

HISTORY TAKING AND PHYSICAL EXAMINATION OF MUSCULOSKELETAL SYSTEM

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CONTENT OF PRESENTATION

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- SCREENING HISTORY
- SYMPTOMS OF THE MUSCULOSKELETAL PROBLEMS
- PHYSICAL EXAMINATION

INTRODUCTION

- Musculoskeletal complaints are among the most common symptoms and are the greatest cause of disability globally. Musculoskeletal conditions are also frequent comorbid conditions that need to be identified and managed.
- All physicians should be able to recognize an abnormality of the musculoskeletal system and whether it is important by being able to perform a screening assessment in combination with basic knowledge of musculoskeletal conditions.
- Firstly, you should be able to capability to make a screening assessment of the musculoskeletal system to be able to recognize an abnormality of the musculoskeletal system.
- In this lecture, a basic screening assessment of the musculoskeletal system is described that is appropriate as part of a general examination to identify whether any abnormality is present.

SCREENING HISTORY

We should ask some questions to the patient regarding the musculoskeletal system

What are the symptoms?

Where is the site and distribution of symptoms?

How is chronology?

What are the associated symptoms?

What are the preceding illnesses or injuries and other relevant clues?

How is the response to health interventions

What is its impact on activities, participation and quality of life?

WHAT ARE THE SYMPTOMS?

- Symptoms specifically related to musculoskeletal conditions are most often pain and stiffness, frequently accompanied by loss of function and mobility, which can limit activities and restrict participation, but there may be non-specific symptoms as well. Red flags for potentially serious conditions must be recognized

SYMPTOMS OF A MUSCULOSKELETAL PROBLEM

- Specific Symptoms
- General symptoms
- Red flags
- Other possible symptoms



SPECIFIC SYMPTOMS

- Pain
- Stiffness
- Swelling
- Deformity
- Weakness
- Instability
- Loss of function



Analysis of these symptoms helps the physician to differentiate a musculoskeletal complaint into:

- Inflammatory musculoskeletal disease
- Mechanical joint problem
- Periarticular/soft tissue problem
- Bone disorder
- Non-rheumatic disease causing musculoskeletal symptoms
- A disorder of unknown cause



PAIN

- Pain should be characterized to identify its cause and effect. Nociceptive pain results from a stimulus or lesion in peripheral tissues that causes a painful impulse to be transmitted by an intact nervous system, whereas neuropathic pain arises as a direct consequence of a lesion or disease affecting the nervous system. These need distinguishing; different causes of nociceptive pain have their own characteristics. Pain may also be referred from another site.

WHAT IS THE SITE AND DISTRIBUTION OF PAIN?

- Ask the patient to demonstrate where the pain is felt and where it is most severe. Is the pain generalized or localized? How easily can it be localized?
- Articular and periarticular pain often radiates widely and presents far from its origin. Such referred pain is felt in the dermatome relating to the myotomal or sclerotomal origin of the affected structure.
- Pain from bone and periosteum radiates little and is localized more reliably.
- Widespread pain can be due to fibromyalgia or polymyalgia rheumatica, whereas pain in several joints suggest an arthropathy.
- Myeloma or metastatic malignancy must be considered with multiple sites of pain that are not just related to joints.

WHAT ARE ITS CHARACTERISTICS AND PATTERN OF PAIN?

TYPE	PAIN PATTERN	CAUSE
Bone pain	Pain at rest and at night	Tumor, Paget's, fracture
Mechanical joint pain	Pain related to joint use only	Unstable joint
Osteoarthritic joint pain	Pain on joint use, stiffness after inactivity, pain at end of day after use	Osteoarthritis
Inflammatory joint pain	Pain and stiffness in the joints in the morning, at rest, and with use	1.Inflammatory 2.Infective
Neuropathic	Diffuse pain and paresthesia in dermatome, worsened by specific activity	Root or peripheral nerve compression
Referred	Pain unaffected by local movement	

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- **What precipitates, worsens, or improves pain?**
 - **What is its effect on the patient?**

STIFFNESS

- “Stiffness” is to be used to describe a reduced or limited range of motion or by the patient to describe the difficulty in moving the joints. More specifically, patients often describe stiffness related to symptomatic joints.
- In inflammatory joint disorders are generally associated with severe and prolonged morning and evening joint stiffness, whereas osteoarthritis is associated with short-lived but severe stiffness after inactivity.
- Morning stiffness of the joints is characteristic of inflammatory joint diseases.
- The duration of morning stiffness can indicate the activity of inflammation.

