Online HorseCollege

Student Workbook

3.H.11 Skeletal System

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Contents

Skeletal System 3.H.11 Workbook

Students are to complete Horse Care 3.H.05-08 online assessments prior to attempting Horse Care 3.H.09-12 and to follow all recommended safety considerations.

Practical assessments for Horse Care 3.H.09-12 are as follows:

A) Basic Reproduction

B) Pregnancy & Foaling

C) Skeletal System

D) Muscular-Skeletal System

These assessments incorporate the following unit from the SIS30710 Sport Industry Training Package which include the listed elements

RGRPSH401A Relate anatomical and physiological features to the care and treatment of horses

- Identify basic anatomy and physiology of horses
- Relate anatomy and body systems to the performance of racehorses
- Follow illness and injury management plans

Further information about this assessment is available at www.training.gov.au

Skeletal System Introduction

This workbook prepares you for the following week's topic (the musculo-skeletal system) by providing you a basic overview to the structure and function of the skeletal system and its components. Whilst this is not a lengthy workbook the reading presented is full of information which will become an invaluable part of your knowledge of horse anatomy and physiology.

Skeletal System

The skeleton consists of bones and joints and provides many functions:-

- a protective shell especially for the heart, lungs, brain and spinal cord.
- bones act as levers as an essential component of locomotion.
- the framework for the attachment of tissues.
- an aid to respiration.
- and red and white blood cell formation and storage of minerals.

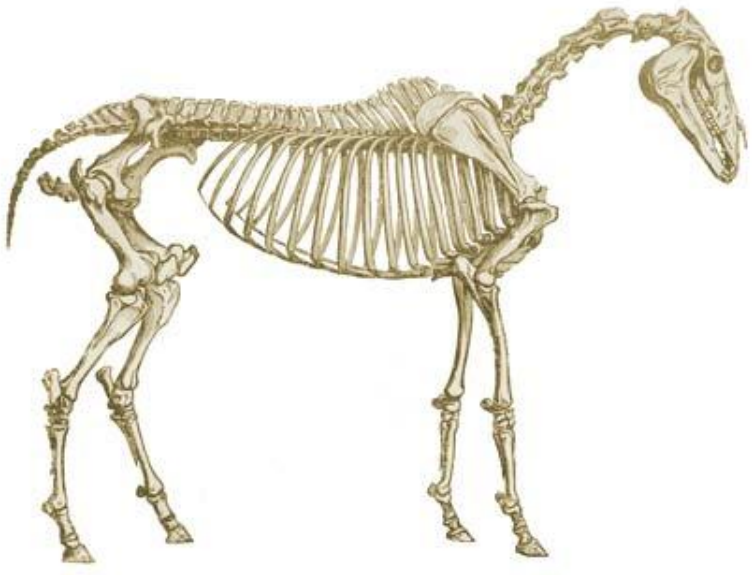
The skeleton has two main parts (1) the axial; which consists of the skull, vertebral column, ribs and sternum and (2) the abaxial; which includes the limbs and pelvis.

A horse has 54 bones in the vertebral column (spine) which is made up of:-

- 7 neck (cervical) vertebrae
- 18 chest (thoracic) vertebrae
- 6 lumbar (loins) vertebrae
- 5 vertebrae are used to form the sacrum. These are fused to form a single bone
- 18 tail vertebrae (coccygeal) vertebrae- this number can range from 15 to 25

The vertebrae column assists in protecting the spinal cord which is a tubular bundle of nervous tissue and support cells which runs the entire length of the vertebral column. In the horse it is approximately 200cm long and it plays a role in the transportation of messages and communication of neurons through-out the body.

