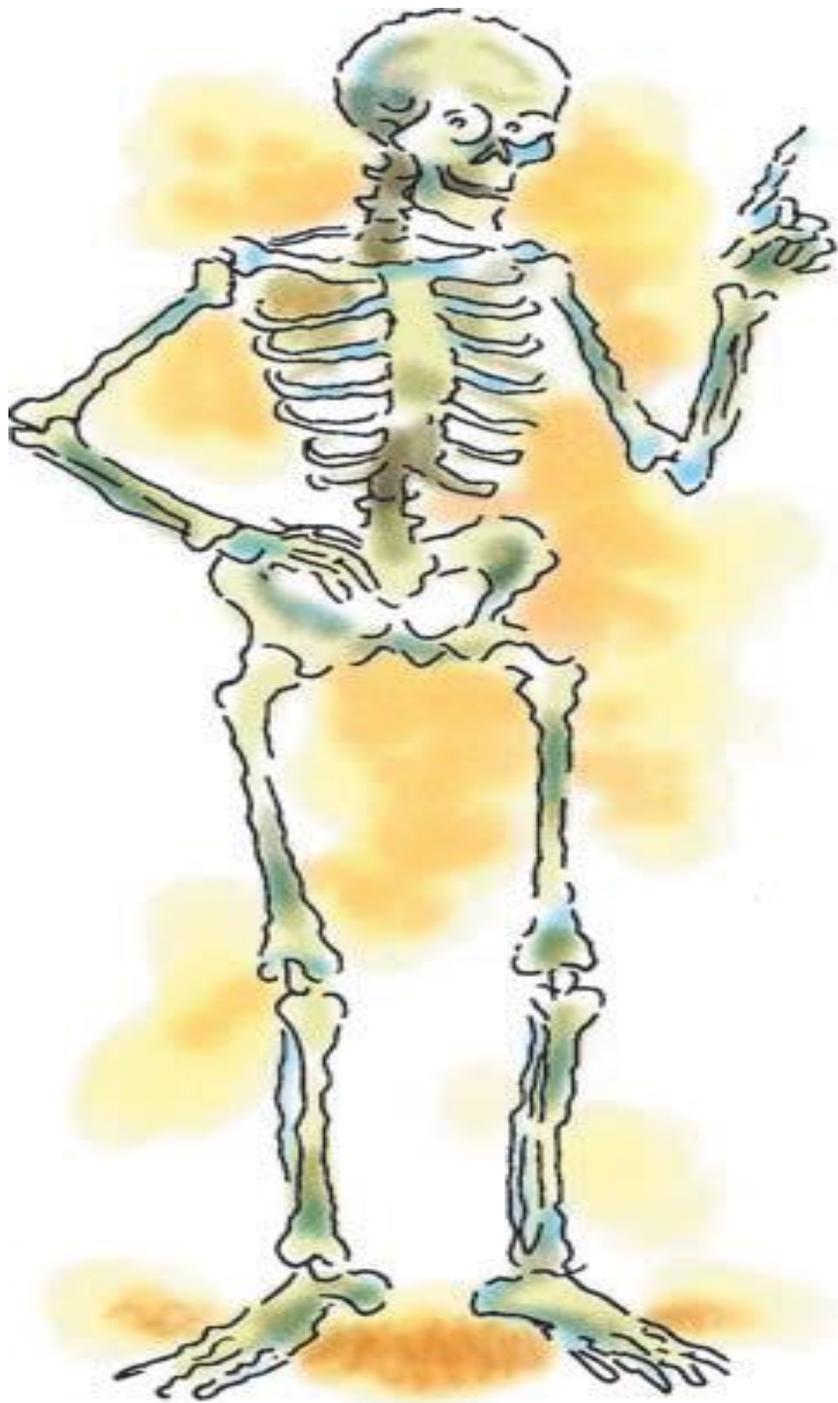


Assessment For Musculoskeletal System

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Lecture Outlines:

- **Anatomy**
- **Assessment**
- **Abnormal findings**



Anatomy of the Musculoskeletal System

The three main parts of the **musculoskeletal System** are **bones, muscles and joints**.

□ The **206 bones** of the skeleton form the body's Framework.

- Supporting and protecting organs and tissues.
- Storage sites for minerals such as calcium.
- It contains bone marrow, which produces red blood cells.



❑ **Skeletal muscles** contract and produce skeletal movement when they receive a stimulus from the **central nervous system** (CNS). The CNS is responsible for involuntary and voluntary muscle function.

❑ Joints:

The junction of two or more bones is called a **joint**. Joints stabilize the bones and allow a specific type of movement.

