REHABILITATION MANAGEMENT OF LOW BACK PAIN

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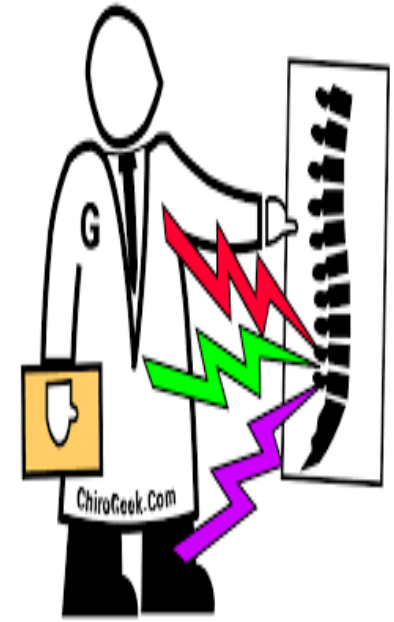

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- Anatomy
- Causes
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- Physical Modalities
- Exercises
- Orthosis, or brace
- Prevention
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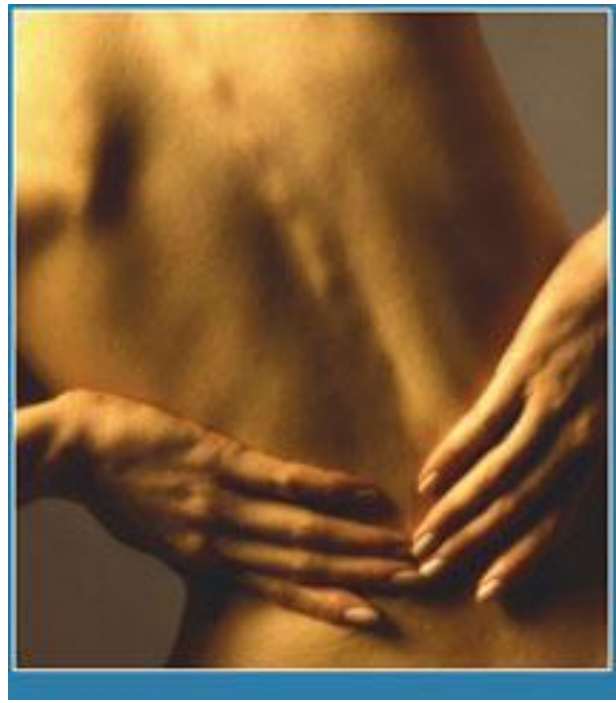
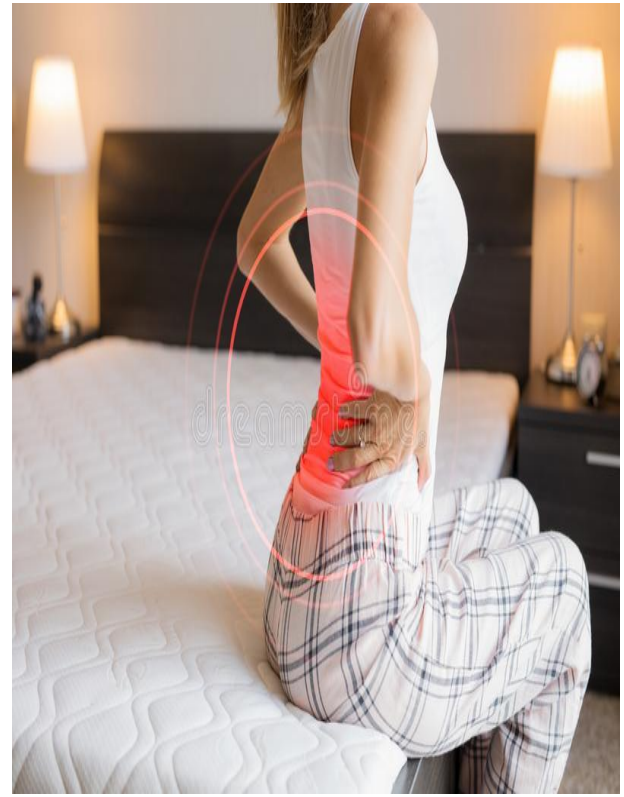
Introduction

- 60-90% life time incidence
- 5% annual incidence
- Peak in 40’s
- 12-26% in children and adolescents
- cost in US upwards of 100 billion per year



- 90% resolve in 6-12 weeks
- 40-80% in 1 week
- 75% sciatica clear in 1-6 months
- 70-90% recur

  Croft et al (1998)