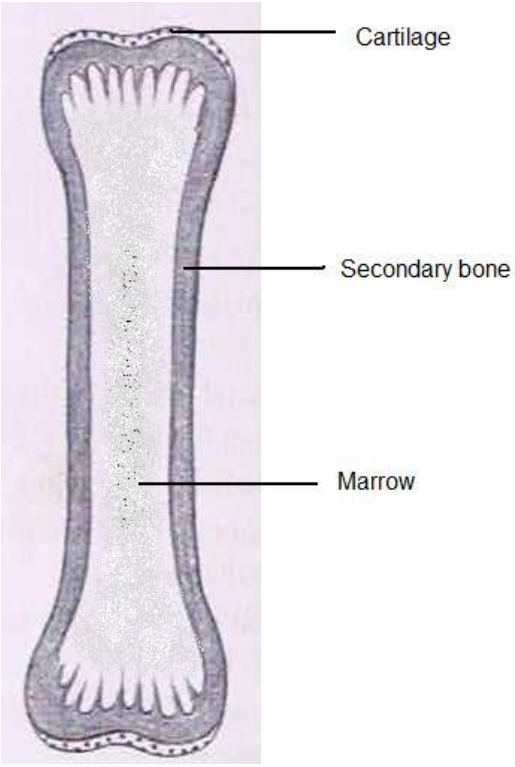
There are 18 pairs of ribs with 8 being true ribs which are connected by cartilage to the sternum (breast-bone) and 10 false in that they attach by cartilage to the rib in front.



Bones

Bone is living tissue and therefore requires regular supply of nutrients (these minerals and elements are constantly exchanged with fresh nutrients) and can mend from injury although depending upon the type of injury it will mend with varying levels of usefulness. They are classified in shape being long, short, irregular or flat. A healthy bone should be hard however the degree of hardness cannot be determined by manual palpation.

Healthy bones are hard (determined by scientific techniques). Adult bones consist of layers of cartilage, secondary bone and marrow.



Flat bones are only found in the skull which protects the brain and is the heaviest bone in the body. Skull bones however develop from the mineralisation of facial membranes unlike other bones which are developed from cartilage.

The hind legs and fore legs contain the same bones from the knee or hock down:-

- the cannon bone, which has 2 small split bones on either side
- the long pastern bone
- the short pastern bone
- the pedal bone (also referred to as the coffin bone), found in the hoof
- the sesamoid bones, found in the hoof
- and the navicular bone, found in the hoof

Bones (cont.)

In the fore legs from the knee up are:-

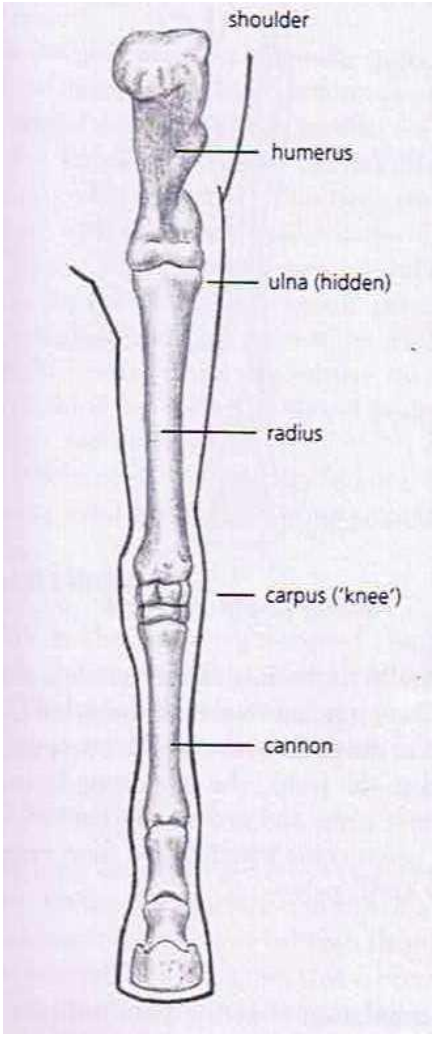
- the shoulder blade or scapula
- the humerous or arm
- the ulna
- the radius or forearm
- and the carpus or knee

