MB, ChB
Phase II – Theory Modules

Musculoskeletal System

52302 371
2015
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Phase II – Theory Modules
2015

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 eight weeks. The initial section consists of four weeks of basic science lectures including Anatomy and Physiology, the neurology of the peripheral nerves, as well as applied Anatomy and Physics.

The last four 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 four weeks), a practical assessment, as well as a theoretical test will be held. At the end of the clinical section (second four 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 28 April 2015 (with lectures in Lecture Hall 7, Teaching Block).

LOCATIONS

All lectures are presented in Lecture Hall 7, Teaching Block.
All Anatomy practicals are presented in practical locations F123/124, F237/238 and F225, 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 group work (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)

1. Moore and Dalley. 2011/2013. Clinically Oriented Anatomy. 6th or 7th Edition, Lippincott, William and Wilkens. (References are indicated as M6/M7 in the study guide). (NB! All page references in this study guide refer to Moore!)

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 program (during which a structured dissection program is followed), coupled to a self-study program (as preparation for the practicals) a pre-assessment (forms 10% of class mark) and a lecture-program (supplemented where necessary).

- Theme 1 starts on TUESDAY 28 April 2015 at 08:00. All students must meet on TUESDAY 28 April 2015 at 08:00 in Venue 7, Teaching Block for a lecture. The practical sessions start WEDNESDAY 29 April 2015 in locations F123/124, F237/238, F225 and Histology lab. 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.

  - Each student must pay an amount of R500.00 for leasing of the skeletons. The fee will be deducted from your student’s account

  - NB! An amount of R300 per student is payable for the loan of the skeletons during the year. This amount will not be refunded.

  - NB! An amount of R200 will be paid back only if all material handed back is complete and in a satisfactory condition. **You are not allowed to make any marks on the bones.**

  - Handing in late: handing in late will only be accepted if you hand in a written request with valid reasons to the Division Anatomy and Histology 2 weeks prior to the handing in date. Also arrange a time with her when the bones will be handed in.

  - NB! A fine of between R50 to R250 is payable for late handing in of bones.

  - Skeletal bones must be handed back in person at the Division. Arrangements will be confirmed at the end of the module.

- **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.** Handing in of bones will start on the day of writing the Musculoskeletal module examination and the next successive two days.

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

- **Handing back of bones takes place in the ossuary, 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 (2014). 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 from the day of writing the Musculoskeletal module examination in November and the next successive two days, 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, and 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**

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<td>… your destination for the theme, i.e. the outcomes</td>
</tr>
<tr>
<td><img src="image2.png" alt="Icon 2" /></td>
<td>… contact session with a lecturer</td>
</tr>
<tr>
<td><img src="image3.png" alt="Icon 3" /></td>
<td>… an assignment that you must complete, i.e. self-study</td>
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<tr>
<td><img src="image4.png" alt="Icon 4" /></td>
<td>… group work with your fellow students</td>
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<tr>
<td><img src="image5.png" alt="Icon 5" /></td>
<td>… a practical</td>
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<tr>
<td><img src="image6.png" alt="Icon 6" /></td>
<td>… a case study</td>
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<td><img src="image7.png" alt="Icon 7" /></td>
<td>… the use of prescribed reading material</td>
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<td>… the use of computers</td>
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<td>… the use of internet material</td>
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<td><img src="image11.png" alt="Icon 11" /></td>
<td>… the use of slides</td>
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<tr>
<td><img src="image12.png" alt="Icon 12" /></td>
<td>… take note!</td>
</tr>
<tr>
<td><img src="image13.png" alt="Icon 13" /></td>
<td>… a brain “workout”: something extra for those looking for a challenge</td>
</tr>
<tr>
<td><img src="image14.png" alt="Icon 14" /></td>
<td>… self-assessment, an opportunity to ascertain whether you are on the right path</td>
</tr>
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<td><img src="image15.png" alt="Icon 15" /></td>
<td>… assessment during the module, that contributes to the class mark</td>
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ASSESSMENT

Section 1 – Anatomy (A), Histology (B), Physiology (C) and Neurosciences (D)

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 (Spot test): 35%
- Written (theoretical) assessment:
  - Section A, B and C: 35%
- GERGA (theoretical) assessment:
  - Section D: 20%
- Pre-practical Sunlearn test: 10%

Practical Assessment

Date: Thursday 21st May 2015
Time: The group-division, venue and times for meeting will be made known at a later stage on the notice board, Fisan Building. 11:30 – 14:30
Location: GERGA and Examination location, 5th Floor, Teaching Block
Type: Identification (identification of anatomical and histological structures).
Percentage contribution: 50%

Theoretical Assessment

Date: Friday 22nd May 2015
Time: 10:00 – 12:30 The group-division (GERGA, BOYD) and times for meeting will be made known at a later stage on the notice board, Fisan Building.
Location: GERGA and Examination location, 5th Floor, Teaching Block
Type: True-and-false questions; short questions; paragraph questions; long questions; Multiple choice questions on WebCT
Percentage contribution: 50%

Because the practical assessment contributes 50% to the marks of the preclinical part 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 31st July 2015  
Time:  09:00 – 12:00  
Location:  GERGA  
Type:  Multiple Choice Questions

Examination (Written & Computer MCQ)

The examination for MB, ChB-students takes place on Wednesday 4th November 2015 (at 09:00) in GERGA and the Examination Location, Fifth Floor, Teaching Block (details to be confirmed at a later stage).

Global Mark Allocation

1)  Test
   a. Practical anatomy test (Thursday 21 May 2015)
   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 22 May 2015)]
   c. Second theory test will include Clinical Orthopaedics, Rheumatology and other subjects studied since the first test. (Friday 31st July 2015)
   d. Test mark allocation = (Preclinical tests [a +b] and portfolio + Clinical test [c])/2

2)  Exam (Wednesday 4th November 2015)
   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 prospective 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.

Review Sessions:
At the end of most themes there will be a review session. All lecturers who were involved in the session will participate in this. Prior to this session students are encouraged read over the study material relevant to the theme, and to prepare questions to ask this panel. The lecturers will answer questions and discuss and clarify topics covered in the recently completed theme. Members of the panel will also present case studies of relevant clinical conditions.

REFERENCES AND TEXTBOOKS FOR THE CLINICAL SECTION OF THE 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.

1. Concise System Of Orthopaedics And Fractures – AG Apley/L Solomons
2. Apleys System Of Orthopaedics And Fractures – AG Apley/L Solomons
3. Clinical Orthopaedic Examination - Ronald Mcrae
4. Practical Fracture Treatment - Ronald Mcrae
5. Dorlands Medical Dictionary – Saunders
Websites

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

LOCATIONS

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

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<th>Lectures</th>
<th>Lecture Hall 7, Ground Floor, Teaching Block</th>
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<tbody>
<tr>
<td>HL</td>
<td>Histology Laboratory, Room 5035, 5th Floor, Education Block</td>
</tr>
<tr>
<td>PL</td>
<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>
<th>E-MAIL</th>
<th>TEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prof B Page</td>
<td>Div of Anatomy &amp; Histology</td>
<td><a href="mailto:bjp@sun.ac.za">bjp@sun.ac.za</a></td>
<td>021-938 9430</td>
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<tr>
<td>Dr V Tchokonte-Nana</td>
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<td><a href="mailto:venant@sun.ac.za">venant@sun.ac.za</a></td>
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<td><a href="mailto:aa2@sun.ac.za">aa2@sun.ac.za</a></td>
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</tr>
<tr>
<td>Dr SH Kotze</td>
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<td><a href="mailto:shk@sun.ac.za">shk@sun.ac.za</a></td>
<td>021-938 9428</td>
</tr>
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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.

OVERVIEW OF THE THEME

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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 6, Moore 7

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 planes and the specific meaning of certain terms can be defined and explained:

- the anatomical position (M6: 5; M7: 5)
- anatomical planes (M6: 5; M7: 5)
- terminology with regards to relationships (M6: 6; M7: 6)
- terminology with regards to movements (M6: 7; M7: 7)

**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) | Plantar flexion |
| (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.

OVERVIEW OF THE THEME

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THEME 2: OSTEOLOGY

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 6/7
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 (M6: 19; M7: 19).
- Explain and demonstrate the concepts axial and appendicular skeleton (M6: 19; M7:19).
- Explain the meaning of the following terms (M6: 20; M7: 20):
  - condyles
  - epicondyle
  - supracondylar ridge
  - tubercle
  - tuberosity
  - trochanter
  - ridge
  - capitulum
  - trochea
  - spina
  - malleolus
  - line ("linea")
  - fossa
  - notch
  - head
  - neck
  - shaft
  - linea aspera
  - interosseous border
  - foramen
  - groove
  - ramus
  - articular processes/surfaces
  - projection
- Name and identify the following bones with their specific parts:
  1. Occipital bone (M6: 822; M7: 822)
     - occipital condyles
  2. Vertebrae (M6: 76;440-453;982-984; M7: 76;440-453; 982-984)
     - body
     - vertebral foramen
     - pedicle
     - lamina
     - transverse process
     - spinous process
     - articular surfaces
     - foramen transversarium (C1-C7)
     - dens (on C2)
     - sacrum (5 fused sacral vertebrae)
  3. Sacrum (M6: 451-453; M7: 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)
4. **Sternum (M6: 76-78; M7: 76-78)**
   - manubrium
   - body
   - xiphoid-process
   - jugular notch (suprasternal notch)
   - clavicular notch
   - attachment-area for cartilage of rib 1
   - costal notches 2-7 (for articulation with costal cartilages 2-7)
   - manubrio-sternal joint (sternal angle; angle of Louis)
   - xiphi-sternal joint
   - transverse ridges

5. **Rib (M6: 74; M7: 74)**
   - head
   - neck
   - shaft
   - tubercle
   - costal angle
   - costal groove
   - articular surfaces
   - external surface
   - internal surface

6. **Clavicle (M6: 673-675; M7: 673-675)**
   - medial extremity (sternal extremity)
   - lateral extremity (acromial extremity)
   - shaft
   - superior surface
   - inferior surface
   - anterior margin
   - posterior margin

