Bandaging Techniques
Make it a Work of Art!

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Introduction

As veterinary nurses and assistants, it is important to understand bandaging techniques especially when assessing wounds and assisting in applying bandages, casts and splints. Bandages are applied to cover and treat wounds, to prevent swelling or to stabilise injuries temporarily. Splints are often used to temporarily stabilise factures for transport or for definitive treatment of some fractures or soft tissue injuries.

Types of Wounds

Surgical Incisions

A scalpel incision represents the ideal wound repair situation. Due to the aseptic preparation of the skin prior to surgery the wound is uncontaminated by bacteria, dirt and other debris. When the skin is closed with sutures each tissue layer will become re-vascularised and heal leaving only a minimal scar.

Lacerations

When the wound is fresh and has been caused by a sharp object, then these wounds can be similar to surgical incisions, but sometimes there will be bacteria and usually some debris present. The body reacts to remove all foreign organic matter (including bacteria) before healing can take place as infected wounds do not heal. Once a fresh wound has been gently but thoroughly cleansed it can be repaired by using sutures or staples to close the tissue layers. Drainage may be left to allow fluid and remaining debris to be flushed out of the wound.

De-Gloving Wounds

These wounds result when there is an extensive loss of skin from a limb, usually the result of severe trauma. In this type of injury there is not sufficient viable skin left to close the wound. Even though bandaging techniques will play a critical role in healing, it is still essential to reduce the amount of dead, injured, or contaminated tissue as soon as possible.

Bite Wounds and Other Puncture Wounds

These wounds are characterised by a small external wound, but with a penetration deep in soft tissues with bacteria and debris. These wounds can almost never be sutured directly because of the strong likelihood of trapping bacteria and debris in the wound.

Toxic Wound

White-tailed spider bites, stinging insects and snakebites can all result in injured or necrotic tissue. These wounds can result in a severe tissue loss and an open wound. In this situation we must also prevent infection from developing while there is an open wound.

Pressure Sores

Also known as decubital ulcers, these can result from chronic pressure of soft tissue (skin) between a bony prominence and a hard surface. They most often occur when pets are recumbent for long periods due to other injuries or orthopaedic conditions such as osteoarthritis.

Many wounds are combinations of two of the above types of wounds. For example, dog bites are often combinations of punctures and lacerations.

Healing Patterns

Primary Closure

Surgical incisions and fresh lacerations are examples of wounds that can heal by primary closure. Sutures or staples are used to oppose tissue layers and hold them together until the wound heals. This often happens within 10-21 days.

Delayed Primary Closure

If there is debris or infection in a wound, then closure is delayed until a combination of surgical, chemical and bandaging techniques can be used to clean the wound. Usually 3-5 days later a primary closure can be undertaken.

Secondary Closure

If the infection or debris cannot be controlled within 3-5 days the body will begin to form granulation tissue in the parts of the wound. Generally, the granulation tissue fills the bottom of the wound first. Once contamination is eliminated the wound can be closed with sutures or staples.

Second Intention Healing

In this situation a severely contaminated wound is allowed to continue to granulate without sutures or staples. There will be a hairless area with a scar present. There may also be some “contracting” of the wound in healing.

Role of Bandage, Casts & Splints in the Healing Process

Bandages

Bandages are non-rigid materials formed into the shape of the part being covered. Usually cotton (or synthetic cotton), gauze, and some type of tape are used to form bandages.

Casts

Casts are rigid moulded tubular structures applied to a limb. If the cast were removed it would be in the shape of the limb being protected.

Splint

Splints are more rigid than bandages, but not as rigid as a cast. They are made from a firm material (plastic, wood or metal) and usually applied to one aspect of a limb rather than in a tubular fashion. They are often applied over a bandage.