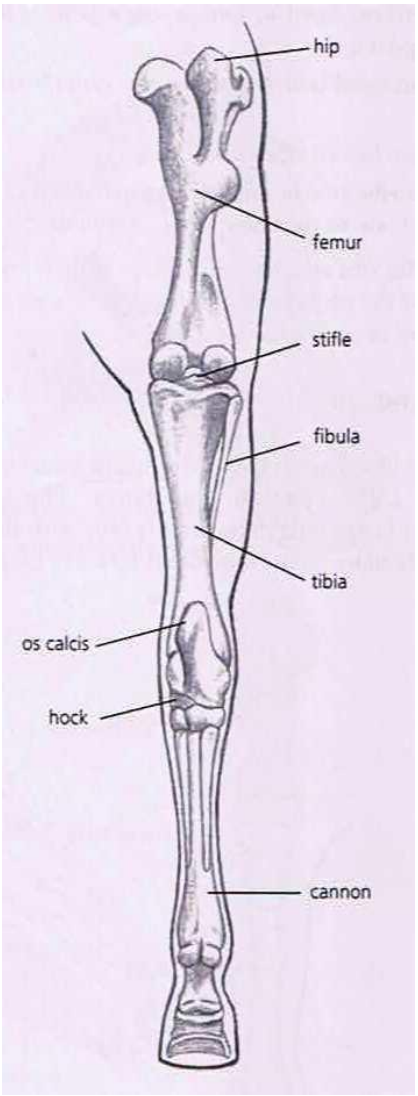
See image 1.

In the hind legs from the hock up are:-

- the pelvis
- the hip joint
- femur or thigh bone
- stifle
- patella (shown in image 3)
- tibia (gaskin)
- fibula (attached to the tibia)
- and the tarsal bones or hock

See image 2.





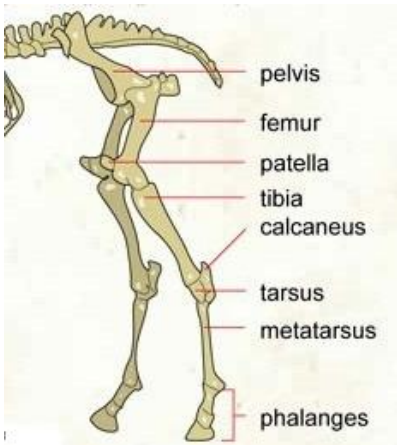


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Image 1 Image 2. Image 3

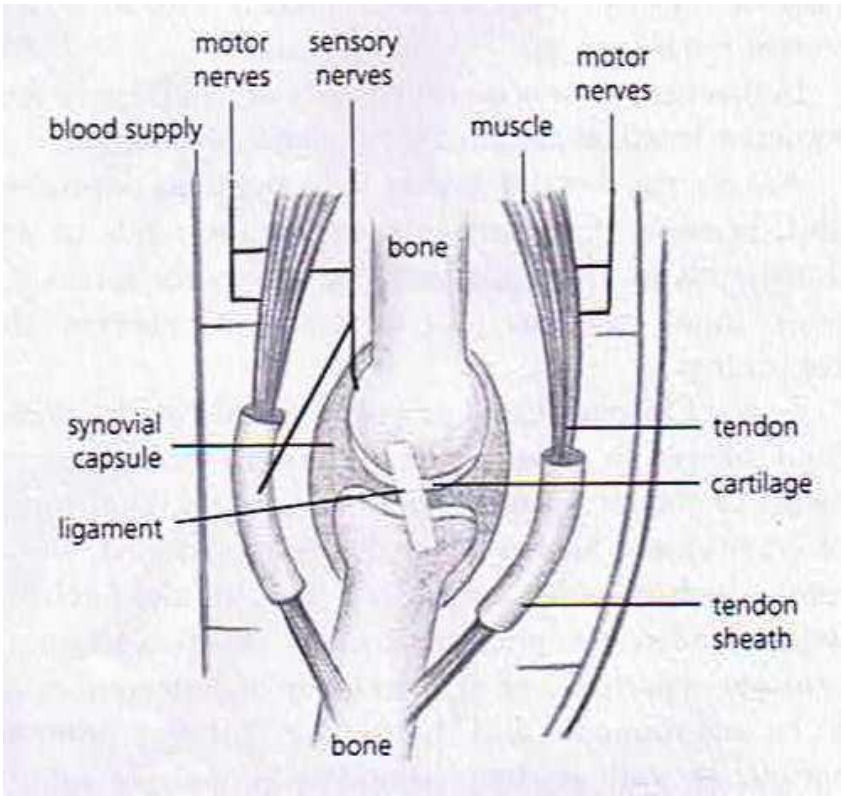
Joints

A joint is a unit of locomotion and allows the skeleton of the horse to move whilst providing mechanical support. Joint structure and function are all basically similar and comprise of cartilage, bone, ligaments, tendons and muscles.

