

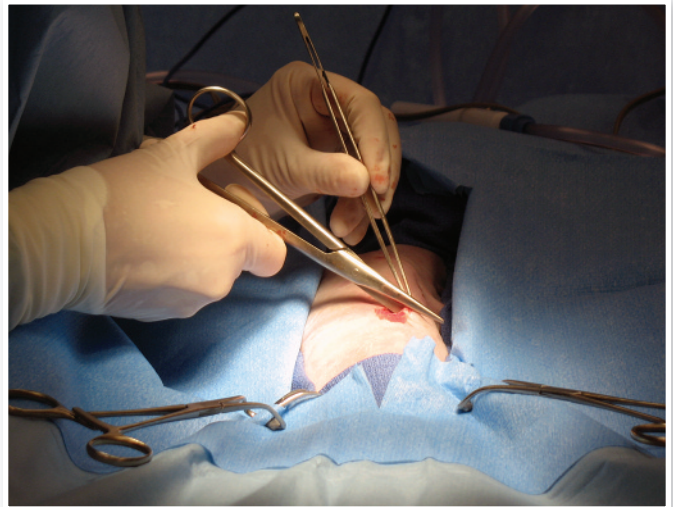
Surgical Treatment for Bite Wounds

This step-by-step outline on the surgical treatment of canine bite wounds supplements the Consultant on Call **Bite Wounds** (page 21), which reviews and describes details and tips on presentation, medications, and follow-up.

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Bite wounds, a common emergency presentation, can often be deceiving. When treating canine bite victims, it is important to consider the *iceberg effect*, in which minimal surface damage may disguise expansive damage underneath the skin. Patients that appear stable at initial presentation may present days later with systemic inflammatory response syndrome (SIRS) or sepsis.

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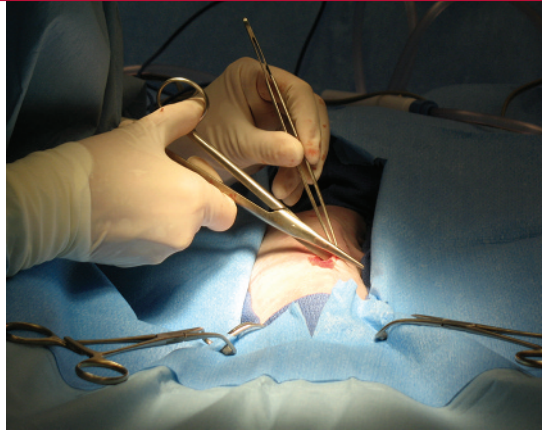
What You Will Need

- Sterile surgical cap, mask, gown, and gloves
- Clippers
- Sterile water-soluble gel (to place on wounds while clipping)
- Surgical scrub and gauze for periwound skin
- 0.05% chlorhexidine solution in an IV bag
- Pressure cuff for IV bag
- IV administration set
- 22–16-gauge needle
- Sterile towels and drape
- Sterile instruments
 - Towel clamps
 - Scalpel handle and blades (#10, #15)
 - Hemostats
 - Thumb forceps
 - Metzenbaum and Mayo scissors
 - Needle holder
 - Suture scissors
- Assorted suture material
 - Polydioxanone (3-0, 2-0)
 - Nylon (4-0, 3-0)
 - Poliglecaprone 25 (4-0, 3-0)
- Moisture-retentive dressing
- Bandaging material
- Anesthetics and analgesics
- IV fluids
- Antibiotics
- Culturettes for aerobes and anaerobes

Step-by-Step ■ Surgical Treatment for Bite Wounds

Step 1

Always wear gloves when working around a wound. Prepare a large area for surgery, as tissue damage is commonly more widespread in the deeper aspect of the bite wound than on the surface. Administer time-dependent antibiotics (eg, cephalosporins, augmented penicillins) IV q90min during surgery.



