

Unit VII – Problem 7 – Clinical: Low Back Pain



- What is the anatomy of the low back?

- Vertebrae and the IV discs between them.
- Ligaments around the spine and discs (ex. Anterior longitudinal ligament, posterior longitudinal ligament... etc).
- Spinal cord and nerves.
- Muscles of the low back (superficial and deep).
- Internal organs of the pelvis and abdomen (they can cause low back pain).
- The skin covering the lumbar area.

- Causes of low back pain:

• **The most common causes are:**

- ✓ Injury or overuse of muscles (ex. Swelling or myositis of piriformis muscle can compress the sciatic nerve).
- ✓ Pregnancy (because of increased intra-abdominal pressure).
- ✓ Lifting heavy weights.
- ✓ Putting the wallet in back-pocket where it can compress on the sciatic nerve (especially when you sit).

- Pressure on nerve roots in the spinal canal:

• **This can be caused by:**

- ✓ A herniated disc (disc prolapsed): this happens when the nucleus pulposus leaks out through a tear in the annulus fibrosus part of the IV disc.
- ✓ Osteoarthritis: degenerative changes to vertebral bodies (osteophytes are formed which will compress on spinal nerve roots in intervertebral foramina) and IV discs.
- ✓ Spondylolesthesis: slipping of the vertebra leading to compression on the nerve at the level of L5-S1.
- ✓ Infection: pyogenic osteomyelitis with accumulation of pus can also lead to compression on the nerve (this condition is not treated by surgery. Antibiotics will do their job).
- ✓ Fractures: a simple fracture to the spine with no compression to the nerve is only treated by cast (there is no need to surgery).
- ✓ Tumors.

- Red flags for acute low back pain:

- History: pain > 1 month (not resolving). **Note that back pain in pediatric must always be taken seriously!**
- Cancer.
- Unexplained weight loss.
- Immunosuppression.
- Prolonged use of steroids.
- Intravenous drug use.
- Urinary tract infection (UTI).
- Pain that is increased by rest.
- Fever.
- Significant trauma related to age.

Note: these all are red flags, but the following 2 are emergency conditions:

- Bladder or bowel incontinence.
- Urinary retention (with overflow incontinence).

Note: if surgical intervention is not done within 8 hours from these emergency conditions, permanent nerve damage is going to occur.



- **Cauda equine syndrome:** a patient with this condition has no back pain! His chief complaint is that he has urinary retention (he can't void). In addition, he has weak extensor hallucis longus tendon and saddle anesthesia.
- **Myth: skinny people = pain-free**
 - Anyone can get back pain. In fact, people who are too thin, such as those suffering from anorexia, an eating disorder, may suffer bone loss resulting in fractured or crushed vertebra.
- **How is low back pain diagnosed?**
 - **A complete history: question that you must ask the patient:**
 - ✓ For how long the pain has been there?
 - ✓ What is the nature of the pain?
 - ✓ What are the aggravating and relieving factors?
 - ✓ Are there any associated symptoms (such as fever, numbness, tingling, incontinence...etc).
 - ✓ Duration and progression of symptoms.
 - ✓ Note that you must ask the patient about his/her bowel and urine (your examination of back pain is not complete without examining the abdomen and doing PR to check for the tone of external anal sphincter).
 - **Physical examination:**
 - ✓ Gait and posture: a disc prolapse can lead to foot drop gait (the patient will not have heel strike during his walk ---> his forefoot will touch the ground first instead of his heel). Compensatory gaits for foot-drop are:
 - ❖ Swing-out gait.
 - ❖ Steppage gait.
 - ❖ Waddling gait.
 - ✓ Palpation or percussion of the spine.
 - ✓ Range of motion: flexion-extension, right-side deviation, left-side deviation and rotation.
 - ✓ Heel-toe walk: if any patient can walk on his heel and on the tip of his toes ---> this means that he is neurologically intact.
 - ✓ Squat and rise: you ask the patient to sit on the floor. If he has a muscular dystrophy (muscle weakness), he will use his hands to climb on his body and thus he can get up from the floor.
 - ✓ Straight leg raising test: patient in the supine position ---> his leg will be raised combined with dorsiflexion of the foot (so the sciatic nerve will be stretched).
 - **Sensory testing and muscle test:**
 - ✓ Sensory testing: nipples (T4), xyphoid process (T7), umbilicus (T10), pubic rami (T12).
 - ✓ Special tests:
 - ❖ Piriformis stretch test: keep the patient supine ---> flex the hip ---> internally rotate it ---> and adduct it.
 - ❖ Bowstring test: flex the hip ---> flex the knee ---> and press on the sciatic nerve in the popliteal fossa.
 - ❖ Thomas test: for the hip-flexion (contraction of the hip).
- **Selective indications for radiography in acute low back pain:**
 - Age > 50 years.
 - Significant trauma.
 - Neuromotor deficits.
 - Unexplained weight loss (10 lb in 6 months).
 - Suspicion of ankylosing spondylitis