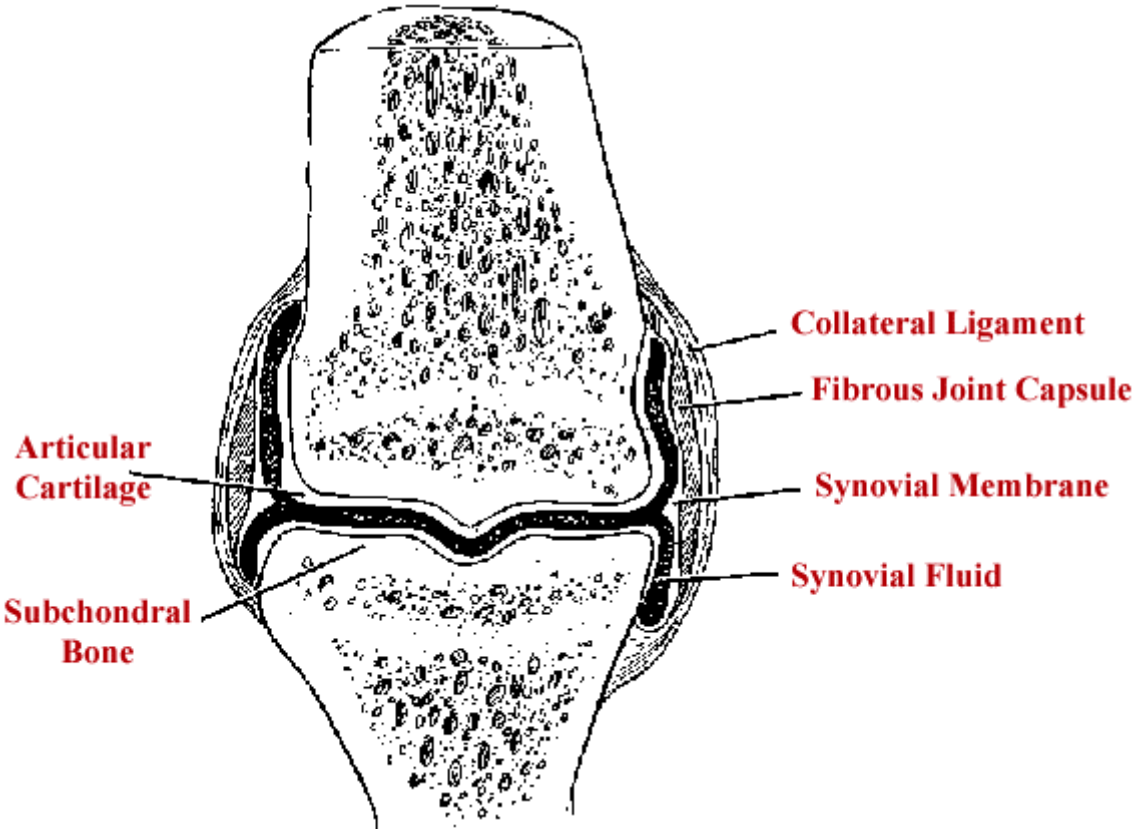
The ends of bones are connected by joints (they are said to articulate with each other) and these ends are covered in cartilage which has the role of protecting the bone. Damage to cartilage does not cause pain as there is no nerve supply in addition there is also no blood supply, instead cartilage is nutritionally supported by synovial fluid within the joint. Synovial fluid also acts as lubrication and a shock absorber for the joint and if impaired then the quality of the cartilage in the joint will be affected, resulting in death of cells which in turn makes the joint more susceptible to stress. Damage to this cartilage can never be completely repaired.