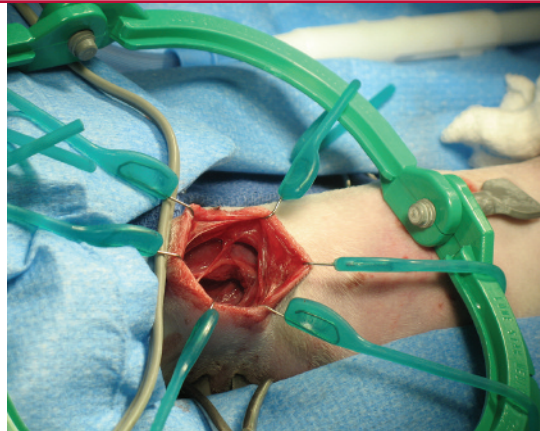
A 1-year-old Maltese presented with bite wounds on its dorsal thorax. The entire thorax was clipped and scrubbed bilaterally. A puncture wound is being opened with a pair of Mayo scissors.

Author Insight

When tissue viability is unclear, apply the adage *when in doubt, cut it out*, if it is not essential to life or future repair and is located where repeated assessment and debridement are difficult (eg, deep muscle, intraabdominal or intrathoracic tissue).

Step 2

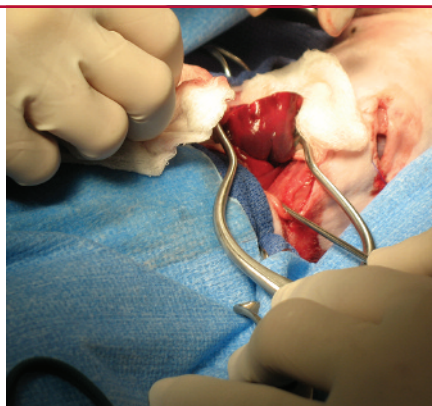
Always use sterile instruments and aseptic technique when debriding and lavaging wounds. Open the bite wounds with scissors or incise skin over a hemostat placed in the wounds. Follow the wounds to their deepest extent.



In the patient from Step 1, multiple deeper bite wound tracks were found under the single puncture wound; each track was explored and debrided.

Step 3

If underlying tissue is healthy, trim puncture edges and lavage. If not, excise necrotic tissue, as it perpetuates inflammation, blocks granulation, and increases risk for infection and SIRS. Necrotic tissue ranges from black (if dry) to white-gray (if moist); does not bleed when cut (rule out hypovolemia, hypothermia, vasoconstriction); lacks sensation (rule out altered sensation from inflammation or medications); and may be friable, lack structural integrity, and/or have limited-to-no body attachments. Culture damaged tissue samples.



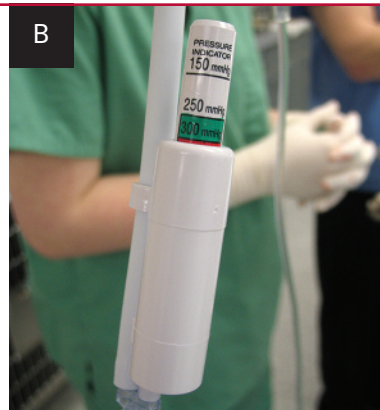
In the patient from Step 1, one track led into the thorax, where a bite wound was found in a lung lobe. Lobectomy was performed, the thoracic cavity lavaged, and a chest tube placed.

Author Insight Use the guideline *when it's superficial or skin, leave it in* for superficial tissue valuable for closure (eg, skin on distal limb) that can be readily debrided during bandage changes, if they prove nonviable. Highly valuable deeper tissue (eg, tendon, ligament, joint capsule, bone fragments important for orthopedic function) with uncertain viability may also be left in place, although the client should be advised that additional surgery may be needed if tissue necrotizes.

