Neurodynamics

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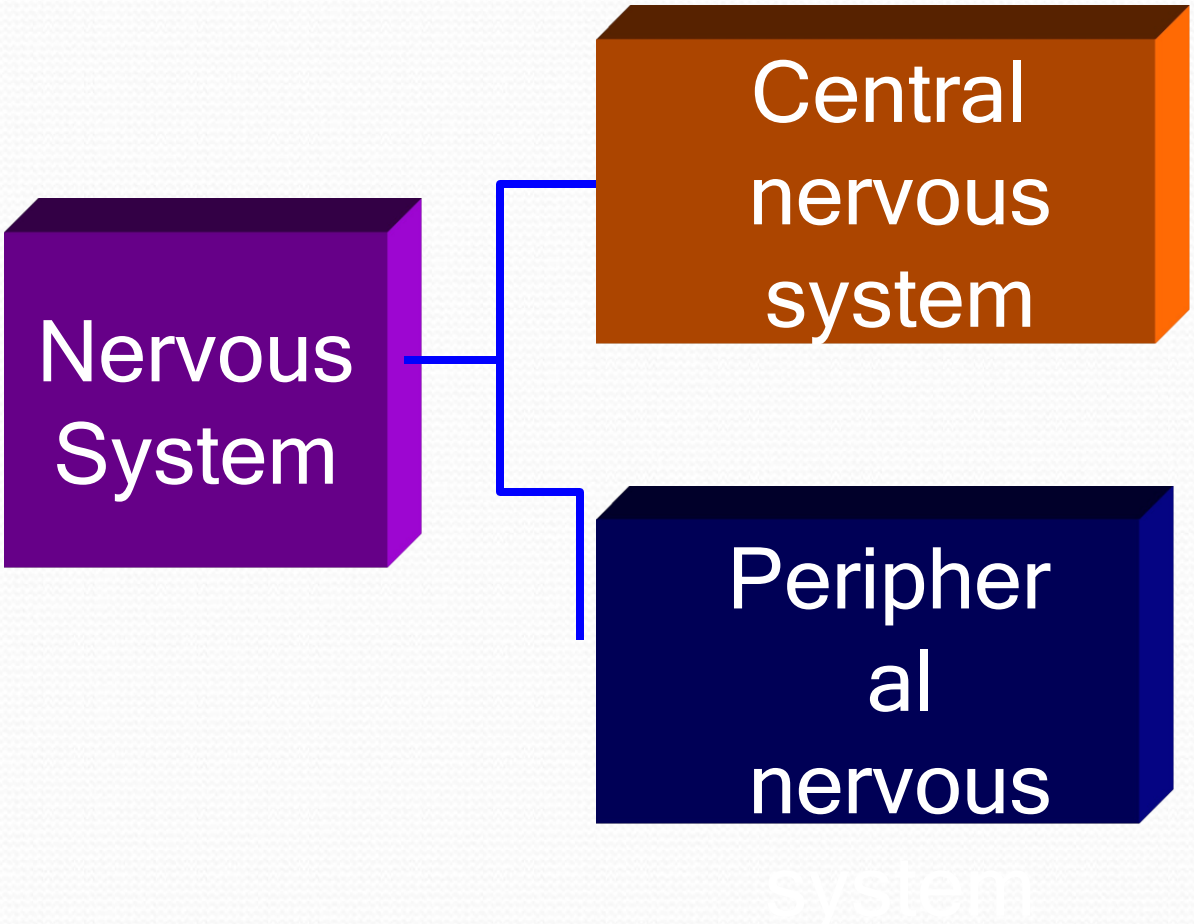
NERVOUS SYSTEM

Functions of Nervous System

1. Collect sensory input
2. Integrate sensory input
3. Motor output

Major divisions



Peripheral Nervous System

The P.N.S consists of the cranial and the spinal nerves from the point that they exit to where they terminate at connecting muscles and organs .