The synovial membrane is responsible for the chemical composition of the synovial fluid. Because this membrane has a nerve and blood supply damage and inflammation of it or the joint capsule is related to lameness.

Other lameness problems can result from the relationship between joints and ligaments but this will be covered in the next workbook.



Joints (cont.)



Above: Knee Capsule

Extension Lesson

How does the skeleton of a horse differ to the skeleton of a human?

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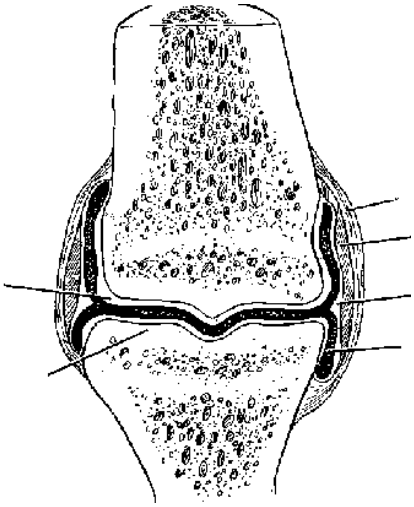
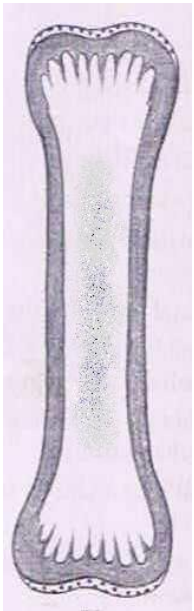
Here is a short video detailing the parts of the skeleton:

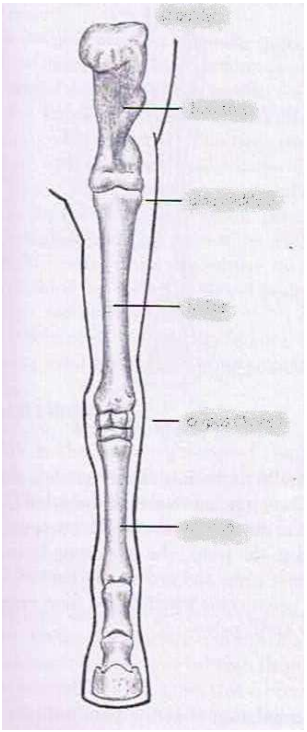
http://www.youtube.com/watch?v=BHjBgakRM2o

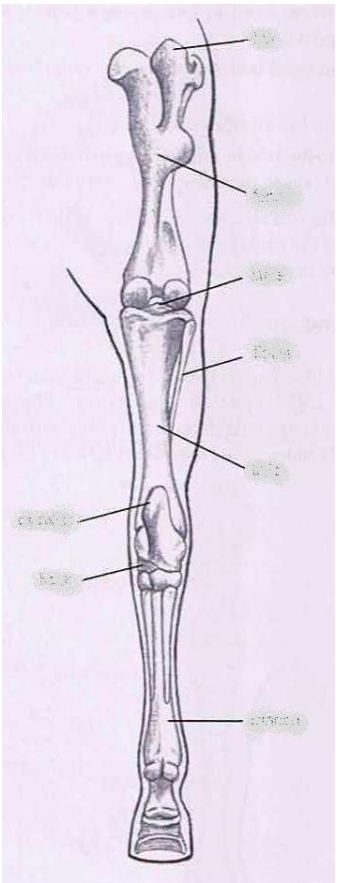
Practice labelling the following diagrams.





Extension Lesson (cont.)





Recommended Reading

Publication:-	Author:-
Veterinary notes for horse owners	Captain M. Horace Hayes
The BHS veterinary manual	P. Stewart Hastie

Websites:-

www.newrider.com/Library/Misc_Tips/lower_leg.html#img

www.youtube.com/watch?v=BHjBgakRM2o

References

Publication:-	Author:-
Veterinary notes for horse owners	Captain M. Horace Hayes
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Websites & Images:-

http://www.australianwesternhorseshowcase.com.au

http://en.wikipedia.org

http://www.thehorse.com

www.newrider.com