

Physical Therapy

After an episode of low back pain has lasted between two and six weeks, or if there are frequent recurrences of low back pain, it is reasonable to consider back pain exercises and physical therapy for treatment. Some spine specialists consider back exercise and physical therapy even sooner if the pain is severe. In general, the goals of back pain exercises and physical therapy are to decrease back pain, increase function, and provide education on a maintenance program in order to prevent further recurrences. These goals are reached through various physical therapy modalities which are explained in more detail below.

Passive Physical Therapy

When treating acute back pain, the therapist may focus on decreasing pain with passive physical therapy. These are considered passive therapies because they are done *to* the patient rather than requiring active patient participation. Multiple modalities are commonly employed to reduce low back pain which include heat/ice packs, TENS units, iontophoresis, and ultrasound.

- ❖ **Heat and Ice Packs:** Heat and/or ice are the most commonly used form of passive physical therapy, and they help to reduce muscle spasm and inflammation. Some patients find more relief with heat packs and others with cold therapy such as ice massage – the two may also be alternated. They are generally applied for about 10-20 minutes once every two hours, and are more useful during the first few days in the course of an episode of pain, although they can also be helpful for chronic back pain.
- ❖ **Iontophoresis:** Iontophoresis is a means of delivering steroids through the skin. The steroid is applied to the skin and then an electrical current is applied that causes it to migrate under the skin. The steroids then produce an anti-inflammatory effect in the general area that is causing pain. This modality is especially effective in relieving acute episodes of pain.
- ❖ **TENS Units:** A transcutaneous electrical nerve stimulator (TENS) unit uses electrical stimulation to modulate the sensation of low back pain by overriding the painful signals that are sent to the brain. A trial of electrotherapy with the TENS unit is usually done first, and if the patient experiences substantial pain relief, a TENS unit may be used at home for low back pain relief on a long-term basis.
- ❖ **Ultrasound:** Ultrasound is a form of deep heating in which sound waves are applied to the skin and penetrate into the soft tissues. Ultrasound is especially useful in relieving acute episodes of pain and may enhance tissue healing.

Active Physical Therapy

A typical response to experiencing back pain is to take it easy by either staying in bed or at least stopping any activity that is at all strenuous. While this approach is understandable and may even be recommended in the short term, when done for more than a day or two it can actually undermine healing. Instead, active forms of exercise are almost always necessary to rehabilitate the spine and help alleviate back pain.

When done in a controlled, gradual, and progressive manner, active exercise distributes nutrients into the soft tissues in the back to keep the discs, muscles, ligaments, and joints healthy. Consequently, a regular exercise routine helps patients avoid stiffness and weakness, minimize recurrences of low back pain, and reduce the severity and duration of possible future episodes of low back pain.

Depending upon the patient's specific diagnosis and level of pain, the back pain exercise and rehabilitation program will be very different, so it is important for patients to see a spine specialist trained to develop an individualized back exercise program and to provide instruction on using the correct form and technique.

To be effective, a patient's back pain exercise program should be comprehensive, working the whole body even if it targets the back. A balanced workout should include a combination of stretching, strengthening, and low impact aerobic conditioning.

Stretching

Almost everyone can benefit from stretching the soft tissues (muscles, ligaments and tendons) in the back and around the spine. The spinal column and its contiguous muscles, ligaments and tendons are all designed to move, and reduced motion can accentuate back pain. Stretching different muscles and ligaments is essential for gaining and maintaining mobility and flexibility. Patients with chronic back pain may find that it takes weeks or months of stretching to mobilize the spine and soft tissues, but will find that meaningful and sustained relief of low back pain typically follows the increase in motion.

Since other exercises may not be done everyday, stretching should not be just linked to other back pain exercises. In order to make stretching exercise a part of one's daily routine, it is best to stretch every morning when getting up and before going to bed. Stretching exercises are good back hygiene, just like brushing one's teeth twice a day is good dental hygiene. Just 5-10 minutes of stretching in the morning and at night can provide significant back pain relief over time. If one already has low back pain or neck pain, it is best to check with a physician or physical therapist to discuss whether the stretching exercises should be done. Also, always keep in mind when starting a stretching routine to wear comfortable clothes that won't bind, to not force the body into difficult and/or painful positions, to move into the stretch slowly and avoid bouncing (which may actually tear muscles), to hold stretches for 20-30 seconds to allow muscles or joints to become loose, and to repeat the stretch generally 5-10 times. Some of the most common types of stretches are listed below.

