

Course Name : Bachelor of Physical Education

Year : IInd

Paper Name : Kinesiology and Physiology of Exercise

Paper No. Ist

Lecture No. 15

Topic no. : Prac. - 1

Lecture Title : Examination of Body Joints, type of Movements and Deformities

Introduction

Hello and welcome to yet another module on physical education. Today we are discussing about the various body joints and practical techniques of discovering whether these joints are fully functional condition or there are some problems in them or there are some deformities.

In examining the musculoskeletal system it is important to keep the concept of function in mind. Note any gross abnormalities of mechanical function beginning with the initial introduction to the patient. Continue to observe for such problems throughout the interview and the examination.

On a screening examination of a patient who has no musculoskeletal complaints and in whom no gross abnormalities have been noted in the interview and general physical examination, it is adequate to inspect the extremities and trunk for observable abnormalities and to ask the patient to perform a complete active range of motion with each joint or set of joints.

If the patient presents complaints in the musculoskeletal system or if any abnormality has been observed, it is important to do a thorough musculoskeletal examination, not only to delineate the extent of gross abnormalities but also to look closely for subtle anomalies.

The Examination Process

To perform an examination of the muscles, bones, and joints, use the classic techniques of inspection, palpation, and manipulation. Start by dividing the musculoskeletal system into functional parts. With practice the examiner will establish an order of approach, but for the beginner it is perhaps better to begin distally with the upper extremity, working proximally through the shoulder. Then, beginning with the temporomandibular joint, pass on to the cervical spine, the thoracic spine, the lumbar and sacral spine, and the sacroiliac joints. Finally, in the lower extremity, again begin distally with the foot and proceed proximally through the hip.

Use the opposite side for comparisons: it is easier to spot subtle differences as well as identify symmetrical problems. If there is any question, use your own anatomy as a control.

Glean the maximum information from the observation. Concentrating on one area at a time, inspect the area for discoloration (e.g., ecchymoses, redness), soft tissue swelling, bony enlargement, wasting, and deformity (abnormal angulation, subluxation). While noting these changes, attempt to determine whether these are limited to the joint or whether they involve the surrounding structures (e.g., tendons, muscles, bursae).

Observe the patient's eyes while palpating the joints and the surrounding structures. A patient's expression of pain depends on many factors. For this reason the verbalization of pain often does not correlate directly with the magnitude of the pain. The most objective indicator of the magnitude of tenderness produced by pressure on palpation is involuntary muscle movements about the eyes. Therefore, the examiner should observe the patient's eyes while palpating the joints and surrounding structures. With practice the examiner will become skilled in evaluating the magnitude of pain produced by the examination and will be able to do a skillful evaluation without producing excessive discomfort to the patient. Note areas of tenderness to pressure, and if possible identify the anatomic structures over which the tenderness is localized.

One should also note areas of enlargement while palpating the joints and surrounding structures. By noting carefully the consistency of the enlargement and its boundaries, one can decide whether this is due to bony widening, thickening of

the synovial lining of the joint, soft tissue swelling of the structure surrounding the joint, an effusion into the joint capsule, or nodule formation, which might be located in a tendon sheath, subcutaneous tissue, or other structures about the joint.

While palpating the joints, note areas of increased warmth (heat). A method for doing this that will help even the most inexperienced to perceive subtle increases in heat is to choose the most heat-sensitive portion of the hand (usually the dorsum of the fingers) and, beginning proximally, lightly pass this part of your hand over all portions of the patient's extremity several times. As you proceed from proximal to distal, the skin temperature gradually cools. If you find an area becoming slightly warmer, this represents increased heat.

Have the patient perform active movements through an entire range of motion for each joint. Defects in function can be most rapidly perceived by having the patient perform active functions with each region of the musculoskeletal system. This reduces examination time and helps the examiner to identify areas in which there is poor function for more careful evaluation.

Manipulate the joint through a passive range of motion only if the patient is unable actively to perform a full range of motion, or if there is obvious pain on active motion. In passively manipulating a joint, note whether there is a reduction in the range of motion, whether there is a pain on motion, and whether crepitus is produced when the joint is moved. Note also whether the joint is stable or whether abnormal movements may be produced.

Musculoskeletal disorders are the commonest cause of disability. Each year 15 per cent of patients on a general practitioner's list will consult their doctor with a locomotor problem, and such conditions form 20–25 per cent of a GP's workload. About 30 per cent of those with any physical disability, and 60 per cent of those with a severe disability, have a musculoskeletal disorder as the primary cause of their problems.

Clinical skills – i.e. competent history taking and examination – are the key to making an accurate diagnosis and assessment of a patient complaining of joint problems.

‘Arthritis’ is a term that is frequently used to describe any joint disorder (and not infrequently any musculoskeletal problem). It could be argued that the term ‘arthritis’ should be used to describe inflammatory disorders of the joint whilst ‘arthropathy’ should be used to describe non-inflammatory disorders. Other musculoskeletal problems should similarly be described according to their anatomical site (e.g. muscle or tendon) and whether they are of inflammatory or non-inflammatory aetiology. However, the term ‘arthritis’ is in such widespread general use to describe any disorder of the joint that, for the purpose of this module, it will be used in that sense.

There are over 200 different types of ‘arthritis’ (both inflammatory and non-inflammatory) and, in general, it is not necessary for a practising clinician to know about all of these. A more realistic approach is to adopt a classification scheme, and to learn how to place patients’ problems within this classification, using information gained through a full history and examination.

