

Techniques Of External Fracture Fixation



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METHOD OF EXTERNAL FRACTURE FIXATION



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- ❖ *Robert jones bandage*
 - ❖ *Ehmer sling*
 - ❖ *Plaster cast*
 - ❖ *Thomas splints*
 - ❖ *Walking cast*
 - ❖ *Hanging pin cast*
 - ❖ *External skeletal fixation*
 - ❖ *Kirschner- Ehmer (KE) Splints*

ROBERT JONES BANDAGE

- ▶ It is well padded with bulk cotton and compressed with successive layers of elastic gauge and tape
- ▶ Bulk and mild compression of Robert jones bandage provides support and reduce swelling
- ▶ Provides temporary support to fractures and dislocations
- ▶ It extends from toes to mid humerus or mid femur



TECHNIQUE

- ▶ Limb is prepared for application by completing wound care
- ▶ Tape stirrups are essential to prevent slipping of the bandage beyond the toes
- ▶ Stirrups are constructed from adhesive tape of width appropriate to size of animal
- ▶ Strips of tape are applied to either the cranial and caudal or medial and lateral surfaces of extremity
- ▶ Beginning at the toes, cotton padding is wrapped around the limb and continued proximally to level the midshaft femur or humerus
- ▶ The cotton padding is overlapped proximally and distally until sufficient bulk is established



CONT.

- ▶ Nails of two middle toes should remain barely visible at this point
- ▶ Elastic gauze is applied to the cotton padding beginning again with the toe
- ▶ At proximal and distal ends of bandage gauze is tucked to prevent it from falling out
- ▶ The tape stirrups are now inverted and stuck to the outer surface of elastic gauze
- ▶ Elastic tape is used to cover the entire bandage



A

APPLICATION OF STIRRUPS



B

APPLICATION OF BULK COTTON ROLL



C

APPLICATION OF SECOND LAYER OF BANDAGE



D

APPLICATION OF ELASTIC TAPE

EHMER SLING

- Used to prevent weight bearing of the pelvic limb and to maintain a limited degree of internal rotation of the hip and abduction of the limb
- The ehmer sling is also commonly used as adjunctive stabilization for coxofemoral luxation after open reduction and to prevent weight bearing after internal repair of acetabular and femoral fractures.



PLASTER CAST

► Indications :

- External immobilization of the fractures below the elbow and stifle joints.
- Ligamentous injuries.

► Materials required

- Plaster of Paris bandages, cotton, gauze bandages, splints (aluminium strips, wood or bamboo strips)

► Site :

- Fracture site incorporating upper and lower joints in plaster cast.

► Restraint and Anaesthesia :

- In lateral recumbency with the affected limb upward.
- General anaesthesia- dog, cat.
- Deep narcosis/tranquilization-large animals



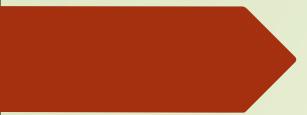
NOTE

- ▶ Joints above and below the fracture are immobilized with plaster cast.
- ▶ No movement should be permitted while the cast is setting.
- ▶ If mild oedema or swelling of limb is expected, a change of plaster cast is necessary after oedema subsides.
- ▶ Placing splints along one or both the plaster surfaces provides strength to the cast without increasing its weight.



AFTER CARE

- ▶ Toes or hooves are inspected several times during the first 24 hrs for any swelling, coldness or constriction.
- ▶ If toe/hoof is swollen or cold, pressure at the end of cast is released or cast is removed and re-applied after swelling subsides.
- ▶ Radiographs are taken at intervals of ***15, 30, 60*** and ***90 days*** to see the extent of callus formation.
- ▶ Plaster is removed after radiological fracture union takes place.
- ▶ Affected area is massaged to promote circulation after removal of POP cast.
- ▶ Animal is kept on light exercise till the limb regain its normal function.



Complications/contraindications

- ▶ Cannot be used in fractures of proximal bones (femur and humerus) as the joint above the fracture site cannot be included in the cast.
- ▶ Cannot be used in long oblique and comminuted fractures, as bone length and alignment cannot be guaranteed.
- ▶ Produces fracture disease.

NEWER CAST MATERIALS USED

- ✓ A variety of plastics and resin-impregnated fiberglass, molded by heat, moisture or chemicals, are used in recent days.
- ✓ They are more stronger, lighter in weight and radiolucent in comparison with Plaster of Paris,
- ✓ however, they are more costlier.



MODIFIED THOMAS SPLINT



► Indications :

- ❖ Immobilization of fractured distal femur, radius/ulna, distal humerus and tibia/fibula.

► Materials required :

- ❖ Aluminium rod or conduit pipe of various sized, cotton, gauze bandages, adhesive tape, splint mold, sedative/tranquilizer.



PREPARATION

- The length of bar will be the distance from the thigh up to the tip of the toe in an extended leg
- Ring diameter is ascertained by placing a scale from the tuber ischi to tuber coxae
- Total length of rod is calculated from the following formula:-

$$2(3D+1)+2L+20$$

D= Diameter of ring

L= length of the splint





POSTOPERATIVE CARE

- ▶ Splint is kept in place for 3 to 6 weeks depending on the type of fracture.
- ▶ All skin wounds created by rubbing of splint, if any, is treated with antibiotic ointment.

Complications/contraindications

- ▶ In long oblique/comminuted fractures where it is difficult to prevent overriding of fragments.
- ▶ Fractures near the joints, unless properly reduced, may lead to malunion and degenerative joint disease.