- ❖ **Neck and Shoulder Stretches:** A stiff back is sometimes accompanied by a stiff neck. The following exercises can be done to stretch the neck and shoulder area.
 - *Flexion Stretch (Chin-to-Chest):* While standing or sitting, gently bend the head forward while bringing the chin toward the chest until a stretch is felt in the back of the neck.
 - *Lateral Flexion Stretch (Ear-to-Shoulder):* This exercise stretches the neck area below the ears as well as the top of the shoulder. To begin, gently bend the neck to one side as if to touch the ear to the shoulder until a stretch is felt in the side of the neck. Switch to stretch the other side.

- ❖ **Back Stretches:** Many back pain patients know the feeling of tension in the back, especially first thing in the morning. These stretching exercises can help bring back some suppleness and increase mobility and decrease back pain and discomfort.
 - *Back Flexion:* While lying on one's back, pull both knees to the chest while simultaneously flexing the head forward until a comfortable stretch is felt in a balled-up position.
 - *Knee-to-Chest Stretch:* While lying on the back with the knees bent and both heels on the floor, place both hands behind one knee and bring it to the chest.

- ❖ **Hips and Gluteus Stretches:** The hips and buttocks (where the gluteus muscles are) support the lower back and stretching these muscle groups plays a pivotal role in maintaining spine flexibility.
 - *Hip Stretch:* While standing with feet should-width apart, take a half-step back with the right foot, bend the left knee and shift weight back to the right hip. While keeping the right leg straight, bend forward more and reach down the right leg until a stretch in the outer hip is felt.
 - *Piriformis Muscle Stretch:* Lie on the back and cross one leg over the other and gently pull the other knee toward the chest until a stretch is felt in the buttock area.

- ❖ **Hamstring Stretches:** The hamstrings run through the back of each thigh. Tightness in this muscle limits motion in the pelvis which can increase stress across the low back and interfere with correct posture. Stretching the hamstrings can gradually lengthen them and reduce the stress felt in the lower back. Hamstring stretching should include applying pressure to lengthen the hamstring muscle for 30-45 seconds

at a time, one to two times each day. The hamstring muscles will lengthen over time, decreasing stress on the low back.

- *Standing Hamstring Stretch:* While standing, simply bend forward at the waist with arms hanging down and with legs relatively straight. Try to touch the toes but do not strain to do so. Stop when a stretch is felt in the hamstring.
- *Chair Hamstring Stretch:* Sit on a chair and place the legs straight out in front on another chair. In this position, reach toward the toes. One leg at a time may be stretched.
- *Towel Hamstring Stretch:* Lie on the floor and pull the leg up and straighten by holding onto a towel that is wrapped behind the foot. One leg at a time may be stretched. Another less stressful option is to lie on the floor, with the buttocks against a wall, and place the foot up against the wall and then try to push the knee straight. One leg at a time may be stretched.

Strengthening

Just like reinforced steel can bear more weight than sheet aluminum, a strong and well-conditioned back can withstand more stress and protect the spine better than a back that has not been conditioned through exercise. Conditioning through flexibility and strengthening exercises not only helps the back avoid injury, or minimize the severity of injury if the spine is traumatized, it also can help relieve the pain of many back conditions.

Many exercises can help strengthen the spinal column and the supporting muscles, ligaments, and tendons. Most of these exercises focus not only on the back, but also the abdominal muscles and buttocks and hip muscles. Taken together, these strong muscles can provide back pain relief because they provide strong support for the spine, keeping it in alignment and facilitating movements that extend or twist the spine.

Two of the most well-known strengthening exercises are McKenzie exercises and Dynamic Lumbar Stabilization. These back exercises are generally first learned by working with a physical therapist who can demonstrate the exercises and correct a patient's form to ensure strengthening and/or back pain relief is achieved. Although McKenzie exercises and dynamic lumbar stabilization exercises tend to be used for specific conditions, when appropriate, the two forms of physical therapy exercise may also be combined.

- ❖ **McKenzie Exercises:** These back exercises are named after a physical therapist in New Zealand who found that extending the spine through exercise could reduce pain generated from a compromised disc space. Theoretically, extension exercises may also help reduce the herniation of the disc itself and reduce pressure on a nerve root. There is a wide range of McKenzie exercises, some of which are done standing up while others are performed lying down. All of them use core muscle contraction and, usually, arm motions to stabilize the trunk and extend the spine. For patients who are suffering from leg pain due to a disc herniation (radiculopathy), extending the spine with McKenzie back exercises may also help reduce the leg pain by moving the pain from the leg to the back. For most patients, back pain is usually more tolerable than leg pain, and if a patient is able to centralize the pain, they may be able to continue with non-surgical treatment (such as exercise) and avoid a surgical discectomy. When the pain is acute, the exercises should be done frequently (every one to two hours). To be effective, patients should try to avoid flexing the spine (bending forward) during exercising as this undercuts the strengthening motion. McKenzie exercises may also be helpful for those individuals who have back pain due to degenerative disc disease. While sitting or flexing forward can accentuate low back pain for patients with degenerative disc disease, extending the spine can serve to relieve the pressure on the disc. Note that the opposite is true in elderly patients who have facet osteoarthritis and/or lumbar stenosis (extending the spine jams the facet joints on the back and increases pressure across the joints, so these patients will typically feel better sitting, and have more pain with extension).
- ❖ **Dynamic Lumbar Stabilization Exercises:** With this back exercise technique, the physical therapist first tries to find the position that allows the patient to feel most comfortable. The back muscles are then exercised to teach the spine how to stay in this position. This back exercise technique relies on the

