

JOINT TRAUMA SYSTEM K9 CLINICAL PRACTICE GUIDELINE



Dental Trauma Care for MWDs (K9 CPG: 8)

This CPG provides outlines initial management and care guidelines of Traumatic Dentoalveolar Injuries (TDI) in Military Working Dogs (MWDs).

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GOALS

The purpose of this Clinical Practice Guideline (CPG) is to describe immediate and urgent care guidelines for Traumatic Dentoalveolar Injuries (TDIs) in the Military Working Dog (MWD). This CPG provides recommendations to deployed providers and veterinarians about the care of MWDs with dental trauma and are not a substitute for clinical judgment. It is understood that some of the subsequent treatments may require secondary interventions involving specialists with experience in dental trauma and advanced oral and maxillofacial training.

BACKGROUND

An MWD primarily uses its oral cavity as a device to perform trained tasks. The oral cavity, teeth, and olfactory system are all anatomically connected through thin alveolar bone, blood vessels, and nerves. Multiple disease processes can concurrently affect both oral and nasal structures. Tooth fracture is the most common oral exam finding in the MWD population, occurring in 43.6% of MWDs in active service.¹ Pulp and nerve exposure increases the potential for complications including pain, infection, and performance deficiencies.

Catastrophic tooth fractures requiring treatment should be expected by any provider encountering MWDs. Clinical management of TDIs should focus on saving strategic teeth (the mandibular first molar teeth, the mandibular and maxillary canine teeth, the maxillary 3rd incisors, and the maxillary 4th premolar teeth).

Treatment options for a tooth fracture with pulp exposure include endodontic therapy (i.e., root canal therapy) or extraction therapy. Maintaining the function of these teeth with advanced dental procedures allows preservation of bite forces, sustains occlusal biomechanics and ensures olfactory health. Endodontic care for pulp exposure in MWDs is preferred over extraction therapy to preserve bite function and minimize recovery time.

Performing appropriate endodontic procedures permits a faster recovery and strengthens operational effectiveness by minimizing down time of the MWD team. Extraction therapy requires tooth and surrounding bone removal, is more invasive, and requires 10 to 28 days for healing, depending on the tooth type extracted. Furthermore, extraction therapy of a canine tooth has been shown to increase the risk of fracture of the contralateral canine tooth by greater than 50%.²

TRAUMATIC DENTOALVEOLAR INJURY

Traumatic dentoalveolar injuries are a collection of specific injuries to the tooth or tooth supporting structures sustained as a direct result of a traumatic force.³ In the MWD, these forces may be caused by abnormal chewing behaviors in the kennel, training rewards, bite work, or blunt force trauma (falling or running into stationary objects). Maxillary tooth fractures are the most common at 60.9% compared to mandibular tooth fractures at 39.1%. The most common TDI is enamel-dentin-pulp fractures which account for 59.9% of all injuries.¹

There are several systems used to classify TDIs. The most common descriptions for traumatic injuries to the tooth include tooth fracture with pulp exposure, tooth fracture without pulp exposure, root fracture, subluxation, luxation, avulsion, concussive injury, thermal injury, alveolar bone fracture, and iatrogenic injury. Consequences of untreated TDI include negative quality of life, periodontal pain and infection, endodontic pain and infection, osteomyelitis, systemic dissemination of inflammatory mediators and chronic bacteremia.

EVALUATION AND TRIAGE

A TDI should be considered an emergency, but treatment will vary based on the type of injury and the time that has elapsed since injury. Diagnostics involve extra- and intraoral examinations, palpation, examination of tooth mobility or displacement and imaging. The modalities of imaging include head radiographs, intra-oral dental radiographs, conventional computed tomography (CT) or cone-beam CT (CBCT), and magnetic resonance imaging (MRI). The provider should use at a minimum, intra-oral dental radiographs and should consider medical evacuation (MEDEVAC) to higher level of care if more advanced imaging is needed. Clinical photographs of the TDI should be obtained for consultation and medical record documentation.