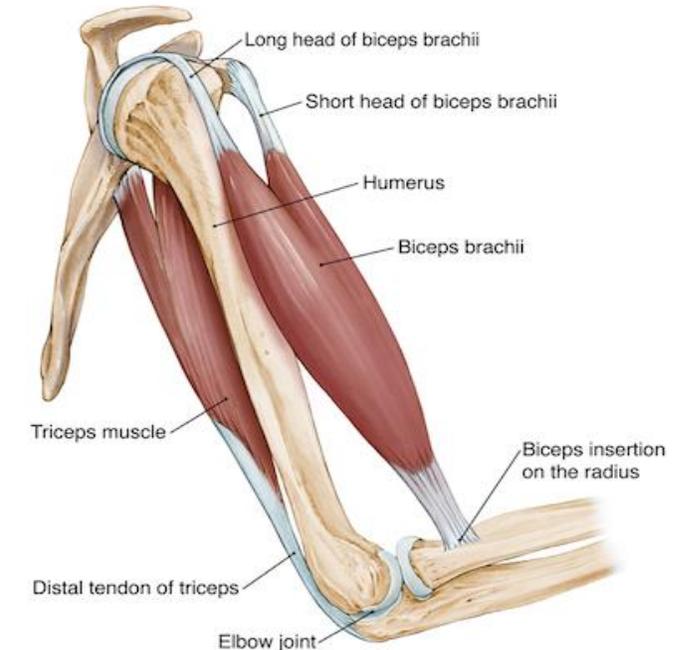
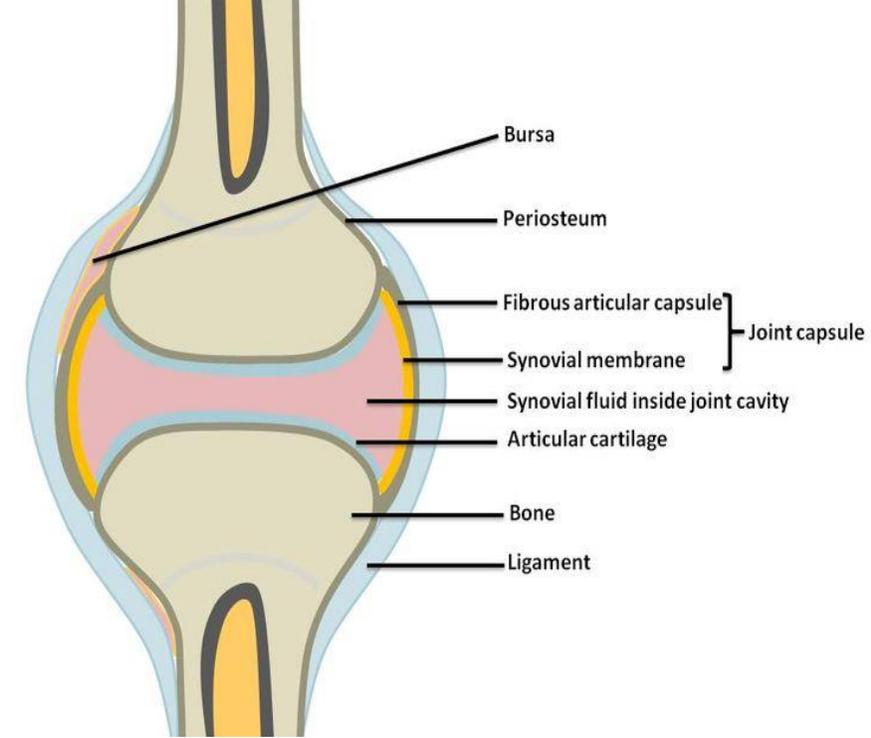
The two types of joints are:

- In **nonsynovial joints**, the bones are connected by fibrous tissue, or cartilage. The bones may be **immovable**, like the sutures in the skull
- **Synovial joints** move freely; the bones are separate from each other and meet in a cavity filled with synovial fluid, a lubricant.



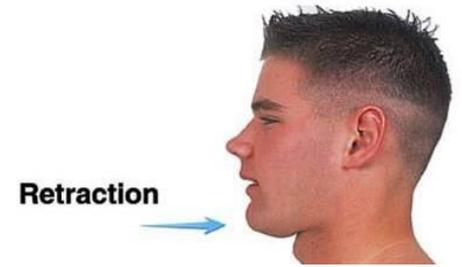
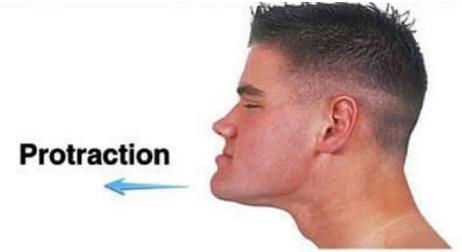
Other supporting structures

- **Tendons** (connect muscle to bone)
- **Ligaments** (Bind the articulating bones together)
- **Bursae** (is a sac filled with synovial fluid that cushions the movement of structures.)

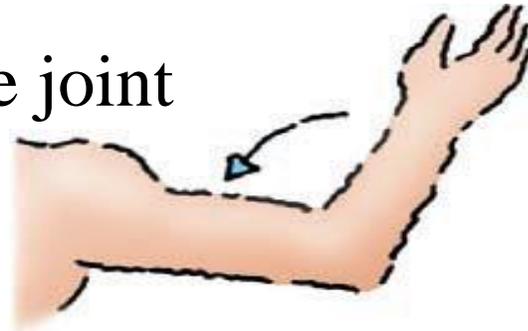


Types of joint motion

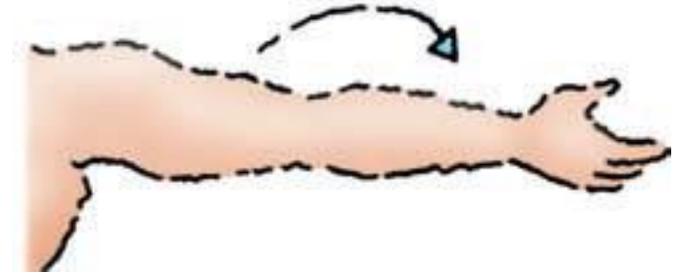
➤ **Retraction and protraction:** Moving backward and forward.



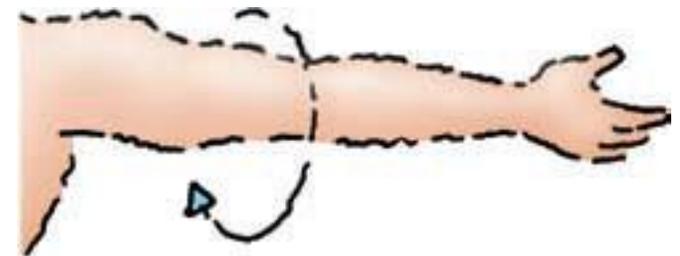
➤ **Flexion:** Bending, decreasing the joint angle.



➤ **Extension:** Straightening, increasing the joint angle.



➤ **Circumduction:** Moving in a circular manner



➤ **Abduction:** Moving away from midline.