Anatomy of the nerve

Cellular component:

Neurons- cell body & axon and dendrites

Schwann cells

Connective tissue (layers cover nerve)

Endoneurium

Perineurium

Epineurium

Endoneurium

Each nerve fiber is surround, a thin layer

Perineurium

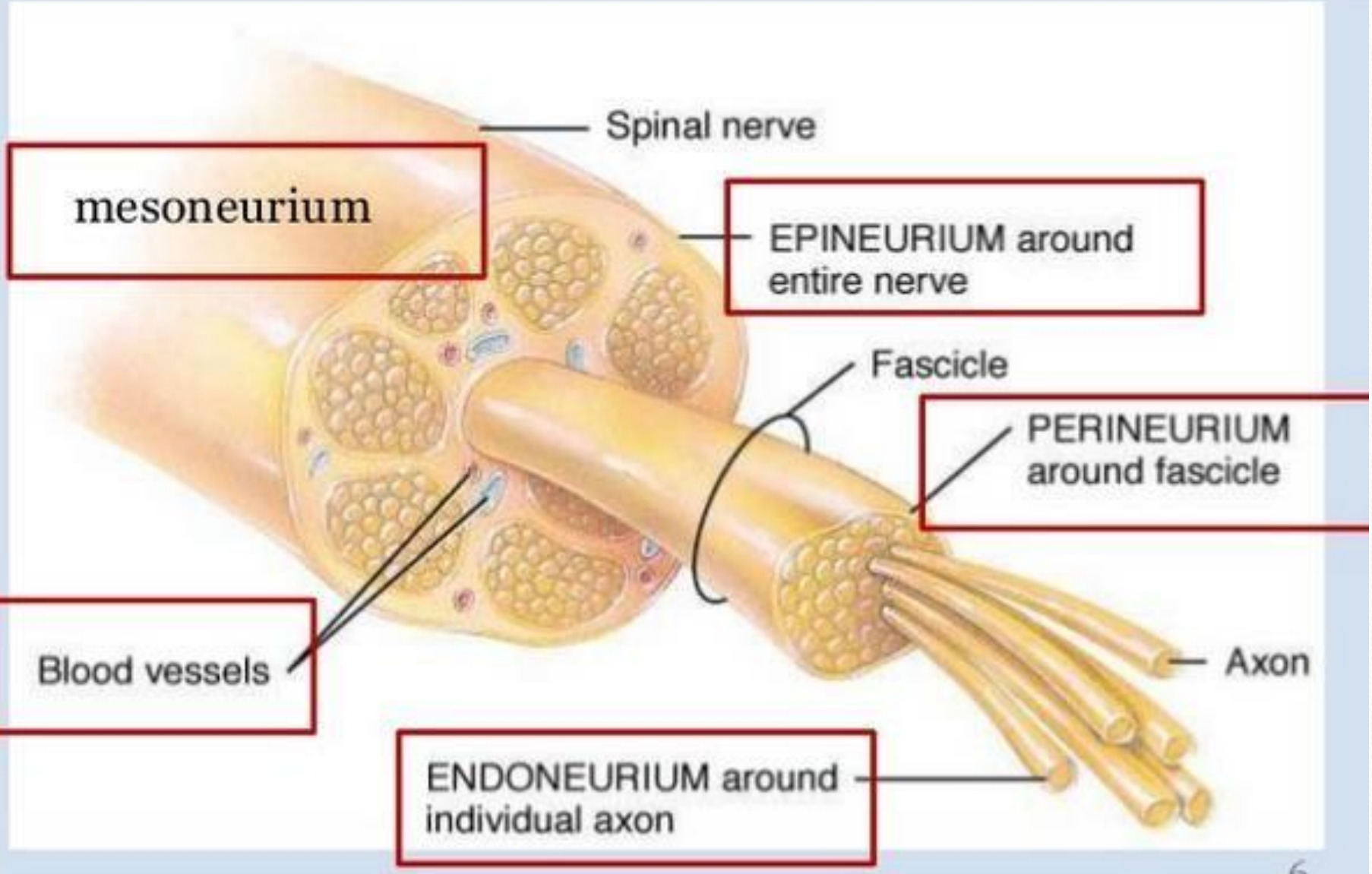
Cover nerve fascicle (Nerve fibers, which are axons, organize into bundles known as **fascicles**)

Epineurium

This is considered the outermost layer form a sheath around nerve.