SWELLING AND DEFORMITY

- Swelling may be of the soft tissues, the joint, or bone.
- Did it follow an injury? Did it appear rapidly or slowly? Is it painful? Does it come and go, or is it gradually enlarging?
- Any swelling needs careful examination to establish its nature and cause.
- Joint swelling is a sign of disease, and examination is necessary to confirm whether it is related to the joint or a periarticular structure and to establish if it is due to an effusion, synovial proliferation, or bony growth.

WEAKNESS AND INSTABILITY

- **Weakness** refers to loss of muscle strength. That is, people cannot move a muscle normally despite trying as hard as they can.
- The pattern of muscle weakness, whether generalized or in a central or peripheral distribution, should be established.
- Regional weakness is more likely to have a specific cause. However, “weakness” may be used by a patient to describe different things, such as general fatigue, difficulty with movement because of joint disease or pain, the feeling of insecurity that is associated with many forms of joint disease, or the regional weakness of a joint or limb caused by the local muscle wasting that can accompany joint damage.
- Joint **instability** can occur at any joint when the surrounding structures start to fail to stabilise the joint.

LOSS OF MOVEMENT OR FUNCTION

- Musculoskeletal conditions often cause difficulty in performing various activities, and this may be the presenting complaint. It is uncommon for these limitations to arise in the absence of a complaint of pain and/or stiffness, but the painless loss of movement suggests a tendon rupture or a neurologic cause. Inquiry should establish if any particular movements and functions are restricted and whether this relates to pain and stiffness or if it is a primary problem.

FATIGUE AND MALAISE

- Fatigue is a manifestation of most generalized rheumatic disorders, including rheumatoid arthritis, systemic lupus erythematosus (SLE), and, most notably, fibromyalgia. Fatigue is sometimes functional and related to depression. Fatigue may also be the consequence of poor sleep, often related to pain. It may be severely disabling and is very distressing to the person. The fatigue of rheumatoid arthritis or SLE is a good indicator of the systemic disease activity. The time at which fatigue becomes a problem is sometimes used, along with the duration of morning stiffness, as one of the indicators of disease activity.



WHAT IS THE PATTERN AND CHRONOLOGY OF SYMPTOMS?

- How did the patient arrive at the present situation?
- When and how did it start—was the onset sudden or gradual, spontaneous, or after some specific event such as trauma or an infection?
- What was the subsequent course with respect to time and pattern of distribution of symptoms?
- If articular, is it peripheral small joints, large joints, or axial?
- Has it followed an additive, intermittent, or flitting course?
- Is it symmetric or asymmetric?
- What associated symptoms or signs have developed, and when?
- Do the symptoms fit some recognized pattern?



ANSWERS YOU NEED TO KNOW

- What interventions have been tried—prescription and over-the-counter pharmacologic treatments, physiotherapy, dietary supplements, or complementary therapies?
- What was the response to them?
- Did the patient benefit or sustain any adverse effects?
- What are the patient's attitude to and probable compliance with any treatment?
- Knowing the patient's socioeconomic background is important in assessing the condition and its impact and in planning management.



