MB, ChB
Phase II – Theory Modules

Musculoskeletal System
52302 371
2011
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Phase II – Theory Modules
2011

MUSCULOSKELETAL SYSTEM
52302 371

MODULE SUPERVISOR:
Dr ICM Robertson
MUSCULOSKELETAL SYSTEM

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MUSCULOSKELETAL SYSTEM

INTRODUCTION

This module comprises the study of the musculoskeletal system with regards to the different components, microscopic and macroscopic structures, functional characteristics, physiological aspects and biochemical composition, so that you can understand the relevant disease processes, clinical pictures and management of the conditions.

OVERVIEW MUSCULOSKELETAL BLOCK

This musculoskeletal course lasts approximately six weeks. The initial section consists of three weeks of basic science lectures including Anatomy and Physiology, the neurology of the peripheral nerves, as well as applied Anatomy and Physics.

The last three weeks of this course is clinically orientated and consists of musculoskeletal conditions such as Trauma, Paediatric Orthopaedics and Elective Orthopaedics at the level of what a competent General Practitioner would be expected to know.

Seventeen lectures are devoted to Rheumatology and there are also lectures on subjects such as Physiotherapy, Occupational Therapy and Nuclear Medicine.

There will be many evaluation opportunities. In the basic science section (first 3 weeks), a practical assessment, as well as a theoretical test will be held. At the end of the clinical section (second three week block) a written test covering this section will be completed. The final examination covering all material studied in this course will be held in November.

START OF MODULE

This module starts at 08:00 on Tuesday 03 May 2011 (with lectures in Lecture Hall 8, Teaching Block).

LOCATIONS

All lectures are presented in Lecture Hall 7, Teaching Block.
All Anatomy practicals are presented in practical locations 1A and 2A, Fisan Building.
All Histology practicals are presented in the Histology Laboratory (Room 5035, Fifth Floor, Education Block).

STARTING POINT

The starting point is that you are primarily responsible for your own learning process. This starting point is maintained throughout this module. In this module, you will be required to work independently and continuously so that you can complete the outcomes of each theme by the end of the module. A number of activities are presented to make the learning process easier and to complete the outcomes. These activities include formal lectures, structured unaccompanied groupwork (practicals), and directed self-study.
SELF-STUDY ACTIVITIES

As already mentioned, you are responsible for your own learning process. Directed self-study activities must therefore be given the necessary attention since they often serve as preparation for practicals and also contribute to making the outcomes more easily attainable. In this module, you must work independently and continuously so that the outcomes of each theme can be achieved at the end of the module (for example, the theme dealing with Osteology and Joints follows closely on the theme covering Skeletal muscles: you must consequently cover the theme dealing with Skeletal muscles while independently acquiring knowledge on aspects that have a relationship to the themes that have been covered in Osteology and Joints). You will consequently only be able to complete the outcomes at the end of the module. Consult the necessary resources in good time so that the specific aspects (as described in this study guide in the Self-study programme) can be studied.

OUTCOMES

The outcomes for each theme are described to give you an indication of what must eventually be completed by the end of the module. The aim is not to answer the outcomes in writing. You should know all the information after completing the module. The themes serve as a control for the contents that have been covered, as well as the required depth. It will be a waste of time to answer all the outcomes in writing and, if you try, you will waste time that should be used for other activities.

PRESCRIBED RESOURCES: (for pre-clinical module of musculoskeletal course)


RECOMMENDED RESOURCES

2. Sadler TW. Langman’s Medical Embryology.
TAKE NOTE

This theme (which deals with skeletal muscles) is spread over a period of 3½ weeks. The major component of this theme is a practical programme (during which a structured dissection program is followed), coupled to a self-study programme (as preparation for the practicals) and a lecture-programme (supplemented where necessary).

- Theme 1 starts on **TUESDAY 03 May 2011** at 08:00. All students must meet on **TUESDAY 03 May 2011 at 08:00** in Venue 7, Teaching Block for a lecture. The practical sessions start **WEDNESDAY 04 May** in locations 1A and 2A. Attendance of these practical programmes is compulsory.

- You are working with human tissue (bones and wet specimens). You must make sure of the "Notice in compliance with Article 65 of the Anatomy Act, 1983" which will appear on the notice board.

- It is your responsibility to complete and sign the registration form, which will be handed out to you. This registration form with your signature is compulsory in accordance with the Anatomy Act (1983), which grants you permission to handle human tissue. The Inspector of Anatomy checks this registration form during his annual visit to the Department.

- There are specific conditions for the loan of skeletal bones (also see "notice" on the notice board in connection with the conditions for lending of skeletal bones.

- Two students share an unarticulated skeleton for use during the first part of this module. If any student suspends their course, they must inform the Department of Anatomy and Histology immediately and hand the bones in. **You are not allowed to make any marks on the bones.** You will be informed of dates to hand bones in.

- Strict rules apply according to Article 65 of the Anatomy Act, 1983 when students are in possession of human tissue (i.e. skeletal bones). If this ordinance is transgressed, the Inspector of Anatomy may instigate further investigations in accordance with Article 65 of the Anatomy Act, 1983.

- Each skeletal bone supplied to you, is on record. Each bone MUST later be handed back to the Division of Anatomy and Histology in a neat and acceptable condition (date for handing in of bones will be **on the 18th July 2011**).

- Bones of different skeleton sets may not be exchanged or mixed.

- Handing back of bones takes place in the ossuary (opposite Room F220, Fisan Building).
CODE OF CONDUCT FOR THE DIVISION ANATOMY AND HISTOLOGY

- All lectures and practicals are compulsory.
- The class will be divided into the same groups as for Cardiovascular and Respiratory Modules (2010). Ensure that you know in which group and dissection hall you are working. You are not allowed to change groups.
- **No visitors are allowed for students in the museum and dissection halls.** In exceptional circumstances you can organize a visit with the head of the department or for the museum, with the curator.
- It is strictly forbidden to take photographs of any human tissue in the lecture or dissection halls or the museum. Guilty students run the risk of being expelled.
- Your group is responsible for the care of the cadaver. Exposure to air is the main cause of damage to the tissue. Therefore, expose only the area where you work and keep the rest of the cadaver covered with the wet flannel cloths and plastic. Keep the skin of the cadaver and replace it, together with the cloth and plastic after the practical. The flannel cloths should be wet when you cover the cadaver. Use the fluid provided at your table. All the dissected tissue should be placed into the specific container for your cadaver.
- Clean the work area and leave it in a tidy condition. The use of latex gloves is optional.
- Place all used sharp instruments (blades) into the special sharps containers. Be careful not to injure yourself or your fellow students.
- Students are allowed into the dissection halls from Monday to Friday from 08:00 – 16:00.
- It is compulsory to wear a clean white coat, closed shoes and long trousers (for men) to the dissection practical. You will not be allowed into the practical without the correct clothing. The same rules apply to the practical assessing. Your general appearance should be neat and respectable.
- It is compulsory to wear shoes in the Fisan building.
- Smoking is prohibited in the buildings of the Faculty of Health Sciences.
- All human tissue in the department is under the control of the Human Tissue Act (1983) and the Inspector of Anatomy. The skeletal bones used by students must be handed back to the department on the 18th July 2011 or earlier should you end your course. Late handing in of skeletal bones will result in fines and loss of deposits. Failure to give the bones back will lead to prosecution by the police.
- Eating, drinking and the use of radios are prohibited in the dissection halls.
- Despite the condition (death) of the cadaver, it is still human. That human had thoughts, he/she saw the beauty of nature, he/she held a baby, his/her feet carried him/her on their path of life. Treat the remains of that person with the necessary respect and compassion.
- Times for the museum: Monday to Friday 08:00 – 16:00. The museum is closed on weekends and public holidays.
- Only students and personnel of the faculty are allowed into the museum, unless a specific visit is organized.
- Silence and irreproachable behaviour is expected in the museum. Do not sit on the tables, use the chairs provided.
- Any problems in the museum should be reported to Prof. B.J. Page, Room F162 on the First floor, Fisan Building.
**ICONS**

The following are used so that you can easily find your way around this study guide:

<table>
<thead>
<tr>
<th>ICON</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>🚗</td>
<td>… your destination for the theme, i.e. the outcomes.</td>
</tr>
<tr>
<td>🗣️</td>
<td>… a contact session with a lecturer.</td>
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<tr>
<td>📝</td>
<td>… an assignment that you must complete on your own, i.e. self-study.</td>
</tr>
<tr>
<td>⬅️</td>
<td>… groupwork together with fellow students.</td>
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<tr>
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<td>… a practical.</td>
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<td>… a case study</td>
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<td>📚</td>
<td>… the use of prescribed reading material.</td>
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<td>🖥️</td>
<td>… the use of a computer.</td>
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<td>… the use of video material.</td>
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<td>… the use of material on the internet.</td>
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<tr>
<td>📚</td>
<td>… the use of slide material.</td>
</tr>
<tr>
<td>📚</td>
<td>… take note!</td>
</tr>
<tr>
<td>🧠</td>
<td>… a brain “workout”: something extra for those looking for a challenge</td>
</tr>
<tr>
<td>🗓️</td>
<td>… self-assessment, an opportunity to establish whether or not you are on the right track.</td>
</tr>
<tr>
<td>✔️</td>
<td>… assessment during the module which can contribute marks to your class mark.</td>
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</table>
ASSESSMENT

Section 1 – Anatomy, Histology, Physiology and Neurosciences

General
At the end of this section, there will be a theoretical (written) and a practical (identification) assessment. Detail on the nature of these assessments will be supplied to you at a later date.

Section 1 test mark
The test mark will be calculated as follows:

- Practical assessment: 50%
- Written (theoretical) assessment: 50%

Practical Assessment
Date: Friday 27th May 2011
Time: The group-division, venue and times for meeting will be made known at a later stage on the notice board, Fisan Building.
Location: Will be announced at a later stage (for meeting and instructions).
Type: Identification (identification of anatomical and histological structures).
Percentage contribution: 50%

Theoretical Assessment
Date: Friday 27th May 2011
Time: 14:00 – 16:00
Location: Examination location, 5th Floor, Teaching Block (or will be announced at a later stage).
Type: True-and-false questions; short questions; paragraph questions; long questions
Percentage contribution: 50%

Because the practical assessment contributes 50% to the marks of this module, group activities during the practicals are of great importance. If you do not use your time optimally during the practical sessions (directed self-study and preparation is thus a prerequisite), you cannot expect to do well in the practical evaluation. You should thus work independently and continuously and use your practical sessions optimally, if you wish to complete this module successfully.

Clinical Assessment
Date: Friday 05th August 2011
Time: 09:00 – 12:00
Location: Examination location, 5th Floor, Teaching Block
Type: Written paper

Examination (written)
The examination for MBChB-students takes place on Wednesday 16th November 2011 (at 09:00) in the Examination Location, Fifth Floor, Teaching Block (consult the examination timetable whether any dates and times have possibly changed).
Global Mark Allocation

1) Test
   a. Practical anatomy test (Friday 27 May 2011)
   b. First theory test (Will include Anatomy, Histology, Physiology and Neurology and will cover all subjects studied up to the date of the test) (Friday 27 May 2011)
   c. Second theory test will include Clinical Orthopaedics, Rheumatology and other subjects studied since the first test. (Friday 05 August 2011)
   d. Test mark allocation = (Preclinical tests [a +b] + Clinical test [c])/2

2) Exam (Wednesday 16 November 2011)
   a. Anatomy and Neurology (90 marks)
   b. Orthopaedics and Rheumatology (90 marks)

Final mark will be calculated as follows

(Test mark [1.d] + Exam mark [2])/2

INTRODUCTION CLINICAL SECTION

Welcome to the clinical section of the musculoskeletal system module.

Conditions of the musculoskeletal system are particularly common, and will occupy much of your time in general practice. In the USA, it is one of the most common reasons for patients consulting their general practitioner. Approximately 75% of all people will, for example, at some time present with complaints of back pain. Trauma and violence are presently epidemic in South Africa, and with the increase in high velocity injuries and gunshot wounds, your practice with continually be overflowing with musculoskeletal injuries. Other common conditions include joint diseases, bone diseases and deformities. To better understand these, as well as the neoplastic and infective conditions of the musculoskeletal system, appropriate pathological as well as microbiological aspects will be covered.

The relevance of the various imaging modalities will also be put into perspective throughout.

During this block, the presentations will, as far as possible, be multidisciplinary since treatment of these problems usually requires a multidisciplinary approach.

There will be a continual emphasis on a practical approach with regards to the most common conditions affecting the musculoskeletal system.

The most important aspects of the clinical diagnosis, radiological interpretation and treatment will be emphasized.

A number of practical self-study assignments will be expected from you; you are encouraged to complete these assignments as quick as possible and to liaise with your class mates for future reference.
REFERENCES AND TEXTBOOKS FOR THE CLINICAL SECTION OF THE MUSCULOSKELETAL MODULE

Please make use of the references that appear in your study guides. All references can be found in the library of the Faculty of Health sciences. You also have access to numerous videos, which are worth using to establish practical guidelines.

You are recommended to buy the following textbooks. The majority of information that you require appears within.

Concise System Of Orthopaedics And Fractures – AG Apley/L Solomons
Apleys System Of Orhtopaedics And Fractures – AG Apley/L Solomons
Clinical Orthopaedic Examination - Ronald Mcrae
Practical Fracture Treatment - Ronald Mcrae
Dorlands Medical Dictionary – Saunders

Websites
1. www.sun.ac.za/ortho
2. webct.sun.ac.za (module 371)

LOCATIONS

The locations referred to in the timetables for the activities of the themes are as follows:

<table>
<thead>
<tr>
<th>Lectures</th>
<th>Lecture Hall 7, Ground Floor, Teaching Block</th>
</tr>
</thead>
<tbody>
<tr>
<td>HL</td>
<td>Histology Laboratory, Room 5035, 5th Floor, Education Block</td>
</tr>
<tr>
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<td>Practical Locations</td>
</tr>
</tbody>
</table>
LECTURERS

These are the names and contact details of the lecturers that are involved with the module:

<table>
<thead>
<tr>
<th>NAME</th>
<th>DEPT/DIV</th>
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<th>TEL</th>
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</thead>
<tbody>
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</tr>
</tbody>
</table>

The following session staff will be assisting at the practicals:

1. Dr. S Mouton
2. Dr. C Chase
Contact People

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EXPLANATION OF SYMBOLS FOR CLINICAL SECTION:

Clinical Picture
C1 - Know about
C2 - Tentative diagnosis
C3 - Diagnose and refer
C4 - Diagnose and treat

Knowledge
T1 - Know about
T2 - Superficial knowledge
T3 - Working knowledge
T4 - Detailed knowledge

Skills
S1 - Just know about
S2 - Must have seen this performed a few times
S3 - Must have performed this a few times under supervision
S4 - Must be able to perform this independently and accurately

TIMETABLE AND STUDY INFORMATION IN SAQA FORMAT

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Phase II (Theory): MUSCULOSKELETAL SYSTEM – 52302 371
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THEME 1:
TERMINOLOGY

AIM OF THE THEME

At the end of the theme, you should realise the importance of internationally acceptable anatomical terms and also be able to apply anatomical terms correctly since anatomical terminology forms a large portion of general medical terminology.

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THEME 1: TERMINOLOGY

SESSION 1: TERMINOLOGY

OUTCOMES

1. Describe and explain the anatomical positions.
2. Describe and explain the different anatomical levels.
3. Describe and explain terms that demonstrate the relative position of structures to each other (terminology with regards to relationships).
4. Describe and explain terms that describe movements of limbs and other parts of the body (terminology with regards to movement).

RESOURCES

1. Moore 5, Moore 6

ANYTHING SPECIFIC YOU SHOULD DO?

Lecture and Directed Self-study

During the lecture, selected aspects of terminology will be explained and demonstrated to you.

During the directed self-study, you should study the sections on terminology in preparation for the application thereof in this section.

Self-study

The following aspects should be dealt with during the self-study so that the anatomical position, anatomical levels and the specific meaning of certain terms can be defined and explained:

- the anatomical position (M5: 5; M6: 5)
• anatomical levels (M5: 5-6; M6: 5-6)
• terminology with regards to relationships (M5: 6-7; M6: 6-7)
• terminology with regards to movements (M5: 7-11; M6: 7-11)

Self-assessment

After completion of the self-study, see if you can answer the following questions:

1. The correct definition for abduction is:
   (a) Moving away from the median plane
   (b) Moving away from the median plane in a coronal plane
   (c) Moving away from the median plane in a sagittal plane
   (d) Moving the upper or lower limb away from the body
   (e) Moving away from the axial line of the body

2. Lateral means:
   (a) Further away from the coronal plane
   (b) Further away from the median plane
   (c) Further away from the sagittal plane
   (d) Further away from the body
   (e) On the opposite side of the body

3. Inferior means:
   (a) Away from the head
   (b) Distally
   (c) Downwards
   (d) Nearer to feet
   (e) Nearer to the floor

4. Superior means:
   (a) Upwards
   (b) Proximally
   (c) Nearer to the roof
   (d) Nearer to the head
   (e) Away from the feet

5. What is the anatomical definition of the following terms:
   (a) Median plane
   (b) Sagittal plane
   (c) Flexion
   (d) Extension
   (e) Rotation
   (f) Medial rotation
   (g) Lateral rotation
   (h) Abduction
   (i) Adduction
   (j) Circumduction
   (k) Proximal
   (l) Distal
(m) Pronation
(n) Supination
(o) Eversion
(p) Inversion
(q) Dorsiflexion
(r) Plantarflexion
(s) Medial
(t) Lateral
THEME 2: OSTEOLOGY

AIM OF THE THEME

At the end of the theme, you should be able to describe, explain, identify and demonstrate the organisation and composition of the skeleton.

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SESSION 1: OSTEOLOGY

OUTCOMES

1. Explain the organisation and composition of the human skeleton.
2. Name the functions of bones
3. Identify and name all the bones of an articulated human skeleton.
4. Describe and explain the principles of the blood supply and nerve supply of bone (self-study).
5. Name the different characteristics of bones and identify each on a bone.

RESOURCES

1. Moore 5
2. The unarticulated skeleton supplied to you on loan.
3. Articulated skeletons in practical locations.

ANYTHING SPECIFIC YOU SHOULD DO?

Lecture and Self-study

During the lecture, selected aspects of osteology will be explained and demonstrated to you, with the help of certain selected bones.

During the directed self-study, you should consult your resources to study the bones and their specific parts.

During the practicals (on muscle groups), you will also have the opportunity to name and identify the relevant osteological structures that have a reference to muscle groups or specific muscles (for example attachments of muscles).
**Self-study**

Consult your resources to study the following aspects in preparation for practicals (that follow later) so that the relevant osteological aspects are already known to you. This results in the required outcomes being attained more easily:

- Name the functions of bones (M5; 19-20; M6: 19-20).
- Explain and demonstrate the concepts axial and appendicular skeleton (M5; 18-19; M6:18-19).
- Explain the meaning of the following terms (M5; 21; M6: 20-22):
  - Condyles
  - epicondyle
  - supracondylar ridge
  - tubercle
  - tuberosity
  - trochanter
  - ridge
  - capitulum
  - trochlea
  - spina
  - malleolus
  - line (“linea”)
  - Fossa
  - notch
  - head
  - neck
  - shaft
  - linea aspera
  - interosseous border
  - foramen
  - groove
  - ramus
  - articulatory processes/surfaces
  - projection

- Name and identify the following bones with their specific parts:
  1. Occipital bone (M5; 897; M6: 830)
     - occipital condyles
  2. Vertebrae (M5; 81-82; 480-494; 547-552; 1047; M6: 76; 440-453; 485; 983-984)
     - body
     - vertebral foramen
     - pedicle
     - lamina
     - transverse process
     - spinous process
     - articulatory surfaces
     - foramen transversarium (C1-C7)
     - dens (on C2)
     - sacrum (5 fused sacral vertebrae)
  3. Sacrum (M5; 490-494; M6: 451-453)
     - sacral canal
     - sacral foramina (intervertebral foramina)
     - anterior surface (pelvic surface)
     - posterior surface
     - sacral promontorium (anterior margin of body of S1)
     - base (superior surface of S1)
     - apex (attached to C01)
- median crest (median crest)
- lateral crest
- sacral hiatus
- intermediary crest
- auricular surface (articulatory surface with ilium)
- sacral cornu

4. Sternum (M5; 83; 91; 92; M6: 76-78)
- manubrium
- body
- xiphoid-process
- jugular notch (suprasternal notch)
- clavicular notch
- attachment-area for cartilage of rib 1
- costal notches 2-7 (for articulatory with costal cartilages 2-7)
- manubrio-sternal joint (sternal angle; angle of Louis)
- xiphi-sternal joint
- transverse ridges

5. Rib (M5; 78-79; M6: 75)
- head
- neck
- shaft
- tubercle
- costal angle
- costal groove
- articulatory surfaces
- external surface
- internal surface

6. Clavicle (M5; 729-730; M6: 673-675)
- medial extremity (sternal extremity)
- lateral extremity (acromial extremity)
- shaft
- superior surface
- inferior surface
- anterior margin
- posterior margin

7. Scapula (M5; 730-732; M6: 675-676)
- spina
- supraspinous fossa
- infraspinous fossa
- subscapular fossa
- acromion
- coracoid process
- glenoid cavity
- superior angle
• inferior angle
• medial border
• lateral border

8. Humerus (M5; 732-733; M6: 676-677)
• proximal portion
  • head
  • neck (anatomy neck)
  • surgical neck
  • greater tubercle
  • lesser tubercle
  • intertubercular groove (bicipital groove)
• body (body)
  • deltoid tuberosity
• distal portion
  • lateral supracondylar ridge
  • medial supracondylar ridge
  • lateral epicondyle
  • medial epicondyle
  • capitulum (M5; 732 ;M6 : 677)
  • trochlea (M5; 733 ;M6 : 677)
  • coronoid fossa (M5; 733 ;M6 : 677)
  • olecranon fossa (M5; 733 ;M6 : 677)

9. Ulna (M5; 734-735 ; M6: 677-678)
• Proximal portion
  • olecranon
  • trochlear notch
  • coronoid process
  • radial notch (for articulation with head of radius)
  • tuberosity of ulna
• body
• distal portion
  • head
  • styloid process (of ulna)

10. Radius (M5; 735-736; M6: 678-679)
• proximal portion
  • head
  • neck
  • tuberosity of radius
• body
• distal portion
  • ulnar notch (for articulation with head of ulna)
  • styloid process (of radius)

11. Carpal bones (M5; 737;M6: 680)
• Scaphoid
• Lunate
• Trapezium
• Trapezoid
• triquetrum
• pisiform
• capitate
• hamate
12. Metacarpal bones (M5: 737-738; M6: 680)
13. Phalanges (of hand) (M5: 738; M6: 680)
  • proximal
  • middle
  • distal
14. Hip bone (os coxae) (M5: 560-562; M6: 514-516)
  • ilium
    □ iliac ridge
    □ iliac fossa
    □ iliac tuberosity
    □ articular surface (for articulation with sacrum)
    □ anterior superior iliac spina
    □ anterior inferior iliac spina
    □ posterior superior iliac spina
    □ posterior inferior iliac spina
    □ greater sciatic notch
    □ ala (wing) of ischium (postero-lateral surface)
  • ischium
    □ body of ischium
    □ ischial spina
    □ ischial tuberosity
    □ ramus of ischium
    □ lesser sciatic notch
  • pubis
    □ body of pubis
    □ superior ramus of pubis
    □ inferior ramus of pubis
    □ pubic crest
    □ pubic tubercle
    □ pecten pubis (pectineal line)
  • obturator foramen
  • acetabulum (ilium, ischium and pubis contribute to acetabulum)
    □ acetabular fossa
    □ acetabular notch
    □ articular surface (for articulation with head of femur)
15. Femur (M5: 563-565; M6: 516-520)
   - proximal portion
     - head (with fovea capitis to which ligamentum capitis femoris is attached)
     - neck
     - greater trochanter
     - lesser trochanter
     - intertrochanteric crest (ridge)
     - intertrochanteric line
     - trochanteric fossa
     - quadrate tubercle
     - pectineal line (continuous with base of lesser trochanter)
   - body
     - anterior surface
     - lateral surface
     - medial surface
     - linea aspera
     - lateral lip of linea aspera
     - medial lip of linea aspera
     - glutal tuberosity
   - distal portion
     - lateral supracondylar line
     - medial supracondylar line
     - popliteal surface
     - adductor tubercle
     - lateral epicondyle
     - medial epicondyle
     - lateral condyle
     - medial condyle
     - intercondylar fossa
     - patellar surface (for articulation with patella)

16. Patella
   - base
   - apex
   - anterior surface
   - posterior surface

17. Tibia (M5: 566-568; M6: 520-521)
   - proximal portion
     - medial condyle
     - lateral condyle
     - medial tibial plateau
     - tibial tuberosity
   - body
     - borders (anterior; interosseous; medial)
     - surfaces (medial; lateral; posterior)
18. Fibula (M5: 568-569; M6: 521-522)
- proximal portion
  - head (with apex)
- body
  - borders (anterior; interosseous; posterior)
  - surfaces (medial; lateral, posterior)
- distal portion
  - lateral malleolus
  - articulatory surfaces

19. Tarsal bones (M5: 570-572; M6: 522-524)
- calcaneous
- talus
- navicular bone
- cuboid bone
- cuneiform bones (3): medial; intermediary; lateral

20. Metatarsal bones (M5: 570-572; M6: 524)

21. Phalanges of foot (M5: 571-572; M6: 524)
- proximal
- middle
- distal
AIM OF THE THEME
At the end of the theme, you should be able to describe and explain the classification and characteristics of the different joints.

OVERVIEW OF THE THEME

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THEME 3: JOINTS

SESSION 1: JOINTS

OUTCOMES
1. Explain the structural classification of joints (fibrous; cartilagenous; synovial) and name the most important characteristics of each type of joint.
2. Name, identify and classify (according to above-mentioned classification system) all the joints that appear in the human skeleton.
3. Name all the movements that are present at each specific synovial joint.
4. Discuss the anatomy of the following synovial joints:
   - atlanto-occipital joint
   - atlanto-axial joint
   - shoulder joint
   - elbow joint
   - wrist joint
   - hip joint
   - knee joint
   - ankle joint

RESOURCES
1. Moore 5/6
**ANYTHING SPECIFIC YOU SHOULD DO?**

**Lectures, Directed Self-study and Practicals**

During the lectures, selected aspects of the relevant joints, as well as an approach to any synovial joint described, will be explained and demonstrated to you.

During the directed self-study, you should consult your resources to study specific aspects of joints (see self-study).

During the practicals (on muscle groups), you will have the opportunity to name, identify and classify the relevant joints, as well as an opportunity to name and identify the important aspects of specific joints (see self-study).

**Self-study**

1. Study the anatomy of the following synovial joints:
   - atlanto-occipital joint (M5: 506; M6: 467)
   - atlanto-axial joint (M5: 506; M6: 467)
   - shoulder joint (M5: 853; M6: 796)
   - elbow joint (M5: 860; M6: 800)
   - wrist joint (M5: 869; M6: 809)
   - hip joint (M5: 675; M6: 626)
   - knee joint (M5: 684; M6: 634)
   - ankle joint (M5: 702; M6: 647)

   **NB:** Use the following framework (recipe) to describe each of above-named synovial joints:
   - typical characteristics of synovial joints
   - articulating surfaces of the relevant bones (for example the head of humerus articulates with the glenoid fossa of the scapula)
   - capsule and bursa
   - ligaments (that stabilise joints)
   - intracapsular structures
   - movements by joint
   - important muscles for each of the specific movements
   - blood supply and nerve supply of the joint
   - important clinical aspects

2. The following joints should be named, identified and classified according to the classification-system:
   - fibrous
   - primarily cartilagenous (synchondroses)
   - secondary cartilagenous (symphysis)
   - synovial
     - skull sutures(M5: 887; 888; 896; M6: 823; 824; 830)
     - tempo-mandibular joint (M5: 981; M6: 916)
     - atlanto-occipital joint (M5: 506; M6: 467)
     - atlanto-axial joint (M5: 506; M6: 467)
     - joints of the vertebral bodies (intervertebral joints) (M5: 499; M6: 455)
• joints of the vertebral arches ("zygapophyseal joints") (M5: 504; M6: 466)
• costo-vertebral joints (M5: 86; M6: 79-80)
  □ between head of rib and vertebral body
  □ between tubercle of rib and transverse process of vertebra
• costo-chondral joints (M5: 86; M6: 81)
• interchondral joints (M5: 86; M6: 81)
• sternocostal joints (M5: 88; M6: 81)
• manubrio-sternal joint (M5: 83; M6: 78)
• xiphio-sternal joint (M5: 83; M6: 78)
• lumbo-sacral joint (M5: 366; M6: 332)
• sacro-coccygeal joint (M5: 367; M6: 332)
• sacro-iliac joint (M5: 365; M6 330)
• pubic symphysis (M5: 366; M6: 332)
• sterno-clavicular joint (M5: 848; M6: 794)
• acromio-clavicular joint (M5: 851; M6: 796)
• shoulder joint (gleno-humeral joint) (M5: 853; M6: 796)
• elbow joint (M5: 860; M6: 800)
• proximal radio-ulnar joint (M5: 863; M6: 804)
• distal radio-ulnar joint (M5: 866; M6: 806)
• wrist joint (M5: 869; M6: 809)
• hand joints: (M5: 871-874; M6: 809-813)
  (intercarpal joints; carpo-metacarpal joints; intermetacarpal joints; metacarpo-phalangeal joints; interphalangeal joints)
• hip joint (M5: 675; M6: 626)
• knee joint (M5: 684; M6: 623)
• proximal tibio-fibular joint (M5: 701; M6: 645)
• distal tibio-fibular joint (M5: 701; M6: 646)
• ankle joint (M5: 702; M6: 647)
• foot joints (M5: 707; 704- 705 table 5.18; M6: 650; 652 table 5.18)
  (subtalar joint; talo-calcaneo-navicular joint; calcaneo-cuboid joint; tarso-metatarsal joints; intermetatarsal joints; metatarso-phalangeal joints; interphalangeal joints)

Information

Examples of how bony aspects, ligaments, muscles and other structures contribute to the stabilisation or mobilisation of the joint:

- the large head of the humerus relative to the small glenoid-fossa of the scapula contributes to increasing mobilisation as a result of few limiting bony aspects that can restrict movement;
- the level glenoid-fossa of the scapula contributes to decreased stabilisation (or increased mobilisation) because the head of the humerus does not fit firmly in the level glenoid-fossa;
- the communal function of the rotator-cuff muscles (supraspinatus, infraspinatus, teres minor and subscapularis) is stabilisation of the head of the humerus against the glenoid-fossa of the scapula;
- the origin of the long head of biceps brachii (which is intracapsular), contributes to stabilise the head of the humerus against the glenoid-fossa of the scapula;
the "lax" inferior portion of the capsule of the shoulder joint does not restrict abduction of the humerus and thus contributes to increased mobility of the shoulder joint (Moore V; 854 fig 6.61 A;M6: 799 fig 6.95 A)

- the glenoid-labrum (a fibro-cartilagenous structure) is deep in the glenoid-fossa and thus contributes to the stability of the shoulder joint;
- extra-capsular ligaments present in the shoulder joint exert minimal limiting effects with regards to the area of movement possible by the shoulder joint (Moore V: 854 fig 6.61 B;M6: 799 fig 6.95 B);
- the ball-and-socket architecture of the shoulder joint and hip joint contribute to a wide range of movements at this joints;
- the head of the femur is inserted deep in the acetabulum of the hipbone: this contributes to increased stability of the hip joint;
- the ligament of the head of the femur (ligamentum capitis femoris) that is situated intracapsularly, as well as other extracapsular ligaments of this joint, contribute to the stability of the hip joint;
- the numerous ligaments of the knee joint (patellar ligament; medial collateral ligament; lateral collateral ligament; popliteal ligaments; cross ligaments; etc) contribute to the stability of the knee joint;
- the menisci (C-shaped fibro-cartilage plates) deep within the articulating surface of the tibia, contribute to the stabilisation of the knee joint.

