

AVIAN FRACTURE IMMOBILIZATION

This is a guideline for immobilizing fractures. The key word here is *guideline*; there are significant differences in size, temperament, etc. from one species to another. You will need to use your experience and creativity to apply what you learn to varying situations.

Stabilization: When a bird comes in and you suspect a fracture, the first thing to do (in any case, fracture or not) is assess the bird's overall condition and stabilize it with fluids, pain meds, heat, etc. as indicated before carrying out any further treatment. For severe or open fractures that appear to be treatable, it is advisable to do a quick body wrap to at least keep the affected limb from incurring further damage during stabilization.

If the bird is not in critical condition and does not require an emergency wrap, try to observe it in the box/cage. Look for the symmetry of the wing carriage; the position of the bird often tells what the problem could be before you've even done the physical-exam (see wing position diagram). Look for the use or non-use of each leg; also watch the wing carriage--a bird will often hold out a wing on the same side as a leg injury to help balance.

While the bird is stabilizing or resting in the box, assemble all materials you may need: tape, scissors, Micropore[®] tape, splint materials, Nolvasan[®] or Betadine solution[®] for cleaning wounds, Telfa[®], antibiotics, analgesics, etc. Also try to prepare the bird's cage so it can go directly into it after being treated.

Examination: Examine the bird gently but thoroughly, carefully palpating each limb. Start at the shoulder and work your way out to the carpus, then do the same from the hip to the toes. Hold the ends of each bone firmly and gently push along the length of the bone. If the bone "gives" at any point, it may be fractured. This method is particularly helpful in assessing greenstick fractures in young birds. Record which bones are fractured and where on the bone the fracture is.

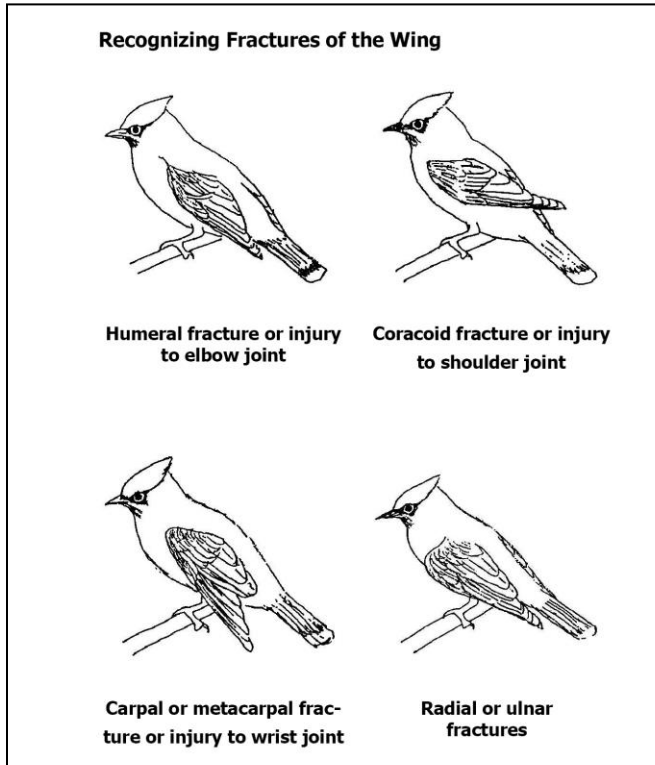
Once you have located one fracture, don't stop--there could be more, especially if the bird has been hit by a car or captured by a cat or dog.

After a thorough exam has been done, consider the prognosis of the bird, keeping in mind the species, natural history, and overall body condition.

WING FRACTURE IMMOBILIZATION

Treatment: In general, one person can wrap a smaller bird's wing, but it is usually easier on any bird (less handling time) if two people work together to immobilize the fracture. The wing should be positioned as normally as possible--don't over flex the joints. The wrap and/or splints should immobilize the fracture but not the circulation. Movement of the fracture slows healing and increases the size of the callus and the risk of a non-union.

For open fractures, the wound should be thoroughly flushed with dilute antiseptic solution (use a sterile syringe and needle), being careful to avoid soaking the bird. Once the wound has been thoroughly cleaned, dry the area as much as possible and apply a Telfa[®] pad. Topical ointments such as TAO and Nolvasan[®] cream usually should not be applied, as they can actually impede healing in some circumstances. If the bone end is sticking out and you can't pull the bone ends into alignment, apply a sterile gel (e.g., Surgilube[®]) over the wound and cover it with Telfa[®] and Tegaderm[®] to keep the bone ends from drying out and becoming necrotic. This type of fracture will require immediate surgical attention as soon as the bird is stable. Any bird suffering from an open fracture should be started on antibiotics immediately [Clavamox[®] (.1cc/30g body wt PO BID) or Clindamycin (10mg/100g body wt) are good choices] and an anti-inflammatory/analgesic like meloxicam (.5-1mg/kg BID).