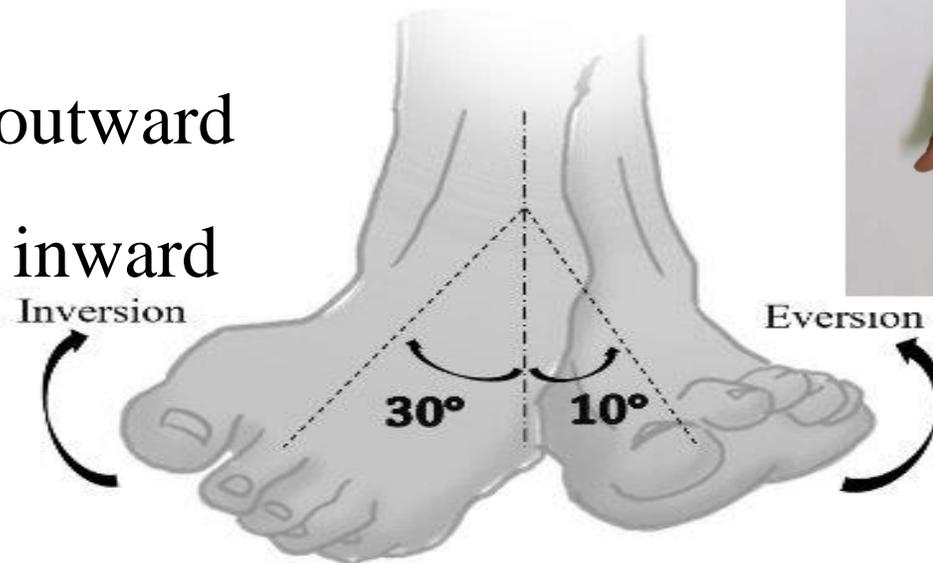
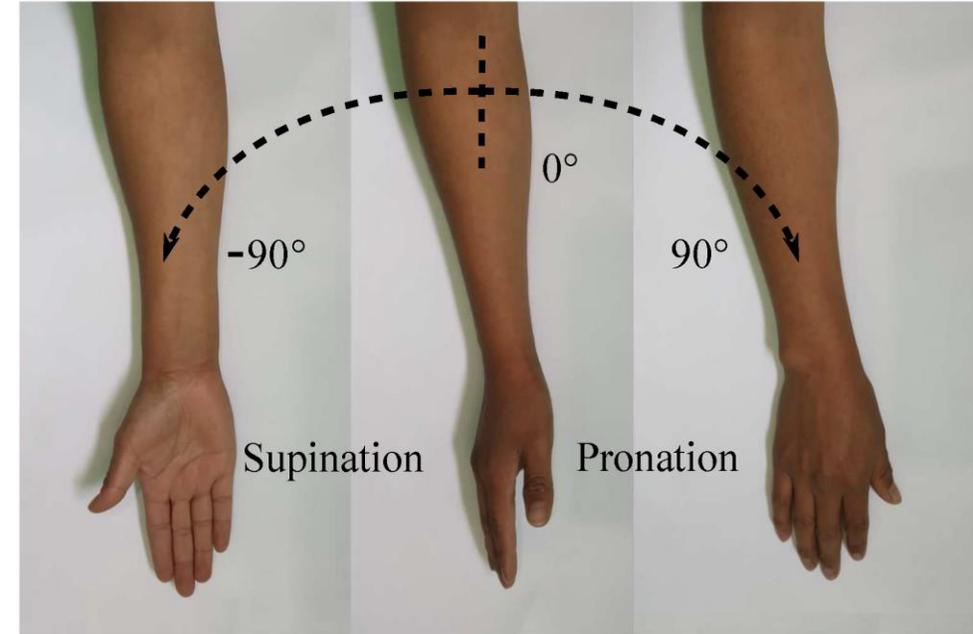
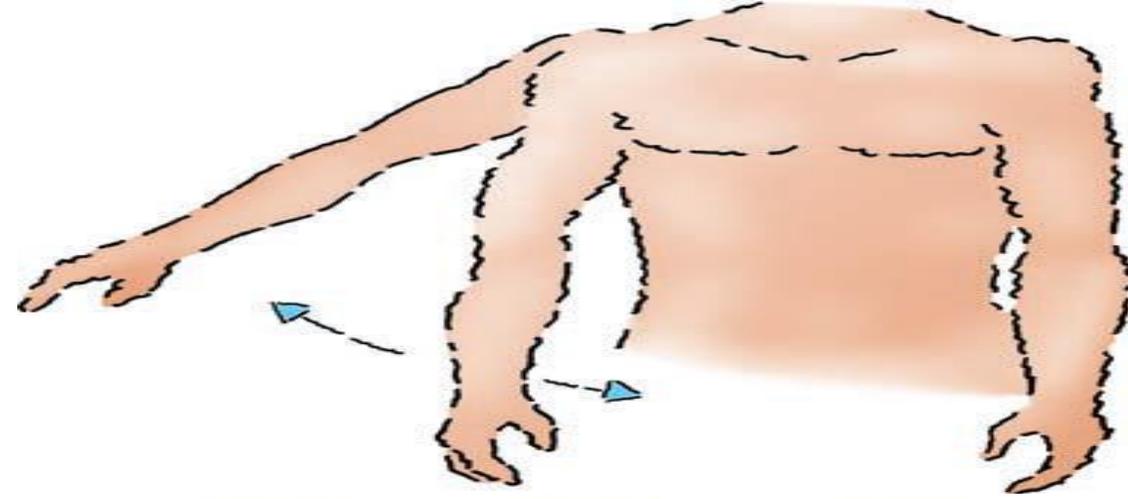
➤ **Adduction:** Moving toward midline.