Elapsed time between injury and therapy is important and influences the therapeutic approach and prognosis. The pulp plays a key role in the treatment of TDIs and is strongly associated with the outcome, particularly in severe cases. A correct pulp diagnosis is essential as it forms the basis for developing the appropriate management strategy. However, many TDIs are complex, and diagnosis can be difficult. Specific details are included in treatment guidelines below.

ORAL HISTORY

1. Maintain a high index of suspicion based on mechanism of injury.
 - a. Blast Injury (BI)
 - b. Direct facial trauma
 - c. Blunt force trauma
 - d. Bite history
2. Ask the K9 handler if MWD has had any changes to ability to perform bite work or changes to eating.

INITIAL EXAMINATION

1. Observe MWD from a distance noting attitude, overall symmetry, and any other wounds.
2. Ask the K9 handler if they can safely lift MWD's lips for a visual exam of teeth from a safe distance. Depending on temperament of the MWD, this may be accomplished by allowing MWD to hold a jute, tug, or similar toy in their mouth to allow visual inspection.
3. Patients presenting with obvious maxillofacial trauma should be assessed for shock and changes in mentation, including a cranial nerve examination. A patient's ability to perform ocular tracking can be helpful to determine orbital rim fractures or extraocular muscle damage. Evidence of changes in mentation, epistaxis, or abnormalities in ocular tracking supports the need for critical evaluation of the patients with head trauma and assessing their suitability for general anesthesia.
4. Sedation will be required to allow detailed and safe examination of the entire oral cavity and to allow intra-oral imaging but may be able to be delayed based on initial visual findings (see [Analgesia and Anesthesia K9 CPG](#)).
5. Guidance is provided below in treatment planning to assist the clinician with determination of when to sedate and treat immediately, when delayed sedation may be okay, and when to MEDEVAC for further diagnostics and treatment.

TELEMEDICINE

1. Management of MWD TDIs may be complex. Recommendation is to complete a telemedicine consultation as soon as possible, either through the ADVISOR line or direct communication with a 64F Veterinary Clinical Medicine Officer or veterinary dental subject matter expert (SME) (in-theater, if available).
2. Telemedicine improves and extends veterinary care to remote or deployed locations.
3. Information to be provided in consultation:
 - Focal history: Mechanism of injury, time since injury.
 - Focal exam: Key exam findings.
 - Photograph(s) and intra-oral radiographs (if taken).

PROVIDER CAPABILITIES AND LIMITATIONS

Veterinarians must perform dental and endodontic treatments consistent with their education, clinical experience, and contemporary standards. Each provider must recognize the limits of their skill to optimize patient outcomes and maximize working life of MWDs.

Only a Veterinary Corps Officer (VCO) or Veterinary Medical Officer (VMO) is authorized to perform dental treatments on MWDs except for specific circumstances regarding endodontic care as outlined below. Standard training prepares VCOs/VMOs to perform all procedures listed in this CPG (including nerve blocks and extractions) except endodontic therapy. Prior to deployment, it is recommended that VCOs/VMOs receive additional training to be able to complete temporary obturation of strategic teeth as outlined below if definitive endodontic therapy is not possible in the operational environment.

When an MWD would benefit from endodontic treatment but the local facility or VCO/VMO cannot provide the advanced level of care, the Veterinary Medical and Surgical Team (VMST)/Veterinary Role 3 OR veterinary dental SMEs will develop a plan for establishing treatment. This course of action may involve continued medical management, assistance from local human endodontic assets, or evacuation to the next role of medical care that is capable to perform advanced veterinary endodontics.

The United States Army Veterinary Medical Standardization Board (VMSB) Comprehensive Oral Health Assessment and Treatment (COHAT) Small Animal and Equine Guidelines Version 2 (2026)⁶ clearly establish the hierarchy of qualified providers for endodontic care on MWDs. It is important to note that human endodontists and human comprehensive dentists are the only approved providers outside of the Veterinary Corps to assist in providing such care.