Uses of Splints, Casts and Bandages

- Promote Wound Healing
- Protect Wounds from contamination and self trauma
- Reduce Pain
- Reduce swelling/oedema
- Control haemorrhage
- Prevent motion of bony and soft tissues
- Hold bony tissues in correct anatomical position
- Eliminate dead space
- Absorb exudates and debris

Application Techniques

- Bandage application is an art form – the only way to become good at it is to practice.
- Loose bandages as well as overly tight bandages can result in further discomfort and pain to the animal and hinder healing.
- Always wrap bandaging material from distal to proximal.
- The bandage should always stabilise the joint above and the joint below the injury.
- A limb bandage should incorporate the toes
- The more padding the tighter the bandage can be applied.
- When applying splints or cast, pad around the bony prominences.
- Avoid placing splint material over bony prominences.

BANDAGES

Bandaging materials usually come in a range of widths usually 5, 7.5 and 12 cm widths. The wider the roll, the more bandage is applied and less materials are required to achieve the desired support and thickness.

As a rule, the smaller and thinner the limb then the narrower bandage material should be. Using wider tapes makes it more difficult to maintain the limb in a functional position as the bandage does not conform as easily to the limb. Causing straightening of the bandaged joints, however thinner tapes can end up bunching.

For cats and small dogs use 2.5cm bandage, for medium dogs use 5cm bandages and use 12cm bandages for large dogs. If possible, bandage with an assistant to maintain the limb in the correct position.

Bandages generally consist of three layers although it is important to remember that not all bandages will require all these layers.

INNER LAYER (PRIMARY OR CONTACT)

This layer should be sterile and is in contact with the wound. The product should be soft enough to contour to the wound surface. In most cases the inner layer should allow fluids from the wound surface to pass through the material and into the middle (absorbent) layer. The primary layer can aid the body in removing necrotic material that adheres to the dressing and is “lifted” from the wound. The contact layer also helps form an occlusive seal over the wound to protect the wound from contamination. Commercial products on the market are specifically designed primary layers that aid in absorbing exudates.

SECONDARY LAYER (INTERMEDIATE)

The fluids exuding from the wound site pass through the primary layer into the secondary layer. Serum, tissue debris, bacteria, pus, and small debris particles all can be kept away from the wound. In the first stages of wound healing there is usually a lot of fluid and debris and dressings need to be changed often. As healing progresses, the frequency of changes decreases. It is important that the secondary layer not become overly wet as this may cause contamination by exogenous bacteria. Secondary layers should be bulky and have a fibrous nature to provide the maximum surface area for absorption. The bulk also helps to protect and immobilize the wound. There are dozens of products available for secondary layers; however, cotton products have been the standard for many years.

OUTER LAYER (TERTIARY)

This layer does add some strength to the bandage, but the primary purpose is to hold the primary and secondary layers in place. Non-waterproof tape is used in most cases to form the outer layer. Waterproof tapes are available, but these trap fluid inside of the bandage.

Fluid accumulation at the wound site delays healing. The tape should be applied tightly enough to hold the primary and secondary layers in place, but not so tight as to become a pressure bandage and decrease circulation.

TYPES OF BANDAGES

Simple Bandage

In clean surgical wounds or fresh clean lacerations, a simple bandage composed of the three layers (e.g. a gauze swab, cotton wrap, and tape) may be applied to protect the wound as minimal or no fluid accumulation is anticipated at the wound site.

Dry-to-Dry Bandages

If a wound is badly contaminated with debris and infection (even after surgical debridement) a dry to dry dressing may be applied. In this type of dressing a sterile gauze pad is used as the primary layer. Debris and necrotic tissue can pass through the gauze in or be trapped within the gauze itself. The secondary and tertiary layers are then applied. When the dressing is changed the wound site should be checked. If the contact layer gauze is not adhered to the wound it can be gently lifted off. If the contact layer is adhered, then wet the swab with warmed sterile irrigating saline. As healing begins new cells (granulation tissue) can adhere to the dressing causing pain and bleeding when it is removed. This technique is generally not recommended.

