

NHS Training for
Physiotherapy Support Workers

Workbook 11
The articular system



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Workbook 11

The articular system

11.1 Aim

The aim of this workbook is to provide the Healthcare Support Worker (HCSW) with the knowledge and understanding of the structure and function of the major joints of the body.

11.2 Learning outcomes

By the end of this workbook you will be able to:

- Identify and name the different types of joints that exist in the body and the movements that may occur at them.
- Identify the location of the major joints of the body and define and demonstrate the movements that occur at each.

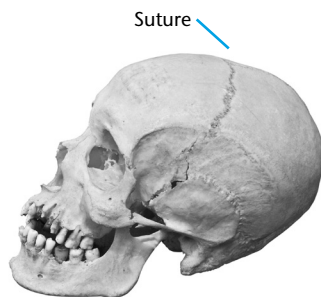
11.3 The articular system

Joints

The bones of the body come together or unite through joints. Movement occurs at joints but the type and amount of movement which occurs depends on the structure and function of the joint.

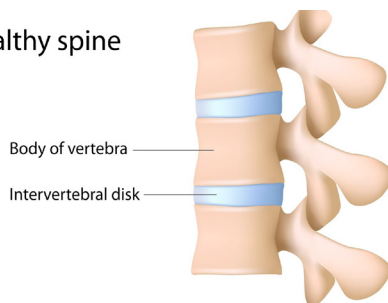
Classification of joints

The variety of function and structure of the body's joints allows them to be classified into three groups.

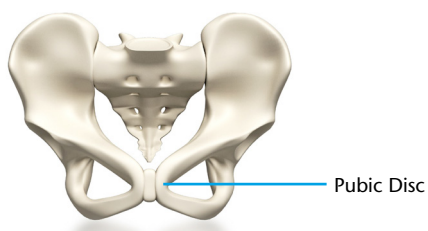


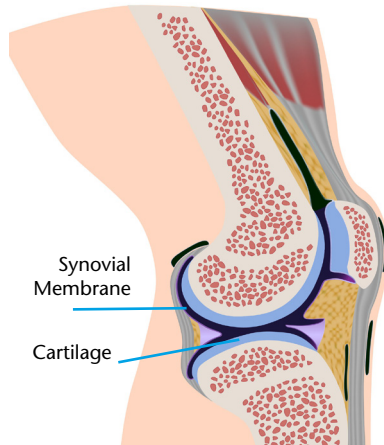
- **Fibrous joints** in which bone is directly united to another bone by fibrous tissue
 - sutures of the skull
 - teeth held in their sockets by their root

Healthy spine



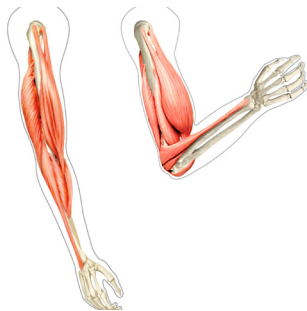
- **Cartilaginous joints** where two bones are united by a continuous pad of cartilage
 - The growth plate where the bone grows in childhood
 - Joints in the pelvis and at the discs between spinal vertebrae





- **Synovial joints** These joints move freely. The surfaces are covered in a very smooth cartilage which enables movement of one bone over another. A fibrous structure called the capsule surrounds the joint.
 - There is a moist, slippery membrane lining the inside of the joint, known as the synovial membrane. This is like an oil can, secreting fluid into the joint to lubricate it and to provide nutrition.
 - The knee, hip, shoulder and most of the limb joints are synovial.

Grouping of synovial joints according to movement



- **Hinge joints** The arrangement and fit of the articular surfaces allows movement in one plane only, for example the elbow joint.
 - The knee joint is a type of hinge joint, but allows flexion and extension, with some rotation.

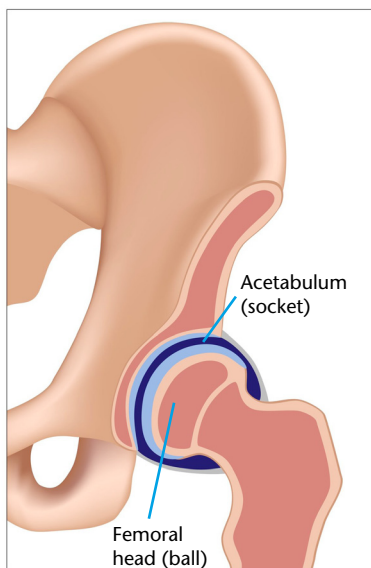


Carpometacarpal Joint

- **Pivot joints** Bones rotate on one another – the joint connecting the skull to the spine (the atlanto-axial joint) is an example.
- **Saddle joints** where the thumb meets the wrist the bones fit over each other like a saddle fits over the back of a horse. This allows side to side and back and forth movement.



