

Chapter 13

General Examination of Orthopaedic Patients

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Examination of an Orthopaedic Patient:

1. General Principles

The examination of an orthopaedic patient is a systematic process used to identify the site, nature, severity and functional consequences of a musculoskeletal disorder. A good examination should always be performed after taking an appropriate history and should compare the affected side with the normal side whenever possible.

Before beginning the examination: Introduce yourself and explain the procedure; obtain consent; ensure adequate exposure while maintaining privacy and dignity; position the patient appropriately and comfortably; examine the patient in a systematic manner; compare the affected limb or joint with the opposite side; and examine the patient both at rest and during movement.

Classical sequence: Look → Feel → Move → Measure → Special tests → Neurovascular examination → Functional assessment.

2. General Examination

The patient should first be assessed as a whole rather than concentrating immediately on the affected limb.

Observe: general appearance and nutritional status; pallor, icterus, cyanosis and lymphadenopathy; fever or other signs of systemic illness; body habitus and height; gait and posture; obvious deformity or abnormal limb position; and evidence of previous surgery, trauma or immobilisation.

In children, particular attention should be paid to growth, limb length, developmental abnormalities and nutritional status.

3. Local Examination

Local examination is usually divided into three major components: inspection, palpation and movement.

A. Inspection

Expose the affected area adequately and inspect it from different directions.

Look for:

- Swelling – site, size, shape, extent and skin changes over the swelling.
- Deformity – abnormal angulation, rotation, shortening, dislocation or subluxation, and abnormal posture. Describe deformity in relation to the distal segment, for example varus, valgus, flexion or extension deformity.
- Skin changes – redness, scars, sinuses, ulcers, discharging wounds, bruising, pigmentation and dilated veins.
- Muscle wasting – compare the bulk of muscles on both sides.
- Abnormal movements – abnormal movement at a joint or fracture site.
- Limb position and attitude – the position adopted by the patient may provide important diagnostic clues.

B. Palpation

Palpation should be gentle and systematic. Compare the affected and normal sides.

Temperature: Feel the affected area with the dorsum of the hand. Increased temperature may suggest inflammation or infection, while reduced temperature may occur with vascular compromise.

Tenderness: Identify the site of maximum tenderness and its extent, and determine whether it is superficial or deep.

Swelling: Determine local temperature, consistency, mobility, fluctuation, compressibility, pulsatility and relation to underlying structures.

Bony tenderness: Palpate relevant bony landmarks systematically.

Crepitus: May be felt in fractures and degenerative joint disease. It should not be deliberately elicited forcefully, particularly when a fracture is suspected.

Pulses: Peripheral pulses should be examined whenever there is trauma, suspected vascular injury, acute limb pain or swelling, dislocation, or fracture around major vessels.

4. Examination of Movements

Movement should be assessed systematically.

Active movement: Ask the patient to move the joint independently. Assess range of movement, pain, restriction, quality of movement and muscle power.

Passive movement: The examiner moves the joint while the patient relaxes. Compare passive and active ranges. Restriction of both active and passive movement may suggest a joint or mechanical problem, whereas restriction predominantly of active movement may point toward muscle, tendon or neurological pathology.

Record range of movement using a goniometer when appropriate.

5. Measurement

Measurement is particularly important in orthopaedic examination.

Limb length: Measure and compare true and apparent limb length using standard anatomical landmarks.

Limb circumference: Measure muscle bulk at identical levels on both sides to identify muscle wasting, hypertrophy or swelling.

Deformity: Angular deformities can be measured clinically and, when necessary, confirmed radiologically.

6. Joint-Specific Examination

Shoulder: Assess contour and wasting, tenderness, active and passive movements, rotator cuff function, instability and neurovascular status.

Elbow: Look for carrying-angle abnormalities, swelling, deformity and tenderness; assess range of movement, stability and ulnar nerve function.

Wrist and Hand: Examine swelling and deformity, finger alignment, tendon function, grip, individual joint movements, sensory and motor function, and radial and ulnar pulses.

Hip: Assess attitude of the limb, apparent and true shortening, range of movements, fixed deformity, gait, Trendelenburg test and neurovascular status.

Knee: Examine alignment, swelling, quadriceps wasting, tenderness, range of movement, effusion, ligament stability, meniscal signs and patellar movement.

Ankle and Foot: Assess alignment, swelling, deformity, tenderness, range of movement, foot arches, gait, tendon function and neurovascular status.

7. Examination of the Spine

Inspection: Look for abnormal posture, kyphosis, lordosis, scoliosis, muscle wasting, scars or sinuses.

Palpation: Assess midline tenderness, paraspinal tenderness, muscle spasm and step deformity.

Movements: Assess flexion, extension, lateral flexion and rotation.

Neurological examination: Assess motor power, sensory function, reflexes, gait and signs of nerve-root involvement. Assess bowel and bladder function when clinically indicated.

8. Neurovascular Examination

Every significant limb injury, particularly fractures and dislocations, should include a documented neurovascular examination.

Vascular assessment: Check peripheral pulses, capillary refill, skin colour, temperature and distal perfusion.

Neurological assessment: Assess sensory and motor function of the relevant peripheral nerves.

Findings should be documented before and after manipulation, reduction or application of a splint or cast.

9. Examination of Gait

Gait provides valuable information about lower-limb and neurological disorders.

Observe the patient walking normally, turning, walking on toes and heels when appropriate, rising from a chair and climbing stairs when appropriate.

Look for limp, antalgic gait, Trendelenburg gait, high-stepping gait, foot drop, abnormal limb rotation and leg-length discrepancy.

10. Functional Assessment

Orthopaedics is concerned not only with anatomical abnormalities but also with function.

Depending on the condition, assess the patient's ability to walk, climb stairs, sit and stand, squat, run, dress independently, perform activities of daily living, use the affected upper limb, and grip or manipulate objects.

Functional assessment helps correlate clinical findings with the patient's actual disability.

11. Examination of the Opposite Limb

The opposite side should be examined whenever possible. It serves as an important internal control for range of movement, limb length, muscle bulk, deformity, joint stability and

neurological findings. However, the opposite side should not automatically be assumed to be normal.

12. Regional Examination

An important principle in orthopaedics is: Examine the joint above and the joint below the suspected site of pathology.

For example, in a patient with a suspected femoral shaft fracture, the hip and knee should also be examined. Similarly, in a patient with knee pain, examination should include the hip and lumbar spine because pain may be referred.

13. Systemic Examination

Certain orthopaedic conditions are manifestations of systemic disease. Appropriate systemic examination may include the cardiovascular system, respiratory system, abdomen, neurological system and skin, particularly in suspected infection, inflammatory arthritis, malignancy, metabolic bone disease or neurological disorders.

14. Summary of Orthopaedic Examination

1. General examination
2. Gait and posture
3. Local inspection
4. Palpation
5. Active movements
6. Passive movements
7. Measurements
8. Joint-specific and special tests
9. Neurovascular examination
10. Functional assessment
11. Examine adjacent joints and opposite side
12. Systemic examination where indicated