RECOGNIZING FRACTURES OF THE WING
Diagram courtesy of Leah Schimmel
& NWRA Quick Reference

Wings are always wrapped in a flexed, natural position. The immobilization technique is based on the type of fracture:

Humerus - These are difficult to align properly with external wraps. Surgical pinning is usually more effective but may not be possible if the break is near a joint. Wrap the wing to the body. Remember that the body wrap goes under the good wing and above the legs. It should fit snugly so that the bird's feet do not get caught in it, but make sure it is not so tight that the bird has trouble breathing.

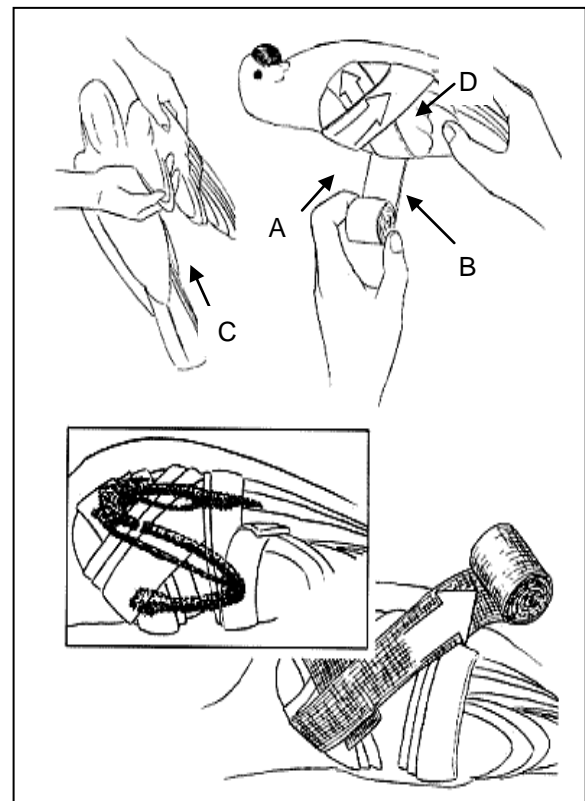
Radius/Ulna - The best scenario is when just one bone is broken, which allows the other to help keep the broken bone in alignment. Whether it's one or both, the wing is wrapped in a figure-of-eight bandage. If only one bone is broken this wrap is usually all that is needed. A splint may also be indicated for a multiply-fractured bone. If the bird is excessively active, the wing may need to be wrapped to the body as well, but this is usually not necessary.

Stabilization of fractures distal to the elbow

Using roll gauze or Micropore™ tape, start with the wrap end behind the carpus (wrist) (A), and apply the wrap down in the direction of the feathers. Come up behind the elbow (B), making sure to incorporate the axillary feathers (C) in the wrap. Continue the wrap towards the carpus (D), and come up behind the wrist to complete the 'Figure of 8'. Repeat this pattern. If the wing is large/long, complete the wrap by circling the wing at the point of the elbow (E), making certain that the elbow is included in the wrap. If gauze was used for the first layer, this should be covered by a layer of Vetrap™, repeating the pattern.

The position of the two wings should look the same, with both wings at the same height and the wrapped wing not extending away from the body. Both wing tips should lie at the same level above the tail. When doing the body wrap (not shown), it is important not to wrap tightly, as this will impair the bird's ability to breathe!

Wing wrap illustrations are from: Ritchie, B.W., G.J. Harrison, & L.R. Harrison, eds. 1994. *Avian Medicine: Principles and Application*. Wingers Publishing, Inc.: Lake Worth, FL.



** For figure-of-8 wraps make sure the wrap goes over the elbow securely and does not slide off the back of the elbow!!!** The axillars (feathers over the scapula) must be included in the figure-of-8 wrap to ensure a snug fit up in the "wingpit".

Metacarpus/carpus - Again, a figure-of-8 wrap is usually sufficient for most birds, though a splint may be helpful; use THIN strips of Micropore® tape for small passerines. Keep in mind that open carpal fractures carry a very poor prognosis. Most carpal/metacarpal fractures cannot be surgically pinned due to their size and a limited blood supply. Healing is also slow in this area for that same reason.

Coracoid/Clavicle/Scapula - When more than one of these bones is fractured, the prognosis is often poor; however release is still possible, especially for non-migratory passerines. The wing is wrapped in a body wrap and activity is restricted. Cage rest for 10 - 14 days is the key, and may be sufficient without a wrap as long as the wing isn't drooping. If any of these bones is luxated/dislocated, the prognosis is grave and euthanasia is recommended.

LEG FRACTURE IMMOBILIZATION

Treatment: The injured leg should be positioned as normally as possible-don't over flex the joints. The wrap and/or splints should immobilize the fracture but not the circulation. Movement of the fracture slows healing and increases the size of the callus and the risk of a non-union. When possible, immobilize the joints on both ends of the bone that is fractured.

