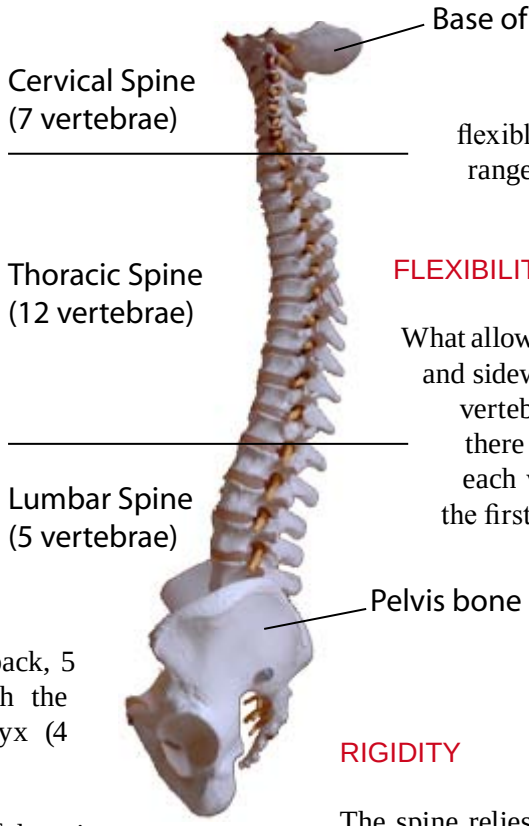
A PATIENT GUIDE TO

THE SPINE

Some 80% of the entire population will suffer from back and neck pains at some point within their lifetime. While at any one-point in time, about 20% of the adult population suffered at least one episode of back or neck pain within the past six months. These statistics make back and neck pains one of the most prevalent musculoskeletal condition. At the centre of all of this is the human spine.

THE SPINE

Your spine is a complex arrangement of various structures such as the bones, joints, muscles, ligaments, discs, a spinal cord and nerves. The most basic and perhaps the most familiar structure is the bone or vertebra. There are 24 main vertebrae altogether, stacked one on-top the other vertically; divided broadly into 3 separate regions – the cervical spine (neck – 7 vertebrae), thoracic spine (chest or mid-back, 12 vertebrae) and the lumbar spine (lower back, 5 vertebrae). The spine ends with the sacrum (5 vertebrae) and coccyx (4 vertebrae).



One of the best known function of the spine is to provide protection for the spinal cord which runs through a "hole" in the vertebra, forming a bony armour around the cord.

A lesser thought of but equally important function of the spine is to form the "foundation" on which our extremities such as arms and legs work off against in order to walk and lift things. Without a firm foundation, the effectiveness of these activities will be very low or may not even be possible.

To meet these challenging tasks, the spine must be rigid enough to provide that foundation, and at the same time flexible enough to provide us with a useful range of motion.

FLEXIBILITY

What allows our spine to bend forwards, backwards and sideways? Two things. First, the fact that the vertebrae are not fused together and second, there is an intervertebral disc sitting between each vertebra with the exception of between the first and second cervical vertebra.

This disc act as a shock absorbing device much like sitting on a ball giving you the freedom to tilt in any direction.

RIGIDITY

The spine relies on two systems to provide it with the necessary stability – a passive system and a active system.

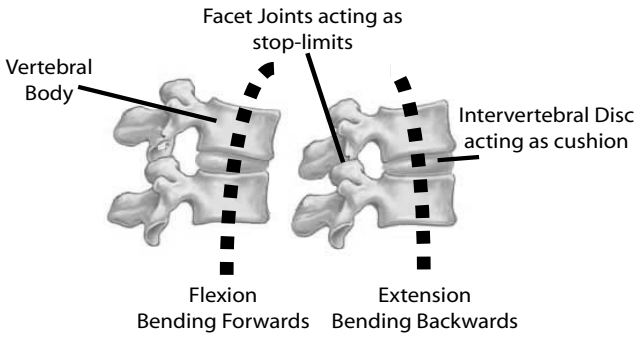
The passive system refer to structures that are static in nature such as the facet joints and ligaments.

1. The facet joints provide a hard limit to how much you can bend backwards, how far forward can the vertebra slide against each other and rotate along the spine.

2. The system of ligaments holds the alignment of

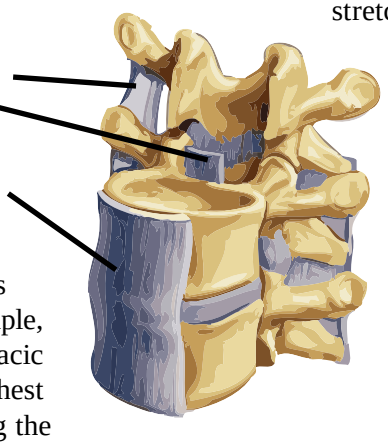
the spinal column together. Ligaments connect bone to bone and are made of a tough fibrous material.

The active system is the collection of muscles and nervous system to help provide further rigidity and support which may be dynamically adjusted to meet demands.



NERVE ROOTS

The spinal cord is essentially a bundle of nerves to control and obtain sensory feedback from the various parts of the body such as the arm and legs. These nerves originate from the spinal cord from its protective hollow of the vertebra through an opening called the foramen on each side of the vertebra forming a pair of nerve roots.



Generally speaking, the nerve roots originating from a specific position in the spinal column affects the region nearest to it. For example, nerves originating from the thoracic spine controls the arms and the chest regions while the nerves controlling the legs originate from the lower lumbar spine.

BACK AND NECK PAINS

All of the various structures listed above work closely together. When one of them is physically damaged or strained, you may suffer from back and neck pains. Some of the common problems are:

1. Vertebral bodies – aside from major trauma such as a violent accident, vertebral bodies are often damaged when the bone density drops through conditions such as osteoperosis.

2. Intervertebral Discs – Degenerative disc diseases such as slipped disc are relatively common. See your complementary "Patient Guide to Slipped Disc" for more information.

3. Facet Joints – the most common problem regarding facet joints is osteoarthritis where the cartilage in the joints wear out causing bone to grate against bone. Also, this is accompanied with the narrowing of the intervertebral spaces which may pinch or press the nerve roots. See your complementary "Patient Guide to Osteoarthritis" for more information.

4. Ligaments - an often overlook key structure in the spine. When ligaments become inflamed, they can pressed against and irate the nerve roots causing sharp pains. Ligaments can be over stretched due to the poor posture e.g. Sitting in a slouch position with little or no support from the back muscles. The slouch position is achieved simply by "hanging" off the ligaments. Overtime under constant strain, the ligaments become stretched and loose.

5. Muscles – sprains and muscles pulls are quite common especially when carry heavy loads or sudden movement before the muscles are properly warmed up.

6. Nerve Roots – when they are pinched or pressed upon, sharp shooting pains or tingling sensations are sometimes felt. Sciatica or compression on the sciatic nerve is one such condition. See your complementary "Patient Guide to Sciatica" for more information.

A healthy spine is one where all the various structures work optimally together within their limits and not with one structure working under stress to take up the load of another structure.