TREATMENT PLANNING

Diagnosis and treatment planning are the responsibilities of the veterinarian and will be supported by procedures such as radiographs and clinical evaluation under sedation and/or general anesthesia. Radiographs provide information on tooth trauma, the stage of root development, the width and health of the pulp cavity (compared with the neighboring teeth), and resorptive processes or periapical lesions. Radiographs of the affected tooth/teeth serve as a reference for follow-up after treatment.

When the pulp of a previously intact tooth is traumatically exposed, it can generally be assumed that the pulp is healthy and capable of regeneration if treated within 48 hours.⁵ Acute trauma to the pulp results in inflammation and pain that has been shown to last 14-28 days during pulp necrosis. Once the pulp has been exposed to the oral environment for greater than 48 hours, the inflammatory response has been reported to be more pronounced as necrosis of the pulp continues apically. Furthermore, bacterial invasion from the oral cavity through the pulp canal and into the periradicular space can lead to periapical abscess.

When oral trauma or tooth fracture with pulp exposure is identified in an MWD, pain and discomfort should be addressed with appropriate anti-inflammatories, soft food, and minimized patrol training if possible. Oral rewards should be limited to soft toys or treats. However, in a deployed environment, use of the MWD for intended purposes is mission priority. Although their use in therapy is controversial, antibiotics are rarely indicated for endodontic or exodontic procedures. There is an effort in the veterinary profession toward appropriate antimicrobial stewardship. Furthermore, bacteria in endodontic and periapical disease typically exist in biofilms and exhibit antibiotic resistance. The judicious use of antibiotics is at the discretion of the veterinarian.

Consultation with the assigned 64F Veterinary Clinical Medicine Officer and veterinary dental SME is recommended. Treatment recommendations are always based on the MWD's age, certification, injured tooth, fracture type, timing of injury to treatment, previous exodontia or endodontic procedures and parafunctional oral habits. In a deployed environment, the MWDs location, operational requirements, and timeline for redeployment will also be a factor.

TOOTH FRACTURE WITHOUT PULP EXPOSURE

AWAKE ORAL EXAM

1. Confirm and document the fractured tooth.
2. Take clinical photos for consultation.

HEAVY SEDATION/GENERAL ANESTHESIA DIAGNOSTICS

1. Intra-oral radiographs of the injured tooth (crown and apex) and contralateral tooth to determine extent of fracture and pulp comparison.
2. Dental charting with dental explorer and periodontal probe.
3. Clinical photos.

MANAGEMENT

1. Assess and document fracture with other clinical findings.
2. Consider applying a bonded sealant treatment if available.
3. Consider analgesia if tooth sensitivity is reported – such as the handler reporting changes with the dog's eating habits or bite work. Administer carprofen at 2.2mg/kg PO BID for 14 days.
4. Feed softened food for 3 days if acute injury.
5. Limit bite/patrol training for 3 days if mission allows.
6. Recheck if clinical signs do not resolve.

TOOTH FRACTURE WITH PULP EXPOSURE OF A NON-STRATEGIC TOOTH

AWAKE ORAL EXAM

1. Confirm and document the fractured tooth that has visible pulp exposure.
2. Take clinical photos for consultation.
3. Determine if it is a strategic tooth: the mandibular first molar teeth, the mandibular and maxillary canine teeth, the maxillary 3rd incisors, and the maxillary 4th premolar teeth.

HEAVY SEDATION/GENERAL ANESTHESIA DIAGNOSTICS

1. Intra-oral radiographs of injured tooth (crown and apex) and the contralateral tooth to determine extent of fracture and pulp comparison.
2. Dental charting with dental explorer and periodontal probe.
3. Clinical photos.