PHYSICAL EXAMINATION

- General examination
- Regional examination of the musculoskeletal system

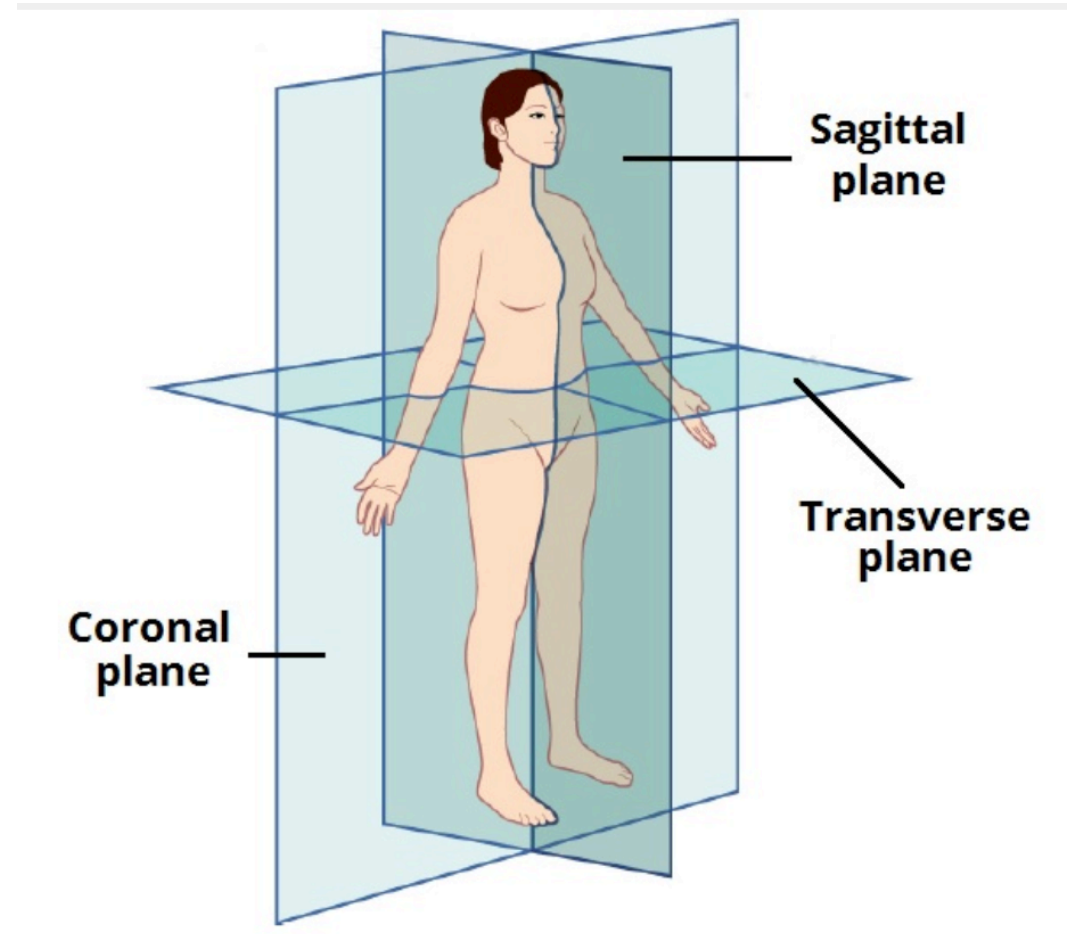
THE ANATOMICAL POSITION

- The anatomical position or neutral position is the starting position for describing any movement. It is important that you know this to be able to understand what is meant by certain movement patterns. It is sometimes also called the anatomical starting position or fundamental starting position.



BODY PLANES OF MOTION

- **The Sagittal plane** passes through the body front to back, so dividing it into left and right. Movements in this plane are the up and down movements of flexion and extension
- **The frontal plane** divides the body into front and back. Movements in this plane are sideways movements, called abduction and adduction
- **The Transverse plane** divides the body into top and bottom. Movements in this plane are rotational in nature, such as internal and external rotation, pronation and supination

