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## YOUR GUIDE TO PHYSICAL THERAPY

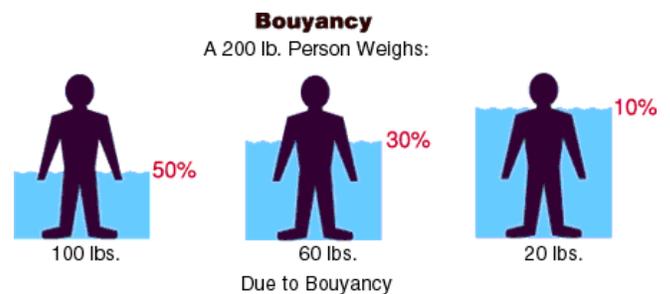
### VOLUME 3

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By decreasing the amount of joint stress it is easier and less painful to perform exercises.



## The Benefits of Aquatic Therapy

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*About.com Health's Disease and Condition content is reviewed by the Medical Review Board*

Aquatic therapy or pool therapy consists of an exercise program that is performed in the water. It is a beneficial form of therapy that is useful for a variety of medical conditions. Aquatic therapy uses the physical properties of water to assist in patient healing and exercise performance.

One benefit of aquatic therapy is the buoyancy provided by the water. While submerged in water, buoyancy assists in supporting the weight of the patient. This decreases the amount of weight bearing which reduces the force of stress placed on the joints. This aspect of aquatic therapy is especially useful for patients with arthritis, healing fractured bones, or who are overweight.

The viscosity of water provides an excellent source of resistance that can be easily incorporated into an aquatic therapy exercise program. This resistance allows for muscle strengthening without the need of weights. Using resistance coupled with the water's buoyancy allows a person to strengthen muscle groups with decreased joint stress that cannot be experienced on land.

Aquatic therapy also utilizes hydrostatic pressure to decrease swelling and improve joint position awareness. The hydrostatic pressure produces forces perpendicular to the body's surface. This pressure provides joint positional awareness to the patient. As a result, patient proprioception is improved. This is important for patients who have experienced joint sprains, as when ligaments are torn, our proprioception becomes decreased. The hydrostatic pressure also assists in decreasing joint and soft tissue swelling that results after injury or with arthritic disorders.

Lastly, the warmth of the water (Aquatic therapy is performed in a heated pool with temperatures normally between 92 and 96 degrees) experience during aquatic therapy assists in relaxing muscles and vasodilates vessels, increasing blood flow to injured areas. Patients

with muscle spasms, back pain, and fibromyalgia find this aspect of aquatic therapy especially therapeutic.

It is important to know however, that aquatic therapy is not for everyone. People with cardiac disease should not participate in aquatic therapy. Those who have fevers, infections, or bowel/bladder incontinence are also not candidates for aquatic therapy.

<http://physicaltherapy.about.com/od/strengtheningexercises/a/aquatictherapy.htm> (accessed 5/14/09)

### **Aquatic Therapy is Beneficial for Patients Recovering from:**

- Sports and work related injuries requiring rapid rehabilitation
- Lower extremity fractures with internal fixation allowing for early range of motion, with minimal weight bearing.
- Rheumatic disorders including rheumatoid arthritis, osteoarthritis, and fibromyalgia.
- Lumbar strain, sciatic and degenerative disc disease
- Post-operative lumbar laminectomy patients.
- Podiatric disorders and osteotomy surgery
- Shoulder, knee, and ankle reconstructive surgery.

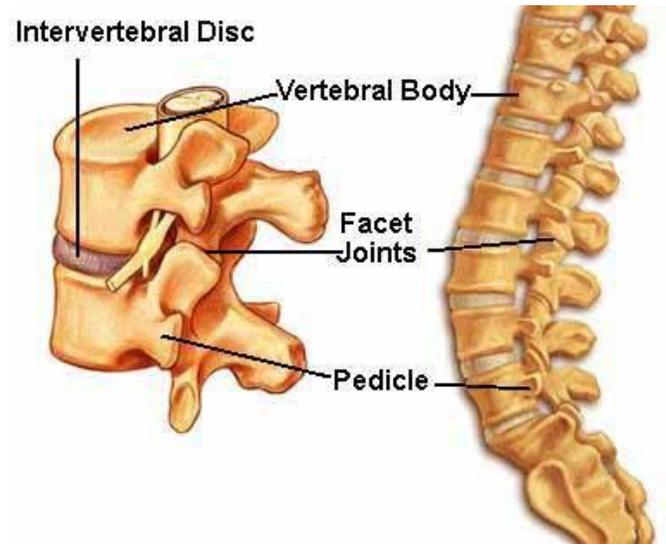
### **Reason to use Aquatic therapy**

- Buoyancy (up to 90% of our body weight is removed)
- Reduced pain & muscle spasm
- Increased range of motion
- Increased relaxation
- Increased circulation
- Decreased swelling
- Decreased rehabilitation time (because movement can be initiated easier)
- Cardiovascular conditioning
- Accelerates healing process
- Allows patients mobility and freedom

<http://www.lakewayaquatics.com/aquatherbenefits.htm> (accessed 5/14/09)

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As you can see from the image below, your back, or spine, is made up of many parts. First, we're going to look at the bone structures. Your backbone, also called your vertebral column, helps support a lot of your body weight, and it protects your spinal cord. You have 33 vertebrae (bones) that make up the vertebral column. In the image, they're labeled as "Vertebral Body."



### **Parts of the Spine**

Your spine is divided into regions: there's your neck (cervical spine), mid-back (thoracic spine), and low back (lumbar spine). At the bottom of your spine, you also have the sacrum and the coccyx, which is commonly called your tailbone.

The vertebrae in your neck are labeled C1-C7, meaning that you have seven vertebrae in that region. Most adults have 12 vertebrae in the thoracic spine (T1-T12), which goes from your shoulders to your waist. Then there are five vertebrae in your low back (L1-L5), and below that, your sacrum is made up of five vertebrae between the hipbones. By the time you're an adult, these five bones have fused into one bone. The coccyx is made of small fused bones at the very tail of your spine (hence the tailbone).

Your spine also has facet joints, which are on the posterior side (back) of your vertebrae. These joints (like all joints in your body) help facilitate movement and are very important to your flexibility.

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# **A Pain in the Back:**

## **Anatomy of Back Pain**

Another vertebral bone structure that's labeled in the image is the pedicle. These are on either side of your vertebrae, and they are part of the "walls" for your spinal canal.

In between your vertebrae, you have intervertebral discs (also labeled on the image). These act like pads or shock absorbers for your spine as it moves. Each disc is made up of a tire-like outer band called the annulus fibrosus and a gel-like inner substance called the nucleus pulposus.

Together, the vertebrae and the discs provide a protective tunnel (the spinal canal) to house the spinal cord and spinal nerves. These nerves run down the center of the vertebrae and exit to various parts of the body, where they help you feel and move.

Your back also has muscles, ligaments, tendons, and blood vessels. Muscles are strands of tissues that act as the source of power for movement. Ligaments are the strong, flexible bands of fibrous tissue that link the bones together, and tendons connect muscles to bones and discs. Blood vessels provide nourishment. These parts all work together to help you move.

Back pain may be a result of injury to any or all of these body parts. Injury to the muscles, ligaments, tendons can result in sprains or strains, which are generally not considered serious. However, injury to bones, nerves, or blood vessels may be more serious. Also, the outer layers of the intervertebral discs can get tears or cracks, allowing the annulus fibrosus or nucleus pulposus to bulge out. Any of these injuries can cause inflammation and pain.

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<http://www.spineuniverse.com/article/back-pain-anatomy-3901.html> (accessed 5/14/09)

## Causes of Back Pain

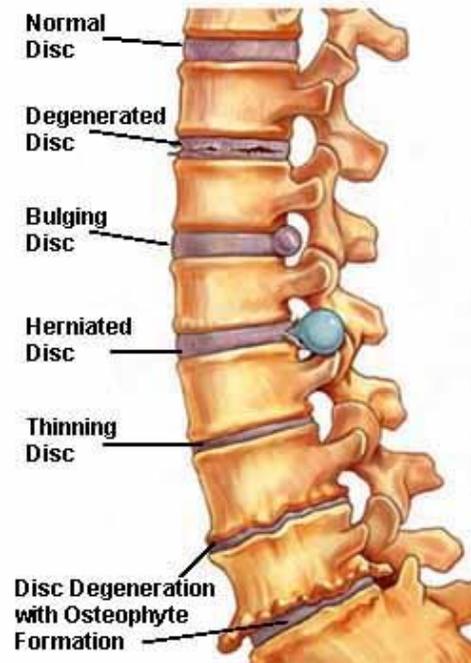
Because there are a variety of causes of back pain, it's vital to know the exact cause of your pain, and your doctor will help figure that out.

You may not remember injuring your back—but your back certainly does, and the pain is trying to tell you something. Or you may not know that something is wrong with your spine until a stressful movement aggravates the condition. Some common causes of back pain include:

- **Agging:** Ligaments thicken and discs dry out with age—that's just part of what happens to us as we grow older. These age-related changes in the spine may lead to disorders that create

pressure on your spinal nerves—meaning that you'll have symptoms such as pain, numbness, or weakness. Degenerative disc disease is an example of an age-related spinal disorder. Over time, your discs can lose their normal structure and function. That is just wear and tear, but it can result in a bulging disc or a herniated disc and pain.

