

Principles of Musculoskeletal Assessment

Introduction to Clinical Studies
Traumatology
RHS 231
Dr. Einas Al-Eisa

Purpose of Assessment:

- To understand the patient's problem from the patient's and clinician's perspectives.
- “Diagnosis is only a way of applying one's anatomy” (Cyriax, 1982).

When should physiotherapists assess patients?

- On first patient contact:
 - to determine the patient's problem & treatment plan
- During the treatment:
 - to check improvement versus deterioration

When should physiotherapists assess patients?

- Following each treatment:
 - to judge the efficacy of the intervention
- At the beginning of each new treatment:
 - to determine the lasting effects of treatment and the effect of other activities on the patient's signs & symptoms

Subjective & Objective Assessment

- **Symptoms** = what the person complains about (e.g., my knee hurts)
- **Signs** = what can be measured or tested (e.g., anterior drawer test for ACL injuries)

Subjective & Objective Assessment

- **Subjective** assessment:
 - to gather relevant information about the site, nature, and onset of symptoms
 - review the patient's general health and past treatments
- **Objective** assessment:
 - to determine abnormalities using special tests (without bias)

Correct Diagnosis depends on:

1. Knowledge of functional anatomy
2. Accurate patient history
3. Diligent observation
4. Thorough examination

Differential Diagnosis involves:

- Clinical signs & symptoms
- Physical examination
- Knowledge of pathology & mechanisms of injury
- Provocative tests
- Laboratory & diagnostic imaging techniques

The Problem-oriented Medical Records Method: SOAP

- S = Subjective (Patient History)
- O = Objective (Observation)
- A = Assessment (Examination)
- P = Plan

Assessment should be:

- Sequential
- Organized
- Comprehensive
- Reproducible

Total Musculoskeletal Assessment

- Patient History
- Observation
- Examination of movement
- Special tests
- Reflexes and cutaneous distribution
- Joint play movement
- Palpation
- Diagnostic imaging



Patient history

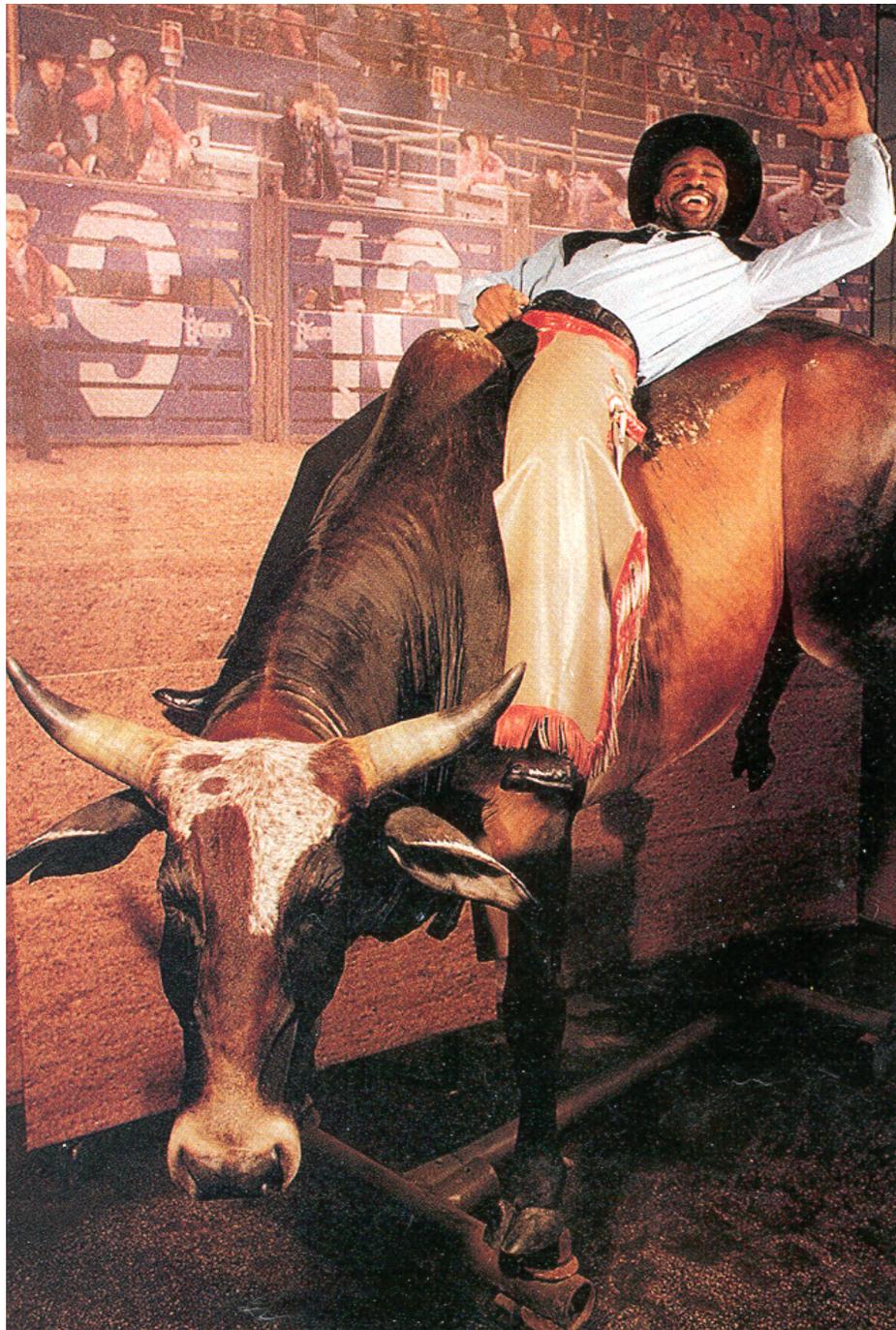
- Complete medical history with special emphasis on the portion with the greatest clinical relevance
- Listen to the patient
- Ask questions, but don't lead the patient
- “Red flags”