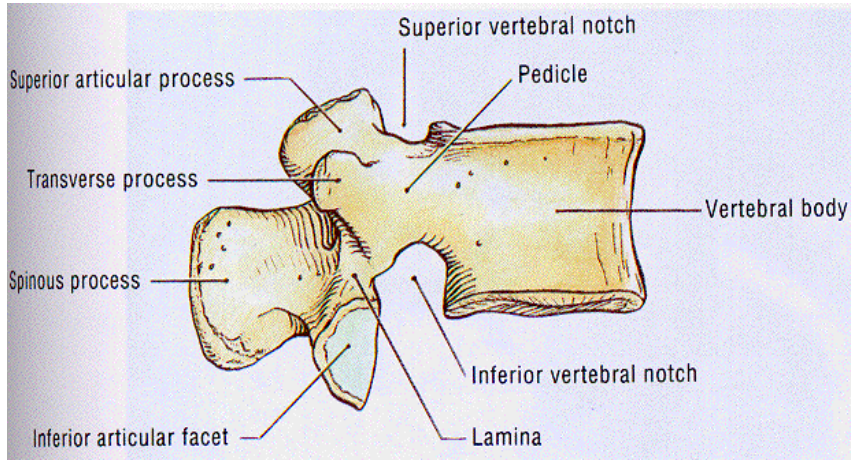


There are four reasons:

- **Lack of exercise**
- **Poor posture**
- **Physical trauma**
- **Emotional stress**

Anatomy

- Vertebra
  - Body, anteriorly
    - Functions to Support weight
  - Vertebral arch, posteriorly
    - Formed by two pedicles and two laminae
    - Functions to protect neural structures



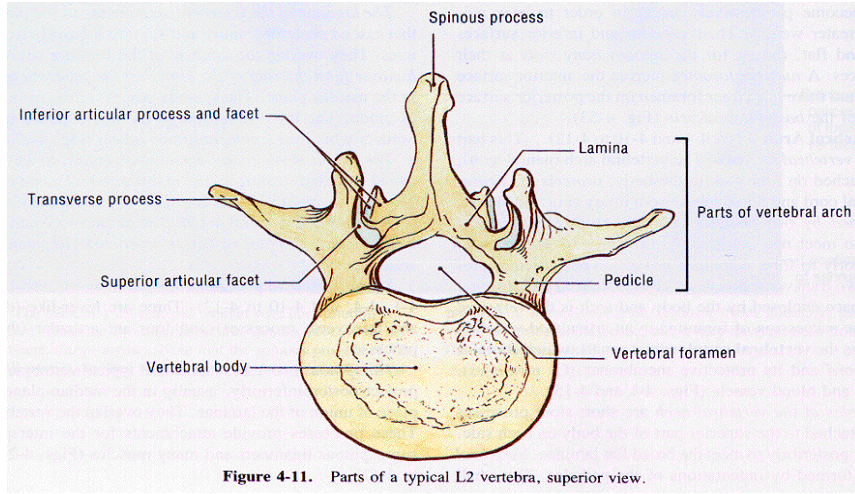
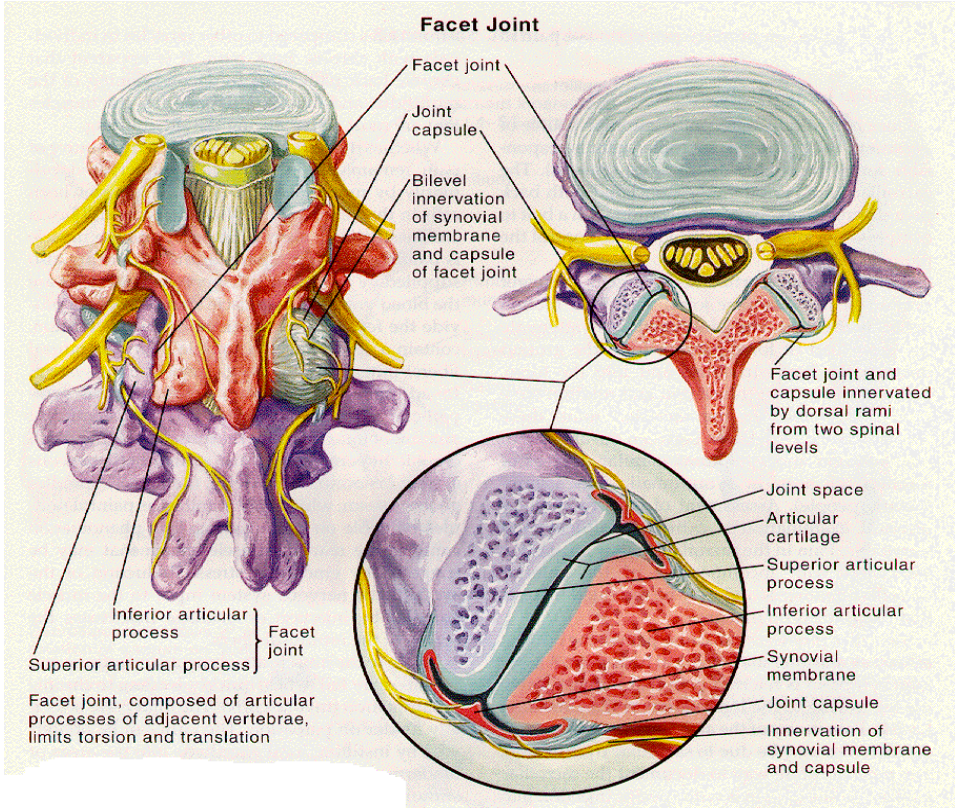


