MUSCULOSKELETAL ASSESSMENT

SUBJECTIVE DATA

History of injury, description of symptoms, and associated personal health and family history can give clues to the underlying problem and appropriate care for that problem.

A. Pain

1) Where is the pain located?

✓ Joints	✓ Muscles or soft tissue	✓ Bone, as in fractures

2) Is it **sharp** → as in a fracture or sprain, or **dull**, as in a bone tumor?

3) Does the pain **radiate**?

Δ To buttocks or legs → **lower back pain**	Δ To thigh or knee → **hip fracture**

4) What makes the pain **increase**? What makes it **better**?

5) When was the onset of pain?

B. Limited Range of Motion

1) Is **stiffness** present? How long does it last?

   Δ Present in **morning** for < 30 minutes or **after sitting** for long period (due to OA).

   Δ May **persist** and is associated with acute pain (due to **spasm** of lower back strain).

2) Is **swelling** present and **limiting mobility**?

Δ Fracture	Δ Soft-tissue injury (sprain, strain, or contusion)

3) How does limited mobility affect **activities of daily living** (ADLs)?

C. Associated Symptoms

1) **Sensory/motor deficit**→ numbness, paresthesias, weakness→neurovascular compromise
2) Any weight loss, fever, or malaise → bone tumors?
3) Any bony nodules or deformity → rheumatoid arthritis?

D. History

1. Mechanism of Injury

- How did the injury occur? To **identify the extent of injury**.
- What was the **progression of symptoms**?
- Was there any repetitive movement or strain that may have contributed to problem?

2. Medical History

- What medications taking (name, dosage, over-the-counter medications, and herbals)?
- Any history of corticosteroid use that predisposes to osteoporosis?
- Is woman postmenopausal? On estrogen? If deficient, predispose to osteoporosis.
- Any history of prostate, breast, or lung cancer→ may metastasize to the bone?
- What are other chronic conditions that may affect immobility → traction, or surgery?

3. Social History

- What is the patient's occupation → may contribute to lower back strain or OA?
- Does the patient exercise? What type of exercise, frequency and duration?
- What activities the patient participate in, such as running or tennis?
- Are there risk factors for osteoporosis, as smoking, inactivity, low calcium intake?
- Is there a family history of osteoporosis or arthritis?
- What cultural issues/religious beliefs contribute to this history?
- Does the patient drink alcohol? If yes, what is the daily alcohol consumption?

OBJECTIVE DATA

Data on **current system condition** and **functional abilities**, **palpation**, and **measurement.** Always compare with contralateral side (one side of the body to the other).

Musculoskeletal System

1. Skeletal Component

- Note deviation from abnormal → deformities, alignment, symmetry, amputations.
- Identify abnormal motion and crepitus (grating sensation), as found with fractures.

2. Joint Component

Identify swelling (due to inflammation/effusion)	Estimate active & passive range of motion
Note deformity (in contractures or dislocations)	Evaluate stability, which may be altered.

3. Muscle Component

Inspect for size and contour of muscles.	Assess coordination of movement.
Palpate for muscle tone.	
Estimate strength through cursory evaluation (ie, handshake) or scaled criteria (ie, 0 = no palpable contraction; 5 = normal ROM against gravity with full resistance).	
Measure girth → **increase** (swelling or bleeding), **decrease** (atrophy (>1 cm significant).	

Additional Assessment

1. Neurovascular Component

Circulatory status (skin color & temp, peripheral pulses, capillary refill, pain, edema.	
Assess neurologic status → (ability to move distal muscles & sensation (paresthesia)	
Compare all to uninjured/unaffected extremity.	Test reflexes of extremities.

2. Skin Component

Inspect traumatic injuries (eg, cuts, bruises).	Note hair distribution & nail condition.
Inspect for Heberden's or Bouchard's nodes.	Assess for warmth or coolness of skin.
Assess chronic conditions (eg, dermatitis, stasis ulcers).	