➤ **Pronation:** Turning downward

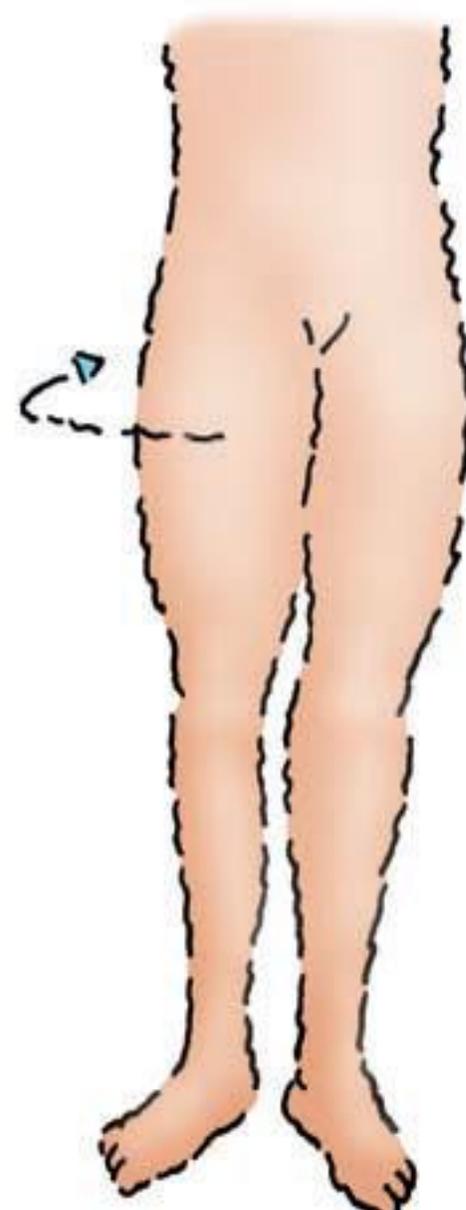
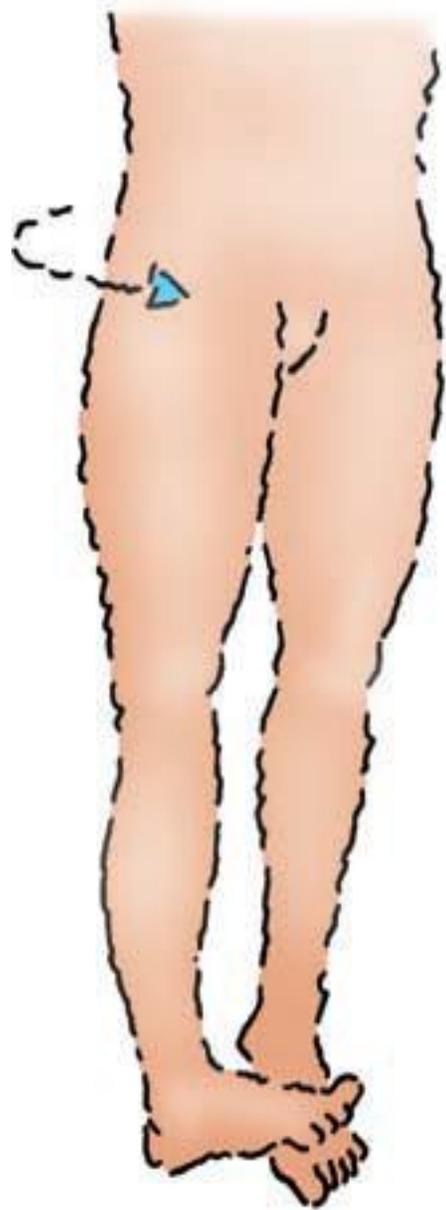
➤ **Supination:** Turning upward

➤ **Eversion:** Turning outward

➤ **Inversion:** Turning inward



➤ **Internal rotation:**
Turning toward
midline



External rotation:
Turning away from
midline

Video for joint of motion

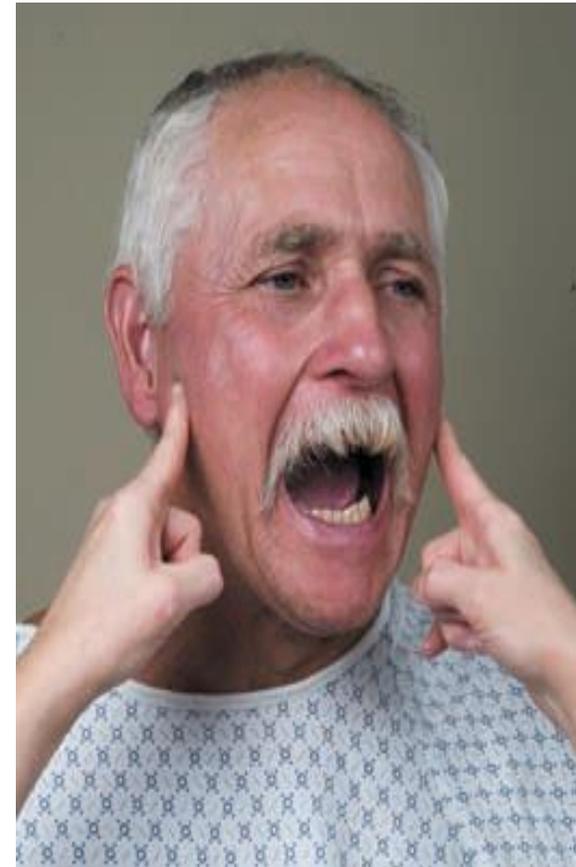


Head and jaw

Inspect the patient's face for swelling, symmetry, and evidence of trauma. The mandible should be in the midline, not shifted to the right or left. Then evaluate **ROM (range of motion)** in the temporomandibular joint.



If you hear or palpate a click as the patient's mouth opens, suspect an improperly aligned jaw. **Swelling** of the area, **crepitus**, or **pain** may occur.



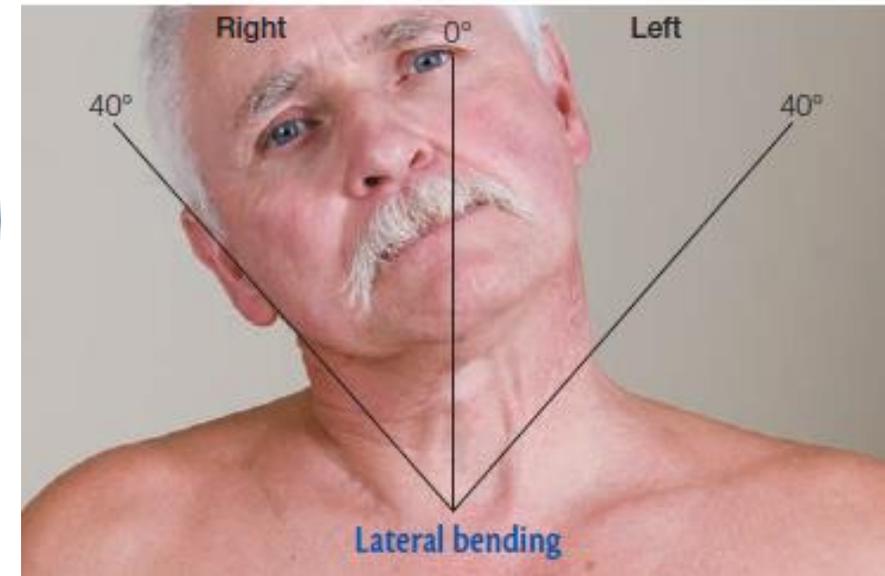
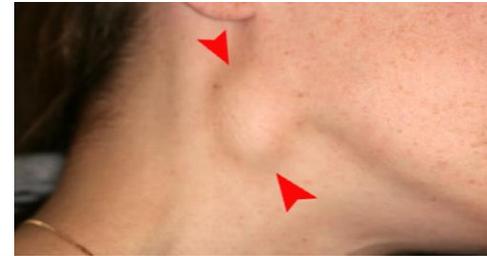
Neck

Inspect the front, back, and sides of the patient's neck, noting muscle asymmetry or masses. **Then palpate** the cervical vertebrae and the areas above each clavicle (supraclavicular fossae) for tenderness, swelling, or nodules.