Wet to Dry Bandages

If a wound does not have a lot of necrotic tissue and debris, but is infected, then a wet to dry bandage may be used. In this type of dressing a gauze or cotton swab is applied to the wound as a contact layer after first moistening the gauze with saline or an antiseptic solution. The fluid in the dressing dilutes the pus and allows it to pass into the secondary layer.

Non-Adherent Semi-Occlusive Bandage

Basically, this is a simple bandage and is used for wounds that have granulation tissue present and no contamination. These bandages will not stick to the wound and healing can take place under the primary layer. These dressings are considered to be semi-occlusive in that they keep the wound surface moist, but do not allow free passage of fluids from the primary to the secondary layers.

Non-Adherent Occlusive Bandages

Sterile wound dressings composed of a hydrocolloid material can be applied directly to a healing wound. The material reacts with tissue fluids to form a gel that completely occludes the wound. The gel provides a moist wound environment for healing and prevents any contact with exogenous bacteria. They can be left in place for 2-3 days.

Pressure Bandages

These bandages should only be used for a short time to control bleeding on an emergency basis.

Pressure bandages can also be used to help control swelling of the limbs. The main risk is that blood supply to bone and soft tissues can be cut off resulting in permanent damage and eventual amputation.

Robert Jones Bandage

This bandage is very bulky and requires large amounts of padding in the secondary layer. It functions as a splint even though there is no rigid material used. It is comfortable and light, but its bulk makes it awkward for the patient to move. They are used to stabilize injuries particularly at the elbow or below or at the stifle or below. They should not be left in place if there are contaminated wounds present. Properly applied they are said to sound like a ripe watermelon when flicked.

Modified Robert Jones Bandage

This bandage is mainly used to control swelling after trauma or surgery. It provides less support than a Robert Jones unless splint material is added. The secondary layer is usually less bulky than that of Robert Jones.

CASTS

Casts may be applied to limbs that have bone or joint injuries and they may also be used when stabilising soft tissue injuries such as following a tendon repair. Casts fit the limb well as they are directly moulded to the affected limb and if applied correctly should not rub against soft tissues causing ‘cast sores’. Casts are usually applied to injuries distal to the elbow or stifle.

TYPES OF CASTS

Plaster

Plaster has been available for many years and is one of the oldest cast materials. It is available in extra fast set types that harden in 3-5 minutes. It has the advantages of being inexpensive, and very strong. The disadvantages are that it is heavy and therefore somewhat limiting to the patient and can soften if exposed to liquids such as water and urine.

Fibreglass

Several brands of resin impregnated cast materials are now available. They are similar to plaster in that they can be moulded to the limb. They have the advantage of being very strong while being very light and they will not weaken if wet.

SPLINTS

Splints are usually used to stabilise bone or joint injuries but may also be applied to soft tissue injuries. Splints are never applied directly to the skin, padding is first applied to the limb and then the splint is attached over the padding.

TYPES OF SPLINTS

Conventional Splint

There are many materials used to form splints. Originally splints were made of wood however the development of plastic pre-formed splints has largely replaced wood. Aluminium pre-formed splints are also available. Temporary splints can also be made from general items such as cardboard and rolled up newspaper. All of these materials can make effective support for injured limbs. The advantages are that they are relatively inexpensive, easy to apply and strong while being light. The disadvantage of pre-formed splints is that they may not fit the limb exactly and may cause pressure sores to develop if the splint rubs against soft tissues. In addition, a splint that does not fit perfectly may allow motion at the affected part. Pre-formed splints are usually reserved for emergency stabilisation and not permanent repair.

SLINGS

Slings are primarily bandages that are used to prevent weight bearing or support a limb post-surgery or injury.

TYPES OF SLINGS

Velpeau Sling

A bandage wrapped around the thorax and forelimb with the elbow fully flexed and the carpus touching the opposite shoulder. This sling is used primarily to prevent weight-bearing following surgery, luxation of the shoulder or fracture of the scapula.

