



Al-Mustaqbal University  
Collage of Engineering  
Prosthetics and Orthotics Engineering  
Third Stage

## **ORTHOTICS III**

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# INTRODUCTION TO THE SPINE

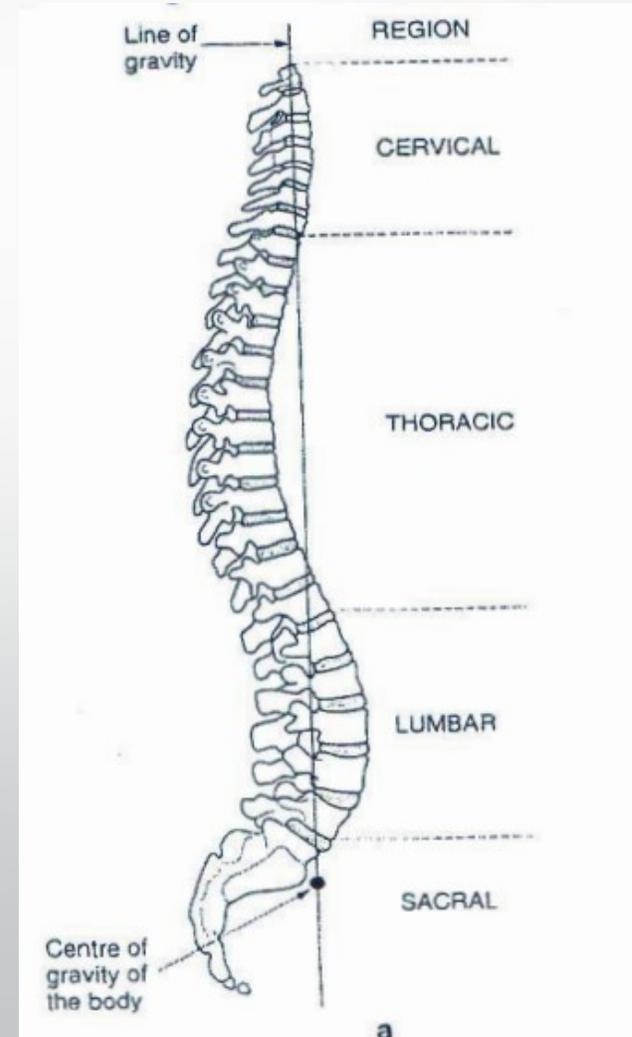
ENG. Hussein Dhameer Hussein

# The spine

- The anatomy of the spine/ vertebral column is a very complex construction of bones, ligaments, muscles, nerves and intervertebral discs (IVD's). The essential functions of the column vertebra are:
  1. To carry and support the thoracic cage
  2. To surround and protect the spinal cord
  3. To act as a shock absorber (due to the design of the curves, intervertebral discs, muscles and ligaments)