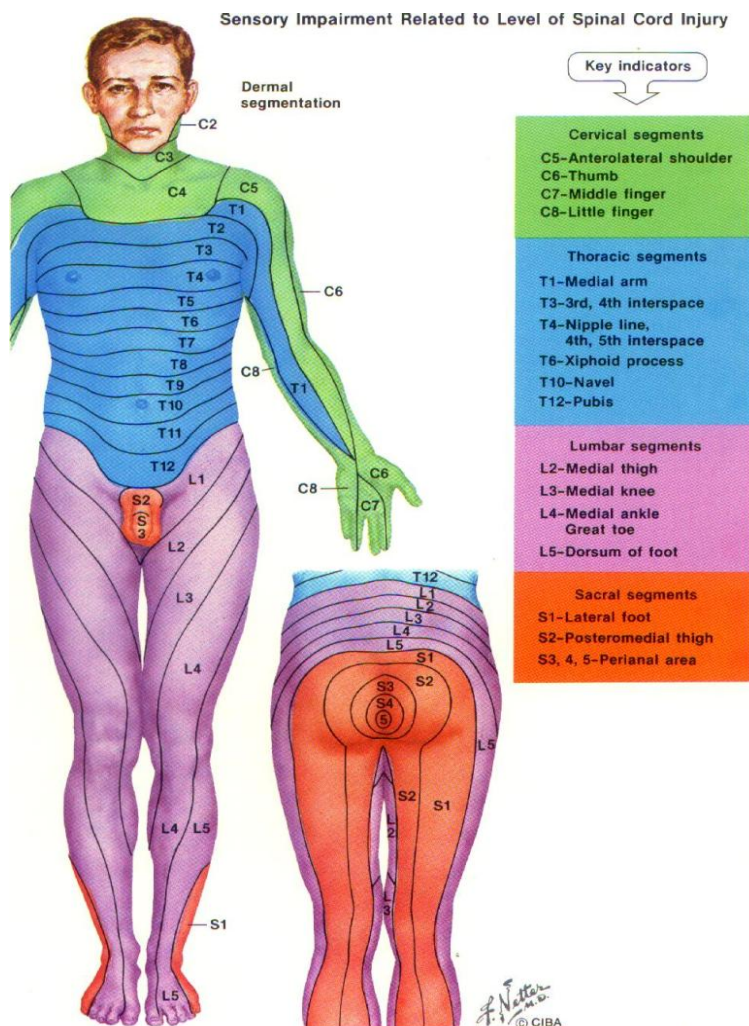
- Drug or alcohol abuse.
- History of cancer.
- Use of corticosteroids.
- Fever ≥ 37.8 C
- Recent visit (within 1 months) for the same problem without improvement.
- Patients is seeking compensation for back pain.

- **Further diagnosis of low back pain:**

- You start with plain film x-ray.
- Then you do blood test and urine test.
- Afterthat you continue with the sequence of CAT scanning, MRI, bone scan, EMG...etc.

- **Treatment:**

- Stress relief (because around 60% of back pain cases are psychological!!): this is achieved by doing exercise, walking, breaking the routine...etc.
- Physical therapy: improvement of muscular strength and endurance.
- Medications: NSAIDs and pain killers.
- Opioids: given 1 or 2 times to relax the muscle (not regularly!).
- Epidural steroid shots.
- Surgical intervention.



Upper Limb Myotomes

Shoulder abduction	C5
Elbow Flexion	C5,6
Elbow Extension	C7
Wrist Extension	C7
Wrist Flexion	C8
Finger Extension	C7
Finger Flexion	C8
Finger Abduction	T1

Lower Limb Myotomes

Hip Flexion	L1,2
Hip Extension	L5, S1
Knee Flexion	L5, S1
Knee Extension	L3,4
Ankle Dorsiflexion	L4
Ankle Plantarflexion	S1,2
1 st Metatarsal Extension	L5

Reflexes

Ankle	S1,2
Knee	L3,4
Biceps	C5,6
Triceps	C7,8