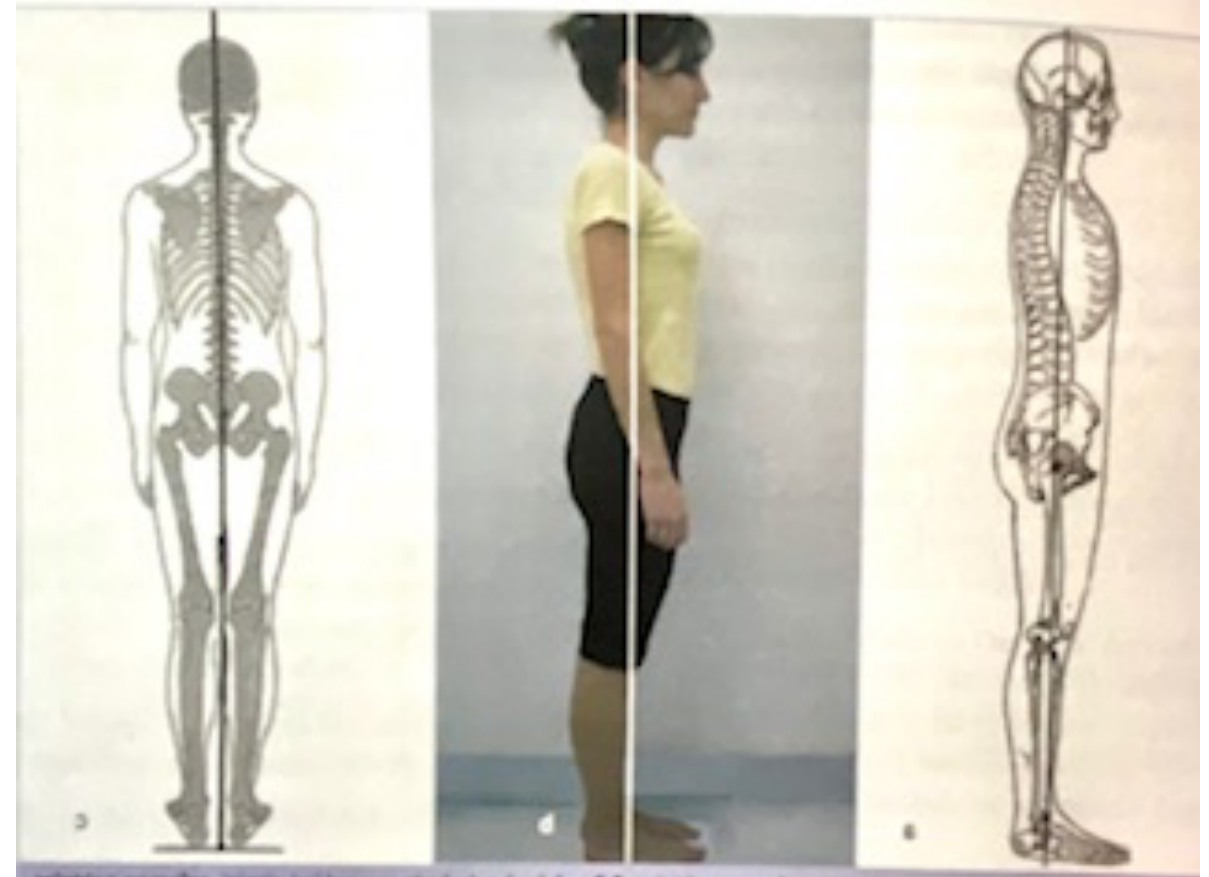


GAIT

- Gait demonstrates the integrated function of the lower limbs and will reveal abnormalities in the musculoskeletal system. Further assessment of the lower limbs will be necessary to identify the specific cause of any abnormality in gait.
- Certain abnormal patterns of gait are well recognized. Pain in one limb causes avoidance of weight bearing by that limb and shortening of that phase of the gait cycle. The cycle is asymmetric, with shorter steps on the painful limb, and is described as an antalgic gait.

POSTURE

- The normal symmetry of the body helps identify abnormalities in posture. Observe the whole person while he or she is standing and dressed only in underwear and look for equality of height of landmarks—the tips of the shoulders, the scapulae, the pelvic brim, and the crease of the buttocks. Inspect the spine carefully for its normal curves, and identify any scoliosis. Look at the feet during normal posture.



Normal posture

REGIONAL EXAMINATION OF THE MUSCULOSKELETAL SYSTEM—, SPINE, AND PELVIS

Cervical Spine	
Look	Look for hyperextension caused by thoracic kyphosis or loss of normal lordosis.
Feel	Percuss the vertebrae for tenderness.
	Palpate the paraspinal muscles for spasm or tenderness.
Move	Actively turn the head to the right, left, flexion, extension, rotation to the left and right, and lateral flexion to the left and right with the examiner gently guiding the head to ensure that maximum range is reached.
Tests	Problems related to the cervical spine are often associated with neurologic symptoms and signs, which should be elicited.

POSTURE AND ALIGNMENT OF THE HEAD AND NECK

Normal posture



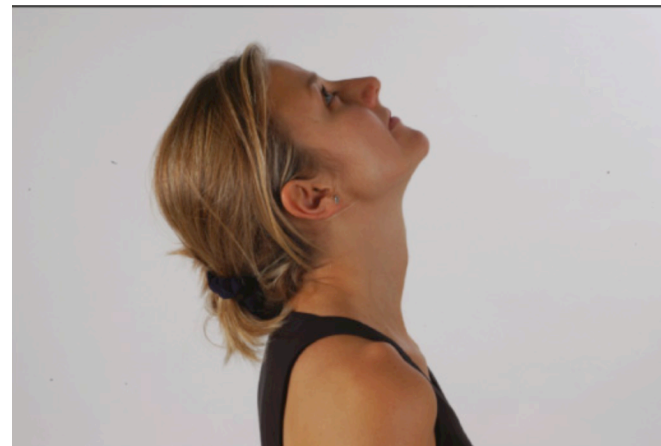
Flexion



Lateral flexion



Extension



Lateral rotation



If we make the range of motion ourselves on the patient, it is named passive; if the patient moves him or herself, it is called active

