

Feline Physical Rehabilitation

A feline patient is not a canine patient, period.

Nonetheless, developing a physical rehabilitation program for a cat, while sometimes challenging, is absolutely possible.

The misconception exists that feline patients will not cooperate with therapeutic exercises, especially if there is water involved, but it has been found that, when “asked” correctly, many cats willingly participate.¹ (Did that make you smile?)

WENDY DAVIES performs range of motion therapy on a cat at the University of Florida Small Animal Rehabilitation and Fitness Center. Photo courtesy of Lyon Duong, University of Florida | UF Photography.

Successful feline physical rehabilitation demands a good understanding of feline behavior, including excellent handling skills. This article gives an overview of several rehabilitation therapies that can be used with cats, as well as insights for dealing with feline patients in potentially stressful situations, such as physical rehabilitation. Pharmacologic treatment is not addressed because of the complexity of the topic; readers are encouraged to pursue further resources in this area (**BOX 1**).

PATIENTS AND PERSONNEL

Treatment advances and the high costs involved in veterinary medicine and surgery are leading cat owners to expect postoperative and postinjury care for their pets similar to that offered for dogs. This care often includes physical rehabilitation, or physiotherapy, which is concerned with physical function and considers the value of movement and the optimization of physical potential to be essential to the health and well-being of individuals.¹ The most common reasons to perform physiotherapy in feline patients are generally related to injuries sustained as a result of trauma or joint conditions.²

Physical rehabilitation programs for cats should be formulated by a veterinarian and a physical therapist, both of whom should be certified in physical rehabilitation. The veterinarian is responsible for examining the patient and

Before beginning any rehabilitation therapy, patients must be examined by the rehabilitation veterinarian. This examination should include pain assessment and scoring.

prescribing the modalities that the credentialed veterinary technician or nurse certified in physical rehabilitation will carry out. Therapies that the certified veterinarian should perform include joint mobilizations, myofascial trigger point needling, chiropractic manipulations, and acupuncture. The certified rehabilitation physical therapist is an expert in joint mobilizations.

Cats often make willing patients, but sessions should be kept short and interesting and should be undertaken in a quiet, relaxed environment (see **HELPFUL HINTS FOR HANDLING FELINE STRESS AND ANXIETY**).³

BOX 1 Suggested Reading

Pharmacologic Treatment for Rehabilitation Patients

- Epstein M, Rodan I, Griffenhagen G, et al. 2015 AAHA/AAFP pain management guidelines for dogs and cats. *JAAHA* 2015;51:67-84.
- Epstein M. The prevention and management of pain in dogs. In: Zink MC, Van Dyke JB, eds. *Canine Sports Medicine and Rehabilitation*. Ames, IA: John Wiley & Sons; 2013:370-388.
- Fox SM, Downing R. Rehabilitating the painful patient: pain management in physical rehabilitation. *Canine Rehabilitation and Physical Therapy*. 2nd ed. Saunders; 2014:243-253.
- Mathews KA, Kronen PW, Lascelles D, et al. WSAVA guidelines for recognition, assessment and treatment of pain. *J Small Anim Pract* 2014;55:E10-E58.

Detailed Techniques for Feline Rehabilitation Modalities

- Bockstahler B, Levine D. Physical therapy and rehabilitation. In: Norsworthy GD, ed. *The Feline Patient*. 4th ed. Ames, IA: John Wiley & Sons; 2011:687-690.
- Bockstahler B, Levine D. Physical therapy and rehabilitation. In: Schmeltzer LE, Norsworthy GD, eds. *Nursing the Feline Patient*. Ames, IA: John Wiley & Sons; 2012:138-144.
- Drum MG, Bockstahler B, Levine D. Feline rehabilitation. *Vet Clin North Am Small Anim Pract* 2015;45:185-201.
- Medina C, Robertson S. Non-pharmacological pain management in cats. *Feline Focus* 2015;1(6):195-199.
- Sharp B. Feline physiotherapy and rehabilitation. 1. Principles and potential. *J Feline Med Surg* 2012;14:622-632.
- Sharp B. Feline physiotherapy and rehabilitation. 2. Clinical application. *J Feline Med Surg* 2012;14:633-645.