**Classification of joints (with examples)**

- **FIBROUS JOINTS**
  - Sutural joints
    - skull sutures
  - Syndesmosis
    - distal tibio-fibular joint
  - Gomphosis
    - between a tooth and the bone wherein it is implanted

- **CARTILAGENOUS JOINTS**
  - Primary cartilagenous joints (synchondrosis)
    - first sternocostal joint
    - costo-chondral joint
    - xiphi-ternal joint
  - Secondary cartilagenous joints (symphysis)
    - manubrio-ternal joint
    - intervertebral joints between vertebral bodies
    - sacro-coccygeal joint
    - pubic symphysis

- **SYNOVIAL JOINTS**
  - atlanto-occipital joint
  - atlanto-axial joint
  - sterno-clavicular joint
  - acromio-clavicular joint
  - 2nd - 7th sterno-costaal joints
- interchondral joints
- costo-vertebral joints
- sacro-iliac joint
- facet joints ("zygopophyseal joints")
- temporo-mandibular joint
- shoulder joint; elbow joint; wrist joint
- proximal and distal radio-ulnar joints
- hip joint; knee joint; ankle joint
- proximal tibio-fibular joint
- hand joints and foot joints

**Important characteristics of each joint type**

- **fibrous joint**
  - bones are attached by *fibrous tissue*
  - no joint cavities
  - movement that is possible, is a function of the length of the membrane/ligament holding the bones together
    - skull sutures: no movement in adults
    - interosseous membrane: good movement (e.g. between ulna and radius)
    - tooth in alveolar process: very limited movement

- **cartilagenous joint**
  - bones attached by *hyaline cartilage* or *fibrocartilage*
  - no joint cavities
  - primary cartilagenous joint (synchondroses): bones attached by hyaline cartilage; limited movement in early life; joint ossifies by adulthood
  - secondary cartilagenous joint (symphysis): bones attached by fibrocartilage (e.g. the fibrocartilagenous intervertebral discs between the bodies of vertebrae); strong joints that allow limited movement; bones attached together by fibrocartilage-disc

- **synovial joint**
  - capsule (exist with synovial membrane on inside)
  - joint cavities
  - hyaline cartilage (on articulating surfaces of bones)
Self-assessment

Answer the following questions and review the answers to check whether you have answered the questions correctly. It is a waste of time to guess the answers or to copy the from someone else since the self-assessment is there to give you an indication of the extent to which you understand the structure and classification of joints.

**MARK THE CORRECT ANSWER** (Each question has only one correct answer)

1. Which one of the following joints is a synovial joint?
   - (a) Intercostal joints
   - (b) Costochondral joints
   - (c) Distal tibio-fibular joint
   - (d) Manubrio-sternal joint
   - (e) Sacro-coccygial joint

2. Which one of the following joints is a primary cartilaginous joint (Synchondroses)?
   - (a) First sterno-costal joint
   - (b) Second sterno-costal joint
   - (c) Manubrio-sternal joint
   - (d) Joints between vertebral bodies
   - (e) Sacro-coccygial joint

3. Which one of the following joints is a secondary cartilaginous joint (Symphysis)?
   - (a) Sutures of the skull
   - (b) Costochondral joints
   - (c) Sacro-coccygial joint
   - (d) Sterno-clavicular joint
   - (e) Acromio-clavicular joint

4. Which one of the following joints is a fibrous joint?
   - (a) Sutures of the skull
   - (b) Costochondral joints
   - (c) Manubrio-sternal joints
   - (d) Sacro-coccygial joint
   - (e) Distal radio-ulnar joint

5. The main movement(s) at the atlanto axial joint:
   - (a) Gliding movement
   - (b) Rotation
   - (c) Flexion and extension
   - (d) Flexion, lateral flexion, extension and rotation
   - (e) Flexion, extension, abduction, adduction and circumduction

6. The main movement(s) at the atlanto occipital joint:
   - (a) Gliding movement
   - (b) Rotation
   - (c) Flexion and extension
   - (d) Flexion, lateral flexion, extension and rotation
   - (e) Flexion, extension, abduction, adduction and circumduction.
7. The main movement(s) at facet joints:
   (a) Gliding movement
   (b) Rotation
   (c) Flexion and extension
   (d) Flexion, lateral flexion, extension and rotation
   (e) Flexion, extension, abduction, adduction and circumduction.

8. The following are all the movements at the elbow joint:
   (a) Rotation
   (b) Flexion and extension
   (c) Flexion, extension and rotation
   (d) Flexion, extension, abduction, adduction and circumduction.
   (e) Flexion, extension, abduction, adduction, circumduction and rotation

9. The following are all the movements at the proximal radio-ulnar joint:
   (a) Rotation
   (b) Flexion and extension
   (c) Flexion, extension and rotation
   (d) Flexion, extension, abduction, adduction and circumduction.
   (e) Flexion, extension, abduction, adduction, circumduction and rotation

10. The following are all the movements at the wrist joint:
    (a) Rotasie/Rotation
    (b) Fleksie en ekstensie/Flexion and extension
    (c) Fleksie, ekstensie en rotasie/Flexion, extension and rotation
    (d) Fleksie, ekstensie, abduksie, adduksie en sirkumduksie/Flexion, extension, abduction, adduction and circumduction.
    (e) Fleksie, ekstensie, abduksie, adduksie, sirkumduksie en rotasie/Flexion, extension, abduction, adduction, circumduction and rotation

11. The following are all the movements at the metacarpo-phalangeal joints:
    (a) Rotation
    (b) Flexion and extension
    (c) Flexion, extension and rotation
    (d) Flexion, extension, abduction, adduction and circumduction.
    (e) Flexion, extension, abduction, adduction, circumduction and rotation

12. The following are all the movements at the interphalangeal joints:
    (a) Rotation
    (b) Flexion and extension
    (c) Flexion, extension and rotation
    (d) Flexion, extension, abduction, adduction and circumduction.
    (e) Flexion, extension, abduction, adduction, circumduction and rotation

13. At the wrist joint the distal part of the radius articulates with the:
   (a) Only the scaphoid
   (b) Scaphoid and trapezoid
   (c) Scaphoid, trapezoid and trapezium
(d) Scaphoid, lunate and triquetrum
(e) Schaphoid, pisiforme, lunate and triquetrum

14. The head of the first rib articulates with:
(a) Costal facet on the body of T1
(b) Costal facet on the pedicle of T1
(c) Costal facet on the transvers process of T1
(d) Demi-(half) facets on the bodies of C7 and T1
(e) Demi-(half) facets on the bodies of T1 and T2

15. The proximal radio-ulnar joint is located between:
(a) Head of radius and capitulum of ulna
(b) Head of radius and radial notch of ulna
(c) Head of radius and olecranon of ulna
(d) Head of radius and trochlear notch of ulna
(e) Head of ulna and olecranon of ulna

16. Articular surfaces at the elbow joint:
(a) Trochlea of humerus with head of radius; and trochlear notch of humerus with capitulum of ulna
(b) Trochlear notch of humerus with trochlea of radius; and capitulum of humerus with head of ulna
(c) Trochlear notch of humerus with trochlea of ulna; and capitulum of humerus with head of radius
(d) Trochlea of humerus with trochlear notch of radius; and capitulum of humerus with head of ulna
(e) Trochlea of humerus with trochlear notch of ulna; and capitulum of humerus with head of radius

17. Which one of the following joints is NOT a synovial joint?
(a) Temporo-mandibular joint
(b) Atlanto-occipital joint
(c) Sacro-iliac joint
(d) Sacro-coccygeal joint
(e) Facet joints of vertebrae

18. Which one of the following joints is NOT a synovial joint?
(a) Atlanto-axial joint
(b) Kosto-vertebrale gewrigte/Costo-vertebral joints
(c) Sterno-klavikulêre gewrig/Costo-clavicular joint
(d) Kosto-kondrale gewrigte/Costo-chondral joints
(e) Inter-falangeale gewrigte/Interphalangeal joints

19. Which one of the following joints is NOT a cartilaginous joint?
(a) Costa vertebral joints
(b) Costa chondral joints
(c) Pubic symphysis
20. Which one of the following joints is an example of a primary cartilaginous joint (Synchondroses)?
(a) Atlanto-occipital joint  
(b) Acromio clavicular joint  
(c) Sutures of the skull  
(d) Costo chondral joints  
(e) Sacro coccygial joint

21. Which one of the following joints is an example of a secondary cartilaginous joint (Symphyses)?
(a) Atlanto-occipital joint  
(b) Acromio clavicular joint  
(c) Sutures of the skull  
(d) Costo chondral joints  
(e) Sacro coccygial joint

22. Which one of the following is the most important criterion of a synovial joint?
(a) Ball and socket joint  
(b) Always a wide range of movement  
(c) A capsule is present  
(d) Presence of cartilage  
(e) Presence of ligaments

23. Which bones are all involved at the knee joint?
(a) Femur and tibia  
(b) Femur, tibia and fibula  
(c) Femur, tibia and patella  
(d) Femur, fibula and patella  
(e) Femur, tibia, fibula and patella

24. Which bones are all involved at the hip joint?
(a) Ilium and femur  
(b) Ischium and femur  
(c) Pubis and femur  
(d) Ischium, pubis and femur  
(e) Ilium, ischium, pubis and femur

25. Which bones are all involved at the ankle joint?
(a) Tibia and talus  
(b) Tibia and calcaneus  
(c) Tibia, fibula and talus  
(d) Tibia, fibula and calcaneus  
(e) Tibia, fibula, talus and calcaneus
26. Which one of the following joints is a fibrous joint?
   (a) Proximal radio-ulnar joint
   (b) Distal radio-ulnar joint
   (c) Proximal tibio-fibular joint
   (d) Distal tibio-fibular joint
   (e) Manubrio sternal joint

27. The following are all the movements at the hip joint:
   (a) Flexion and extension
   (b) Flexion, extension and rotation
   (c) Flexion, extension and circumduction
   (d) Flexion, extension, abduction and adduction
   (e) Flexion, extension, abduction, adduction, rotation and circumduction.

28. The following are all the movements at the knee joint:
   (a) Flexion and extension
   (b) Flexion, extension and rotation
   (c) Flexion, extension and circumduction
   (d) Flexion, extension, abduction and adduction
   (e) Flexion, extension, abduction, adduction, rotation and circumduction.

29. The following are all the movements at the ankle joint:
   (a) Flexion and extension
   (b) Flexion, extension and rotation
   (c) Flexion, extension and circumduction
   (d) Flexion, extension, abduction and adduction
   (e) Flexion, extension, abduction, adduction, rotation and circumduction.

30. The most superior intervertebral disk is located between:
   (a) Occipital bone and axis
   (b) Occipital bone and atlas
   (c) Axis and atlas
   (d) Axis and C3
   (e) Atlas and C3

31. The head of the seventh rib articulates with:
   (a) Costal facet on the body of T7
   (b) Costal facet on the pedicle of T7
   (c) Costal facet on the transvers process of T7
   (d) Demi- (half) facets on the bodies of T6 and T7
   (e) Demi- (half) facets on the bodies of T7 and T8

32. Which bone or cartilage also articulates at the manubrio-sternal junction?
   (a) None
   (b) Clavicle
   (c) Costal cartilage of rib 1
   (d) Costal cartilage of rib 2
   (e) Costal cartilage of rib 3
33. The distal radio-ulnar joint is located between:
   (a) Head of radius and capitulum of ulna
   (b) Head of radius and radial notch of ulna
   (c) Head of radius and olecranon of ulna
   (d) Head of radius and trochlear notch and ulna
   (e) Head of ulna and ulnar notch of radius

34. Mark the CORRECT statement:
   (a) Fibrous joints are united only by fibrocartilage
   (b) Fibrous joints are united only by fibrous tissue
   (c) Fibrous joints are united by fibrocartilage or fibrous tissue
   (d) Cartilagenous joints are united only by fibrocartilage
   (e) Cartilagenous joints are united by fibrocartilage or fibrous tissue

35. Mark the CORRECT statement:
   (a) Fibrous joints are united only by fibrocartilage
   (b) Fibrous joints are united by either fibrocartilage or fibrous tissue
   (c) Cartilagenous joints are united only by fibrocartilage
   (d) Cartilagenous joints are united by either fibrocartilage or hyaline cartilage which
       ossifies at a later stage
   (e) Synovial joints always provide free movement

36. Mark the INCORRECT statement:
   (a) The periosteum of bone is rich in sensory fibers
   (b) Synovial joints have a rich nerve supply
   (c) The articular cartilage of synovial joints is usually of the hyaline type.
   (d) The elbow joint is a uni (1)-axial joint.
   (e) The ankle joint is a bi (2)-axial joint.

Are the following statements CORRECT or INCORRECT?

37. The tibial collateral ligament (medial ligament) of the knee is attached to the medial
    meniscus.
38. The fibular collateral ligament (lateral ligament) of the knee is attached to the lateral
    meniscus.
39. The anterior and posterior cruciate ligaments are called cruciate because they cross each
    other.
40. The posterior cruciate ligament prevents hyper-extension of the knee joint.
41. The names anterior and posterior (of the anterior and posterior cruciate ligaments) refer
    to the positions of their attachments to the femur.
42. The names anterior and posterior (of the anterior and posterior cruciate ligaments) refer
    to the positions of their attachments to the tibia.
43. The names anterior and posterior (of the anterior and posterior cruciate ligaments) do not
    refer to positions of attachments, but to their locations (i.e. the anterior cruciate ligament
    is situated anteriorly, and the posterior cruciate ligament is situated posteriorly).
44. The cruciate ligaments of the knee are intracapsular (within the articular capsule of the
    joint).
45. The cruciate ligaments of the knee are located extra-synovial (outside the synovial joint
    cavity: M5: 686 fig 5.58B, 688; M6: 637 fig 5.87.
46. The atlanto-axial joint is a synovial joint.
47. The manubio-sternal joint is a secondary cartilaginous joint.
48. The ilio-sacral joint is a synovial joint.
49. Joints between vertebral bodies are secondary cartilaginous joints.
50. Facet joints of vertebrae are synovial joints.
51. The patellar ligament has an attachment to the tibia.
52. Rotation is one of the movements at the knee joint.
53. The fibula is one of the bones involved in articulation at the knee joint.
54. The fibula is one of the bones involved in articulation at the ankle joint.
55. Eversion is an important movement at the ankle joint.
56. The patella articulates with the tibia in the fully extended knee.
57. The calcaneus is one of the bones involved in articulation at the ankle joint.
THEME 4:
THE VERTEBRAL COLUMN

AIM OF THE THEME

At the end of the theme, you should be able to describe and explain the characteristics, bones, joints and movements of the vertebral column, as well as the important muscles involved in vertebral column movements and posture (namely the intrinsic back muscles).

OVERVIEW OF THE THEME

<table>
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<th>Venue</th>
<th>Activity</th>
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THEME 4: THE VERTEBRAL COLUMN

SESSION 1:
THE VERTEBRAL COLUMN

OUTCOMES

1. Name the functions of the vertebral column.
2. Describe the typical characteristics of the vertebral column.
3. Describe the characteristics of a typical vertebra as well as the regional (cervical; thoracic; lumbar; sacral; coccygeal) characteristics of vertebrae.
4. Name, identify and classify all the joints of the vertebral column.
5. Discuss the anatomy of the atlanto-occipital and atlanto-axial joints.
6. Name and identify all the ligaments involved in the vertebral column.
7. Name and identify the intrinsic back muscles and indicate in which movements of the vertebral column these muscles are involved in.

RESOURCES

1. Moore 5
2. Netter
THEME 5: SKELETAL MUSCLES

AIM OF THE THEME

At the end of the theme, you should be able to describe and explain the different skeletal muscle groups, as well as the muscles in each group, together with their main functions and nerve supply.

OVERVIEW OF THE THEME

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THEME 5: SKELETAL MUSCLES

SESSIONS 1 - 13:
SKELETAL MUSCLES

OUTCOMES
1. Name and identify the different muscle groups.
2. Name and identify the different bones involved in the muscle groups.
3. Name and identify the joints involved with the muscle groups.
4. Name and identify the origin and insertion of muscles.
5. Name and identify the main function of the muscle groups and muscles.
6. Name and identify the nerve supply of muscles.
7. Name and identify the structures (muscles, ligaments, nerves, blood vessels, etc) as described in the practical outcomes.
8. Describe the anatomy of the following clinically important areas:
   - Axilla
   - cubital fossa
   - carpal tunnel (syndrome)
   - femoral triangle
   - adductor canal
   - popliteal fossa
9. Write complete notes on the following nerve plexuses:
   - brachial plexus
   - lumbar plexus
   - sacral plexus

RESOURCES
1. Moore 5
2. Netter
3. Dissector
4. Practicals

ANYTHING SPECIFIC YOU SHOULD DO?

Self-study, Practicals and Lectures

During the self-study, you should study the individual muscles with regards to their origin (proximal attachment), insertion (distal attachment), nerve supply and main action.

During the practicals, you will have the opportunity to name and identify the relevant structures involved with the skeletal muscles and the joints (see Practical programme).

During the lectures, selected aspects pertaining to skeletal muscles (and aspects related to skeletal muscles), will be explained and demonstrated to you.
LOCATIONS AND GROUPS

- The whole class (MB, ChB) is divided into the same 2 groups as for Respiratory and Cardiovascular Modules (2010) for practical sessions in Anatomy.
- Consult the timetable for the allocation of practicals (mostly groups A and B will be dissecting simultaneously).
- Group A - mainly Afrikaans speaking group.
- Group B - mainly English speaking group. Allocation based on Respiratory and Cardiovascular modules (2010).

GENERAL INFORMATION

- You will not, due to practical and logistical reasons, necessarily study the muscles dealt with in the lectures in the exact same sequence as in the practical session.
- You must study topics independently as preparation for practical sessions (these are often only dealt with later in a formal lecture).
- The lectures on skeletal muscles are only there to:
  - establish a framework for the information that you have already acquired
  - answer questions
  - give you an indication of to what depth each subject must be studied
  - explain important/problematic aspects
- The lectures are not there to repeat information that has already been dealt with independently in practicals and in self-study
- You should attach meaning to the names of muscles that you study in the practical sessions, for example:
  - the name of the deltoid muscle refers to the shape of the muscle (triangular);
  - gluteus maximus refers to the position and size of the muscle (a large muscle in the gluteal area);
  - the muscle biceps femoris refers to the number of heads (involving the origin) and the position of the muscle (a muscle with two heads and which is situated in the femur);
  - the muscle triceps brachii refers to the number of heads (involved in the origin) and the position of the muscle (a muscle with three heads and situated in the upper arm or brachium);
  - adductor brevis refers to the function and size of the muscle (a small / short muscle causing adduction of the upper leg).
- You should be able to explain the main action of the muscles belonging to that muscle group (i.e. you should practice the action of muscle or muscle groups, be able to relate this to the origin and insertion of the muscle, as well as be able to name the joint at which the movement occurs);

Remember: If a muscle or muscle group stretches over more that one joint, it can also carry out an action at more than joint, for example

- Rectus femoris can result in flexion of the hip joint, as well as extension at the knee joint.
- Extensor digitorum can contribute to extension of the medial 4 fingers at the metacarpophalangeal joints, as well as extend the hand at the wrist joint.
Remember: Muscles can cause more than one action at a specific joint, for example:

- Deltoid can cause flexion of the humerus at the shoulder joint (as a result of contraction of its anterior fibres); abduction of the humerus at the shoulder joint (as a result of contraction of its middle fibres); and extension of the humerus at the shoulder joint (as a result of contraction of its posterior fibres).
- Flexor carpi ulnaris can cause flexion as well as adduction of the hand at the wrist joint (adduction in collaboration with extensor carpi ulnaris).
- Extensor carpi ulnaris can result in extension as well as adduction of the hand at the wrist joint (adduction in collaboration with flexor carpi ulnaris).

Summary

The practical sessions serve as an establishment of knowledge. Each practical session should be optimally used for knowledge establishment.

Self-Study

1. The brachial nerve plexus should be studied with regards to (M5; 773-779; M6: 721-725):
   - position
   - spinal cord segment origin
   - nerves (branches and terminal branches)
   - muscle groups or muscles supplied by specific nerves
   - sensory innervation (in upper limb)

2. The lumbar nerve plexus should be studied with regards to (M5; 336 fig 2.76; 336; M6: 312 fig 2.97; 312-313)
   - position
   - spinal cord segment origin
   - nerves (branches and terminal branches)
   - muscle branches (to muscle groups or muscles)
   - cutaneous branches

3. The sacral nerve plexus should be studied with regards to (M5; 379 fig 3.10 A; 380; 381 table 3.4; M6: 357 fig 3.21; 358; 359):
   - position
   - spinal cord segment origin
   - nerves (branches and terminal branches)
   - muscle branches (to muscle groups or muscles)
   - cutaneous branches

4. The axilla should be studied with regards to (M5; 763; M6: 713):
   - definition
   - position
   - apex
   - base
   - walls (anterior; posterior; medial; lateral)
   - contents

5. The cubital fossa should be studied with regards to (M5; 795; M6: 739):
   - definition
• position
• borders
• roof
• floor
• contents

6. The carpal tunnel should be studied with regards to (M5; 840):
• position
• structures
• borders
• roof
• floor
• contents
• carpal tunnel syndrome

7. The femoral triangle should be studied with regards to (M5; 600-604; 598 fig 5.17A&B; M6: 551-556; 553 fig 5.27 A&B):
• position
• borders
• base
• apex
• roof
• floor
• contents

8. The adductor canal (subsartorial canal; Hunter's canal) should be studied with regards to (M5; 607 fig 5.20; M6: 556):
• definition
• position
• beginning of canal
• end of canal
• borders of canal
• contents of canal

9. The popliteal fossa should be studied with regards to (M5; 632; M6: 584):
• position
• borders
• roof (posterior aspects)
• floor (anterior aspects)
• content

10. Explain the following terms (what do you understand by the following terms?) (M5; 602-603; M6: 552-553):
• femoral sheaths
• compartments of femoral sheaths
• femoral canal
• femoral ring
• femoral hernia: (M5; 607; M6: 556)
11. Explain the following terms (what do you understand by the following terms?):
   - Palmar aponeurosis
   - Plantar aponeurosis
   - Fascia lata
   - ilio-tibial tract
   - flexor retinaculum
   - extensor retinaculum
   - menisci
   - bicipital aponeurosis
   - bursa
   - dermatome
   - myotome
   - adductor hiatus
   - varicose veins
   - intracapsular/extracapsular ligaments

12. Revise the following synovial joints:
   - shoulder joint (M5: 853; M6: 796)
   - elbow joint (M5: 860; M6: 800)
   - wrist joint (M5: 869; M6: 809)
   - hip joint (M5: 675; M6: 626)
   - knee joint (M5: 684; M6: 634)
   - ankle joint (M5: 702; M6: 647)

13. The precise position of muscle attachments (origin and insertion/ "proximal and distal attachments") of all muscles to the following bones should be indicated and identified:
   - Clavicle
   - scapula
   - humerus
   - sacrum
   - hipbone (ilium; ischium; pubis)
   - femur
   - tibia
   - fibula

Self-assessment
Are the following statements CORRECT or INCORRECT?

1. Tibialis anterior is supplied by the tibial nerve.
2. Tibialis posterior is supplied by the tibial nerve.
3. Flexor digitorum longus is supplied by the deep peroneal nerve.
4. Extensor digitorum longus is supplied by the deep peroneal nerve.
5. Soleus is supplied by the tibial nerve.
6. Biceps femoris is supplied by the femoral nerve.
7. Triceps brachii is supplied by the musculo-cutaneous nerve.
8. Biceps brachii is supplied by the musculo-cutaneous nerve.
9. Flexor digitorum superficialis has an attachment to the humerus.
10. One of the functions of coraco-brachialis is flexion at the elbow joint.
11. One of the functions of brachialis is flexion at the shoulder joint.
12. One of the functions of extensor digitorum is extension of the wrist joint.
13. One of the functions of tibialis anterior is eversion of the foot.
14. One of the functions of tibialis posterior is inversion of the foot.
15. One of the functions of extensor digitorum longus is dorsiflexion at the ankle joint.
16. Pectoralis major has an attachment to the clavicle.
17. Pectoralis major has an attachment to the humerus.
18. Biceps brachii has an attachment to the humerus.
19. Triceps brachii has an attachment to the scapula.
20. Triceps brachii has an attachment to the humerus.
21. Triceps brachii has an attachment to the radius.
22. Triceps brachii has an attachment to the ulna.
23. One of the functions of gluteus maximus is flexion at the hip joint.
24. One of the functions of the quadriceps femoris muscle group is flexion at the knee joint.
25. One of the functions of biceps femoris is extension at the knee joint.
26. One of the functions of semitendinosus is flexion at the knee joint.
27. Trapezius is an intrinsic muscle of the back.
28. Trapezius has an attachment to the clavicle.
29. Latissimus dorsi has an attachment to the humerus.
30. The fascia lata is the deep fascia of the thigh.
31. The ilio-tibial tract is thickened deep fascia.
32. The extensor retinaculum is thickened deep fascia.
33. Popliteus is involved in "locking" the knee joint.
34. The patella articulates with the tibia in the fully extended knee.
35. The calcaneus is one of the bones involved in articulation at the ankle joint.
36. Longissimus forms the lateral part of the erector spinae muscle group.
37. The erector spinae muscle group stretches from the sacrum to the skull.
38. The piriformis muscle runs through the greater sciatic foramen.
39. The sciatic nerve runs through the greater sciatic foramen.
40. Most gluteal muscles are supplied by branches of the lumbar plexus.
41. The sciatic nerve has its origin from the lumbar plexus.
42. Biceps brachii is the main flexor of the fore-arm.
43. Coracobrachialis is the main flexor of the fore-arm.
44. Brachialis is the main flexor of the fore-arm.
45. The saphenous nerve, a branch of the femoral nerve, supplies part of the skin of the foot.
46. The superficial peroneal nerve (superficial fibular nerve) supplies part of the skin of the foot.
47. The deep peroneal nerve (deep fibular nerve) supplies part of the skin of the foot.
48. The sural nerve (which usually originates from both the tibial nerve and common peroneal nerve) supplies part of the skin of the foot.
49. The lateral plantar nerve (a terminal branch of the tibial nerve) supplies part of the skin of the foot.
50. The medial plantar nerve (a terminal branch of the tibial nerve) supplies part of the skin of the foot.
PRACTICAL PROGRAMME

CONTENTS
• general information
• locations and groups
• care of cadaver
• dissection programme

GENERAL INFORMATION
• Practicals are a **learning opportunity**: the aim of the practicals is to serve as a learning opportunity (and not as a dissection opportunity); you should use this learning opportunity optimally; never again in your medical training will you have the privilege of studying Anatomy in this manner.
• Practicals are **structured unaccompanied groupwork**: you, together with other members of your practical group, are responsible for the interactive groupwork during the sessions: share your knowledge and also your questions and problems with other group members; ask questions; consult and acquire answers independently; and enlighten your group members with information that you have acquired.
• Use the time **optimally** during practicals: practicals are unique learning opportunities aimed at giving you the chance to study anatomical structures independently; the purpose of practicals is not just to complete a set of dissection instructions; dissection instructions are there to assist you in achieving the required outcomes.
• **Directed self-study** serves as preparation for practicals. Follow the self-study programme so that you can use and experience the practicals optimally as learning opportunities.
• The **aims of dissection** are to demonstrate:
  - a 3-D exposure of structures in the human body
  - an exposure to the texture of different structures
  - the relationship of structures to each other
• **Aspects contributing to optimal use of time** during practicals include:
  - preparation (get a theoretical understanding/framework of the area before starting on the dissection)
  - use Moore 5/6 regularly; also understand what the terms mean
  - bony landmarks are the key in the search of soft tissue structures (identify the bony landmarks)
  - do not waste time unnecessarily (e.g. do not waste unnecessary time looking for cutaneous nerves, etc): maintain a balance between time that is best spent exploring structures and time spent learning anatomical facts.
• Use anatomical terminology and apply it correctly.
• Groupwork (interaction between yourself and fellow students) is essential: share your knowledge with fellow students.
You and the other group members are responsible for the care of the cadaver: after each practical session, you should wet the cadaver and cover it properly with wet flannel cloths and the plastic cover; clean and tidy up the area where you have been working.