7. **Scapula (M6: 675-676 ; M7 : 675-676)**
   - spina
   - supraspinous fossa
   - infraspinous fossa
   - subscapular fossa
   - acromion
   - coracoid process
8. Humerus (M6: 676-677; M7: 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 (M6: 677; M7: 677)
     - trochlea (M6: 677; M7: 677)
     - coronoid fossa (M6: 677; M5: 677)
     - olecranon fossa (M6: 677; M7: 677)

9. Ulna (M6: 677-678; M7: 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 (M6: 678-679; M7: 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 (M6: 680; M7: 680)
   - scaphoid
   - lunate
   - triquetrum
   - pisiform
   - trapezium
   - trapezoid
   - capitate
   - hamate

12. Metacarpal bones (M6: 680; M7: 680)

13. Phalanges (of hand) (M6: 680; M7: 680)
   - proximal
   - middle
   - distal

14. Hip bone (os coxae) (M6: 514-516; M7: 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 (M6: 516-520; M7: 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
     - gluteal 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 (M6: 520-521; M7: 520-521)
   - proximal portion
     - medial condyle
     - lateral condyle
     - medial tibial plateau
     - tibial tuberosity
   - body
     - borders (anterior; interosseous; medial)
     - surfaces (medial; lateral; posterior)
• distal portion
  □ medial malleolus
  □ articular surface

18. Fibula (M6: 521-522; M7: 521-522)
  • proximal portion
    □ head (with apex)
  • body
    □ borders (anterior; interosseous; posterior)
    □ surfaces (medial; lateral, posterior)
  • distal portion
    □ lateral malleolus
    □ articular surfaces

19. Tarsal bones (M6: 522-524; M7: 522-524)
  • calcaneous
  • talus
  • navicular bone
  • cuboid bone
  • cuneiform bones (3): medial; intermediary; lateral

20. Metatarsal bones (M6: 524; M7:524)

21. Phalanges of foot (M6: 524; M7:524)
  • proximal
  • middle
  • distal
THEME 3: JOINTS

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.

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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 6/7
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 (M6: 466-467; M7: 466-467)
   - atlanto-axial joint (M6: 467-468; M7: 467-468)
   - shoulder joint (M6: 796; M7: 796)
   - elbow joint (M6: 800; M7: 800)
   - wrist joint (M6: 809; M7: 809)
   - hip joint (M6: 626; M7: 626)
   - knee joint (M6: 634; M7: 634)
   - ankle joint (M6: 647; M7:647)

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 (symphyses)
- synovial
- skull sutures(M6: 822-836; M7: 822-836)
- tempero-mandibular joint (M6: 916; M7: 916)
- atlanto-occipital joint (M6: 467; M7: 467)
- atlanto-axial joint (M6: 467; M7: 467)
- joints of the vertebral bodies (intervertebral joints) (M6: 464;
- joints of the vertebral arches ("zygapophyseal joints") (M6: 466; M7: 466)
- costo-vertebral joints (M6: 79-80; M7: 79)
  - between head of rib and vertebral body
  - between tubercle of rib and transverse process of vertebra
- costo-chondral joints (M6: 80; M7: 80)
- interchondral joints (M6: 81; M7: 80)
- sternocostal joints (M6: 81; M7: 81)
- manubrio-sternal joint (M6: 78; M7: 78)
- xiphi-sternal joint (M6: 78; M7: 78)
- lumbo-sacral joint (M6: 332; M7: 332)
- sacro-coccygeal joint (M6: 332; M7: 332)
- sacro-iliac joint (M6: 330; M5: 330)
- pubic symphysis (M6: 332; M5: 332)
- sterno-clavicular joint (M6: 794; M7: 794)
- acromio-clavicular joint (M6: 796; M7: 796)
- shoulder joint (gleno-humeral joint) (M6: 796; M7: 796)
- elbow joint (M6: 800; M7: 800)
- proximal radio-ulnar joint (M6: 804; M7: 804)
- distal radio-ulnar joint (M6: 806; M7: 806)
- wrist joint (M6: 809; M7: 809)
- hand joints: (M6: 809-813; M7: 809-813)
  - (intercarpal joints; carpo-metacarpal joints; intermetacarpal joints; metacarpo-phalangeal joints; interphalangeal joints)
- hip joint (M6: 626; M7: 626)
- knee joint (M6: 634; M7: 634)
- proximal tibio-fibular joint (M6: 645; M7: 645)
- distal tibio-fibular joint (M6: 647; M7: 647)
- ankle joint (M6: 647; M7: 647)
- foot joints (M6: 650; 652 table 5.18; M7: 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 (supraspinatous, infraspinatous, 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 (M6: 799 Fig 6.95 A; M7: 799 Fig 6.95A)

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 (M6: 799 Fig 6.95 B; M7: 799 Fig 6.61 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

• CARTILAGINOUS 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-costal joints
- interchondral joints
- costo-vertebral joints
- sacro-iliac joint
- facet-joints ("zygapophyseal 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 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) Interchondral 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) Costo-chondral 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) Costo-chondral 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) Rotatie/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 metacarpophalangeal 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) Scaphoid, pisiform, 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 transverse 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 and ulna
   (e) Head of ulna and ulnar notch of radius

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) Temperomandibular 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-aksiale gewrig/Atlanto-axial joint
   (b) Kosto-vertebrale gewrigte/Costo-vertebral joints
   (c) Sterno-klavikulêre gewrig/Sterno-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
   (d) Xiphi-ster nal joint
   (e) Joints between vertebral bodies
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 (Symphysis)?
   (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 criterium 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: M6/7: 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

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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 6/7
2. Netter
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 the osteology of the vertebrae in general as well as the regional characteristics (M6: 76: 443-451; M7: 76: 443-451).
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) (M6: 466-469 Fig 4.21 A; M7: 466-469 Fig 4.21 A)
   - posterior atlanto-occipital membrane (ligament) (M6: 467-469 Fig 4.21 B; M7: 467-469 Fig 4.15 B)
   - anterior atlanto-axial membrane (ligament) (M6: 466-469 Fig 4.21 A; M7: 466-469 Fig 4.21A)
   - posterior atlanto-axial membrane (ligament) (M6: 467-469 Fig 4.21 B; M7: 467-469 Fig 4.21 B)
   - tectorial membrane
   - alar ligaments ("check ligaments") (M6: 468 Fig 4.20 A; M7: 468 Fig 4.20A)
   - ligamentum nuchae (M6: 468 Fig 4.20 A M7:468 Fig 4.20 A)
   - transverse ligament of atlas (M6:468-469 Fig 4.20 A,B,C ; M7: 468-469 Fig 4.20 A,B,C)
   - anterior longitudinal ligament (M6: 466 Fig 4.17; M7: 466 Fig 4.17)
   - posterior longitudinal ligament (M6: 467 Fig 4.18 B; M7:467 Fig 4.18 B)
   - ligamentum flavum (M6: 466 Fig 4.17; M7: 466 Fig 4.17)
   - supraspinous ligaments (M6: 467 Fig 4.18 B; M7: 467 Fig 4.18 B)
   - interspinous ligaments (M6: 467 Fig 4.18 B; M7: 467 Fig 4.18 B)
   - intertransverse ligaments (M6: 467 Fig 4.18 B; M7: 467 Ffig 4.18 B)

NB:

- anterior atlanto-occipital membrane: runs from the anterior border of foramen magnum to the anterior arch of C1 (M6: 469 Fig 4.21 A; M7: 469 Fig 4.21 A)
- posterior atlanto-occipital membrane: runs from the posterior border of foramen magnum to the posterior arch of C1 (M6: 469 Fig 4.21 B; M7: 469 Ffig 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) (M6: 466 Fig 4.17; M7: 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 (M6: 468 Fig 4.20 A; M7: 468 Fig 4.20 A).
- transverse ligament of the atlas: strong band which runs between the tubercles of the lateral masses of C1 (contains the dens of C2 against the anterior arch of C1) (M6: 468 Fig 420 A; M7: 468 Fig 420 A)
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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<td>12/05/2015</td>
<td>Venue 7</td>
<td>Upper Leg (Thigh)</td>
<td>Dr V Tchokonte-Nana</td>
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<td>13/05/2015</td>
<td>Venue 7</td>
<td>Lower Leg</td>
<td>Dr V Tchokonte-Nana</td>
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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 6/7
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 (2013) for practical sessions in Anatomy.
- Consult the time table for the allocation of practicals (mostly groups A and B will be dissecting simultaneously).
- Group A - mainly Afrikaans speaking group.

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 deltid 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):
  - M. rectus femoris can result in flexion of the hip joint, as well as extension at the knee joint.
  - M. 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: If a muscle or muscle group stretches over more than one joint, it can also carry out an action at more than joint, for example
- M. rectus femoris can result in flexion of the hip joint, as well as extension at the knee joint.
- M. 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 (M6/7: 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 (M6/7: 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 (M6/7: 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 (M6/7: 713):
   - definition
   - position
   - apex
   - base
   - walls (anterior; posterior; medial; lateral)
   - contents
5. The **cubital fossa** should be studied with regards to (M6/7: 739):
   - definition
   - position
   - borders
   - roof
   - floor
   - contents

6. The **carpal tunnel** should be studied with regards to (M6/7: 790):
   - position
   - structures
   - borders
   - roof
   - floor
   - contents
   - carpal tunnel syndrome

7. The **femoral triangle** should be studied with regards to (M6/7: 551-556; 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 (M6/7: 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 (M6/7: 584):
   - position
   - borders
   - roof (posterior aspects)
   - floor (anterior aspects)
   - content

10. Explain the following **terms** (what do you understand by the following terms?) (M6/7: 552-553):
    - femoral sheaths
    - compartments of femoral sheaths
• femoral canal
• femoral ring
• femoral hernia: (M6/7: 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 (M6/7: 796)
• elbow joint (M6/7: 800)
• wrist joint (M6/7: 809)
• hip joint (M6/7: 626)
• knee joint (M6/7: 634)
• ankle joint (M6/7: 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.
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 a 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 and pre-practical test (forms 10% of test mark) serve 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 6/7 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.

- You 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 6/7 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.
- The allocation of groups is based on grouping in Respiratory and Cardiovascular modules.

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 6/7 (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 6/7 (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*: 14th Edition (p. 5-13); 15th Edition (pages 5-14).