- **Condyloid joints** a condyloid joint is similar to a ball and socket joint in that it allows movement in a circular motion. In the condyloid joint the bone sits up at the end of a bone rather than in a socket. For example, the carpels of the wrist rest against the end of the radius bone of the forearm.



- **Ball and socket joints** As the name suggests the 'ball' of one bone fits into the 'socket' of another. Movement can occur in all directions, examples include the hip and the shoulder joints
- **Multi-axial joints** allow movement in all planes.



Evidence

Describe in your own words what is meant by a joint

Provide examples of the classes of joints

What is the difference between each?

Name the different types of synovial joint

Provide an example of each type

Ligaments

The amount of movement possible at a joint depends on two factors:

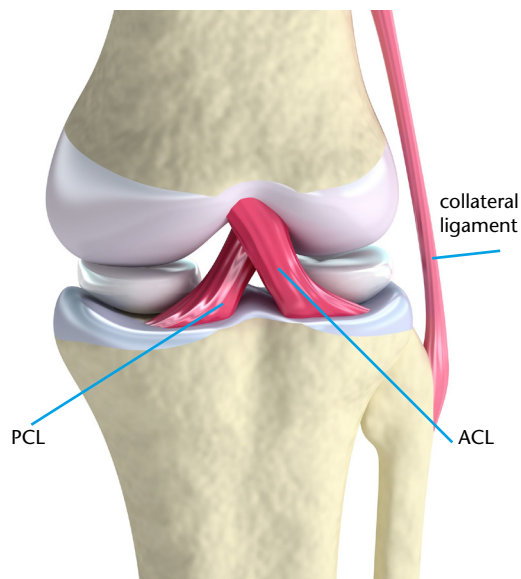
- the shape of the bones where they join
- ligaments around the joint

Ligaments are strong cords of dense white fibrous tissue at most synovial joints. These grow between the bones, lashing them together even more firmly than possible with the joint capsule alone.

The function of ligaments is to protect joints from damage through too much movement or force, and to limit how much movement occurs at a joint.

The knee joint

Looking in more detail at the knee joint, you can see where the ligaments join the bones together. They are very important in keeping the joint intact.



In the illustration below you can see the ligaments inside the joint (ACL and PCL).

They are known as the **cruciate ligaments** and prevent the femur from sliding forward on the tibia.

Sportsmen commonly damage these ligaments, and repairs can be performed surgically.



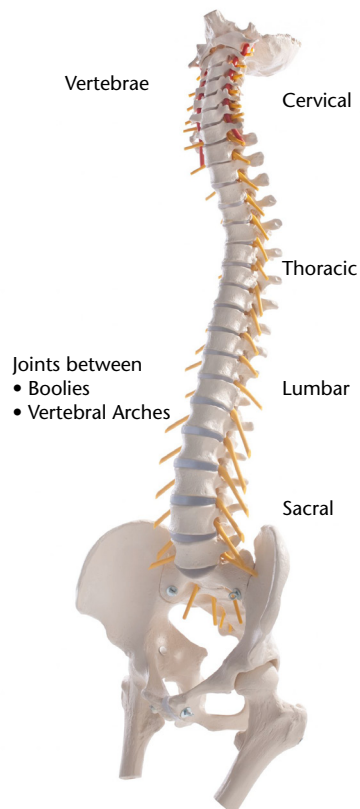
Evidence

What are ligaments for?

What do you think happens at a joint if the ligaments are damaged?

11.4 Individual joints

Knowledge of how the joints work is important for carrying out passive movements, so bear in mind what you have learned when moving the limbs of your patients.