CONDITIONS COMMONLY TREATED WITH REHABILITATION THERAPY IN CATS

Cats are most often referred to rehabilitation facilities for osteoarthritis,⁸ fractures, neurologic conditions, femoral head and neck excision, and weight reduction.⁹ Other conditions that can benefit from rehabilitation therapy are listed in **BOX 2**. Cats are less commonly affected by developmental orthopedic diseases and orthopedic injuries⁹ than dogs.

Osteoarthritis

Osteoarthritis, also known as *degenerative joint disease*, is the most common form of arthritis. Its true prevalence is unknown, but one study suggests that 90% of cats >12 years of age have evidence of osteoarthritis,¹¹ and with

BOX 2 Conditions That Can Benefit from Rehabilitation Therapy¹⁰

- Traumatic stifle luxation
- Femoral fractures
- Articular fractures
- Spinal cord trauma
- Cruciate ligament injury

such high numbers being suggested, it is likely that osteoarthritis is underdiagnosed in cats. It frequently affects multiple joints bilaterally, and most cases are primary or

Helpful Hints for Handling Feline Stress and Anxiety

When cats are faced with something stressful, they typically try to alleviate the stress they feel by creating distance between themselves and the stressor; that is, they run away.⁴ If they cannot run, they may attempt to groom or “waste time,” hoping the stress goes away. As a last resort, they use aggression. When it comes to restraint for feline patients, a general guideline is “less is more.”

Before Arrival at the Facility

Feline patients that need rehabilitation therapy may already be stressed or in pain from whatever condition has prompted the need for therapy, even if it is performed in the patient's home. If therapy is to be performed in a rehabilitation facility, the stress of transportation to the facility can cause cats to toilet or even vomit in their carrier, which may be particularly unpleasant for these obsessively clean animals.⁵ Encouraging the owner to bring the patient's own bedding and toys not only makes the owner feel involved in the treatment, but also can help the patient feel more settled through the retention of familiar scents. The owner should be asked before the first visit what treats the cat enjoys. Having a variety of low-calorie, palatable treats on hand is helpful in bonding with the patient and goes a long way to establishing trust for future rewards after therapeutic exercises.

In the Hospital

Hospital waiting rooms can also be extremely stressful, and using pheromone diffusers (e.g., Feliway, Comfort Zone) in these areas and examination rooms can improve the response feline patients have to being in the facility. Feliway (Ceva) is clinically proven to help reduce stress related to traveling and visiting the veterinarian.^{6,7} Other strategies to improve the feline experience in the waiting room include keeping waiting times to a minimum, having separate areas for dogs and cats, and providing benches where cat carriers can be placed off the ground, thus helping cats feel less exposed. Examination areas should be quiet and secure, with little or no traffic to cause disruption.

Staff members involved with planned feline rehabilitation therapies should gather any required therapy equipment before getting the cat out of its carrier. The cat should be given time to explore the therapy area and become familiar with its surroundings, allowing it to feel more comfortable. This time spent with the patient helps to develop a rapport between cat and nurse. Sudden or rapid movements, which can be threatening to cats, should be avoided.

The cat should be given time to explore the therapy area and become familiar with its surroundings, allowing it to feel more comfortable.

idiopathic. Diagnosis is challenging because of the lifestyle of most cats (e.g., they are not taken for walks) and the feline tendency to conceal pain and illness.¹² Some clinical signs of feline osteoarthritis are listed in **BOX 3**, and tools that can assist in the recognition of pain are described in **RECOGNIZING PAIN IN CATS**.

Veterinary technicians and nurses can help in the diagnosis of osteoarthritis by guiding owners through a questionnaire focusing on changes in behavior and lifestyle. A sample questionnaire can be downloaded at todaysveterinarytechnician.com. After analgesia has been administered, the questionnaire can be repeated to monitor the effectiveness of treatment.

Simple range of motion and massage techniques (described under Modalities for Feline Rehabilitation) can be taught to owners, help alleviate muscular pain associated with osteoarthritis, and improve joint mobility.¹⁸ These techniques also help promote interaction between owners and their cats. The owner should be encouraged to interact with the cat and engage it in play for several minutes at least 3 times a day (or according to the preference of the individual cat) to encourage exercise and mental stimulation. Using different toys or alternating play techniques and locations is likewise helpful. Some cats may even be amenable to outdoor exercise on a leash or harness. Simple home modifications that can help cats with osteoarthritis are listed in **BOX 4**.