Your are allocated to a specific table: your input and presence are required at that table.

Practicals are compulsory: if you do not attend practicals, you may be refused admission to the examination.

It is compulsory to wear a white jacket and shoes during practicals: you may not enter a practical location without a white jacket and shoes.

It is compulsory to wear a name tag.

You must be present for the full duration of the practicals and punctuality is required.

You must look up the necessary references yourself in Moore 5/6 or other textbooks.

No other people or students apart from MBChB-students may have access to the practical locations.

LOCATIONS AND GROUPS

Consult the timetable in this study guide for your practical programme and practical locations.

The whole class (MB, ChB) will be divided into 2 groups for practical sessions in Anatomy.

Group A – mainly Afrikaans speaking group.


CARE OF THE CADAVER

You and the other group members are responsible for the care of the cadaver: after each practical session, you should wet the cadaver and cover it properly with wet flannel cloths and the plastic cover; clean and tidy up the area where you have been working.

DISSECTION PROGRAMME

Dissection of the body is carried out regionally and as far as possible in correlation with the lecture programme. This is not always practically possible. Guidance will be given to you as far as possible in the lectures and during practicals with regards expected dissection goals. If the work of a specific dissection instruction has not yet been discussed in the lectures, you must look up the relevant information independently in the meantime. When it is then dealt with later in the lectures, you have the advantage of already being familiar with this work. Dissection instructions are continuous and you should continue with your dissection programme to the end of the module.

Remember to take your dissection handbook as well as Moore 5/6 (OR other textbook) and Atlas to the dissection practicals. It is indispensable that you have these information sources close at hand for reference.

During the dissection programme, you will have the opportunity to name and identify the relevant structures (as listed under the Practical outcomes) on a cadaver or on an articulated skeleton (or on isolated bones).

Make use of the tables in Moore 5/6 (or other sources).

Dissect both limbs. The whole table will be penalized if any limb, or part of the limb, is not fully dissected.
Dissection instructions: Week 17

Grant’s Dissector: 13th Edition (pages 4-11); 14th Edition (p. 5-13).

- Study and identify the bony landmarks and surface anatomy of the vertebral column (as well as the characteristics of individual vertebrae in each area of the vertebral column).
- Remove the skin together with the superficial fascia.
- Dissect and study the extrinsic (superficial) muscles of the back: trapezius; latissimus dorsi; rhomboid major; rhomboid minor; levator scapulae; serratus posterior (superior; inferior).
- Study and dissect the intrinsic (deep) muscles of the back:
  - first layer: splenius capitis; splenius cervicis
  - second layer: erector spinae group (iliocostalis; longissimus; spinalis)
  - third layer: transversospinalis group (semispinalis; multifidus; rotatores)
- NB: you do not need to dissect the sub-occipital area.

Dissection instructions: Week 18


- Study and dissect the shoulder girdle area.
- NB: do not dissect the pectoral area, only reflect the muscles.
- Study and identify the surface anatomy of the upper limb (axilla; anterior axillary fold; posterior axillary fold; rounded shoulder area with deltoid muscle; grooves both sides of biceps brachii; cubital fossa with superficial veins; tendon of palmaris longus; styloid process of radius; styloid process of ulna; tenar eminence; hypothenar eminence; palmar folds).
- Study and identify the superficial veins of the arm as a whole (before dissection takes place).
- Study and identify the cutaneous nerves of the arm as a whole (before dissection takes place).
- Dissect and identify the superficial veins and cutaneous nerves.
- NB: do not waste unnecessary time looking for the cutaneous nerves.
- Remove the superficial fascia of the upper limb.
- Identify the bony landmarks on the scapula.
- Identify the bony landmarks on the proximal portion of the humerus.
- Study and dissect the walls of the axilla.
- Study and dissect the contents of the axilla.
- Study and dissect the upper arm and cubital fossa.
- Study and dissect the forearm.

Dissection instructions: Week 19


- Study and dissect the hand.
- Study the following joints: (in the museum)
  - shoulder joint
• elbow joint
• wrist joint

- Study the superficial veins of the lower limb (before starting the dissection).
- Study the cutaneous nerves of the lower limb (before starting the dissection).
- Dissect and identify the superficial veins and cutaneous nerves.
- NB: do not waste unnecessary time looking for the cutaneous nerves.
- Study and dissect the saphenous opening.
- Study and dissect the femoral sheath and the compartments thereof (and the contents of each compartment).
- Study and dissect the anterior compartment of the upper leg (thigh) with specific attention to the femoral triangle, adductor canal and muscles in the anterior compartment.
- Study and dissect the medial compartment of the upper leg.
- Study and dissect the gluteal area (give particular attention to important landmarks).
- Study and dissect the posterior compartment of the upper leg (thigh).
- Study and dissect the popliteal fossa.

Dissection instructions: Week 20


- Study and dissect the anterior compartment of the lower leg.
- Study and dissect the lateral compartment of the lower leg.
- Study and dissect the posterior compartment of the lower leg.
- Study and dissect the foot.
- Study (in the museum) the following joints:
  • hip joint
  • knee joint
  • ankle joint
- Complete dissection program.

PRACTICAL ASSESSMENT

The practical assessment (identification), which contributes 50% to your class mark, takes place on Friday 27 May 2011.

Students must meet at the correct times (see notice board, ground floor, Fisan Building) for the venue, group division of students and times.

PRACTICAL OUTCOMES

The following muscles should be studied with regards to the following aspects:

- areas where the muscles are situated
- name and identification
- main function(s)
- nerve supply
A. EXTRINSIC BACK MUSCLES (M5; 755; M6: 700-701)
1. Trapezius.
2. Latissimus dorsi.
3. Levator scapulae.
4. Rhomboid major.
5. Rhomboid minor.

B. INTRINSIC BACK MUSCLES (M5: 537-539; M6: 484-489)
1. Splenius (capitis; cervicis)
2. Erector spinae (iliocostalis; longissimus; spinalis)
3. Transversospinalis (semispinalis; multifidus; rotatores)
4. Interspinalis; intertransversarii; levator costarum

C. PECTORAL MUSCLES (M5: 752; M6: 698)
1. Pectoralis major
2. Pectoralis minor
3. Subclavius
4. Serratus anterior

D. SCAPULAR MUSCLES (M5: 755; M6: 704-705)
1. Deltoid.
2. Supraspinatous.
3. Infraspinatous.
4. Teres minor.
5. Teres major.

E. MUSCLES OF THE UPPER ARM (M5: 788-789; M6: 734-735)
1. Anterior compartment.
   i) Biceps brachii (long-head; short head)
   ii) Brachialis.
   iii) Coracobrachialis.
2. Posterior compartment.
   i) Triceps brachii (long head; medial head; lateral head)
   ii) Anconeus.

F. MUSCLES OF THE FOREARM
1. Anterior compartment (M5: 804-805; M6: 748-749).
   i) Pronator teres.
   ii) Flexor carpi radialis.
   iii) Palmaris longus.
   iv) Flexor carpi ulnaris.
   v) Flexor digitorum superficialis.
vi) Flexor digitorum profundus.

vii) Flexor pollicis longus.

viii) Pronator quadratus.

2. Posterior compartment (M5: 808-809; M6: 751-752).

i) Brachioradialis.

ii) Extensor carpi radialis longus.

iii) Extensor carpi radialis brevis.

iv) Extensor digitorum.

v) Extensor digiti minimi.

vi) Extensor carpi ulnaris.

vii) Anconeus.

viii) Supinator.

ix) Abductor pollicis longus] borders of

x) Extensor pollicis brevis] "anatomical

xi) Extensor pollicis longus] snuff-box"

xii) Extensor indicis.

G. INTRINSIC HAND MUSCLES

1. Tenar muscles (M5: 832; M6: 776)

i) Abductor pollicis brevis.

ii) Flexor pollicis brevis.

iii) Opponens pollicis.


3. Hypotenar muscles (M5: 833; M6: 777)

i) Abductor digiti minimi.

ii) Flexor digiti minimi (brevis).

iii) Opponens digiti minimi.


i) Lumbricales (4).

ii) Interossei:

   a) dorsal (4): DAB

   b) palmar (3): PAD

H. GLUTEAL AREA (M5: 609; M6: 564)

i) luteus maximus

ii) Gluteus medius

iii) Gluteus minimus

iv) Piriformis

v) Obturator internus

vi) Gemelli (superior and inferior)

vii) Quadratus femoris

I. UPPER LEG (‘THIGH’)

1. Anterior compartment (M5: 593-594; M6: 546-547)
i) Iliopsoas (Psoas major; Iliacus)
ii) Tensor fasciae latae (tensor or the fascia lata)
iii) Sartorius
iv) Quadriceps femoris:
   (a) Rectus femoris
   (b) Vastus lateralis
   (c) Vastus medialis
   (d) Vastus intermedius

2. Medial compartment (M5: 599; M6: 549)
i) Pectineus
   ii) Adductor longus
   iii) Adductor brevis
   iv) Adductor magnus
   v) Gracilis
   vi) Obturator externus

3. Posterior compartment (M5: 617; M6: 570)
i) Semi-tendinosus
   ii) Semi-membranosus
   iii) Biceps femoris

J. LOWER LEG ('LEG')

1. Anterior compartment (M5: 640; M6: 591)
i) Tibialis anterior
   ii) Extensor hallucis longus
   iii) Extensor digitorum longus
   iv) Peroneus tertius (Fibularis tertius)

2. Lateral compartment (M5: 640; M6: 591)
i) Peroneus longus (Fibularis longus)
   ii) Peroneus brevis (Fibularis brevis)

3. Posterior compartment
   3.1 Superficial group (M5: 648; M6: 597)
i) Gastrocnemius
   ii) Soleus
   iii) Plantaris
   3.2 Deep group (M5: 649; M6: 598)
i) Popliteus
   ii) Flexor hallucis longus
   iii) Flexor digitorum longus
   iv) Tibialis posterior
K. MUSCLES OF THE FOOT

1. Dorsum of foot (M5: 61; M6: 614)
   i) Extensor digitorum brevis
   ii) Extensor hallucis brevis

2. Sole of foot (M5: 659-660; M6: 612-613)
   2.1 First layer:
      i) Abductor hallucis
      ii) Abductor digiti minimi
      iii) Flexor digitorum brevis
   2.2 Second layer:
      i) Quadratus plantae (Flexor accessorius)
      ii) Lumbricales (4)
   2.3 Third layer:
      i) Adductor hallucis
      ii) Flexor hallucis brevis
      iii) Flexor digiti minimi brevis
   2.4 Fourth layer:
      i) Interossei:
         (a) plantar (3) : PAD
         (b) dorsal (4) : DAB

The following nerves should be named and identified:
1. cords (lateral; posterior; medial) of brachial plexus
2. terminal branches of brachial plexus (and the further course):
   • axillary nerve
   • radial nerve
   • musculo-cutaneous nerve
   • median nerve
   • ulnar nerve
3. femoral nerve
4. obturator nerve
5. sciatic nerve
6. common peroneal nerve (common fibular nerve)
7. superficial peroneal nerve (superficial fibular nerve)
8. deep peroneal nerve (deep fibular nerve)
9. tibial nerve
10. lateral plantar nerve
11. medial plantar nerve

The following areas should be studied with regards to
   • borders/walls; apex; base; roof; floor (true or relative)
   • contents
1. axilla (M5; 763; M6: 713)
2. cubital fossa (M5; 793; M6: 739)
3. femoral triangle (M5; 600; M6: 551)
4. adductor canal (M5; 607; M6: 556)
5. popliteal fossa (M5; 632; M6: 584)

The following arteries should be named and identified:
1. axillary artery
2. brachial artery
3. radial artery
4. ulnar artery
5. palmar arterial arches (superficial; deep)
6. superior gluteal artery
7. inferior gluteal artery
8. external iliac artery
9. femoral artery
10. popliteal artery
11. anterior tibial artery
12. posterior tibial artery
13. dorsalis pedis artery (dorsalis pedis artery; dorsal artery of foot)
14. lateral plantar artery
15. medial plantar artery

The following veins should be named and identified:
1. axillary vein
2. cephalic vein
3. basilic vein
4. median cubital vein
5. dorsal venous network (on dorsum of hand)
6. external iliac vein
7. femoral vein
8. popliteal vein
9. venae comitantes (in lower leg; runs with anterior and posterior tibial arteries)
10. vena saphena magna (great saphenous vein)
11. vena saphena parva (small saphenous vein)
12. dorsal venous arches (on dorsum of foot)

The following structures should be named and identified (the meaning of the terms should be explained):
1. palmar aponeurosis (thickened central portion of palmar fascia)
2. flexor retinaculum
3. extensor retinaculum
4. fascia lata (deep fascia of the upper leg)
5. ilio-tibial tract (thickened deep fascia on the lateral side of the upper leg)
6. menisci (lateral; medial): fibro-cartilagenous flat discs at the knee joint
7. tibial collateral ligament (medial collateral ligament)
8. fibular collateral ligament (lateral collateral ligament)
9. patellar ligament  
10. anterior cruciate ligament  
11. posterior cruciate ligament  
12. deltoid-ligament (medial ligament of ankle joint)  
13. lateral ligament (of the ankle joint)  
14. plantar aponeurosis (thickened central portion of plantar fascia)

**NB:**

- the cruciate ligaments of the knee are situated **intracapsular** but **extra-synovially** (M5: 690; M6: 636: “the cruciate ligaments join the femur and tibia, criscrossing **within** the articular capsule of the joint but **outside** the synovial cavity”)
- the deep fibres of the tibial collateral ligament is **firmly attached** to the medial meniscus while the fibular collateral ligament is **not attached** to the lateral meniscus (M5: 691 fig 5.60 B; M6: 637 fig 5.87 B)
THEME 6: BONE AND CARTILAGE

AIM OF THE THEME

At the end of this theme, you should be able to identify, describe and draw the different types of bone and cartilage, as well as being able to explain the development and growth of bone and cartilage.

OVERVIEW OF THE THEME

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THEME 6: BONE AND CARTILAGE

SESSION 1-4: LECTURES

OUTCOMES

At the end of this session, you should be able to do the following:

1. Make annotated line drawings of a cross-section and a longitudinal section through a long bone in order to show the histology.
2. Briefly name the components of bone matrix, and explain how the collagen fibres are arranged.
3. Name three types of cartilage, and describe their histology and the composition of the matrix of each type of cartilage.
4. Describe the growth and nutrition of cartilage.
5. Describe membranous bone formation.
6. Annotate a diagram of endochondral bone formation.
7. Explain how and why (with examples) the remodelling of bone occurs.
RESOURCES

1. Class notes
2. Functional Histology, 4th or 5th edition

ANYTHING SPECIFIC YOU SHOULD DO?

_session 1-4: Lectures_

You will receive class notes: "The histology of bone and cartilage" which will be available on Web CT at the end of the day.

THEME 6: BONE AND CARTILAGE

SESSION 5:

PRACTICAL

OUTCOMES

At the end of this session, you should be able to do the following:

1. Identify and draw hyaline cartilage and elastic cartilage under the microscope.
2. Identify and draw bone tissue under the microscope.
3. Differentiate between bone tissue and hyaline cartilage under the microscope.

RESOURCES

1. Your theoretical notes
2. Functional Histology, 2006 OR 2000
3. Practical notes

ANYTHING SPECIFIC YOU SHOULD DO?

_session 5 (2 periods): Practical_

1. You will see a demonstration at the practical that will assist you in identifying and drawing the tissues.
2. Bring the following items with you:
   a) Your theoretical notes
   b) Functional Histology.
3. The practical notes will be available in the Histology laboratory.
4. In the practical test at the end of the module, you will be required to identify tissues/structures/cells from this practical work under the microscope.

Half of the MB, ChB-class will be busy in the histology laboratory while the other half will be busy with Anatomy practical. Thereafter the two groups will swap. Please see the timetable details.
You will get the most from this activity if you have already mastered the information on bone and cartilage from the previous sessions.

**THEME 6: BONE AND CARTILAGE**

**SESSION 6: TUTORIAL ON THE COMPUTER**

**OUTCOMES**

At the end of this session, you should be able to do the following:

1. Work through the tutorial “Bone and cartilage” and give all the labels correctly.
2. Identify the different tissues/structures/cells in the tutorial.
3. Use the tutorial for revision before the practical test.

**RESOURCES**

1. Notes (practical and theory)
2. Study guide (NB: Study guide contains instructions for computer work!)

**ANYTHING SPECIFIC YOU SHOULD DO?**

Session 6 (1 period): self study (own time)

**TUTORIAL IN GERGA**

**INSTRUCTIONS** N.B. If you are sharing a computer, BOTH people must type in their student numbers and answer the questions, to get a mark. See point 15.

1. Sign on as usual.
2. Double click on “My computer” icon.
3. Under “Network drives” at the bottom, double click on “Studente on Tygdept”
5. A number of files appear, look for “Menu.exe” A red icon. (NOT Fmenu.exe or any others) WAIT for the icon to change colour to red (a few seconds).
6. Double click on menu.exe.
7. A list appears which gives access to tutorials.
8. Click **ONCE** on “Bone & Cartilage” to open a tutorial. You do only that one. N.B.: Do NOT click a second time. The tutorial takes a while to open, and if you click again, it tries to open twice, which takes MUCH longer!
9. The program sometimes gives a warning: “Menu is a read-only file in DOS…”. Click on OK, this is just a program check.
10. The program will ask your initials. Type in your initials (any initials, we do not keep a record of this entry), then the tutorial will open.
11. You use the tutorial by clicking on "NEXT". That will allow the next screen to appear.
12. There is a screen where you must type in your student number. Important! This tells us you have done the tutorial!
13. Click once at any point on the screen (but not on existing text or photo) for a label to appear. Click again for the next label, etc.
14. There are questions at the end, click on the purple block next to the correct answer, then on "Done" and "next".
15. DO NOT page back and forth in between the questions. If you do, your marks will not appear correctly. Do all the questions in the correct order and get your mark. After that, you may page back and forth. The last screen gives the marks for the questions. Click on "Score Quiz", and your mark will appear. (If you are sharing a computer, click "return to list", and click on the tutorial as before, then the second person can type in his/her student number and do the questions right away, to get a score.)
16. When you have got your score, click "Return to list", and the main list will appear again. Click on "exit" to leave the program.

**SUMMARY:** Double click: My computer - Studente on Tygdept - Anatomie-Toolbook-Menu.exe

**ONE click:** "Bone & Cartilage".
THEME 7: MUSCULAR ACTIONS

AIM OF THE THEME

At the end of the theme, you should be able to understand how muscles work with the aim of bringing about controlled movements.

OVERVIEW OF THE THEME

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<td>09/05/2011 09:00</td>
<td>Venue B</td>
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<td>Mr D van Vuuren</td>
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</table>

THEME 7: MUSCULAR ACTIONS

SESSIONS 1-4: MUSCULAR ACTION

OUTCOMES

At the end of these sessions, you should be able to do the following:

1. Explain what is meant by concentric, isometric and eccentric contraction of skeletal muscle.
2. Distinguish between the factors that determine whole muscle work; including the importance of active and passive elements, muscle fiber type and recruitment.
3. Have an understanding of the relationships between the tension generated by a muscle, the load on that muscle and the work eventually done by that muscle.
4. Understand the musculoskeletal system in terms of a lever and fulcrum system.
5. Discuss factors involved in the regulation of movement; including the importance of agonist and antagonist muscle pairs, as well as mono- and bi-articular muscles.

RESOURCES

- Class notes and your own annotations are the most important sources of knowledge for this theme. It is thus advisable to attend these sessions!
- Silverthorn, Chapter 12: 324-326; 341-348.
**ANYTHING SPECIFIC YOU SHOULD DO?**

**Sessions 1-4: Lectures**

Before the lecture: Please revise Cell and Tissue, Theme 5 (The cellular basis of muscle function): the crossbridge cycle in skeletal muscle, and the meaning of "motor units". This information is also available on CD-Rom in GERGA. The program's name is "Essentials of Human Physiology". Watch Portion II (Muscle Physiology), Chapter 4, 2nd part ("The crossbridge cycle"). Watch especially the animation of the crossbridge cycle (Click on the last icon on the page).

**After the lecture**

a. Supplement you class notes from the available resources.

b. Try and complete all the outcomes.

**Very important!**

You are reminded of the self-assessment questionnaire handed out during week 6. This contains TRUE/FALSE questions muscular action (Theme 7).

NB: This self-assessment will contribute to your assessment during the module. Ensure that you answer all the questions and that you hand in your answer sheet in good time.

You can prepare for the question paper by completing the self-assessment questions that follow.

**Questions 1 - 29 are “right or wrong” questions. Check the answers with your class notes and class mates.**

<table>
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<tbody>
<tr>
<td>1. The mechanical tension in the activated muscle fibres of the arm used to hold postcard (1 g) in front of the eyes (in order to read it), is the same as the tension in the activated muscle fibres used to hold a heavy physiology textbook (1,5 kg) in front of the eyes. Assume that the arm in both cases is in exactly the same pose.</td>
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<tr>
<td>2. To lift up a postcard, more muscle fibres in the musculus biceps (of the upper arm) are activated, than when the postcard is held still in front of the eyes (in order to read it).</td>
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<tr>
<td>3. To place a postcard down on a table (after you have read it), activate skeletal muscle fibres in the musculus triceps (of the upper arm).</td>
<td></td>
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<tr>
<td>4. When a person places a heavy, iron hammer very carefully down on a glass table, the musculus biceps (of the upper arm) contracts eccentrically. Assume that the action is brought about by extension of the elbow. No other movement of the arm occurs. The hammer is placed down on the table in such a way that the glass top is not damaged.</td>
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</table>
5. When a person uses a hammer to hit a nail in a horizontal block of wood, then the musculus triceps (of the upper arm) contract concentrically. Assume that the hitting movement (i.e. the power shot) is carried out by extension of the elbow alone. Ignore the action whereby the hammer is lifted up, away from the nail. The nail sits vertically (upwards) in the horizontal block of wood.

6. More active muscle fibres in the quadriceps femoris muscle are used when a person quickly climbs off a ladder than when the person climbs off slowly. The musculus quadriceps femoris is the muscle that provides the most power when climbing a ladder. This question refers to the activity of the quadriceps, only while the foot is on the crossbar of the ladder - not while the legs move from one crossbar to the other.

7. The tension/load per activated skeletal fibre used to push an Olympic weight (7.26 kg iron ball), is greater than the tension/load per activated skeletal fibre used to hold a postcard (without letting it move). Assume that the muscle fibres used for the two activities have exactly the same characteristics. Assume that the person attempts to push the 7.26 kg weight as far as possible. Take note: this deals with the load PER ACTIVATED MUSCLE FIBRE (not the load on the whole muscle).

8. More muscle fibres are activated in the gluteus maximus muscle for sprinting than for jogging. This involves the times when the gluteus maximus is shortened during extension of the hip. Assume that both occur on an even road in the absence of wind.

9. More muscle fibres are activated in the musculus biceps when picking up a heavy case (10 kg), than picking up a ping-pong ball at the same tempo. Assume that the m. biceps is responsible for both these movements.

10. The load per activated skeletal fibre is the same when the musculus biceps is activated to pick up a heavy case (10 kg) than picking up a ping-pong ball at the same tempo. Assume that the m. biceps is responsible for both these movements.
The following questions (11-20) refer to the following situation:
A beaker is lifted to the mouth with the right arm, and then placed down again carefully on the table. The lifting and placing down of the beaker consists of exactly the same movements of the arm, but in opposite directions. The movement of the arm consists mainly of flexion and extension of the elbow.

11. When a beaker is lifted up, the right musculus biceps contracts isometrically.
12. When a beaker is lifted up, the right musculus triceps contracts concentrically.
13. When a beaker is lifted up, the load per activated fibre in the right musculus biceps is less than when the beaker is placed down.
14. When a beaker is lifted up slowly, the load per activated fibres in the right musculus biceps is less than when the beaker is lifter up rapidly.
15. When a beaker is lifted up slowly, the number of activated fibres in the right musculus biceps is less than when the beaker is lifter up rapidly.
16. When the beaker is put down slowly, the right musculus triceps contracts concentrically.
17. When the beaker is put down slowly, the right musculus biceps contracts eccentrically.
18. More muscle fibres are activated in the biceps when the beaker is lifter up than when it is placed down.
19. More muscle fibres are activated in the biceps when the beaker is put down quickly than when it is placed down slowly.
20. When the beaker is put down slowly, fewer muscle fibres are activated in the right musculus triceps than in the right musculus biceps.

Assume that the muscle fibres in both muscles are the same length and thickness, and contain the same number of myofibrils per cell.

The questions 21-29 refer to the following situation:
A person holds a pencil (10 g) in the right hand, and a 10 kg iron ball in the left hand. The objects are moved up and down by flexion and extension of ONLY the elbow. Both arms are moved at exactly the same way.

Assume that the skeletal muscles in the two arms have the same composition and characteristics. Ignore the influence of friction and the mass of the arms themselves.

21. If both objects are held still (no movement), with the elbow in 90º flexion, then the load per activated fibre is exactly the same in the musculus biceps of both arms.
22. If both objects are lifted up slowly (both at 0.10 meters per second), then the number of fibres activated in the left m. biceps is exactly 1000 times higher than in the right arm.
23. If both objects are lifted up quickly (both at 1.0 meters per second), then the number of fibres activated in the left m. biceps is exactly 1000 times higher than in the right arm.
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<tr>
<td>24.</td>
<td>If both objects are placed down slowly (both at 0.10 meters per second), then the m. triceps in the right arm contracts concentrically.</td>
</tr>
<tr>
<td>25.</td>
<td>If both objects are placed down slowly (both at 0.10 meters per second), then the m. triceps in the left arm contracts eccentrically.</td>
</tr>
<tr>
<td>26.</td>
<td>If both objects are placed down slowly (both at 0.10 meters per second), then the m. biceps in both arms relax completely (i.e. no active muscle fibres). Ignore muscle “tone” (the background activity that occurs in normal healthy skeletal muscles of awake people).</td>
</tr>
<tr>
<td>27.</td>
<td>If all the skeletal muscle fibres in the m. biceps of both arms are activated, then the right hand will ascend faster than the left-hand.</td>
</tr>
<tr>
<td>28.</td>
<td>Isometric contraction of the m. biceps of both arms will enable the right hand to rise, while the left hand drops.</td>
</tr>
<tr>
<td>29.</td>
<td>If the load per activated muscle fibre in the m. biceps of both arms is exactly $P_0/3$ (one-third of isometric tension), then the right hand will rise slower than the left hand.</td>
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NEURO SCIENCES SESSIONS

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NEURO SCIENCES

SESSION I: ANATOMY OF THE SPINAL CORD

OUTCOMES

After completion of this session, you should be able to do the following:

1. Describe the embryological development of the spinal cord.
2. Name the regions of the spinal cord.
3. Describe the position, relations and coverings of the spinal cord.
4. Differentiate between the different parts of the spinal cord on a transverse section at the level of C5, T5 and L5, respectively.
5. Name and demonstrate the position of the afferent and efferent nerve pathways in the spinal cord.
6. Describe the elements and course of the somatosensory pathways.
7. Describe the elements and course of the descending nerve pathways.
8. Name the elements of the grey matter horn, as well as which body parts are represented by each.
9. Describe a dermatome and the dermatomal pattern of the body.
10. Discuss a few spinal cord lesions.
RESOURCES
Netter: 148 - 151, 155 - 159.

ANYTHING SPECIFIC YOU SHOULD DO?

Session 1: Lecture
Only a few of the outcomes will be covered in the lecture. The study of the remaining subjects is your responsibility.