Ehmer Sling

This is actually a type of bandage and is used to hold luxated hips in position post reduction or to prevent a patient from temporarily using a limb. Not commonly used today.

BANDAGING, CAST AND SPLINT CARE:

- Do not leave splints on for long periods of time
- Owners should check splints daily for position, dampness, discharges and odour.
- Do not allow casts, bandages or splints to get wet. Use a water proof cover i.e. plastic bag or used fluid bag when walking a patient. Always remember to remove the bag when they are not outdoors.
- Excessive chewing at the splint doesn't necessarily mean a "naughty dog", it usually means the splint is rubbing somewhere causing discomfort.
- Tape stirrups should be applied parallel to the long axis of the limb to attach the splint or bandage to the leg. **NEVER** apply tape in a circumferential (around the leg) direction directly to the leg as this may cut off circulation.
- If the splint covers the toes, then cotton wool should be applied between the toes. Use a small amount.
- Do not struggle with the patient when changing or applying splints. Chemical restraint will prevent additional injuries to the patient and the staff!
- Use the correct amount of padding. Too much padding may result in a splint that does not stabilize the injured part and is likely to slip. Too little padding may result in pressure sores if the splint rubs against unprotected skin.
- Owners judge the quality of your hospital or clinic care by the quality (appearance and cleanliness) of splints and bandages. It takes no more time to do it right. A dirty or poorly applied bandage, splint or cast sends a very negative message.

WILDLIFE BANDAGING TECHNIQUES

FIGURE OF EIGHT BANDAGE

These bandages are indicated for wing fractures distal to the elbow, luxations of the elbow or carpal joint and soft tissue wounds of these areas. These bandages are not to be used for humerus fractures unless combined with a wing-body wrap.

Technique:

1. Loosely wrap around the body of the wing with cast padding – wing in natural flexed position.
2. Apply the bandage as high in the axilla as possible to prevent the bandage from slipping below the elbow.
3. Continue in figure-of-eight pattern up around the carpus and then down around the wing again.
4. Cover with conforming bandage in the same pattern.

Wing to Body Bandage

This bandage is used to stabilise fractures or luxations of the humerus, coracoid, furcula or scapula or for any unexplainable droop wing as it minimises movement of the shoulder. Humeral fractures often are best immobilized with both a figure-of-eight and a wing-body bandage.

Technique:

1. Wing should be in a normal flexed position close to the body.
2. Start in the middle of the keel, extend the legs to pull the stifle joints out of the way.
3. Wrap away from the injured wing, around the body, underneath the unaffected wing.
4. Continue around the back – one full turn around the body.
5. Then wrap over the affected wing (from back to front).

Leg Tape/Bandage Technique

This bandage may be used for tibial-tarsus and tarsus-metatarsus fractures in small birds (roughly less than 150gm), however works best with mid-shaft tibial-tarsal fractures. It can also be used for fractures of the digits. **DO NOT use for femoral fractures.**

Technique:

1. Hold the leg slightly flexed so that the bird is able to perch.
2. Place overlapping strips of tape on the inner (medial) and outer (lateral) aspect of the leg.
3. The tape must extend the joint above and below the fracture site.
4. Pinch the tape splint as close to the leg as possible using a haemostat.
5. Trim and round the corners to prevent irritation, leaving a small edge of tape.

Interdigital Bandage Technique

This type of bandage is used when there is a wound present on the bottom of the foot however it still allows the bird to be able to perch.

Technique:

1. Treat wounds and apply sterile dressing if indicated.
2. Start by loosely wrapping conforming bandage around the ankle.
3. Then pass across the bottom of the foot over the metatarsal pad.
4. With each turn, wrap up around the ankle.
5. Loosely place the bandage between toes 2 & 3 and 3 & 4
6. End by wrapping up around the ankle.

NOTES