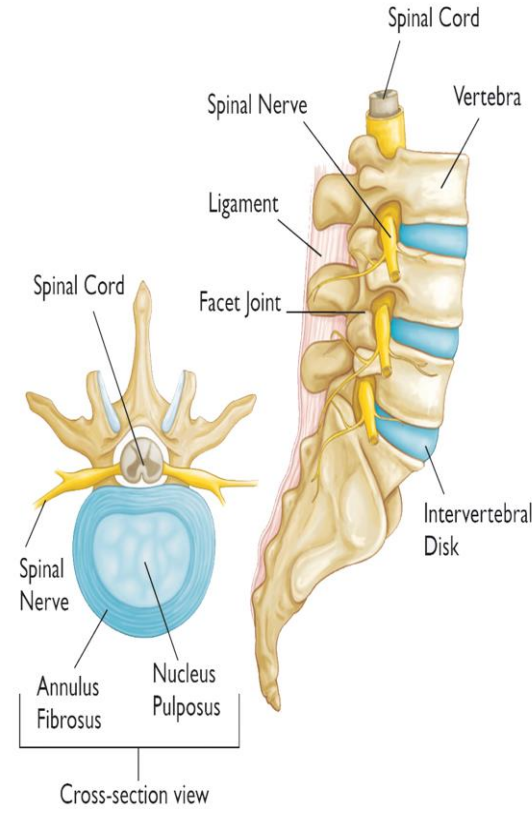
Figure 4-11. Parts of a typical L2 vertebra, superior view.

Facet Joint

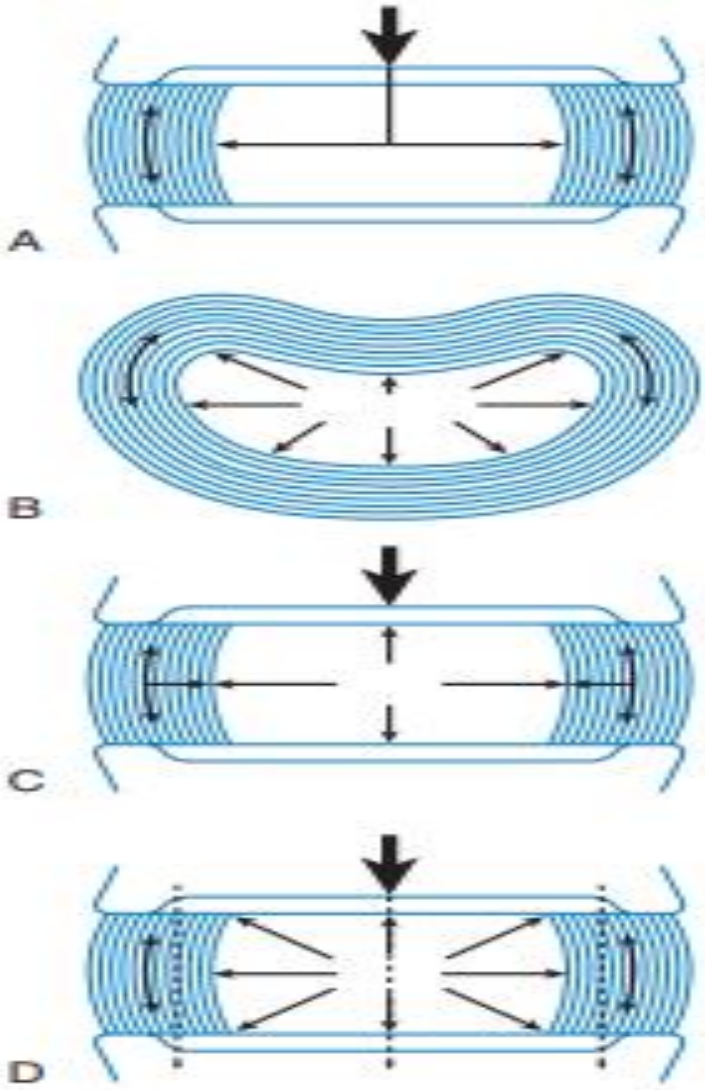
- Formed by articulation of inferior and superior processes of subsequent vertebrae
- Orientation in lumbar spine is toward sagittal plane, allowing flexion and extension but limiting rotation of the lumbar vertebrae
- Helps to prevent anterior movement of superior vertebra on inferior vertebra