Directed self-study
Test and examination questions will be taken from the following:

1. Discuss/describe the anatomy of the spinal cord. (10)
2. Discuss/describe the anatomy of a dermatomal segment. (10)
3. Discuss/describe the architecture of the cutaneous nerve supply of the body. (10)
4. Make sketches (with captions) to distinguish the structure of the spinal cord at the level of C5, T5 and L5. 3 x 3 = (9)
5. Describe the blood supply of the spinal cord (10)

NEURO SCIENCES

SESSION 2: SPINAL CORD

OUTCOMES
At the end of this session, you should be able to do the following:

Give a definition/short description of the following:

1. Spinal shock
2. Chronic spinal cord compression
3. Cauda equina syndrome
4. Conus medullaris syndrome
5. Brown-Sequard syndrome
6. Anterior spinal arterial syndrome
7. Syringomyelia
8. Myeloradiculopathy: cervical spondylosis
SESSION 3: TRAUMA OF THE SPINAL CORD

OUTCOMES

Spinal Injuries
At the end of this session, you should be able to do the following:

1. Describe the clinical picture of:
   1. Hemisection of the spinal cord.
   2. Total damage of the spinal cord.
   3. Partial damage of the spinal cord.
   4. Compression of the spinal cord.

2. Describe the management of spinal cord injury.
3. Describe the management of spinal cord compression.

PATHOLOGY OF TRAUMA OF THE SPINAL CORD

OUTCOMES

At the end of this session, you should be able to do the following:

1. Briefly describe the pathology and basic differences between an open and closed injury of the spinal cord.
2. List and briefly describe the late consequences of damage to the spinal cord.
3. List the main causes of pressure on the spinal cord and nerve-roots.
4. Define the term syringomyelia and briefly describe the possible pathogenetic mechanisms.

RESOURCES

1. Class notes
3. Web CT:
   • WWW lectures
   • PowerPoint case presentations
   • Questions/Answer case presentations
   • MCQ’s for self-assessment.
4. Examples in the Pathology Museum of the 4th Floor.
At the end of this session, you should be able to do the following:

1. Define the terms axonal (Wallerian) degeneration, distal axonal degeneration, and segmental demyelination.
2. Define the terms mononeuropathy, mononeuritis multiplex and polyneuropathy.
3. Draw a diagram to illustrate the different levels of involvement in myopathic and neurogenic muscle weakness.
4. Give a basic classification of the most important primary conditions that can result in muscle weakness.
5. Make a list of the most important causes of compression of the spinal cord and the nerve roots.

**RESOURCES**

1. Class notes

**BACKGROUND KNOWLEDGE**


**Lecture with opportunity for discussion**

PowerPoint illustrated lecture with an opportunity for questions - attend the lecture and make supplementary notes to your textbook. The lecture will deal with basic concepts and illustrate the importance of the role of muscle biopsies in the diagnosis of neuromuscular disease.
SESSION 5: ANATOMY OF THE PERIPHERAL NERVOUS SYSTEM

OUTCOMES

After completion of this session, you should be able to do the following:

1. Name the elements of a spinal nerve.
2. Name the elements and describe the course of the nerves making up a dermatome.
3. Name the elements of and describe myotomes.
4. Have knowledge of the elements making up each of the plexuses.
5. Describe the formation of the sympathetic chain from the spinal cord.
6. Describe the structure of the cervical plexus.

RESOURCES

DeMeyr: 67-91.

ANYTHING SPECIFIC YOU SHOULD DO?

Lecture

Only a few of the outcomes will be dealt with in the lecture. The study of the remaining subjects is your responsibility.

Directed self-study

Test and examination questions will be taken from the following:

1. Discuss/describe the concept of a dermatome (10)
2. Discuss/describe the anatomy of the cervical plexus (10)
3. Discuss/describe the anatomy of the brachial plexus (10)
4. Discuss/describe the anatomy of the lumbo-sacral plexus (10)

SESSION 6: MUSCLE DISEASE/PROXIMAL WEAKNESS

OUTCOMES

At the end of this session, you should be able to do the following:
1. Describe the differential diagnosis of global weakness.
2. Indicate how the disease conditions that involve the anterior horn cell, nerves, neuromuscular junctions and muscle can be distinguished from one another.
3. Describe the pathophysiology of inflammatory muscle disease.
4. Describe the pathophysiology of the muscular dystrophies.
5. Describe the pathophysiology of metabolic disorders affecting muscle.
6. Describe further special investigations relevant to diseases affecting muscle.
7. Make a list of the different acute processes that can involve muscle.
8. Make a list of the different chronic processes that can involve muscle.

---

### SESSION 7: PERIPHERAL NEUROPATHY

At the end of this session, you should be able to do the following:

1. Describe the differential diagnosis of global distal weakness.
2. Indicate how the disease conditions that involve the anterior horn cell, nerves, neuromuscular junctions and muscle can be distinguished from one another.
3. Describe the pathophysiology of distal length-dependent polyneuropathy.
4. Describe the pathophysiology of the random demyelination of the peripheral nerves.
5. Describe the pathophysiology of random axonal damage to the peripheral nerves (mononeuritis multiplex).
6. Describe further special investigations relevant to diseases affecting the peripheral nerves.
7. Make a list of the different acute processes that can involve peripheral nerves.
8. Make a list of the different chronic processes that can involve peripheral nerves.

---

### SESSION 8: ANATOMY, PHYSIOLOGY & CLINICAL FEATURES OF THE AUTONOMIC NERVOUS SYSTEM

At the end of this session, you should be able to do the following:

Discuss

1. Anatomical structures that make up the sympathetic and parasympathetic systems
2. Understand the various neurotransmitters involved in the autonomic nervous system
3. The clinical picture of syncope
4. The causes of syncope
**NEURO SCIENCES**

**SESSION 9: PHARMACOLOGY OF NEUROPATHIC PAIN**

**OUTCOMES**

At the end of this session you should be able to do the following:

1. Define neuropathic pain.
2. Describe the symptoms of neuropathic pain.
3. Name the drugs used in the management of neuropathic pain.
4. Describe the major adverse effects of and safety monitoring required for each of the above drugs.

**SESSION 10: LOCALISATION OF A LOWER MOTOR NEURON (LMN) LESION**

**OUTCOMES**

At the end of this session, you should be able to do the following:

1. Define the motor unit.
2. List the clinical characteristics of a lesion of the anterior horn cell, motor nerve, neuromuscular junction and muscle.
3. Make a sketch of the dermatomes of:
   a. The arm
   b. The torso
   c. The leg
4. Describe the root innervation of the following muscles:
   a. Deltoid
   b. Biceps
   c. Brachioradialis
   d. Triceps
   e. Quadriceps
   f. Tibialis anterior.
5. Describe the physiology of nerve repair, and a classification of the types of injury.
6. Describe the characteristics of the following:
   a. Carpal tunnel syndrome.
   b. Ulnar neuropathy
   c. Radial nerve paralysis
   d. Peroneal neuropathy

**RESOURCES**

1. Web CT: HTML tutorial: "Lower Motor Neuron"
2. Class notes
OUTCOMES

At the end of this session you should be able to do the following:

1. Describe the efferent nervous system with regards to its role in the transmission of messages from the brain (integrating centre) to the effector organs. Make specific reference of the two components of the efferent nervous system, namely the somatomotor neurons and the autonomic neurons.
2. Revise the physiology and function of events in a typical synapse. Pay special attention to the concepts presynaptic, postsynaptic, synaptic cleft and neurotransmitters.
3. Give a classification of the most important neurotransmitters in the body.
4. Define the concept autonomic as it is used in the term autonomic nervous system.
5. Explain why the autonomic nervous system van be viewed as a classical homeostatic control system.
6. Give a list of the most important effector organs / target tissues of the autonomic nervous system.
7. Explain the basic differences and similarities between the two sub-sections of the autonomic nervous system, namely sympathetic and parasympathetic.
8. Briefly explain the autonomic control of cardiac function and blood pressure in the body.

RESOURCES

AIM OF THE THEME

The main aim of this theme is to prepare you for taking a useful clinical history and for performing an appropriate clinical examination of the musculoskeletal system.

You should also be able to perform a complete, thorough and relevant clinical examination of the upper limbs, lower limbs and the spinal cord, and be able to distinguish the normal appearance, posture, movement and stability from physiological, age and pathological anomalies. You should be able to identify abnormal gaits and clinically evaluate differences in bone length. You must know the basic principles of the examination of a joint in general.

OVERVIEW OF THE THEME

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<td>Clinical Examination of the Hip and Knee joint</td>
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<td>Examination of the Foot and Ankle</td>
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AIM OF THE THEME

During this theme, we will build on your knowledge of terminology acquired during the Phase II module on the Musculoskeletal system. You will learn additional terminology that will describe the most common musculoskeletal anomalies, and this will enable you to communicate accurately with colleagues.

OUTCOMES

At the end of this session, you should be able to do the following:
1. Describe the normal posture, appearance and movements of the musculoskeletal system.
2. Recognize and describe the common musculoskeletal anomalies.

ANYTHING SPECIFIC YOU SHOULD DO?

1. Read through the piece of work, and complete by referring to Dorland’s Medical Dictionary and the Module: The Musculoskeletal System of Phase II

RESOURCES

1. Dorland’s Medical Dictionary
Epiphysis:
Eversion:
Physis:
Flexion:
Gon-arthrosis:
Hallux:
Internal rotation:
Inversion:
Involucrum:
Kyphosis:
Lysis:
Lordosis:
Metaphysis:
Metatarsalgia:
Olistesis:
Osteitis:
Osteochondritis:
Osteochondrosis:
Osteolysis:
Osteosclerosis:
Osteophyte:
Osteomalacia:
Osteomyelitis:
Osteoclasts:
Osteotomy:
Plantar flexion:
Planus:
Pollux:
Procurvatum:
Pronation:
Recurvatum:
Sequestrum:
Circumduction:
Sclerosis:
Scoliosis:
Spondylolysis:
Spondylolisthesis:
Spondylosis:
Supination:
Torticollis:
Valgus:
Varus:
THEME 8: PHYSICS AND BIOMECHANICS

SESSION 2:
PHYSICS AND BIOMECHANICS

OUTCOMES

At the end of this session, you should understand:
1. Lever systems and how the skeletal system uses them.
3. Biomechanics of Musculoskeletal structures. Characteristics of structures under load. Loading of bone and soft tissue how these may fail - fractures, ligament rupture etc.
5. Implant materials and how they may fail in the body.
6. Nuclear physics. The periodic table and atomic numbers. Isotopes and how they are used in medicine. The dangers of irradiation to the patient and doctor.

RESOURCES

THEME 8: CLINICAL EXAMINATION METHODS

SESSION 3:
LINEAR AND ROTATIONAL DEFORMITIES OF THE LIMBS, GAIT, DIFFERENCES IN BONE LENGTH AND THE EXAMINATION OF A JOINT

OUTCOMES

At the end of this session, you should be able to do the following:
1. Name the most common linear and rotational deformities of the limbs.
2. Name and describe the 4 most common anomalies of gait of patients, and recognize each on a video.
3. Name the causes of an apparent difference in bone length.
4. Be able to evaluate painful and limited active and passive movement of a joint.
5. Evaluate a swollen joint clinically and distinguish between an effusion and a synovitis.
RESOURCES
1. Clinical Orthopaedic Examination McRae, Page 1
2. Orthopaedic Assessment Video Cassette, US Library, WE 141 Ort
3. Physical examination of the spine and extremities Stanley Hoppenfeld
4. Pecutra gaits / Buckanon MFG WE103BUC US Library

ANYTHING SPECIFIC YOU SHOULD DO?

Lecture
This lecture and demonstration demonstrates the clinical methods associated with the examination of a joint, including normal movement and stability, and distinguishing this from a pathological process. The clinical evaluation of differences in bone lengths, normal gait and anomalies thereof, as well as rotational and linear deformities of the limbs will also be discussed.

Please complete the assignment that was given to you during the session.

THEME 8: CLINICAL EXAMINATION METHODS
SESSION 4:
PAIN STAGING, MUSCLE POWER, SPASTICITY, MYOTOME INNERVATION, DERMATOME INNERVATION, LMN LESION AND UMN LESION

OUTCOMES
At the end of this session, you should be able to do the following:
1. Explain how the musculoskeletal system is graded.
2. Grade muscle power according to the Oxford scale.
3. Grade muscle spasm according to the Ashworth scale.
4. Describe/sketch the neurological innervation of the myotomes of the limbs.
5. Describe/sketch the sensory innervation of dermatomes.
6. Explain how to distinguish clinically between an upper and lower motor neuron lesion.

RESOURCES
- Clinical Orthopaedic Examination McRae, Page 13
- Apleys System Of Orthopaedics And Fractures Page 194, 4
- Orthopaedic Physical Assessment. D Magee 3rd Edition Pages 21, 24

THING SPECIFIC YOU SHOULD DO?

Self-study
The aim of this self-study is to give you a good perception of the degree of pain that your patients experience, as well as the quantification thereof and the degree of morbidity. You must also be able to quantify power and spasm of muscles for the purpose of follow-up documentation.
In addition, you should be able to localize neurological lesions anatomically by means of a good peripheral limb examination.

**THEME 8: CLINICAL EXAMINATION METHODS**

**SESSION 5:**

**EXAMINATION OF THE NECK AND SHOULDER**

**OUTCOMES**

At the end of this session, you should be able to do the following:

1. Explain how to examine normal movements of the neck.
2. Perform an appropriate neurological and vascular examination of the upper limbs.
3. Demonstrate how to examine normal movements of the shoulder girdle and explain how to identify limited movement.
4. Describe the clinical tests to identify rotator cuff tears and shoulder tightness.
5. Explain how to differentiate between glenohumeral and scapulo-thoracic movement.
6. Explain how to clinically evaluate stability of the shoulder joint.

**RESOURCES**

1. Clinical Orthopaedic Examination McCrae – The shoulder Page 41
   The cervical spine Page 27
4. Orthopaedic Physiotherapy Video cassette: The Examination Of The Shoulder WE810WIN US Library
5. Examination Of The Shoulder/Kelly IG, WE810KEL, US Library

**ANYTHING SPECIFIC YOU SHOULD DO?**

**Lecture**

The objective of this session is to assist you in taking an appropriate medical history and performing a basic, useful clinical examination in order to identify and differentiate between conditions of the neck and shoulder.

A lecture demonstration will be presented on the clinical examination methods of the neck and shoulder girdle. In preparation therefore you should review the osteology of the neck Phase II, Theme 2, Session 1 and Phase II, The Musculoskeletal System, Theme 4.

Please complete the assignment that was supplied to you.
OUTCOMES

1. Basic embryological development of the spinal column.
2. Normal development of the spinal column.
3. Basic anatomy of the disc ligaments, blood and nerve supply.
4. Pathological conditions such as disc and vertebral pathology, lordosis and scoliosis.
5. Traumatic conditions such as fractures and the relevant biomechanics thereof.
6. Muscles and their actions.

The above will serve as a background for the interpretation of pathological conditions, symptomatology, as well as use of the findings to make a diagnosis.

RESOURCES

Dorland's medical dictionary

ANYTHING SPECIFIC YOU SHOULD DO?

Lectures, Directed Self-study and Practicals

During the lectures, selected aspects involving the vertebral column will be explained and demonstrated to you.

During the directed self-study, you should consult your resources in order to study specific aspects of the vertebral column (see self-study).

During the practicals (on muscle groups), you will also have the opportunity to study the relevant aspects of the vertebral column.

Self-study

1. Revise die osteology of the vertebrae in general as well as the regional characteristics (M5: 81-82; 482-493; 547-552; 1047; M6: 76; 443-451; 495; 855).
2. Name the two parts of the intervertebral disk.
3. List all the ligaments playing a role in stabilising the vertebral column.
4. List, classify and identify all the joints of the vertebral column.
5. List all the movements of the vertebral column.
6. Name and identify the following ligaments (indicate the position of the following ligaments on an articulated skeleton, on isolated vertebrae, on pictures or drawings):
   - anterior atlanto-occipital membrane (ligament) (M5: 508 fig 4.15 A; M6: 469 fig 4.21 A)
• posterior atlanto-occipital membrane (ligament) (M5; 508 fig 4.15 B; M6: 469 fig 4.21 B)
• anterior atlanto-axial membrane (ligament) (M5; 508 fig 4.15 A; M6: 469 fig 4.21 A)
• posterior atlanto-axial membrane (ligament) (M5; 508 fig 4.15 B; M6: 469 fig 4.21 B)
• tectorial membrane
• alar ligaments ("check ligaments") (M5; 507 fig 4.14 A; M6: 468 fig 4.20 A)
• ligamentum nuchae (M5; 505 fig 4.12 A; M6: 468 fig 4.20 A)
• transverse ligament of atlas (M5; 507-508 fig 4.14 A, B, C; M6: 468-469 fig 4.20 A, B, C)
• anterior longitudinal ligament (M5; 501 fig 4.11; M6: 466 fig 4.17)
• posterior longitudinal ligament (M5; 505 fig 4.12 B; M6: 467 fig 4.18 B)
• ligamentum flavum (M5; 501 fig 4.11; M6: 466 fig 4.17)
• supraspinous ligaments (M5; 505 fig 4.12 B; M6: 467 fig 4.18 B)
• interspinous ligaments (M5; 505 fig 4.12 B; M6: 467 fig 4.18 B)
• intertransverse ligaments (M5; 505 fig 4.12 B; M6: 467 fig 4.18 B)

NB:

• anterior atlanto-occipital membrane: runs from the anterior border of foramen magnum to the anterior arch of C1 (M5; 508 fig 4.15 A; M6: 469 fig 4.21 A)
• posterior atlanto-occipital membrane: runs from the posterior border of foramen magnum to the posterior arch of C1 (M5; 508 fig 4.15 B; M6: 469 fig 4.21 B)
• anterior longitudinal ligament: runs on the anterior surface of the body of the vertebrae (from the occipital bone to the sacrum)
• posterior longitudinal ligament: runs on the posterior surface of the body of the vertebrae from C2 to the sacrum (thus this ligament is situated inside the vertebral canal)
• tectorial membrane: reaches from the occipital bone to C2 (continues further as the posterior longitudinal ligament)
• ligamentum nuchae: runs from the occipital bone on the spinous processes to C7 (continues under C7 further as the supraspinous ligaments)
• supraspinous ligaments: from spinous process of C7 to sacrum
• ligamentum flavum: runs vertical from the lamina of one vertebra to the lamina of the following vertebra (and thus forms part of the posterior wall of the vertebral canal) (M5; 501 fig 4.11, 505; M6: 466 fig 4.17)
• cruciate ligament: this cruciate ligament is formed by the transverse ligament of the atlas and two longitudinal bands (superior longitudinal band and inferior longitudinal band): the superior longitudinal band runs upwards from the transverse ligament and attaches to the occipital bone; the inferior longitudinal band runs downwards from the transverse ligament and attached to the body of C2 (M5; 507 fig 4.14 A; M6: 468 fig 4.20 A).
OUTCOMES

At the end of this session, you should be able to do the following:
1. Describe the normal contour, as well as the extent of movement, of the thoracolumbar spine.
2. Describe how to measure chest wall expansion and explain what the loss thereof means.
3. Explain the importance of the pelvic tilt.
4. Describe how to identify a kyphosis and explain the importance thereof.
5. Describe how to identify scoliosis and explain the importance thereof.
6. Describe how to clinically evaluate the neurological and vascular components of the lower limbs.
7. Describe how to examine the sacro-iliac joints.

RESOURCES

1. Clinical Orthopaedic Examination McCrae - The Thoracic And Lumbar Spine Page 113
2. Routine Examination Of Joints. Video 5 - The Spine/Holland CD WE544HOL, US Library
3. Orthopaedic Physiotherapy: Examination Of The Lumbar Spine WE750WIN, US Library

ANYTHING SPECIFIC YOU SHOULD DO?

The objective of this session is to assist you in taking an appropriate medical history and performing a basic, useful clinical examination in order to identify and differentiate between conditions of the thoracolumbar spinal column.

Before starting this session, you should review the functional anatomy of the spinal cord.

Lecture demonstration

During this session, the normal contour and normal movements of the thoracic vertebrae will be demonstrated. Anomalies of posture and deformities, such as scoliosis and kyphosis, will be discussed.

At the end of this session, you must complete the assignment with the help of the lecturer.
SESSION 8: 
APPLIED NEUROLOGY OF THE UPPER EXTREMITY

OUTCOMES
1. The physiology of nerve repair and a classification of the types of injury.
2. Chronic nerve entrapment syndromes and common sites for these in the upper limb.
3. An understanding of movement patterns in the upper limb and the nerves controlling these.
4. Common nerve injury caused by trauma to the upper limb and how the site can affect the pattern seen.

RESOURCES
- Nerve injury (http://www.wheelessonline.com/ortho/nerveinjury)
- Nerve entrapment (http://www.emedicine.com/plastic/topic300.htm)

THEME 8: SKELETAL MUSCLES

SESSION 9:  
APPLIED ANATOMY UPPER EXTREMITY

OUTCOMES
1. The development and growth of the upper limb, including the age at which important ossification centres appear.
2. The names and shapes of bones in the upper limb, including their muscle attachments.
3. The joints of the upper limb, including their movement and muscles responsible for this.
4. The reason for common deformities seen in upper limb joints in chronic inflammatory disease.
5. Tendon degeneration - Tendinitis and tendonosis seen in the upper limb.
6. The compartments of the hand and the unique problems of sepsis here.

RESOURCES
- Grays Anatomy
- Wheeless textbook of Orthopaedics (http://wheelessonline.com)
- Tendinitis (http://www.webmd.com/osteoarthritis/guide/arthritis-tendinitis)
- Hand sepsis (http://www.aafp.org/afp/20031201/2167.html)
OUTCOMES

At the end of this session, you should be able to do the following:

1. Describe the normal movements of the elbow, wrist, metacarpophalangeal and interphalangeal joints.
2. Name the stabilising structures in all of these joints.
3. Name the muscles mainly responsible for the movement of these joints.
4. Describe the myotome innervation of the upper arm, forearm and hand, and explain how to distinguish between movements of muscles innervated by the median, ulnar and radial nerve.
5. Describe the dermatome sensory distribution of the hand and forearm.
6. Describe the course of the main nerves in the upper limb.
7. Describe the course of the main arteries in the upper limb.
8. Differentiate between the functions of the various tendons in the fingers.

RESOURCES

2. Clinical Orthopaedic Examination McCrae
   Segmental And Peripheral Nerves Of The Upper Limb Page 13
   The elbow Page 61
   The wrist Page 77
   The hand Page 95
3. Routine Examination Of Joints. Video I: Part. 1 The hand, Part. 2 The elbow/Holland CD
   WE544HOL, US Library
4. Neurovascular Examination Of The Hand/Mennen U, WE830MEN, US Library

ANYTHING SPECIFIC YOU SHOULD DO?

The objective of this session is to assist you in taking an appropriate medical history and performing a basic, useful clinical examination in order to identify and differentiate between conditions of the elbow, forearm and hand.

Pre-study

Before starting this lecture, you are expected to review the functional anatomy of the arm, as well as the content of the muscle compartments of the upper arm, forearm and hand. Phase II, The Musculoskeletal System, Sessions 3, 4, 5 and 6.
Lecture

A 45-minute lecture demonstration will be presented. The clinical examination of the elbow and forearm joints will be discussed. The examination of the median, ulnar and radial nerves will be discussed by means of a demonstration. The function of the most important tendons in the hand will also be discussed.

At the end of this session, you should be able to complete the assignment that has been provided.

THEME 8: CLINICAL EXAMINATION METHODS

SESSION 11:
EXAMINATION OF THE HIP AND THE KNEE JOINT

OUTCOMES

At the end of this session, you should be able to do the following:
1. Describe the normal extent of movements of the hip.
2. Explain how to evaluate muscle spasm of the hip.
3. Describe the normal extent of movements of the knee.
4. Describe the examination techniques used to evaluate cruciate ligaments, collateral ligaments, unstable patella or a meniscus injury.

RESOURCES

1. Clinical Orthopaedic Examination McCrae
   The hip Page 155
   The knee Page 189
2. Routine Examination Of Joints Video 3: The hip/Holland CD, WE544HOL, US Library

Lecture

The objective of this session is to assist you in taking an appropriate medical history and performing a basic, useful clinical examination in order to identify and differentiate between conditions of the hip and knee joint.

During this session, there will be a 45-minute lecture demonstration on examination techniques of the knee and hip joints. At the start of this lecture, you are expected to have revised the functional anatomy of the knee and hip joints. Phase II, The Musculoskeletal System, M4607 and M4617.

At the end of this lecture, you should complete the assignment supplied to you.
THEME 8: SKELETAL MUSCLES

SESSION 12:
APPLIED ANATOMY OF THE LOWER EXTREMITY

OUTCOMES

1. The lower limbs of the growing child regarding the changing alignment of the lower limb as the child develops. The ages when important secondary ossification centers appear.
2. An understanding of why the metaphysis of young patients is susceptible to infection and tumours and how infection here may enter a joint.
3. Understand Shenton's line of the hip and its significance.
4. Know the blood supply of the femur neck and why it may be disrupted by trauma.
5. The abductors and flexors of the hip, their nerve supply and their importance in normal gait.
6. Understand the biomedical stresses borne by the proximal femur and why pathological processes here have greater risk of fracture.
7. The concept of the mechanical axis of the lower limb, its significance and how it can be measured.
8. Understand how ligament stabilise the knee and the effect of their injury on the menisci.
9. Know the neurovascular structures at risk from injury to the knee.
10. Know about sesamoid and other common accessory bones in the foot and lower limb.
11. Understand how ligaments and tendons function.

RESOURCES

- http://www.sun.ac.za/orth
- http://www.upstate.edu/cdb/grossanat/limbs8.shtm - applied anatomy of knee injury
- ligaments
THEME 8: CLINICAL EXAMINATION METHODS

SESSION 13: EXAMINATION OF THE FOOT AND ANKLE

OUTCOMES

At the end of this session, you should be able to do the following:

1. Describe the normal movements of the ankle and foot joints.
2. Describe how to examine the function of the tendons of the foot and ankle.
3. Describe how to examine instability of the ankle joint.
4. Describe how to localise nerve pressure of the foot.

RESOURCES

1. Clinical Orthopaedic Examination McCrae.
   - The Ankle Page 239
   - The Foot Page 253
2. Routine Examination Of Joints Video 6, The Ankle And Foot/Holland CD WE544HOL, US Library
3. Movements Of The Ankle And Foot/Waugh W WE880WAU, US Library

ANYTHING SPECIFIC YOU SHOULD DO?

The objective of this session is to assist you in taking an appropriate medical history and performing a basic, useful clinical examination in order to identify and differentiate between conditions of the foot and ankle.

At the start of this lecture, you should have revised the functional anatomy of the foot and ankle. Phase II, The Muskuloskeletal System M4632, M4512, M4515.

Lecture/Slide show

A lecture will be presented, using the slide projector, to demonstrate the clinical examination methods of the foot and ankle.

At the end of the lecture, an assignment will be provided for completion.
THEME 9:
IMAGING INVESTIGATIONS OF THE MUSCULOSKELETAL SYSTEM

AIM OF THE THEME

At the end of this theme, you should know the indications for requesting a normal X-ray to diagnose musculoskeletal conditions and be able to evaluate and interpret the X-ray systematically in order to reach the diagnosis.

You should also be aware of the musculoskeletal conditions, which do not justify unnecessary radiological investigations.

You should know the indications for requesting additional imaging investigations (e.g. conventional tomography, nuclear medicine, computerized tomography and magnetic resonance), as well as the relevance, possible side-effects and costs thereof.

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THEME 9: IMAGING INVESTIGATIONS OF THE MUSCULOSKELETAL SYSTEM

SESSION 1:
IMAGING INVESTIGATIONS OF THE MUSCULOSKELETAL SYSTEM

ANYTHING SPECIFIC YOU SHOULD DO?

Before this session, you should read up on the indications and advantages of X-rays of the spinal cord in patients with backache. Is it always necessary to take X-rays? Reference: Rational Investigating UPDATE, June 2000, Page 35.

OUTCOMES

At the end of this session, you should be able to do the following:

Objectives: The following topics will be discussed:

1. Discussion of the radiological characteristics of common as well as less common fractures.
2. Discussion of the radiological characteristics of dislocations.
3. Discussion of the radiological characteristics of degenerative, rheumatoid, infective, neoplastic, dysplastic and common metabolic conditions.
4. Radiological characteristics of avascular necrosis.
5. Radiological characteristics of benign and malignant tumours.
6. Dangers of repeated radiological investigations.
7. You should know when X-rays are indicated in a patient presenting with backpain.
8. Useful imaging investigations must be requested.

RESOURCES
Principles Of Fractures Treatment. Apleys System Of Orthopaedics And Fractures. Chapter 23, Pages 516, 563
Journal Of American Family Physicians, Radiological Examination Upper Extremity Fractures 1 March 1998, Page 995
Journal Of American Family Physicians, Radiological Examination Lower Limb Traums, 15 March, 1998, Page 1314
Website www.aafp.org/afp

ANYTHING SPECIFIC YOU SHOULD DO?

Self-study assignment
Before starting the lecture, you are expected to tabulate Perkins' rules with regards to taking X-rays in trauma and to bring this to the lecture for discussion. Reference: Apleys System Of Orthopaedics And Fractures Page 520.

Lecture
During this session, there will be a slide lecture demonstrating the most important radiological characteristics of traumatic and non-traumatic conditions of the skeleton.

At the end of this lecture, 10 minutes will be devoted to small group discussions on taking unnecessary X-rays (Previously self-study assignment).

