiting (and sometimes diarrhea) may be physiologically necessary in order to remove the offending substance, in many cases the vomiting continues due to over-stimulation or irritation of the stomach and medical intervention is required to prevent dehydration and / or severe electrolyte disturbances. Diarrhea may persist due to bacterial toxins, and ongoing infectious, parasitic, or inflammatory process, or due to the ingestion of a diarrhea-inducing toxic substance.

In a normal dog, the abdomen will be soft and easily palpated. A skilled veterinarian can palpate parts of the liver, spleen, small intestine, colon, bladder, and sometimes the kidneys. However, in a scared, injured, or acute abdomen dog, the abdomen will be hard and the dog will resist abdominal palpation by tensing the stomach muscles and sometimes by vocalization or attempting to bite.

Canine “bloat,” or gastric dilatation and volvulus, is an immediately life-threatening condition that can occur at any time with no warning in large breed dogs, including the breeds commonly used as military and police working dogs such as German Shepherds, Labrador Retrievers, Golden Retrievers, large mixed breeds, and others.^{4,9,12}

The physical exam findings consistent with bloat are a hard, turgid abdomen, with a tympanic swelling behind the rib cage, rapidly progressing cardiovascular shock, vomiting or non-productive retching, a dog in lateral recumbency or a severely hunched standing posture, and gasping for air and / or vocalizing in pain and distress. The fourth article in this series will cover in detail the diagnosis and appropriate emergency medical interventions for canine gastric dilatation and volvulus.^{4,9,11}

By utilizing the skill set that a provider has developed in his career and following this outline for the emergency physical exam of the canine officer, a military Medic, police medic, paramedic, EMT, or other medical personnel should be able to provide lifesaving tactical medical care to canine officers in the field. The forthcoming four articles will focus on the details of providing tactical field care (consistent with the Tactical Field Care phase of TCCC theory) to canine officers experiencing specific emergency medical conditions common to working dogs.

Following is a table that contains normal physiological parameters and physical exam findings for working canines in the weight range of 85 to 110 lbs. The drug doses denoted with an asterisk are from the “Shock” article in the textbook “The 5-Minute Veterinary Consult.”¹³ Other values are condensed and edited from articles referenced herein^{4,11,12,14} and are consistent with those used by this author in private practice on working canines. This card may be photocopied and laminated for the use of individual JSOM subscribers.

Parameter	At Rest	Exercise	Drug Dose	Standard Dose	CV Shock Dose
Temp.	100.5-101.5	101.0-104.0	Crystalloids	2.0-3L / 24hr	10-20ml/kg/hr *
Heart Rate	60-75	75-130	Hespan (hetastarch)	n/a	5ml/kg bolus* 20 ml/kg max
Resp. Rate	10-20	30-panting	Dexamethasone	n/a	0.1-0.2mg/kg IV*
Mucus mm	Pink	Bright pink	Diphenhydramine	2 mg/kg q 6-8 hrs	n/a
CRT	1-2 secs	1 sec	Diazepam	0.2-0.3mg/kg slow IV	Seizures: 1.0mg/kg IV bolus to effect
Pulses	Moderate	Bounding	Fentanyl Morphine	1-5meq/kg/hr IV 0.5-2.0mg/kg IM	n/a
Heart Sounds	Behind left shoulder	Sinus arrhythmia at rest	Water	Maintenance: 2.0-3L / 24hr	Exercise: 5-15L / 24hr
Resp Sounds	Caudal 1/2 of thorax	Louder than human	Food	Maintenance: 4-6 cups dry / 24hr	Exercise: 8-12 cups / 24hr

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In the TCCC arena, Dr. Taylor lectures and teaches a laboratory station in the TCCC training courses held at TREI in Dallas, and serves as a veterinary consultant to several North Texas area law enforcement and private security organizations.