

Post-operative Physical Rehabilitation

Dr. Kristin Kirkby Shaw provides expert insight on how physical rehabilitation can help return patients to normal function after orthopaedic surgery.



Physical rehabilitation has been defined as “the treatment of injury or illness to decrease pain and restore function.” This philosophy is not dissimilar to that of orthopedic surgery, which strives to return a patient to normal function post-operatively. With these common goals in mind, it is clear a synergistic relationship should exist between the surgeon and the rehabilitation veterinarian; such is the standard of care in human surgery.

The overall aim of rehabilitating an animal is to decrease pain, facilitate tissue healing, restore muscle strength, endurance and proprioception, prevent further injury, and restore the animal to their prior activity level. The first step in this process is to establish a thorough diagnosis.

A complete orthopedic and neurologic examination should be performed. It is common for animals that have an injury that is apparently isolated to one limb to develop compensatory changes in other limbs or their back.

For example, many dogs that have surgery for cranial cruciate ligament rupture will shift weight to the contralateral limb and thoracic limbs and adopt a posture of increased hip and lumbar flexion. As a result, the hip flexor muscles can become tight, fasciculations may develop in the lumbar epaxial muscles, and the latissimus dorsi muscles might develop trigger points. A complete post-operative rehabilitation plan should address not only the post-surgical limb, but the entire body.

During the physical examination, measurements should be taken that can be utilized to objectively evaluate the outcome of therapy. These include thigh (or brachial) circumference, goniometric measurement of joint range of motion, body weight and body condition score, and when available, force mat gait analysis. Once an assessment of the animal's condition is made, a rehabilitation plan is developed and individually tailored to the patient. It is tempting to develop “protocols” for certain conditions, however a better method of practice is to develop guidelines

for progression through rehab. That is, rather than changing or instituting new treatments at certain time points, functional or physiologic goals should be set as criteria for an animal to progress from one phase of treatment to the next.

Physical rehabilitation generally includes three categories of treatment: manual therapy, therapeutic exercise, and therapeutic modalities. However, rehabilitation veterinarians may also utilize pharmaceutical analgesics and nutritional supplements, provide weight loss and nutritional guidance, and perform acupuncture as part of a customized treatment plan.

Rehabilitation following surgery

The processes of healing and recovery are similar regardless of the type of orthopedic surgery performed. The following is an overview of phases of healing and the potential rehabilitation interventions available as therapy progresses.

Phase 1: Inflammatory phase

Inflammation begins at the time of surgery; and, while a normal and essential part of the healing process, hallmarks of this phase include pain and swelling. Goals of rehabilitation during inflammation are to minimize pain and swelling, particularly joint effusion. Excessive effusion or swelling can also perpetuate pain and impair wound healing. Pain should be addressed using a multi-modal approach that includes pharmaceutical and rehabilitation therapies. Modalities that are recommended to decrease joint effusion include cryotherapy with compression, laser, neuromuscular electrical stimulation and joint compressions/ mobilization. The inflammatory phase typically lasts three days; however, clinical signs of inflammation (heat, pain, redness, swelling, loss of function) should be used to gauge the end of this phase.



Phase 2: Weight bearing and range of motion

It is tempting to restrict weight bearing or motion of a limb following orthopedic surgery in an attempt to protect the surgical site. However, so long as the repair is stable, weight-bearing and joint motion should be encouraged as soon as possible in order to attain an optimal outcome. It has been shown that joint immobilization or failure to bear weight on a limb can lead to deleterious changes in cartilage, bone and muscle.

Early, controlled weight bearing should be encouraged through minimizing pain and joint effusion, therapeutic exercises, and operant conditioning (rewarding the dog for using the leg). The cornerstone of this therapy is slow leash walking. Prior to consistent weight bearing, joint compressions and mobilizations should be performed to stimulate proprioceptors within the joint.

Neuro-muscular electrical stimulation (E-stim) can be used to stimulate muscle contraction if the animal is not weight bearing. Passive range of motion (ROM) should also be employed at this stage. All joints in the affected limb should be placed through ROM exercises. Human studies have shown that people who regain normal ROM early in the convalescence period are quicker to return to normal function.

Therefore, extrapolating from this research, once the animal is using the limb consistently and ROM is approaching normal, active ROM can be instituted. That is, rather than the therapist (or owner) placing the joint through ROM, the animal is led through exercises which require them to flex and/or extend their joints.

Phase 3: Strengthening and proprioception

Once the animal is bearing weight consistently while walking and standing, the aim of rehabilitation is to strengthen the musculature of the affected limb. Controlled therapeutic exercises, including underwater treadmill therapy, are the keys to increasing strength. Proprioception training should be instituted as soon as the animal is weight bearing. This includes balance exercises and cavaletti poles. Core strengthening (abdominals, epaxials) should also be introduced in this phase.

Phase 4: Endurance

This phase will overlap with strengthening. As an animal becomes stronger and more confident using the post-operative limb, the length of leash walks should be gradually increased. Underwater treadmill sessions can also be intensified.

The degree of endurance training will differ based on the expected activity level of the dog following therapy; however, some degree of endurance training or conditioning should be implemented in the rehabilitation of all dogs following orthopedic surgery.

Phase 5: Controlled functional activities

The goal of this phase of rehabilitation is to ensure that the return to normal activity is gradual and that the animal is able to safely perform common activities in a controlled setting prior to being “turned loose”. Examples of activities during this phase include destination jumping, short recalls or ball chasing, trotting and running.

Phase 6: Sport specific re-conditioning

Dogs that participate in sporting events such as agility, lure coursing, or hunting will require additional sport specific rehabilitation prior to competitively engaging in these activities. Rehabilitation may last 6-12 months, depending on the individual dog, before the animal is competing at the same level as prior to surgery.

Conclusion

Rehabilitation plays an important role in the care of dogs following orthopedic surgery. Veterinarians and physiotherapists interested in providing physical rehabilitation for dogs are encouraged to pursue continuing education programs, such as the Canine Rehabilitation Institute, to learn the skills and tools of veterinary rehabilitation.

As Certified Canine Rehabilitation Therapists, they will be better able to develop customized treatment plans for patients following orthopedic surgery. 🐾



Dr. Kristin Kirkby Shaw, (DVM, MS, PhD, CCRT, DACVS, DACVSMR) is double board-certified in Veterinary Surgery and Veterinary Sports Medicine and Rehabilitation. She is a surgeon at the Animal Surgical Clinic of Seattle, Medical Director of Sound Veterinary Rehabilitation Center, and Founder of CARE: Canine Arthritis Resources and Education.