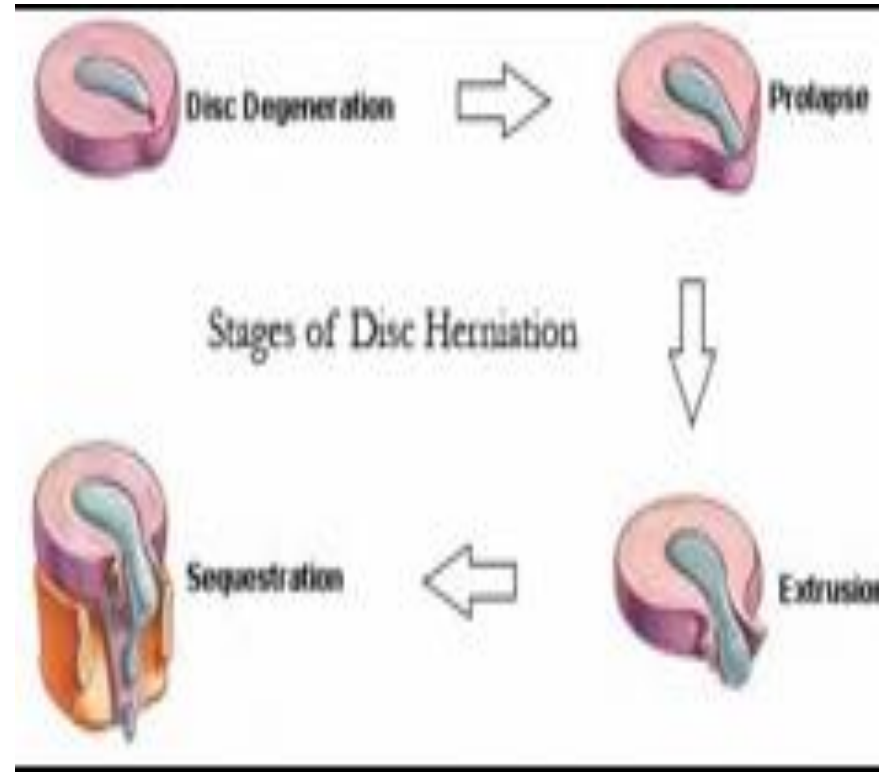


Intervertebral Disc

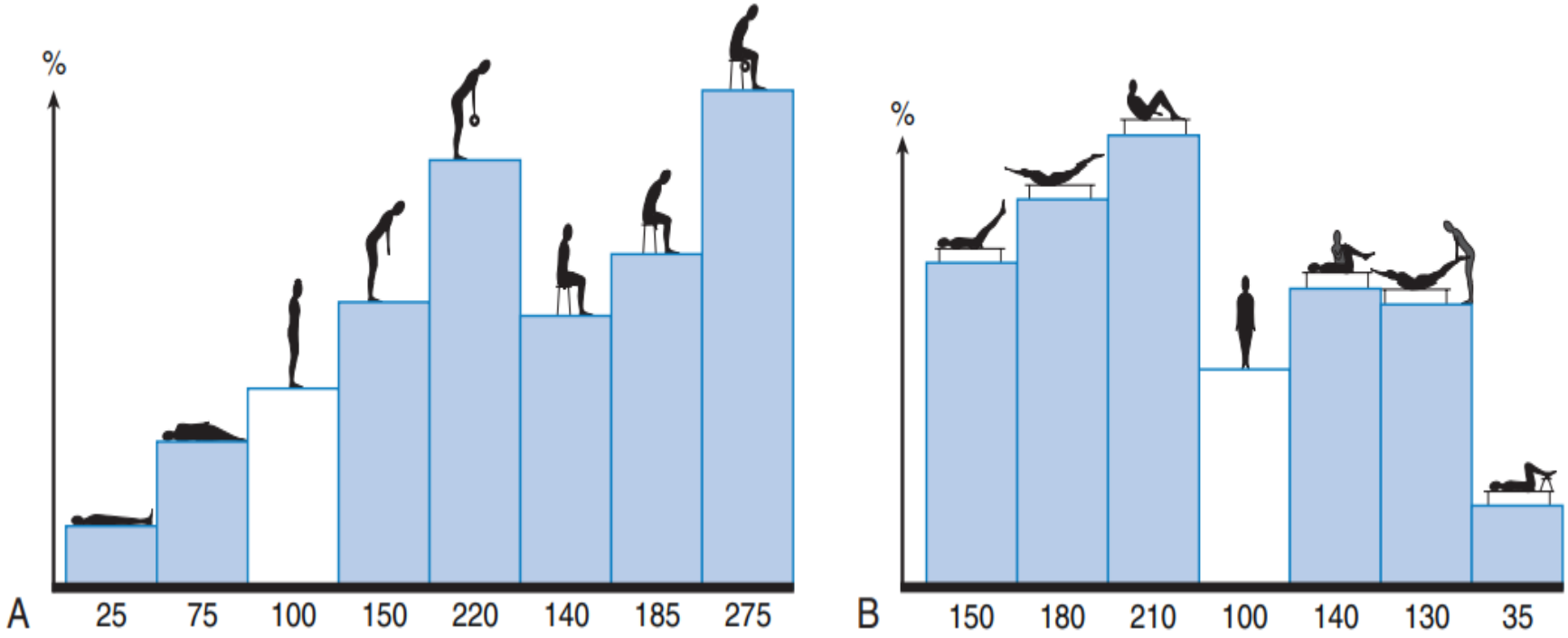


- Most common site of back pain
- Normally comprises ~ 25% of length of spine
- Consists of a central nucleus pulposus
  - Reticulated and collagenous substance
  - Composed of ~ 88% water
- Annulus fibrosus
  - Consists of concentric lamellae of fibrocartilage fibers arranged obliquely
  - With each layer, they are arranged in opposite directions





The mechanism of weight transmission in an intervertebral disk



- A,Relative change in pressure (or load) in the third lumbar disk in various positions
- B, Relative change in pressure (or load) in the third lumbar disk during various muscle-strengthening exercises

