

# Fracture of the Distal Tibial Physis

## What is a physis?

Physes or growth plates are thin bands of cartilage located near the ends of long bones in growing animals. Longitudinal bone growth i.e. lengthening occurs from the physes. The zones of cartilage cells in physes and ossification centres are weaker than the surrounding bone so in young animals it is more common for the physes to separate (fracture) than for the surrounding bone to fracture.

Physeal fracture may sometimes cause significant damage to the delicate cells of the physis responsible for bone growth such that the injured physis is no longer capable of growth, and the physis shuts down (physeal closure).

## Surgical repair

Fractures of the distal tibial growth plate (physis) are typically repaired with very small pins (Kirschner-wires). The implants are often removed after several weeks, particularly in very young puppies and kittens.

## Outcome and potential risks of surgery

Even though damage to the growth plate may cause it to cease growing, most dogs recover well after fracture repair. A shortened tibia may develop, but often compensatory growth can occur from the top of the tibia and even the femur, such that overall limb length is not unduly reduced. There is also a risk of angular deformity (bent leg) if only one side of the physis continues to grow. Fortunately, the majority of dogs are able to return to normal levels of activity without consequence.

Overall success rates with physeal fracture repairs are typically very good, however as with any surgery complications may arise and are detailed below:

- The bone is quite fragile in young animals and may occasionally suffer additional fractures during an attempted repair.
- Infection is relatively uncommon if the fracture site was uncontaminated before surgery, as strict sterile technique is used during the surgery and antibiotics are administered in the peri-operative period. Statistically, approximately 1 in 50 animals undergoing orthopaedic surgery are likely to develop a post-surgical infection (this will be higher for risk factors such as soft tissue injuries, contaminated wounds or pre-existing disease in the patient). Contamination of the wound in the early postoperative period may increase this risk e.g. your dog licking the wound in the first few days after surgery may significantly increase the risk of infection. Should infection occur, early detection and treatment generally result in rapid resolution, although very occasionally removal of the implants may be required once the bone has healed. More serious problems may occur if infection progresses untreated or if your dog suffers infection with multiple resistance bacteria e.g. MRSA. If you suspect an infection contact your VET immediately.
- Excessive activity will reduce the likelihood of bone healing and will increase the risk of implant failure or loosening; very young animals have much softer bone than adults thus implant loosening occurs more readily.
- The growth plate is likely to have suffered significant damage at the time of fracture; this may result in complete arrest of physeal activity i.e. the growth plate “shuts down” and the bone stops growing. There is also a risk of angular deformity (bent leg) if only one side of the physis continues to grow. In cases of complete physeal shutdown the phenomenon of “compensatory growth” often occurs, in which growth occurs elsewhere in the limb to make up for lost growth from the inactive physis. e.g. the other end of the tibia can provide some extra growth, as can the femur. Very occasionally the early closure of the affected growth plate may result in more significant shortening of the limb as a whole and/or deformity of the distal tibia. Consequences may include lameness and the potential for development of osteoarthritis due to abnormal joint loading.
- Sometimes additional fractures occur to the bone on either side of the physis (metaphysis or epiphysis), or rarely to the malleoli, where the collateral ligaments attach. Additional fractures increase the complexity of the repair/s and may negatively reduce the prognosis i.e. dogs with additional fractures are more likely to have complications and the longer-term outlook may be compromised.

- Even after the physis has healed it is still important to have a controlled, gradual increase in activity, similar to human patients undergoing rehabilitation following surgery. If activity is increased too quickly after surgery straining of joint structures may occur. Rest and anti-inflammatory medications typically resolve these problems.

## Postoperative care

Your dog should be kept confined to a large cage. Confinement should be maintained at all times until your Vet specifically advises otherwise. Short **leash** walks in the garden (a few minutes four to six times daily) are recommended to allow toileting. Keep your dog at your side; use a lead of no more than 1-metre length.

A soft or splinted bandage will often be applied to the operated limb to protect the repair. It is important the dressings are well cared for to minimise the risk of complications. Dressings must be kept clean and dry and checked regularly.

If there is no bandage present **ice packs** for 10 to 15 minutes several times daily are recommended in the first few days following surgery to reduce swelling and improve comfort. Regular, gentle massage (sweeping motions upwards e.g. from ankle to hip) may help dissipate oedema fluid.

X-rays should be performed approximately three to four weeks following surgery to assess implant position and healing.

Early implant removal may be recommended to increase the likelihood of continued physal function. Implant removal may be also advised if causing irritation to soft tissues.

## Declaration:

I have read the information contained herein and am satisfied I have a sufficient understanding of distal tibial physal injury and repair, including potential complications that may occur and requirements for aftercare following surgery. I hereby consent for my dog to undergo fracture repair.

Owner's name:

Dog's Name:

Owner's signature:

Date: