This eBook addresses a medical aspect of health and fitness, demonstrating my ability to write about health topics other than just exercise.▫
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Live Again!

How to Get Rid of Your Back Pain and Live a Normal Life Once Again

By John E. Fike

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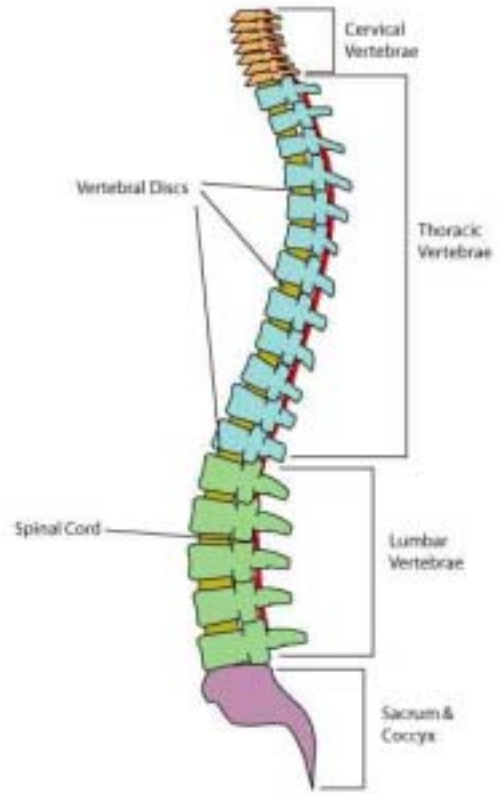

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Chapter Two:
How Your Back Works
& Why It Gets Injured

Knowing how the back is constructed and how its various pieces work together will help you understand what occurs when you experience injury and pain in your back.

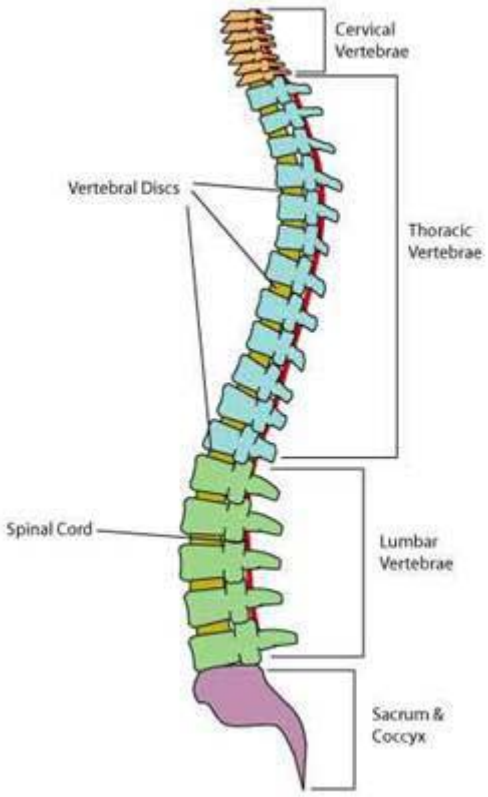
THE VERTEBRAL COLUMN

The spinal or vertebral column is comprised of a series of up to 34 small bones stacked on top of each other to form the spine. These bones, called vertebrae, are sort of cylindrical in shape with several bony protrusions off the back side. You can feel those protrusions as small bumps up the middle of your back. Each vertebrae is separated from the ones above and below by thin rubbery disks, called vertebral disks. The vertebrae are bound together by a network of muscles, tendons and ligaments.

The vertebral column serves three primary functions:

1. It provides the vertical posture of the human body and holds the body upright.
2. It allows a wide variety of movement
3. It protects the spinal cord from damage

Medical science has categorized vertebrae into five types. The top 7 vertebrae that make up your neck and support your head are known as the cervical vertebrae. Cervical vertebrae have perhaps the widest range of motion in the spine. The next 12 vertebrae comprise the middle back or dorsal area and are known as the thoracic vertebrae. Thoracic vertebrae attach to the ribs and tend to be less mobile that other vertebrae because of it. Next comes the lumbar region, or lower back, where the vast majority of back pain occurs. There are 5 lumbar vertebrae in the lower back and they are the largest vertebrae in the spine. They also bear the majority of the upper body's weight. The spine ends in the sacrum, which starts at birth as 5 separate vertebrae but fuses together toward adulthood. The sacrum connects to the hip bones on either side. Just beneath the sacrum are a few small bones that form the coccyx (pronounced cox-ix). Some believe the coccyx is actually the evolutionary remains of a tail as it bears some similarities to tails in animals.



Looking at the diagram of the spine on the previous page, you can see that the vertebral column is not a straight column, but that it has a variety of curves. The curves form two necessary functions. First, they make space for the vital organs of the upper body, such as the heart and lungs, to be in a position that center's the body's weight over the hips. Secondly, the curves act as springs or shock absorbers for movement. If you were to look at the leaf springs on the back axle of an old truck, you'd see that they are bowed. This bowed shape allows them to flex and spring and reduce the amount of jolting experienced the by the load in the truck. The curves of your spine work the same way; since most of your body weight is upheld by the spine, you can imagine how jolting it would be to walk, run or jump if your spine was a straight line from head to hips.

VERTEBRAL DISKS

Vertebral disks are constructed of fibrous connective tissue that acts as a shock absorber. If you were to look at a vertebral disk from the top, it would look rather like a cheese Danish. The outer rim of the disk is fibrous and tough and the center of the disk is soft and squishy. In addition to absorbing shock, the disk also allows the vertebrae to rock back and forth on each other without the bones grating against each other. As the spine flexes or extends, the watery center of the disks shift to expand one side of the joint and allow the opposite side to come closer together.

When you hear someone talk about a bulging, herniated or ruptured disk, they are talking about deformities to the vertebral disks. A bulging or herniated disk is one in which a part of the disk protrudes out from between the vertebrae it separates. A ruptured disk is one that has torn to some degree. We'll talk more about bulging disks and ruptured disks more in the next chapter. You may also hear someone talk about a slipped disk. A slipped disk is actually a misnomer and most often refers to a ruptured disk. Vertebral disks don't actually slip out from between the vertebrae because they are wrapped tightly by ligaments and muscles to keep them in place.

MUSCLES, TENDONS & LIGAMENTS

There are an amazing number of connective tissues and muscles that surround the vertebrae, connect them to each other and connect them to other bones and body structures. To describe them all to you would require a college text book and wouldn't be of much use to you anyway. But you do need to know the basic types and functions.

Ligaments hold the spine together. There are some that join individual vertebrae and there are some that join groups of vertebrae. The Posterior Longitudinal Ligament connects the back side of all the vertebrae from head to pelvis. This ligament is thicker toward the top and thinner around the lumbar. Some surmise that the thinner ligament is partly to blame for the high frequency of lower back pain since the ligament is supposed to restrict joints from moving further than is safe. However, since the lumbar region must facilitate a large range of motion, it may be the case that the ligament is thinner in that region in order to facilitate movement.

The variety of muscles along the spine are as numerous, or perhaps more numerous, than the variety of ligaments. Vertebral muscles serve two primary functions: they move the

vertebral column, they connect the column to limbs, skull and pelvis, and they stabilize the spine to keep it strong and upright. The back has multiple layers of muscles that each do different jobs, but work together in harmony. The small, deep muscles of the spine join the individual vertebrae together and join them to ribs. These muscles are covered by larger muscles that connect sections of the spine together and connect them with other bones and joints. Those are covered by large sheets of muscle, such as the latissimus dorsi, trapezius and gluteus muscles that tie everything together and provide the bulk of our strength.

FLEXIBILITY: ADVANTAGES & DISADVANTAGES

The spine's construction gives the spine an amazing level of flexibility and mobility. If you have a goose-neck lamp at home, take a look at it. It works much like the spine in that a series of small connected parts give it great flexibility in almost any direction. The spine can bend forward, backward, left, right and allow the trunk and neck to roll in a complete circle.

Unfortunately, this same construction that gives the spine great flexibility and mobility also makes it more vulnerable to injury if not treated with respect. The general rule of mechanical science is that the more moving parts you have in something, the more vulnerable it is to breaking. Equipment and machines built for the military and for farm use tend to be big, heavy and made with as few moving parts as possible. Equipment that does require many moving parts, like an engine, are protected by large sheets of steel to keep foreign objects from getting in there and making a mess of things. That's how things are built when they need to be durable.

Your body, including the spine, are built the same way: your arms and legs, which tend to extend away from the body and are fairly vulnerable, are made with few joints (moving parts) as are necessary to get the job done. The delicate and highly mobile joints, such as shoulders, hips and the spine, are in close and covered with a myriad of muscles. Of course, these muscles facilitate the movement of the joints, but they also hold the bones, cartilage and other components in place like the armored plates of a tank or tractor keep the engines from being exposed to damaging situations. If these muscles are weak or are subject to greater loads than they can handle, damage occurs and the joint becomes painful and limited in its use until the damage is repaired.

Some have suggested that because the back, particularly the lower back, contains some of the smallest muscles that they are somehow weaker than other muscles. Yes, the really tiny muscles that connect individual vertebrae are capable of less force than a large muscle like the quadriceps when you compare one individual muscle to another. But strength is rarely a matter of one muscle verses another.

Strength is the result of total muscle tension involved in a movement—it doesn't matter if that tension comes from one muscle or many. The quadriceps is a large muscle, but it is the only one that extends the knee. The back, however, has many muscles working together to provide movement, strength and stability. And muscle is muscle—if you exercise it, it will become stronger and do its job better; if you don't exercise it, it will