- 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) and intermediate muscles of the back:
  - first layer: mm. splenius capitis; splenius cervicis
  - second layer: erector spinae group (mm. iliocostalis; longissimus; spinalis)
  - third layer: transversospinalis group (mm. semispinalis; multifidus; rotatores). Study (no dissection) the latter two muscles only.
- **NB:** you do not need to dissect the sub-occipital area.

**Dissection instructions: Week 18**


✅ **Pre-practical assessment (Sunlearn Test 1):** Back, Upper extremity and Axilla.

- 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; thenar 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


Pre-practical assessment (Sunlearn Test 2): Hand, Joints of Upper extremity and Thigh.

- 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 thigh with specific attention to the femoral triangle, adductor canal and muscles in the anterior compartment.
- Study and dissect the medial compartment of the thigh.
- Study and dissect the gluteal area (give particular attention to important landmarks).
- Study and dissect the posterior compartment of the thigh.
- Study and dissect the popliteal fossa.

Dissection instructions: Week 20


Pre-practical assessment (Sunlearn Test 3): Gluteal region, Leg, Foot and Joints of Lower extremity.

- Study and dissect the posterior compartment of the (lower) leg.
- Study and dissect the lateral compartment of the (lower) leg.
- Study and dissect the anterior 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 22 May 2015.

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 (M6/7: 700-701)

1. Trapezius.
2. Latissimus dorsi.
3. Levator scapulae.
4. Rhomboid major.
5. Rhomboid minor.

B. INTRINSIC BACK MUSCLES (M6/7: 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 (M6/7: 698)

1. Pectoralis major
2. Pectoralis minor
3. Subclavius
4. Serratus anterior

D. SCAPULAR MUSCLES (M6/7: 704-705)

1. Deltoid.
2. Supraspinatous.
3. Infraspinatous.
4. Teres minor.
5. Teres major.
E. **MUSCLES OF THE UPPER ARM** (M6/7: 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** (M6/7: 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** (M6/7: 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. **Thenar muscles** (M6/7: 776)
   i) Abductor pollicis brevis.
   ii) Flexor pollicis brevis.
   iii) Opponens pollicis.

2. **Adductor pollicis** (M6/7: 776).

3. **Hypothenar muscles** (M6/7: 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 (M6/7: 564)**
   i) Iliacus maximus
   ii) Gluteus medius
   iii) Gluteus minimus
   iv) Piriformis
   v) Obturator internus
   vi) Gemelli (superior and inferior)
   vii) Quadratus femoris

I. **THIGH**
   1. Anterior compartment (M6/7: 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 (M6/7: 549)
      i) Pectineus
      ii) Adductor longus
      iii) Adductor brevis
      iv) Adductor magnus
      v) Gracilis
      vi) Obturator externus
   3. Posterior compartment (M6/7: 570)
      i) Semi-tendinosus
      ii) Semi-membranosus
      iii) Biceps femoris

J. **LOWER LEG ('LEG')**
   1. Anterior compartment (M6/7: 591)
      i) Tibialis anterior
      ii) Extensor hallucis longus
      iii) Extensor digitorum longus
      iv) Peroneus tertius (Fibularis tertius)
2. Lateral compartment (M6/7: 591)
   i) Peroneus longus (Fibularis longus)
   ii) Peroneus brevis (Fibularis brevis)

3. Posterior compartment
   3.1 Superficial group (M6/7: 597)
      i) Gastrocnemius
      ii) Soleus
      iii) Plantaris

   3.2 Deep group (M6/7: 598)
      i) Popliteus
      ii) Flexor hallucis longus
      iii) Flexor digitorum longus
      iv) Tibialis posterior

K. MUSCLES OF THE FOOT

1. Dorsum of foot (M6/7: 614)
   i) Extensor digitorum brevis
   ii) Extensor hallucis brevis

2. Sole of foot (M6/7: 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 (M6/7: 713)
2. cubital fossa (M6/7: 739)
3. femoral triangle (M6/7: 551)
4. adductor canal (M6/7: 556)
5. popliteal fossa (M6/7: 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 (M6: 636; M7: 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 (M6: 637 Fig 5.87 B; M7: 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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<td>PRACTICAL</td>
<td>Ms A Alblas</td>
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<td>Group A: 10:00</td>
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<td>Group B: 14:00</td>
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<tr>
<td>6 &amp; 7</td>
<td>12/05/2015</td>
<td>GERGA</td>
<td>Histology tutorials</td>
<td>Selfstudy</td>
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<td>Group A: 14:00</td>
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<td>Revision muscle tissue</td>
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<td>Group B: 08:00</td>
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</table>

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.
8. Use Gerga tutorial to revise muscle tissue.

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 Webstudies 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 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 swop. 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 EN 7: TUTORIALS 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. Revise muscle tissue. Use the "Muscle tissue" tutorial on Toolbook under the menu "FOR Foundation Phase (Life forms...)"
4. Use the tutorials for revision before the practical test.

**RESOURCES**

1. Notes (practical and theory)
2. Study guide
3. Tutorials in Gerga

**ANYTHING SPECIFIC YOU SHOULD DO?**

Session 6 & 7 (1 period each): self-study (own time)

**TUTORIALS IN GERGA**

**Instructions**

Use the tutorials for revision of the histology practical before the practical test. Instruction to access the tutorials will be available on Webstudies under the S-drive on the desktop. Use it in conjunction with your lecture and practical notes. You will also be expected to complete a quiz on Webstudies after you have completed the tutorials. Details will be given in the practical class.
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>Dr D van Vuuren</td>
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<td>Tutorial</td>
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THEME 7: MUSCULAR ACTIONS

SESSION 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 and analyze 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!

**ANYTHING SPECIFIC YOU SHOULD DO?**

**Sessions 1-4: Lectures**

To get the most out of the lectures it would be to your benefit if you revise the basic principles of skeletal muscle contraction. There are two sources you can use for this:

- Previous work: 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). Silverthorn (5th ed.): p. 408-420.

**After the lecture**

- Supplement your class notes from the available resources.
- Try and complete all the outcomes.

**Very important!**

In preparation for the test and exam, try and complete the following questions: Questions 1 - 29 are “right or wrong” questions. Check the answers with your class notes and class mates.

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
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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>
<td>T</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>
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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.

![Hammer hitting a nail](image)

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.

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<tbody>
<tr>
<td>11.</td>
<td>When a beaker is lifted up, the right musculus biceps contracts isometrically.</td>
</tr>
<tr>
<td>12.</td>
<td>When a beaker is lifted up, the right musculus triceps contracts concentrically.</td>
</tr>
<tr>
<td>13.</td>
<td>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.</td>
</tr>
<tr>
<td>14.</td>
<td>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.</td>
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<tr>
<td>15.</td>
<td>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.</td>
</tr>
<tr>
<td>16.</td>
<td>When the beaker is put down slowly, the right musculus triceps contracts concentrically.</td>
</tr>
<tr>
<td>17.</td>
<td>When the beaker is put down slowly, the right musculus biceps contracts eccentrically.</td>
</tr>
<tr>
<td>18.</td>
<td>More muscle fibres are activated in the biceps when the beaker is lifter up than when it is placed down.</td>
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<tr>
<td>19.</td>
<td>More muscle fibres are activated in the biceps when the beaker is put down quickly than when it is placed down slowly.</td>
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</tbody>
</table>
| 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.

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<tr>
<td><strong>21.</strong> If both objects are held still (no movement), with the elbow in 90° flexion, then the load per activated fibre is exactly the same in the musculus biceps of both arms.</td>
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<td><strong>22.</strong> 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.</td>
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<tr>
<td><strong>23.</strong> 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.</td>
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<td><strong>24.</strong> 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>
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<tr>
<td><strong>25.</strong> 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>
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<tr>
<td><strong>26.</strong> 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>
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<tr>
<td><strong>27.</strong> 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>
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<td><strong>28.</strong> Isometric contraction of the m. biceps of both arms will enable the right hand to rise, while the left hand drops.</td>
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<tr>
<td><strong>29.</strong> If the load per activated muscle fibre in the m. biceps of both arms is exactly Po/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 1: ANATOMY OF THE SPINAL CORD

**OUTCOMES**

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

1. Name the regions of the spinal cord.
2. Describe the position, relations and coverings of the spinal cord.
3. Name and demonstrate the position of the afferent and efferent nerve pathways in the spinal cord.
4. Describe the elements and course of the somatosensory pathways.
5. Describe the elements and course of the descending nerve pathways.
6. Describe a dermatome and the dermatomal pattern of the body.
7. Discuss a few spinal cord lesions.
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.
SESSION 4: THE PATHOLOGY OF DISEASES OF THE SPINAL CORD AND LMN, INCLUDING ANTERIOR HORN CELL, NEUROMUSCULAR NERVE JUNCTION, MUSCULAR AND PERIPHERAL NERVES

OUTCOMES

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: 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

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

SESSION 6: PERIPHERAL NEUROPATHY

OUTCOMES

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.

**NEURO SCIENCES**

**SESSION 7: 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.

**NEURO SCIENCES**

**SESSION 8: 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 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.
OUTCOMES

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

Discuss

1. Understand the anatomical structures that make up the sympathetic and parasympathetic systems
2. Understand the various neurotransmitters involved in the autonomic nervous system
THEME 8:
INTRODUCTION TO THE CLINICAL MUSCULOSKELETAL BLOCK - 371

AIM:
The aim of this theme is to supply you with essential background information, understanding and knowledge of the basic sciences. This will greatly enhance your ability to understand the tools we use to make sense out of the Musculoskeletal Module. Biomechanics, Applied Anatomy, Structured Examination of the Musculoskeletal Patient and the ability to use Special Investigations, for the correct indication and at appropriate times, will empower you to understand and appreciate the art of Orthopaedics. All the relevant information is provided in your notes under standardized headings. References have been provided for further reading.