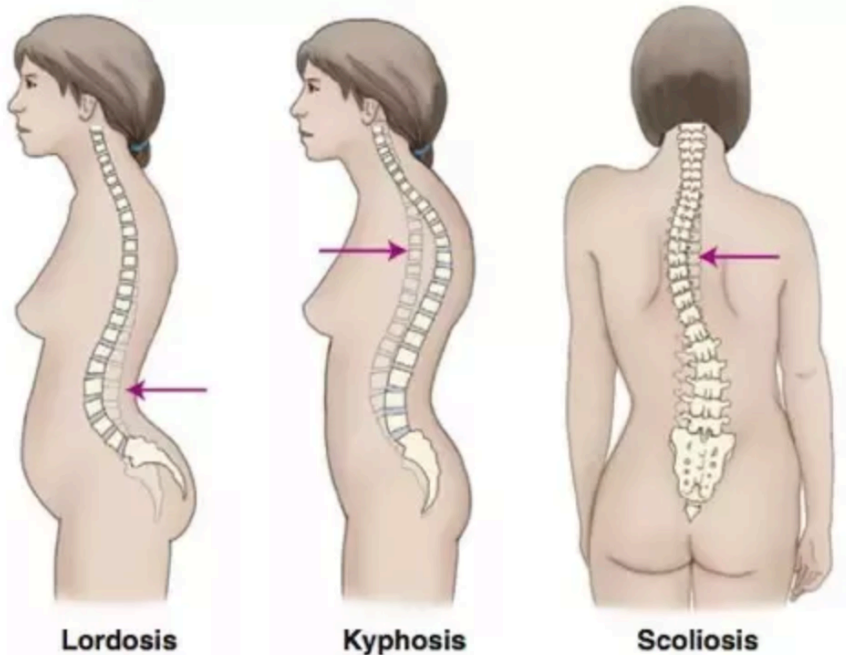
TEMPOROMANDIBULAR JOINTS

Feel	Palpate over the joint line for tenderness, crepitus, or clicking. The joint can be palpated anterior to the tragus or from within the external auditory meatus. Feel for crepitus or clicking on movement.
Move	Open the mouth wide. Deviate the lower jaw side to side.

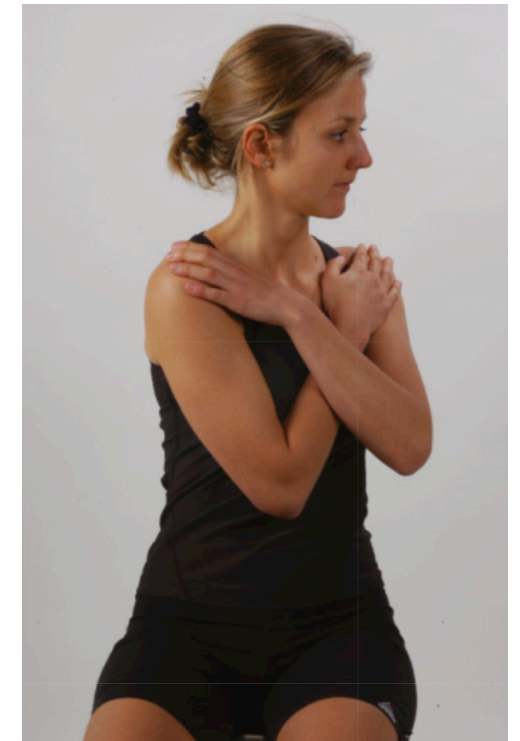
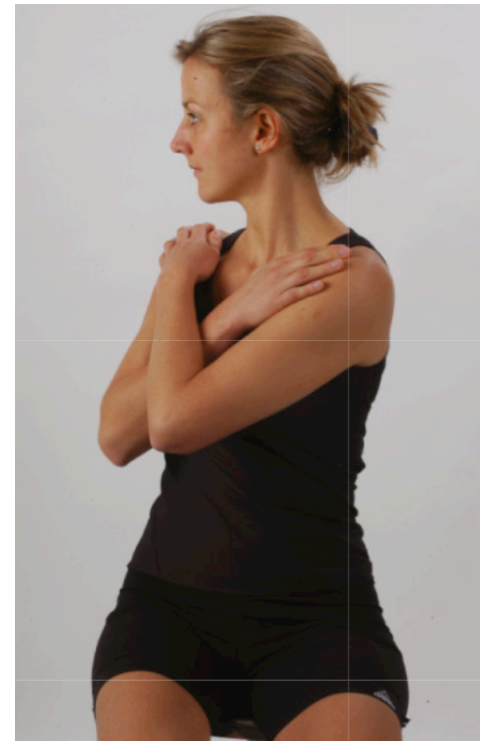