## Examples of Disc Problems



Sometimes, the bulging or herniated disc can push on a nerve, causing pain that travels to another part of your body. For example, a herniated disc could push on a nerve in your low back and send a shooting pain down your leg (also known as sciatica). Pain that travels from the origin to another part of your body is called radiculopathy. You can experience cervical radiculopathy, which affects your arms mainly, or lumbar radiculopathy, which affects your legs.

- **Daily Life:** Just getting through every day takes its toll on your body. Stress and emotional tension can cause muscles to tighten and contract, resulting in pain and stiffness. Since we carry most of our weight in our backs, that's where we can feel the end result of tense daily living: tight muscles and painful movements.

Also, the way you're getting through your day could be the cause of your back pain. Poor posture—standing for long periods of time or sitting incorrectly—can cause back pain (so watch out while you're at the office). Low back

pain is often associated with heavy physical work, lifting or forceful movement, bending or twisting, or awkward positions. If you don't use proper lifting techniques while hefting a box of books, for example, you can really hurt your back.

Even healthy, normal activities can cause muscle sprains and strains, which can lead to back pain. Gardening, tennis, horseback riding, biking, and even golf can all potentially hurt your back.

- **Injuries and Accidents:** You can fracture a spinal bone in a fall or a car accident. If you have osteoporosis, a condition that weakens your bones, you're much more prone to fracturing a bone.

You can have a sports-related injury, such as pain caused by being tackled too many times in football. These are the sudden, unexpected causes of back pain that most likely require immediate medical attention.

- **Obesity:** Being overweight puts pressure and stress on the back, especially the low back. Plus, carrying excess weight aggravates other health conditions such as osteoporosis (weak bones), osteoarthritis (joint pain), rheumatoid arthritis (an autoimmune disease), degenerative disc disease (described above in the aging section), spinal stenosis, and spondylolisthesis.

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<http://www.spineuniverse.com/article/back-pain-causes-3902.html> (accessed 5/14/09)

## Physical Therapy to Relieve Back Pain

To help relieve your back pain, you may have to go to physical therapy. There, a physical therapist will work with you to restore movement and help your body heal. The therapist may also teach you about ways to minimize pain in the future.

Physical therapy includes both passive and active treatments. Passive treatments help to relax you and your body. They're called passive because you don't have to actively participate. Your physical therapy program may start with passive treatments as your body heals, but the goal is to get into active treatments. These are therapeutic exercises that strengthen your body and help prevent a recurrence of your back pain.

## Passive Treatments

Your physical therapist may give you passive treatments such as:

- **Deep Tissue Massage:** This technique targets spasms and chronic muscle tension that perhaps builds up through daily life stress. You could also have spasms or muscle tension because of strains or sprains. The therapist uses direct pressure and friction to try to release the tension in your soft tissues (ligaments, tendons, muscles).

- **Hot and Cold Therapies:** Your physical therapist will alternate between hot and cold therapies. By using heat, the physical therapist seeks to get more blood to the target area because an increased blood flow brings more oxygen and nutrients to that area. Blood is also needed to remove waste byproducts created by muscle spasms, and it also helps healing.

Cold therapy, also called cryotherapy, slows circulation, helping to reduce inflammation, muscle spasms, and pain. You may have a cold pack placed upon the target area, or even be given an ice massage. Another cryotherapy option is a spray called fluoromethane that cools the tissues. After cold therapy, your therapist may work with you to stretch the affected muscles.

- **TENS (transcutaneous electrical nerve stimulation):** A TENS machine stimulates your muscles through variable (but safe) intensities of electrical current. TENS helps reduce muscle spasms, and it may increase your body's production of endorphins, your natural pain killers. The TENS equipment your physical therapist uses is relatively large. However, a smaller machine for at "at home" use is also available. Whether large or small, a TENS unit can be a helpful therapy.
- **Ultrasound:** By increasing blood circulation, an ultrasound helps reduce muscle spasms, cramping, swelling, stiffness, and pain. It does this by sending sound waves deep into your muscle tissues, creating a gentle heat that enhances circulation and healing.

## Active Treatments

In the active part of physical therapy, your therapist will teach you various exercises to improve your flexibility, strength, core stability, and range of motion (how easily your joints move). Your physical therapy program is individualized, taking into consideration your health and history. Your exercises may not be suitable for another

person with back pain, especially since your pain might not even be caused by the same condition.

If needed, you will learn how to correct your posture and incorporate ergonomic principles into your daily activities. This is all part of the "self-care" or "self-treatment" aspect of physical therapy: through physical therapy, you learn good habits and principles that enable you to take better care of your body.

Your physical therapist may also suggest a personalized exercise program for you. This can help reduce the likelihood of your back pain recurring and can also improve your overall health.

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<http://www.spineuniverse.com/article/back-pain-physical-therapy-treatments-3912.html> (accessed 5/14/09)

