



Radial Fx-Toy Breeds

Author: Sara Ayres DVM, DVSc

In dogs weighing less than 3 kg, fractures of the distal third of the radius and ulna are relatively common. In most cases it occurs after jumping or falling from a height (often out of the owners arms). Historically, a complication rate of up to 80-85% has been documented with delayed union, malunion and nonunion being more common than in larger breeds. These fractures pose a challenge due to the small size of the radius. There is little bone overlap at the fracture site and the distal fragment typically involves only 15-37% of the radial length which limits implant selection. Healing is also compromised by the decreased intraosseus blood supply and minimal extraosseus blood supply (due to the small amount of soft tissue covering) seen in toy and small breed dogs.

Radial Fx Toy Breeds (continued)

Affected breeds include Chihuahuas, Miniature Pinschers, Pomeranians, Yorkshire terriers, toy poodles and Italian Greyhounds. Patients are usually 1-2 years of age. There is concern that there is an inherent weakness in the radius and ulna of these breeds, as some patients will be bilaterally affected. The fractures are typically transverse or short oblique.

External coaptation, intramedullary pins, external fixators and bone plates have been used to repair fractures of the radius and ulna. External coaptation is not recommended for toy breed dogs. In one study, 83% of toy patients treated with a cast had a serious complication including malalignment or non-union. Intramedullary pinning is not recommended for radial fractures as there isn't a good entry point for the pin, the pin cannot counteract rotational forces and the size of the pin is limited by the medullary canal and, therefore, is not strong enough. This is particularly problematic in toy breed dogs as they have little medullary canal. In one study, IM pinning had an 80% complication rate.

Open or closed reduction with internal or external fixation is recommended. Circular external fixators and fixators with PMMA connecting bars have been used successfully. The distal fragment can typically accept 2 pins or wires. External fixators have the advantage of staged removal which allows dynamization of the bone during healing. In addition, the implants do not interfere with the extensor tendons reducing the risk of reduced carpal flexion following surgery. Overall, the outcome is good, however, external fixators are more inconvenient for owners and there is the need for a relatively long period of exercise restriction (19 weeks in one study). Complications include pin loosening causing lameness and possible instability, pin tract infections, malalignment and, rarely, delayed or non-unions.

Open reduction and internal fixation with a mini-plate system is the most common repair. Internal fixation has the benefit of allowing more accurate fracture alignment. The advent of mini plate systems has allowed treatment of very small patients improving surgical outcome. 1.5 and 2.0 DCP are most commonly used. 2.0 DCP are available in 1 and 1.5 mm thicknesses. There are also 1.5/2.0 and 2.0/2.7 veterinary cuttable plates. For very distal fractures, a veterinary mini-T plate can be used allowing for 2 to 3 screws in the distal fragment. The plate is typically placed on the dorsal aspect of the bone, however, in some cases a medial approach may allow for better bone purchase. Due to the small contact surface, perfect alignment is important. Careful plate application is also very important as there is little room for error. Following surgery, exercise is limited to on-leash activity and jumping is not permitted until the bone has healed (typically 8-12 weeks). The advantage of internal fixation with a plate includes early weight-bearing. In one study, early weight-bearing was documented to speed-up revascularization of the fracture site.

Internal fixation has also been used successfully in patients with nonunions. Fibrous tissue is resected from the fracture site, the medullary canal is opened and a cancellous bone graft is placed. Stable fixation is paramount to success. For malunions, a wedge or oblique osteotomy and plate fixation or external fixator are used.

About the Author

Sara Ayres obtained her DVM from the Ontario Veterinary College in 1992 and completed an internship and residency in small animal surgery in 1998. She was board certified by the American College of Veterinary Surgeons in 2000. Following completion of a one year fellowship in surgical oncology at the University of Illinois in 2001, Dr. Ayres moved to central Ontario and started a mobile surgical referral practice. Dr. Ayres has been providing referral surgical services at Mapleview Animal Clinic in Barrie since the fall of 2012.



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Complications with plate fixation include osteopenia, skin erosions over the plate, thermal conduction, reduced carpal flexion and synostosis between the radius and ulna. Osteopenia and resorption of the ulna can occur due to the strength of the plate relative to the bone, causing stress protection. This has become less common with the smaller and thinner plates now available for our veterinary patients. Nonetheless, osteopenia should be monitored with radiographs following surgery. It is typically transient, however, if there are any concerns, destabilization of the repair may be needed. Removal of all implants are rarely performed due to the risk of fracture through a screw hole. Instead, the repair can be dynamized by removing all screws but the most proximal and distal screws. Cancellous bone graft is placed in the screw holes and exercise is restricted for 4 weeks while the screw holes fill in.

Studies have shown good to excellent results when the mini dynamic compression plates are used in toy and small breed dogs and the risk of non-union or delayed union is no different than with larger patients.

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scil animal care company is a global leader in Veterinary Diagnostics with 8 offices world-wide and distribution presence in 24 countries. Being part of this larger global network allows us to offer the most advanced products and remain a company focused on customer success through support and training.

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"There are many reasons. It provides quick accurate results in a timely manner. This in turn gives us confidence to proceed with anesthesia or diagnose an animals illness. In the end it allows us to provide great care to our patience and make there "people" happy."-*Fundy veterinarians*

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"because we receive rapid accurate results which is especially helpful for critical cases. We love how easy and reliable it is. Its ease-of-use is extremely helpful in training new team members. We also love that the results are easily integrated into our Avimark medical history files for future reference and medical history archiving"-*Petroglyph Animal Hospital*

"It gives us results rapidly, while the client is waiting, and allows us to formulate a treatment plan on the spot. Those results are also consistently accurate when compared to controls run at outside labs."-*Selkirk Vet Hospital*