The rehabilitation technician or nurse should be prepared to instruct the owner in a home exercise program for the cat. It is best to provide written and verbal instructions and hands-on demonstrations for clients, then have the clients perform the exercises while still in the facility to ensure they understand the instructions and are performing the exercises correctly.

Several therapies performed in the facility can also be beneficial for osteoarthritis patients, including cold/heat therapy, joint mobilizations (performed by the rehabilitation veterinarian or physical therapist), and electrotherapeutic modalities such as laser therapy or therapeutic ultrasound. When these techniques are used in conjunction with therapeutic exercises, patient outcomes are greatly improved. Therapeutic exercises are described under Modalities for Feline Rehabilitation.

Weight Loss/Obesity Management

A 2011 study by the Association for Pet Obesity Prevention found that >50% of cats in the United States were either obese or overweight.³ Quantitatively, obesity is generally defined as exceeding ideal body weight by 15% to 20% or more.¹⁹ A number of risk factors have been identified for obesity in domestic cats, including physical inactivity, urban dwelling, and increased humanization of the diet (e.g., being fed from the table, eating what the owner eats instead of a well-balanced nutritional plan). Indoor-only cats are less active than cats with access to the outdoors, and, unlike their ancestors, modern domestic cats no longer have to hunt for food. The resulting obesity predisposes cats to a number of medical conditions (**BOX 5**), as well as an increased risk for orthopedic disease.²¹ Excess weight also contributes to the development of musculoskeletal diseases and places excessive strain on joints, muscles, tendons, and ligaments, thus aggravating existing health problems.

The management of obesity is based on the dual approach of reducing caloric intake and increasing physical activity, which can comprise a combination of land-based and water-based exercise. Activity through play is most effective

BOX 3 Clinical Signs of Osteoarthritis¹²

- Decreased willingness and ability to jump up and down (particularly from previously frequented locations)
- Changes in interaction with owners (increased aggression or decreased interaction)
- Reduced hunting or outdoor exploration
- Reduced grooming or overgrooming a painful joint
- Claw overgrowth
- Overt lameness (limp, stiffness, abnormal posture)
- Changes in toileting habits
- Changes in eating habits

BOX 4 Home Modifications to Help Cats with Osteoarthritis¹⁷

- Secure hiding places
- Stairs or ramps to alleviate sore joints
- Litterboxes that have easy access (cutout section or lower sides)
- Scratching posts that are horizontal instead of vertical for patients with abnormal joint motion
- Raised food and water bowls for patients with stiffness in elbows, shoulders, or spine
- Padded, comfortable bedding
- Non-slip flooring (e.g., yoga mats)

with obese cats as, in addition to burning calories, it increases muscle mass, increases resting metabolic rate, improves mobility and mental stimulation, and often improves the cat-owner bond.¹⁰ Owners should be encouraged to increase their cat's activity level at home gradually, based on its needs, starting with 5 to 10 minutes per day of low-intensity activities for sedentary pets (e.g., walking).²² Creativity in activities, such as incorporating food-dispensing toys, placing meals in different parts of the house, and using interactive toys, laser pointers, and electronic mice can also be helpful with a long-term weight loss program.²² Any increase in physical activity is likely beneficial for a cat of any weight.

Cats that have long-term exercise restrictions for medical reasons and, therefore, have decreased energy requirements pose a challenge for weight management. It is important to devise a weight maintenance plan for these patients and to switch them to low-calorie foods if needed. Clients who have problems restricting their cat's food intake as prescribed should be encouraged to use

low-calorie cat foods. The veterinary rehabilitation team can offer suggestions to the client as to which food has the best nutritional value. Premium cat foods contain high-quality ingredients with a balanced mixture of all essential nutrients and can help facilitate dietary management considerably for patients with weight loss challenges.

In the rehabilitation facility, a variety of therapeutic exercises are used to treat obesity. For example, underwater treadmill therapy decreases joint stress while increasing the metabolic rate for successful weight loss.

Numerous body condition scoring systems are used to evaluate obesity in cats, and owners should be instructed on how to regularly use these to assess their pet.

MODALITIES FOR FELINE REHABILITATION

It is beyond the scope of this article to discuss any techniques in detail, and readers are encouraged to learn more (**BOX 1**). **BOX 6** lists modalities for feline rehabilitation not discussed below.