MANAGEMENT

1. Assess and document pulp exposure with other clinical findings.
2. Seek telemedicine consultation if necessary.
3. If mission allows post-op recovery time, extract the non-strategic teeth.
4. Provide analgesia (carprofen at 2.2mg/kg PO BID) for 14 days.
5. Feed softened food for 14 days.
6. Limit bite/patrol training for 14 days if mission allows.
7. Limit rewards to food or soft toys for 14 days.
8. Post-op recheck in 14 days to ensure proper closure of the gingival tissue and return to full duty if healing is appropriate.

TOOTH FRACTURE WITH PULP EXPOSURE OF A STRATEGIC TOOTH

AWAKE ORAL EXAM

1. Confirm and document the fractured tooth that has visible pulp exposure.
2. Take clinical photos for consultation.
3. Determine if it is a strategic tooth: the mandibular first molar teeth, the mandibular and maxillary canine teeth, the maxillary 3rd incisors, and the maxillary 4th premolar teeth.

HEAVY SEDATION/GENERAL ANESTHESIA DIAGNOSTICS

1. Intra-oral radiographs of injured tooth (crown and apex) and the contralateral tooth to determine extent of fracture and pulp comparison.
2. Dental charting with dental explorer and periodontal probe.
3. Clinical photos.

MANAGEMENT

1. Assess and document pulp exposure with other clinical findings.
2. Seek telemedicine consultation if possible.
3. Provide analgesia (carprofen at 2.2mg/kg PO BID) until treatment.
4. Feed softened food for 14 days.
5. Limit bite/patrol training for 14 days if mission allows.
6. Limit rewards to food or soft toys for 14 days.
7. If there is evidence of a periapical lucency on the dental radiograph of the fractured tooth, antibiotics can be prescribed. Amoxicillin / Potassium Clavulanate at 15-22 mg/kg PO BID OR Clindamycin 5-10 mg/kg PO BID for 7-14 days.
8. Consultation with the assigned 64F Veterinary Clinical Medicine Officer and veterinary dental SME is required.
9. If the tooth is determined to be a good candidate for a root canal procedure, the local VCO (through consultation with a 64F and/or veterinary dental SME will provide coordination of treatment and be present for the procedure due to the anesthetic requirements. This ensures proper equipment and supplies are available and communication with an appropriate human dental provider (an endodontist, although comprehensive dentists can be considered) will be established. If coordination for treatment can be established in theater, the root canal procedure will be performed.
10. If unable to perform root canal therapy due to lack of advanced resources, supplies and skill, coordinate medical TDY or MEDEVAC to a VMST/Veterinary Role 3 or equivalent facility with endodontic capabilities.
11. If unable to MEDEVAC for any reason (operational need, inability to MEDEVAC, etc.), treatment options are to provide a temporary restorative treatment using a calcium hydroxide sealer or extraction therapy but only when approved by the assigned 64F.

ROOT FRACTURE

AWAKE ORAL EXAM

1. Confirm and document the fractured tooth root.
2. Take clinical photos for consultation.

HEAVY SEDATION/GENERAL ANESTHESIA DIAGNOSTICS

1. Intra-oral radiographs of injured tooth (crown and apex) and the contralateral tooth to determine extent of fracture and pulp comparison.
2. Dental charting with dental explorer and periodontal probe.
3. Clinical photos.

MANAGEMENT

1. Assess and document root fracture with other clinical findings.
2. Seek telemedicine consultation if necessary.
3. If mission allows post-op recovery time, extractions of the non-strategic teeth are recommended.
4. Provide analgesia (carprofen at 2.2mg/kg PO BID) for 14 days.
5. Feed softened food for 14 days.
6. Limit bite/patrol training for 14 days if mission allows.
7. Limit rewards to food or soft toys for 14 days.
8. Post-op recheck in 14 days to ensure proper closure of the gingival tissue and return to full duty if healing is appropriate.

TOOTH SUBLUXATION/LUXATION

EXAM

1. Note if affected tooth is loose but not displaced (subluxation) or is partially dislocated where it is moved from its normal position but remains in the socket (luxation). This traumatic injury most commonly occurs with the maxillary canine teeth.