The five key questions which need to be answered are:

- Does the problem arise from the joint, tendon or muscle?
- Is the condition acute or chronic?
- Is the condition inflammatory or non-inflammatory?
- What is the pattern of affected areas/joints?
- What is the impact of the condition on the patient’s life?

The answers to these questions should enable you to produce a succinct summary of the patient’s condition. An example of a patient summary produced using this method might be:

‘This patient has a chronic symmetrical inflammatory polyarthritis, mainly affecting the small joints of the hands and feet, which is causing pain, difficulty with dressing and hygiene, and is limiting her mobility.’

A brief screening examination, which takes 1–2 minutes, has been devised for use in routine clinical assessment. This has been shown to be highly sensitive in detecting significant abnormalities of the musculoskeletal system. It involves inspecting carefully for joint swelling and abnormal posture, as well as assessing the joints for normal movement.

This screening examination is known by the acronym ‘GALS’, which stands for Gait, Arms, Legs and Spine. The sequence in which these four elements are assessed can be varied – in practice, it is usually more convenient to complete the elements for which the patient is weight bearing before asking the patient to climb onto the couch.

Movement Observations

Ask the patient to walk a few steps, turn and walk back. Observe the patient’s gait for symmetry, smoothness and the ability to turn quickly.

With the patient standing in the anatomical position, observe from behind, from the side, and from in front for:

- bulk and symmetry of the shoulder, gluteal, quadriceps and calf muscles
- limb alignment
- alignment of the spine
- equal level of the iliac crests
- ability to fully extend the elbows and knees
- popliteal swelling
- abnormalities in the feet such as an excessively high or low arch profile, clawing/retraction of the toes and/or presence of hallux valgus.

Arms

- Ask the patient to put their hands behind their head. Assess shoulder abduction and external rotation, and elbow flexion (these are often the first movements to be affected by shoulder problems).
- With the patient’s hands held out, palms down, fingers outstretched, observe the backs of the hands for joint swelling and deformity.
- Ask the patient to turn their hands over. Look at the palms for muscle bulk and for any visual signs of abnormality.
- Ask the patient to make a fist. Visually assess power grip, hand and wrist function, and range of movement in the fingers.
- Ask the patient to squeeze your fingers. Assess grip strength.
- Ask the patient to bring each finger in turn to meet the thumb. Assess fine

precision pinch (this is important functionally).

- Gently squeeze across the metacarpophalangeal (MCP) joints to check for tenderness suggesting inflammatory joint disease. (Be sure to watch the patient's face for non-verbal signs of discomfort.)

Legs

- With the patient lying on the couch, assess full flexion and extension of both knees, feeling for crepitus.
- With the hip and knee flexed to 90°, holding the knee and ankle to guide the movement, assess internal rotation of each hip in flexion (this is often the first movement affected by hip problems).
- Perform a patellar tap to check for a knee effusion. Slide your hand down the thigh, pushing down over the suprapatellar pouch so that any effusion is forced behind the patella. When you reach the upper pole of the patella, keep your hand there and maintain pressure. Use two or three fingers of the other hand to push the patella down gently. Does it bounce and 'tap'? This indicates the presence of an effusion.
- From the end of the couch, inspect the feet for swelling, deformity, and callosities on the soles.
- Squeeze across the metatarsophalangeal (MTP) joints to check for tenderness suggesting inflammatory joint disease. (Be sure to watch the patient's face for signs of discomfort.)

Spine

- With the patient standing, inspect the spine from behind for evidence of scoliosis, and from the side for abnormal lordosis or kyphosis.
- Ask the patient to tilt their head to each side, bringing the ear towards the shoulder. Assess lateral flexion of the neck (this is sensitive in the detection of early neck problems).
- Ask the patient to bend to touch their toes. This movement is important functionally (for dressing) but can be achieved relying on good hip flexion, so it is important to palpate for normal movement of the vertebrae. Assess lumbar spine flexion by placing two or three fingers on the lumbar vertebrae. Your fingers should move apart on flexion and back together on extension.

Recording the findings from the screening examination (GALS)

It is important to record both positive and negative findings in the notes. The presence or absence of changes – in appearance or movement – in the gait, arms, legs or spine should be noted in a grid. Figure 9(a) shows a normal result. If there are abnormalities, these should be recorded with a cross, and a note should be made describing the abnormalities – for a patient with wrist and knee swelling and associated loss of movement the recording might be as shown.

If you have been alerted to a musculoskeletal problem – by the screening questions, your examination or the spontaneous complaints of the patient – you will need to take a detailed history (as described above). You should also conduct a regional examination of relevant joints – this is described in the sections which follows.

'GALS' screening examination: checklist

Gait

- Observe gait
- Observe patient in anatomical position

Arms

- Observe movement – hands behind head
- Observe backs of hands and wrists
- Observe palms
- Assess power grip and strength
- Assess fine precision pinch
- Squeeze MCPJs

Legs

- Assess full flexion and extension
- Assess internal rotation of hips
- Perform patellar tap
- Inspect feet

- Squeeze MTPJs

Spine

- Inspect spine
- Assess lateral flexion of neck
- Assess lumbar spine movement

Conclusion

In examining the musculoskeletal system it is important to keep the concept of function in mind. Note any gross abnormalities of mechanical function beginning with the initial introduction to the patient. Continue to observe for such problems throughout the interview and the examination.

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So in this episode we have discussed a very visual description, a very practical description of various body joints and their movements and any kind of problems

and deformities that might be found in them. So this information I hope will be useful to all of you. Thank you so much for watching.