THEME 9: IMAGING INVESTIGATIONS OF THE MUSCULOSKELETAL SYSTEM
SESSION 2:
NUCLEAR MEDICINE AS IMAGING MODALITIES IN THE MUSCULOSKELETAL SYSTEM

OUTCOMES
At the end of this session, you should be able to do the following:
1. Describe the pathophysiological basis of skeletal scintigraphy.
2. List the most common indications for skeletal scintigraphy.
3. Explain how the skeletal scintigram will be conducted to a patient referred therefor.
4. List the advantages of skeletal scintigraphy.
5. Explain the role of skeletal scintigraphy in sports medicines to your patient.
RESOURCES

1. Phase 2 notes on the physiology of the skeleton
2. Class notes

ANYTHING SPECIFIC YOU SHOULD DO?

Lecture

The aim of this session is to enable you to implement Nuclear Medicine selectively and purposefully in order to diagnose or confirm musculoskeletal conditions.

Before attending the lecture, please review your Phase 2 notes on the physiology of the skeleton. The subject will be covered during an interactive lecture.
THEME 10: INFECTIVE CONDITIONS OF THE MUSCULOSKELETAL SYSTEM

AIM OF THE THEME

During this theme, you will learn to recognize the most common infective conditions of the musculoskeletal system. You will also learn how to treat these conditions. Of particular importance is an understanding of the underlying anatomy and pathology, which results in the principles of therapy being somewhat different than for other organ systems.

OVERVIEW OF THE THEME

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THEME 10: INFECTIVE CONDITIONS OF THE MUSCULOSKELETAL SYSTEM

SESSION 1: GENERAL PATHOLOGICAL PRINCIPLES

OUTCOMES

At the end of these sessions, you should be able to do the following:

1. Define acute and chronic osteomyelitis, tuberculous osteomyelitis and infective arthritis.
2. Name the most important causes of osteomyelitis.
3. Discuss the sequential changes in the pathogenesis of osteomyelitis.
4. Discuss and identify the morphological changes of osteomyelitis.
5. Explain the clinico-pathological correlations of osteomyelitis.
6. Name the most important causes of infective arthritis.
7. Discuss the pathogenesis and morphological changes of septic and tuberculous arthritis.
8. Explain the distinguishing clinico-pathological correlations of septic and tuberculous arthritis.

BACKGROUND KNOWLEDGE

It is important that you review the principles and outcomes of acute and chronic infections, as well as granulomatous infections (refer again to the Phase 2 module: Basis of Disease Processes). Ensure that you are familiar with the morphological manifestations of infection, including suppuration, abscess formation, spreading infections such as cellulitis and erysipelas, and necrotizing infection. You must also review tissue repair and the local and systemic factors influencing this (Refer again to the Phase 2 module: Basis of Disease Processes; especially Themes 16 and 21).

ANYTHING SPECIFIC YOU SHOULD DO?

Read pages 792-793 and 813-814 in Underwood before attending the lecture. You will also benefit by glancing at pages 222-224, especially the illustrations and tables. During the lecture, the lecturer will explain and illustrate the theory underlying the outcomes and provide relevant guidelines for further study.

Lecture with appropriate images and illustrations

1. Make supplementary notes to your textbook and class notes.
2. The lecture is available at the following webaddress:
   http://www.sun.ac.za/healthsciences/schools/basic_appHealth/anat_path/ppt/ppt.html

THEME 10: INFECTIVE CONDITIONS OF THE MUSCULOSKELETAL SYSTEM

SESSION 2:
SELF-STUDY

RESOURCES

- Underwood, 1996. Pages 792-793 and pages 813-814
- Own notes made during contact sessions
- Class notes
- Examples of specimens that you can study in your own time will be made available in the pathology demonstration hall on the 4th floor in the Education Block. A list of cases is attached at the end of this theme.
- Computer-assisted guidance: This website offers a number of examples, illustrations and tutorials that are not available elsewhere.
  http://medstat.med.utah.edu/WebPath/html#MENU<Organ System Pathology>
  <Bone and Joint Pathology>
**ANYTHING SPECIFIC YOU SHOULD DO?**

**Self-study**

Answer the following questions during your self-study:

1. Define acute and chronic pyogenic osteomyelitis.
2. Name the most important causes of osteomyelitis and of infective arthritis.
3. Discuss the sequential changes in the pathogenesis of pyogenic osteomyelitis.
4. Discuss the morphological changes of pyogenic osteomyelitis and explain their clinico-pathological correlations (Study figure 25.6 on page 794 in Underwood).
5. Discuss the clinico-pathological characteristics of tuberculous osteomyelitis and arthritis. Refer specifically to the most important differences between this and pyogenic osteomyelitis and arthritis. Make a sketch illustrating the differences. Refresh your thoughts by looking at the figure and description of pages 232-236 and 241-243 in Underwood.
6. Name other important non-infective causes of arthritis.
7. Discuss the pathogenetic and morphological changes of septic arthritis and tuberculous arthritis.
8. Explain the distinctive clinico-pathological correlations of septic and tuberculous arthritis. Briefly discuss the clinico-pathological characteristics of gonococcal arthritis, spirochaetal arthritis and viral arthritis.
9. Take note that the following examples of skeletal and soft tissue pathology will be available for study in your own time. The location will be made known to you. This opportunity is provided in order to help you; the specimens will not be part of your assessment.

You are encouraged to formulate questions and direct them to Prof Schneider at jws2@sun.ac.za

* AS32, AS21, AS22 : Osteomyelitis
* AS31 : Bone - syphilitic osteitis
* AV23 : Paget's disease
* JV 3 : Femur - haemolytic anaemia
* AS40 : Echinococcus cyst (bone)

Wet specimens

* PM382/88, 137/89 - Tuberculosis
OUTCOMES

At the end of this session, you should know the following:
1. Tabulate the common organisms responsible for acute bone and joint infections.
2. Tabulate the organisms responsible for chronic bone and joint infections.
3. Tabulate the organisms responsible for soft tissue infections.
4. Discuss the pathogenesis of bone and joint infections.
5. Discuss the role of the laboratory in the diagnosis of bacterial infections.
6. Name the antimicrobial drugs and doses used in the treatment of common musculoskeletal infections.
7. Discuss the most important characteristics and diagnosis of musculoskeletal tuberculosis.
8. Tabulate the drugs used in the treatment of musculoskeletal tuberculosis, as well as the dose, duration and side-effects thereof.

BACKGROUND KNOWLEDGE

Before starting the session, the student should have the following background knowledge:
1. The classification of bacteria
2. Basis of pathogenesis and bacterial virulence
3. Basis of antimicrobial action

At the end of the lecture, an assignment will be handed out for completion.

RESOURCES

- Myint: Medical Microbiology Made Memorable, 1999. Chapter 27, Page 64
- Inglis: Microbiology and Infection, 1998. Chapter 13, Page 131, Chapter 6, Pages 57-58
- Class notes

ANYTHING SPECIFIC YOU SHOULD DO?

Lecture

Objectives: This session deals with the most important characteristics of the general organisms that give rise to acute and chronic infections of soft tissue, bones and joints.

You must also know about the less common organisms that give rise to musculoskeletal infection.
AIM OF THE THEME

This session focuses on the different pharmacological aspects of antibiotics that are commonly used to treat musculoskeletal infections.

OUTCOMES

At the end of the session, you should be able to complete the following:

1. The formulation of a clinical diagnosis of a microbial infection.
2. The formulation of a microbial diagnosis.
3. Determination of the benefit for empirical antibiotics.
4. A systematic approach to empirical antibiotics.
5. Pharmacodynamic and pharmacokinetic factors of therapy.
6. Antimicrobial drug toxicity and the management thereof.
7. The importance and place of combination therapy.
8. Antimicrobial prophylaxis.

RESOURCES


OUTCOMES

At the end of this session, you should be able to do the following:

1. Explain how to make the clinical diagnosis of an acute septic arthritis and an acute osteomyelitis, as well as how to distinguish between the two and superficial soft tissue infections.
2. Explain how to diagnose and treat a subacute bone and joint infection.
3. Name the necessary special investigations, as well as the interpretation thereof in order to diagnose bone and joint infections.
4. Describe when a bone and joint infection requires surgical treatment.
5. Describe the particular clinical presentation of musculoskeletal infections in the neonate.
6. Tabulate the complications of septic arthritis of the hip.
7. Tabulate the complications of acute infections of bone and joints.
8. Tabulate the appropriate antibiotic doses, as well as the duration of treatment for acute septic arthritis and osteomyelitis.
9. Tabulate the ways in which soft tissue infections may present.
10. Describe the clinical presentation of an abscess and the drainage technique.
11. Describe cellulitis and the treatment thereof.
12. Briefly describe the entities of discitis and the clinical presentation thereof.

RESOURCES
- Infection Apleys System Of Orthopaedics And Fractures - Chapter 2

ANYTHING SPECIFIC YOU SHOULD DO?

Self-study
In preparation, you should please review Session 2 of this theme on Staphylococcus aureus. Please complete the assignment during this session.

Lecture
During this session you will learn how musculoskeletal infections may present systemically and locally. You will also be told how to differentiate between soft tissue and bony infections as well as how to apply the principles in the treatment thereof.

This 45-minute lecture demonstration will cover clinical presentation, radiological evaluation, appropriate side-room investigations and the treatment of acute septic arthritis and osteomyelitis.

THEME 10: INFECTIVE CONDITIONS OF THE MUSCULOSKELETAL SYSTEM
SESSION 6:
NON-PYOGENIC INFECTIONS OF BONE AND JOINTS

OUTCOMES
At the end of this session, you should be able to do the following:
1. Describe the incidence and clinical presentation of musculoskeletal Tuberculosis.
2. Explain how to distinguish between an acute septic arthritis and a tuberculous arthritis clinically, with side-room investigations and radiologically.
3. Explain when tuberculosis of the spinal cord would be suspected clinically and describe the radiological signs thereof.
4. Describe the natural course of tuberculosis of the spinal cord, the possible neurological complications, and the treatment thereof.
5. Tabulate the choices of medications for the treatment of the spinal cord, the possible neurological complications, and the period of treatment.
6. Explain the guidelines used to evaluate the patient's environment, as well as to ensure continued medication.
7. Describe the signs of drug-resistance.
8. Name the bursae that can be affected by tuberculosis.
9. Describe the presentation and treatment of cold abscesses. Tabulate the factors resulting in chronic osteomyelitis.
10. Tabulate and recognise the radiological characteristics of a chronic osteomyelitis.
11. Discuss the role of antibiotics in the treatment of chronic osteomyelitis.
12. Tabulate the complications of chronic osteomyelitis.
13. Describe a Brodi's abscess.

RESOURCES
- Tuberculosis - Apleys System Of Orthopaedics And Fractures - Page 47.

ANYTHING SPECIFIC YOU SHOULD DO?

Lecture
At the end of this session, you should understand the most important aspects with regards to the presentation, incidence and spread of musculoskeletal tuberculosis. It is important that you know about the clinical presentation, radiological interpretation and the useful special investigations, as well as about the recommended treatment modalities. This session, lasting approximately 45 minutes, will be used to discuss the presentation and anatomical spread of musculoskeletal tuberculosis. Tuberculosis of the spinal cord and common large joints will be discussed.

Please complete the assignment during this session.
Chronic Osteomyelitis. Apleys System of Orthopaedics and fractures Page 40

ANYTHING SPECIFIC YOU SHOULD DO?

Self-study and self-assessment
The aim of this self-study session is meaningfully analyse the clinical problem of chronic osteomyelitis. You are expected to be able to make the diagnosis, interpret the X-rays meaningfully and know how to treat chronic osteomyelitis.

Using the recommended references, you must solve the following problem and complete the assignment:
A 40-year old man presents with a draining sinus of the lower leg.

1. Tabulate the possible causes
2. Describe the probable radiological appearances.
3. Briefly discuss the organisms responsible therefor.
4. Tabulate the possible complications

Check your answers during a group discussion.

At 12.00, you should meet again in Lecture Hall 1 to discuss the answers with the lecturer.
OUTCOMES

At the end of this session, you should be able to do the following:

1. Describe the clinical signs of a Paronechia and explain how to drain this.
2. Describe the clinical signs of a web space infection and describe how this should be drained.
3. Describe the clinical signs of a septic arthritis of the hand and describe how this should be drained.
4. Describe the clinical signs of a Tenovaginitis.
5. Tabulate common organisms causing hand infections, as well as the appropriate antibiotics and dosages.
6. Describe the local anaesthetic methods for drainage of hand infections.
7. Discuss the most important aspects in the rehabilitation of the hand after an infection.

RESOURCES

- Treatment Of Hand Infections CME Aug 1991 Vol 9 No 8 Page 978
- Hand Infections CME July 1996 Vol 14 No 7 Page 943
- How To Drain An Abscess Modern Medicine Vol 22 No 8 Aug 97 Page 66

ANYTHING SPECIFIC YOU SHOULD DO?

Pre-study

Please review the anatomy of the hand with specific reference to the spaces and synovial shadows. Phase II Module The Musculoskeletal System M4769 M4770

Lecture

After completing this session, you should be able to identify the presentation and localisation of the most common hand infections, and distinguish these from each other. You should know the basic principles of treatment, including the performance of simple surgical procedures on a primary health level.

This lecture also deals with the areas of localisation of the various hand infections. The methods of drainage of each infection will be discussed. You will also receive information on how to administer local anaesthetic.

Self-study

After completing this session, the student should read the references regarding the basic principles of rehabilitation of a hand after drainage of an infection, and then tabulate this.
THEME 11: APPROACH TO ARTHRITIS

AIM OF THE THEME

During this theme you will learn to recognise the most common types of arthritis. By the end of the theme you should have an approach to a patient presenting with rheumatological symptoms. You should also have insight into the basic diagnostic and therapeutic principles used in the management of these conditions.

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BACKGROUND KNOWLEDGE

Required reading: Prior to starting this theme, the student is expected to have revised the following:

i) The basic mechanisms of inflammation.
ii) The basic physiology of pain.
iii) The basic structure of the joint (synovial joint and vertebral discs) and its nourishment.
THEME II: APPROACH TO ARTHRITIS

SESSION 1: GENERAL APPROACH AND POLYARThRITIS

OUTCOMES

At the end of this session, the student should:

i) Be able to distinguish between articular and extra-articular pain.

ii) Be able to distinguish between inflammatory and non-inflammatory (mechanical) pain.

iii) Have insight into the significance of the onset, site and distribution of joints affected by arthritis.

iv) Have knowledge of the important aspects in the history and general examination of a patient that presents with musculoskeletal complaints.

v) Have knowledge of the basic principles of the musculoskeletal examination of a patient that presents with a rheumatological problem.

vi) Have an approach to a patient presenting with an oligo- or polyarthritis.

THEME II: APPROACH TO ARTHRITIS

SESSION 2: RHEUMAtOID ARThRITIS (RA)

OUTCOMES

At the end of this session, the student should:

i) Have knowledge of the typical clinical picture of a patient with RA.

ii) Have knowledge of the typical features of both early and advanced (late) RA as seen in the hands.

iii) Be able to name the extra-articular manifestations of RA.

iv) Have a basic knowledge of how RA is diagnosed, including the relevant special investigations.

v) Have an approach to the management of RA, including medical, paramedical and orthopaedic treatment options.

THEME II: APPROACH TO ARTHRITIS

SESSION 3: APPROACH TO MONOAthRITIS; OSTEOARThRITIS (OA)

OUTCOMES

At the end of this session, the student should:
i) Have an approach to the patient presenting with monoarticular symptoms and signs.
ii) Have knowledge of the appropriate diagnostic work-up in order of importance in a patient presenting with monoarticular symptoms and signs.
iii) Know the difference between primary vs secondary OA wrt
   a. Causes
   b. pattern of joint involvement
iv) be able to describe the typical symptoms and signs of OA
v) Be able to name the basic radiological features of OA
vi) Should have an approach to the management of OA

THEME II: APPROACH TO ARTHRITIS

SESSION 4: CRYSTAL ARTHROPATHIES

OUTCOMES

At the end of this session, the student should:

i) Have knowledge of the types of crystals and their associated conditions
ii) Know the causes of hyperuricemia: primary and secondary (especially drugs)
iii) Be able to describe the clinical manifestations of hyperuricemia
iv) Have knowledge of the dietary guidelines for a patient with gout
v) Be able to give a differential diagnosis of gout
vi) Have an approach to the management of acute gout
vii) Know the indications for uric acid lowering therapy
viii) Be able to describe the typical clinical picture of CPPD
ix) Know the most common conditions associated with CPPD
x) Know the most common conditions associated with Ca-hydroxy-apatite

THEME II: APPROACH TO ARTHRITIS

SESSION 5: INTERACTIVE SESSION

OUTCOMES

The students will be given the opportunity to use their knowledge to solve clinical problems.
OUTCOMES

At the end of this session, the student should:

i) Have knowledge of the typical features of a spondyloarthropathy (SpA)

ii) Have an understanding of the significance of genetic predisposition

iii) Have a thorough knowledge of the clinical picture of ankylosing spondylitis (AS)

iv) Have an understanding of the term enthesitis.

v) Be able to differentiate between mechanical and inflammatory back pain (clinically)

vi) The ability to differentiate between mechanical and inflammatory back pain (clinically)

vii) Have an understanding of the term “reactive arthritis” (ReA)

viii) Know the importance of the ability of certain organisms to induce a chronic inflammatory response

ix) Have knowledge of the clinical features of a ReA

x) Have an understanding of the term dactylitis

xi) Be able to name the different rheumatological manifestations of psoriatic arthritis

xii) Have a basic knowledge of the clinical features of an entheropathic arthritis

xiii) Have a basic knowledge of the treatment of the SpA

OUTCOMES

This lecture should be regarded as complementary to previous lectures given, including Infectious conditions of the musculoskeletal system (Department of Orthopedics) as well as Spondyloarthropathies.

At the end of this session the student should:

i) Have knowledge of the most important rheumatological manifestations associated with HIV

ii) Have insight on the impact of HIV on the serological markers used in rheumatological conditions.

iii) Have knowledge of the impact of HAART on the rheumatological manifestations associated with HIV
iv) Have knowledge of the different rheumatological manifestations that may follow a streptococcal infection

THEME II: APPROACH TO ARTHRITIS

SESSION 8: SOFT TISSUE RHEUMATISM

OUTCOMES

At the end of this session, the student should have the following:

i) An approach to a patient with generalised pain.

ii) An approach to the differentiation between organic and functional symptoms.

iii) Knowledge of the symptoms which characterize fibromyalgia, as well as a number of associated conditions.

iv) An approach to the differentiation between organic and functional pathology.

v) A superficial understanding of "Regional pain syndromes".

vi) Basic knowledge of Fibromyalgia, especially related to:

   a) the examination of the patient with fibromyalgia and the physical signs which assist with the diagnosis.
   b) the choice and interpretation of special investigations.
   c) A rational approach to treatment.
   d) An overview of the prognosis.

vii) Basic knowledge of the anatomy of a joint and the surrounding soft tissue.

viii) Basic knowledge of the pathophysiology of Soft Tissue Rheumatism.

ix) Should have an approach to differentiate between joint pathology versus soft tissue pathology.

THEME II: APPROACH TO ARTHRITIS

SESSION 9: PAEDIATRIC RHEUMATOLOGY

OUTCOMES

At the end of these sessions, the student should know the following:

i) The core symptoms and signs of juvenile idiopathic arthritis (JIA)

ii) The criteria on which this diagnosis is based

iii) The morbidity associated with these conditions and the importance of making an early diagnosis.

iv) A basic treatment approach for JIA
THEME II: APPROACH TO ARTHRITIS

SESSION 10: INTERACTIVE SESSION

OUTCOMES

The students will be given the opportunity to use their knowledge to solve clinical problems
THEME 12: APPROACH TO CONNECTIVE TISSUE DISEASES

AIM OF THEME:

During this theme you will be introduced to the most common connective tissue diseases. By the end of the theme you should have knowledge of the concepts of these auto-immune diseases and have insight into the broad principles of their diagnosis.

OVERVIEW OF THE THEME

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<td>Lecture</td>
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<td>3</td>
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THEME 12: APPROACH TO CONNECTIVE TISSUE DISEASES

SESSION 1: SYSTEMIC LUPUS ERITEMATOSUS (SLE)

OUTCOMES

At the end of this session, the student should be able to:

i) Understand the concept of an Auto-Immune Diseases.
ii) Have insight into the role of sex hormones in these conditions.
iii) Understand the importance of criteria and their role in diagnosis of auto-immune diseases, including their strengths and weaknesses.
iv) Have knowledge of the different skin rashes as markers of underlying systemic diseases.
v) Have an understanding of the wide scope of presentation of Auto-Immune Diseases.
vi) Differentiating constitutional symptoms from non-organic symptoms.
vii) Recognise key signs with the diagnosis of Auto -Immune Diseases.
viii) Have a basic knowledge of the importance and limitations of Serology.
ix) Have knowledge of the hands as indicators of systemic diseases.
xi) Recognise the importance of early referrals for these cases.

xi) Know the warning signs of SLE flare-ups.
THEME 12: APPROACH TO CONNECTIVE TISSUE DISEASES

SESSION 2: SYSTEMIC SCLEROSIS, MYOPATHIES, VASCULITIS

OUTCOMES

At the end of this session, the student should:

i) Know the classification of scleroderma
ii) Know the classification of the inflammatory myopathies
iii) Understand the contribution of skin, vascular and immunological abnormalities in the pathogenesis of scleroderma.
iv) Know the organ systems which are mainly affected by the above diseases.

THEME 12: APPROACH TO CONNECTIVE TISSUE DISEASES

SESSION 3: INTERACTIVE SESSION

OUTCOMES

The students will be given the opportunity to use their knowledge to solve clinical problems.
THEME 13: TREATMENT OF RHEUMATOLOGICAL CONDITIONS

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<td>Dr J Latief</td>
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<td>3</td>
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<td>Slideshow test</td>
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<td>Dr D Whitlaw</td>
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AIM OF THEME:

By the end of the theme you should have insight and knowledge of the different treatment modalities involved in rheumatological conditions.

SESSION 1: PHARMACOLOGY

OUTCOMES

At the end of these sessions, the student should:

i) Know the various classes of drugs used in the most commonly occurring rheumatological conditions.
ii) Be able to list the most common side effects of these drugs.
iii) Know the mechanism of action of non steroidal anti inflammatory drugs and allopurinol used in gout.
iv) Be aware of drugs that need regular monitoring via blood tests.
v) Have insight in to the limitations of some of the drugs used in chronic inflammatory arthritis.
vii) Have a basic knowledge of the new therapeutic agents used in chronic inflammatory arthritis.

Resources:
Pharmacology by Rang, Dale, Ritter and Moore 5th edition, Chapter 16
THEME 13: TREATMENT OF THEUMATOLOGICAL CONDITIONS

SESSION 2: PARAMEDICAL ROLE IN RHEUMATOLOGY

OUTCOMES

Students are given the opportunity to discuss these important aspects of the management of rheumatological conditions with these disciplines.

SESSION 3: SLIDESHOW REVISION

OUTCOMES

Students are given the opportunity to revise the highlights of the lectures, also in preparation for the slide test.

SESSION 3: SLIDESHOW TEST
THEME 14:
CONGENITAL AND DEVELOPMENTAL CONDITIONS OF THE MUSCULOSKELETAL SYSTEM

AIM OF THE THEME

At the end of this theme, you should have a broad knowledge with regards to the natural course of rotation and angular anomalies of the lower limbs as a result of physiological reasons in the growing child and you should also be able to recognise this presentation clinically. You should also be able to identify pathological anomalies and deformities of the musculoskeletal system, for example the most common metabolic and dysplastic which give rise to angular and rotational deformities.

You will also learn about the general osteochondroses as causes of a painful lower limb, in addition to their natural causes. You should be able to identify and treat normal leg pain in the growing child.

You should be able to reach a differential diagnosis with regards to a child with a painful or limping gait.

You should be able to recognise the general congenital anomalies of the lower limbs in the newborn. You should also know about developmental conditions, such as Perthe’s disease and sliding proximal femoral epiphysis of the hip, and their natural course.

OVERVIEW OF THE THEME

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<td>1</td>
<td>26/07/2011</td>
<td>Lecture</td>
<td>Linear and Rotation Deformities of the Lower Limbs, Leg pains in Children and Osteochondroses</td>
<td>Dr J du Toit</td>
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<td>2</td>
<td>26/07/2011</td>
<td>Lecture</td>
<td>Congenital Club Feet, Metatarsus Adductus, Cavus Feet and Flat Feet in Children</td>
<td>Dr J du Toit</td>
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<td>3</td>
<td>27/07/2011</td>
<td>Lecture</td>
<td>Congenital Hip dysplasia, Perthes' Diseases of the Hip and Sliding Proximal Femoral Epiphysis</td>
<td>Dr J du Toit</td>
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<td>4</td>
<td>27/07/2011</td>
<td>Lecture</td>
<td>Orthopaedic Aspects of Cerebral Palsy and Neuromuscular Diseases</td>
<td>Dr J du Toit</td>
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SESSION 1:
LINEAR AND ROTATION DEFORMITIES OF THE LOWER LIMBS, LEG PAINS IN CHILDREN AND OSTEOCHONDROSES

OUTCOMES

At the end of this session, you should be able to do the following:

1. Describe/recognize/accurately document linear and rotational deformities of the lower limbs in children, and explain how these can be distinguished from metabolic and dysplastic conditions.
2. Give the diagnostic criteria for Blount’s disease (tibia vara) and describe the natural course thereof.
3. Describe the clinical characteristics of rickets and tabulate the radiological presentation thereof.
4. Explain how the diagnosis of osteochondrosis can be made in the growing child, name the different sites as well as the ages in which it may present.
5. Compare the characteristics of normal and pathological leg pain, and explain what is meant by referred leg pain.

RESOURCES

2. The Osteochondroses – Apleys System Of Orthopaedics And Fractures Page 103
3. Journal Of American Family Physicians Osteochondritis Desicans, Jan 1, 2000 Page 151

ANYTHING SPECIFIC YOU SHOULD DO?

Lecture

During this session there will be a lecture demonstration (40 minutes) discussing rotational and linear deformities of the lower limbs, as well as their natural course and their distinction from pathological conditions. Leg pains in children will be discussed.

Pre-study

Read up on osteochondroses of the lower limb, and, during the last 10 minutes of the lecture, complete the assignment provided to you after consultation with the lecturer.
THEME 14: CONGENITAL AND DEVELOPMENTAL CONDITIONS OF THE MUSCULOSKELETAL SYSTEM

SESSION 2:
CONGENITAL CLUB FEET, METATARSUS ADDUCTUS, CAVUS FEET AND FLAT FEET IN CHILDREN

OUTCOMES

At the end of this session, you should be able to do the following:

1. Describe the clinical characteristics and principles of treatment of congenital clubfeet, and be able to discuss the functional and cosmetic prognosis with the parents.
2. Describe the clinical presentation of a metatarsus adductus and the be able to name the differentiating features from a club foot.
3. Write down the instructions for the mother on how to manipulate clubfeet as well as a metatarsus adductus.
4. Describe the clinical elements of a flat foot, tabulate the most important causes and describe how to clinically distinguish between a rigid and a mobile flat foot.
5. Name aids that can be utilised for the treatment of flat feet.
6. Describe the clinical elements of a cavus foot and tabulate the other conditions with which cavus feet can be associated.

RESOURCES

2. Deformities Of The Foot – Apleys System Of Orthopaedics And Fractures Page 473
3. Clinical Orthopaedic Examination – McRae Page 264

ANYTHING SPECIFIC YOU SHOULD DO?

Lecture

The objective of this session is to enable you to recognize, identify and distinguish between the general foot anomalies occurring in children.

During this session, there will be a 40-minute lecture demonstration. The distinction between clubfeet and metatarsus adductus will be discussed. Flat feet in the child will be discussed with reference to the causes at different ages, as well as the natural progression. Cavus feet will also be discussed.

Selfstudy assignment

After this lecture, you will be expected to research and tabulate the most common neurological causes of Cavus feet.
OUTCOMES

At the end of this session, you should be able to do the following:

1. Tabulate the most important characteristics of the high risk baby for a congenital hip dislocation, and describe and explain the clinical investigations as applicable to various age groups.
2. Tabulate the treatment modalities and explain the application thereof.
3. Write down the radiological characteristics of a congenitally dislocated hip and recognise this condition on x-ray.
4. Define the entity of a transitory synovitis, and explain the causes and natural course.
5. Define Perthe's disease, describe the clinical presentation and tabulate the radiological signs.
6. Describe the treatment modalities as well as the natural course of the condition.
7. Define a sliding proximal femoral epiphysis, describe the clinical presentation, tabulate the radiological signs and recognise this condition on x-ray.
9. Define the entity of idiopathic chondrolysis and briefly describe the natural course thereof.

RESOURCES

- The Limping Child Journal Of Bone And Joint Surgery (B) Nov. 1999 Page (6) 1029

ANYTHING SPECIFIC YOU SHOULD DO?

Preparation

Refer to "The Limping Child."
Lecture

The objective of this session is to highlight the common congenital and developmental conditions of the hip in the growing kind, from birth to adolescence.

You should be able to describe the clinical diagnosis of a congenital hip dislocation in the neonate. You will be introduced to developmental conditions of the hip peculiar to children, for example Perthe's disease and sliding proximal femoral epiphysis, their presentation, the age of distribution, as well as the modalities of examination applicable in these cases.

During this session, there will be a 40-minute lecture demonstration wherein the aetiology, diagnosis and treatment of hip dysplasia will be discussed. The appearance, clinical presentation, natural course and complications of Perthe's disease of the hip, as well as slipped proximal femoral epiphyses will also be discussed.

The last 10-minutes will be spent on the completion of an assignment on the differential diagnosis of hip pain in the growing child from birth to adolescence.

