



HUMERUS FRACTURE (proximal growth plate, articular)

Your pet has had a fracture of the proximal humerus through the growth plate fracture of the articular surface repaired with stainless steel implants called K wires or pins. These implants are surgically attached into the bone, bridging the fracture to provide stability until the bone heals to its original strength. The majority of patients will have their implants for their entire life & do NOT have long term activity restrictions. It is possible for younger animals to need their implants removed once the fractures have healed; this is a minor surgical procedure requiring brief general anesthesia.

GENERAL INFORMATION

Please keep a note of your questions as you & your pet progress thru recovery & address them to your primary care veterinary team. Our surgery group will contact your primary care team on DAY 2 (after their phone follow-up with you) & DAY 14 (after your recheck visit with them) to check in on your pet's progress & see if you have had any concerns or questions. This method maintain continuity in care & an accurate patient medical record.

POST-OP Day 1 - 5

MONITORING

Please keep your pet in a comfortable, safe, indoor location without free access to stairs for the next 24 hours as he/she recovers from anesthesia & surgery.

Your pet may be groggy for the next few days. He or she may whine or appear more anxious than usual; this may indicate pain/discomfort or side-effects of the medications.

Please call your primary care veterinary team for assistance with medication adjustments or return for exam & additional pain medications as needed.

Monitor appetite & attitude. If both do NOT steadily improve over the next 2-3 days, please call your primary care veterinary team or return for progress evaluation & problem-solving.

You can expect your pet to have a bowel movement within 5 days. Some animals take longer than others depending on when they last ate prior to surgery & when they started eating after surgery. It may be abnormal in color & consistency for 2-3 days. If you have any concerns, please speak with your primary care veterinary team.

Please confirm that your pet has urinated within 24 hours of returning home. If he or she does NOT or you notice any problems related to urination, please speak with your primary care veterinary team.

Closely supervise your pet's movements over the first 3-4 days when he or she will be groggy from anesthetics & pain medications. Limit activities to necessary events only on/off leash or to go out to the bathroom; access to food & water.

MEDICATIONS

It is likely that you have been prescribed one or more medications (given by mouth) for your pet over the first 2-3 weeks of recovery. During the discharge appointment or shortly thereafter, please make sure you understand:

1. What each medication is being used to treat.
2. What side effects may develop.
3. Whether or NOT the medication should be refilled & continued.

BANDAGE CARE (If Present)

A clear, plastic adhesive bandaid may have been applied to the incision (Primapore). This will protect the incision from infection from the environment. It is useful for up to 5-7 days. You may remove it like a bandaid at any time if the adhesive bandaid is easily removed. If it is hard to peel off, waiting longer may make for easier removal. There is no urgency in taking it off.

A padded bandage may have been applied to the operated site. The goal of the bandage is to provide pressure to the surgical site to minimize swelling & improve patient comfort for 12-24 hours. If this bandage starts at the foot, please place a plastic baggy over the foot whenever you take your pet outside to prevent soiling of the bandage; remove when indoors. You may remove the bandage or return to your primary care clinic for removal the morning following surgery. If the bandage slips below the incision or becomes soiled or wet before this time, please remove it by simply cutting away one layer at a time (use caution, avoid skin); no need to replace unless otherwise directed.

POST OP: WEEK 1 - 2 (Monitoring)

Please look at the incision twice daily. It should be dry, slightly red along the margins, slightly swollen/thick on the edges with a light crust down the center. Over several days, it should lose redness & swelling.

Problems to call your veterinarian about:

1. Gapping (the edges should be exactly touching).
2. Ongoing or new discharge (other than small amount of crusting).
3. Swelling (other than slightly raised skin near edges).
4. Some bruising is normal & will resolved in 5-7 days.

The Occasional patient will have more extensive bruising &/or swelling on day 2-3. If this develops, please let your primary care veterinarian know; a visit or sending photos will help them characterize the issue & decide on a course of action. The vast majority of the time, this is a transient issue that will follow a typical 5-7 day course resolving.

Do NOT allow your pet to lick or chew the incision. Pets tend to want to lick early in the healing period & scratch later in the healing period; this can compromise the incision & predispose to infection. If necessary, please prevent access to the incision by using creative clothing options (examples: backward long-sleeves T-shirt worn as pants), an E-collar, lick sleeve &/or other devices, if you must leave your pet unattended.

Closely supervise your pet's movements over the first 3-4 days when he or she will be groggy from anesthetics & pain mediations. Limit activities to necessary events only (on & off leash & to the bathroom; access to food & water.