OVERVIEW OF THE THEME

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<td>Lecture</td>
<td>Welcoming &amp; Introduction Lecture</td>
<td>Dr J du Toit, Dr ICM Robertson</td>
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<td>2</td>
<td>6/7/2015</td>
<td>Lecture</td>
<td>Terminology</td>
<td>Dr J du Toit</td>
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<td>3</td>
<td>6/7/2015</td>
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<td>Biomechanics and Physics</td>
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<td>Lecture</td>
<td>Orthopaedic Special Investigations - Radiology</td>
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<td>7</td>
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<td>Lecture</td>
<td>Principles of Nuclear Medicine</td>
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<td>8/7/2015</td>
<td>Revision</td>
<td>Theme 8</td>
<td>Dr J du Toit, Dr ICM Robertson, Prof J Warwick</td>
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OUTCOMES:

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

1. Utilize your ability to describe normal posture, appearance, movements and anatomy of the musculoskeletal system (Theme 1-7) so that you can better understand the musculoskeletal anomalies.
2. Recognize and describe the common musculoskeletal anomalies.

ANYTHING SPECIFIC YOU SHOULD DO?

1. Revise the Module: The Musculoskeletal System of Phase II.
2. Utilize the prescribed resources to study each of the following definitions before attending Session 1:

Normal Osteology of a Long Bone:
- Epiphysis
- Physis
- Metaphysis
- Diaphysis

-Algia: A Combining form denoting “Pain in a specified part of the body”
- Antalgia
- Arthralgia
- Causalgia
- Metatarsalgia
- Myalgia
- Neuralgia
- **Arthro**: A Combining form meaning “Joint” OR “Jointed”
  - Arthritis
  - Arthrosis
  - Gon-Arthrosis
  - Arthrodesis
  - Arthroplasty
  - Arthroscopy
  - Subluxation
  - Dislocation

- **Osteo**: A Combining form meaning “Bone”
  - Osteitis
  - Osteomyelitis
  - Osteochondritis
  - Osteochondrosis
  - Osteolysis
  - Osteosclerosis
  - Osteophyte
  - Osteomalacia
  - Osteoclasts
  - Osteotomy
  - Osteoporosis
  - Osteopenia

- **Osteitis**: Inflammation of bone or bony tissue and Related Terminology
  - Osteitis
  - Osteomyelitis
  - Involucrum
  - Sequestrum

- **Spondylo**: A prefix meaning the vertebrae or the spinal column
  - Spondylolysis
  - Spondylolisthesis
  - Spondylosis
- Terminology related to the Spine
  - Lordosis
  - Kyphosis
  - Scoliosis
  - Torticollis

- Terminology related to normal or pathological processes in bone
  - Dysplasia
  - Dystrophy
  - Exocytosis
  - Lysis
  - Sclerosis
  - Osteoporosis
  - Osteopenia
  - Osteomalacia

- Osteoarthritis and Related Terminology
  - Osteoarthritis
  - Osteophyte
  - Osteosclerosis
  - Cysts
  - Subluxation
  - Ankylosis

-Musculoskeletal Terminology for Anomalies around the Foot
  - Bunion or Hallux Valgus
  - Pes Cavus
  - Pes Planus
  - Equines
  - Curly Toe
  - Hammer Toe

- Musculoskeletal Terminology for Anomalies around the Hip Joint
  - Coxa: The hip bone or hip joint
  - Coxa Breva
  - Coxa Magna
  - Coxa Vara
RESOURCES

1. Dorland’s Medical Dictionary
Publisher: Saunders; 29 edition (June 15, 2012)
Language: English
ISBN-10: 1455708437

2. Moore’s Clinically Oriented Anatomy
Publisher: Lippincott Williams & Wilkins; Seventh, North American Edition (February 13, 2013)
ISBN-10: 1451119453

3. Oxford Dictionaries
http://www.oxforddictionaries.com

CASE STUDIES

At the end of this session a cross word puzzle assessing your understanding and knowledge of terminology will be presented, thus enabling us to emphasize the key concepts.

THEME 8: INTRODUCTION TO THE CLINICAL MUSCULOSKELETAL BLOCK - 371

SESSION 3: BIOMECHANICS AND PHYSICS

OUTCOMES

At the end of this session, you should understand:

1. Lever systems and how the skeletal system uses them.
   Loading of bone and soft tissue and 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.
9. Failure of bone in compression. Torus 'fractures'.
RESOURCES


THEME 8: INTRODUCTION TO THE CLINICAL MUSCULOSKELETAL BLOCK - 371

SESSION 4:
PRINCIPLES OF APPLIED ANATOMY

OUTCOMES

After this session you should:
1. Have a better understanding of the clinical importance of anatomy in orthopaedics
2. Understand how the neuro-musculo-skeletal systems integrate to enable controlled motion
3. Understand how to apply anatomy to the examination of the musculo-skeletal system.

This lecture provides an overview of the applied anatomy of the musculo-skeletal system. It is the application of the knowledge on anatomy that you have previously acquired.

THEME 8: INTRODUCTION TO THE CLINICAL MUSCULOSKELETAL BLOCK - 371

SESSION 5:
EXAMINATION OF THE ORTHOPAEDIC PATIENT

OUTCOMES

After this session you should be able to:
1. Structure an orthopaedic-directed interview and examination
   a. Be able to obtain a thorough history
   b. Do a focussed general examination
   c. Do a systemic musculo-skeletal examination
2. Be able to formulate a differential diagnosis
3. Make a decision on the need for further investigations

ANYTHING SPECIFIC YOU SHOULD DO?

SELF STUDY:
This lecture will provide an overview of the examination of an Orthopaedic patient. Detailed examinations of specific regions will be taught during your clinical rotation. You should perform self-study of the regional examinations to familiarise yourself with these regional examinations.
RESOURCES

1. Apleys system of orthopaedics and fractures pg 3-13
2. Clinical Orthopaedic Examination. McCrae
3. Orthopaedic Physical Assessment. D Magee

SESSION 6:
ORTHOPAEDIC SPECIAL INVESTIGATIONS-
RADIOLOGY

Outcomes:

1. Indications for requesting a X-ray to diagnose musculoskeletal conditions
2. The actual methodology of requesting a X-ray
3. Be able to evaluate and interpret the X-ray with regards to:
   - General Principles
   - Discussion of the radiological characteristics of fractures
   - Discussion of the radiological characteristics of dislocations
4. Be aware of musculoskeletal conditions which do not justify unnecessary radiological investigations.
5. Indications for requesting additional imaging investigations (e.g. Ultrasound, Nuclear Medicine, Computerized Tomography and Magnetic Resonance)
6. Possible side-effects, risk and costs of these imaging investigations

RESOURCES

1. Orthopedic Imaging: A Practical Approach
   Author: Adam Greenspan
   Publisher: Lippincott Williams & Wilkins; Fifth, North American Edition (October 4, 2010)
   ISBN-10: 1608312879
5. Accuracy of Ottawa ankle rules to exclude fractures of the ankle and mid-foot:
ANYTHING SPECIFIC YOU SHOULD DO?

Please prepare yourself for this session by doing some background reading on the topic of radiology and the risks thereof:

These articles are freely available on the Internet:


CASE PRESENTATIONS:

At the end of this session a clinical case scenario will be presented. A 10 minute small group discussion will be devoted to the appropriate imaging modalities and the actual request thereof.

THEME 8: INTRODUCTION TO THE CLINICAL MUSCULOSKELETAL BLOCK - 371

SESSION 7:
PRINCIPLES OF NUCLEAR MEDICINE

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 9:**

**ORTHOPAEDIC TRAUMA - GENERAL PRINCIPLES**

**AIM:**
This session deals with general trauma principles of the Musculoskeletal system. It will equip you to deal with Musculoskeletal Trauma encountered in an emergency setting. The diagnosis and emergency treatment of the multiple injured patient will be discussed as well as the general treatment principles and complications of Orthopaedic injuries. Special emphasis will be placed on Paediatric Trauma and Spinal cord injuries. All the relevant information is provided in your notes under standardized headings. References have been provided for further reading.

**OVERVIEW OF THE THEME**

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<td>Approach to the Orthopaedic Trauma Patient -</td>
<td>Dr ICM Robertson</td>
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<td>Resuscitation - Part 1</td>
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<td>Resuscitation - Part 1</td>
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<td>General Principles of Fracture Management - 1</td>
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<td>Dr D Hugo</td>
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<td>Complications - Part 1</td>
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<td>Complications - Part 2</td>
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<td>Dr D Hugo</td>
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<td>Dr J Davis</td>
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OUTCOMES:
At the end of this session, you should understand and be able to do the following:

1. Pre-Hospital care and the Golden hour.
2. Hospital workup and resuscitation.
3. Surgical timing and Damage control Orthopaedics.
4. Explain the emergency treatment of an injured limb.
5. Explain emergency immobilisation techniques of the neck, spinal column and limbs.

RESOURCES

3. ATLS Advanced Trauma Life Support for Doctors - Student Course Manual: Ninth Edition

ANYTHING SPECIFIC YOU SHOULD DO?

Trauma make a large part of the burden of disease we have to deal with in South Africa and a clear understanding thereof is extremely important to be able to practice medicine effectively. This is a wonderful opportunity to quickly revise and consolidate your understanding of the principles of Resuscitation, with specific reference to Orthopaedic injuries (presentation, basic treatment and complications).

Case presentations:

Examples of trauma cases will be presented and discussed.
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. Describe and discuss the basic principles pertaining to application of a cast.
8. Discuss the principles of a three point pressure system in a cast.
9. Tabulate and discuss the complications of cast application and the prevention thereof.
10. Describe how a fracture and/or a dislocation is reduced.

RESOURCES

3. ATLS Advanced Trauma Life Support for Doctors - Student Course Manual: Ninth Edition

ANYTHING SPECIFIC YOU SHOULD DO?

Trauma make a large part of the burden of disease we have to deal with in South Africa and a clear understanding thereof is extremely important to be able to practice medicine effectively. This is a wonderful opportunity to quickly revise and consolidate your understanding of the principles of Resuscitation, with specific reference to Orthopaedic injuries (presentation, basic treatment and complications).

Case presentations:

Examples of trauma cases will be presented and discussed.
OUTCOMES
At the end of this session, you should be able to do the following:

Discuss and understand the complications associated with Trauma under the following headings:

- Early onset - Hypovolaemic Shock
- Intermediate onset - SIRS/MOD/MOF
  - Fat Embolism Syndrome
  - Complications of prolonged Bed rest

Discuss and understand the complications associated with Fractures and Dislocations under the following headings:

- Early onset - Vascular injuries
  - Nerve injuries
  - Compartment syndrome
- Late onset - Avascular necrosis
  - Post traumatic Osteoarthritis/Joint stiffness
  - Complex Regional Pain Syndrome
  - Delayed and Non-unions

RESOURCES
6. ATLS Advanced Trauma Life Support for Doctors - Student Course Manual: Ninth Edition

ANYTHING SPECIFIC YOU SHOULD DO?