THEME 14: CONGENITAL AND DEVELOPMENTAL CONDITIONS OF THE MUSCULOSKELETAL SYSTEM
SESSION 4:
ORTHOPAEDIC ASPECTS OF CEREBRAL PALSY AND NEUROMUSCULAR DISEASES

OUTCOMES

At the end of this session, you should be able to do the following:
1. Tabulate the different types of cerebral palsy and describe their functional properties.
2. Name the causes of contractures and deformities and briefly describe the functional abilities thereof.
3. Tabulate the possible therapeutic modalities for for cerebral palsy and briefly describe the applications of each.
4. Describe the functional properties of spina bifida and myelomeningocele.
5. Name the sensory implications of spina bifida and myelomeningocele and explain the motor implications for the lower limbs.
6. Tabulate the musculoskeletal implications of poliomyelitis, congenital multiplex arthrogryposis and Duchenne's muscular dystrophy.

RESOURCES

2. Neuromuscular Disorders – Apleys System Of Orthopaedics And Fractures Chapter 10 Page 192
ANYTHING SPECIFIC YOU SHOULD DO?

During this session, you will be informed of the orthopaedic aspects of general neuromuscular disease conditions in the growing child, as well as the treatment modalities that are applied to improve locomotor abilities and prevent back and limb deformities. You must have sufficient insight to inform parents of these conditions.

Pre-study
1. Please review the assignment of muscle power and spasticity grading. Sessions 2 & 3, Theme 2.
2. Before commencing this lecture, you should review the differences between an upper and lower motor neuron lesion. Refer to Sessions 2 & 3, Theme 2.

You will be expected to give feedback during this session.

Feedback
10 Minute feedback on Sessions 2 and 3.

Lecture
This lecture demonstration deals with the clinical evaluation of the locomotor system in cerebral palsy. The functional abilities and natural course will also be discussed. The therapeutic modalities to control of muscle spasticity will also be discussed. You should tabulate these modalities and make necessary annotations. The important musculoskeletal aspects of the less common neuromuscular conditions will also be discussed.
THEME 15: ONCOLOGICAL CONDITIONS OF THE MUSCULOSKELETAL SYSTEM

AIM OF THE THEME

At the end of this theme, you should know the principles pertaining to the classification, morphological spectrum, clinicopathological importance and diagnosis of tumours and tumourlike conditions of the skeleton and soft tissues.

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<td>Prof J Schneider</td>
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<td>Dr I Robertson</td>
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<td>Lecture</td>
<td>Soft Tissue Tumours</td>
<td>Prof J Apffelsteadt</td>
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SESSION 1: GENERAL PATHOLOGICAL PRINCIPLES

OUTCOMES

At the end of this session, you should be able to:

1. Give a basic classification of skeletal and soft tissue tumours.
2. Discuss the most important morphological characteristics and clinicopathological importance of the common benign and malignant bone tumours with reference to the age and sexual distribution thereof, preferential anatomical positions of different tumours, and their biological behaviour and prognosis.
3. Discuss the pathology of metastatic tumours to bone.
4. Explain the concept of clinical-pathological-radiological correlation in the diagnosis of bone tumours.
5. Briefly discuss the more common tumour-like conditions of bone and soft tissue, including fibrous dysplasia, fibromatosis, nodular fasciitis and myositis ossificans.
RESOURCES
- Underwood, 1996 Pages 798-802 and 825-827
- Make supplementary notes during contact sessions
- Class notes
- Examples of specimens that you can study in your own time will be made available. The location will be given to you. A list of cases is attached at the end of this theme.
- Computer-assisted guidance: This website offers numerous examples, illustrations and tutorials which you will be able to access elsewhere.

http://medstat.med.utah.edu/WebPath/html#MENU <Organ System Pathology> <Bone and Joint Pathology>

ANYTHING SPECIFIC YOU SHOULD DO?

Revision
It is important that you review the principles of carcinogenesis and neoplasia in order to have a good understanding of tumour nomenclature, the differences between benign and malignant neoplasia, tumour differentiation, and grading and staging. Review carcinogenesis and refer especially to the principles of carcinogenesis, neoplastic transformation of cells, and host factors that play a role in neoplasia. Take note of the specific aspects that are important with regards to tumours of bone and soft tissue. Ensure that you review the concept of paraneoplastic syndrome and the clinical importance of local and systemic consequences of tumours (refer again to Phase II module: Basis of Disease Processes; Theme 21).

Lecture
1. Read pages 798 to 802, and 825 to 827 in Underwood before attending the lecture. You will benefit greatly by reviewing pages 246 to 258, and 284 to 290; pay attention to the illustrations and tables. During the lecture, the lecturer will explain the theory underlying the outcomes, and provide illustrations and appropriate guidelines for further study.
2. Make supplementary notes to your textbook and class notes.
3. The lecture is available at the following web address:

http://www.sun.ac.za/healthsciences/schools/basic_appl_health/anat_path/ppt/ppt.html

Assignments for further directed self-study
Answer the following questions during your self-study:
1. Classify tumours of the skeleton and soft tissue. Ensure that you have a logical approach with respect to the principles of tumour nomenclature. Page 799 in Underwood.
2. Discuss the most important morphological characteristics and clinicopathological importance of the more common benign and malignant bone tumours, and refer to the importance of age, sex, and anatomical position in the differentiation of the various tumours.
3. Discuss the prognostic importance of the most important skeletal tumours.
4. Discuss metastatic tumours to bone and highlight the common tumours which are prone to develop skeletal metastases.
5. Explain the importance of clinical-pathological-radiological correlation in the diagnosis of bone tumours. Refer to osteosarcoma and giant cell tumour of bone to illustrate your answer.
6. Explain the diagnostic value and dangers of biopsies of bone tumours. Refer to the role of a general medical practitioner in the diagnosis of bone tumours.

Take note that the following examples of skeletal and soft tissue pathology are available for study purposes. The location will be made known to you. This opportunity is available for assistance but will not form part of your assessment. You are encouraged to formulate questions and direct these to Prof Schneider at jws2@sun.ac.za

- AU23, AU24, AU32: Osteosarcoma
- AU30: Neoplastic giant cell tumour of bone
- AU27: Skull metastases
- AU28: Carcinoma metastases (femur)
- AU26: Vertebrae - sarcoma metastases
- AU22: Vertebrae - metastases
- AU29: Tibia - fibrosarcoma
- AU43: Synovial sarcoma (hand)
- AU3: Hand - synovial sarcoma
- JU41: Vertebra, kidney and spleen - myelomatosis
- JW2: Femur - acute leukaemia
- AU25: Vertebrae - lymphoma

Wet specimens
- SD1845-6/81, 14452/89: Osteosarcoma
- SD8164/86, 1298/90, 4536/90: Osteosarcoma
- SD2121-24/89, 10278/90: Osteosarcoma
- PM94/90: Osteosarcoma with lung metastases
- SD5403/89: Angiosarcoma
- SD4174/88: Leiomyosarcoma

THEME 15: ONCOLOGICAL CONDITIONS OF THE MUSCULOSKELETAL SYSTEM

SESSION 2:
PRIMARY AND SECONDARY BONE TUMOURS

OUTCOMES

At the end of this session, you should be able to do the following:

1. Recognize and tabulate the radiological characteristics of benign and malignant bone lesions.
2. Tabulate the spread of common benign bone lesions.
3. Tabulate the age of presentation and localisation of primary bone tumours.
4. Name the most common benign bone tumours, as well as their localisation and natural course.
5. Make a radiological diagnosis of metastatic bone tumours and tabulate the tumours which commonly metastasise to bone.
6. Define pathological fractures and describe the treatment thereof.
7. Know the supplementary special investigations used to stage tumours.
8. Describe the most important aspects pertaining to biopsies of bone lesions.
9. Describe the application of the various treatment of primary bone tumours.
10. Know the prognosis of different tumours and be able to inform the patient thereof.

**RESOURCES**

System of Orthopaedics and Fractures A. Graham Appley - Butterworths Chapter 9 Page 162
Journal of American family Physicians, Pigmental villonodular synovitis, Aug 1, 1999, Page 1909

**ANYTHING SPECIFIC YOU SHOULD DO?**

During this session, the clinical and radiological aspects of the common primary and secondary tumours of bone and joints will be covered. You should be aware of the incidence, presentation and distribution of these tumours, as well as realize the importance of age and localisation in the differentiation. You should be able to differentiate between primary and secondary bone tumours, as well as between benign and malignant bone tumours.

The activities of Session 3 include 2 clinical problems to solve.

45 minute lecture demonstration
45 minute self-study

**Self-study**

Four clinical problems will be presented for discussion. You will be expected to discuss and solve each problem together during the session with the assistance of your lecturer and tabulate the approach with reference to the relevant clinical history, appropriate x-rays and special investigations. A differential diagnosis and therapeutic guidelines must be reached.

**Lecture**

The lecture will include the following important clinical problems:

1. Common benign bone tumours
2. Common malignant bone and joint tumours. Emphasis should be placed on the age of presentation.
3. Recommendations should be made to stage a tumour with the assistance of special investigations.
4. Discuss the treatment of benign tumours.
5. Emphasis will be placed on metastatic diseases of the bony skeleton and metastatic tumours. Occult metastases will be discussed as well as the diagnosis thereof.

The role of prophylactic internal fixation will be discussed.
Outcomes

At the end of the session you should be able to:

1. Describe the pathological characteristics of the common soft tissue tumours.
2. Describe the clinical presentation.
3. Tabulate the most important diagnostic investigations.
4. Discuss the basic guidelines for the most important treatment modalities.
5. Describe the prognosis and course of the most important tumours.

Resources


Anything specific you should do?

Lecture

This session will be useful in learning to suspect soft tissue tumours of the musculoskeletal system as well as formulating a reference framework.

This session will discuss the approach to a patient that presents with a soft tissue mass of the musculoskeletal system. The appropriate special investigations will be discussed, as well as the relevant pathology. You will also be informed of the various therapeutic modalities. The specific tumours that will be discussed are aggressive fibromatosis, lipoma and liposarcoma, fibrosarcoma and variants, as well as synovial sarcoma.
THEME 16:
CONDITIONS OF THE PELVIS AND SPINAL COLUMN

AIM OF THE THEME

This theme will cover the examination methods relevant to the spinal column and pelvis which are applicable to disease conditions of the area. You will be instructed on how to evaluate a patient with neck or back pain in order to reach a diagnosis and to formulate a therapeutic plan. The first two sessions deal with general deformities of the thoracolumbar vertebrae in children, namely postural, scoliosis and kyphosis. The causes and natural course will be discussed. You will also be instructed on how to differentiate between back pain in children.

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<td>Dr J Davis</td>
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<td>Lecture</td>
<td>Neck pain and back pain in adults</td>
<td>Dr AJ Vlok</td>
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THEME 16: CONDITIONS OF THE PELVIS AND SPINAL COLUMN

SESSION 1:
SCOLIOSIS AND KYPHOSIS

OUTCOMES

At the end of this session, you should be able to do the following:

1. Define and tabulate the clinical characteristics of scoliosis and kyphosis of the spinal cord.
2. Discuss the neurological examination of a back patient.
3. Tabulate the causes of a kyphosis.
4. Tabulate the causes of scoliosis and define an idiopathic scoliosis.
5. Tabulate the difference between a structural and functional scoliosis.
6. Discuss the natural progression of scoliosis and know the reference guidelines for treatment.
7. Be able to inform the parents of the condition of scoliosis and be able to discuss possible therapeutic options.
8. Tabulate the possibilities that can give rise to back pain in children.
RESOURCES


ANYTHING SPECIFIC YOU SHOULD DO?

Lecture
During this session, a lecture will be presented on how to make a clinical and radiological diagnosis of scoliosis or kyphosis of the thoracolumbar vertebrae. The causes thereof at different ages will also be discussed. The therapeutic modalities for these conditions will be discussed and the role of the general practitioner highlighted.

Backpain in children is unusual and the causes will be discussed, as well as the ways of presentation.

Self-study
The schoolteacher refers a girl with a poor posture to your practice. Discuss your evaluation and tabulate the possible causes. The class will divide into smaller groups to discuss this assignment.

You are expected to give a brief feedback during Session 2.

THEME 16: CONDITIONS OF THE PELVIS AND SPINAL COLUMN

SESSION 2:
NECK PAIN AND BACK PAIN IN ADULTS

OUTCOMES

At the end of this session, you should be able to do the following:

1. Identify referred pain from the neck.
2. Evaluate the extent of movement of the neck and muscle spasm.
3. Tabulate the most important causes of Torticollis.
4. Make the diagnosis of cervical and lumbar spondylosis and propose the appropriate treatment thereof.
5. Make the diagnosis of cervical and lumbar disc lesion, and know the indications for surgery.
6. Discuss the infective conditions that may involve the neck and lumbar vertebrae.
7. Discuss the neoplastic conditions that may affect the neck and lumbar vertebrae.
8. Know the role of neck and lumbar braces and physiotherapy in the treatment of neck and back conditions.
RESOURCES

1. Concise System Of Orthopaedics And Fractures/A Graham Apley/L Solomons, Chapter 17, Page 150
2. Clinical Orthopaedic Examination - McRae

ANYTHING SPECIFIC YOU SHOULD DO?

Revision

Please revise the examination of the neck and back before attending the session. (Theme 2 Session 3)

RESOURCES

- Mechanical Low Lumbar Back Pain - Modern Medicine, Vol 26 No. 6 June 2001 Page 56
- Journal Of American Family Physicians, Backache Diagnosis OA, March 15, 2000 Page 1795
- Journal Of American Family Physicians, Management Of Acute Lower Backache, March 15, 2000 Page 1779
- Backache: Causes And Prevention, WE720BAC, US Library
- Journal Of American Family Physicians, Evaluation And Treatment Of Herniated Lumbar Disc, Feb 1, 1999
- Backache - Ian McNab
  Rational investigating Update June 2000 Page 35

Self-study

Please read up on back pain in the workplace. References:

1. Concise System Of Orthopaedics And Fractures
2. Notes: Prof GJ Vlok
3. Backache: Ian Macnab
THEME 17:
CONDITIONS AND DEFORMITIES OF THE UPPER LIMB

AIM OF THE THEME

The aim of these two sessions is to make you aware of the clinical signs of a brachial plexus, as well as the extent and prognosis of the injury and to ensure that you are able to relay this to the patient. You will also be instructed on clinical examination methods of the shoulder girdle and how to apply this in order to distinguish between rotator cuff lesions, pressure conditions, instability and arthritis.

This theme will also assist you in applying the clinical examination methods pertaining to the upper limb in order to identify disease conditions and deformities and thus make a diagnosis and formulate a therapeutic plan.

OVERVIEW OF THE THEME

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<tr>
<th>Session</th>
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<tbody>
<tr>
<td>1</td>
<td>28/07/2011</td>
<td>Lecture</td>
<td>Neurological Evaluation of the Upper Limb The Brachial Plexus</td>
<td>Dr S Pretorius</td>
</tr>
<tr>
<td>2</td>
<td>28/07/2011</td>
<td>Lecture</td>
<td>Degenerative Arthritis, Rotator cuff lesions and Instability of the Shoulder girdle, Epicondylitis and Arthritis of the Elbow joint, Swellings on the Wrist, De Quervain Synovitis Kienbock se Diseases And Arthritis of the Wrist joint</td>
<td>Dr S Pretorius</td>
</tr>
<tr>
<td>3</td>
<td>28/07/2011</td>
<td>Lecture</td>
<td>Rheumatoid Arthritis of the Hand, Carpal Tunnel syndrome, Conditions and Deformities of the Hand</td>
<td>Dr S Pretorius</td>
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</tbody>
</table>

THEME 17: CONDITIONS AND DEFORMITIES OF THE UPPER LIMB

SESSION 1:
NEUROLOGICAL EVALUATION OF THE UPPER LIMB

OUTCOMES

At the end of this session, you should know:

1. The sensory and motor dermatome and myotome patterns of the upper limb.
2. The reflex pathways.
3. The clinical signs of a radiculopathy.
4. The clinical signs of an upper and lower radial median and ulnar nerve injury.
5. The importance and performance of the tinel test.
6. Tabulate the causes of a brachial plexus lesion.
7. Sketch the anatomy of the brachial plexus.
8. Clinically localise the level of a brachial plexus lesion.

RESOURCES
- Apleys System Of Orthopaedics And Fractures, Peripheral Nerve Injuries. Chapter II, Page 221
- Clinical Orthopaedic Examination - McRae Page 10
- Modern Medicine Assessment Of Nerve Root Function In The Upper & Lower Limb (Practical procedures) Vol 24, No 1, Jan 1999, Page 21
- Apleys System Of Orthopaedics And Fractures, Peripheral Nerve Injuries. Chapter II, Page 221
- Clinical Orthopaedic Examination - McRae Page 10

ANYTHING SPECIFIC YOU SHOULD DO?

Self-study
Before starting this session, you should review your knowledge on the functional anatomy of the upper limb, as well as the brachial plexus. You should know the origin and insertion, as well as the functions, of the important muscle groups. You should also revise the nerve supply of the upper limb. Refer to Phase II module The Musculoskeletal System Theme 5, Sessions 2, 3, 4, 5 and 6.

This self-study period is devoted to the completion of the schematic presentation of the brachial plexus that will be handed out to you. You must refer to Greens Hand Surgery textbook in order to tabulate the causes of a brachial plexus lesion and to distinguish between a high and a low brachial plexus lesion and the functional implications thereof.

Lastly, you should tabulate the special investigations that may be helpful in assessing the prognosis of the lesion.

Please complete the assignment.

THEME 17: CONDITIONS AND DEFORMITIES OF THE UPPER LIMB
SESSION 2:
DEGENERATIVE ARTHRITIS, ROTATOR CUFF LESIONS AND INSTABILITY OF THE SHOULDER GIRDLE

OUTCOMES
At the end of this session, you should be able to do the following:
1. Tabulate the causes of referred pain to the shoulder joint.
2. Describe the characteristics and localisation of shoulder pain.
3. Recognise rotator cuff lesions with reference to a diagnostic and therapeutic approach.
4. Discuss shoulder instability.
5. Define and discuss adhesive capsulitis.
6. Tabulate the causes of referred pain to the elbow joint.
7. Tabulate pressure neuropathies of the elbow and discuss the treatment and natural course thereof.
8. Explain the entities of medial and lateral epicondylitis, and discuss the causes and treatment thereof.
9. Tabulate the causes of an olecranon bursitis and discuss the clinical presentation and treatment thereof.
10. Discuss the use of local corticosteroid injections into the elbow.
11. Define a ganglion of the wrist joint and explain the differentiation from other swellings of the wrist joint.
12. Define and discuss De Quervain's tenosinovitis.
14. Define carpal instability and discuss the implications thereof.
15. Explain the implications of osteoarthritis of the wrist joint.

ANYTHING SPECIFIC YOU SHOULD DO?

Pre-study

The Shoulder, Clinical Orthopaedic Examination – Mc Rae, Chapter 4, Page 41

The last 10 minutes of this session will be devoted to the completion of an assignment of the area of local infiltration for the management of shoulder problems.

Lecture

This lecture deals with the approach to the patient with a painful shoulder, and discusses the soft tissue conditions peculiar to the shoulder joint and the clinical and radiological distinction thereof.

This lecture deals with the approach and differential diagnosis of a patient with a painful wrist. The entity of ganglions and swellings will be discussed, as well as their differentiation. The diagnosis and treatment of osteoarthritis of the wrist will be discussed. You will also learn about Kienböck's disease and the implications thereof.

The natural course and outcome of each condition will also be discussed.

RESOURCES

- The Painful Shoulder. CME March 1991 Vol. 9 No. 3, Page 275
- Intractable Shoulder Pain - Update Feb 2000, Page 36
- Tackling Painful Shoulder Problems - Update Aug 1998, Page 41
- The Shoulder: Apleys System Of Orthopaedics And Fractures, Chapter 13, Page 261
ANYTHING SPECIFIC YOU SHOULD DO?

This session will assist you in making a differential diagnosis for a patient presenting with a painful elbow. You will also be able to differentiate between intra-articular and extra-articular pathology and referred pain to the elbow.

The aim of this session is to enable you to evaluate a painful wrist. You will be instructed on how to differentiate between intra-articular causes of pain and surrounding tenosinovitis and pressure syndromes. You will also be able to recognise deformities of the wrist joint, as well as limited movement thereof, and to couple this to a diagnosis.

Pre-study

Preparatory studies include revision of the functional anatomy of the elbow, as well as the contents of the flexor and extensor compartments of the forearm.

You must review the examination of the wrist – Theme 2 of this module. You must also revise the functional anatomy of the wrist joint – the course of the tendons through the wrist, and also the wrist bones – refer to Phase II module The Musculoskeletal System.

RESOURCES

- Clinical Orthopaedic Examination: Mcrae – The Elbow, Chapter 5, Page 61
- Apleys System Of Orthopaedics And Fractures – The Elbow, Chapter 14, Page 286
- Journal Of American Family Physicians, Evaluation Of Overview Elbow Injuries, Feb 1, 2000
- The Painful Hand And Wrist. CME March 1991 Vol. 9, No. 3 Page 300
- Apleys System Of Orthopaedic And Fractures: The Wrist – Chapter 15, Page 296
- Clinical Orthopaedic Examination: The Wrist – Chapter 6, Page 77

THEME 17: CONDITIONS AND DEFORMITIES OF THE UPPER LIMB

SESSION 3:
RHEUMATOID ARTHRITIS OF THE HAND

OUTCOMES

At the end of this session, you should be able to do the following:
1. Discuss the characteristic pattern of wrist involvement.
2. Describe the characteristic deformities of the wrist and hand and explain the causes thereof.
3. Discuss the soft tissue and tendon involvement of the wrist and the hand.
4. Explain the basic principle in the treatment of a rheumatoid wrist and hand.
5. Make the diagnosis of a carpal tunnel syndrome, tabulate the causes, perform the necessary clinical investigations and discuss the treatment.
6. Discuss the indications for and the results of surgery.
7. Make the diagnosis of carpometacarpal osteoarthrosis of the thumb and prescribe treatment. Discuss the surgical indications.
8. Describe a trigger finger and discuss the treatment.
10. Describe a Boutonniere deformity, a swan neck deformity and a "mallet finger", and discuss the causes and treatment thereof.
11. Describe a Dupuytren's contracture of the hand, tabulate its associations and discuss the possible treatment modalities.

RESOURCES

- Apleys System Of Orthopaedics And Fractures. Chapter 3 And Chapter 16 Wrist And Hand Disorders Update Febr 1999, Page 93
- Apleys System Of Orthopaedics And Fractures: The Wrist, Chapter 15, Page 296
- Clinical Orthopaedic Examination: The Wrist, Mcrae, Chapter 6, Page 77
- Ultrasound Treatment May Relieve Carpel Tunnel Syndrome, Modern Medicine, Vol 23, No 10, Oct 1998, Page 58
- The Fase II Module The Musculoskeletal System Theme 5 Session 6
- Trigger Finger And Thumb - CME March 1991 Vol. 9 No 3 Page 364
- Apleys System Of Orthopaedics And Fractures. The Hand, Chapter 16, Page 311
- Clinical Orthopaedic Examination, Mcrae, The Hand, Chapter 7, Page 95
- Journal Of American Family Physicians, Nails And Nail Disorders In Children And Adults, May 1, 1997

ANYTHING SPECIFIC YOU SHOULD DO?

The aim of this session is to ensure that you become aware of the extent to which rheumatoid arthritis may affect the wrist and hand joints. You will be able to recognise the characteristic deformities of the hand and wrist, and discuss the natural course and treatment.

Self-study

During this self-study session, you should be able to tabulate the hand deformities associated with Rheumatoid arthritis. You should be able to name the probable causes and briefly discuss the treatment of each deformity.

This information will be checked by the lecturer.
ANYTHING SPECIFIC YOU SHOULD DO?

The aim of this session is to enable you to identify and evaluate carpal tunnel syndrome, and formulate a treatment protocol.

This session will ensure that you can identify the most common deformities of the hand and fingers, formulate a possible aetiological diagnosis, and describe the course and treatment thereof.

Pre-study

You must review the anatomy and content of the carpal tunnel.

Lecture

This lecture deals with the causes, clinical diagnosis and treatment of carpal tunnel syndrome. Compression of the ulnar nerve will also be discussed.

Degenerative and inflammatory conditions of the carpometacarpal joints will be discussed.

Overview of common congenital finger and hand deformities.

Deformities of the hand due to inflammatory and degenerative conditions will be discussed.

(refer back to Session 4) The common finger deformities such as "mallet finger", Boutonniere and swan neck deformities will be discussed in depth.
THEME 18: CONDITIONS AND DEFORMITIES OF THE LOWER LIMB

AIM OF THE THEME

This theme will enable you to recognise and evaluate the clinical examination methods and radiological investigations pertaining to the lower limb as applicable to disease conditions and deformities thereof, and to formulate a meaningful therapeutic plan.

OVERVIEW OF THE THEME

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<tr>
<td>1</td>
<td>28/07/2011</td>
<td>Lecture</td>
<td>Osteoarthritis and Avascular Necrosis of the Hip</td>
<td>Dr H de Jongh</td>
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<tr>
<td></td>
<td>14:00 - 14:45</td>
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<td>Painful Hip – Problem Solving</td>
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<td>2</td>
<td>28/07/2011</td>
<td>Lecture</td>
<td>Angular Deformities of the Knee, Osteotomies and Knee replacements</td>
<td>Dr H de Jongh</td>
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<td>15:00 - 15:45</td>
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<td>3</td>
<td>29/07/2011</td>
<td>Lecture</td>
<td>The Sportsman with (A) A Painful Lower leg, (B) The Ileotibial Band Syndrome</td>
<td>Dr J Davis</td>
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<td>08:00 - 08:45</td>
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<td>4</td>
<td>29/07/2011</td>
<td>Lecture</td>
<td>Chronic Instability of the Ankle joint, Degenerative Conditions of the Ankle, Cavus Feet and Flat feet in Adults, Heel pain and Forefoot Pain, Forefoot Deformities</td>
<td>Dr I Terblanche</td>
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<td>09:00 - 09:45</td>
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THEME 18: CONDITIONS AND DEFORMITIES OF THE LOWER LIMB

SESSION 1:
OSTEOARTHRITIS AND AVASCULAR NECROSIS OF THE HIP; PAINFUL HIP - PROBLEM SOLVING

OUTCOMES

At the end of this session, you should be able to do the following:

1. Tabulate the causes of osteoarthritis of the hip.
2. Tabulate the causes of avascular necrosis of the hip.
3. Describe the clinical presentation of degenerative diseases of the hip.
4. Discuss the conservative treatment of osteoarthritis of the hip.
5. Tabulate the indications and contra-indications for a total hip replacement, and discuss the implications of this operation.
6. Explain an osteotomy of the hip.
7. Explain an arthrodesis of the hip.
After this session, you should have sufficient information to advise a middle-aged patient with a grade III painful hip and osteoarthritis about the advantages and disadvantages of surgery to the hip, as well as the conservative modalities available.

**RESOURCES**

Osteoarthritis Update Febr 1999 Page 98  
- The Painful Hip CME March 1991 Vol 9 No. 3 Page 311  
- Apleys System Of Orthopaedics And Fractures - Chapter 5, Page 9, Chapter 19, Page 414  
- Journal Of American Family Physicians, Anterior Hip Pain In Athletes, Apr 1, 2000, Page 2109  
- How I Examine The Hip, Vol 14, No. 4 July 2000 Page 262  
- Osteo-arthritis Update Febr 1999 Page 98  
- The Painful Hip CME March 1991 Vol 9 No. 3 Page 311  
- Apleys System Of Orthopaedics And Fractures - Chapter 5, Page 9, Chapter 19, Page 414

**ANYTHING SPECIFIC YOU SHOULD DO?**

This session will enable you to evaluate osteoarthritis of the hip joint by appropriate clinical methods, and to recommend appropriate treatment on the grounds of history and special investigations.

**Revision**

Please read the radiological signs of osteoarthritis and avascular necrosis. Theme 3.

**Lecture**

This lecture deals with the possible causes of osteoarthritis of the hip; the radiological findings as well as the clinical presentation. The causes of avascular necrosis of the hip will be discussed and the radiological differentiation of osteoarthritis will be covered. You will be instructed about the conservative treatment of osteoarthritis, as well as the indications for a total hip replacement and the natural course thereof. In addition, the indications and suitability of osteotomies and arthrodeses of the hip will be discussed.

**ANYTHING SPECIFIC YOU SHOULD DO?**

The objective of this self-study session is to enable you to solve specific clinical problem involving a young patient presenting with a severely painful hip joint.
Self-study and clinical problem solving

You are expected, with the aid of your references, to solve the following problem to the best of your ability:

A 40 year old man presents with a grade 3 pain in his right hip secondary to avascular necrosis, possibly due to ethanol abuse and secondary osteoarthritis.

Discuss the treatment possibilities with reference to the advantages and disadvantages as relevant to this specific case.

THEME 18: CONDITIONS AND DEFORMITIES OF THE LOWER LIMB

SESSION 2:
ANGULAR DEFORMITIES OF THE KNEE, OSTEOTOMIES AND KNEE REPLACEMENTS

OUTCOMES

At the end of this session, you should be able to do the following:

1. Tabulate causes of osteoarthritis of the knee.
2. Discuss the conservative treatment of osteoarthritis of the knee.
3. Explain the requirements for a total knee replacement.
4. Explain the longterm outcomes of knee replacements.
5. Explain an arthrodesis of the knee.
6. Briefly discuss osteotomies of the knee.