Recognizing Pain in Cats

Rehabilitation technicians or nurses must be skilled at recognizing pain in feline patients because therapy will have little to no benefit if the patient is in pain. Simple, online, practice-friendly numerical rating scales are available and are slowly helping to improve recognition of feline pain.¹³ One such scale has been developed (but not yet validated) by Colorado State University.¹³ A currently validated assessment tool is the UNESP-Botucatu multidimensional composite pain scale, available from animalpain.com.br/assets/upload/escala-en-us.pdf.^{14,15} The Glasgow Feline Composite Measure Pain Scale: CMPS – Feline (CMPS-F) has been described as “a valid scale for the measurement of acute pain in cats [that] heralds a new era in the recognition and management of acute pain in cats.”¹⁶ The CMPS-F is a 3-page form that may be downloaded from newmetrica.com/cmeps/cats/eng/download/CMP_feline_eng.pdf.

Chronic pain scales that use pet owner observations and input are also available. The Multifactorial Clinical Measurement Instruments are recommended by the American Animal Hospital Association and American Academy of Feline Practitioners in their 2015 guidelines.¹³ Ideally, patients with chronic pain

should be evaluated with one of these multifactorial instruments at every visit to view trends in data.¹³ To date, the instrument specifically used for feline patients is the Feline Musculoskeletal Pain Index (FMPI).¹⁷ The validity of the scoring system has been tested, but the conclusion of the paper by Dr. B. D. X. Lascelles' group was that “responsiveness and criterion validity of the FMPI could not be established in this cohort of cats.”¹⁷

Rehabilitation technicians or nurses who suspect that a patient is in pain should immediately alert the rehabilitation veterinarian and cease all therapies until the cat is no longer painful. Use of a validated scoring system at each visit, if possible, will help the physical rehabilitation team to objectively monitor pain scores and address changes in pain states promptly.

Use of a validated scoring system will help the physical rehabilitation team to objectively monitor pain scores and address changes in pain states promptly.

Manual Therapy

Manual therapies are commonly used in human therapy programs and may be used on veterinary patients. Credentialed veterinary technicians or nurses may perform massage, range of motion (ROM) exercises, and stretching.

Massage

Massage is defined as the therapeutic manipulation of the soft tissues of the body^{1,23} and has mechanical, physiologic, and psychologic effects.²⁴ Massage uses stroking, effleurage, compression (kneading, wringing), friction, and percussion techniques.

When massaged, muscle is mechanically stretched, reducing tone and increasing pliability (**FIGURE 1**). Over time, this can lead to a reduction in muscle soreness and an increase in connective tissue strength.²⁵ Scar tissue is also mobilized and softened, helping to maintain movement between tissues and restore function after injury or surgery.²⁵

BOX 5 Possible Consequences of Obesity in Cats²⁰

- Cardiovascular disease, heart failure, and high blood pressure
- Diabetes mellitus
- Gastrointestinal problems (e.g., constipation, flatulence)
- Loss of liver function
- Reproductive disorders (e.g., decreased breeding performance, dystocia)
- Increased risk for complications during anesthesia
- Higher frequency of skin problems
- Greater susceptibility to infection due to decreased immune defense
- Shorter life expectancy

BOX 6 Other Modalities for Feline Rehabilitation

- Thermotherapy (hot and cold)
- Postural management for neurologic patients
- Positioning and chest care for intensive care patients
- Maintenance exercises for recumbent patients (passive range of motion and massage)

Physiologically, massage increases interstitial pressure, which in turn increases venous and lymphatic flow. Using massage strokes in a distal to proximal direction is recommended to move fluid from the extremities back to the central circulatory system,²⁴ which becomes vitally important when addressing an edematous extremity. With each massage stroke, the hands should gently squeeze and stretch the tissue. This action creates pressure differences between one area and another, with high pressure pushing old fluid and irritating metabolites into the vasculature and low pressure drawing in new fluid. This flushing effect may be responsible for decreasing inflammation, pain, and muscle fatigue.²⁵

Psychologically, massage decreases stress and anxiety, produces relaxation, and improves emotional well-being.^{1,23–25} The body and mind are both linked to the skin via the nervous system, and different types of touch elicit different types of mental responses.