Trauma make a large part of the burden of disease we have to deal with in South Africa and a clear understanding thereof is extremely important to be able to practice medicine effectively. This is a wonderful opportunity to quickly revise and consolidate your understanding of the principles of Resuscitation, with specific reference to Orthopaedic injuries (presentation, basic treatment and complications).
Case presentations:

Examples of trauma cases will be presented and discussed.

THEME 9: ORTHOPAEDIC TRAUMA - GENERAL PRINCIPLES

SESSION 4:
APPRAOH TO THE ORTHOPAEDIC TRAUMA PATIENT - THE PAEDIATRIC PATIENT

OUTCOMES

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

1. Explain the skeletal differences between children and adults.
2. Name and describe the fracture types unique to children.
3. Describe the Salter-Harris classification and explain its clinical significance.
4. Describe the steps of initial evaluation and resuscitation of a paediatric patient with polytrauma.
5. Name the important associated non-orthopaedic injuries.
6. Discuss the basic principles of initial management of orthopaedic injuries in the child.

Resources

- WebCT link to lecture

ANYTHING SPECIFIC YOU SHOULD DO?

Preparation

- Ensure that you have a good working knowledge of the content of this lecture by reviewing the notes beforehand.
- Refer to the following article: Paediatric Polytrauma Management. J Pediatr Orthop 2006;26:268 - 277)

Lecture

The objective of this session is to provide you with an approach to the child with a fracture as well as the paediatric polytrauma patient. Key topics are:

1. The immature skeleton: where, how and why does it fracture
2. General approach to the polytrauma patient: evaluation, treatment and transport
3. Advanced life support principles
4. Principles of fracture management appropriate to children
There will be a 10 mark quiz at the end consisting of fracture recognition and questions relating to the child as a polytrauma patient.

THEME 9: GENERAL PRINCIPLES OF ORTHOPAEDIC TRAUMA

SESSION 5:
APPROACH TO THE ORTHOPAEDIC TRAUMA PATIENT – SPINAL CORD INJURIES

Outcomes:

After study of the supplied teaching material and attendance of the lecture session - candidates should be able to:

1. Discuss incidence, etiology and mechanism of cord injuries
2. Effectively use classification and descriptive terminology around cord injuries
3. Describe pathophysiology of cord injuries and distinguish between spinal shock and neurogenic shock
4. Prognosticate cord injuries and provide opinion on life expectancy
5. Discuss pre-hospital care of the cord injured patient
6. Discuss emergency treatment of the cord injured patient
7. Provide a plan for detailed in-hospital work-up and relevant imaging
8. Discuss the controversy around steroid therapy
9. Identify the patient requiring surgical treatment
10. Discuss the complications associated with cord injured patients and appropriate avoidance strategies

RESOURCES

2. Orthobullets (http://www.orthobullets.com)

ANYTHING SPECIFIC YOU SHOULD DO?

Emphasis is placed on recognizing and appropriately treating life-threatening situations and opportunities to spare or improve functionality and eventual outcomes in patients with cord injuries.

It is considered core-knowledge to safely and effectively manage these patients in the emergency environment.
Lecture

The lecture will emphasise the following:

1. Specific occurrences encountered in dealing with a cord injured patient that if managed correctly - dramatically improves outcomes.
2. Recognizing and dealing with complications.
3. Emergency management of the cord injured patient, as part of a multiply injured patient.

Case presentations:

Clinical scenarios will be discussed.
THEME 10:
ORTHOPAEDIC TRAUMA – UPPER LIMB

AIM:
This theme will ensure that you are able to apply the basic orthopaedic knowledge and understand the basic principles in the fracture management and dislocations of the upper limb. You should be able to describe a fracture/dislocation under the heading of definition, mechanism of injury, clinical examination, classification, appropriate clinical investigations, radiological interpretation, management non-surgical & surgical and relevant complications. All the relevant information is provided in your notes under standardized headings. References have been provided for further reading.

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<td>Dr J Davis</td>
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THEME 10: ORTHOPAEDIC TRAUMA – UPPER LIMB

SESSION 1:
APPROACH TO SHOULDER AND ARM TRAUMA

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
- www.Orthobullets.com

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.

Case Studies
Case studies illustrating the conditions discussed in this lecture will be shown and discussed.

THEME 10: ORTHOPAEDIC TRAUMA - UPPER LIMB

SESSION 2:
APPROACH TO ELBOW AND FOREARM TRAUMA

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
- www.orthobullets.com

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.

Case Studies

Case studies illustrating the conditions discussed in this lecture will be shown and discussed.
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.
8. Discuss the examination of flexor tendons injury and treatment thereof.
9. Discuss the extensor tendon injuries levels and treatment thereof.

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
- www.orthobullets.com

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. This session also discusses the types of tendon injury and management principals.

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 will be demonstrated. You will be also shown the some techniques of tendon repair.
Case Studies
Case studies illustrating the conditions discussed in this lecture will be shown and discussed.
AIM:
The aim of this theme is to educate the student as to common fractures and soft tissue injuries seen due to trauma to the spine, pelvis, lower limb and foot. An approach to clinical and radiological diagnosis will be given. In each region common pitfalls will be pointed out. An awareness of associated injuries will be created; fracture classifications will be explained where appropriate. Management of these injuries will be detailed if they need immediate care. Recognition and stabilization methods will be recommended. All the relevant information is provided in your notes under standardized headings. References have been provided for further reading.

OVERVIEW OF THE THEME

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<td>Dr J Davis</td>
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<td>Dr D Hugo</td>
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<td>Review</td>
<td>Theme 11</td>
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<td>Dr D Hugo</td>
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THEME II: ORTHOPAEDIC TRAUMA - AXIAL, SKELETAL AND LOWER LIMB

SESSION 11.1:
VERTEBRAL COLUMN FRACTURES

Outcomes:

After studying the supplied teaching material, as well as attending the lecture session, a candidate should be able to:

1. Define a stable- vs. an unstable fracture or injury pattern of the spinal column
2. Consider the various regions of the spinal column - anatomical peculiarities that causes vulnerability, the various injury patterns encountered and the associated complications
3. Discuss Pathological fractures: Work-up and the Decision making process.
4. Interpret radiological investigations of vertebral column injuries.
5. Understand the strategies in treatment for vertebral column fractures - conservative treatment vs surgical treatment.

RESOURCES
2. Orthobullets (http://www.orthobullets.com)

ANYTHING SPECIFIC YOU SHOULD DO?

In this session you will be equipped to understand the mechanism behind failure of the spinal column, thus it is important that you:

- Recognize the differences between the adult and pediatric spine.
- Familiarize yourself with the commonly encountered injury patterns, how to identify them and decide on definitive form of treatment.
- Are able to thoroughly evaluate the various imaging modalities that will provide you with important knowledge and information to enable you to function as a physician dealing with acute trauma on an efficient and responsible manner.

Lecture

The lecture will emphasise the following:

1. Recognizing spinal-column injury patterns.
2. Interpreting special investigations.
3. Deciding on an appropriate course of action to definitively treat these patients.

Case presentations:

Specific imaging and interpretation thereof will be presented.
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. Understand the basic classification of pelvic fractures
3. Initiate emergency treatment for patients with pelvic fractures and prepare patients for referral to appropriate centers
4. Know what other organ systems are commonly injured in conjunction with a pelvic injury
5. Know the basic principles of treatment of pelvic fractures

RESOURCES:

1. Apley’s System Of Orthopaedics And Fractures. L Solomon; D Warwick; S Nayagam; A Apley; 9th Ed. London: Hodder Arnold 2010

http://www.orthobullets.com/trauma/1030/pelvic-ring-fractures
http://www.orthobullets.com/trauma/1034/acetabular-fractures
http://www.orthobullets.com/trauma/1035/hip-dislocation

CASE PRESENTATIONS OR REINFORCEMENT:
X-rays of pelvic fractures will be presented and thereafter a 10 minute small group discussion will be conducted to discuss the appropriate diagnosis and initial management for the patients.
Outcomes:

At the end of this session, you should be able to do the following:
1. Give a radiological classification of proximal femur fractures, and describe the guidelines for treatment of both intra-capsular and extra-capsular femur fractures.
2. Give a radiological classification for femur shaft fractures, discuss treatment options on both children and adults and tabulate the complications.
3. Give a radiological classification of distal femur fractures and discuss treatment options.
4. Recognize the common injuries associated with femur fractures.
5. Treat a paediatric patient with a femur fracture in Gallows traction
6. Place a Thomas splint unto a patient correctly
7. Be able to administer emergency treatment and prepare a patient for transport to a centre which can provide specialist treatment.
8. Recognise the various surgical options for treatment of a femur fracture.
9. Give a classification of patella fractures and similar injuries to the extensor mechanism of the knee.
10. Be able to treat appropriate injuries conservatively or refer patients for specialised care when necessary

RESOURCES

- Apley’s System Of Orthopaedics And Fractures. L Solomon; D Warwick; S Nayagam; A Apley ;9th Ed. London : Hodder Arnold 2010
- http://www0.sun.ac.za/ortho/webct-ortho/general/trac/trac-2.html

ANYTHING SPECIFIC YOU SHOULD DO?

Please review the notes on the internet on Femoral traction before the lecture. The lecture will only add to the information included on the website.

CASE PRESENTATIONS OR REINFORCEMENT:
A 10 minute quiz will be held at the end of the lecture on the different types of femur fractures and their appropriate treatment

THEME 11: ORTHOPAEDIC TRAUMA – AXIAL, SKELETAL AND LOWER LIMB

SESSION 4:
APPROACH TO KNEE TRAUMA

OUTCOMES:

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

1. Clinical approach to the injured knee
2. Radiological signs of knee injury.
3. Pitfalls and commonly overlooked injuries.
4. How to recognise and manage an acute knee dislocation.
5. Acute dislocation of the patella.
6. Signs of acute quadriceps and patella tendon ruptures.
   a. Why these are seldom ligamentous injuries
   b. Management of tibial spine avulsions in the child.
8. Conservative management of the less severe knee injury.
9. Acute meniscal injury
   a. Clinical and special investigations for diagnosis of meniscal injury.
   b. Patterns of meniscal tears.
   c. Arthroscopic repair and the place of arthroscopy in knee injuries.
    a. Diagnosis of AND
    b. Indications for surgical repair.