- As the patient moves his neck, listen and palpate for **crepitus, an abnormal grating sound**. After inspecting and palpating, check ROM in the neck.

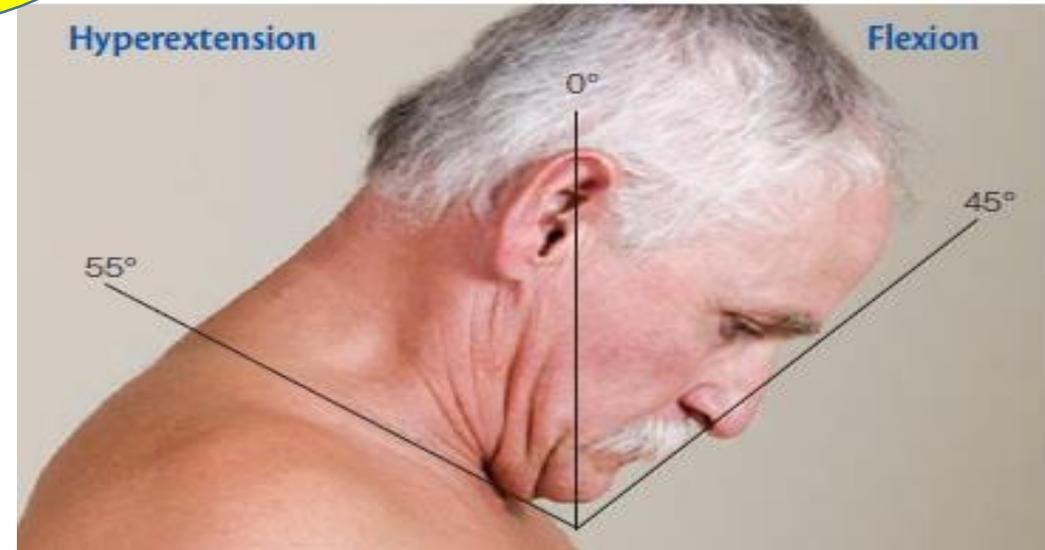


Ask the patient to try touching his right ear to his right shoulder and his left ear to his left shoulder. The usual range of motion is 40 degrees on each side.





Ask him to touch his chin to his chest and then to point his chin toward the ceiling. The neck should flex forward 45 degrees and extend backward 55 degrees.



- To assess **rotation**, ask the patient to turn his head to each side without moving his trunk. **His chin should be parallel to his shoulders.**

Spine

The spine should be in midline position without deviation to either side.



Ask the patient to straighten up.

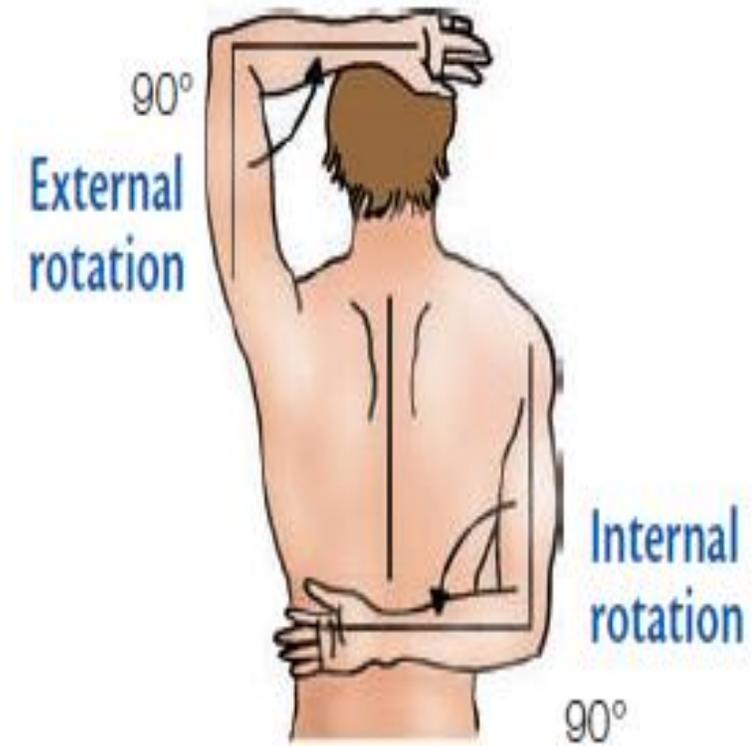
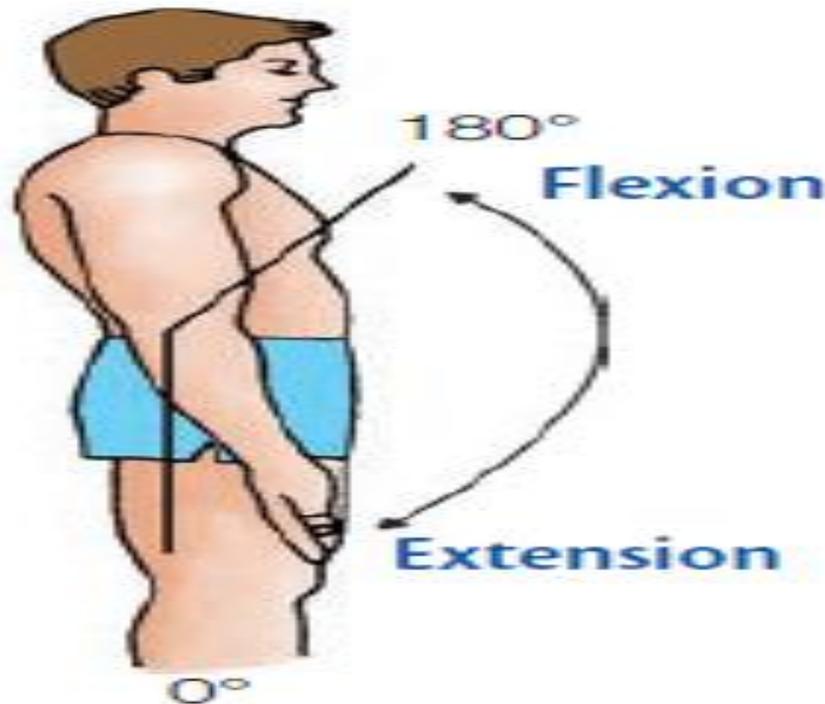
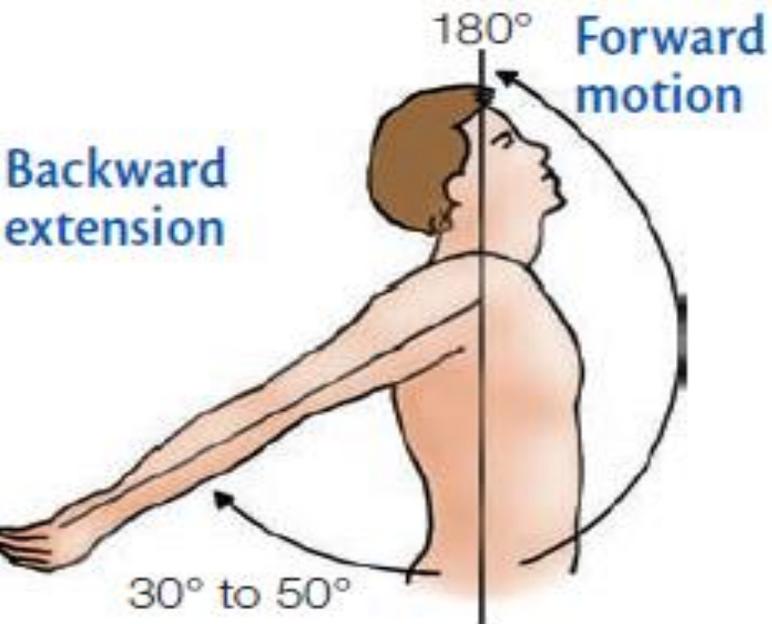
- Use a measuring tape to measure the distance from the nape of his neck to his waist.
- Ask the patient to bend forward at the waist.
- Continue to hold the tape at the patient's neck, letting it slip through your fingers slightly to accommodate the increased distance as the spine flexes.
- The length of the spine from neck to waist usually increases by at least (5 cm) when the patient bends forward. If it doesn't, the patient's mobility may be impaired, and you'll need to assess him further.



