Dental Care Program for Nonhuman Primates

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1. Purpose
This document outlines the dental care program developed for the Unit for Laboratory Animal Medicine (ULAM) within the University of Michigan Medical School. The program is designed to help optimize the health of all nonhuman primates (NHPs) used in research at the University of Michigan by defining and addressing veterinary care procedures necessary to reduce the incidence of disease involving the oral cavity.

2. Responsibility
1. ULAM Veterinary Personnel

3. Definitions
1. IM: Intramuscular
2. SQ: Subcutaneous

4. Procedures
1. Observation/Examination of the Oral Cavity
   1. Whenever an animal is sedated or anesthetized, attempt a superficial oral exam.
   2. Personal protective equipment (PPE) to be worn by the examiner during a routine exam:
      1. Shoe covers
      2. Face mask
      3. Goggles
      4. Long-sleeve water resistant gown
      5. 2 sets of gloves
         1. If possible, wear at least one set of nitrile gloves. This is recommended as nitrile gloves may be more resistant to tears than are latex gloves.
      6. A Powered Air Purifying Respirator (PAPR) must be used during scaling or at any time when the risk of aerosolization of saliva is possible (see below).
   3. A veterinary technician, veterinary resident, or clinical faculty veterinarian should thoroughly examine the oral cavity of all NHPs no less frequently than every 6 months. Ideally, this should be coordinated to occur at the time of the animal’s routine semiannual tuberculosis test.
      1. Adequately sedate or anesthetize the animal to allow for a thorough exam without risking injury to personnel.
      2. Refrain from placing fingers or hands in the animal’s mouth. Instead, use a tongue depressor or similar disposable item to manipulate the oral cavity as needed. In order to reduce disease transmission, appropriately discard or disinfect such items after use with each animal.
   4. Document any abnormalities noted upon exam in each animal’s health record, which may be done on the included dental chart (see Appendix A).
      1. Abnormalities noted should include but are not limited to the following:
         1. Loose, missing, or damaged teeth
         2. The degree of dental tartar present (ex. none, mild, moderate, severe)
         3. The degree of gingivitis noted (ex. none, mild, moderate, severe)
         4. The presence of obvious caries (cavities)
         5. The presence of oral masses or lesions associated with the mucous membranes
      2. If moderate to severe dental tartar or moderate to heavy gingivitis is noted, conduct a thorough dental prophylaxis while the animal is maintained under general anesthesia.
      3. If a veterinary technician notes any previously undiagnosed abnormalities during examination, report the abnormalities to the area veterinary resident and clinical faculty.
      4. Consult a dentist for any severe conditions that require more expertise than the ULAM veterinary staff can provide.