PROGRESS EXAMS

Please return to your primary care clinic - hospital in 10-14 days for a progress exam. Skin healing will be evaluated, sutures (if present) will be removed, use of the limb will be assessed & any questions you have will be addressed.

Your pet should start touching his or her toe down within the first 2 weeks. Thereafter, leg use should steadily improve to 90% normal at 6-8 weeks. If you notice a sudden deterioration in leg use at any time after surgery, please see your veterinarian for exam.

POST-OP: Month 1 -2 (Progress Exam)

Please return for postoperative x-rays in 4-6 weeks to evaluate healing, implant stability & leg function. It may be beneficial to have some oral tranquilizer/sedatives to use before your visit, since quality x-rays require careful patient positioning & cooperation. Please discuss with your primary care veterinary team at least a week before your scheduled x-ray visit. Additional x-rays may be needed in 4-6 weeks depending on the initial healing.

DIETS

The MOST beneficial & LEAST expensive treatment for arthritis (& general health) over the lifetime of your pet is maintaining your pet on the lean/thin side of normal his or her whole life. Any orthopedic condition can progress with arthritis over time due to excessive wear & tear; carrying less body weight will relieve some of this stress from the joints. Good parameters to monitor body condition are:

1. You should be able to feel the ribs & pelvic bones, but not see them.
2. Your pet should have an "hour glass" figure when viewed from above looking down.
3. Your pet should have a tucked-up belly when viewed from the side.

Glucosamine/Chondroitin supplements ("chondroprotectants") may have some beneficial effects in these patients, but this has NOT been clearly established. High-dose (medicinal dose fish oil may improve comfort in arthritic joints longterm. You & your veterinarian should discuss whether or not these products would be helpful for your pet.



Figure 3. Mediolateral radiographs of the humerus of a 12-month-old cavalier King Charles spaniel with a Salter-Harris type one fracture of the proximal humeral physis (left). This has been stabilised with parallel K-wires through the greater tubercle into the humeral diaphysis (right).

Home Preparation For Your Pet's Home Recovery

Prior to your pet coming home, you should determine where you are going to confine your dog during this post-operative period. Making your dog as comfortable as possible is as important as having a good rehabilitation/recovery plan. As your dog's mobility is to be restricted, we recommend that you utilize the following:

1. A dog crate that is large enough that he or she can stand up & turn around (for only pets that are NOT self-destructive or anxious being kennel for long period of time).
2. A gated off area such as the kitchen (for rooms w/o furniture for patient to jump on).
3. Confinement to a room (for rooms without furniture for patient to jump on).

Surfaces such as hardwood floors, tile, linoleum, etc can be very slippery. We suggest that you place some throw rugs with rubber backing or yoga mats on these surfaces to make it easier for your dog to walk around.

RESTRICTIONS

Avoid any rigorous activity for 8 weeks; no running, jumping, playing or anything that feels like "exercise." For dogs, short, leashed walks around the yard to urinate/defecate are fine. Walking around one level of the house is fine. Prevent pets from jumping up & down from furniture, etc. A bad landing or an awkward take-off can result in serious further injury.

Minimal supervised/assisted access to stairs is advised during restricted period. Use baby gates to prevent free access to stairs during this restricted period. When navigating stairs & up & down, have a neck leash &/or chest harness & a leash/safety-strap called a "sling" under the belly to prevent slips, stumbles or falls.

Please use a short (~6ft), hand-held leash when outside to urinate/defecate. Confine your pet to a small area/room/crate when unattended. Please do NOT allow your pet to run, jump or play during this restriction period.

The HELP'EM UP HARNESS (see company website) is a very useful tool that your dog can wear during the restricted period that allows you to have a quick "handle" to grasp by the shoulders & by the rump to assist your pet to rise, climb/descend stairs, save from a slippery floor, etc.

No jumping at all! No jumping on/off the bed/couch/furniture/windows! No jumping on you! Over extended/flex of the knee could compromise the repair of your dog's leg & delay the healing time.

No active play! Refrain from active play with your dog & do not allow him/her to play with other dogs until your veterinarian tells you otherwise (likely after the 6 week post-operative x-rays to confirm bone healing).

Meds: If your pet's personality-type challenges these restrictions, discuss options for medicinal-assistance for your pet to make restrictions easier to manage (i.e. acepromazine, gabapentin, trazadone, tramadol & others).