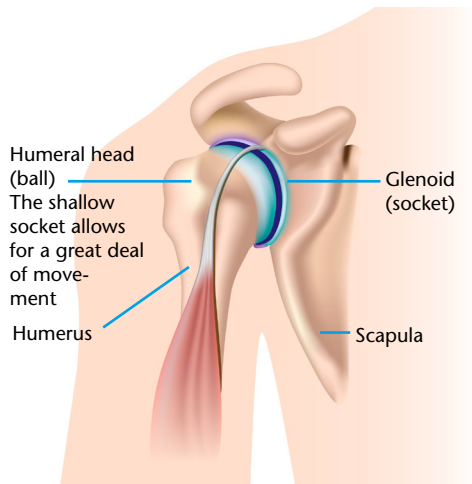


Basic joints of the spine

- The spine comprises several parts
- At the neck there are 7 cervical bones, or vertebrae
- At the upper part of the back, joining the ribs there are 12 thoracic vertebrae
- At the lower back there are 5 lumbar vertebrae
- Below this are the sacrum and the coccyx
- Bones of the spine are joined at the front and at the back

Because it is made up of so many little joints, the spine is flexible and movements of flexion (bending) and extension (straightening), side flexion (bending sideways) and rotation (turning) can occur.

Joints of the upper limb

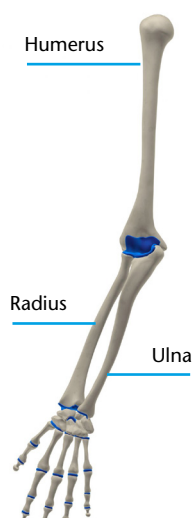


The shoulder joint

Joints The scapula and the humerus

Type Synovial ball and socket joint

Movements Flexion, extension; abduction and adduction; medial and lateral rotation. The shallow socket allows for a great deal of movement