Shoulders and elbows



- With the patient sitting or standing, **observe** the shoulders, noting **asymmetry**, **muscle atrophy**, or **deformity**.
- **Palpate** the shoulders with the palmar surfaces of your fingers to locate bony landmarks; note **crepitus** or **tenderness**. Using your entire hand, palpate the shoulder muscles for firmness and symmetry. Also palpate the elbow and the ulna for subcutaneous **nodules** that occur with **rheumatoid arthritis**.
- **Assess ROM.**



Wrists, hands, and fingers



Inspect the wrists and hands for contour, and compare them for symmetry. Also check for nodules, redness, swelling, **deformities**, and **webbing** between fingers. Use your thumb and index finger to palpate both wrists and each finger joint. Note any tenderness, nodules, or **bogginess**. Then assess ROM of the wrists and fingers.



Testing for Carpal tunnel syndrome

1-Tinel's sign

- Lightly percuss the transverse carpal ligament over the median nerve where the patient's palm and wrist meet.
- If this action produces numbness and tingling shooting into the palm and finger, the patient has Tinel's sign and may have carpal tunnel syndrome.



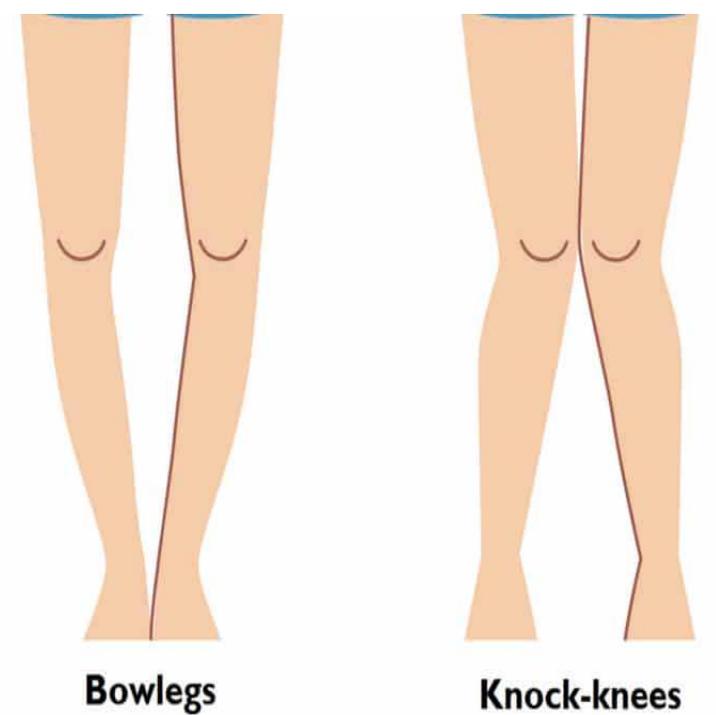
2-Phalen's maneuver

- Have the patient put the backs of his hands together and flex his wrists downward at a 90-degree angle.
- Pain or numbness in his hand or fingers during this maneuver indicates a positive Phalen's sign. The more severe the carpal tunnel syndrome, the more rapidly the symptoms develop.



