

UPDATES IN FRACTURE MANAGEMENT

The Dallas Veterinary Surgery Center (DVSC) utilizes many resources to help pets recover from their fractures, and the type of fixation is determined by multiple factors including the patient's age, type of injury, and expected activity level. The goal of fracture fixation is to immobilize the fracture segments to create a healing environment and to return the limb to function as quickly as possible. Recent developments in fracture fixation including "biologic fixation" and "locking plate" technology will be discussed on this page.

Over the past decade, increasing emphasis has been placed on the concept of biologic fixation. This theme encourages increased emphasis on the protection of the blood supply to the fracture fragments with less importance placed on the anatomic reduction of the fragments of complex fractures. The identification of growth factors and their presence in the fracture hematoma have accelerated the advancement of this concept.

This practice has the potential of decreasing potential complications through infections and delayed healing by decreasing surgery time and patient morbidity. Developments that have fostered this practice include the "plate-rod" technique and more recently, developments in locking plate technology. Two examples of this technology incorporated by the DVSC include the SOP, or "String of Pearls" system, and the New Generation Devices (NGD) plate system.

Locking technology involves not only securing the plate to the fracture fragment, but also locking the screw to the plate. This greatly increases the stability of the construct and helps decrease the potential for implant loosening and fragment translocation. In essence, the locking plates act like an "external fixator" buried next to the bone.

The NGD plate system incorporates the use of standard or locking screws in the holes of the plates. The locking screws have special threads which secure the screw to the plate and then lock the plate to the bone. This system has specially designed holes in the plate which allow the plate to be used in dynamic compression mode and locking plate mode in the same setting. These plates help provide additional security to the tibial plateau leveling osteotomy (TPLO) stabilization.

Another advantage of locking plate systems is the ability to allow increased potential for minimally invasive fracture fixation. This idea conforms to biologic fixation principles by minimizing disruption of the blood supply to the fracture fragments and disruption of the initial healing factors found in the fracture hematoma. This idea has



Locking TPLO Plate

already been incorporated at DVSC with the use of fluoroscopy to assist in closed reduction of fractures and implant placement for external skeletal fixation and trans-condylar screws. The minimally-invasive techniques also provide less discomfort for the patient.

The "String of Pearls", SOP system provides much more versatility since it can be contoured in 6 different degrees of freedom allowing it to be used in unconventional positions. The 3.5mm SOP plate has similar strength to a 3.5mm dynamic compression plate and SOP plates can be "stacked" side-by-side to provide tremendous additional strength. Since the screws are all locked, the plate can only fail by breaking, shearing screws, or pulling the screws out of the bone, not by cycling loose.



"String of Pearls" plates

The limited contact design bodes well for biologic fixation as it provides the least interference of

blood supply to the fracture due to plate-bone contact. The biomechanics of SOP plates are not suitable for every fracture because they can only provide buttress support to the fracture site, and specific principles must be obeyed to achieve fracture healing. The plate has a slightly higher profile compared to other plates and may be palpable under the skin by the owner, but the system does provide a significant advantage in dealing with many complicated fractures.

The locking plate technology and biologic fixation techniques are welcome additions to the armament for the treatment of complex fractures. Hopefully this explanation clarifies some of the differences you may have noticed in radiographs recently. As always, contact the DVSC if you have any questions regarding the treatment of your patients as we continue to welcome the opportunity to be an extension of your practice by providing surgical support until the problem is resolved.