RESOURCES

The Painful Knee CME March 1991 Vol 9 No 3, Page 320
Apleys System Of Orthopaedics And Fractures. Chapter 20, Page 432
Clinical Orthopaedic Examination – Mcrae Page 160
Journal Of American Family Physicians, Knee OA, Aug 1, 2000, Page 565

ANYTHING SPECIFIC YOU SHOULD DO?

The aim of this session is to ensure that you can identify deformities of the knee joint, diagnose degenerative arthritis of the knee and formulate a treatment strategy.

Revision

Please revise the radiological signs of osteoarthritis and the mechanical axes of the lower limb. Theme 2 and Theme 3.
**Lecture**

This session deals with the linear deformities of the lower limb in adults which may result in knee pain and degenerative changes. The conservative treatment will be discussed, as well as indications for surgery. In addition, the role of osteotomies, arthrodesis and knee replacements will also be discussed.

**Self-study assignment**

Tabulate the possible differential diagnosis, as well as the appropriate special investigations that you would use to establish the diagnosis.

**THEME 18: CONDITIONS AND DEFORMITIES OF THE LOWER LIMB**

**SESSION 3:**

THE SPORTSMAN WITH

(A) A PAINFUL LOWER LEG

(B) THE ILEOTIBIAL BAND SYNDROME

**OUTCOMES**

At the end of this session, you should be able to do the following:

1. Define ileotibial band syndrome, and briefly discuss the diagnosis and treatment thereof.
2. Define "shin splints" and briefly discuss the clinical presentation and treatment thereof.
3. Discuss stress fractures of the lower leg with regards to clinical and radiological presentation and natural course.
4. Briefly discuss chronic compartment syndrome of the lower in terms of the clinical presentation and treatment thereof.

**RESOURCES**

The ileotibial band friction syndrome

- SA Bone and Joint Surgery Vol IX No 1 Feb 1999, Page 10
- Bone Stress Injuries In Athletes CME Febr 1999 Vol 17 No. 2 Page 107
- Clinics In Physical Therapy. Physical Therapy Of The Foot And Ankle Gary C Hunt Pages 225-227
- Turecks Orthopaedics 1994 Stress Fractures Pages 112-113, 293
- Myofascial Pain And Fibromyalgia Syndromes. Peter E Boldry Shin Splints Page 289
- Journal Of American Family Physicians, Stress And Insufficiency Fractures, July 1997, Page 175
- Acute And Chronic Knee Injuries In Children CME Jan. 2001 Vol 19, No. 1 Page 27
- Apleys System Of Orthopaedics And Fractures Page 676
- Clinical Orthopaedic Examination - Mcrae Page 189

**ANYTHING SPECIFIC YOU SHOULD DO?**

You should be aware of common overuse sports injuries affecting the lower leg, and the clinical and special investigations used to make this differentiation.
Lecture

The following will be dealt with:

1. Ileotibial band syndrome
2. "Shin splints"
3. Lower leg stress fracture
4. Lower leg chronic compartment syndrome in the sportsman

OUTCOMES

At the end of this session, you should be able to do the following:

1. Describe ankle instability with reference to causes, clinical presentation, radiological evaluation and treatment protocol.
2. Tabulate the causes of ankle arthritis.
3. Discuss the clinical presentation, radiological picture and treatment options.
4. Define osteochondritis dessicans of the talus and briefly describe the condition.
5. Describe the clinical presentation of flatfoot and cavus foot, discuss the implications of a structural deformity and briefly discuss the treatment options.
6. Discuss plantar fasciitis with reference to aetiology, clinical picture, natural course and treatment.
7. Briefly explain tarsals femur neck syndrome.
8. Discuss degenerative rupture of the achilles tendon achilles with reference to aetiology, clinical picture and treatment options.
9. Briefly describe a Morton's neuroma.
10. Discuss hallux valgus and claw toes with reference to causes, clinical picture and treatment options.
11. Discuss ingrown toenails and explain the treatment thereof.
12. Explain hallux rigidus.
RESOURCES
- The Painful Ankle And Foot CME Vol 9, No 3 March 1991, Page 329
- Apleys System Of Orthopaedics And Fractures Chapter 21, Page 471
- Clinical Orthopaedic Examination - McRae, Chapter 14, Page 253
- Modern Medicine, How To Treat Corns, Calluses & Plantar Warts Vol 23, No 2, Feb 99, Page 50
- Modern Medicine, Doctor’s Rooms Procedures For Ingrown Toenails (Practical Procedures) Vol 22, No 9, Sept 1997, Page 49
- Ganglion Of The Foot Update Feb 1998, page 93
- Management Of Ingrowing Toenail Update April 2000, page 40
- The Ingrown Toenail And Its Treatment CME Sept 1999 Vol 17, No 9, page 778
- Common Foot Problems Febr 1997, Vol 15, No 2 page 141
- Subcalcaneal Heel Pain Syndrome S A Bone And Joint Surgery Vol VII, No 2, June 97, page 12

ANYTHING SPECIFIC YOU SHOULD DO?

The objective of this session is to recognise post-traumatic chronic instability and degenerative arthritis of the ankle, and to differentiate between each other. You should also be able to describe the clinical presentation of a flat foot and a cavus foot, and to know the natural course of these foot deformities in adults as well as the basic principles of treatment.

The aim of this session is to enable you to make a meaningful differential diagnosis when a patient presents with heel pain by applying your knowledge of appropriate clinical examination methods. You should also be able to identify the clinical presentation of common fore-foot deformities.

Pre-study
Please revise the examination of the ankle. Theme 2.

Lecture
This session offers a lecture on the causes of chronic instability of the ankle joint and the conservative treatment thereof. The surgical possibilities will be discussed. The causes of degenerative conditions of the ankle will be discussed briefly, as well as cavus feet and flat feet and their associations and natural course in adults.

This session will also discuss tendon rupture and inflammatory conditions of the foot and ankle, nerve entrapment syndrome of the foot and ankle, forefoot and toe deformities.
THEME 19:
GENERAL PRINCIPLES OF RESUSCITATION AFTER TRAUMA AND EMERGENCY TREATMENT OF FRACTURES AND DISLOCATIONS

AIM OF THE THEME

This session deals with the general principles in the emergency treatment of the patient with multiple musculoskeletal injuries.

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<tr>
<td>1</td>
<td>29/07/2011</td>
<td>Lecture</td>
<td>General Principles of Resuscitation after Trauma and Emergency treatment of Fractures and Dislocations</td>
<td>Dr I Terblanche</td>
</tr>
</tbody>
</table>

THEME 19: GENERAL PRINCIPLES OF TRAUMATIC CONDITIONS

SESSION 1:
GENERAL PRINCIPLES OF RESUSCITATION AFTER TRAUMA AND EMERGENCY TREATMENT OF FRACTURES AND DISLOCATIONS

OUTCOMES

At the end of this session, you should be able to do the following:

1. Tabulate and explain the general basic principles of resuscitation (ABC).
2. Tabulate the principles of radiological evaluation.
3. Explain the emergency treatment of an injured limb.
4. Explain emergency immobilisation techniques of the neck, spinal column and limbs.
5. Discuss and briefly explain the complications of multiple injuries in a patient.

RESOURCES

- Apleys System Of Orthopaedics And Fractures. Chapter 22 Page 501
- Practical Fracture Treatment, McRae Pages 31-38
- Journal Of American Family Physicians, Radiological Examination Upper Extremity Trauma, March 1, 1998, Pages 995
**ANYTHING SPECIFIC YOU SHOULD DO?**

**Pre-study**

Pre-study includes the revision of the general principles of fluid therapy in conditions of shock, as well as blood transfusions.

**Lecture**

During this session, the general principles of systemic resuscitation will be discussed briefly. The emergency treatment of pelvic and vertebral fractures will be discussed briefly, as well as the emergency treatment of limb fractures and dislocations. In addition, the appropriate radiological investigations in the patient with multiple injuries will be discussed.
THEME 20:
GENERAL PRINCIPLES OF TRAUMATIC CONDITIONS

AIM OF THE THEME

This theme will enable you to adapt your knowledge pertaining to basic principles in the radiological evaluation of fractures and dislocations in order to meaningfully interpret these types of injuries and thus recommend appropriate treatment, and also to discuss the course and prognosis.

OVERVIEW OF THE THEME

<table>
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<tr>
<td>1</td>
<td>29/07/2011</td>
<td>Lecture</td>
<td>Fracture Patterns, Open Fractures, Growth plate Injuries</td>
<td>Dr I Terblanche</td>
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<td>Self-study</td>
<td>The principles of fracture and dislocation</td>
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<td>Reduction and Immobilisation</td>
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<td>The Principles of Open Reduction and Internal Fixation</td>
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<td>2</td>
<td>29/07/2011</td>
<td>Lecture</td>
<td>Imminent Compartment Syndrome,</td>
<td>Dr J Davis</td>
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<td>Non-Accidental Syndrome,</td>
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<td>Reflex Sympathetic Dystrophy</td>
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<td>Common Complications of Fractures And Dislocations</td>
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THEME 20: GENERAL PRINCIPLES OF TRAUMATIC CONDITIONS

SESSION 1:
FRACTURE PATTERNS, OPEN FRACTURES, GROWTH PLATE INJURIES, THE PRINCIPLES OF FRACTURE AND DISLOCATION, REDUCTION AND IMMOBILISATION. THE PRINCIPLES OF OPEN REDUCTION AND INTERNAL FIXATION

OUTCOMES

At the end of this session, you should be able to do the following:

1. Describe and illustrate fracture patterns in children and adults.
2. Discuss the biological and structural implications of fracture patterns.
3. Discuss displacement and angulation of fractures.
4. Discuss fracture healing according to Perkins’ rule.
5. Classify open fractures and discuss the basic principles of wound debridement.
6. Briefly discuss the implications of gunshot wounds.
7. Classify growth plate injuries.
8. Tabulate combination fractures.
9. Describe and discuss the basic principles pertaining to application of a cast.
10. Discuss the principles of a three point pressure system in a cast.
11. Tabulate and discuss the complications of cast application and the prevention thereof.
12. Describe how a fracture and/or a dislocation is reduced.

RESOURCES

- Growth Plate Injuries Specialist Medicine Feb 2001 Page 765
- Apleys System Of Orthopaedics And Fractures - Chapter 23, Page 515
- Practical Fracture Treatment, McRae, Chapter I, Page 3
- Apleys System Of Orthopaedics And Fractures
- Practical Fracture Treatment;
- Child Abuse Page 45
- Closed Reduction And Fixation Of Fractures Chapter 3, Page 47
- Head Injuries In Child Abuse, WS 270, HAR, U.S. Library
- Journal Of American Family Physicians July 1997, Page 175, Stress Fractures

LECTURE

This lecture deals with the general guidelines in traumatic conditions of the musculoskeletal system with regards to clinical evaluation, radiological requests and interpretation, and an estimation of the natural course of the injury. Guidelines will be given with regards to the therapeutic principles of open fractures and growth plate injuries.

This session consists of a lecture demonstration on the reduction of a traumatic fracture and/or dislocation after appropriate analgesia and the application of the basic principles of immobilisation by means of plaster or splints. Non-traumatic fractures will also be discussed.

Self-study assignment

During the session, you must complete the assignment that you received and, in your own time and by referring to the resources, complete the implications of the various growth plate injuries.

ANYTHING SPECIFIC YOU SHOULD DO?

The aim of this session is to ensure that you understand the mechanisms of reduction of fractures and dislocations, as well as how to apply this to the basic principles in immobilisation and plaster technique.
THEME 20: GENERAL PRINCIPLES OF TRAUMATIC CONDITIONS

SESSION 2:
IMMINENT COMPARTMENT SYNDROME, NON-ACCIDENTAL INJURY SYNDROME
REFLEX SYMPATHETIC DYSTROPHY, COMMON COMPLICATIONS OF FRACTURES AND DISLOCATIONS

OUTCOMES

At the end of this session, you should be able to do the following:

1. Know the causes of this syndrome, as well as the clinical signs, presentation and treatment thereof.
2. Know the clinical and radiological signs of NAIS.
4. Tabulate the short and longterm complications thereof.
5. Define and briefly discuss delayed union as well as non-union.
6. Define and briefly discuss reflex sympathetic dystrophy (Sudeck's atrophy).
7. Define and briefly discuss myositis ossificans.

RESOURCES

- Practical Fracture Treatment Non-Accidental Injury, McRae, Page 45
- Apleys System Of Orthopaedics And Fractures. Principles Of Fractures Chapter 23, Page 515
- Practical Fracture Treatment, McRae, Chapter 2 P. 25, Chapter 5, Page 75

ANYTHING SPECIFIC YOU SHOULD DO?

Self-study

The aim of this session is to solve three specific clinical problems that commonly occur after trauma of the musculoskeletal system.

The class divides into 3 groups, each with the task of solving one of the following clinical problems by referring to the resources:

1. How is the circulation examined clinically the day after plaster application for a fracture? What is an imminent compartment syndrome?
2. What do you understand by the term non-accidental injury syndrome (NAIS)? What are the implications of this condition? Briefly describe the clinical aspects thereof. Tabulate the radiological aspects thereof.
3. "Doctor, it has already been 2 months since my wrist fracture, but my arm is still sore". Briefly discuss the possible causes thereof.
4. The three groups must bring along their information on the assignments and share the information with each other. This information will be briefly controlled by the lecturer at the start of Session 4.

The aim of this session is to ensure that you are aware of the complications which may arise during the treatment of fractures and dislocations in general and can thus propose necessary preventative measures.

Lecture
This lecture covers the general complications of fractures and dislocations, the prevention thereof and, briefly, the treatment of the specific complications.

Pre-study
Review the common factors that may give rise to delayed fracture healing and tabulate in your assignment.
THEME 21:
IMMOBILISATION TECHNIQUES OF
THE UPPER LIMB

AIM OF THE THEME
The aim of this theme is to ensure that you know how to apply the basic principles of immobilisation techniques of the upper limbs.

OVERVIEW OF THE THEME

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<tr>
<td>1</td>
<td>01/08/2011</td>
<td>Lecture Demonstration</td>
<td>Immobilisation Techniques of the Upper Limb</td>
<td>Dr J Davis</td>
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THEME 21: IMMOBILISASIE TECHNIQUES OF THE UPPER LIMB

SESSION 1:
IMMOBILISATION TECHNIQUES OF THE UPPER LIMB

OUTCOMES
At the end of this theme, you should be able to do the following:

Apply the various immobilisation techniques.

RESOURCES
- Practical Fracture Management. Chapter 2 Page 25, McRae
- Plaster Of Paris Technique WO 170 PLA U.S. Library
- Plaster Technique WO 170 BIR U.S. Library
- Cast Manual For Adults And Children Freuler: Wiedmer
- Fractures In Children Rockwood
- Primary Surgery Vol 2, Maurice King and Peter Bewes
- Collar-cuff bandage Reference I Page 133, II Page 174
- Triangular bandage Reference II Pages 39-40, IV Pages 226
- Reversed triangular bandage
- Figure 8 Bandage Reference I, page 117, III, page 958
- U-splint, Reference I, page 125, Reference III, page 915
- Thomas splint
- Gallow traction
- Holter neck traction
- Skeletal neck traction
- Apleys Systems Of Fractures And Orthopaedics. Principles Of Fractures Chapter 23, page 515
- Traction Video Cassette: Checks And Balances, US Library, WE19OTRA
THEME 22:
FRACURES AND DISLOCATIONS OF
THE SPINAL COLUMN AND PELVIS

AIM OF THE THEME

The aim of this theme is to enable you to tabulate the various fracture patterns and dislocations of the spinal column and pelvis, describe the radiological presentation, name the possible complications and discuss the basic principles in the treatment of these injuries.

OVERVIEW OF THE THEME

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<tr>
<td>1</td>
<td>01/08/2011</td>
<td>Lecture</td>
<td>Clinical Presentation and Incidence of Vertebral Fractures</td>
<td>Prof GJ Vlok</td>
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<td>10:00 – 10:45</td>
<td>Self Study</td>
<td>The Nursing aspects of Paraplegics and Tetraplegics in the Post-Injury Period</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Transport of a Tetraplegic</td>
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<tr>
<td>2</td>
<td>01/08/2011</td>
<td>Lecture</td>
<td>Pelvis Fractures</td>
<td>Dr H de Jongh</td>
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<td></td>
<td>11:00 – 11:45</td>
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THEME 22: FRACTURES AND DISLOCATIONS OF THE SPINAL COLUMN AND PELVIS

SESSION 1:
CLINICAL PRESENTATION AND INCIDENCE OF VERTEBRAL FRACTURES, THE CARE OF PARAPLEGICS AND TETRAPLEGICS IN THE POST-INJURY PERIOD, TRANSPORT OF A TETRAPLEGIC

OUTCOMES

At the end of this session, you should be able to do the following:

1. Discuss the emergency treatment of an acute spinal column or pelvic injury and tabulate the precautionary guidelines that must be taken before transporting the patient.
2. Describe the clinical examination of these injuries.
3. Discuss the radiological evaluation of neck and spinal column injuries.
4. Tabulate the radiological signs of spinal column instability.
5. Discuss the basic principles in the treatment of spinal column injuries.
6. Describe pelvic fractures.
7. Discuss visceral injuries associated with pelvic fractures.
8. Precautionary guidelines to protect the patient against further injuries during treatment.
At the end of this session, you should know of the following aspects pertaining to paraplegics and tetraplegics:

1. Their functional abilities
2. Their aids and the use thereof in their environment.
3. The framework of physiotherapists, occupational therapists and social workers required.
4. The complications of paraplegia, e.g. contractures, fractures, heterotopic ossification, urinary problems, as well as pressure sores.
5. Know about the drugs that control spasms.
6. Know about the support network for such patients in the community.
7. Know what is meant by a central cord syndrome.
8. Know what is meant by a Brown Sequard syndrome.

RESOURCES

- Practical Fracture treatment McRae:
  - Spinal Injuries Chapter 10, Page 209
  - Pelvis Injuries Chapter 11, Page 239
- Spinal Stabilisation Video Cassette WB 541 SP1 U.S. Library
- Practical Fracture Treatment – McRae Chapter 10. Spinal Paralysis Page 231

ANYTHING SPECIFIC YOU SHOULD DO?

Revision

Before the start of this session, you are expected to review the neurological evaluation of a patient. You should know the general characteristics of an upper motor neuron lesion, as well as the bulbocavernous reflex.

The aim of these two sessions is to ensure that you can clinically evaluate an acute spinal cord injury and know which precautionary measures should be taken before transporting the patient. You should also have the necessary knowledge with regards to the longterm multi-disciplinary implications of a paraplegic and a tetraplegic.

Lecture

During this session, a lecture will be given on the clinical presentation and incidence of vertebral fractures. The mechanisms of injury will be discussed. You will be shown how to interpret X-rays and to decide whether or not the fracture/dislocation is stable. Guidelines with regard to specific fracture treatment will also be discussed.

Precautionary measures that must be followed before transporting a patient will also be explained to you.
This lecture also deals with care aspects of paraplegics and quadroplegics in the post-injury period. The rehabilitation program will be discussed, as well as the functional abilities. The general longterm complications associated with these injuries will also be discussed. You will be explained how to prevent pressure sores and how to treat them when present.

During this session, you must make a summary of the clinical and radiological diagnosis of a young rugby player with a C5/C6 bifacet dislocation with a complete neurological lesion. This problem will be solved, with the help of your lecturer, by means of small group discussions.

Tabulate the precautionary measures that must be followed before transporting the patient. Briefly discuss his prognosis, his future abilities and the potential problems that he can expect.

Please complete the assignment handed out to you.

### THEME 22: FRACTURES AND DISLOCATIONS OF THE SPINAL COLUMN AND PELVIS

#### SESSION 2: PELVIC FRACTURES

**OUTCOMES**

You should know the following:

1. Clinical evaluation
2. Emergency treatment
3. Radiological investigations and interpretation
4. Principles of treatment of pelvic fractures

**RESOURCES**

- Apleys System Of Orthopaedics And Fractures.
THEME 23:
FRACTURES AND DISLOCATIONS OF THE UPPER LIMB

AIM OF THE THEME

This theme will ensure that you are able to apply the knowledge learnt in the previous themes with regards to the basic principles in fracture management and dislocations to the upper limb. You should be able to describe the appropriate clinical investigations, the radiological interpretation and the necessary treatment.

OVERVIEW OF THE THEME

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<td>Lecture</td>
<td>Fractures and Dislocations of the Shoulder girdle</td>
<td>Dr A Ikram</td>
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<td>2</td>
<td>01/08/2011</td>
<td>Lecture</td>
<td>Fractures and Dislocations on the Elbow Forearm Fractures</td>
<td>Dr A Ikram</td>
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<tr>
<td>3</td>
<td>01/08/2011</td>
<td>Lecture</td>
<td>Fractures and Dislocations of the Wrist joint, Hand and Fingers</td>
<td>Dr A Ikram</td>
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SESSION 1:
FRACTURES AND DISLOCATIONS OF THE SHOULDER GIRDLE

OUTCOMES

At the end of this session, you should be able to do the following:

1. Classify clavicle fractures and discuss the treatment in children and adults.
2. Classify acromioclavicular and sternoclavicular dislocations and discuss the treatment thereof.
3. Classify glenohumeral dislocations, describe the clinical presentation, tabulate the radiological characteristics and possible complications thereof, and discuss the different treatment strategies.
4. Classify fractures of the proximal 1/3 of the humerus and briefly discuss the treatment of each.
5. Discuss fractures of the humerus shaft with reference to possible complications and the treatment methods.
RESOURCES
- Apleys System Of Orthopaedics And Fractures Chapter 24, Page 566
- Practical Fracture Treatment - McRae Chapter 6, Page 99
- Orthopaedic Trauma IS de Wet Pages 268-290
- Journal Of American Family Physicians, Management Of Clavicle Fracture, Jan 1997
- Journal Of American Family Physicians, Shoulder Instability In Young Athletes. 15 May 1999 WWW.aafp.org/afp
- How I Examine The Shoulder, Vol 14, No 6, Nov 2000 Pages 435

ANYTHING SPECIFIC YOU SHOULD DO?

Lecture demonstration
This lecture deals with fractures and dislocations of the clavicle and the treatment thereof on a primary health level. Dislocations of the shoulder will be discussed in detail. Guidelines will be given or the conservative treatment of humerus soft fractures and the indications for surgery.

THEME 23: FRACTURES AND DISLOCATIONS OF THE UPPER LIMB
SESSION 2:
FRACTURES AND DISLOCATIONS OF THE ELBOW AND FOREARM FRACTURES

OUTCOMES
At the end of this session, you should be able to do the following:
1. Tabulate the appearance of the ossification centre in the elbow.
2. Describe and interpret the radiological soft tissue signs of the elbow, as well as the necessary lines seen on xray.
3. Classify supracondylar fractures in children, tabulate the possible complications and discuss the various treatment options.
4. Describe the radiological presentation as well as the treatment options for epicondylar fractures.
5. Classify elbow dislocations and discuss the treatment thereof.
6. Classify radial head fractures and discuss the treatment thereof.
7. Classify olecranon fractures and discuss the treatment thereof.
8. Tabulate the possible complications of elbow injuries.
9. Describe a Monteggia fracture dislocation and discuss the treatment principles in children and adults.
10. Describe a Galliazi fracture dislocation and discuss the principles of treatment.
11. Discuss the principles of treatment of mid-shaft forearm fractures.
12. Discuss the principles of treatment of isolated radius and ulna fractures.
13. Describe a Colles fracture clinically and radiologically, and discuss the treatment and natural course thereof.
14. Describe the radiological presentation of a displaced distal radius fracture and discuss the treatment modalities.
15. Classify growth plate injuries of the distal radius and ulna and discuss the treatment.
17. Give a radiological classification of scaphoid fractures, and discuss the treatment and complications thereof.
18. Classify wrist and carpal dislocations, and discuss the emergency treatment thereof.

RESOURCES
- Ortopediese Trauma Izak de Wet, H. 12 Pages 231-258
- Fractures In Children, Rockwood & Green, Ch. 10, Page 653
- Practical Fracture Treatment McRae, Injuries about the elbow, H. 7 Page 129
- Apleys System Of Orthopaedics And Fractures Chapter 24, The elbow Page 577
- Practical Fracture Treatment McRae. Chapter 7, Page 129
- IS de Wet, Ortopediese Trauma 1984, Pages 219-227, 225, 213, 186-190
- F Freuler, U Wiedmer, Cast Manual for Adults & Children: Springer-Verlap, 1979, Pages 28-31
- IS de Wet. Ortopediese trauma HAUM, 1984, Pages 296-205
- F Freuler, U Wiedmer, Cast Manual for Adults and Children Springer-Verlap, 1979, Pages 38-39, 44-45
- CA Rockwood, DP Green, Rockwood & Green's Fractures in Adults: Lippincott-Raven, 1996, Pages 791-801.
- Apleys System Of Orthopaedics And Fractures, Chapter 24, Pages 595
- Practical Fracture Treatment McRae, Chapter 8, P. 155 Chapter 9 Page 7 169
- Journal Of American Family Physicians, Common Wrist Injuries, Feb 1997, Page 857
- www.aafp.org/afp

ANYTHING SPECIFIC YOU SHOULD DO?

The aim of this session is to ensure that you are able to classify common fractures and dislocations of the elbow (presenting in both children and adults) according to radiological presentation and able to discuss treatment options.

The objective of this session is to enable you to classify common fracture patterns in the forearms of both children and adults with reference to the radiological presentation and discuss the treatment guidelines for each fracture or fracture/dislocation.

The aim of this session is to ensure that you can classify fractures of the distal radius and ulna according to radiological presentation and accordingly formulate treatment guidelines. You will also learn how to identify fractures and dislocations of the wrist joint radiologically and apply emergency treatment at a primary health level.
Lecture

This lecture discusses the common fractures and dislocations of the elbow joint. You will learn how to interpret the X-ray. The treatment and methods of reduction of fractures and dislocations will be discussed. The guidelines for surgery will be indicated and the possible complications discussed.

This lecture also deals with common fractures of the forearm.

The fractures and fracture-dislocation patterns of the forearm in adults and children will be discussed.

The aim of this session is to ensure that you can classify the fractures of the distal radius and ulna according to radiological presentation and accordingly formulate a treatment strategy. You will also learn how to identify fractures and dislocations of the wrist joint radiologically and apply emergency treatment on primary health level.

Lecture

This lecture covers the clinical diagnosis of common fractures of the distal radius and wrist joint, namely the Colles’ fracture, disrupted distal radius fracture, scaphoid fractures and acute wrist dislocations and instabilities.

The radiological manifestations, conservative treatment and surgical indications will be discussed.

Please complete the assignment given to you during this session.

THEME 23: FRACTURES AND DISLOCATIONS OF THE UPPER LIMB

SESSION 3:
FRACTURES AND DISLOCATIONS OF THE WRIST JOINT, HAND AND FINGERS

OUTCOMES

At the end of this session, you should be able to do the following:

1. Discuss the emergency treatment of an acutely swollen hand after an injury.
2. Classify metacarpal fractures, describe the methods of immobilisation after a displaced fracture, and discuss the clinical and radiological indications for surgery.
3. Define a Bennett’s fracture, describe the radiological presentation thereof and discuss the treatment thereof.
4. Define a «boxer» fracture, describe the radiological presentation thereof and discuss the treatment modality.
5. Give a radiological classification of a phalanx fracture, describe the method of immobilisation and discuss the clinical and radiological indications for surgery.
6. Classify MP and IP dislocations, describe the methods of reduction and immobilisation and tabulate the indications for surgery.
7. Discuss finger tip injuries in children in detail.
RESOURCES
- Practical Fracture Treatment McRae, Chapter 9, Page 191
- Apleys System Of Orthopaedic And Trauma, Page 608
- Management Of Hand And Finger Injuries Update July 1999, Page 23
- Journal Of American Family Physicians, Fingertip Amputations, Aug 1 2001, Page 455

ANYTHING SPECIFIC YOU SHOULD DO?

The aim of this session is to ensure that you can classify common fractures and dislocations that occur in the hand and fingers radiologically and formulate appropriate treatment plans.

Lecture

During this lecture, you will be shown how to make a diagnosis of fractures in the hand and fingers. The treatment of the common fractures will be discussed. You will be shown how to reduce dislocations. The application of a Z-splint and hand ball will be demonstrated.
THEME 24: FRACTURES AND DISLOCATIONS OF THE LOWER LIMB

AIM OF THE THEME
This theme will familiarize you with the basic principles of fracture evaluation and treatment in the lower limb. You will be able to describe the appropriate clinical investigations, the radiological interpretation as set out in in Theme 19, as well as the treatment guidelines.

