

## **Wound Management Secrets**

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### **Split-shot Wound Management**

#### **Key Points**

- Skin has the ability to stretch when placed under mild tension
- Normal wound contraction often stops before wound edges appose.
- Split-shot wound management can be used to encourage skin edges to contract.

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**Indications:** Use of various appliances to create tension on the local skin of non-contracting open wounds is not new. Subcutaneously buried silastic balloons (i.e., skin expanders) injected every 24 hours with varying amounts of saline will stretch local skin and have been used extensively in human plastic and reconstructive surgery. Skin expanders have also been described for use in veterinary patients. Skin expansion may be indicated in wounds that have undergone normal wound contraction without successful wound margin apposition. The most common locations for inappropriate wound contraction in small animals are extremities, head, and tail.

**Applied Anatomy:** Skin is made up of several layers that collectively form a complex organ system. Skin is not capable of regeneration. One method of getting 'more' skin for wound coverage is encouraging local skin to undergo intussusceptive growth. This can be accomplished by applying tension to local skin around the wound. If tension is constant, skin layers will accommodate the increase tension by becoming thinner thus allowing the skin to 'stretch'.

**Anesthesia:** Patients undergoing split-shot wound management should be placed under general anesthesia.

**Technique: Positioning:** Patients are positioned with the wounded area uppermost.

**Patient preparation:** Wounds identified for split-shot wound management should be treated as an open wound until there is evidence of a healthy granulation tissue bed. Routine aseptic preparation of the local skin is performed.

**Special instruments and suture:** Metallic split-shot (i.e., other than lead) can be purchased at any local sporting goods or fishing store. Split-shots are placed in a cold sterilization media for an appropriate time period and thoroughly rinsed prior to use. Monofilament non-absorbable suture with a swaged-on taper needle, size 00 to #1 depending upon location and size of wound is recommended. A sterile rubber bumper is fashioned from a feeding tube or catheter.

**Split-shot technique:** The wound and surrounding skin are prepared for aseptic surgery. Two bumpers are created by cutting one 1/2 inch piece off the flanged end of a 20 French feeding tube or catheter. This segment of tube is then split in two.

An appropriate size monofilament nonabsorbable suture is selected. The skin edges are gently undermined being careful not to trim the wound edge. The swaged-on needle is placed through the rubber bumper and enters the wound at the commissure. The wound edges are then sutured using a simple continuous pattern. Care is taken to engage the needle in the tough collagen laden subcutaneous tissue. Patients with thin subcutaneous tissue (i.e., cats, small dogs, areas of thin skin) may require penetration of skin instead of subcutaneous tissue. Once the entire length of the wound has been sutured, the suture is passed out through the skin of the remaining commissure of the wound. Knots are not tied in either end of the suture.

Gentle traction is placed on the exiting ends of the suture until mild tension is placed on the wound edges and local skin. A split-shot is placed on each end of the exiting suture against the bumper. The split-shot is then gently but firmly clamped against the suture; this maintains tension on the skin edges and local skin. The wound is bandaged, an Elizabethan collar placed, and the patient confined to a cage. Each day the bandage is removed, the ends of the suture gently pulled and a split-shot is placed between the bumper and the original split-shot. Daily tension is performed without the need for general anesthesia or sedation. Skin may be responsive to tension for 7 to 10 days. When the wound is closed to your satisfaction, the suture and bumpers are removed. The remaining wound is bandaged only if it requires further protection.

## **Tie-over Bandage Technique**

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### **Key Points**

- The most important aspects of wound management are debridement, debridement, debridement.
- The solution to pollution is dilution.
- A tie-over bandage can cover the most difficult to bandage wounds.

- A tie-over bandage can help 'stretch' local skin.

If you would like an instructive DVD of this topic, go to [www.ivseminars.net](http://www.ivseminars.net) and click on Video Vet.