The epineurium separates the nerve fascicles, support protect , cushion against external pressure ,large at level of joint

Transection of a nerve



Peripheral nerve types

Sensory **Motor**

Dermatome :

is an area of skin supplied by a single spinal root

Myotome :

Represents a muscle unit supplied by a single spinal root

neurodynamics

The concept of**ilibomoruen ro scimanydoruen zation** is originally based on the research by physiotherapists, Michael Shacklock and David Butler. further researchers such as Dr Michel Coppieters and Dr Alf Brief have added to the volume of scientific research supporting the hypothesis **that your nerve tissue also requires full movement to remain for full pain-free function.**

Neurodynamics

- Encompasses the interactions between **mechanics** and **physiology** of the nervous system.

NeuromobilizationTechniques

Definition of Neuromobilization Technique

It is a physical therapy technique that can be utilized to mobilize the nerve (assessment and treatment) that may be adherent , irritable or compressed. Neuromobilization techniques restore normal neuromechanical function of both peripheral nerves and the central nervous system.

The dynamic nervous system

- The central nervous system is a dynamic organ like muscle, joint or any other involved in movement.
- Possesses **plastic and elastic properties**
- Mechanically and physiologically continuous

Neuromobilization can be considered as:

- **Diagnostic Technique**
- **Therapeutic Technique**

Indications

- Back Pain e.g Bulging disc
- Sciatica
- Neck Pain
- Shoulder Pain
- Carpal Tunnel Syndrome
- Tennis Elbow
- Pinched Nerve

Contraindications

1. Recent infection, malignancy of nervous system
2. Recent onset of, or worsening neurological signs
3. Cauda equina lesions
4. Injury to the spinal cord

Incidence of Peripheral nerve injury

Radial nerve ------ commonly injuried

Ulnar nerve ------- 30 %

Median nerve ----- 15 %

Lumbosacral plexus ---- 3 %

Neurodynamic testing

- **Straight leg raise test (SLRT)**
- **Slump test**
- **Upperlimb neurodynamic tests (ULNT)**
- Passive neck flexion test
- Prone Knee bend test (PKBT)

• Purpose

• These tension tests are performed to check the peripheral nerve compression or as a part of neurodynamic assessment. The main reason for using a ULTT is to check cervical radiculopathy. These tests are both diagnostic and therapeutic. Once the diagnosis of cervical radiculopathy is made the tests are done to mobilise the entrapped nerve

Analysis of Neurodynamic testing

- **Normal response**
  - Resistance/ pain or both bilaterally
  - Is it relevant to patient's problem?

- **Positive test**
  - If test reproduces patient's symptom
  - If response is altered by movement of distant body part

when will be the Neurodynamic testing essential to be done ?

1. The patient has symptoms anywhere in the head, arms, neck and thoracic spine
2. the symptoms are not severe and the problem is not easily provok
3. Neurological symptoms are not easily provoked and intermittent
4. The problem is stable and not rapidly deteriorating
5. The pain is not severe at the examination time

principles TECHNIQUE

1. Explanation to the patient:
2. Test the unaffected side first
3. Maintain each movement precisely
4. Be gentle, Do Not hurry
5. Evoke vs Provoke
6. Short duration of testing > : 10 secs
7. Observe the site & quality of symptoms
8. Perform structural differentiation

Neurodynamic sliders

Definition

The slider is a neurodynamic manoeuvre whose purpose is to produce a sliding movement of neural structures relative their adjacent tissues.

Neurodynamic tensioners

Definition

The tensioner is a neurodynamic test that produces an increase in tension in neural structures. It relies on the natural viscoelasticity of the nervous system and does not pass the elastic limit. Therefore, the technique does not produce damage and, if performed gently, may improve neural viscoelastic and physiological functions.