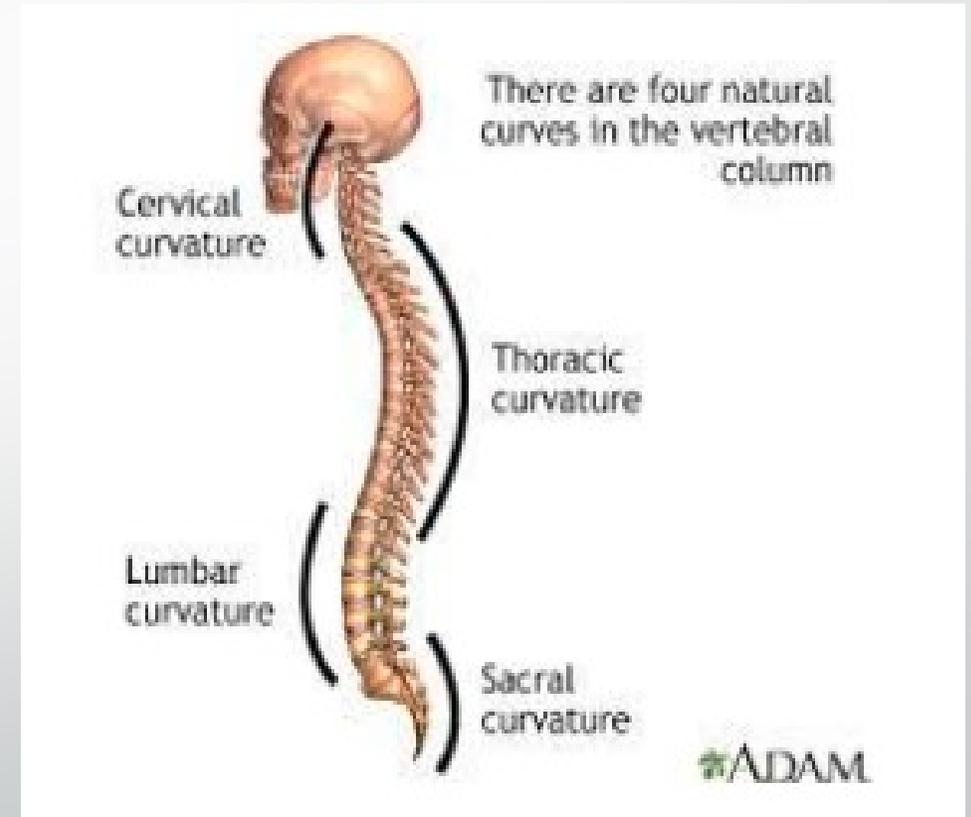
# Spine Regions

- Spine made up of 33 vertebrae divided into five regions:
  - Cervical Vertebrae
  - Thoracic Vertebrae
  - Lumbar Vertebrae
  - Sacrum (5 fused)
  - Coccyx (4 fused)
- Between these vertebrae there are intervertebral discs as Spongy, cartilaginous



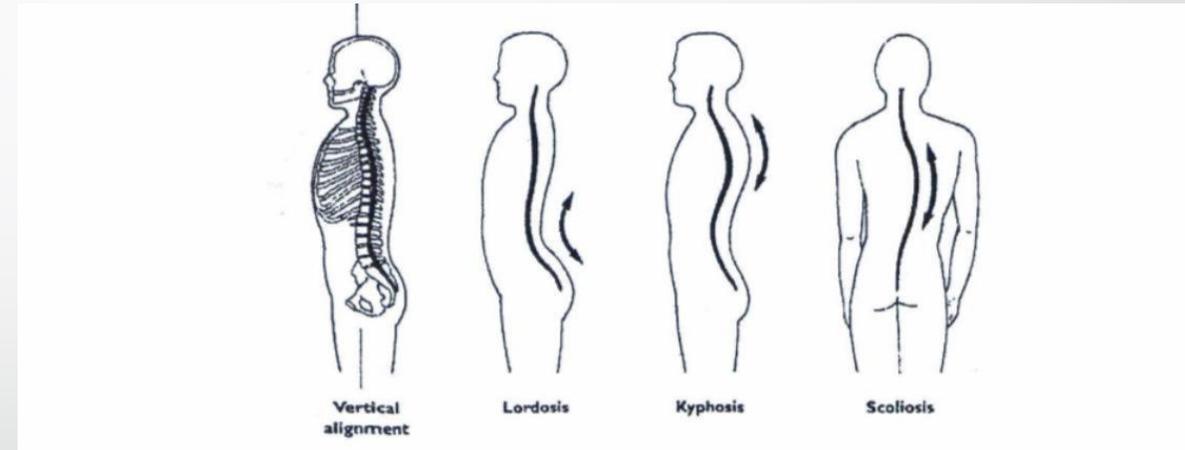
# Curves of The Spine

- Natural curve in the spine helps distribute stress.
- The two forward curves are located in the neck, or cervical spine, and lower back, or lumbar spine.
- The two backward curves are located in the chest, or thoracic spine, and hips, or sacral spine.
- These forward curves are referred to as normal lordosis whereas the backward curves are referred to as normal kyphosis.
- These natural curves are important in absorbing shock and help the spine to function.