SIRS = systemic inflammatory response syndrome

Step 4

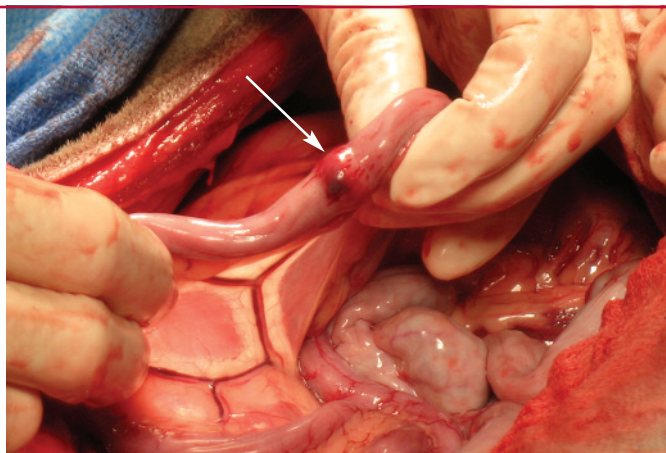
Break down walls between pockets of dead space to allow thorough, copious lavage of debrided wounds. Add 25 mL of 2% chlorhexidine to a liter bag of lactated Ringer's solution, saline, or sterile water to obtain 0.05% chlorhexidine for lavage of SC tissue and muscle (A). To achieve the desired lavage pressure of 7 psi for SC tissue and muscle, pump the pressure cuff on the fluid bag up to 300 mm Hg (B), and lavage using a 22–16-gauge needle on a regular IV administration set (C).



Author Insight Default thoracotomy is not necessary when thoracic penetration cannot be ruled out; however, be prepared to enter the thorax when debriding wounds over this region.

Step 5

Because the risk for intestinal perforation by bites into the abdominal cavity is high and the consequence of intestinal compromise is usually life threatening, perform a celiotomy if abdominal penetration cannot be ruled out or there is significant abdominal crush injury.



An 8-year-old Siberian husky attacked by other members of its sled-dog team had puncture wounds on the neck, limbs, and abdomen. Physical examination, wound probing, and standard radiography provided no clear evidence of abdominal perforation; however, celiotomy was performed because of the presence of wounds over the abdominal cavity. Three jejunal perforations were found (arrow depicts 1). The sites were removed via intestinal resection and anastomosis.

Author Insight Risk for contaminated hollow organ puncture with abdominal bite wounds is high, so early abdominal exploration is warranted when abdominal penetration cannot be ruled out. Debridement of bite wounds in internal organs may require intestinal resection and anastomosis, partial or full splenectomy, liver or lung lobectomy (see Step 3 or 5). The abdomen and thorax should be repeatedly lavaged with warm sterile saline (without added antiseptics).

MORE ►



See the companion Consultant on Call titled **Bite Wounds** on page 21 of this issue.

Step 6

Postoperatively, apply a moisture-retentive dressing or applying a vacuum dressing (ie, negative pressure wound therapy). Perform serial debridement and lavage as needed. Any dead space must be adequately drained. The best method of drainage is open-wound management. If a wound must be closed before the above criteria are met, place the drain(s). Cover the drain exit site with a bandage to lower the risk for ascending infection. Do not close wounds until all contamination and tissue with uncertain viability are eliminated.



After debridement and lavage of bite wounds, calcium alginate (a white, highly absorptive dressing that supports autolytic debridement and granulation formation via moist wound healing) was used as the primary dressing (A). Bandaging was completed with cast padding, conforming gauze, and an elastic self-adherent wrap (B).

Step 7

Place an appropriate feeding tube in significantly compromised animals and/or to bypass a serious pharyngeal (esophagostomy tube), esophageal (gastrostomy tube), gastric, or proximal intestinal injury (jejunostomy tube).

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A schnauzer (13 years of age) was referred for treatment of cervical bite wounds after preliminary wound care by the local veterinarian. Severe laryngeal and tracheal trauma (eventually requiring laryngectomy and permanent tracheostomy) and esophageal perforation were diagnosed by endoscopy. View of the ventral neck in the standing dog (A). Treatment included placement of a percutaneous endoscopic gastrostomy (PEG) tube, seen here exiting from the left abdominal wall (B).

See **Aids & Resources**, back page, for references & suggested reading.

Dr. Campbell is a consultant for KCI Animal Health with a special clinical interest in negative pressure wound therapy.