Red flags

- Cancer: persistent pain at night, loss of appetite, unusual lumps
- Cardiovascular: shortness of breath, dizziness, constant calf pain, discolored feet, chest pain
- Gastrointestinal / Genitourinary: severe abdominal pain, heartburn, vomiting
- Neurological: changes in hearing or vision, severe headache, fainting, balance problems

Questions to ask:

- Age & occupation?
- Why has the patient come for help?
- Was there a trauma or repetitive activity?
= The mechanism of injury
- Was the onset of the problem slow or sudden?
- Where are the symptoms that bother the patient?
- What are the movements or activities that aggravate or relieve the pain?



Pain Questions:

- How long has the problem existed?
(acute, subacute, chronic pain)
- Are the intensity, duration, and frequency of pain changing? (pain scale)
- Is the pain associated with rest, activity, or certain postures?

Type of pain?

- **Nerve** pain: sharp, burning, run in the distribution of specific nerves
- **Muscle** pain: dull, aching, & hard to localize
- **Bone** pain: deep & very localized
- **Vascular** pain: diffuse, aching, poorly localized (referred to other areas)

Principles of Examination

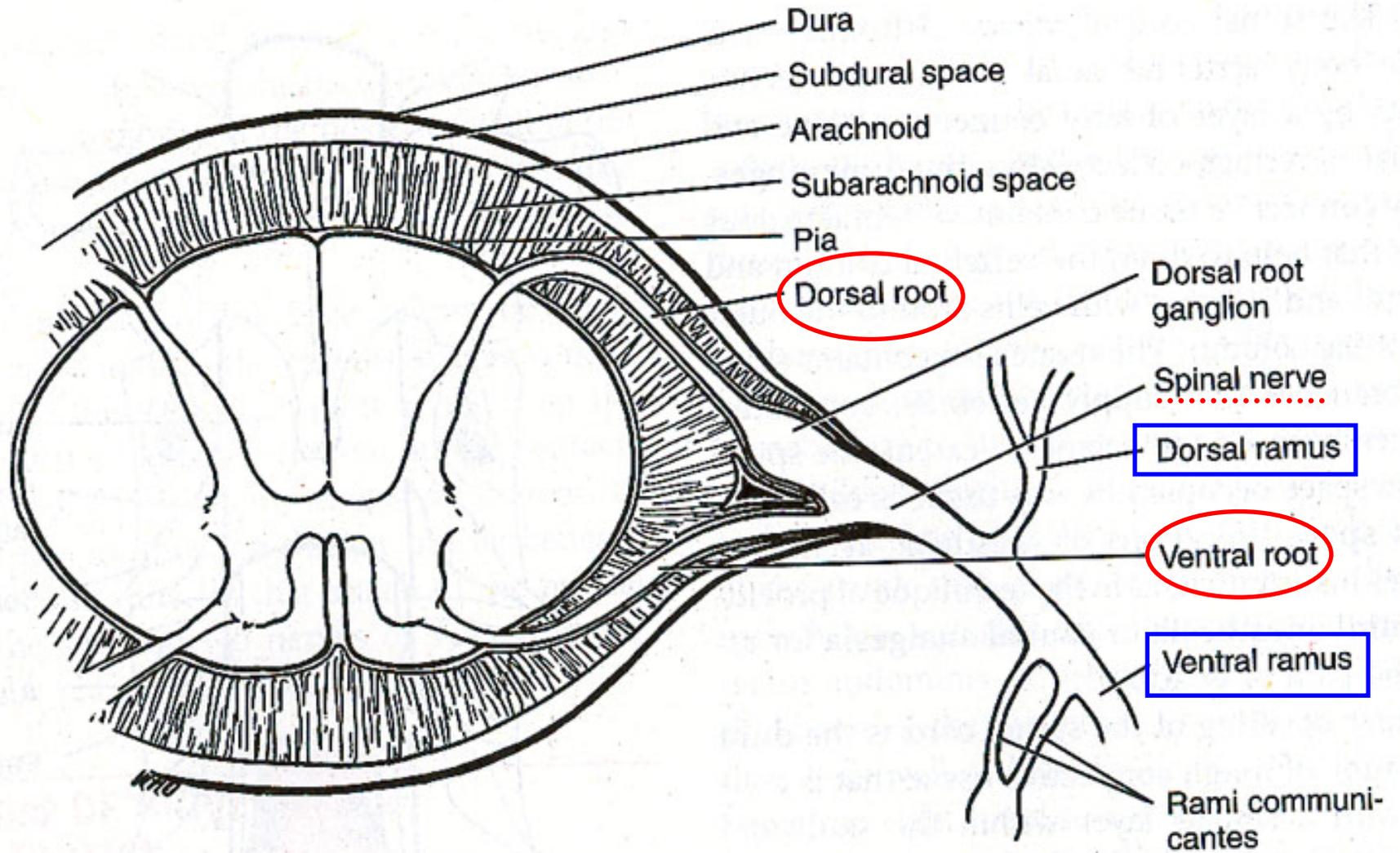
- Test the normal (uninvolved) side first
- Active movements first, then passive, then resisted isometric movement
- Painful movements are done last
- Apply over pressure with care (if active ROM is restricted or to determine the end-feel)
- Myotomes testing: contractions must be held for 3-5 seconds