AWAKE ORAL EXAM

1. Confirm and document the fractured tooth root.
2. Take clinical photos for consultation.

HEAVY SEDATION/GENERAL ANESTHESIA DIAGNOSTICS

1. Intra-oral radiographs of injured tooth (crown and apex) and the contralateral tooth to determine extent of fracture and pulp comparison.
2. Dental charting with dental explorer and periodontal probe.
3. Clinical photos.

MANAGEMENT

1. Assess and document luxated tooth with other clinical findings.
2. Seek telemedicine consultation if necessary.
3. Extractions of luxated teeth are recommended.
4. Provide analgesia (carprofen at 2.2mg/kg PO BID) for 14 days post-extraction.
5. Feed softened food for 14 days.
6. Limit bite/patrol training for 14 days if mission allows.
7. Limit rewards to food or soft toys for 14 days.
8. Post-op recheck in 14 days to ensure proper closure of the gingival tissue and return to full duty if healing is appropriate.

TOOTH CONCUSSIVE INJURY: PULPITIS

EXAM

1. Maintain an index of suspicion if history of blunt trauma.
2. Observe tooth for signs of discoloration (pink or purple hues).
3. Ask K9 Handler if MWD is showing any bite sensitivity.

AWAKE ORAL EXAM

1. Confirm and document the concussed tooth.
2. Take clinical photos for consultation.

HEAVY SEDATION/GENERAL ANESTHESIA DIAGNOSTICS

1. Intra-oral radiographs of injured tooth (crown and apex) and the contralateral tooth to determine extent of fracture and pulp comparison.
2. Dental charting with dental explorer and periodontal probe.
3. Clinical photos.

MANAGEMENT

1. Assess and document findings.
2. If evidence of pulp non-vitality (widened pulp cavity compared to contralateral canine or periapical lucency), treatment options include root canal therapy or extraction therapy. See sections above to determine steps for strategic or non-strategic teeth.
3. If no evidence of disease and tooth appears vital, continue monitoring with dental radiographs every 6 months to ensure endodontic health.
4. Consider analgesia if tooth sensitivity – handler may report dog has changes in his bite work or eating (carprofen at 2.2mg/kg PO BID)

TREATMENT PROCEDURES

Exodontia is the removal of a tooth with bone contouring and soft tissue closure. It often involves surgical (open) extraction or simple (closed) extraction sites.

Endodontics is the field of dentistry related to treating disorders of the pulp–dentin complex and periapical tissues. The goal of treatment is preservation of natural tooth structure. Endodontic therapies may include standard root canal therapy (for pulpitis and pulp necrosis), surgical root canal therapy (when standard root canal therapy fails), vital pulp therapy (with direct pulp capping), indirect pulp capping (for near pulp exposure), apexification (to close an open apex), and regenerative endodontics (to revitalize a nonvital tooth).

Complicated fractures with pulp exposure have a relatively rapid ingress of oral bacteria, resulting in irreversible pulpitis in mature teeth. Complicated fractures are treated by root canal therapy, vital pulp therapy or extraction. General anesthesia is required for all dental procedures as the MWD must be intubated and the airway must be protected. Intra-oral nerve blocks with appropriate doses of a local anesthetic agent are always performed before any treatment. Post-operative pain medications are also required for a duration that matches the treatment and level of discomfort.

REGIONAL ANALGESIA

Regional nerve blocks and local infiltration should be utilized for procedures where indicated. 0.5% bupivacaine is the recommended local block with a maximum dose of 2 mg/kg. 2% lidocaine may also be used with a maximum dose of 5 mg/kg. Needle size and length utilized should be 25 to 27-gauge with $\frac{3}{4}$ "-1 $\frac{1}{4}$ " length.

The four regional blocks most commonly used are rostral maxillary (infraorbital), caudal maxillary (maxillary), rostral mandibular (middle mental), and caudal mandibular (inferior alveolar).