Causes of low back pain

- Mechanical/**Lumbar strain**
- Osteoarthritis - Facet/disk/SI
- Facet Syndrome

- Fracture –
  - Stress
  - Compression
  - Other
- Spinal Stenosis
- Tumor
- Discogenic

Causes of low back pain

- Non-back pain
  - retroperitoneal process (Pancreatic, Renal, Duodenal, Gyn, Prostate)
  - AAA
  - Zoster
  - Diabetic radiculopathy
- SI joint
- Rheumatologic disorders
  - Reiters
  - Ankylosing Spondylitis

DIFFERENTIATION OF INFLAMMATORY VERSUS MECHANICAL LOW BACK PAIN

	Inflammatory pain	Mechanical pain
Age at onset	<40 yr	Any age (usually later)
Type of onset	Insidious	Acute
Symptom duration	>3 mo	<4 wk
Morning stiffness	>30 min	<30 min
Nocturnal pain	Common	Absent
Effect of exercise	Improvement	Exacerbation
Sacroiliac joint tenderness	Frequent	Absent
Back mobility	Loss in all planes	Abnormal flexion
Chest expansion	Often decreased	Normal
Neurologic deficits	Unusual	Possible

Classification according to duration of symptoms

- Acute **back pain** lasts <6 weeks.
- Subacute **back pain** lasts between 6 and 12 weeks.
- Chronic **back pain** lasts for greater than 12 weeks.

Assessment

- History
- **Examination**
- **Imaging**
- **Laboratory**

History

- Three major concerns:
  - Is there evidence of systemic disease
  - Is there evidence of neurological disease
  - Is there social or psychological stress which is contributing?
- Exclude serious underlying pathology, such as infection, malignancy or cauda equina syndrome

Mechanism of injury
Associated symptoms:
- Bladder / bowel function
- Fevers / chills
- Sleep disturbance
- Numbness / tingling

Prior injuries, treatment and outcomes
Medications
Functional history: ADL, Extended ADL
Family history
Social history:
- Vocational
- Education
- Tobacco

Litigation

Pain Specifics

Quality: sharp, dull, shooting, burning, etc.

Location / Distribution:

- **Radicular:** Dermatomal distribution, dysesthesias
- **Radiating:** Nondermatomal

Onset:

- **Gradual:** DDD
- **Acute:** Disc abnormality, strain, compression fractures

Severity / Intensity

Frequency: Constant vs. Intermittent

Duration

Exacerbating and Alleviating Factors

Time of Day: If nocturnal, consider malignancy

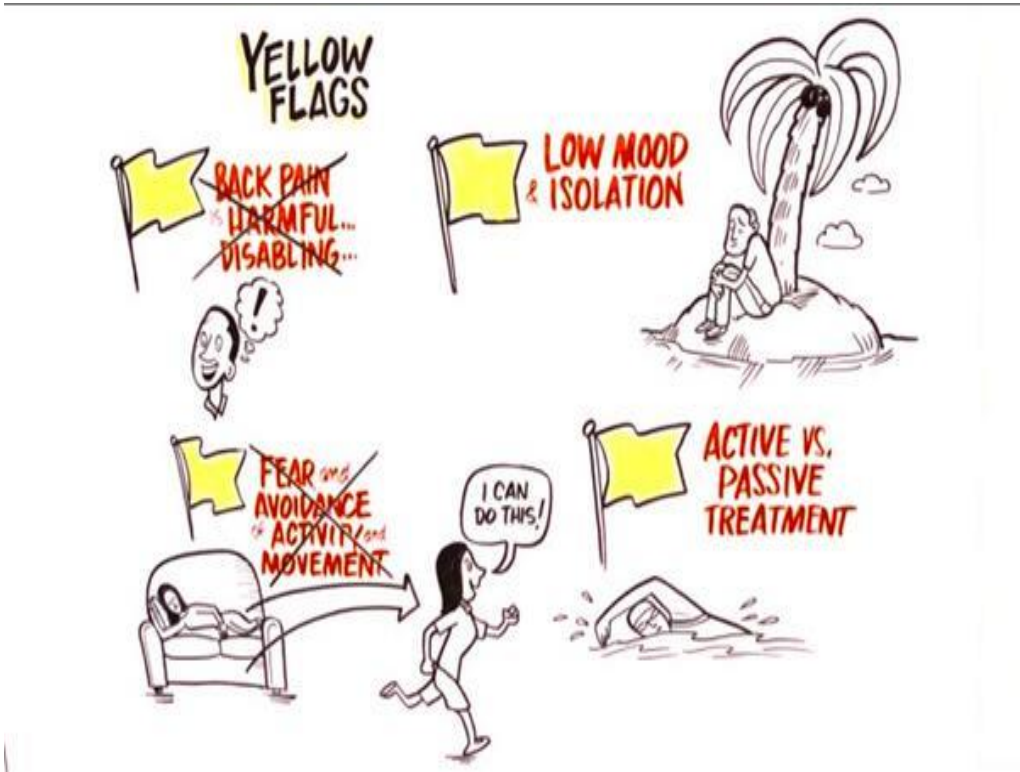
Red Flags

- Cancer
  - **> 50**
  - **History of Cancer**
  - **Weight loss**
  - **Unrelenting night pain**
- Infection
  - IVDU
  - Steroid use
  - Fever
  - UTI
- Fracture
  - Age > 70
  - Steroid use
  - Trauma hx
  - Bladder dysfunction
  - Osteoporosis
- Cauda Equina Syndrome
  - **Saddle anesthesia**
  - **Bowel/bladder dysfunction**
  - Loss of sphincter tone
  - Rapid progression
  - Unilat or bilat major motor weakness