RESOURCES:

Textbooks:
- Apleys System of Orthopaedics and Fractures, Page 680
- Practical Fracture Treatment McRae, Page 295

Web reference: Knee ligament injuries and knee dislocations:
http://www0.sun.ac.za/ortho/webct-ortho/plateau/knee.html
ANYTHING SPECIFIC YOU SHOULD DO?

Revise your anatomy of the knee before attending this session. Pay particular attention to the knee ligaments, the position of the popliteal artery and the peroneal nerve.

CASE PRESENTATIONS OR REINFORCEMENT:

At the end of this session a series of cases illustrating various knee injuries will be discussed. A "Clicker" session (online quiz) will be given to obtain feedback as to your understanding of the concepts discussed. If possible, bring your internet enabled mobile device to this session, as it will be needed for the "Clicker" session.

THEME II: ORTHOPAEDIC TRAUMA – AXIAL, SKELETAL AND LOWER LIMB

SESSION 5:
APPROACH TO TIBIAL TRAUMA

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.
5. Understand the principles and options for surgical treatment of tibial shaft fractures

RESOURCES:

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

Web References
- Plateau Fractures: http://www0.sun.ac.za/ortho/webct-ortho/plateau/plateau1.html
- Tibial Shaft: http://www0.sun.ac.za/ortho/webct-ortho/tibia/tibia.html

ANYTHING SPECIFIC YOU SHOULD DO?

The aim of this session is to ensure that you can recognise classify tibial plateau fractures, shaft fractures and pilon fractures both clinically and radiologically. You will learn the indications for internal fixation. The principles of conservative management will be explained.
Lecture

Plateau fractures will be discussed:

- How to diagnose these injuries, and be aware of associated soft tissue and vascular complications
- A classification method.
- Indications for conservative management.
- How to temporarily stabilise these fractures before referral for internal fixation.
- Prognosis.

Tibial shaft fractures:

- This lecture deals with the fracture patterns of the tibia and fibula.
- Pitfalls and commonly overlooked injuries.
- You will be shown how to reduce uncomplicated fractures, if necessary, and to apply an appropriate plaster.
- How to adequately splint and immobilise the tibial fracture that needs to be referred.
- A practical guide as to how to follow up a tibial fracture treated in a plaster cast, wedge a plaster and recognise delayed union and other complications.
- Principle of cast braces and when a patellar bearing cast is appropriate.

- The treatment of an open fracture - a basic debridement - will be reviewed briefly and you will be shown how to apply an external fixator.
- What the general practitioner should know about the follow up of a patient with a tibial fracture treated with an external fixator.

- The morbidity of open fractures of the tibia will be discussed briefly, as well as the long-term implications.

- Traumatic amputations of the tibia with guidelines as to when an open tibia may have to be amputated.

Pilon Fractures

- A simple classification system will be given.
- How to prevent skin breakdown and blister formation by immobilisation and elevation.
- The emphasis of this talk will be about how to manage and appropriately splint these fractures before referral.

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.
Case Presentation or Reinforcement
At the end of this session a series of cases illustrating tibial injuries will be discussed. A "Clicker" session (online quiz) will be given to obtain feedback as to your understanding of the concepts discussed. If possible, bring your internet enabled mobile device to this session, as it will be needed for the "Clicker" session.

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

1. Apply the Ottawa Rules
2. DEVELOP A BASIC UNDERSTANDING OF THE FOLLOWING TOPICS
   - Ankle sprains
   - Ankle Fractures
   - Calcaneus fractures
   - Talar fractures
   - LisFranc joint injuries
   - 5th MT base fractures
   - Metatarsal foot fractures

RESOURCES:

ANYTHING SPECIFIC YOU SHOULD DO?
These are injuries that are frequently seen in casualty and are commonly missed with disastrous results. Revise the notes on this topic prior to the lecture. The didactic lecture will only illustrate the pertinent aspects of the topic.

Case presentations:
A series of case studies involving patients with foot fractures will be presented and discussed
THEME 12:
ORTHOPAEDIC TRAUMA - SOFT TISSUE TRAUMA

AIM:
The aim of this theme is to deal with common traumatic soft tissue wounds and lacerations as well as wound healing. We will teach you the clinical signs and which investigations are pertinent. The appropriate management of these conditions will be emphasized and the relevant complications and pitfalls will be highlighted. All the relevant information is provided in your notes under standardized headings. References have been provided for further reading.

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<td>Management of Wounds and Lacerations</td>
<td>Prof F Graewe</td>
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<td>2</td>
<td>13/7/2015 10:00 - 10:45</td>
<td>Lecture</td>
<td>Principles of Wound Healing</td>
<td>Dr A Zulke</td>
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|         | 15/7/2015 09:00 - 09: | Review   | Theme 12 & 13                             | Prof J Schneider
|         |                  |          |                                            | Prof F Graewe
|         |                  |          |                                            | Dr R Hoffmann
|         |                  |          |                                            | Dr D Hugo                      |
|         |                  |          |                                            | Dr J Davis                     |
|         |                  |          |                                            | Dr S Pretorius                  |

THEME 12: ORTHOPAEDIC TRAUMA - SOFT TISSUE TRAUMA

SESSION 1:
MANAGEMENT OF WOUNDS AND LACERATIONS

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 12: ORTHOPAEDIC TRAUMA - SOFT TISSUE TRAUMA

SESSION 2:
APPROPRIATE WOUND HEALING AND WOUND COVER

OUTCOMES

After completion of these sessions, you should:

1. Understand wound healing and know the factors influencing this.
2. Distinguish between a hypertrophic wound and a keloid.
3. Understand the indications and technique of skin transplant.
4. Know the reconstructive ladder in terms of wound cover.
5. Understand the concept and types of flaps.
6. Get a brief introduction into the speciality of plastic surgery.
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, Maxillofacial and Reconstructive Surgery
   Editor: Georgindes, First Edition
   Volume 1: Chapter 5 Page 29 Skinwounds
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

ANYTHING SPECIFIC YOU SHOULD DO?

At the end of this theme, you should understand the anatomy of the skin.

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

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.
- Understand skin grafts
- Understand flaps

Lecture with slides

During this session, wound healing and wound cover will be described by means of slides and clinical cases.
THEME 13:
MUSCULOSKELETAL INFECTION

AIM:
This theme is aimed at providing insight into the aetiology, pathogenesis, presentation and sequelae of infections of the musculoskeletal system. You will be equipped to recognise, appropriately evaluate and treat these prevalent conditions. All the relevant information is provided in your notes under standardized.

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THEME 13: MUSCULOSKELETAL INFECTION

SESSION 1:
GENERAL PATHOLOGICAL PRINCIPLES OF INFECTIONS

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 to the Phase 2 module: Essentials of Disease Processes and Infections). 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).

RESOURCES

- Underwood, 2009 Pages 720 to 721 and 735 to 736 (Note that the textbook contains limited information especially on tuberculous involvement of the osteoarticular system)
- Make supplementary notes during contact sessions

ANYTHING SPECIFIC YOU SHOULD DO?

Read pages 720-721 and 735-736 in Underwood before attending the lecture. You will also benefit by glancing at pages 200-218, 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/healthscience/schools/basic_appl_health/anat_path/ppt/ppt.html

Assignments for further directed 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 25.8 on page 721 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.

6. Name other important non-infective causes of arthritis.

7. Discuss the pathogenic and morphological changes of septic arthritis and tuberculous arthritis.

8. Explain the distinctive clinico-pathological correlations of septic and tuberculous arthritis.

9. Briefly discuss the clinico-pathological characteristics of gonococcal arthritis, spirochaetal arthritis and viral arthritis.

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
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 do the following:

1. Classify the antibiotics according to their mode of action.
2. Name and understand the principles of its use.
3. Be able to apply a systematic approach to empirical antibiotics.
4. Pharmacodynamic and pharmacokinetic factors of therapy.
5. Antimicrobial drug toxicity and the management thereof.
6. The importance and place of combination therapy.
7. Pre-operative antimicrobial prophylaxis.

RESOURCES


ANYTHING SPECIFIC YOU SHOULD DO?

Preparation

Study and know the various classes of antibiotics and the ways in which they differ. Understand the concepts of "empirical" and "prophylactic" antibiotic therapy.
Lecture

The lecture will discuss:

- the antibiotics most frequently used in orthopaedic surgery.
- the concepts of treatment including "empirical" and "prophylactic" antibiotic treatment
- factors unique to antibiotic use in orthopaedic surgery as seen with infections of bone and metallic implants
- complications of treatment including toxicity and resistance

CASE PRESENTATION OR REINFORCEMENT:

Three clinical scenarios will be discussed.

1. The choice of prophylactic antibiotics before a total hip replacement.
2. The choice of empiric antibiotics for treatment of a contaminated open fracture with large wounds and exposed bone.
3. The antibiotic treatment regimen for a septic arthritis of the hip in a 3 year old child.

THEME 13: MUSCULOSKELETAL INFECTION

SESSION 4:

APPROACH TO ACUTE MUSCULOSKELETAL INFECTIONS AND SEPTIC ARTHRITIS

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 bone and joint infections.
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.
RESOURCES

- Apleys System Of Orthopaedics And Fractures - Chapter 2 (p. 30 - 58)

ANYTHING SPECIFIC YOU SHOULD DO?

Self-study
In preparation, review the above resources and make sure you understand the basic concepts, definitions and terms. 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 demonstration will cover clinical presentation, radiological evaluation, appropriate side-room investigations and the treatment of acute septic arthritis and osteomyelitis.

There will be a case presentation at the end and an assignment to complete.