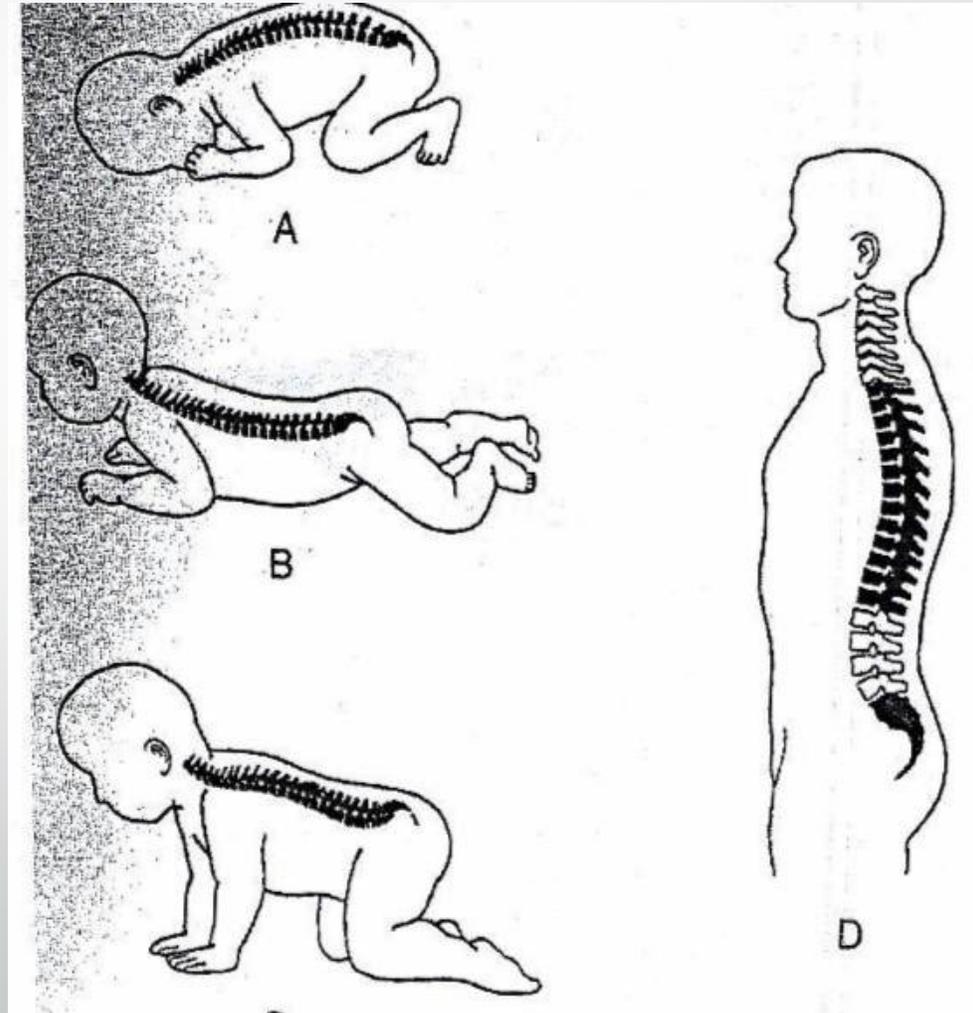
# Development of the curvatures

- When a human reaches adulthood each of the four regions of the vertebral column has a curve.
- There are two main types of curvature of the spine: Lordosis and Kyphosis. Lateral curvature of the spine is called Scoliosis, which is atypical, and will be covered later in the manual
- Lordosis is an anterior convexity curve. Kyphosis is an anterior concavity curve.



## Cont.

- At birth, a child has one long kyphosis curvature. This is referred to as the Primary curve.
- Between the age of 6-12 weeks, the first secondary curvature starts to develop, which is Lordosis in the cervical region. This is a result of the child lying on their stomach and starting to hold up its head.
- From the age of 6 months until around 2 years, the second secondary curvature develops, which is Lordosis at the lumbar region. This is as a result of the child beginning to stand and walk, requiring hip extension.



## Cont.

- At old age the curvatures start to flatten out.
- The first curve at birth is called primary curve
- The curves that develop after birth are called secondary curves.

# INTRODUCTION TO SPINAL ORTHOTICS

- The proper use of spinal orthoses requires understanding of the pathology and physiology of the disorder. Even if the symptoms are obvious, it can be difficult to do a complete analysis of the spine due to the complexity of the anatomy of the spine.
- An accurate assessment and understanding of the effects and function of the orthosis, both positive and negative is required.
- Like almost all orthoses, a spinal orthosis can have different functions, such as:
  - Correction/ prevention of deformity
  - Restriction of movement
  - Assistance with Stability/ Support
  - Reduction of load on the spine

## Cont.

- Spinal orthoses can cover all or part of the spinal region, from the cervical (neck) region down to the sacral (pelvic) region.
- The function of a spinal orthosis should be determined by the functional losses the patient presents with, coupled with the goals of the patient and members of the clinical team.