Yellow Flags

Associated With the Development of Chronic Disabling Pain

- Expectations that the pain will only worsen with work or activity
- Avoidance of normal activity
- Poor sleep
- Compensation issues
- Stress and anxiety
- Poor job satisfaction



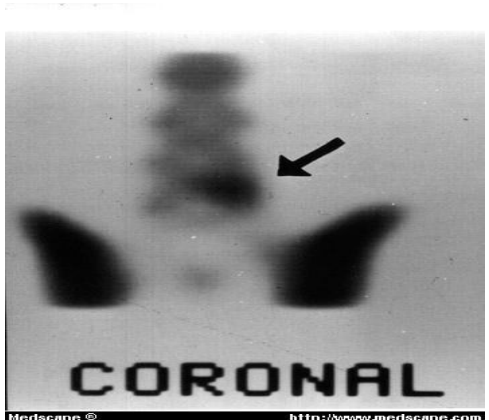
Examination

- **Posture:**
  - **Splinting**
  - **Body language**
- **Gait:**
  - **Antalgia**
  - **Heel / Toe pattern**
  - **Trendelenberg**
- **Musculoskeletal:**
  - **ROM**
  - **Leg length**
  - **Vascular**
  - **Atrophy**

- **Abdomen:**
    - Presence of masses
- **Back:**
    - Inspection
    - Palpation
    - ROM
    - Scoliosis
- **Neurological:**
    - Sensation
    - Motor
    - DTRs
- **Rectal if indicated:**
    - Evaluation of sphincter tone

Imaging

- Radiographs
- MRI/CT
- Ultrasound
- Bone Scan (SPECT)



- **Laboratory:**
  - Performed primarily to screen for other disease etiologies
    - Infection
    - Cancer
    - Spondyloarthropathies
  -

Management

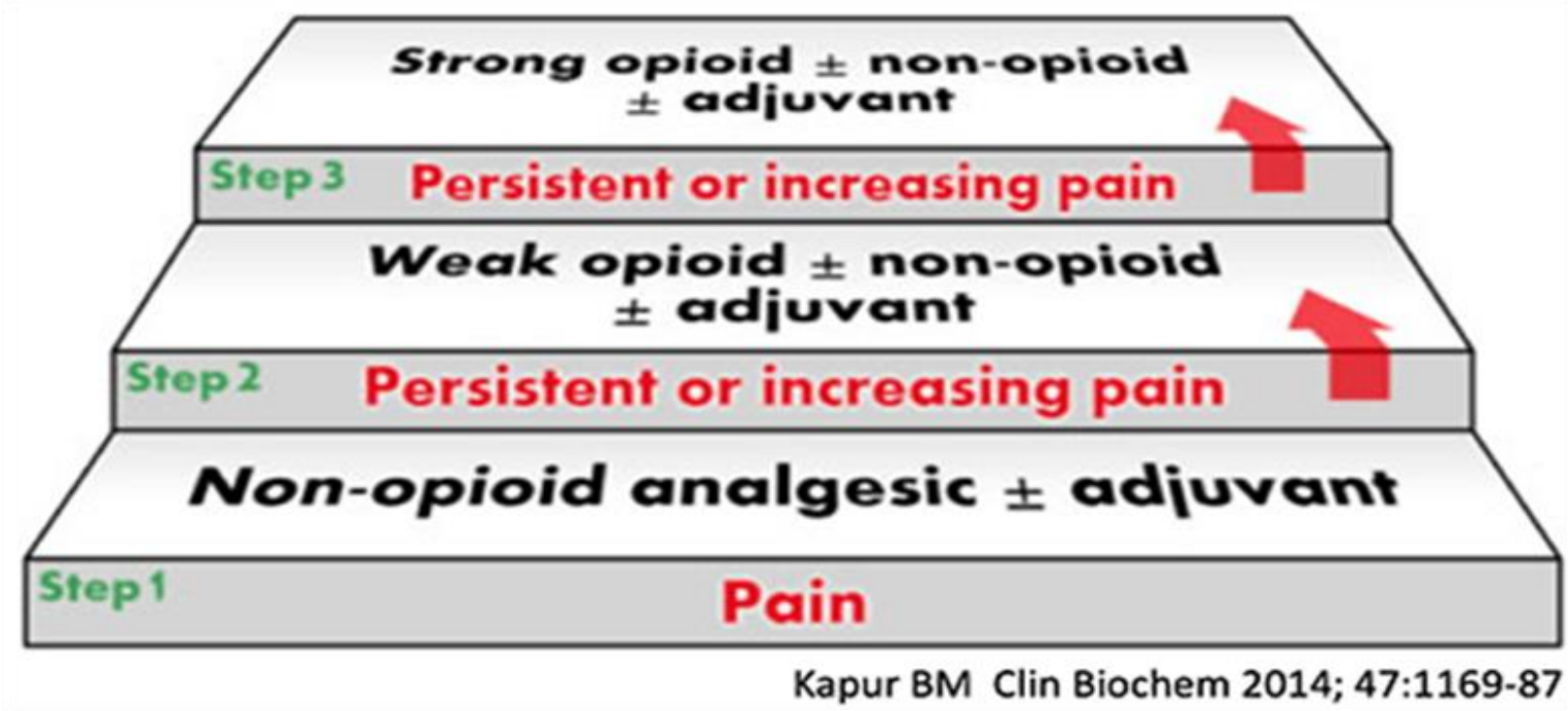
To treat the whole patient with multidisciplinary team approach