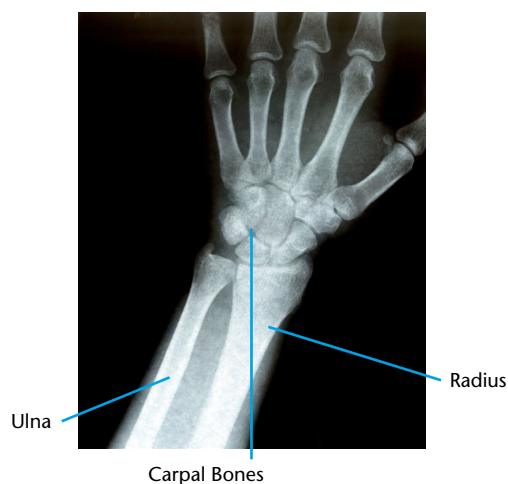


The elbow joint

Joints The humerus, ulna and radius

Type Synovial hinge joint

Movements Flexion and extension

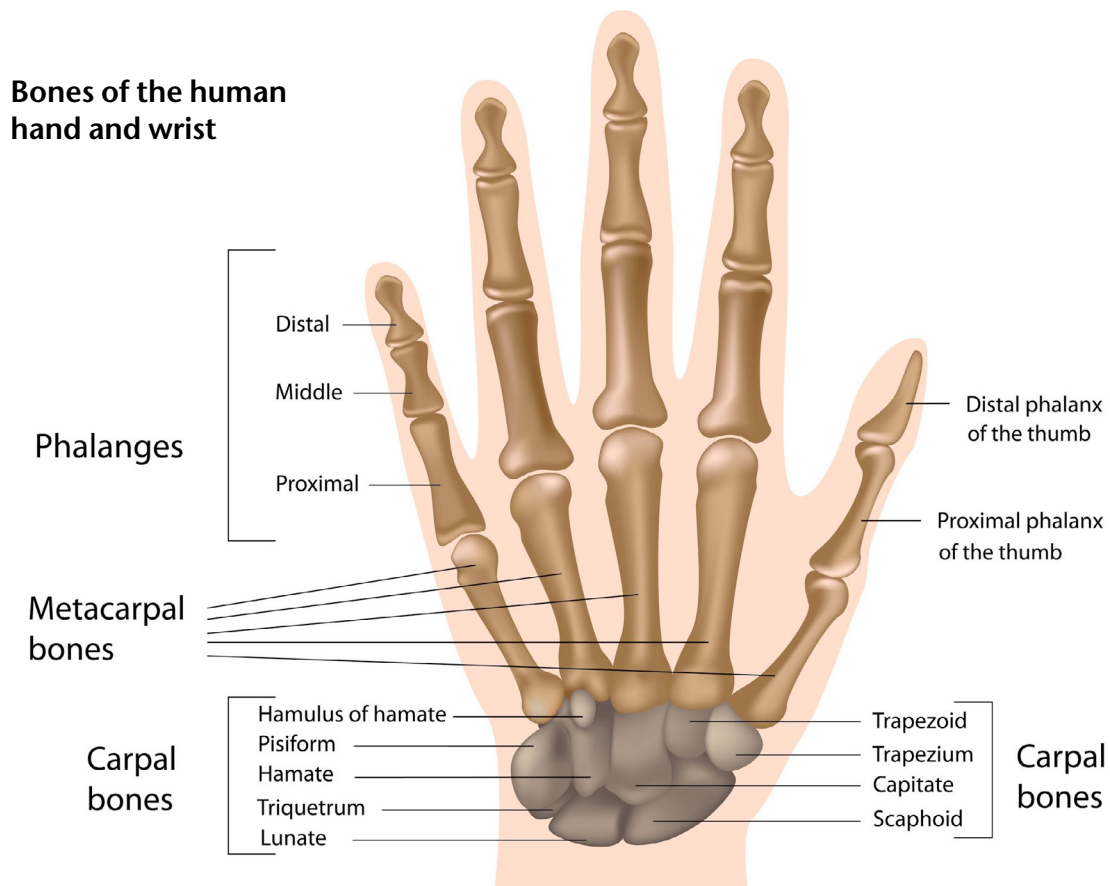


The wrist joint

Joints The radius and ulna to the proximal carpal bones, as well as the two rows of carpal bones

Type Synovial, condyloid joint

Movements Flexion, extension abduction and adduction and circumduction



Carpometacarpal joints

Join The distal row of carpal bones to the metacarpal bones

Type Synovial. The bone at the base of the thumb is saddle-shaped. The others are plane joints

Movements The thumb joint flexes, extends, abducts, adducts, rotates and circumducts. The joints of the other fingers just glide slightly.

Metacarpophalangeal joints

Join Row of long bones of the hand (metacarpals) to bones at the base of the fingers

