

Coaptation splints, casts, and traction splints are often used in veterinary patients because they are considered an inexpensive form of fracture repair – aside from the (often) prohibitive cost of casts, surgery, pins, etc. There are many hidden costs, however, associated with applying and properly maintaining casts and splints. Multiple casts or splinting changes are time-consuming and can be costly when added up. Casts and splints should be applied when indicated and not just because they are a "cheap" form of fracture management. There are simply some kinds of fracture (compound/comminuted) that no splint will address. Here are some simple definitions:

FRACTURE - is a break in the continuity of a bone.

#### BASIC KINDS OF FRACTURE

- 1) Open (compound) Fracture – Bone has broken through skin.
- 2) Closed (simple) Fracture – Skin has *not* been penetrated by bone ends.
- 3) Comminuted (shattered) Fracture – Bone is fragmented/shattered.
- 4) Greenstick (partial) Fracture – Bone is only fractured on one side, not broken all the way through.

#### SIGNS AND SYMPTOMS

- 1) Deformity present. The injured limb lies in an unnatural position or is angulated where there is no joint.
- 2) Pain at the point of fracture
- 3) Crepitating ( grating sound )
  - Felt and heard when bones rub together.
  - Never move the injured extremity to determine crepitation
- 4) Discoloration (echymosis, bruising )
- 5) Loss of motion
- 6) Exposed bones
- 7) Swelling (edema)
- 8) Possible loss of pulse below fracture

#### REASONS FOR SPLINTING

- 1) Relieve pain by minimized movement.
- 2) Prevent further damage to injury site by minimized movement.
- 3) Promote healing in natural position (if this can be achieved without surgery).

#### GENERAL PRINCIPLES OF SPLINTING

- 1) Splint fracture where it lies – do not reposition. HOWEVER, if fracture is severely angulated, straighten it with a gentle pull so that limb can be incorporated into a splint.
- 2) Immobilize fracture site before moving casualty. Splint should immobilize **the** joints above AND below **the actual** fracture site.
- 3) Pad splints before applying to avoid chaffing.
- 4) Dress all wounds and/or open fracture BEFORE the application of splint, and before each RE-application.

For those kinds of fracture such as infected fracture, complicated fracture, serious fracture, open fracture with serious soft tissue damage or wound contamination, no form of splint can be used effectively for healing. PERIOD. Surgery, and even amputation, may be necessary for some extreme fractures. Where tissue has been destroyed, traction can not stabilize the fracture segments, and this can easily lead to infection. If splinting is attempted as a healing solution, some serious complication may very easily occur – such as skin necrosis, local infection, bone infection (osteomyelitis), non-union, bone loss, gangrene, etc. These types of serious fractures can only be handled professionally. The purpose of this article is to show splinting devices for CLOSED and SIMPLE fractures, or for immobilizing limbs prior to taking your animal to the vet in the case of serious fracture. As with anything, PREPARATION is the key, and you should have much of the materials in your Medical Supply Box (see above).

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Commonly used coaptation splint and casting materials include full cylindrical casts made of synthetic or plaster of Paris, Mason metasplints (special spoons), and ventral or lateral coaptation splints which incorporate rigid support. The Schroeder-Thomas splint can be used as a coaptation splint or more often it is used as a traction splint. *When using splints and casts the cardinal rule is "the joint proximal (closest to the body) and distal (farthest from the body) to the injury must be immobilized."*

The advantage of coaptation is that splints and casts are generally applied following closed reduction and thus the additional trauma of surgery is avoided and fracture healing is not disrupted. Coaptation is often used for fractures distal to the elbow and stifle, fractures that are relatively stable and do not involve artery structures, and for fractures in young animals because their fractures heal rapidly.

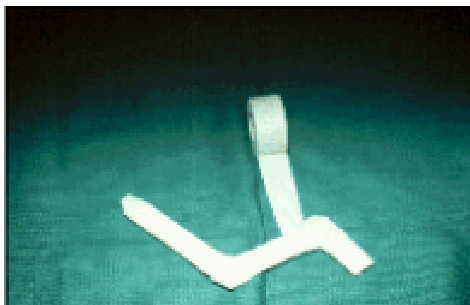
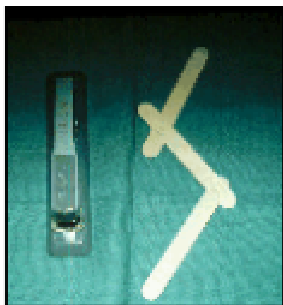
The disadvantages of splints and casts are that even when properly applied, a substantial amount of motion at the fracture site may persist, splints limit limb function, they require constant monitoring and/or changing, animals tend to destroy them, and if joints are immobilized for prolonged periods of time, fracture disease may occur. *In general, the use of external coaptation following internal fixation (surgery) is to be avoided.* Generally if a surgical repair is mechanically inadequate, additional coaptation will not improve stability. Coaptation will only add additional weight to the distal segment and will promote the development of fracture disease.

#### APPLICATION OF CASTS AND COAPTATION SPLINTS

Casts and coaptation splints are supports that are applied in close proximity and conform to the shape of the limb to which they are applied. Again, tongue depressors, metal shoe splints (Mason metasplints), Yucca board, thermoplastic, synthetic casting materials, plaster of Paris, aluminum splint rodding, and plywood are all suitable materials that can be used for coaptation. The choice of a splint material depends on: 1) the type of fracture, 2) the size of the animal, and 3) personal preference. In all types of casts and coaptation splints, a method of fixation of the splint to the limb is necessary. Usually a long piece of tape should be applied either to the cranial and caudal or the medial and lateral aspect of the paw. The two strips are joined beyond the paw so they pull equally on the paw when tension is applied. These two tape "stirrups" are later bound to the splint to prevent the splint from slipping off of the extremity.

#### APPLICATION OF CAST PAD FINAL LAYER OF POROUS TAPE APPLIED

The limb should be padded from the digits to proximal (closest to body) to the distal (farthest from body) end of the splint with absorbent cotton or cast padding material. Long leg full cylindrical plaster or synthetic casts are best suited to fractures below the elbow and stifle. However, that application of full cylindrical casts often produce cast sores and thus are used infrequently in small animals. These types of casts are used in large animals. Plaster casting materials are relatively inexpensive in comparison to synthetic materials; however, plaster casts do not hold up to the daily abuse inflicted by animals. The general principle of immobilizing the joints above and below the fracture must be followed; therefore, fractures of the femur and humerus cannot be treated with full cylinder casts. "Half-casts" can be used to form spica splints.



**Lateral coaptation splint fashioned by stapling tongue depressors together which are covered by tape**

The cast can be taken completely over dorsal midline incorporating the animal's thorax or pelvis (so called spica cast or splint) immobilizing the shoulder or hip. Although unpadded casts were advocated in the past, a light evenly padded cast is preferable in small animals. After applying tape stirrups,