Rules of Practice

1. Steps of the test should be explained to the patient:
2. Test the unaffected side first then the affected
3. Begin active then passive
4. Maintain each movement
5. gentle movement
6. Observe the site & quality of symptoms
7. Perform movement differentiation

- (Upper Limb Tension Test) **evren laidaR))**

- .1 Shoulder girdle depression
- 2. Elbow extension
- .3 Medial rotation of the whole arm
- 4. Wrist, finger and thumb flexion

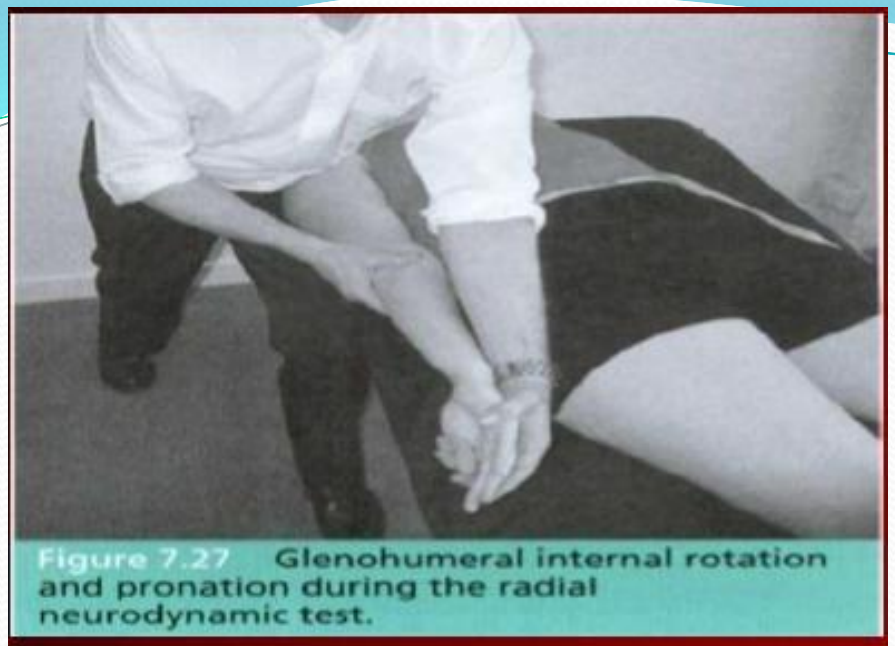


Figure 7.27 Glenohumeral internal rotation and pronation during the radial neurodynamic test.

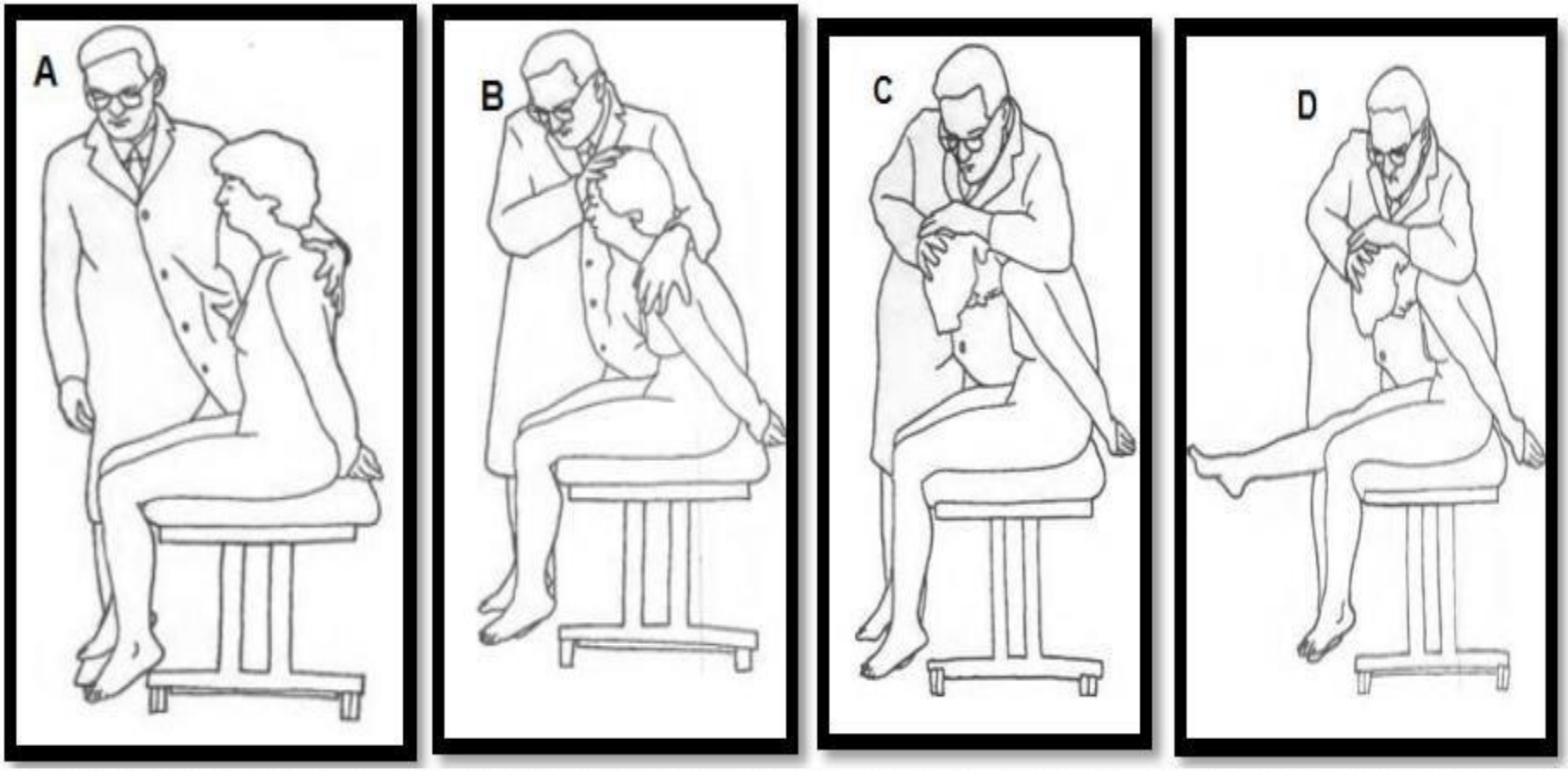
Figure 7.28 Wrist and finger flexion during the radial neurodynamic test.