“ Does it hurt when I do this? ”



Spinal cord & Nerve roots

- **Dermatome** = the area of skin supplied by a single nerve root
- **Myotome** = group of muscles supplied by a single nerve root
- **Sclerotome** = an area of bone or fascia supplied by a single nerve root



Neurological testing

- **Dermatome:** may exhibit sensory changes for light touch and pin prick
- **Myotome:** assessed by performing isometric resisted tests held for 3-5 seconds
(L1-L2: hip flexion, L3: knee extension, L4: ankle dorsiflexion & inversion, L5: extension of big toe, S1-S2: plantar flexion & knee flexion, S3-S4: muscles of the pelvic floor & bladder)

Neurological testing

- **Reflexes:**

- *dull reflexes*  lower motor neurone dysfunction

- *brisk reflexes*  upper motor neurone dysfunction

- the quadriceps reflex (L3)

- the achilles tendon reflex (S1)

Neurological testing

- **Reflexes:**
- The quadriceps reflex
 - L3
- The achilles tendon reflex
 - S1

Referred Pain

- Pain felt in a part of the body that is usually far from the tissue that have caused it.
- May be due to misinterpretation by the brain as to the source of the painful stimulus.
- Indicates that one of the structures innervated by a nerve root is causing signs & symptoms in other tissues supplied by that same nerve root.

Radiating (radicular) Pain

= Pain felt in a dermatome, myotome, or sclerotome because of direct involvement of a spinal nerve root.

Palpation

- After the tissue at fault has been identified, palpate for tenderness to determine the extent of the lesion within that tissue.
- When palpating, note:
 - Differences in tissue tension (muscle tone)
 - Tissue texture (swelling)
 - Tenderness
 - Temperature variation

Functional Assessment

- Measurement of a whole-body task performance ability
- Relates the effect of the injury on the patient's life
- But first, establish what is important to the patient
- Should include repeated movements under different loads

Joint End Feel (passive ROM)

- = the sensation which the *examiner* feels in the joint as it reaches the end ROM
- There are 3 normal end feels:
 - **Bone-to bone**: hard & painless (elbow extension)
 - **Soft tissue approximation**: movement stops due to soft tissue compression (elbow & knee flexion)
 - **Tissue stretch**: feeling of a springy or elastic resistance from the ligaments or capsule (Achilles tendon, or wrist flexion)

Joint End Feel

```
graph TD; A[Joint End Feel] --- B[Hard (Bony)]; A --- C[Soft (Tissue apposition)]; A --- D[Firm (Tissue & capsular stretch)];
```

Hard
(Bony)

Soft
(Tissue
apposition)

Firm
(Tissue &
capsular stretch)

Joint End Feel

- Bony block to movement (hard feel)  arthritic joints
- An empty feel or resistance at the end of the range 
may be due to severe pain associated with infection, active inflammation, or a tumor

Joint End Feel

- Springy block (rebound feel) at the knee →
torn meniscus blocking knee extension
- Spasm (sudden, relatively hard feel) →
muscle guarding
- Hard arrest of movement →
capsular involvement

Joint Play (accessory) Movements

- = The small ROM that can be obtained by the examiner beyond the active ROM
- Joint dysfunction = loss of joint play movement
- Joint play mobilization should be done in a loose packed position

Joint Position

- **Loose packed** (resting) position = the position at which the joint is under the least amount of stress (capsule, ligaments, bone contact).
- **Close packed position** = the position in which the majority of joint structures are under maximum tension.