DORSAL SPINE

Look	Look for any kyphosis or scoliosis. Look for any asymmetry of the scapulae.
Feel	Percuss the vertebrae for tenderness.
	Palpate the paraspinal muscles for spasm or tenderness.
Move	Fix the pelvis by sitting and rotate the upper part of the body to the right and left with the examiner gently guiding the shoulders to ensure that maximum range is reached.



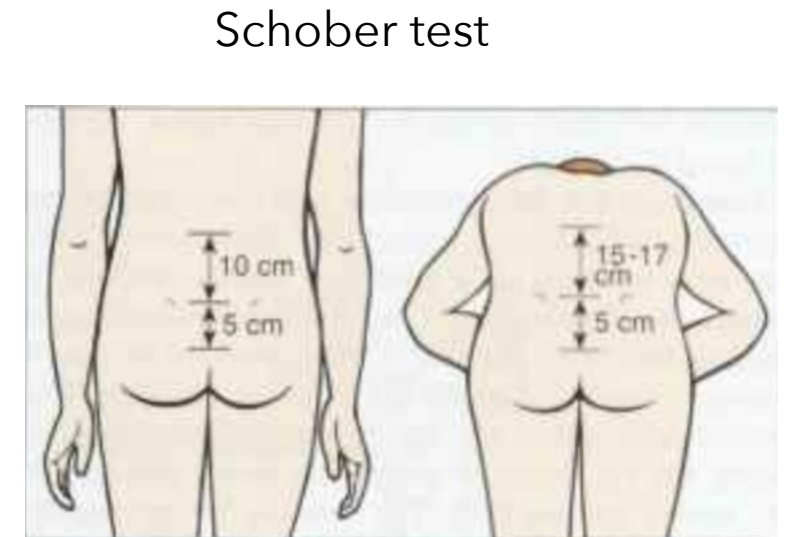
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LUMBAR SPINE

Look	Look for a normal lordosis or any scoliosis. Look for any asymmetry of the pelvic brim or the crease of the buttocks.
Feel	Percuss the vertebrae for tenderness.
	Palpate the paraspinal muscles for spasm or tenderness.
Move	While standing in an erect posture, bend forward as though trying to touch the toes, bend backward to arch the back, and bend from side to side. The person may be able to place the hands flat on the ground if hypermobile.
	Flexion can be more formally assessed with the Schober test by measuring extension of a line drawn when upright between 10 cm above and 5 cm below the level of the posterior iliac spines as identified by the dimples of Venus.
Stress	Tests for tension of the lumbar roots should be performed when patient is lying down.
	<i>Femoral nerve stretch test:</i> With the person lying prone, hold the ankle and passively flex the knee as far as it will go. The test is positive if pain is felt in the ipsilateral anterior aspect of the thigh.
	<i>Sciatic nerve stretch test:</i> With the person lying supine, gently raise the straight leg to the maximum angle achievable without significant pain and then dorsiflex the ankle. An increase in pain indicates sciatic nerve root tension.
Tests	The lumbar spine houses the lumbar spinal nerve roots, and neurologic symptoms and signs should be elicited.

LUMBAR FLEXION, EXTENSION AND ROTATIONS TO THE LEFT AND RIGHT



While standing in an erect posture, bend forward as though trying to touch the toes, bend backward to arch the back, and bend from side to side. The person may be able to place the hands flat on the ground if hypermobile.

STRESS TESTS

- Tests for tension of the lumbar roots should be performed when patient is lying down.
- *Femoral nerve stretch test*: With the person lying prone, hold the ankle and passively flex the knee as far as it will go. The test is positive if pain is felt in the isolateral anterior aspect of the thigh.
- *Sciatic nerve stretch test*: With the person lying supine, gently raise the straight leg to the maximum angle achievable without significant pain and then dorsiflex the ankle. An increase in pain indicates sciatic nerve root tension.