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<td>02/08/2011</td>
<td>Lecture</td>
<td>Hip dislocations, Femur neck, Intertrochanteric and Femur shaft Fractures</td>
<td>Dr I Robertson</td>
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<td>2</td>
<td>02/08/2011</td>
<td>Lecture</td>
<td>Fractures of the Distal Femur, Proximal Tibia and Patella</td>
<td>Dr I Robertson</td>
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<td>3</td>
<td>02/08/2011</td>
<td>Lecture</td>
<td>Acute Knee Dislocations, Knee Ligament injuries and the Longterm consequences of knee Ligament and meniscus injuries</td>
<td>Dr I Robertson</td>
</tr>
<tr>
<td>4</td>
<td>02/08/2011</td>
<td>Lecture</td>
<td>Fractures of the Tibia shaft and plateau</td>
<td>Dr I Robertson</td>
</tr>
<tr>
<td>5</td>
<td>02/08/2011</td>
<td>Lecture</td>
<td>Sprains, Fractures And dislocations of the Ankle, Fractures and dislocations of the tarsals, metatarsal bones and falankse of the foot</td>
<td>Dr I Terblanche</td>
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THEME 24: FRACTURES AND DISLOCATIONS OF THE LOWER LIMB

SESSION 1:
HIP DISLOCATIONS, FEMUR NECK, INTERTROCHANTERIC AND FEMUR SHAFT FRACTURES

OUTCOMES
At the end of this session, you should be able to do the following:

1. Discuss the clinical presentation of anterior and posterior hip dislocations, describe the methods of reduction and tabulate the complications thereof.
2. Give a radiological classification of proximal femur fractures, and describe the guidelines for treatment of both intra-capsular and extra-capsular femur fractures.
3. Give a radiological classification for femur shaft fractures, discuss treatment options on both children and adults and tabulate the complications.
4. Recognize the common injuries associated with femur fractures.
5. Be able to place a small child in gallow traction and supervise their nursing.
6. Be able to place an older child or adult in a Thomas splint and supervise their nursing.
7. Know which fractures need to be referred for specialist treatment.
8. Be able to administer emergency treatment prior to patient transport for specialist treatment.
9. Recognise the various surgical options for treatment of a femur fracture.

RESOURCES
- Apleys System Of Orthopaedics And Fractures Chapter 27, Page 651
- Practical Fracture Treatment Chapter 12, Page 273

ANYTHING SPECIFIC YOU SHOULD DO?

Lecture
This session consists of a lecture on traumatic hip dislocations in children and adults. The clinical presentation of the limb will be discussed, as well as the possible associated injuries, the methods of reduction, follow-up treatment and longterm complications. Femur neck and intertrochanteric fractures in adults will be discussed and the importance of the distinction between intracapsular and extracapsular emphasized. The aim and options of internal fixation will be discussed. The treatment of femur shaft fractures at different ages will be discussed.

OUTCOMES
At the end of this session, you should be able to do the following:
1. Classify acute knee dislocations, describe the emergency treatment thereof and discuss the complications.
2. Discuss acute patella dislocations.
3. Give the radiological classification of distal femoral fractures and discuss the treatment guidelines.
4. Give the radiological classification of proximal tibial fractures and discuss the treatment guidelines.

RESOURCES
- The Injured Knee Update April 2000 Page 45
- The Patient With A Painful Knee Update Nov 1998 Page 29
- Anterior Cruciate Ligament Injuries CME Feb 1999 Vol 17 No 2 Page 117
- Apleys System Of Orthopaedics And Fractures Page 270
- Practical Fracture Treatment McRae Page 290
**ANYTHING SPECIFIC YOU SHOULD DO?**

The aim of this session is to ensure that you can classify fractures and dislocations of the knee joint according to the radiological presentation and discuss the treatment modalities of each as applicable.

**Lecture**

This lecture covers the clinical evaluation of acute traumatic ligament and meniscus injuries of the knee. Background study includes the revision of the examination methods of the knee during Theme 2 of this module. The implication of fractures of the femoral and tibial condyles will be discussed. You will learn how to clinically evaluate patella fractures and to decide which fractures require an operation.

At the end of the lecture, you will, with the help of the lecturer, learn how to evaluate and treat an acute haemarthrosis of the knee in a child and an adult.

Please complete your assignment.

---

**THEME 24: FRACTURES AND DISLOCATIONS OF THE LOWER LIMB**

**SESSION 3:**

**THE LONGTERM CONSEQUENCES OF KNEE LIGAMENT AND MENISCUS INJURIES**

**OUTCOMES**

At the end of this session, you should be able to discuss the following aspects:

1. Should ligaments of the knee and tears of the meniscus be repaired acutely after injury?
2. When are ligament reconstruction procedures indicated?
3. What is the rehabilitation program after a knee injury? When can the patient return to sport?
4. What are the longterm consequences of a knee injury with regards to osteoarthritis?

**RESOURCES**

Apleys System Of Orthopaedics And Fractures, Page 680
- Practical Fracture Treatment McRae, Page 295

**ANYTHING SPECIFIC YOU SHOULD DO?**

The aim of these two self-study sessions is to ensure that you understand the longterm implications of meniscus and ligament injuries of the knee - collateral and cruciate - so as to be able to explain this to your patient.
Self-study

The class divides into 4 groups. Each group studies a single assignment and exchanges the information.

Using the references provided, read up on the implications of ligament injuries and meniscus injuries of the knee. Then complete the assignment handed out to you.

The lecturer will check the problem in the next session.

THEME 24: FRACTURES AND DISLOCATIONS OF THE LOWER LIMB

SESSION 4:
FRACTURES OF THE TIBIA SHAFT AND PLATEAU

OUTCOMES

At the end of this session, you should be able to do the following:

1. Give the radiological classification of tibial shaft and plateau fractures.
2. Tabulate the indications for conservative treatment and discuss the methods of conservative treatment.
3. Discuss the treatment of an open tibia fracture.
4. Discuss the implications of an open tibia fracture, as well as the natural course.

RESOURCES

- Apleys Systems Of Orthopaedics And Fractures, Page 689
- Practical Fracture Treatment McRae, Chapter 13, Page 305

ANYTHING SPECIFIC YOU SHOULD DO?

The aim of this session is to ensure that you can classify tibial shaft fractures both clinically and radiologically and describe the necessary treatment thereof.

Lecture

This lecture deals with the fracture patterns of the tibia and fibula. You will be shown how to reduce uncomplicated fractures, if necessary, and to apply an appropriate plaster. The treatment of an open fracture - a basic debridement - will be reviewed briefly and you will be shown how to apply an external fixator. The morbidity of open fractures of the tibia will be discussed briefly, as well as the long-term implications.

Self-study assignment

You must please read up on the levels of amputations in the lower limb, the advantages and disadvantages of these levels, as well as the functional abilities of a patient after an amputation.
Please complete the assignment that was handed out.

The rehabilitation of a lower leg amputation will be discussed during your rotation at Karl Bremer Hospital.

THEME 24: FRACTURES AND DISLOCATIONS OF THE LOWER LIMB

SESSION 5:
SPRAINS, FRACTURES AND DISLOCATIONS OF THE ANKLE, FRACTURES AND DISLOCATIONS OF THE TARSALS, METATARSAL BONES AND PHALANGES OF THE FOOT

OUTCOMES

At the end of this session, you should be able to do the following:
1. Define and classify ankle sprains, and discuss the treatment thereof.
2. Classify ankle fractures and discuss the treatment thereof.
3. Discuss the emergency treatment of a severely swollen foot.
4. Describe the treatment guidelines for calcaneus fractures.
5. Tabulate the injuries associated with calcaneus fractures.
6. Classify mid-foot fracture dislocations, and describe the indications for surgery.
7. Classify talus fractures, and briefly discuss their treatment and natural course.
8. Discuss the treatment of phalanx fractures and dislocations.

RESOURCES

- Journal American Family Physicians Jan 2001
- Common Sport Injuries In The Adolescent - Foot and ankle S A Bone and Joint Surgery Vol. IX No. 1 Febr. 1999 Page 14
- Apleys System of Orthopaedics and fractures, Page 696
- Practical Fracture Treatment, Chapter 14, Page 319
- Journal Of American Family Physicians, Management Of Ankle Injuries, Jan 1, 2001, Page 93
- Journal Of American Family Physicians, Injured Ankles, Feb 1 1998, Page 474
- Apleys System of Orthopaedics and Fractures
- Practical Fracture Treatment, P. 707, Chapter 15, Page 345
- Journal Of American Family Physicians, Fracture Of Proximal 5th Metatarsal May 1, 1999 Page 2516
ANYTHING SPECIFIC YOU SHOULD DO?

The aim of this session is to ensure that you can classify ankle sprains and fractures and discuss the appropriate treatment options.

The aim of this session is to ensure that you can classify fractures of the tarsal bones, metatarsal bones and phalanges of the foot radiologically and accordingly discuss the treatment and course.

**Lecture**

This lecture will teach the student how to evaluate and treat a sprained ankle. You will be taught how to apply the Weber classification for ankle fracture dislocations, and thus learn to differentiate between a stable fracture which can be managed by yourself and an unstable fracture requiring surgery.

During this lecture you will be shown how to prevent a severely swollen foot and, if present, how to treat it. Calcaneous fracture patterns, the indications for surgery and the longterm implications thereof will also be dealt with. You will be shown how to apply a plaster for the different fracture patterns and dislocations of the foot. The suspicion and evaluation of a Lisfranc fracture dislocation will be discussed. You will be shown how to reduce dislocations of the foot.

Please complete the work assignment that was provided to you.
THEME 25:
SOFT TISSUE INJURIES OF THE MUSCULOSKELETAL SYSTEM

AIM OF THE THEME

This theme deals with lacerations and injuries of the skin, as well as the more important deeper structures, such as muscles, tendons, nerves and blood vessels. You should be able to identify these injuries clinically, know the emergency treatment thereof as well as the referral guidelines for complicated injuries.

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<td>Lecture Demonstration</td>
<td>Lacerations And Penetrating Skin wounds</td>
<td>Dr A Basson</td>
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<tr>
<td>2</td>
<td>03/08/2011</td>
<td>Self-study Lecture Demonstration</td>
<td>Appropriate Wound healing And Wound dressing</td>
<td>Dr F Graewe</td>
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THEME 25: SOFT TISSUE INJURIES OF THE MUSCULOSKELETAL SYSTEM

SESSION 1:
LACERATIONS AND PENETRATING SKIN WOUNDS

OUTCOMES

1. After this session, you should be able to identify simple skin lacerations, know the methods of suturing under local anaesthetic, and also know about the after care and bandage techniques of such lacerations.
2. You should know the basic principles of wound debridement. You should also know about the different suture materials and their properties. You should be able to identify wounds requiring secondary cover.
3. You should know the implications of penetrating wounds in different anatomical areas.
4. You should be able to distinguish between rupture of a nerve or tendon.
5. You should know the prognosis of nerve and tendon injuries.
6. You should be able to identify a "degloving" injury and realise the implications thereof.
7. You should know how to treat a penetrating wound in a joint.
8. You should know how to suture muscle, skin, sinews and nerves.
9. You should be able to realise the severity of blunt trauma to the musculoskeletal system and identify the systemic complications of "crush" injuries.

RESOURCES

4. Wondhegting (Video cassette) WO166 WOM U.S. Library

ANYTHING SPECIFIC YOU SHOULD DO?

Lecture

This session takes the form of a lecture and deals with the identification of lacerations and penetrating wounds of the musculoskeletal system, and the realisation of the importance thereof.

The suturing of skin and muscle lacerations will also be discussed. The diagnosis of arterial nerves and tendon lacerations will be discussed and guidelines will be presented for the treatment of these injuries. "Crush" syndrome and "Degloving" injuries will be briefly rementioned for identification.

THEME 25: SOFT TISSUE INJURIES OF THE MUSCULOSKELETAL SYSTEM

SESSION 2:
APPROPRIATE WOUND HEALING AND WOUND DRESSING

OUTCOMES

After completion of these sessions, you should:
1. Understand wound recovery and know the factors influencing this.
2. Distinguish between a hypertrophic wound and a keloid.
3. Know how to approach an open wound and decide on which wound dressing is appropriate.
4. Understand the indications and technique of skin transplant.
5. Know the reconstructive guidelines for wound dressing.
6. Understand the newly lacerated wound (bandages).
7. Know the basic principles of ulcer prevention and treatment.

RESOURCES

1. Mystery of Plastic and Reconstructive Surgery
   Editor: Mimis Cohen, First Edition
   Volume 1: Chapter 1 Page 3 Woundhealth
   Chapter 4 Page 45 Skin
   Volume 3: Chapter 132 Page 1828 Leg ulcers
2. Textbook of Plastic, Maxiomasal and Reconstructive Surgery
   Editor: Georgindes, First Edition
   Volume 1: Chapter 5    Page 29    Skin wounds
   Volume 2: Chapter 97   Page 1291   Leg ulcers
3. Basic Wound Care Video Cassette WO185 BAS. US Library
4. Wound Care Video Cassette WO185 WU US Library
5. Wondhegting video cassette WO166 WOM US Library
7. Apply emergency treatment of the burn.
8. Know whether further surgical treatment of the burn is required.
9. Know whether wound dressings are required in the treatment of burns.
10. Know how to prevent contractures after burns.
11. Know the long-term rehabilitation as well as the prognosis of different anatomical areas.

ANYTHING SPECIFIC YOU SHOULD DO?

At the end of this theme, you should understand the anatomy of the skin and should thus be able to recognize skin wounds and complicated skin avulsions.

You should have an approach to the treatment of these wounds, as well as disturbed wound healing.

You should be able to diagnose an ulcer, understand the aetiology and accordingly know how to treat such an ulcer.

Pre-study

During this session, you should:

- Revise the anatomy of the skin.
- Understand the blood supply of the skin.
- Understand wound healing and the factors influencing this.
- Compile a list of the various occlusive dressings for casualty.
- Compile a list of the different causes of ulcers.

Lecture with slides

During this session, wound healing and wound dressing will be described by means of slides and clinical cases.
THEME 26:
THE ROLE OF OCCUPATIONAL THERAPY AND PHYSIOTHERAPY IN REHABILITATION

AIM OF THE THEME

At the end of this theme you should be able to describe the role of the physiotherapist and occupational therapist in the rehabilitation of the most common Orthopaedic conditions.

BACKGROUND KNOWLEDGE

- Anatomy: Musculoskeletal System
- Muscle physiology
- MB ChB IV Musculoskeletal module, Session 1 to 18

OVERVIEW OF THE THEME

<table>
<thead>
<tr>
<th>Session</th>
<th>Date</th>
<th>Activity</th>
<th>Topic</th>
<th>Lecturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>03/08/2011</td>
<td>Lecture</td>
<td>The role of OT and PT in rehabilitation of orthopaedic conditions</td>
<td>Ms S de Klerk &amp; Ms S Schmutz</td>
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<td>10:00 - 10:45</td>
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<tr>
<td>2</td>
<td>03/08/2011</td>
<td>Lecture Video</td>
<td>Interactive session on OT and PT treatment of specific Orthopaedic conditions</td>
<td>Ms S de Klerk &amp; Ms S Schmutz</td>
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<td>11:00 - 11:45</td>
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THEME 26: REHABILITATION, AIDS

SESSION 1:
OT AND PT IN REHABILITATION OF ORTHOPAEDIC CONDITIONS

OUTCOMES

At the end of this theme, you should be able to do the following:

- Name the general goals of a rehabilitation program in terms of Orthopaedics.
- Discuss the role of the Occupational- and Physiotherapist in Orthopaedic rehabilitation.
- Recognize different types of assistive devices.

LECTURE

During the lecture rehabilitation and the use of assistive devices/aids will be explained, as relevant to orthopaedic conditions, and the use of aids will be described by lecturer from the Departments of Occupational Therapy and Physiotherapy.
THEME 26: REHABILITATION, AIDS

SESSION 2: GUIDELINES FOR REFERRAL

OUTCOMES

At the end of this session, you should be able to:

- Name the indications for referral to Occupational Therapy and Physiotherapy.
- Write a referral letter to Occupational Therapy and Physiotherapy.

LECTURE

The lecture will focus on indications for referral and provide guidelines for referral to Physiotherapy and Occupational therapy. Practical examples will be given based on conditions Sessions 1 - 18.

RESOURCES

- University of Sydney, Physiotherapy page
  http://libguides.library.usyd.edu.au/content.php
**TIME TABLE**

Unless otherwise indicated within the study guide, all activities will take place in Lecture Hall 7 of the Teaching Block

**KEY:**

- **AL** - Anatomy lecture
- **AP** - Anatomy practical/dissection
- **PL** - Physiology lecture
- **HL** - Histology lecture
- **HP** - Histology practical
- **CL** - Clinical lecture
- **NE** - Neuro Sciences

**WEEK 17: 02 – 06 MAY 2011**

<table>
<thead>
<tr>
<th>TIME</th>
<th>MONDAY 02/05/2011</th>
<th>TUESDAY 03/05/2011</th>
<th>WEDNESDAY 04/05/2011</th>
<th>THURSDAY 05/05/2011</th>
<th>FRIDAY 06/05/2011</th>
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<tbody>
<tr>
<td>08:00-08:45</td>
<td>Welcoming &amp; Review</td>
<td>AL - T3 (S1) Joints - classification &amp; characteristics</td>
<td>AL - T4 (S1) Vertebral column: bones, joints, movements &amp; muscles</td>
<td>AL - T5 (S2) Brachial plexus &amp; axilla</td>
<td></td>
</tr>
<tr>
<td>09:00-09:45</td>
<td>AL - T1 (S1) Anatomical terms</td>
<td>AL - T2 (S1) Osteology - composition of skeleton</td>
<td>AL - T6 (S1) Bone &amp; cartilage</td>
<td>AL - T6 (S2) Bone &amp; cartilage</td>
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</tr>
<tr>
<td>10:00-10:45</td>
<td>Public Holiday</td>
<td>HL - T6 (S1) Bone &amp; cartilage</td>
<td>HL - T6 (S2) Bone &amp; cartilage</td>
<td>HL - T6 (S3) Bone &amp; cartilage</td>
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<tr>
<td>11:00-11:45</td>
<td>PL - T7 (S1) Muscular actions</td>
<td>PL - T7 (S2) Muscular actions</td>
<td>PL - T7 (S2) Muscular actions</td>
<td>PL - T7 (S2) Muscular actions</td>
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<tr>
<td>12:00-12:45</td>
<td>Lunch</td>
<td>AL - T5 (S1) Back muscles, shoulder girdle &amp; shoulder joint</td>
<td>AL - T5 (S1) Back muscles, shoulder girdle &amp; shoulder joint</td>
<td>AL - T5 (S1) Back muscles, shoulder girdle &amp; shoulder joint</td>
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<td>13:00-13:45</td>
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### WEEK 18: 09 – 13 MAY 2011

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<th>TUESDAY 10/05/2011</th>
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<th>THURSDAY 12/05/2011</th>
<th>FRIDAY 13/05/2011</th>
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<tr>
<td>08:00-08:45</td>
<td>PL - T7 (S3) Muscular actions</td>
<td>AL - T5 (S4) Forearm</td>
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<tr>
<td>09:00-09:45</td>
<td>PL - T7 (S4) Muscular actions</td>
<td>AL - T5 (S3) Upper arm</td>
<td>AL - T5 (S5) Forearm (cont.)</td>
<td>AL - T5 (S7) Lumbale &amp; sacral plexus</td>
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<tr>
<td>10:00-10:45</td>
<td>AP (A &amp; B) Scapular region</td>
<td>AP (B) Superficial veins, cut. nerves arm &amp; axilla HP (A) Bone &amp; cartilage</td>
<td>AP (A &amp; B) Axilla, upper arm &amp; cubital fossa</td>
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<td>11:00-11:45</td>
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<td>NE - (S3) Trauma of the spinal cord/ pathology of trauma of the spinal cord</td>
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<tr>
<td>12:00-12:45</td>
<td>NE - (S1) Anatomy cord</td>
<td>NE - (S2) Spinal cord</td>
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<td>13:00-13:45</td>
<td>LUNCH</td>
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<tr>
<td>14:00-14:45</td>
<td>AP (A) Superficial veins, cut. nerves arm &amp; axilla HP (B) Bone &amp; cartilage</td>
<td>AP (A &amp; B) Axilla, upper arm &amp; cubital fossa (continued)</td>
<td>AL - T5 (S6) Hand</td>
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<td>TIME</td>
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<td>08:00-08:45</td>
<td>AL - T5 (S9) Upper leg &amp; femoral triangle</td>
<td>T6 (S6) GERGA (B) (own time)</td>
<td>NE - (S6) Muscle disease</td>
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<td>09:00-09:45</td>
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<td>AL - T5 (S10) Lower leg</td>
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<tr>
<td>10:00-10:45</td>
<td>AP (A &amp; B) Hand</td>
<td>NE - (S4) Pathology of diseases of spinal cord</td>
<td>AP (A &amp; B) Anterior compartment of thigh - femoral triangle, adductor canal and Quadriceps femoris</td>
<td>AP (A &amp; B) Gluteal area (cont.)</td>
<td>Posterior compartment of thigh, Popliteal fossa</td>
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<td>11:00-11:45</td>
<td>NE - (S5) Anatomy of PNS</td>
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<td>12:00-12:45</td>
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<td>NE - (S7) Peripheral neuropathy</td>
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<td>13:00-13:45</td>
<td>T6 (S6) GERGA (A) (own time)</td>
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<tr>
<td>14:00-14:45</td>
<td>AP (A &amp; B) Superficial veins, cut nerves leg</td>
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<tr>
<td>15:00-15:45</td>
<td>AP (A &amp; B) Anterior compartment of thigh - Saphenous opening</td>
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<td>TIME</td>
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<td>TUESDAY 24/05/2011</td>
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<td>THURSDAY 26/05/2011</td>
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<td>08:00-08:45</td>
<td>NE - (S8) Anatomy &amp; Physiology of the Autonomic Nervous System</td>
<td>AL - T5 (S12) Hip &amp; knee joint</td>
<td>AL - T5 (S12) Hip &amp; knee joint</td>
<td>Practical assessment: Anatomy &amp; Histology</td>
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<tr>
<td>09:00-09:45</td>
<td>AL - T5 (S11) Foot</td>
<td>AP (A &amp; B) Foot</td>
<td>AL - T5 (S13) Ankle joint</td>
<td>BLOCK DAY</td>
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<tr>
<td>10:00-10:45</td>
<td>AP (A &amp; B) Anterior &amp; lateral compartment leg</td>
<td>NE - (S10) Applied Neurology of the upper extremity</td>
<td>NE - (S11)</td>
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<tr>
<td>11:00-11:45</td>
<td>NE - (S9) Pharmacology of Neuropathic pain</td>
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<tr>
<td>14:00-14:45</td>
<td>AP (A &amp; B) Posterior compartment leg</td>
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<td>Theoretical assessment</td>
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<tr>
<td>08:00-08:45</td>
<td>Welcoming &amp; Review</td>
<td>T8 - (56) Applied Anatomy of the Vertebral Column</td>
<td>T8 - (S13) Clinical examination methods</td>
<td>T10 - (S4) Infective conditions of the musculoskeletal system</td>
<td>T11 - (S3) Approach to mono-arthritis; Osteo-arthritis (OA)</td>
</tr>
<tr>
<td>09:00-09:45</td>
<td>T8 - (S1) Terminology &amp; deformities</td>
<td>T8 - (S7) Examination of the Back</td>
<td>T9 - (S1) Imaging investigations of the musculoskeletal system</td>
<td>T10 - (S4) Infective conditions of the musculoskeletal system</td>
<td>T11 - (S4) Crystalarthritis</td>
</tr>
<tr>
<td>10:00-10:45</td>
<td>T8 - (S2) Physics and biomechanics</td>
<td>T8 - (S8) Applied Neurology of the Upper Extremity</td>
<td>T9 - (S2) Imaging investigations of the musculoskeletal system</td>
<td>T10 - (S5) Infective conditions of the musculoskeletal system</td>
<td>T11 - (S5) Interactive session</td>
</tr>
<tr>
<td>11:00-11:45</td>
<td>T8 - (S3) Clinical examination methods</td>
<td>T8 - (S9) Applied Anatomy of the Upper Extremity</td>
<td>T10 - (S1) Infective conditions of the musculoskeletal system</td>
<td>T10 - (S6) Infective conditions of the musculoskeletal system</td>
<td>T11 - (S6) Spondyloarthropathies</td>
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<tr>
<td>12:00-12:45</td>
<td>T8 - (S4) Clinical examination methods</td>
<td>T8 - (S10) Clinical examination methods</td>
<td>T10 - (S2) Infective conditions of the musculoskeletal system</td>
<td>T10 - (S7) Infective conditions of the musculoskeletal system</td>
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<tr>
<td>13:00-13:45</td>
<td>LUNCH</td>
<td>T8 - (S11) Clinical examination methods</td>
<td>T8 - (S12) Applied Anatomy of the lower extremity</td>
<td>T11 - (S1) General approach to arthritis and poly-arthritis</td>
<td>T11 - (S2) Rheumatoid arthritis (RA)</td>
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<td>14:00-14:45</td>
<td>T8 - (S4) Clinical examination methods</td>
<td>T8 - (S11) Clinical examination methods</td>
<td>T10 - (S3) Infective conditions of the musculoskeletal system</td>
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<tr>
<td>15:00-15:45</td>
<td>T8 - (S5) Clinical examination methods</td>
<td>T8 - (S12) Applied Anatomy of the lower extremity</td>
<td>T11 - (S2) Rheumatoid arthritis (RA)</td>
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<tr>
<td>08:00-08:45</td>
<td>T11 - (S7) Infections and rheumatism</td>
<td>T13 - (S1) Pharmacology</td>
<td>T14 - (S3) Congenital and developmental conditions</td>
<td>T18 - (S3) Conditions &amp; deformities of the lower limb</td>
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<tr>
<td>09:00-09:45</td>
<td>T11 - (S8) Soft tissue rheumatism</td>
<td>T13 - (S2) Paramedical (OT, Physio, Sw)</td>
<td>T14 - (S4) Congenital and developmental conditions</td>
<td>T17 - (S1) Conditions &amp; deformities of the upper limb</td>
<td>T18 - (S4) Conditions &amp; deformities of the lower limb</td>
</tr>
<tr>
<td>10:00-10:45</td>
<td>T11 - (S9) Paediatric rheumatism</td>
<td>T13 - (S3) Slideshow revision</td>
<td>T15 - (S1) Oncological conditions</td>
<td>T17 - (S2) Conditions &amp; deformities of the upper limb</td>
<td>T19 - (S1) General principles of resuscitation after trauma &amp; emergency treatment of fractures &amp; dislocations</td>
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<tr>
<td>11:00-11:45</td>
<td>T11 - (S10) Interactive session</td>
<td>T13 - (S4) Slideshow test</td>
<td>T15 - (S2) Oncological conditions</td>
<td>T17 - (S3) Conditions &amp; deformities of the upper limb</td>
<td>T20 - (S1) General principles of traumatic conditions</td>
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<tr>
<td>12:00-12:45</td>
<td>T12 - (S1) SLE</td>
<td>T15 - (S3) Oncological conditions</td>
<td>T15 - (S3) Oncological conditions</td>
<td>T20 - (S2) General principles of traumatic conditions</td>
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<td>LUNCH</td>
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<tr>
<td>14:00-14:45</td>
<td>T12 - (S2) SSc, Myopathies, vasculitis</td>
<td>T14 - (S1) Congenital and developmental conditions</td>
<td>T16 - (S1) Conditions of the pelvis and spinal column</td>
<td>T18 - (S1) Conditions &amp; deformities of the lower limb</td>
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<tr>
<td>15:00-15:45</td>
<td>T12 - (S3) Interactive session</td>
<td>T14 - (S2) Congenital and developmental conditions</td>
<td>T16 - (S2) Conditions of the pelvis and spinal column</td>
<td>T18 - (S2) Conditions &amp; deformities of the lower limb</td>
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<td>16:00-16:45</td>
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## WEEK 27: 01 – 05 AUGUSTUS 2011

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<tr>
<th>TIME</th>
<th>MONDAY 01/08/2011</th>
<th>TUESDAY 02/08/2011</th>
<th>WEDNESDAY 03/08/2011</th>
<th>THURSDAY 04/08/2011</th>
<th>FRIDAY 05/08/2011</th>
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<tbody>
<tr>
<td>08:00-08:45</td>
<td>T24 - (S1) Fractures &amp; dislocations of the lower limb</td>
<td>T25 - (S1) Soft tissue injuries of the musculoskeletal system</td>
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<tr>
<td>09:00-09:45</td>
<td>T21 - (S1) Immobilisation techniques of the upper limb</td>
<td>T24 - (S2) Fractures &amp; dislocations of the lower limb</td>
<td>T25 - (S2) Soft tissue injuries of the musculoskeletal system</td>
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<tr>
<td>10:00-10:45</td>
<td>T22 - (S1) Fractures &amp; dislocations of the spinal column &amp; pelvis</td>
<td>T24 - (S3) Fractures &amp; dislocations of the lower limb</td>
<td>T26 - (S1) The role of occupational- &amp; physiotherapy in rehabilitation</td>
<td>Block Day Assessment</td>
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<tr>
<td>11:00-11:45</td>
<td>T22 - (S2) Fractures &amp; dislocations of the spinal column &amp; pelvis</td>
<td>T24 - (S4) Fractures &amp; dislocations of the lower limb</td>
<td>T26 - (S2) The role of occupational- &amp; physiotherapy in rehabilitation</td>
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<td>12:00-12:45</td>
<td>T23 - (S1) Fractures &amp; dislocations of the upper limb</td>
<td>T24 - (S5) Fractures &amp; dislocations of the lower limb</td>
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<td>13:00-13:45</td>
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<td>14:00-14:45</td>
<td>T23 - (S2) Fractures &amp; dislocations of the upper limb</td>
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<td>15:00-15:45</td>
<td>T23 - (S3) Fractures &amp; dislocations of the upper limb</td>
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<td>16:00-16:45</td>
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Phase II (Theory): MUSCULOSKELETAL SYSTEM – S2302 371
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