THEME 13: INFECTIVE CONDITIONS OF THE MUSCULOSKELETAL SYSTEM

SESSION 5:
APPROACH TO CHRONIC MUSCULOSKELETAL INFECTIONS

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 tuberculous arthritis clinically, with side-room investigations and radiological.
3. Tabulate the choices of medications for the treatment of skeletal tuberculosis, as well as the dosages and period of treatment.
4. Explain the guidelines used to evaluate the patient's environment, as well as to ensure continued medication.
5. Describe the signs of drug-resistance.
6. Name the bursas that can be affected by tuberculosis.
7. Describe the presentation and treatment of cold abscesses. Tabulate the factors resulting in chronic osteomyelitis
8. Tabulate and recognise the radiological characteristics of a chronic osteomyelitis.
9. Discuss the role of antibiotics in the treatment of chronic osteomyelitis.
10. Tabulate the complications of chronic osteomyelitis.
11. Describe a Brodies 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 the recommended treatment modalities.

This session will be used to discuss the presentation and anatomical spread of musculoskeletal tuberculosis.

ANYTHING SPECIFIC YOU SHOULD DO?

Self-study and self-assessment

The aim of this self-study session is to 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.
**Outcomes:**
After study of the supplied teaching material and attendance of the lecture session - candidates should be able to:

1. Define spinal infections: discitis / vertebral osteomyelitis
2. Discuss the different pathogens causing spinal infections
3. Describe the pathophysiology of spinal infections - why do certain infections have predilection for certain regions
4. Navigate through a sensible work-up for spinal infections (history, clinical examination, special investigations)
5. Describe treatment for spinal infections

**RESOURCES**

1. Orthopaedic Knowledge Update – Spine 3, Jeffrey M. Spivak, Patrick J. Connolly, AAOS, Chapter 38 Page 367-376
2. Orthobullets (http://www.orthobullets.com)
3. Articles:
   a. (Rasouli, Mirkoohi, Vaccaro, Yarandi, & Rahimi-Movaghar, 2012)

**ANYTHING SPECIFIC YOU SHOULD DO?**

Familiarize yourself with the local treatment regimes of spinal Tuberculosis, is this is variable according to region and endemic status.

This very prevalent disease is commonplace in South Africa and the Western Cape and requires in-depth knowledge.
Lecture

This lecture will:
Identify probable causes for spinal infections, and help you discern between the possibilities.
The pillars of treatment for spinal infections will be elucidated.

Case presentations:
Examples of common spinal infections will be presented.

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:

2. ORTHOP REV (PAVIA). 2012 MAY 9; 4(2): E19
3. Treatment Of Hand Infections CME Aug 1991 Vol 9 No 8 Page 978
5. How To Drain An Absess 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 sheath extensions into the forearm.
**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.

**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.

**Case Discussions:**

Specific case studies will be done for a Fight Bite and an Infected Tenosynovitis of the Thumb or 5th finger.
THEME 14: ORTHOPAEDIC ONCOLOGY

AIM:
In this theme musculoskeletal tumours will be discussed. The pathology of bone tumours will be detailed, including the histology and radiology of these conditions. Diagnosis and Management of benign, malignant and soft tissue tumours will be discussed in separate lectures. Case studies illustrating these tumours will be discussed. All the relevant information is provided in your notes under standardized headings. References have been provided for further reading.

OVERVIEW OF THE THEME

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<td>Prof J Schneider</td>
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<td>Dr ICM Robertson</td>
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<td>Approach to Malignant and Metastatic Bone Tumours</td>
<td>Dr ICM Robertson</td>
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<td>Prof J Apffelsteadt</td>
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<td>Prof J Schneider, Dr ICM Robertson, Prof J Apffelsteadt</td>
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OUTCOMES

At the end of these sessions, 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, 2009 Pages 723-726 and 745-746
- Make supplementary notes during contact sessions
- Class notes (PowerPoint)
- Computer-assisted guidance: This website offers numerous examples, illustrations and tutorials which you will be able to access elsewhere.

http://www.bonetumor.org

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 2 module: Essentials of Disease Processes and Infections; Theme 22).

Lecture
1. Read pages 723 to 726, and 745-746 in Underwood before attending the lecture. You will benefit greatly by reviewing pages 222 to 233, and 252 to 258; 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 724 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.

**THEME 14: ORTHOPAEDIC ONCOLOGY**

**SESSION 3: 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 metastasize 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:

4. Common benign bone tumours
5. Common malignant bone and joint tumours. Emphasis should be placed on the age of presentation.
6. Recommendations should be made to stage a tumour with the assistance of special investigations.
7. Discuss the treatment of benign tumours.
8. 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.

THEME 14: ORTHOPAEDIC ONCOLOGY

SESSION 4:
APPROACH TO MALIGNANT AND METASTATIC BONE TUMOURS

OUTCOMES

1. At the end of this session, you should be able to do the following:
2. Make a radiological diagnosis of metastatic bone tumours and tabulate the tumours which commonly metastasize to bone.
3. Define pathological fractures and describe the treatment thereof.
4. Know the supplementary special investigations used to stage tumours.
5. Describe the most important aspects pertaining to biopsies of bone lesions.
6. Describe the application of the various treatment modalities of primary bone tumours.
7. Know the prognosis of different tumours and be able to inform the patient thereof.

RESOURCES

Text book:
Web Links:
Primary Malignant Tumours: http://www0.sun.ac.za/ortho/webct-ortho/tumors/malignant.html
Metastatic Bone Tumours: http://www0.sun.ac.za/ortho/webct-ortho/tumors/mets.html

ANYTHING SPECIFIC YOU SHOULD DO?

During this session, the clinical and radiological aspects of the common malignant primary and secondary tumours of bone 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.

Lecture

The lecture will include the following important clinical problems:

9. Common malignant bone tumours. Emphasis will be placed on the age of presentation and the part of the bone involved.
10. How to recognise a bone tumour that is secondary to another condition.
11. Recommendations about how to stage a bone tumour with the assistance of special investigations.
12. Discuss the management of malignant tumours.
   - The place and timing of non-surgical management by other disciplines such as chemotherapy and radiotherapy.
   - The place of limb sparing surgery in the management of malignant bone tumours.
13. Emphasis will be placed on metastatic diseases of the bony skeleton...
   - Occult metastases will be discussed as well as how to diagnose these...
   - A short list will be given of some tumours that commonly metastasize to bone.
   - The role of prophylactic internal fixation, and when it is needed, will be discussed.

Case Presentations or Reinforcement

A few clinical problems will be presented for discussion by means of X-rays. 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.
OUTCOMES

At the end of these sessions, 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 15:
**PAEDIATRIC ORTHOPAEDICS CONGENITAL AND DEVELOPMENT**

**AIM:**
The aim of this theme is to empower the student to understand how to approach a paediatric patient that presents with a generic complaint. After understanding the methodology on how to obtain a differential diagnosis and eventually come to the correct diagnoses, important topics in Paediatric Orthopaedics will be discussed. All the relevant information is provided in your notes under standardized.

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<td>Dr J Davis</td>
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Outcomes:

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

1. Have a sound understanding of how to take a problem orientated history and clinical examination to enable you to make a diagnosis or derive a patient specific differential diagnosis
2. Tabulate a differential diagnosis of a limping child with age or the disease process as common denominator
3. Request the most appropriate confirmatory imaging modalities for common limping conditions
4. Judicious use of the appropriate special investigations
5. Utilizing all of the above (Point 1-4) to make an appropriate diagnosis
6. Be aware of the so called "Red Flags" when evaluating a limping child
7. Be aware of and be able to circumvent the "Pitfalls" in the evaluation of a limping child

RESOURCES


ANYTHING SPECIFIC YOU SHOULD DO?

Before this session you have to revise the sessions of Theme 15. (Especially the session on Gait). This will enable you to understand the pathologic processes that we encounter when assessing a limping child. Study the article "M.W.Beresford, A.G. Clearly: Evaluation of a limping child. Current Paediatrics 2005;15,15-22", before attending this session.

This is a wonderful opportunity to quickly revise and consolidate your understanding of Paediatric Orthopaedics.

Case presentations:

A series of case studies involving patients with a limp will be presented and discussed
SESSION 2: 
DEVELOPMENTAL DYSPLASIA OF THE HIP (DDH)

Outcomes:

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

1. Have a very clear understanding of what exactly the spectrum of disease referred to as “Developmental Dysplasia of the Hip” entails
2. Have the ability to identify the “baby at risk” due to a sound knowledge of the etiology of DDH
3. Methods of “Prevention” of DDH
4. Understand the principles and concepts of screening for early detection of DDH
5. Perform an appropriate clinical examination of an infant or toddler to diagnose DDH
6. Have a clear knowledge of the appropriate special investigations to enable us to diagnose DDH
7. Treatment: Birth to 6 Months
8. Pavlik Harness: Tips, Pitfalls, Success, Failure
9. Rx options when Pavlik Harness Fail

RESOURCES


ANYTHING SPECIFIC YOU SHOULD DO?

In preparation for Session 15.2 please listen to the following Lecture and Video:


CASE STUDIES

A series of multiple choice questions will emphasize the pertinent and important points to consolidate core knowledge in Session 15.2
OUTCOMES

At the end of this session, you should be able to do the following with regards to Perthes disease:

1. Discuss the epidemiology and pathogenesis
2. Tabulate its pathological stages (Waldenström)
3. Name the typical clinical features
4. Tabulate the *classic* radiological features
5. Make a list of the differential diagnosis
6. Name the treatment options available

RESOURCES

- International Perthes Study Group (http://community.tsrhc.org/Perthes-disease-about-perthes-disease)
- Ortho Bullets - Legg-Calve-Perthes Disease (Coxa plana)
- Apley’s System of Orthopaedics and Fractures, Ninth edition. (p. 511 - 515)
- Lecture notes available on Web CT

ANYTHING SPECIFIC YOU SHOULD DO?