Test for cruralgia



Test for sciatica



Test for sciatica

PELVIS AND SACROILIAC JOINTS

Look	Look for asymmetry of the pelvic brim and the lower part of buttocks.
Feel	Palpate for tenderness in the buttocks.
	Palpate the sacroiliac joints for tenderness.
Stress	Stress the sacroiliac joints for tenderness. Various methods can be used to compress or distract the joint to elicit tenderness, such as pushing on both iliac wings when the person is lying supine.



Distraction test



REGIONAL EXAMINATION OF THE MUSCULOSKELETAL SYSTEM—UPPER EXTREMITY

Shoulder

Look	Look for any asymmetry in the scapulae and posture or muscle wasting.
Feel	Palpate over the midpoint of each trapezius and the supraspinatus to identify tender spots.
	Palpate over the acromioclavicular joint line, glenohumeral joint line, and bicipital groove.
Move	Actively elevate the arms into the air.
	Actively place the hands behind the head.
	Actively place the hands behind the back.
	Steady the scapula and, with the elbow at 90 degrees, rotate internally and externally; then passively abduct, flex, and internally and externally rotate the shoulder.

SHOULDER MOTIONS



Steady the scapula and, with the elbow at 90 degrees, rotate internally and externally; then let her move to abduction, flexion, and internally and externally rotation of the shoulder.

ELBOW

Elbow

Look	Look for any swelling or deformity. Joint swelling is first apparent in the para-olecranon groove. The olecranon is a common site for bursitis and rheumatoid nodules.
Feel	Palpate over the para-olecranon groove for synovial swelling or tenderness. Palpate over the medial and lateral epicondyles for tenderness. Assess the laxity of the skin if considering hypermobility.
Move	Actively and passively extend and flex the elbow and assess pronation and supination while the elbow is 90 degree flexion.



Flexion



Extention



Assess pronation



Assess supination

WRIST

Look	Look for any swelling or deformity.
Feel	Palpate over the joint line for tenderness or synovial swelling.
Move	Actively and passively flex and extend the wrist.
	Assess for hypermobility by passively moving the thumb toward the volar aspect of the forearm with the wrist in full flexion.



HAND

Look	Look for any swelling or deformity. Is the swelling specific to joints or tendons or is it diffuse?
	Look for any associated clues. Much can be learned from the hand. Look for wasting of the small muscles; inspect the skin, nails, and nail beds.
Feel	Palpate the tendon sheaths during movement to detect crepitus or tendon nodules. Feel the quality of the skin for induration, thickening, or laxity.



Palpate the tendon sheaths

Palpate the metacarpophalangeal joints

Palpate the proximal interphalangeal joints

Palpate the metacarpophalangeal joints

HAND

Move

Actively make a tight fist with palmar aspect uppermost to see whether all fingers fully flex and estimate strength of grip by observing blanching of the palmar surface of the hand on release of the fist.

Actively make a firm pinch grip between the thumb and fingers individually.

Passively extend the fifth finger to assess for hypermobility.

Actively make a fist

Assess grip strength

Release the grip and observe the palm for blanching

Assess hyperextensibility of the fifth finger.

Assess pinch grip

REGIONAL EXAMINATION OF THE MUSCULOSKELETAL SYSTEM—LOWER EXTREMITY

- Observing gait is an important part of assessing the lower limbs. Examination should be done with the person lying on a bench. Measure leg length if a pelvic tilt when standing suggests shortening or with a discrepancy in the position of the medial malleoli with a straightened pelvis. Pain in the hindquarter is often called “hip pain” but can have many origins that need elucidation by examination.



Assess leg length by the relative position of the medial malleoli with the pelvis straightened.

HIP

Look	Observation of the person walking will have given some information about the hips. Wasting of the buttock or thigh muscles from disuse may be apparent.
Feel	Palpation should be used to clarify the origin of any symptoms. The word <i>hip</i> is used to describe symptoms anywhere in the hindquarter.
	Tenderness is usually related to tendinitis or bursitis.
Move	With the person supine, actively and then passively flex the hip as far as possible with the knee in flexion to look for contralateral movement.
	With the hip passively flexed to 90 degrees, rotate it internally and externally by holding the foot, supporting the thigh, and moving the lower part of the leg inward and outward while being careful to not inflict pain.
	Internal rotation is often affected first in disorders of the hip joint.
	With the person lying supine and the leg fully extended, hold the contralateral anterior superior iliac spine to prevent movement of the pelvis and passively abduct and adduct the leg.