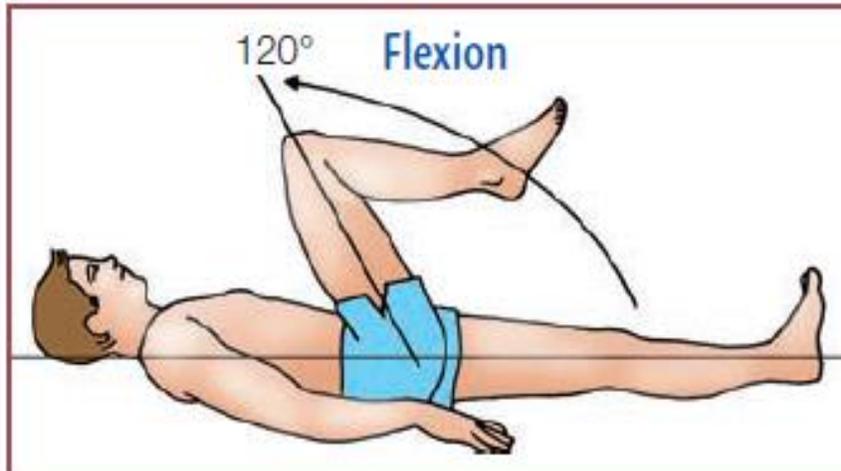
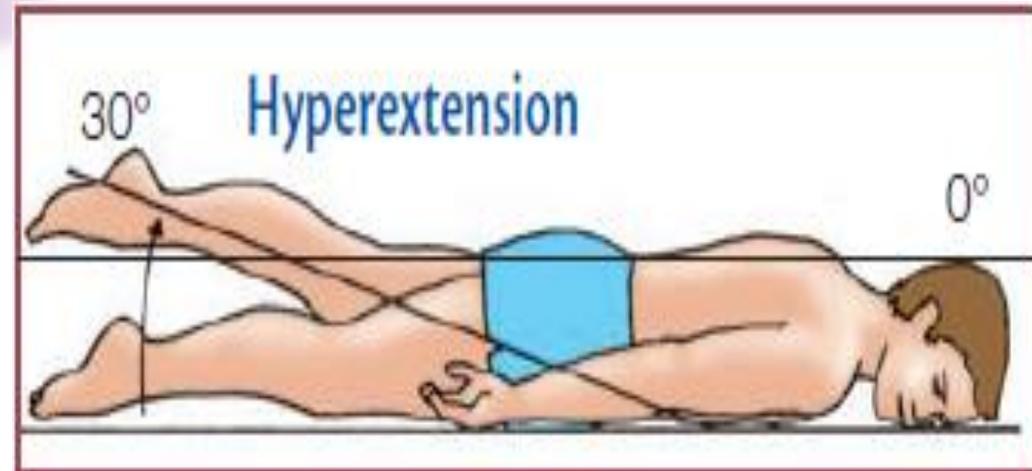
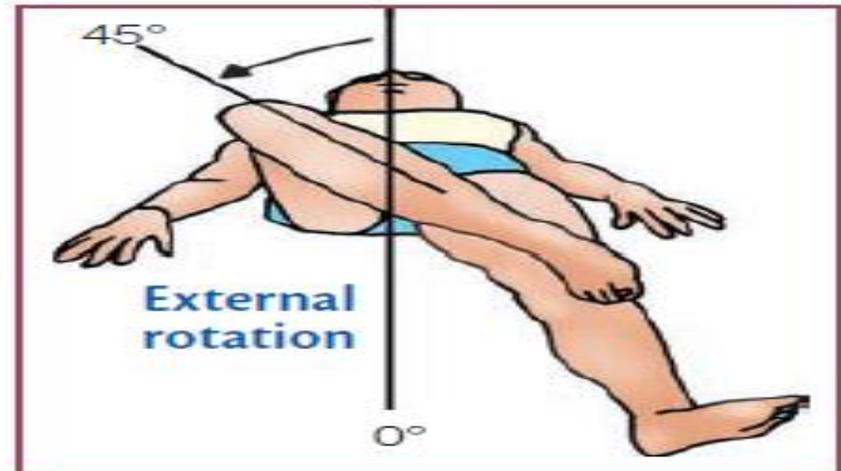
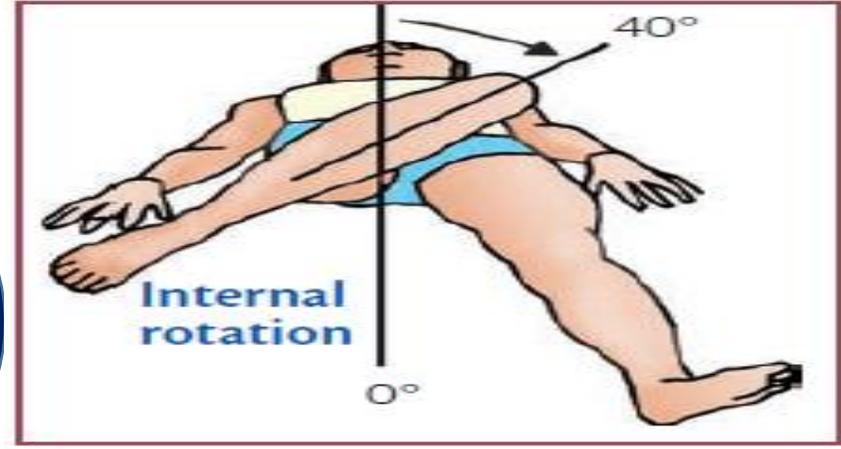
Hips and knees

- **Inspect** the hip area for **contour and symmetry**. Inspect the position of the knees, noting whether the patient is **bowlegged (O-shaped)**, with knees that point out, or **knock-kneed (X-shaped)**, with knees that turn in.
- **Palpate** each hip over the iliac crest for tenderness or instability. Palpate both knees. They should feel smooth, and the tissues should feel solid.
- Assess **ROM** in the hip. These exercises are typically done with the patient in a **supine position**.



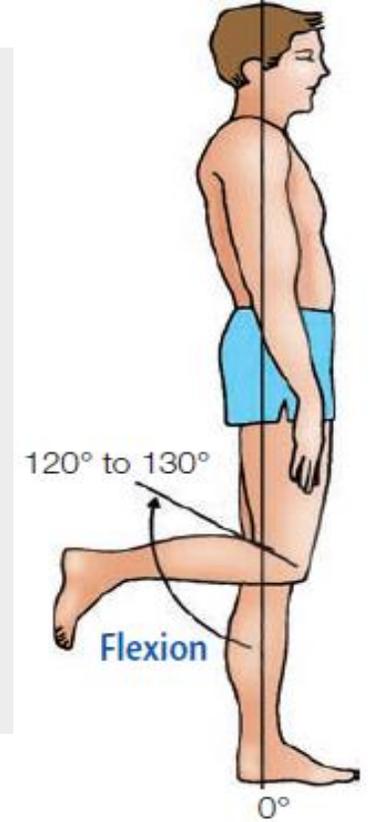


If the patient has undergone a total hip replacement, don't perform these maneuvers without the surgeon's permission; motion can dislocate the prosthesis.



Assessing knee range of motion:

- If the patient is standing, ask him to bend his knee as if trying to touch his heel to his buttocks. **Normal range of motion for flexion is 120 to 130 degrees.**
- If the patient is lying down, have him draw his knee up to his chest. His calf should touch his thigh.



Assessing for bulge sign:

The bulge sign indicates **excess fluid** in the joint. To assess the patient for this sign, ask him to lie down so that you can palpate his knee. Then give the medial side of his knee two to four firm strokes.