ROOT CANAL THERAPY

The most common endodontic procedure performed in veterinary dentistry is standard root canal therapy. The instruments and materials required can be divided into 4 categories, based on the different steps of this procedure.

1. Endodontic access
2. Cleaning, shaping, and disinfecting the pulp cavity
3. Obturation
4. Restoration

Standard root canal therapy is indicated for the treatment of mature teeth (i.e., teeth with a closed apex) and endodontic compromise owing to pulp exposure (traumatic or intentional crown reduction), irreversible pulpitis, or pulp necrosis. Contraindications include an open apex, concurrent disease (e.g., periodontal disease or tooth resorption), complicating factors (e.g., pulp stones, sclerotic root canal), and deciduous teeth.

Standard root canal therapy in dogs has a high success rate. One study indicated a 94% rate of success or no evidence of failure.⁴ Periapical pathology may take 6 months to develop after a failed procedure. Post-treatment imaging at 6 months, followed by additional imaging annually is recommended.

Root canal therapy (or temporary restorative therapy) should only be performed by a VCO/VMO, a military human endodontist or a military comprehensive dentist with veterinarian oversight. All must have the skills and resources necessary to meet defined dentistry standards. If a military human endodontist or military comprehensive dentist supports the endodontic treatment, the overall treatment plan (including anesthesia) is still the responsibility of the VCO.

It is important to ensure the facility has veterinary-length files, gutta percha cones, and paper points. The facility should also have sealers (gutta-percha or a bioceramic), glass ionomer cement, etch, bond, and composite restoration available.

Communication between designated 64F Veterinary Clinical Medicine Officer and the approved human endodontic provider is essential. Take pre-and post-dental radiographs and send them to the designated 64F Veterinary Clinical Medicine Officer for review to ensure endodontic treatment success.

TEMPORARY OBTURATION AND RESTORATION IN STRATEGIC TEETH

This procedure is typically performed when endodontic materials, including appropriate veterinary length materials, are not available or root canal therapy or extraction needs to be delayed due to mission. The steps of this procedure are similar to a root canal treatment, but the pulp canal is filled with a temporary material, calcium hydroxide paste, to promote tertiary dentin formation, provide an antibacterial environment (high pH of calcium hydroxide), and create a temporary seal to prevent contamination and buy time before definitive treatment (root canal or extraction).

ENDODONTIC ACCESS

A diamond endo access bur on a high-speed handpiece with water irrigation is used to create direct access in the canal 2mm above the mesial gingival margin or through the fracture site (access sites vary by tooth receiving treatment and injury type.) A pathfinder can be used to ensure pulp cavity entrance. Ideally, one access through the fracture site is best to minimize removal of tooth structure. Using a Hedstrom or NiTi file, a working length is determined by taking a radiograph to confirm the file is at the apex. Most MWD canine working length is 34-45mm depending on tooth and access.

CLEANING, SHAPING, AND DISINFECTING THE PULP CAVITY

The pulp cavity is debrided using graduating sizes of files of the same working length and a stopper is placed on each file to ensure correct length before entering the canal. The cavity is treated with 1:1 6% NaOCl:NaCl solution and flushed with saline after every other file. The pulp cavity is debrided until the first file to bind to the dentinal tubules creates resistance.

OBTURATION

Apply calcium hydroxide paste (e.g., Dycal, UltraCal™, Calasept) starting at the apex and filling the entire canal to the coronal aspect.

RESTORATION

A 6mm depth is removed to provide space for the final restoration. The diamond endo access bur is used without water to tap the material to create the depth. The walls of the dentin canal are cleaned with curettage. Incremental 2mm layers of a resin modified glass ionomer is placed as a final layer and light cured if required. This layer is used to ensure an adequate seal over the Ca(OH)₂ paste and binds directly to the dentin walls.

A final radiograph is obtained to ensure appropriate fill and restoration. The temporary obturation and restoration can be left for 1-4 months, however, the tooth is more fragile during this time so final treatment should be planned when feasible.