For open fractures, the wound should be thoroughly flushed with dilute antiseptic solution (use a sterile syringe and needle), being careful to avoid soaking the bird. Once the wound has been thoroughly cleaned, dry the area as much as possible and apply a Telfa® pad. Topical ointments such as TAO and Nolvasan® cream usually should not be applied, as they can actually impede healing in some circumstances. If the bone end is sticking out and you can't pull the bone ends into alignment, apply a sterile gel (e.g., Surgilube®) over the wound and cover it with Telfa® and Tegaderm® to keep the bone ends from drying out and becoming necrotic. This type of fracture will require immediate surgical attention as soon as the bird is stable. Any bird suffering from an open fracture should be started on antibiotics immediately [Clavamox® (50-100mg/kg body wt PO BID) or Clindamycin (100mg/1kg body wt PO SID) are good choices] and an anti-inflammatory/analgesic like meloxicam (.5-1mg/kg BID).

The position of immobilization depends on the species; most birds respond best if the leg is wrapped in a normal, partially flexed position; however, this may not always be practical.

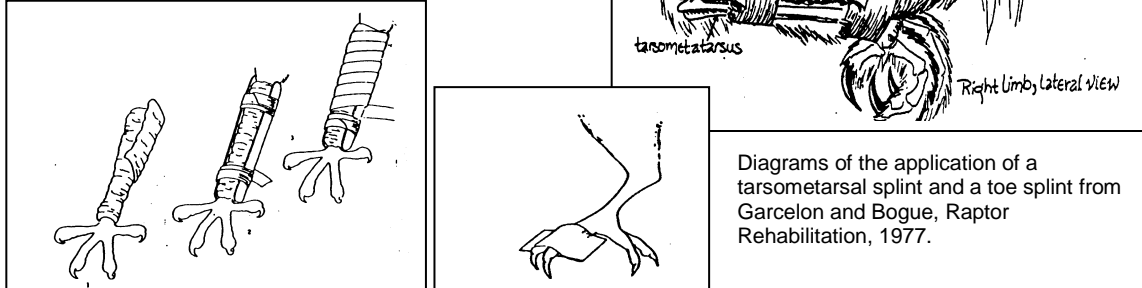
Immobilizing Leg Fractures

Femur - The femur is difficult to immobilize effectively. In general, the leg is flexed and then taped to the body, being careful to not over flex the leg. A splint may be needed around the hock to keep the wrap from constricting the leg. Surgical pinning is advised as soon as the bird is stable.

Tibiotarsus -A tape wrap with or without a Z splint or tibiotarsal splint can be used on songbirds; in general, the leg is flexed and then taped to the body being careful to not over flex the leg. These fractures are easy to pin surgically, but generally hold a good prognosis for recovery with or without surgery.

Tarsometatarsus - Try to immobilize in a normal position whenever possible. Padded splints, L splints, and straw splints work well on these fractures. Be careful that you don't rotate the bone when immobilizing these fractures. The hock must be immobilized in the splint/wrap or the fracture will not heal well.

Place leg in flexion, trying to align fracture fragments. Using Micropore® tape or Vetwrap™, secure the tibiotarsus to the tarsometatarsus so that the intact bone acts as a splint for the fractured bone. If the injury involves the proximal tibiotarsus or the very distal femur, the limb is also taped to the body.



Diagrams of the application of a tarsometatarsal splint and a toe splint from Garcelon and Bogue, Raptor Rehabilitation, 1977.

Digits - A broken toe on a small bird can be taped to an adjoining healthy toe. Sandals secured with paper tape are very suitable for toe fractures or digits that remain flexed. Thermoplastic splints also work very well for toe and foot fractures.

General Considerations: After the fracture has been wrapped, place the bird in the cage and observe it. Is the wing carriage normal? Can the bird move around, feed itself, etc.? Does it fall into its water dish and get soaking wet? A bird with a leg or foot wrap should not have a bathing pan or large food dishes as bandages on wet feet can chafe and/or loosen.

If the bird appears relatively comfortable, the next thing to do is recheck it within 12 hours to see if there is any swelling or coldness in the extremities indicating that the wrap is too tight. For growing nestling birds, wraps should be checked very carefully at least TWICE DAILY for constriction. If a wrap appears too tight, loose, wet or soiled, change it!

Be sure to check the good foot/feet for signs of wear, pink areas, sores, etc. resulting from increased weight-bearing on that foot.

If the limb has been immobilized for more than 7 days, physical therapy may be needed to stretch out muscles and tendons. PT should be done gently any time a bandage is changed.

Fractures should be checked and re-evaluated after a certain amount of time (depends on species, type of fracture, age of the bird). *In general:*

Juvenile birds: 3-5 days; remove 5-10 days Adult birds: 7-10 days; remove 14-21 days

Healing of the bone takes place in four stages: the initial hemorrhage and clot formation, formation of a fibrous soft callus, mineralization of the callus, and finally remodeling of the bone with use. Although the times above show when the wrap **may** be able to come off, complete mineralization of the bone and a return to full strength can take weeks.

NO fracture should go more than 10 days without re-evaluation and perhaps a radiograph.

Growing birds or birds suspected of having metabolic bone disease (MBD; usually seen as soft bones and poor feathers) may benefit from calcium supplementation. Calcium Glubionate (Calcionate Syrup, Rugby Laboratories, Duluth, GA) can be used at .1ml/50g body weight, PO BID x 5-7 days.