

Rehabilitation of Orthopedic Disease

Pilar Lafuente, DVM, PhD, DACVS-SA, DECVS, DACVSMR, CCRT, MRCVS
Royal Veterinary College
London, United Kingdom

The veterinary team must understand orthopedic conditions and treatment options to establish the most suitable rehabilitation protocol. In addition, the veterinarian should understand the different stages of tissue healing, particularly in regard to the strength of bone and tendons during reparation. Each orthopedic patient's progress should be regularly evaluated so the therapeutic program can be adjusted accordingly.

REHABILITATION OVERVIEW

Orthopedic diseases are associated with patient lameness and abnormal function of the affected area. Other changes (eg, muscle atrophy, decreased joint range of motion [ROM], abnormal posture, muscle tightness) also occur.

Physical rehabilitation is used for patients with conditions that affect function rather than those with specific diseases because these present differently in each patient. The goals of rehabilitation are to not only return the patient to a normal function and fitness level but also to maintain that level of function and prevent reinjury.

Patients with acute conditions (eg, bone fractures) are frequently treated with surgery and postoperative rehabilitation to help maintain muscle and joint function during recovery, manage pain, enhance tissue healing, and speed function recovery of the affected limb.

Physical rehabilitation is especially helpful in treating patients with chronic conditions (eg, osteoarthritis).¹

PHYSICAL MODALITIES

Many physical rehabilitation modalities are available for promoting tissue healing and managing pain, muscle weakness, and decreased joint ROM:

- Cryotherapy
- Superficial heating
- Neuromuscular electrical stimulation (NMES)
- Transcutaneous electrical nerve stimulation (TENS)
- Therapeutic ultrasonography
- Low-level laser therapy (LLLT)
- Extracorporeal shock wave therapy.

Although these modalities are non-invasive, the veterinary team must understand their use, benefits, and contraindications and should be trained in correct application techniques.

MANUAL REHABILITATION

Manual rehabilitation is used to evaluate and treat soft-tissue abnormalities, decreased muscle flexibility, reduced passive joint ROM, and arthrokinematic motion restrictions, and includes:

- Soft-tissue mobilization (STM)
- Passive ROM
- Stretching
- Joint mobilization.

THERAPEUTIC EXERCISES

The following therapeutic exercises increase joint ROM and flexibility, improve limb function, increase muscle mass and strength, and help prevent injuries:

- Passive
- Assisted (eg, physioballs, wobble boards, balance discs, donuts; see **Figure 1**, page 36)
- Active (eg, cavaletti poles, land and underwater treadmills; see **Figure 2**, page 36)
- Strengthening (eg, weights, blocks).

AQUATIC THERAPY

Aquatic therapy helps the patient move more comfortably and allows more challenging and mechanically adequate exercises without being painful; the water assists with muscle relaxation and provides a massaging effect. It also works balance and coordination and helps with weight loss and muscle strengthening by raising the patient's metabolism. Common modalities include:

- Swimming
- Using an underwater treadmill.

STEP 2 Treatment Plan ►

Team Approach to Rehabilitation

Pilar Lafuente, DVM, PhD, DACVS-SA, DECVS, DACVSMR, CCRT, MRCVS
Royal Veterinary College
London, United Kingdom

Orthopedic disease management involves a multimodal approach that frequently includes surgical intervention, pharmaceutical management, and physical rehabilitation. A thorough evaluation and frequent reexaminations to evaluate progress are essential for the patient's optimal return to normal function and activities.

SURGICAL INTERVENTION

Some orthopedic conditions (eg, bone fractures, cranial cruciate ligament disease, patellar luxation, osteochondritis dissecans [OCD], tendon ruptures) are typically treated surgically. The surgical techniques vary with the condition, but reestablishing the normal anatomy and stabilizing the affected body part long enough for the tissues to heal adequately is always the main goal. Osseous, cartilaginous, and tendinous tissues require different postoperative environments and times for healing, and the rehabilitation therapist must understand tissue's healing stages and ability to withstand strain.