2. Dental Prophylaxis
Biohazard Concerns

1. Saliva and dental calculus of the macaque species of nonhuman primates may harbor macacine herpesvirus-1, as well as multiple bacteria that may be pathogenic to humans. Since dental procedures often involve aerosolization of saliva, blood, and calculus, there is an increased risk of exposure to personnel in the vicinity of dental procedures. The following PPE and procedures are designed to help prevent disease transmission to personnel.
2. Perform all procedures in rooms with appropriate ventilation.
3. The individual performing the dental must wear the following PPE:
   1. Clean scrub top and pants
   2. Long-sleeve water resistant gown
   3. Shoe covers
   4. Two sets of gloves (use of one set nitrile gloves is recommended)
      1. When performing extractions using a dental elevator, consider the use of a cut-resistant glove on the non-dominant hand. These reusable gloves can be found in the necropsy area.
   5. Powered Air Purifying Respirator (PAPR)
      1. It is not necessary to wear additional eye protection or facemask when wearing a headpiece assembly (head cover and visor) with the PAPR.
         1. Between uses, the outside of the PAPR must be wiped down with an appropriate disinfectant.
4. Any personnel who must also be present within the room must wear the following PPE:
   1. Shoe covers
   2. Hair bonnet
   3. N95 respirator
   4. Goggles
   5. Long-sleeve water-resistant gown
   6. At least one set of gloves
5. All equipment coming in physical contact with or in close proximity to the animal at the time of the procedure is considered contaminated.
6. Use disposable equipment when possible.
   1. Place paper products and general trash (excluding sharps) in an appropriate receptacle for appropriate biohazard disposal.
   2. Place sharps in a sharps container.
7. Disinfect tabletops and large equipment with an appropriate disinfectant (e.g., Clidox) shown to be effective in neutralizing Herpes B virus.
8. Sanitize all other equipment after use with each animal.
   1. For most instruments, soak in an appropriate disinfectant (ex.Spectra-Soak) for the recommended time or autoclave.
   2. Affix filters (e.g. Thermoflo 1 Filter Port Elbow, Ref 6125A, ARC Medical Inc., Scottsdale, GA) between the endotracheal tube and rebreathing tube on the anesthetic machine. All equipment distal to the filters should be considered contaminated and treated accordingly.
3. Anesthesia
   1. General anesthesia is required for all procedures. Unless otherwise warranted, sedate nonhuman primates with an appropriate sedative (e.g. Ketamine or Tiletamine/Zolazopam) in order to remove the animal from its cage and transport it to the dental procedure area. Sedatives and dosages may be found in the Guidelines on Anesthesia and Analgesia in Nonhuman Primates.
   2. An anticholinergic (e.g. glycopyrrolate atropine sulfate) may be used to reduce salivary and bronchial secretions in primates during dental procedures. Dosages may be found in the Guidelines on Anesthesia and Analgesia in Nonhuman Primates.
   3. Intubate the animal with use of a laryngoscope.
   4. Induce and/or maintain and anesthesia using isoflurane
   5. Observe the respiratory rate, mucous membrane color, and response to stimuli to assess anesthetic depth. A pulse-oximeter may be utilized to monitor oxygen saturation and pulse rate.
4. Perform ultrasonic scaling with a veterinary dental scaler.
   1. Only veterinary technicians, veterinary residents, faculty veterinarians or authorized dentists trained in the technique will be allowed to scale teeth.
      1. Training may include, but is not limited to, reading of the instruction and operations manuals, training session trained veterinary technician being familiar with the various components of the scaler, and demonstrating proficiency using the scaler.
   2. After removing the tartar from the teeth, use a gingival probe to explore the sulcus of each tooth, noting any pockets or calculus remnants.
   3. Use of Prophy cups, Prophy paste, and the polishing head of the dental machine to polish the teeth following scaling.
   4. Wipe teeth and gums with novasan-impregnated gauze.
5. Medications
   1. For all invasive dental procedures or those involving moderate to severe dental tartar or gingivitis, administer an appropriate antibiotic (e.g., 20,000-40,000 U/kg Procaine Penicillin SQ, IM) before the dental procedure. Based on the degree of disease noted and the invasiveness of the procedure, additional doses of antibiotics may be prescribed by the veterinary resident or clinical faculty veterinarian.
   2. If the procedure is expected to result in pain or discomfort after anesthetic recovery, administer an appropriate analgesic immediately after anesthetic induction and then as needed. Be sure to inform the lab prior to administration of analgesics to confirm it would not confound their research.
3. **Recovery**
   1. An animal must be continuously observed until it is able to sit upright. The animal should then be periodically monitored until it appears fully ambulatory (see *Guidelines on the Performance of Surgery in Non-Rodent Mammals*).

4. **Records**
   1. After each procedure, create a new dental chart (see Appendix A).
   2. Fill out the chart using Appendix B as a reference.
   3. Record the procedure, follow up plan and any further necessary information on an observation sheet.
   4. Record anesthesia monitoring and monitoring during recovery using a ULAM designated anesthesia and post-operative monitoring form.
   5. Place all records generated during dental procedures in the animal’s permanent health record.

5. **Related Documents**
   1. *Guidelines on Anesthesia and Analgesia in Nonhuman Primates*
   2. *Guidelines on the Performance of Surgery in Non-Rodent Mammals*

6. **Appendices**
   1. **Appendix A**: *Nonhuman Primate Dental Chart*
   2. **Appendix B**: *Nonhuman Primate Dentistry Chart Abbreviations*