Range of Motion Exercises

Passive ROM (PROM) exercises manually exercise joints through their natural pain-free range without voluntary muscle contraction. PROM exercises are performed by pushing or pulling on the lower part of the limb to induce flexion or extension in a target joint.²⁶ They are typically performed in patients with stiffness secondary to surgery or in patients unable to walk on their own.²⁷ The benefits of PROM include prevention of joint contracture and soft tissue adaptive shortening, maintenance of mobility between soft tissue layers, reduced pain, enhanced



FIGURE 1. Petrissage being performed on author's cat. Petrissage is a form of massage that uses compression techniques.

Cats often make willing patients, but sessions should be kept short and interesting and should be undertaken in a quiet, relaxed environment.

blood and lymphatic flow, and improved synovial fluid production and diffusion.²⁸

Active ROM exercises use unassisted active muscle contraction to achieve joint motion²⁸ and are performed independently by the patient.²⁹ Activities include using cavaletti rails (i.e., a system of rails placed at adjustable heights and widths), climbing stairs, swimming, and walking in water, sand, or tall grass.²⁷ The goals of performing active ROM are increasing strength, coordination between muscle groups, flexibility, weight bearing, and joint motion.

Stretching

Stretches are passive movements that help to improve or restore full range to a joint or full length to a muscle. Stretches create change by adding sarcomeres to muscle, thereby increasing the muscle's length/range.¹ Stretching is generally more effective if preceded by light exercise, massage, heat, or therapeutic ultrasound, all of which increase the extensibility of collagen.



FIGURE 2. Cat undergoing laser therapy. Courtesy of Wendy Davies, CVT, CCRA

Electrotherapy

Many electrotherapy modalities can be used on feline patients. All possess inherent precautions/ contraindications and should only be used by operators who have received adequate training and wear personal protective equipment.²⁹

Low-Level Laser Therapy or Photobiomodulation

LASER is an acronym for "light amplification by stimulated emission of radiation." Lasers produce electromagnetic radiation (light) that is monochromatic, coherent, and collimated. These qualities allow laser light to penetrate tissue.³⁰

The mechanisms by which low-level laser therapy (LLLT) decreases pain include release of endogenous opioids, changes in conduction latencies of nerves, increased cellular metabolism, increased circulation, promotion of neovascularization, decreased fibrosis formation, and reduction of inflammation.³⁰ Feline conditions that respond well to LLLT include osteoarthritis, degenerative lumbosacral stenosis, fractures, chronic wounds, and stomatitis.³¹ Most cats tolerate LLLT well, as it is not painful and can be delivered in a relatively short time (**FIGURE 2**).³¹

Therapeutic Ultrasound

In physical rehabilitation, therapeutic ultrasound heats deep tissues and can be used to improve the extensibility of connective tissues, decrease pain and muscle spasms, promote tissue healing, and improve the quality of scar tissue.³⁰ Therapeutic ultrasound units generate an ultrasound wave by applying an electric field to an array of piezoelectric crystals located on the transducer surface. This stimulation causes mechanical distortion of the crystals, resulting in vibration and production of sound waves (i.e., mechanical energy).³²

The biological effects of ultrasound differ depending on the mode used. A continuous mode maximizes thermal effects; this mode is therefore primarily used for tissue heating before stretching.⁹ Pulsed modes produce decreased thermal effects but are used for other applications, including acceleration of the inflammatory process, increased fibroblast proliferation, and increasing the tensile strength of healing tissues.⁹

Electrical Stimulation

Electrical stimulation is a useful therapeutic modality and is often possible in cats. In fact, many cats enjoy it. Nevertheless, cats must be carefully introduced to electrical stimulation to become familiar with it. Principally, this modality can be used for muscle strengthening and pain control. Neuromuscular electrical stimulation is a form of electrical

stimulation that uses current to stimulate a motor nerve and cause the contraction of a muscle or muscle group. To stimulate a denervated muscle (e.g., in patients with spinal cord injuries), the muscle fibers must be excited directly; this form of therapy is called *electrical muscle stimulation*. When electrical stimulation is used for pain control, analgesia results from several mechanisms such as release of endogenous endorphins. The type of electrical stimulation most commonly used for pain control is transcutaneous electrical nerve stimulation.⁹

Therapeutic Exercises

Therapeutic exercises are one of the most important parts of the rehabilitation process. The design of the therapy program depends strongly on the needs of the individual patient and should ensure that the exercises can be performed safely without risk of worsening the clinical signs. The exercises should be selected based on the stage of tissue repair; therefore, the rehabilitation veterinarian and therapy team should understand the underlying pathology, expected recovery progress, and biomechanical considerations.³³