- not just the specific injury or condition
- in order to improve overall recovery
- prevent recurrence of back pain or other source of dysfunction
- needs to focus on functional, vocational, and socioeconomic and psychological status •

Pharmacological treatment

- Analgesic, NSAIDs, muscle relaxants, anti- epileptics, tranquilizers, etc. •

WHO Analgesics Ladder



Kapur BM Clin Biochem 2014; 47:1169-87

Non Pharmacological

- Health education
- Postural care
- Physical Modalities
- Exercises
- Orthosis, or brace
- Surgery

Health Education

- Accurate information
- Good posture in which neutral spine
- Proper lifting and body mechanics

Physical Modalities Used in Low Back Pain

They include

- Heat
- Cold
- Water
- Sound
- Electricity
- Electromagnetic waves(eg. Infrared,visible,
  or {UV} light, shortwaves and microwaves.)

❖**Modality choice and prescription**

-Who(the patient)
-What (agent)
-Why(the diagnosis)
-Where (area)
-When (frequency and duration)
-How(Other treatment ,exercise,education)
-Concurrent issues
-(eg.,level of cooperation,anticoagulation)

- Heat

-can be classified by depth of penetration and mechanism of heat transfer

(1) depth of penetration - superficial
- deep

(2) mechanism of heat transfer - conduction
- convection
- radiation

- Superficial heat

-hot packs
-heating pads
-paraffin baths
-radiant heat

- Deep heat

-ultrasound
-short wave diathermy
-microwave diathermy

Physiological effects of heat

- the therapeutic effects of locally applied heat include pain relief, muscle relaxation, promotion of blood flow, facilitation of tissue healing and a reduction in joint stiffness

Superficial Heat

DEEP HEAT

Microwave therapy

Ultrasound Therapy

Short wave Therapy

- Cold

Cold therapy or cryotherapy refers to the use of local or general body colling for the therapeutic purpose

Physiological effects of cold

- reduction in swelling and bleeding
- reduction in pain
- reduction in muscle spasm/spasticity
- facilitates muscle contraction & may affect muscle strength
- reduction of chronic inflammation
- reduction of oedema and joint effusions

Cryotherapy

- Cold packs
- Ice massage
- Vapocoolant spray
- Cryotherapy Unit

Ref: Electrotherapy explained, 2nd Ed

TENS
(Transcutaneous Electrical Nerve Stimulation)

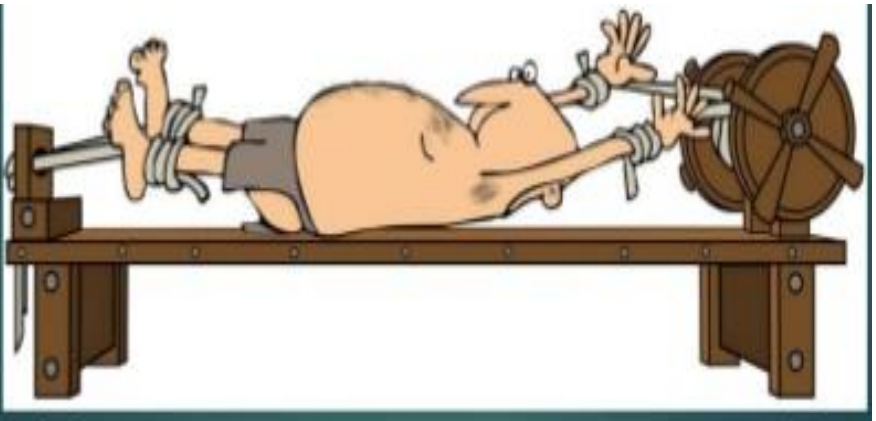
- a form of electrical analgesia
- application of a pulsed rectangular wave current via surface electrodes on the patient's skin.
- generated by small battery operated machine.