EXTRACTION THERAPY

Extraction therapy is the recommended treatment for fractured non-strategic teeth with pulp exposure or fractured strategic teeth when root canal therapy or temporary restorations are not possible. The decision to extract a tooth in a working dog is dependent on the tooth affected, function of the working dog (patrol, tracking, or narcotics), severity of the fracture, and radiographic evaluation (periapical disease or internal or external inflammatory root resorption).

Most extractions performed in working dogs are surgical extractions. These patients receive a mucoperiosteal flap, some degree of bone removal, tooth sectioning of multirooted teeth, complete root removal, and primary closure. A soft diet and restriction of reward objects are recommended for at least two weeks. Moreover, there should be consideration of bone healing time in the extraction of the mandibular canine and first molar teeth. The mandibular bone can take up to six weeks for complete healing. Early return to bite work can cause a mandibular fracture around the weakened extraction site. Latrogenic fracture of the mandible during extraction therapy is also possible. Post-extraction radiographs of the mandibular bone around the tooth apex must be taken before and after extraction to ensure no fracture has occurred.

PROCEDURE TIPS

- Use appropriate local regional blocks for analgesia.
- 4-0 or 5-0 absorbable monofilament suture should be used for closure of flaps.
- Dental radiology is key to ensure whole tooth with root are extracted.
- Keys to preventing dehiscence include a tension free closure of the flap and flap pattern allowing blood flow to the extraction site.
- Use Osteoallograft® bone product only if mandibular first molar tooth or mandibular canine is extracted.

MAXILLOFACIAL TRAUMA

Maxillofacial trauma includes any trauma to the head. This includes trauma to the oral cavity, soft tissue, skin, temporomandibular joints, lymph nodes, salivary glands and facial bones. It is important to note that patients with maxillofacial trauma can present with a variety of confounding injuries and recognizing that the full extent of maxillofacial trauma cannot be determined without general anesthesia. However, initial stabilization and an overall systems evaluation are required to ensure that injuries are limited to the head. Stabilizing the patient and addressing life-threatening injuries is the priority before focusing on the oral cavity.

Patients presenting with obvious maxillofacial trauma should be assessed for changes in mentation, exophthalmos/enophthalmos, pain opening the mouth, and malocclusion. Awake exams should consist of thoracic radiographs, basic bloodwork, and a neurologic exam to ensure suitability and safety for general anesthesia. A patient's ability to perform ocular tracking can be helpful to determine orbital rim fractures or extraocular muscle damage. Evidence of changes in mentation, epistaxis, or abnormalities in ocular tracking support the need for critical evaluation to ensure suitability for general anesthesia.

Once anesthetized, oral exam and imaging findings will drive treatment recommendations. A CT scan should be completed for the most comprehensive injury assessment of injuries, if available. Life-threatening bleeding is rarely a complication following facial trauma but can occur with maxillary fractures involving the nasal cavity. Checking for malocclusion, mobility of the mandible, mandibular/maxillary fractures, missing or fractured teeth, soft tissue wounds, zygomatic arch fractures and temporomandibular joint luxation are some of the injuries that occur with head trauma. General treatment of the above involves restoring normal occlusion, preserving blood supply, and minimally invasive techniques to restore function. Post-operative medical care involves pain management, antibiotic therapy, soft diet, +/- a soft nylon muzzle and MEDEVAC to a Veterinary Role 3 for continued management. There are multiple treatment options that are beyond the scope of this CPG. Consultation with a veterinary dental SME is required.

PERFORMANCE IMPROVEMENT MONITORING

POPULATION OF INTEREST

All MWDs with diagnosis of a TDI or maxillofacial injury in an operational environment.

INTENT (EXPECTED OUTCOMES)

- Preservation of tooth.
- Rapid return to duty (RTD).