PHYSICAL THERAPY REGIMEN

Our lives are often very busy, so if you must error on the "do less" side of these instructions. Less physical therapy will result in a slower return to function, but more aggressive physical therapy by a non-professional too early may result in failure of the implants & surgical repair. Cats & some dogs often resist physical therapy; avoid any activity that results in major uncooperative behavior. Please let us or your veterinarian know if you are interested in a professional physical therapy referral in the Sacramento region ie UC Davis School of Veterinary Medicine, VCA Sac Referral &/or Sierra Veterinary Physical Rehab.

Week 1: Apply ice packs (wrapped in thin cloth) to the incision area twice daily for 10-15 minutes. Baggies of frozen peas work well for this or make an ice pack by freezing 2 parts isopropyl alcohol to one part water in a ziplock bag. Continue for 3 days. Alternate to warm compresses on day 4, day 5 & day 6.

Week 2: ROM (Range of Motion Exercise): Have your pet lie on his or her good side. Apply a warm compress to knee area. Grip the foot with one hand & slowly & gently push the foot up into flexion of all joints; hold for 5 seconds. Slowly pull the foot & push the leg down & back into extension of all joints; hold for 5 seconds. Repeat this motion 10-15 times twice - three times daily. This exercise should NOT be performed to the point of pain or resentment. Initially there will be stiffness, primarily when attempting to flex the limb. Continue for 4 days.

Week 3: Massage: Have your pet lie on his or her good side. Superficial skin massage around the thigh & knee involves using your fingers loosely on the surface of the skin, applying enough pressure to move the skin relative to the underlying tissues. Muscle massage of the thigh involves deeper kneading & pushing of the muscles. Perform both types of massage for 10-15 minutes twice to three times daily. Continue for 4 weeks.

Week 4: Sit/Stand Exercise: Have your pet relatedly sit & stand for 15-20 repetitions twice daily. Use small treats to encourage participation. Continue 4 weeks.

Week 6: Active Exercise: Place your pet on a short leash & have him & her walk at your side. Walk outside on even/solid footing for 10 minutes twice to three times daily. Continue 4 weeks, gradually increasing time & distance.

Swimming is wonderful rehabilitation exercise when performed correctly. You may allow controlled swimming after week 6. Controlled swimming requires that your pet not jump or leap into the water; walking into the water until it is deep enough to swim is required. Throwing balls to fetch often result in sudden jumping & lunging, which can cause serious problems in the healing phase. Do NOT over extend your pet; start with short excursions (5 minutes) & increase duration & frequency gradually.

LONG-TERM LIFESTYLE

After the fracture is fully healed, there are no restrictions on activities for your pet. A gradual return to full function should occur, to allow for a smooth return of muscle function & strength following the restricted period.

Occasionally the K-wire/pin(s) that have been placed across the fracture will cause irritation & limping. These are easily & quickly removed under brief anesthesia if a limp persists after 6 weeks.

REHABILITATION PROTOCOL (Patient with Articular Fracture)

Treatments/Modalities	Day 1-7	Day 7-21	3-8 Wk	8-12 Wk and Beyond
Pain medications	As directed	As directed	PRN	PRN
Cryotherapy	10-15 min 3 times daily before walks or exercises First session immediately after surgery	Use after exercise for 15 min	PRN after exercises	PRN after exercises
Heat therapy		Apply heat to the adjacent muscles 10 min before PROM or exercise	As before 10 min twice daily	PRN
Massage	Twice daily for edema from toes toward heart	Continue twice daily	Massage adjacent muscles before active exercise	Massage adjacent muscles before active exercise

PROM	Gentle joint flexion/extension 10 reps, 3–4 times daily Elicit flexor reflex by toe pinching	Continue flexion and extension with mild resistance 10–15 reps 3 times daily	Continue PROM as previously described up to 4 wk	
Laser therapy	Daily or every other day for first week	Every other day for first week then twice weekly	PRN	
Walks	At 5 d start slow controlled leash walks for 5 min twice daily to encourage active ROM	Increase each walk by 1–3 min each week	Gradually increase to 10–15 min twice daily	20– to 30-min walks twice daily including 10 min of incline work as long as healing has taken place
Underwater Treadmill ³		10–15 min once daily after day 10—incision healed	15–20 min daily	20–30 min 3 times weekly
Stairs ³			Likely 6+ weeks after surgery Start with one flight and add one flight per week	Work up to 5 flights twice daily
Cavalettis ³			5–10 reps over 5 rails once daily	10–15 reps over 5 rails twice daily
Swimming ³			10–15 min with breaks daily	20–30 min once to twice daily

If you would like assistance with your pet's exercise recovery, please let your veterinary team know so we can provide a referral to a local veterinary physical rehabilitation center. If you have any questions, please feel free to ask your primary veterinarian &/or veterinary surgeon.

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