Figure 7.25 Scapular depression during the radial neurodynamic test.

Figure 7.26 Elbow extension during the radial neurodynamic test.

- **Slump Test**

1. Hands behind back
2. Thoracic flexion
3. Extend one knee
4. Dorsiflex foot of extended knee
5. Cervical flexion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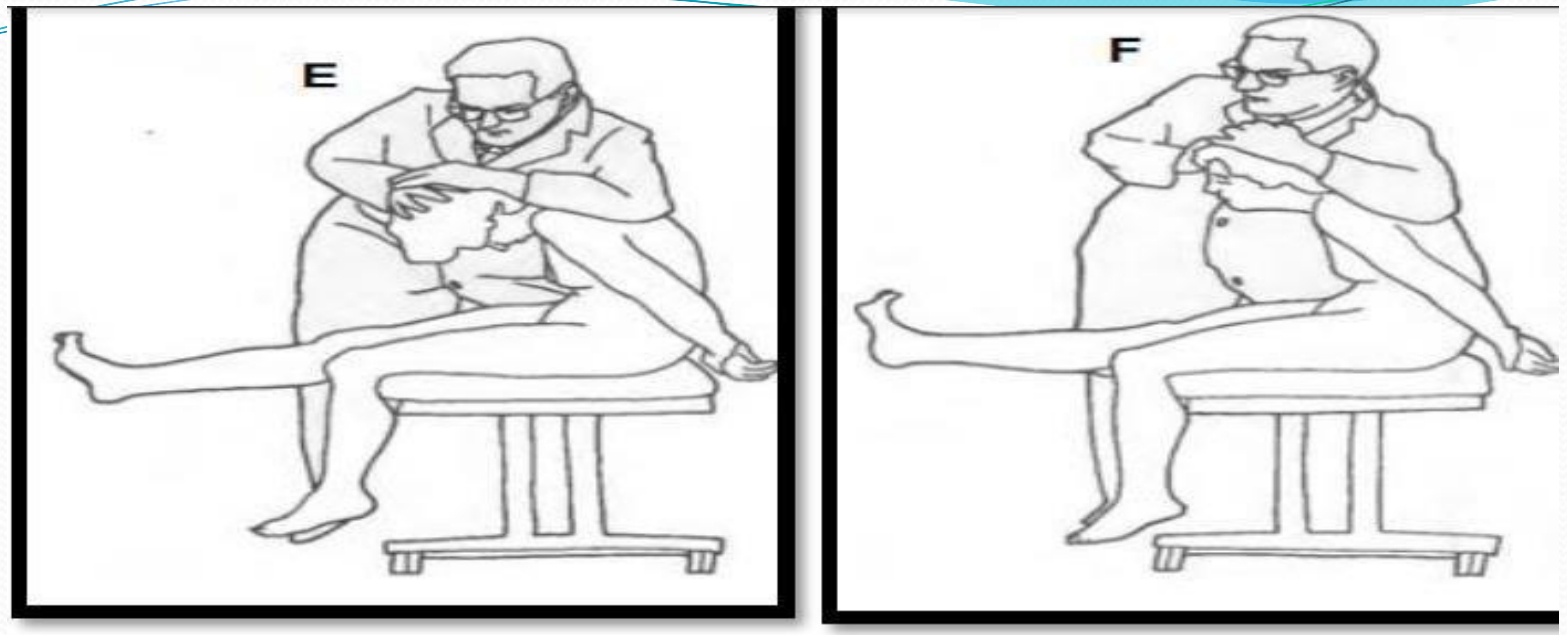