Type Synovial ellipsoid

Movements Flexion/extension, abduction/adduction

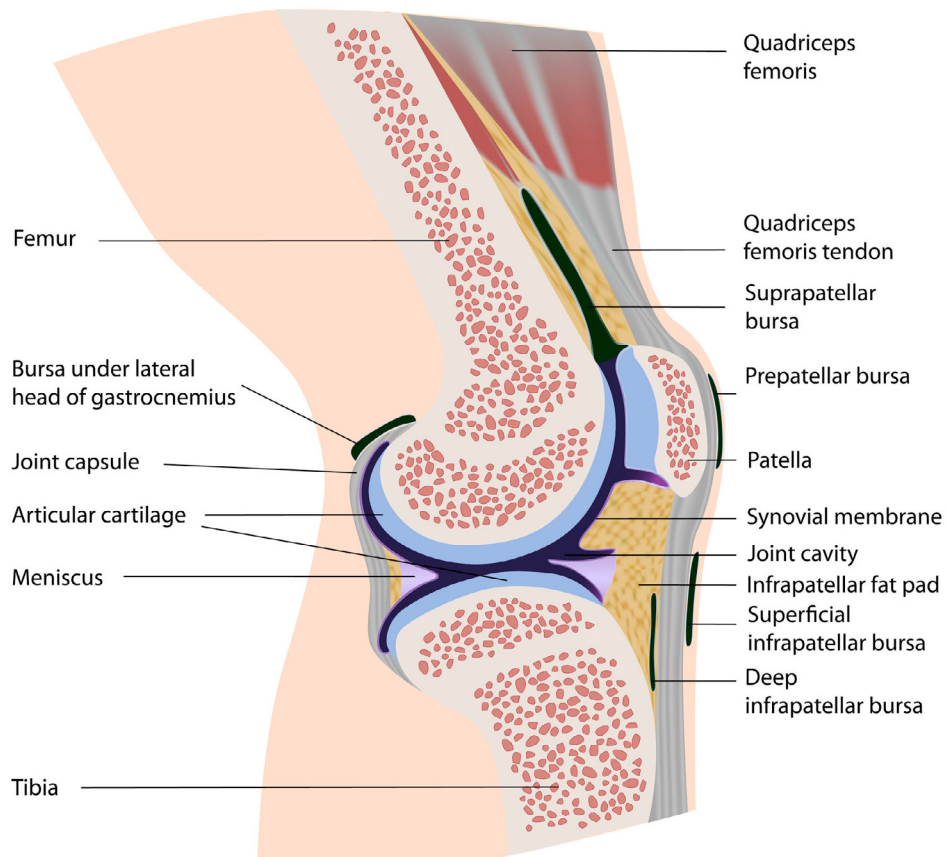
Interphalangeal joints

Join The phalanges (little bones of the knuckles) of the fingers

Type Synovial hinge joints

Movements Flexion and extension

Joints of the lower limb

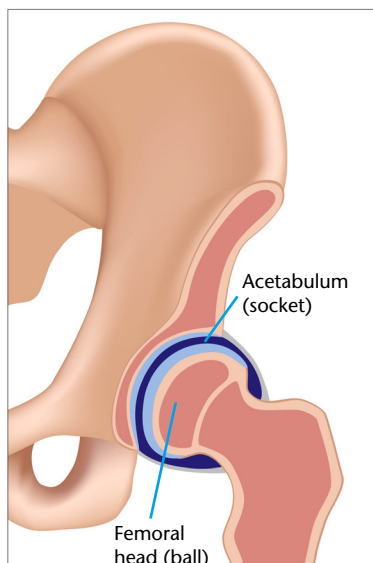


The knee joint

Joints Femur, tibia, patella (kneecap)

Type Synovial, condylar joint

Movements Flexion/extension, rotation



The hip joint

Joints Acetabulum of the pelvis to the head of the femur

Type Synovial ball and socket joint

Movements Flexion/extension, abduction/adduction, medial/lateral rotation

The ankle joint

Joins Tibia, fibula, talus

Type Synovial hinge joint

Movements Flexion (dorsiflexion) and extension (plantarflexion)



Small joints of the foot

The tarsal bones together allow mainly gliding movements. The combination of gliding at all of the small joints causes inversion and eversion of the foot (when you turn your foot inwards or outwards to show the sole of the foot). This enables the foot to adjust when walking over uneven surfaces.

As in the hand, the joints between the phalanges of the toes allow flexion and extension.



Evidence

For each joint, insert the following information:

- joins
- type
- movements

The upper limb

The shoulder joint

Joins

Type

Movements

The elbow joint

Joins

Type

Movements

The wrist joint

Joins

Type

Movements

Carpometacarpal joints

Joins

Type

Movements

Metacarpophalangeal joints

Joins

Type

Movements

Interphalangeal joints

Joins

Type

Movements

The lower limb

The knee joint

Joins

Type

Movements

The hip joint

Joins

Type

Movements

The ankle joint

Joins

Type

Movements

The small joints of the foot

Joins

Type

Movements



Activity

With your mentor, demonstrate where on the body these joints lie, and the movements that occur at each

- The hip joint
- The knee joint
- The ankle joint
- Main joints of the feet and toes
- The shoulder joint
- The elbow
- The wrist
- Main joints of the hand

11.5 Practical anatomy session

In this session you will:

- Name the major joints of the body
- Demonstrate the movements occurring at each



Activity

The joints that you should know are...

The spinal vertebrae

The hip joint

The knee joint

The ankle joint

Main joints of the feet and toes

The shoulder girdle

The shoulder joint

The elbow

The wrist

Main joints of the wrist and hand

Acknowledgements

NHS Tayside

11.6 The articular system workbook completion

Your supervising physiotherapist will sign your portfolio to indicate that you have completed this workbook successfully.

Objective	Physiotherapist's signature	Date
Describe what is meant by a joint		
Describe the different types of joints that exist in the body and what movements may occur at them		
Describe some of the structures of normal joints		
Demonstrate the location and movements occurring at the main joints of the body		

Support worker (name)
Support worker's signature
Physiotherapist (name)
Physiotherapist's signature
Date

11.7 The articular system reflection

Suggested KSF Dimensions: C2, HWB2, HBW7

This form should be placed in the appropriate section of your portfolio.

What did you learn from this module?

How has this influenced your work?

Date module completed