awareness of where one's joints are positioned. Performed on an ongoing basis, these exercises provide pain relief and help keep the back strong and well positioned.

These lumbar stabilization exercises may also be done in conjunction with McKenzie exercises. The McKenzie exercises serve to reduce back pain, and the stabilization exercises help strengthen the back. Stabilization exercises can be rather rigorous and therefore may not be well tolerated by all patients. It may be advisable for elderly patients or patients in significant pain to use other less strenuous means of physical therapy and back exercise to strengthen the back.

The above two exercise programs are commonly prescribed to treat low back pain and leg pain, but many other forms of exercise can also provide pain relief and help with rehabilitation. The important concept is that the exercise includes controlled and progressive strengthening exercises. Alternative forms of strengthening exercise that can be gentle on the back include Pilates, yoga, and tai chi. There are several forms of these disciplines, and they are best learned while working with a certified trainer or practitioner.

Low-Impact Aerobic Exercise

Exercise that increases the heart rate for a sustained period is very beneficial for back problems. Aerobic exercise increases the flow of blood and nutrients to back structures which supports healing, and can decrease the stiffness in the back and joints that lead to back pain. While many patients with back pain can participate in exercises like running or step aerobics, others find it easier to engage in low-impact exercises, which do not irritate the spine.

Reconditioning through aerobic exercise is very useful for both rehabilitation and maintenance of the lower back. Patients who regularly undertake aerobic exercise to condition the back will benefit by having fewer episodes of low back pain and by experiencing less pain when an episode occurs. They are also more likely to stay functional (continue working and carry on with recreational activities), whereas those patients with chronic low back pain who do not engage in aerobic exercise are more likely to experience the gradual loss of functional capabilities. Exercise also makes it easier to control weight or lose weight, decreasing the stress placed on the spine structures and joints. In addition, an increased production of endorphins (body's natural pain killers) is seen after 30 or 40 minutes of exercise which can combat pain and help patients reduce their reliance on pain medication. Endorphins can also elevate mood and relieve symptoms of depression, a condition common in those with back pain or a back injury.

There are several types of aerobic exercise that are gentle on the back and, when done on a regular basis, highly effective in providing conditioning.

- ❖ **Walking:** In general, walking for exercise is very gentle on the back, and walking two to three miles three times per week is very helpful for patients. Walking also has the advantage of not requiring special equipment, and it can be done inside or outside, in almost any location, including at home on a treadmill.
- ❖ **Stationary Bicycling:** For those patients who are more comfortable seated rather than standing, biking or stationary biking may be preferable. Bicycling or 'spinning' classes have grown in popularity over the last decade as more people realize the benefits of this lower impact form of exercise. There are several upright and recumbent bikes that can be purchased for home use, and many come with programs preloaded so that patients have a good variety of sessions from which to choose.
- ❖ **Elliptical Trainer or Step Machine:** These machines provide a low-impact workout because the participant is using pedals suspended above the ground to move in a continuous oval motion, as opposed to continuously stepping on a hard surface. The motor on the machine facilitates a smoother step or forward glide motion, which is less irritating to the back than walking. The benefit of these machines is that they provide an aerobic workout which is comparable to strengthening or resistance training because the arms of most cross-training machines can be pushed and pulled, thus working the upper body, and the resistance of the pedaling motion can be increased to require greater muscle exertion to maintain the movement.

- ❖ **Water Therapy:** Doing exercise in water provides for effective conditioning while minimizing stress on the back because the buoyancy of water counteracts the gravitational pull that can compress the spine. The patient, therefore, becomes more mobile and exercises are less painful. Exercises such as hip abduction lifts, bicep curls, arm circles, and triceps kickbacks are all easier done in water for most people. All these muscles build strength in the low back or neck, and reduce back pain. Water therapy exercise is especially useful for patients in too much pain to tolerate land exercises on a mat or hard floor, or for elderly patients.

Whatever low-impact exercise is used, the exercise should be vigorous enough to increase the heart rate to the target zone (which is scaled to the age of the patient) and keep it elevated. Increasing the heart rate for at least 20 minutes is required to improve cardiovascular strength, burn excess calories, and make noticeable strides in fitness.

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