PHARMACEUTICAL MANAGEMENT

Pharmaceutical agents are essential for postoperative pain management; because they are usually only administered short-term, they are especially

important in treating chronic conditions. Osteoarthritis is the most common chronic orthopedic condition requiring long-term management. Many drugs can be prescribed for pain management. NSAIDs are the most effective, but veterinarians have other options when further pain relief is needed or undesired adverse effects occur. Opioid derivatives (eg, tramadol), gabapentin, amantadine, or amitriptyline can be prescribed because of their analgesic effects.¹

PHYSICAL REHABILITATION

Rehabilitation is essential for recovery and maintenance of the patient's normal function and prevention of reinjuries. The appropriate therapy should be selected based on the patient's condition, previous therapy, and recovery stage. Postoperative rehabilitation is usually focused on management of pain and swelling, maintenance and recovery of normal joint ROM and muscle mass, and early return to limb function. Therapies that may pose a risk of implant or surgery failure should be avoided until good clinical progression and tissue healing is evident. Common early postoperative therapies include cryotherapy, superficial heat, LLLT, soft-tissue mobilization (eg, massages),

and passive ROM and assisted exercises. Depending on progress, other therapies (eg, active strengthening exercises, aquatic therapy) can be added.

OTHER THERAPIES

Other important therapies include¹:

- **Weight management**
- **Exercise modification:** Recommendations include low-impact activities (eg, swimming, walking on soft, padded surfaces).
- **Nutraceuticals:** These support joint cartilage health and may clinically benefit osteoarthritis patients. Therapeutic foods and/or joint supplements containing chondroitin sulfate, glucosamine, omega-3 fatty acids, or green-lipped mussel are routinely recommended.
- **Acupuncture:** This therapy is useful for managing patients with orthopedic conditions because of its pain relief effects, performance and endurance enhancement, and nerve regeneration.²
- **Chiropractic:** Spinal manipulative therapy may improve spinal mobility and can be useful in patients with clinical problems (eg, athletes, working dogs). Only licensed veterinarians or chiropractors should conduct this therapy.
- **Regenerative medicine:** The application of platelet-rich plasma and stem cell therapy in degenerated joints and tendinopathies shows promising effects.^{3,4}

STEP 3 Team Roles ►

Team Roles

Pilar Lafuente, DVM, PhD, DACVS-SA, DECVS, DACVSMR, CCRT, MRCVS
Royal Veterinary College
London, United Kingdom

RECEPTIONIST

Patient and client bonding expert

- Direct calls and client questions to the appropriate service (eg, orthopedics, neurology)
- Explain the importance of pain control and rehabilitation
- Be familiar with the most common surgical procedures and rehabilitation modalities
- Encourage clients to read about rehabilitation modalities (eg, provide brochures)

TECHNICIAN

Patient caregiver, client educator

- Take a thorough history and list the patient's presenting complaints
- Help the veterinarian or therapist during the physical examination and application of rehabilitation exercises
- Know how to obtain high-quality radiographs
- Be familiar with physical rehabilitation modalities, medications, and supplements
- Educate clients about weight loss, nutrition, and detection or recognition of medication adverse effects

VETERINARIAN

Medical expert, client educator

- Perform an orthopedic examination and make recommendations regarding diagnostic imaging
- Confirm diagnosis and discuss options with the client
- Consider referral to an orthopedic specialist
- Write a referral letter for the orthopedic surgeon or rehabilitation therapist

THERAPIST

Patient caregiver and therapist, team communicator

- Obtain a complete history, including the patient's treatment and medications
- Perform a physical examination and gait analysis
- Formulate a rehabilitation plan specific to the patient and the level of the condition
- Apply therapeutic techniques
- Demonstrate the at-home exercises to the client
- Remain in contact with the veterinarian or orthopedic surgeon during the patient's rehabilitation

STEP 4
Team Training Plan ►

Team Training

Kari Koudelka, LVT, CCRP
Center for Veterinary Pain Management and Rehabilitation
The Woodlands, Texas

The veterinary team must stay current on the quickly expanding information about veterinary orthopedic disease by determining, evaluating, and understanding information from multiple trusted sources.

VETERINARIAN

Training starts with the veterinarian, who should ensure each team member knows what to look for and becomes familiar with the signs of orthopedic conditions and injuries.⁵ The veterinarian also determines the practice's fundamental protocol for each orthopedic patient, including options for diagnostic testing, treatment, and therapy.⁵

PRACTICE MANAGER

The practice manager must be knowledgeable about the practice's protocol for treating orthopedic disease. Additionally, he or she should organize team meetings and educate team members with visual presentations that cover the significance of preventive care and a general description of orthopedic disease, diagnostic tests, and effective client communication



Figure 2. Underwater treadmill therapy is used as part of a patient's rehabilitation plan after surgery for cranial cruciate ligament disease.