HIP

Active flexion



P. internal rotation



P. abduction



Passive flexion



P. external rotation



P. adduction



KNEE

Look

Observation of the person walking will have given some information about the knees. Wasting of the thigh muscles from disuse may be apparent. Instability may be present. Look for any swelling and its exact site because it may relate to the joint or periarticular structures. Look for any deformity. Typical deformities are fixed flexion, valgus, or varus.



KNEE

Feel Palpate for tenderness or swelling and establish the affected structures. Palpate the joint line for tenderness. Assess for articular swelling and effusion by the bulge sign or patella tap. Palpate for a popliteal cyst.



KNEE

Move	With the person supine, passively flex the knee as far as possible with the hip in flexion. If the hip is also abnormal, hang the leg over the side of the bench to examine flexion of the knee without hip flexion.
	With the person lying supine, fully extend the leg in an attempt to touch the back of the knee onto the bench. Assess passively if the knee will hyperextend.
Stress	Anterior and posterior stability should be tested to assess the cruciate ligaments.
	Medial and lateral stability should be tested to assess the collateral ligaments and for loss of joint space.



Knee flexion



Knee extension



Stress the cruciate ligaments



Stress the collateral ligaments.

FOOT AND ANKLE

Look

Observe the feet when standing and during walking. Look for a normal longitudinal arch and, during the gait cycle, look for normal heel strike and take-off from the forefoot. Look for any callosities beneath the metatarsal heads and for any swelling and redness of the toes.

Swelling of the metatarsophalangeal joints can separate the toes so that daylight becomes visible between them. Look for any deformities.

Deformities include pes planus (flattening of the longitudinal arch); pronation of the foot; valgus deformity of the hindfoot (eversion of the subtalar joint); pes cavus (high longitudinal arch); talipes equinovarus; hallux valgus; subluxation of the metatarsophalangeal joints; and “claw,” “hammer,” and “mallet” deformities of the toes.



FOOT AND ANKLE

Feel

Symptoms may relate to the joint, periarticular bone, tendons, and their sheaths and insertions, or bursae. Palpate for tenderness or swelling, and establish the affected structures. Squeeze across the metatarsus, and if tenderness is noted, examine the metatarsophalangeal joints individually.



Ankle



Subtalar joint



Midtarsal joint



Metatarsophalangeal
Joints

FOOT AND ANKLE

Move

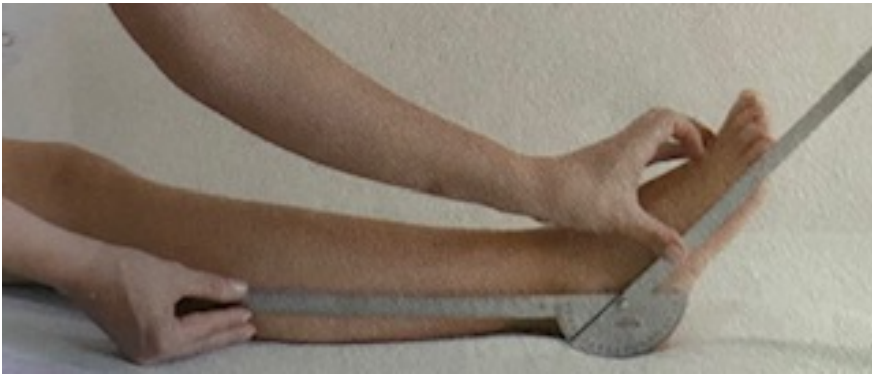
Actively flex and extend the ankle.

Actively invert and supinate and then evert and pronate the foot.

Passively deviate the heel medially (inversion) and laterally (eversion) by grasping the heel between the thumb and index finger of one hand and moving it while anchoring the lower part of the leg with the other hand.

Passively rotate the forefoot on the hindfoot by grasping the forefoot between the thumb and fingers while anchoring the heel with the other hand to assess the midtarsal joint.

See whether the patient is able to stand on the toes, which requires an intact posterior tibialis tendon.





WHAT WE HAVE LEARNED

We have learned;

- How we can take a history of a patient with musculoskeletal system disorder
- How we can examine this patient.
- Thank you for attention!