Exercise is the final element in the process of helping a cat achieve optimum function after injury, surgery, or disease. If the cat is weak, has a neurologic condition, or does not have endurance, then it may need assistance;



FIGURE 3. Proprioception training with a cat after a thrombolytic event. Courtesy of Lynn Nalepa, LVT, CCRP, CVPP

The misconception exists that feline patients will not cooperate with therapeutic exercises, especially if there is water involved, but it has been found that, when “asked” correctly, many cats willingly participate.

assistance can be provided manually or with the aid of “physio-rolls,” slings, harnesses, or carts.

Therapeutic exercise may be used to decrease pain and improve the following¹:

- Aerobic capacity and endurance
- Agility, coordination and balance (static and dynamic)
- Gait and locomotion
- Neuromuscular capability and movement patterning
- Postural stabilization
- Range of motion
- Strength and power



FIGURE 4. Weight shifting exercises after cruciate surgery. Courtesy of Lynn Nalepa

How to Begin Hydrotherapy Exercises for Cats⁵

Introducing a cat to hydrotherapy may be facilitated with the help of the owner, either through their reassuring presence during exercise or through accustoming the cat to being in water at home (e.g., bathing). During therapy, the rehabilitation technician or nurse should accompany the patient into the water to provide assistance and reassurance until the patient is accustomed to the activity.¹

Underwater Treadmill

Begin with a very slow speed (often the slowest speed possible), usually no more than 0.23 m/sec (0.5 mph), depending on the manufacturer settings. Initially, support and encourage the patient until it takes only 1 or 2 steps forward voluntarily or until just before it reaches the back of the exercise chamber; then stop the belt immediately. This process may only take 5 or 10 seconds, but it should be repeated 2 or 3 times. Once the cat is walking voluntarily, it can be challenged with longer durations of up to 1 minute. Many cats will tolerate only 1- or 2-minute intervals for several assisted sessions, regardless of fitness or mobility levels.

It may be helpful to vary the water level initially to find the level at which the cat will walk forward voluntarily; then increase the depth slowly to the desired level for therapeutic goals. Many cats will resist and float their hindlimbs or try climbing out of the treadmill at higher water levels. As the patient improves, lowering the water level will increase the effect of gravity, which can be advantageous for increasing range of motion or aerobic activity.

Swimming

Swimming is very difficult for any land animal, and unfit patients tire quickly. A life jacket is required for initial introduction to the swimming pool and provides a handle to guide and control the patient.⁹ Allowing the patient to swim to a chosen point and then return to a resting spot is preferred to swimming in place. Initial training sessions should be short—2 to 5 minutes each. Many cats will not tolerate longer sessions.

Each patient's acceptance of swimming as therapy must be judged. Some cats are fine on an underwater treadmill but never accept swimming. Others take to

the water and, with motivation from a favorite toy stored in catnip or a favorite treat, will gladly perform any task

(FIGURE A). Rehabilitation technicians should observe individual patients and not push them beyond their comfort zone to where they become stressed or frightened.

Rehabilitation technicians should observe individual patients and not push them beyond their comfort zone to where they become stressed or frightened.