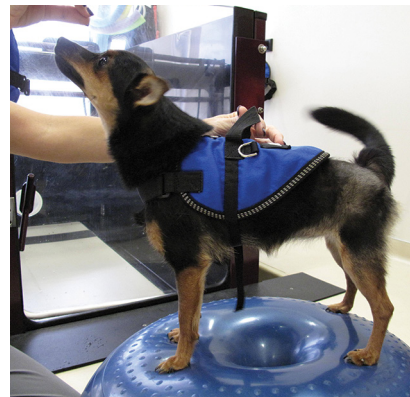


Figure 1. A patient uses a donut during weight-bearing therapy to improve core strength.

about treatment options. The practice manager should always motivate the team to stay current on information by providing access to journals, textbooks, and other literature.⁶

VETERINARY TECHNICIAN

The veterinary technician should know what questions to ask the client about the patient's behavior, activity level, lameness, and home environment and be able to effectively communicate the treatment options, costs, and home-care programs.⁶

RECEPTIONIST

The receptionist should be trained to gather the necessary information from clients, including the patient's history of previous diagnostics or treatments (eg, medications, blood work, imaging, surgery), when scheduling the initial appointment.⁶

STEP 5
Communication Keys ►

Communicating with Clients

Kari Koudelka, LVT, CCRP
Center for Veterinary Pain Management and Rehabilitation
The Woodlands, Texas

Each team member has a role in delivering effective communication that is essential for helping clients understand orthopedic disease. The entire team should be involved in teaching the client the importance of short- or long-term care, including physical rehabilitation, home care, and follow-up examinations.⁶

VETERINARIAN

The veterinarian must clearly explain diagnostic testing and its importance for a good outcome. After establishing a diagnosis, the veterinarian must educate the client about the disease signs and determine the best treatment option for the patient. Using models and other visual aids or introducing clients to apps or websites can help them better understand their pet's condition.

VETERINARY TECHNICIAN

The veterinary technician should carefully explain the treatment plan, provide cost estimates, and familiarize the client with the recommended medications and/or nutraceuticals. Handouts

on orthopedic disease should be verbally reviewed with clients. Also, the veterinary technician should always be available to support clients and return their phone calls if they have questions or concerns.⁶

RECEPTIONIST

It is vital that the receptionist make follow-up phone calls and collect frequent updates on the patient to help ensure client compliance.⁶ Each team member's most important role is showing compassion for the patient and the client. Personal attention and support helps clients feel confident about the decision they make for their pet. 

Each team member's most important role is showing compassion for the patient and the client.

Editor's note: Dr. Pilar Lafuente is a specialist in small animal surgery and canine sports medicine and rehabilitation. She currently works as an orthopedic surgeon and is the head of the sports medicine and rehabilitation service at the Royal Veterinary College in London.

Kari Koudelka gained her canine rehabilitation certification in 2006 and has been the director of veterinary rehabilitation and pain management services at The Center for Veterinary Pain Management and Rehabilitation in The Woodlands, Texas, since 2004. She is also the president of the proposed Academy of Physical Rehabilitation Veterinary Technicians.

References

1. McLaughlin R. Management of chronic osteoarthritic pain. *Vet Clinics North Amer.* 2000;30:933-949.
2. Gaynor JS. Acupuncture for management of pain. *Vet Clinics North Amer.* 2000;30:875-884.
3. Vilar JM, Batista M, Morales M, et al. Assessment of the effect of intraarticular injection of autologous adipose-derived mesenchymal stem cells in osteoarthritic dogs using a double blinded force platform analysis. *BMC Vety Resh.* 2014;10:143.
4. Smyth NA, Murawski CD, Fortier LA, et al. Platelet-rich plasma in the pathologic processes of cartilage: Review of basic science evidence. *Arthroscopy.* 2013;29:1399-1409.
5. Millis DL, Levine D. Common Orthopedic Conditions and their Physical Rehabilitation. In: *Canine Rehabilitation and Physical Therapy*. 2nd ed. Philadelphia, PA: Elsevier; 2014;543-578.
6. Millis DL, Levine D. Conceptual Overview of Physical Therapy, Veterinary Medicine, and Canine Physical Rehabilitation. In: *Canine Rehabilitation and Physical Therapy*. 2nd ed. Philadelphia, PA: Elsevier; 2014;18-20.



READ ALL ABOUT IT

- Millis L, Levine D, eds. *Canine Rehabilitation and Physical Therapy*. 2nd ed. Philadelphia, PA: Elsevier; 2014.
- Zink MC, Van Dyke JB, eds. *Canine Sports Medicine and Rehabilitation*. Ames, IA: Wiley-Blackwell Publishing; 2013.