**WOUND MANAGEMENT:** The area should be clipped and cleaned as soon as possible to provide a clean environment beneath the bandages that will eventually be applied. Sterile, water soluble gel placed on the wound is a convenient means of temporary wound protection. Dried blood and debris should be removed from the surrounding skin with antiseptic soap, using care to avoid contact between the soap and exposed tissues which can result in lipolysis and tissue damage. The primary goal of wound management is to decrease bacterial numbers and debris and enhance the animal's defense mechanisms (i.e., debridement). Gross particulate matter, hair, etc. should be removed manually from the wound. Lavage is beneficial in further decreasing infection-promoting debris and bacteria. Saline is indisputably the ideal lavage solution, although dilute chlorhexidine (0.05 to 0.005%), or povidone-iodine (0.01%) may be used. The effectiveness of lavage is dependent upon volume and pressure. Studies have shown that high pressure (25-60 psi) is superior to low pressure (0.5-5.0 psi) when wounds are only lavaged one time. Medium pressure, which has also been shown to be beneficial can be generated using an 18 gauge needle and large syringe (35-60 ml). Surgical debridement of necrotic-appearing tissue and embedded foreign material limits nutrients for bacterial growth and enhances the animal's local defense mechanisms.

**OPEN WOUND MANAGEMENT:** Open wound management allows optimal drainage and daily inspection, debridement and lavage of tissues. Following surgical excision of necrotic tissue, etc., continued mechanical debridement can be performed using an adherent dressing (wet-to-dry, dry-to-dry, or wet-to-wet). Wide-mesh gauze sponges are ideal for adherent bandages. The type of dressing used depends on wound conditions. Wet-to-dry dressings can be used for wounds with necrotic tissue, foreign matter and viscous exudate. The wet dressing dilutes the exudate and allows absorption. As the dressing dries, necrotic tissues adhere to the gauze and are removed with the bandage. Dry-to-dry dressings have similar indications as wet-to-dry except without the presence of viscous exudate. Wet-to-wet dressings are indicated when viscous exudate is present without necrotic tissues. The contact adherent layer should be covered by an absorbent outer layer. Once necrotic tissues have been removed and granulation tissue begins to form, adherent gauze should be replaced with nonadherent pads (telfa).

**SECOND INTENTION HEALING:** Second intention healing occurs by formation of granulation tissue, wound contraction and epithelialization. The advantages of this

process are drainage remains optimal, wound infections are rare and the time and expense of surgery is avoided. However, second intention healing may cause disfigurement or loss of function due to wound contracture, and the epithelium formed may be easily disrupted.

**TIE-OVER BANDAGE: Indications:** Large surface area wounds (i.e., abdomen, thorax, back, neck) or wounds in 'difficult-to-bandage' areas (i.e., tail, perineum, head, paraprepuccial, proximal extremities) may not be amenable to routine bandaging techniques. These areas generally lend themselves nicely to placement of a tie-over-bandage.

**Technique:** The wound bed is prepared as described above. Several # 0 or #1 monofilament non-absorbable suture loops are placed in the skin on the periphery of the wound. Loop sutures are generally placed 360° around the wound and spaced 2 or 3 cm apart. Appropriate wound covering materials are placed in the wound bed (i.e., wet to dry, gauze, telfa, etc) and a sterile laparotomy pad placed on top to provide protection to the wound. Several lengths of 1/4 inch or 1/2 inch umbilical tape are passed through the loops of suture, over the laparotomy pad and through the suture loop on the opposite side of the wound. The umbilical tape passes over the wound multiple times to hold the laparotomy pad in place (and therefore the wound covering materials). Enough traction is placed on the suture loops to place mild tension on the skin edges of the healing wound. This bandage is easily removed and replaced for ease of bandage change.

Once the granulation bed is healthy and the wound is considered surgically clean it can be closed primarily (i.e., delayed primary closure). If there are small defects at the time of suture removal these can generally heal by second intention.