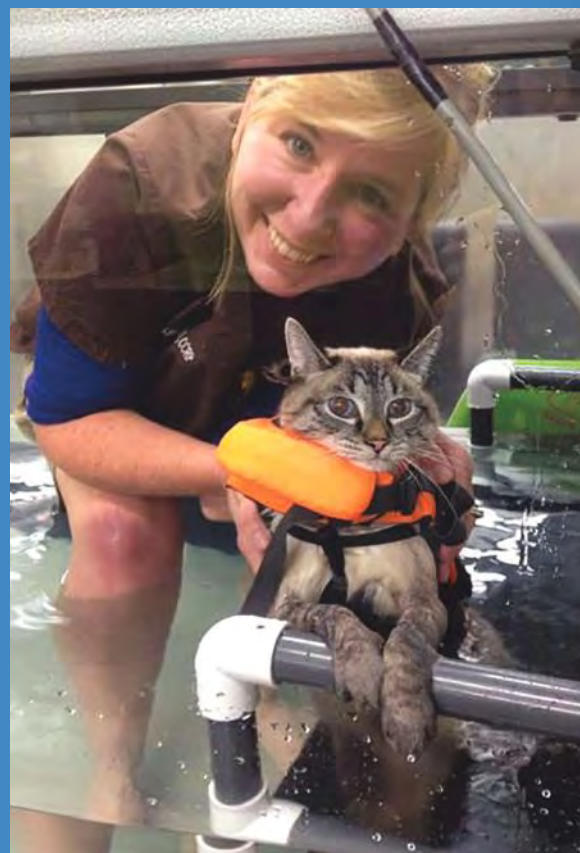


FIGURE A. This feline patient with unknown neurologic trauma affecting both hindlimbs tolerated underwater treadmill exercises and swimming well. *Courtesy of Lynn Nalepa*

Types of Exercise

Strengthening. Strength training is a type of physical exercise specializing in the use of resistance to induce muscular contraction, which builds the strength, anaerobic endurance, and size of skeletal muscles. Strengthening exercises include running, uphill and downhill slope work, use of leg or body weights, dancing, wheelbarrowing, and swimming.¹

Flexibility (suppleness). Flexibility is defined as a joint's range of motion or its ability to move freely. It also refers to muscle mobility, which allows for more movement around the joints. Flexibility allows cats to get through difficult spaces and affords some protection from injury. Flexibility exercises can include activities that encourage the cat to reach or stretch or to maneuver around or through obstacles.¹

Balance and proprioception. Balance is the ability to move or to remain in a position without losing control or falling. It depends partly on proprioception, which is an animal's awareness of where its body is in time and space. Age, physical or neurologic injury, and surgery can all negatively affect proprioception. Balance exercises may require cats to respond to rapid changes in a supporting surface (e.g., wobble cushion, balance pad, trampoline) or changes of direction.¹ Proprioception exercises may include weight shifting or walking in patterns or over uneven surfaces¹ (FIGURES 3 and 4).

Endurance (stamina). Endurance is the ability of an organism to exert itself and remain active for a long period of time, as well as its ability to resist, withstand, recover from, and have immunity to trauma, wounds, or fatigue. Endurance exercises, usually in the form of aerobic or anaerobic exercise, allow for cardiovascular changes to occur. Because aerobic exercise sessions often exceed 15 minutes, they are used less often for cats, but they but can be considered as part of a rehabilitation plan.¹

Land-Based Exercise

Most exercise programs designed for cats primarily consist of exercises performed on land, rather than in water.¹ They may involve direct contact with a therapist, such as assisted standing, wheelbarrowing, dancing, or bicycling in lateral recumbency, in which the cat is placed on its side and its legs are put through ROM exercises similar to bicycling. They may also involve activities such as playing with laser lights, toys, and treats; crawling under cavaletti poles; or other creative uses of equipment that the cat navigates on its own.

The credentialed veterinary technician will be interacting a great deal with the owner, carrying out parts of the therapeutic plan, and monitoring comfort levels during therapy.

Water-Based Exercise

Hydrotherapy (e.g., swimming, underwater treadmill) is a very popular form of rehabilitation therapy for dogs and can be used with cats that will tolerate it. The natural properties of water (e.g., density, buoyancy, resistance) make water-based exercise one of the most useful forms of rehabilitation therapy by reducing the concussive effects of active exercise and helping improve limb mobility, strength, and joint ROM.³⁴

Water aspiration and drowning are real risks during hydrotherapy; therefore, no animal should ever be left unattended during a hydrotherapy session,¹ and the patient should wear an appropriately sized lifesaving vest. For more information, see **HOW TO BEGIN HYDROTHERAPY EXERCISES FOR CATS**.

CONCLUSION

Physical rehabilitation for cats is different than that for dogs. The basic therapeutic principles remain the same, but the plan must be creative, fun, easy to follow, and include short intervals to accommodate the feline attention span, which is much shorter than that of dogs. Before beginning any rehabilitation therapy, patients must be examined by the rehabilitation veterinarian. This examination should include pain assessment and scoring, in addition to observation of patient stress. The rehabilitation veterinarian is responsible for designing and prescribing the therapeutic plan. The credentialed veterinary technician or nurse trained in physical rehabilitation will most likely be interacting a great deal with the owner, carrying out parts of the therapeutic plan and monitoring comfort levels during therapy. Feline patients can benefit from a rehabilitation program just like canine patients. ■