The Inherently Vulnerable Areas of the Body: Reasons why the lower back is inherently vulnerable: -

1. The lumbar area supports the **considerable weight** of the upper body and yet must be flexible enough to allow us to move. This gives a greater potential for compression meaning it is especially prone to injury.

2. **Structural differences:** There is more freedom of movement for flexion & extension at the lumbar region than for the spine just above or below making it more vulnerable; above the thoracic spine is attached to the ribcage and the shape of the spinal processes limit flexion and extension, and below the sacrum is fused. This means we can easily exert excessive compression into the lumbar region when flexing or extending, especially between L4 & L5/ L5 & S1.

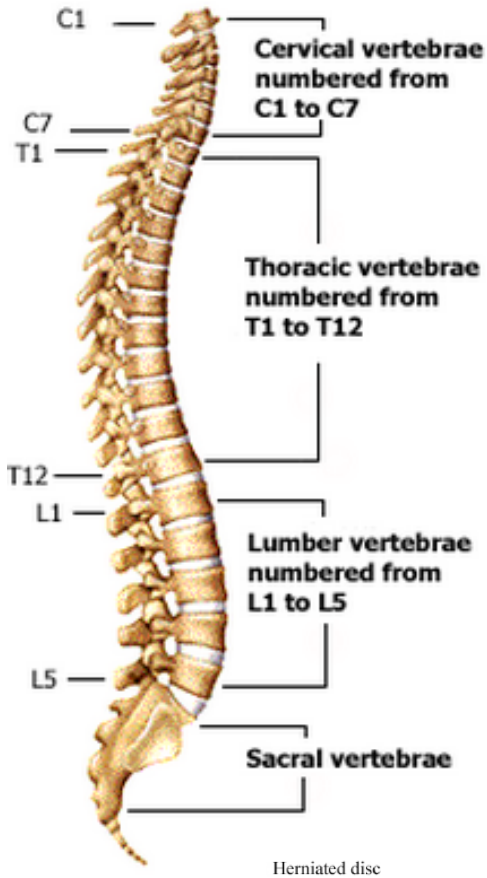
3. As we age the discs that separate and cushion the **joints lose fluid becoming less flexible** and we may find that degeneration leads to bone moving against bone without cushioning.

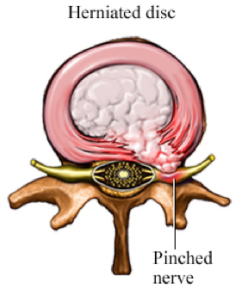
4. Due to **continued repeated pressure on particular vertebral discs** at first the inner nucleus can be torn and then it can become misshapen causing pain; eventually if all of the coverings are broken, the gel-like fluid inside can protrude or herniate and press against spinal nerves. This is a major cause of sciatica where there is muscle weakness, shooting pain, sensations of burning, tingling or numbness in the legs and feet.

5. In addition to excessive compression due to weight when **asymmetrical pressure** is exerted upon the lumbar vertebral discs and ligaments, especially upon already weakened discs, there is a greater likelihood of herniation.

6. Unfortunately, the vertebral discs rely upon nutrition from the surrounding bony vertebrae and when they are **in a state of compression they do not receive as much nutrition** so consequently do not regenerate as effectively.

7. Structurally the **foramen (holes) within the spinal cord become narrower** at the lumbar region meaning there is the increased possibility of entrapped nerves.





8. There are three main sets of ligaments supporting the lumbar spine, with the *posterior longitudinal ligament* connecting vertebral bodies at the back of the spine helping us to safely flex forwards by increasing the pressure of blood supply to vertebral bodies and trapping fluid making the vertebral bodies more proficient at weight bearing – however **in the lumbar region the posterior longitudinal ligament is much more narrow so there is less support for flexion in the lumbar region.** (Lasater: Yoga Body, p38)

9. Hip flexors attach from the top of the femur to the pelvis and the lumbar vertebrae so when the **back is fixed and we are lifting and lowering the legs**, the attachment point which is high upon the femur at the medial trochanter means that this in an **inefficient lever** and the lengthy legs weigh very heavily placing a great deal of pressure upon lumbar vertebrae, causing them to lift from the floor. Due to reciprocal

inhibition at the same time the buttock muscles, the hip extensors, relax so cannot aid the movement and the lower attachments of the abdominal muscles are stretched making it difficult for the abdominals to aid the movement at full stretch, also the pelvic floor is placed under pressure as the pelvis rolls forwards into an anterior tilt. For these reasons we do not double leg lift from a supine position, something which is prohibited by the BWY. (see handout)

10. **Forward-Bending Asana:** If the **hamstrings or back muscles are tight then it will be difficult to create an anterior (forwards) tilt of the pelvis** as the hamstrings attach to the sitting bones of the pelvis. This means when forward bending the intensity of the movement is redirected to the lower back creating compression within the vertebral discs and joints.

11. **Back-Bending Asana:** In **hyperextension, i.e., backbending, it is possible to direct the backbend primarily into the lumbar spine area**, as this is the area that most easily moves into hyperextension, so potentially creating compression within the lumbar vertebrae.

12. **Back-Bending Asana:** Normally good hip mobility allows for spinal hyperextension but when the legs are free to move, such as in Dhanurasana (Bow Pose), **if the hips are allowed to go into more external rotation, i.e., femur heads roll outward**s, then the legs and feet will be seen to fall inwards **placing excessive pressure upon the SI joints and the lumbar spine**. Indeed, in all backbends some activation of the adductors is required to create more stability and help to remove potential pressure upon the lumbar region.

13. **Back-Bending Asana: Flaring the ribs,** like a gymnast, can cause compression between T12 & L1; chronically experienced at level of 'bra-strap'.

14. **Side-Bending Asana: Asymmetrical pressure** can create excessive pressure upon one side of discs making this area vulnerable if there is excessive intensity, especially if some disc compression already exists.

15. **Twisting Asana:** Whilst due to the shape of the vertebrae there is very little rotation within the lumbar region, we may find that when twisting we exert compression into the points of structural and functional difference within the spine, as these are areas of easier access; especially where the lumbar region meets the thoracic spine (**T12 & L1**) and the sacrum (**L5 & S1**). We need to keep to spine lengthened, working as one whole length and avoid 'jamming' at these points of difference.

    In addition: -

16. A normal **lumbar curve may already be flattened or in exaggerated hyperextension.**

17. Many of us have **weakened core and back muscles**.

Bibliography: Lasater, J (2009) Yoga Body, Rodmell Press: Berkley CA

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