❖Mechanisms

Gate Control Theory Presynaptic Inhibition

Lumbar Traction

- Application of a longitudinal force to the spine & associated structure
- Can be applied with continuous or intermittent tension
- May be applied manually or with a mechanical device



Indications

- Muscle spasm
- Certain degenerative disk diseases
- Herniated or protruding disks
- Nerve root compression
- Facet joint pathology
- Osteoarthritis
- Capsulitis of vertebral joints
- Anterior/posterior longitudinal ligament pathology

Contraindications

- Unstable spine
- Diseases affecting vertebra or spinal cord, including cancer & meningitis
- Vertebral fractures
- Spinal cord compression
- Osteoporosis

EFFECTS

- 1) distraction or separation of the vertebral bodies;
- 2) a combination of distraction and gliding of the facet joints;
- 3) tensing of the ligamentous structures of the spinal segment;
- 4) widening of the intervertebral foramen;
- 5) straightening of spinal curves; and
- 6) stretching of the spinal musculature.

Exercises for Low Back Pain

Goal

- to regain flexibility
- to built up muscle strength and stamina
- to improve general fitness

Three main group of exercises

- Stretching exercises
- Strength, stamina, and stabilizing exercises
- Cardiovascular aerobic exercises

Low Back Pain Exercises

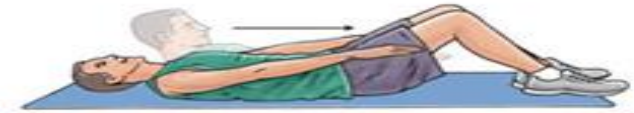
Standing hamstring stretch

Quadruped arm/leg raise

Gluteal stretch

Cat and camel

Pelvic tilt



Partial curl

Extension exercise

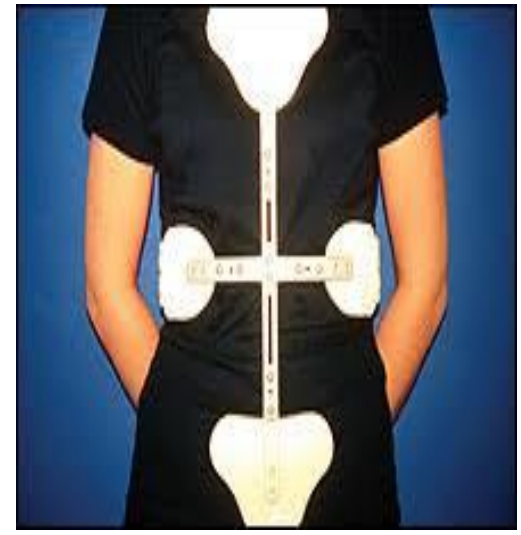
Side plank

Orthosis, or brace

- is an external device applied to body parts to provide or more different functions, including:

1. Reduction in pain/comfort
2. Prevent or correct deformity
3. Support/stability
4. Improvement in function
5. Augment weak muscles (assist motion)
6. Limit ROM (restriction of motion)


Prof. KMH



SURGERY

Indications for spinal surgery

- Only a small minority of patients
- Severe or progressive motor weakness
- Signs and symptoms of cauda equina syndrome

PREVENTION

- Strengthen hip, abdominal and back muscles can help prevent recurrences
- Good Posture
- Proper lifting and body mechanics.

Proper Sitting, Standing, and Lifting

Sitting

Standing

Lifting

1. Bend your knees and squat down to a comfortable level.

2. Lift the object and bring it close to your body.

3. Return to an upright position by pushing up with your legs and buttocks.

Management of Back Pain due to Osteoporotic Vertebral Fracture

- Advise partial bed rest.
- Recommend analgesics.
- Recommend proper posture, positioning
- Use of braces or other assistive devices.
- Avoidance of resistance/strengthening exercises for the first 2 months.
- Avoid activities that increase vertebral compression forces.

Management of Back Pain due to Ankylosing Spondylitis

- Maintenance of erect posture is critical in all activities
- Should sleep in a prone position or supine on a firm mattress with one small pillow or no pillow
- Walking and swimming to maintain joint mobility
- Heat application to reduce muscular spasm and pain
- Deep breathing exercises can improve or maintain lung capacity.
- Avoid contact sports
- Assistive devices such as canes or walkers
- Avoid smoking

European Spine Journal (2018) 27:2791–2803
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REVIEW

Clinical practice guidelines for the management of non-specific low back pain in primary care: an updated overview

Crystian B. Oliveira[1] · Chris G. Maher[2,3] · Rafael Z. Pinto[4] · Adrian C. Traeger[2,3] · Chung-Wei Christine Lin[2,3] · Jean-François Chenot[5] · Maurits van Tulder[6] · Bart W. Koes[7,8]

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- For acute low back pain

Reassurance on the favourable prognosis

Advice on returning to normal activities

Avoiding bed rest

Use of NSAIDs and weak opioids for short periods

- For chronic low back pain

NSAIDs and antidepressants

Exercise therapy

Psychosocial interventions.

- Referral to a specialist

Suspicion of specifc pathologies

Radiculopathy

If there is no improvement after 4 weeks

Take home messages

- Most episodes of low back pain are self-limiting
- **Differences between Inflammatory and Mechanical**
- Red Flags and Yellow Flags Signs
- Multidisciplinary team approach
- Exercises
- Physical Modalities
- Orthosis, or brace
- Referral to a specialist


Be Healthy!
Eat well, Live well.

Thank you for your attention!