PERFORMANCE/ADHERENCE MEASURES

- Number of patients in the population of interest (deployed MWDs) that sustained a TDI.
 - Specify what tooth number and type of TDI, if information is available.
 - Treatment performed.
 - Timeline between injury and treatment and the RTD timeline.
- Number of patients in the population of interest (deployed MWDs) that sustain a maxillofacial injury.
 - Classify type of injury and treatment provided.
 - Timeline to treatment and RTD.

DATA SOURCES

- Patient Record
- Department of Defense Military Working Dog Trauma Registry

SYSTEM REPORTING AND FREQUENCY

The above constitutes the minimum criteria for Performance Improvement (PI) monitoring of this CPG. System reporting will be performed as requested. The system review and data analysis will be performed at the direction of the K9C4 Chair.

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APPENDIX A: CLASS VIII MEDICAL MATERIEL

DENTAL EXAMINATION AND DIAGNOSTIC EQUIPMENT

- Canine dental examination kit
- Dental explorer/probe
- Dental periodontal probe
- Dental forceps/extraction forceps
- Dental elevators/luxators
- Hemostats
- Mouth speculum/retractor
- Oral examination light/headlamp
- Digital dental radiography system/sensor
- Dental radiographic positioning aids/holders
- Radiographic markers

ORAL WOUND MANAGEMENT

- Sterile gauze
- Gauze sponges
- Cotton-tipped applicators
- Sterile irrigation solution
- Irrigation syringes
- Irrigation tips/catheters
- Suction tubing/tips
- Oral wound cleansing supplies
- Hemostatic agents
- Absorbable hemostatic material

DENTAL EXTRACTION AND SURGICAL INSTRUMENTS

- Canine dental extraction forceps
- Dental elevators
- Dental luxators
- Periosteal elevators
- Dental curettes
- Rongeurs
- Small surgical scissors
- Needle holders

ANALGESIA / ANESTHESIA SUPPORT

- Local anesthetic agents
- Dental local anesthetic syringes
- Dental needles
- Syringes and needles
- IV catheters
- IV administration sets
- Endotracheal tubes
- Lubricant
- Anesthesia monitoring supplies
- Pulse oximetry
- Blood pressure monitoring equipment

INFECTION PREVENTION / STERILE SUPPLIES

- Sterile surgical gloves
- Examination gloves
- Surgical masks
- Eye protection
- Sterile drapes
- Sterile instrument covers
- Antiseptic solution
- Skin preparation supplies
- Instrument sterilization supplies

MEDICATIONS

- Canine-appropriate analgesics
- Local anesthetics
- Antibiotics appropriate for contaminated oral/dental injuries
- Anti-inflammatory medications
- Sedative/anesthetic agents
- Gastroprotective/antiemetic medications as clinically indicated

DENTAL EXTRACTION AND SURGICAL INSTRUMENTS (CONT'D)

- Tissue forceps
- Surgical scalpel handles/blades

DENTAL REPAIR / STABILIZATION

- Dental splinting material
- Dental wire
- Orthodontic/acrylic splint material
- Dental bonding/adhesive material
- Dental composite/resin material
- Dental matrix/band material
- Dental polishing/finishing supplies

SUTURES AND SOFT-TISSUE REPAIR

- Absorbable suture material (4-0 or 5-0)

FEEDING / POST-TREATMENT SUPPORT

- Soft/recovery canine diet
- Oral administration syringes
- Feeding supplies
- Water/feeding bowls
- Elizabethan collar or equivalent protective device

DOCUMENTATION / EVACUATION

- DD Form 3073 – K9 Tactical Combat Casualty Card
- DD Form 3074 – Canine Treatment and Resuscitation Record
- Dental treatment documentation supplies
- Dental radiograph storage/transfer media
- Canine restraint/leash/muzzle
- Canine transport/evacuation equipment

For additional information including National Stock Number (NSN), please contact dha.ncr.med-log.list.lpr-cps@health.mil

DISCLAIMER: *This is not an exhaustive list. These are items identified to be important for the care of combat casualties.*