DIAGNOSTIC TESTS

RADIOLOGIC AND IMAGING STUDIES (X-rays)

- Of bone → determine bone density, texture, integrity, erosion, changes in bone.
- Of cortex → to detect any widening, narrowing, irregularity.
- Of medullary cavity → to detect any alteration in density.
- Of joint → to show fluid, irregularity, spur formation, narrowing, changes in joint contour.
- Tomogram → special X-ray technique for detailed view of special plane of bone.

Nursing and Patient Care Considerations

- Encourage patient cooperation → proper positioning is important to obtain a good X-ray.
- Advise patient to remove all jewelry, clothing with zippers or snaps, change from pockets.
- Medicate for pain prior to X-ray as needed.

Bone Scan

It consists of parenteral **injection of bone-seeking radiopharmaceutical** (as gallium); concentration of isotope uptake revealed in primary skeletal disease ***(osteosarcoma), metastatic bone disease, inflammatory skeletal disease (osteomyelitis); fracture.***

Nursing and Patient Care Considerations

- Advise patient that a **laxative may be needed before the procedure**.
- Advice patient to **drink 16 - 32 ounces of water** prior to the procedure, as directed.
- Injectable **radionuclide** may be given **24 - 72 hours before the scan**.
- Reassure patient that there is **no pain** and that **scan will take 1 to 2 hours**.
- Analgesics or sedatives for patients for whom lying immobile for length of time is difficult.
- Discontinued Breast-feeding for at least 4 weeks after test.
- Inform pt (radioactive substances exposure **is small** & substance are excreted quickly
- Advise patient to **flush toilet 3 times after voiding**.

Bone Densitometry

Bone densitometry is a **non-invasive** study that yields an **actual measurement of bone density** and is **diagnostic for osteoporosis**. Portable screening tests analyze wrist or heel.

Nursing and Patient Care Considerations

Reassure patient radiation exposure is minimal	No special preparation or restrictions
Advise patient to lie still with hips flexed for about 20 minutes during test.	
Have patient remove clothing and all jewelry or other metal objects.	

Magnetic Resonance Imaging

- It uses magnetic fields to demonstrate differences in hydrogen density of various tissues. Demonstrates **tumors & soft-tissue** (muscle, ligament, tendon) abnormalities.
- MRI clearly ***defines internal organs***, and able to ***detect nerve damage*** and changes, such as ***edema or bruises, of bone***. Bone bruises (osseous contusions) with traumatic injuries have some predictive value for future development of posttraumatic arthritis.

Nursing and Patient Care Considerations

- Inform patient to ***lie still for about 1 hour***; ***repetitive noise clange will be heard***.
- **Practice relaxation techniques** as ***relaxation breathing & imagery***, ahead of time.
- Sedation may be needed; **claustrophobic** patients may be unable to undergo procedure or may need open MRI.
- **Contraindicated:** ***metal implants***, ***prosthetic valves***, ***pacemakers*** & ***ortho hardware***.

NURSING ALERT
Patients with metal implants or valves, metal braces, or pacemakers are unable to undergo MRI.

Other Tests

1) **CT scan** → ***narrow beam of X-ray*** that scans area in successive layers to evaluate disease, bone structure, joint abnormalities, and trauma (fractures).
2) **Arthrogram** → injection of **radiopaque substance or air into joint cavity** to outline soft-tissue structures (eg, meniscus) and contour of joint.
3) **Myelogram** → injection of ***contrast medium*** into **subarachnoid space** at **lumbar spine** to determine **level of disk herniation** or site of tumor.
4) **Diskogram** → injection of small contrast medium amount into lumbar disk abnormalities
5) **Arthrocentesis** → **needle** insertion **into joint** & ***aspiration of synovial fluid***
6) **Arthroscopy** → ***endoscopic procedure*** allows ***direct visualization of joint structures*** (synovium, articular surfaces, menisci, ligaments) through a small needle incision.
7) **Nerve studies** → to differentiate nerve root compression, muscle disease (eg, dystrophy, myositis), peripheral neuropathies, central nervous system-anterior horn cell neuropathies, neuromuscular junction problems.
    - **Electromyography** (**EMG**) → measures ***electrical potential*** generated by the muscle during relaxation and contraction.
    - **Nerve conduction velocities** → measure the ***rate of potential*** generation along specific nerves (speed of impulse conduction).