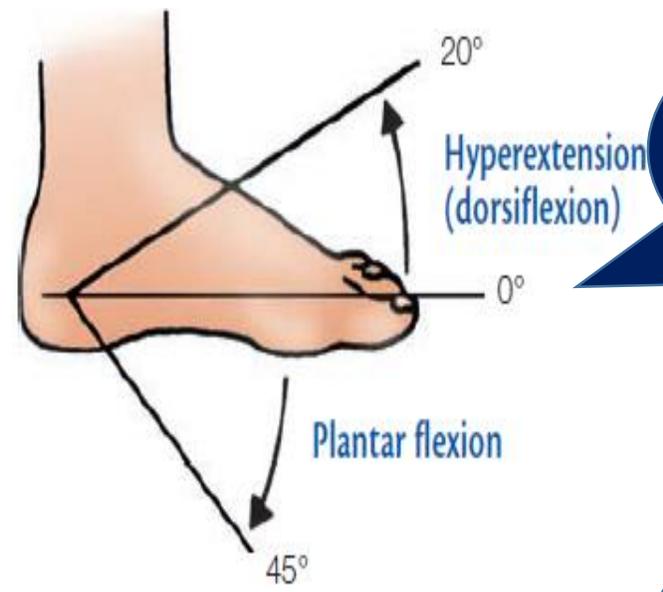


Video For Bulge Sign Test

Ankles and feet

What should I look for in the ankles and feet?

That's easy! Swelling, redness, nodules, or other deformities.



Normal range of motion (ROM) for plantar flexion is about 45 degrees; for dorsiflexion, 20 degrees.

Normal ROM for inversion is 30 degrees; for eversion, 20 degrees.



Assessing the muscles:

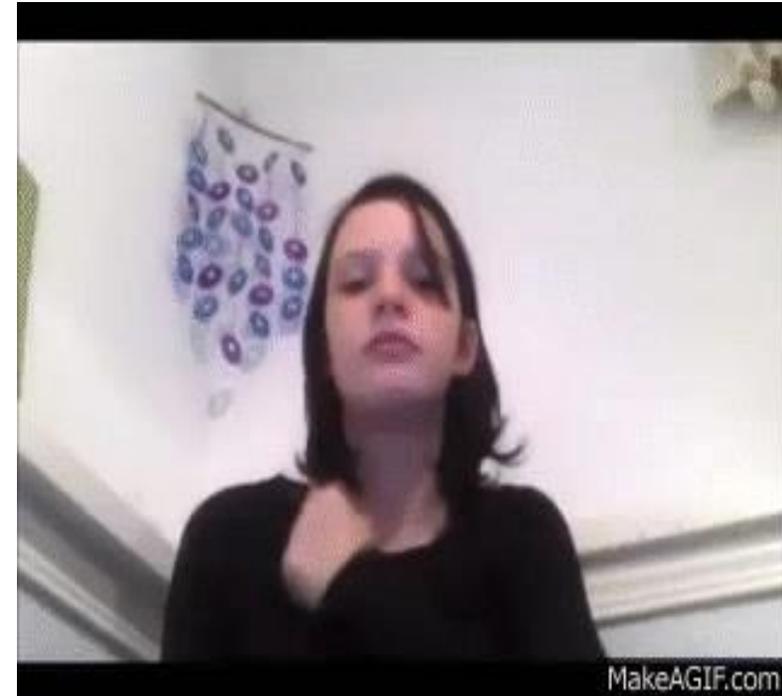
Inspect all major muscle groups. Check for symmetry. If a muscle appears atrophied or hypertrophied, measure it by wrapping a tape measure around the largest circumference of the muscle on each side of the body and comparing the two numbers. Note contracture and abnormal movements, such as spasms.



- Fasciculation



- Tics



- Tremors



Muscle tone describes muscular resistance to passive stretching. To test leg muscle tone by putting the patient's hip through passive ROM exercises and then letting the leg fall to the examination table or bed. Like the arm, the leg **should fall easily**. **Abnormal findings include muscle rigidity and flaccidity.**



Abnormal Finding

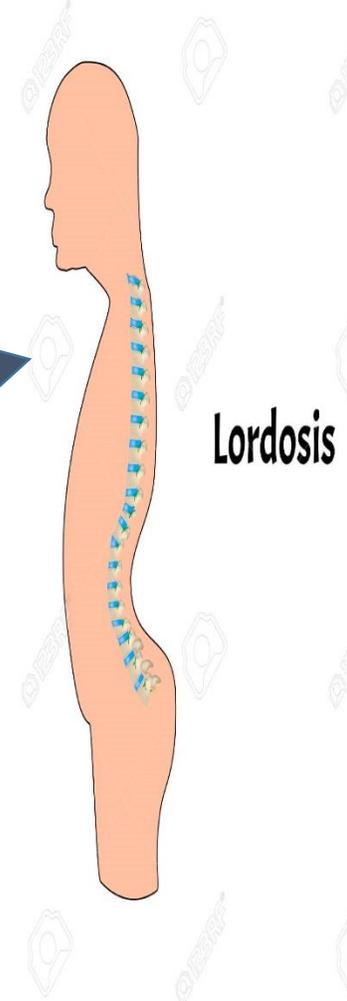
Scoliosis: lateral deviation of the spine is present and the patient leans to the side.



Kyphosis
If the patient has pronounced kyphosis, the thoracic curve is abnormally rounded, as shown below.



Lordosis
If the patient has pronounced lordosis, the lumbar spine is abnormally concave. It is normal in pregnant women and young children.



Footdrop—plantar flexion of the foot with the toes bent toward the instep—is a characteristic sign of certain peripheral nerve or motor neuron disorders. Footdrop may also stem from prolonged immobility.



The 5 P's of musculoskeletal injury

Pain—Does the patient feel pain? If he does, assess its location, severity, and quality.

Paresthesia—Assess for loss of sensation by touching the injured area with the tip of an open safety pin. Abnormal sensation or loss of sensation indicates neurovascular involvement.

Paralysis—Can the patient move the affected area? If he can't, he might have nerve or tendon damage.

Pallor—Paleness, discoloration, and coolness on the injured side may indicate neurovascular compromise.

Pulse—Check all pulses distal to the injury site. If a pulse is decreased or absent, blood supply to the area is reduced.



Thank you