Fig. (8-7) Slump test; stages 5 and 6

Indications

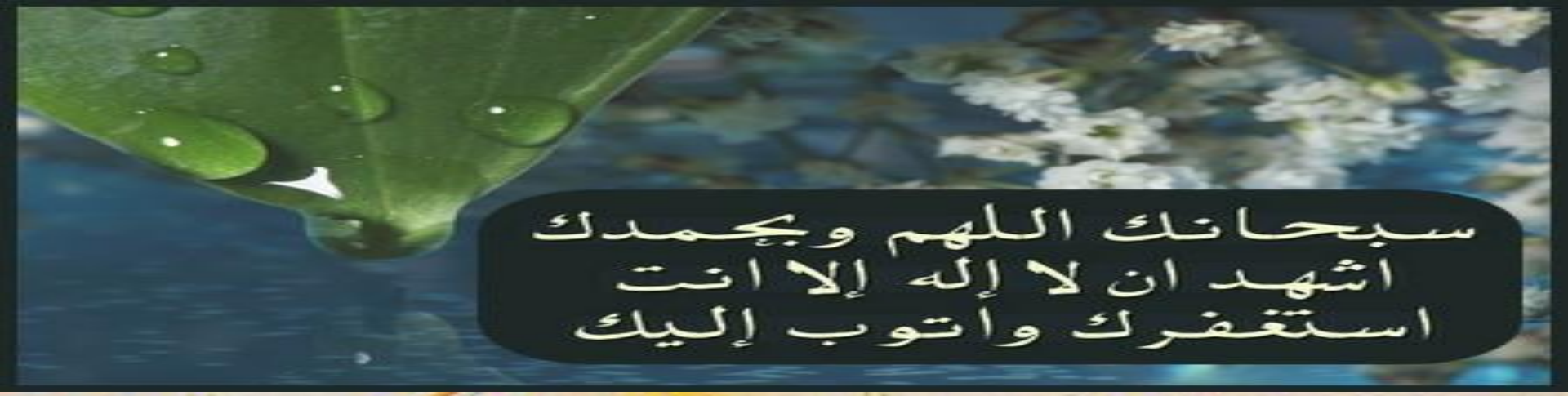
The Slump Test should be a routine test when:

1. There are spinal symptoms.
2. The patient may complain that symptoms are worse getting into a car or kicking a football.
3. Treatment is going to be nerve mobilization ،
4. To ensure that the nervous system moves and stretches properly in a patient ready for discharge.

- Clinical Response **(positive test)**

- pain behind the extended knee and in the hamstring area plus some restriction of knee extension. This restriction should be symmetrical.

- On release of neck flexion -a decrease of symptoms in all areas and an increase in the range of knee extension and range of ankle dorsiflexion.


سبحانك اللهم وبحمدك
اشهد ان لا إله إلا انت
استغفرك واتوب إليك


Thank
You