**Preparation:**
- Essential to understanding Perthes disease is a good understanding of the tenuous blood supply to the femur head
- Refer to the International Perthes Study Group (see link) for excellent X-ray pictures of the typical radiological features as well as the different stages.
- Make sure you know the typical clinical picture as this is essential to be able to discern it from the other hip conditions

**Lecture**

The lecture will discuss the basic pathology of Perthes disease including the clinical and radiological features.
The diagnostic work-up will be discussed and the principles of treatment will be explained.
The lecture will conclude with several case presentations and a cross-word puzzle.
Outcomes:

At the end of this session, you should be able to do the following:
1. Understand the applied anatomy that is relevant for SUFE
2. Clearly understand the concept of the disease entity of “Slipped Upper Femoral Epiphysis”
3. Identify the “At Risk” patient
4. Have a clear understanding of the presenting signs and symptoms of a child with SUFE
5. Classify SUFE and understand why we need to classify a child presenting with SUFE
6. Have a comprehensive and in-depth knowledge and understanding of the diagnosis of SUFE by means of X-rays
7. Understand the general concepts of treatment of SUFE
8. Have an in-depth knowledge of the complications of SUFE and reflect on the correct manner to discuss this with the parents and why it is extremely important to properly inform the parents before initiating treatment

RESOURCES
1. Medbullets (“Essential” Knowledge)
2. Orthobullets (“Essential” and “Good to Know” Knowledge)

ANYTHING SPECIFIC YOU SHOULD DO?
1. Revise the Anatomy of the Hip joint and the Range of Movement of the hip
2. Study the Medbullets review of SUFE before Session 15.4 and make sure you have an basic understanding of the topic before attending the session

CASE PRESENTATIONS

A Clinical scenario will be presented and thereafter a 10 minute small group discussion will be conducted to discuss appropriate management of this child
Outcomes:

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

1. Have a clear understanding of what normal lower limb alignment entail and how alignment change as the child mature into adulthood
2. Tabulate the terminology we use to describe rotational and angular variations and deformities
3. History and Clinical Examination that is problem specific
4. Judicious use of the appropriate special investigations
5. Tabulate and discuss the most common rotational abnormalities
6. Tabulate and discuss the most common angular deformities
7. Understand the principles of treatment for these conditions

RESOURCES


ANYTHING SPECIFIC YOU SHOULD DO?

Read both the resources articles before attending this session. Rotational and Angular Deformities in children is an seemingly difficult diagnostic challenge that is in fact relatively easy to understand if utilizing a standardized manner to approach this interesting problem.

Case presentations:

A series of case studies involving patients with lower limb alignment abnormalities will be presented and discussed.
OUTCOMES

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

1. Define normal gait and describe the phases of normal gait.
2. List the requirements for normal gait.
3. Describe the abnormal gait patterns that is commonly seen in orthopaedics, which includes:
   a. Antalgic gait
   b. Trendellenberg gait
   c. Short leg gait
   d. Drop foot gait
   e. Equines gait
   f. Gait patterns seen in Cerebral Palsy
4. Explain the basic pathology of these abnormal gait patterns.
5. Pair the abnormal patterns with the typical conditions in which they present.

RESOURCES

- Apley’s System of Orthopaedics and Fractures, Ninth edition. (p. 229)
- Lecture notes available on Web CT

ANYTHING SPECIFIC YOU SHOULD DO?

Preparation

- Essential to understanding gait is a good understanding of lower limb anatomy.
- Review the anatomy of the lower limb, with special attention to the neurological supply to the leg. This includes the L1 to S2 myotomes as well as the peripheral nerves.
- Review the muscle groups involved in flexion, extension, adduction and abduction of the hip, knee flexion and extension and ankle flexion, extension, inversion and eversion.

Lecture

The lecture will discuss the normal gait cycle and its phases. The different abnormal gait patterns that are commonly seen in orthopaedics will then be discussed. There will be several case presentations to illustrate the specific gait pattern.

The lecture will conclude with a split-class abnormal gait “walk-off” similar to that seen in Zoolander. Points will be awarded to the best abnormal gait interpretation and the class section with the most points will receive the floating trophy - the judge's decision is final.
OUTCOMES

At the end of this session, you should be able to do the following:
1. Discuss the basic anatomical concepts relevant to foot deformities.
2. Describe the deformities found in congenital clubfeet, and be able to discuss the principles of conservative treatment according to Ponseti.
3. Be able to discuss the functional prognosis of clubfeet with the parents.
4. Describe the clinical presentation of a metatarsus adductus and the be able to name the differentiating features from a club foot.
5. 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.
6. Name aids that can be utilised for the treatment of flat feet.
7. Describe the clinical elements of a cavus foot and tabulate the other conditions with which cavus feet can be associated.

RESOURCES

- Apley’s System of Orthopaedics and Fractures, Ninth edition. ( p. 591-598 )
- Lecture available on WebCT

ANYTHING SPECIFIC YOU SHOULD DO?

Preparation

1. Review the anatomy of the foot, hindfoot, midfoot and forefoot as well as the muscles contributing to a balanced foot
2. Refer to the resources and ensure that:
   o You can name the basic characteristics of each of the deformities eg. The foot deformities in Clubfoot consist of CAVE: Cavus, Adductus, Varus and Equines of the foot. Do the same for
     • metatarsus adductus,
     • flatfeet, (mobile and rigid)
     • cavus feet
3. Understand the basic steps in clubfoot correction by the Ponseti method
4. Know the conditions associated with each foot deformity
Lecture

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

Cavus feet will also be discussed.

Several clinical cases will be presented to illustrate the deformities found in each

THEME 15: PAEDIATRIC ORTHOPAEDICS CONGENITAL AND DEVELOPMENT

SESSION 8:
APPROACH TO NEUROMUSCULAR CONDITIONS

OUTCOMES

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

1. Define cerebral palsy and describe the ways to classification it.
2. Name the causes of contractures and deformities and briefly describe the functional disabilities thereof.
3. Tabulate the possible therapeutic modalities for cerebral palsy and briefly describe the applications of each.
4. Describe the basic pathology 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

ANYTHING SPECIFIC YOU SHOULD DO?

- Using the resources above, ensure that you understand the definitions of the different neuromuscular conditions that will be discussed in the lecture.
- Review the concepts upper and lower motor neuron palsy and the difference between them.

Lecture

The lecture will briefly review the basic patho-anatomy and concepts underlying the various conditions. The lecture will mainly focus on cerebral palsy and myelomeningocele as prototype conditions and discuss the following:

1. Functional properties, disabilities and deformities
2. Treatment modalities
3. Complications

There will be a video clip and case presentation at the end of the lecture for small group discussion.

THEME 15: PAEDIATRIC ORTHOPAEDICS CONGENITAL AND DEVELOPMENT

SESSION 9:
APPROACH TO PAEDIATRIC SPINAL DEFORMITIES

Outcomes:

After study of the supplied teaching material and attendance of the lecture session - candidates should be able to:

1. Definitions and natural history of various deformities
2. Comprehension of complications resulting from deformity in the growing spine
3. Develop a differential diagnosis based on patient demographic parameters and symptoms and signs.
4. Discuss an effective work-up of a child with spinal deformity (reference to history, clinical examination and special investigations)
5. Describe associated conditions
6. Provide specifics about treatment

RESOURCES

2. Orthobullets (http://www.orthobullets.com)
3. Articles:
(Trobisch, Ducoffe, Lonner, & Errico, 2013)

**ANYTHING SPECIFIC YOU SHOULD DO?**
Recognize conditions associated with paediatric spinal deformity
Recognize as a "Red Flag" and consider potential for progression and complications.

**Lecture**
This lecture will:
Provide an approach to spinal deformity in children.
*Guidelines will be provided to aid in diagnosis and predict natural history*

**Case presentations:**
Various examples of paediatric spinal deformity will be presented.
THEME 16: ORTHOPAEDIC CONDITIONS OF THE SPINE

AIM:
This theme will provide you with insight into the recognition and appropriate management of back ache and the associated pathological conditions of the spinal column. All the relevant information is provided in your notes under standardized headings reference have been provided for further reading.

OVERVIEW OF THE THEME

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<td>Lecture</td>
<td>Approach to Back Ache</td>
<td>Dr J Davis</td>
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<td>Dr J Davis</td>
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<td>12:00 - 12:45</td>
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<td>Degeneration</td>
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<td>20/7/2015</td>
<td>Revision</td>
<td>Theme 15 &amp; 16</td>
<td>Dr J Davis, Dr</td>
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<td>8:00 - 8:45</td>
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<td>J du Toit, Dr</td>
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<td>Danie Hugo</td>
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THEME 16: ORTHOPAEDIC CONDITIONS OF THE SPINE

SESSION 1: APPROACH TO BACK-ACHE

Outcomes:

After study of the supplied teaching material and attendance of the lecture session - candidates should be able to:

1. Discuss the prevalence of back ache in children and adults
2. Develop a differential diagnosis in a patient with back-ache based on patient specific parameters and symptoms
3. Name the red-flag symptoms and signs
4. Navigate through an effective work-up (special investigations) to narrow down from initial differential diagnosis to a final diagnosis.
5. Know which patients need referral and why
6. Discuss spondylolisthesis and spondylolysis
7. Knowledge about conservative treatment strategies in patients with back-ache
RESOURCES

1. Orthobullets (http://www.orthobullets.com)
2. Orthopaedic Knowledge Update - Spine 3, Jeffrey M. Spivak, Patrick J. Connolly, AAOS, Chapter 30 Page 281-288

ANYTHING SPECIFIC YOU SHOULD DO?

Know the red flag conditions

Lecture

This lecture will:
Provide the attendee with a systematic and safe approach to patients with acute lower backache. You will be equipped to systematically exclude the ominous causes, and learn how to manage a patient symptomatically in the absence of a surgical solution.

THEME 16: ORTHOPAEDIC CONDITIONS OF THE SPINE

SESSION 2: APPROACH TO INFLAMMATORY CONDITIONS OF THE SPINE

Outcomes:

After studying the supplied teaching material and attendance of the lecture session - candidates should be able to:

Demonstrate a basic knowledge of the following inflammatory conditions:

1. Rheumatoid spine
   a. Pathophysiology and how it affects the spine
   b. Clinical presentation
   c. Investigations
   d. Complications
   e. Treatment
2. Ankylosing spondylitis
   f. Pathophysiology and how it affects the spine
   g. Clinical presentation
   h. Investigations
   i. Complications
   j. Treatment
3. DISH Spine
   k. Pathophysiology and how it affects the spine
l. Clinical presentation
m. Investigations
n. Complications
o. Treatment

4. Ossification of the posterior longitudinal ligament
p. Pathophysiology and how it affects the spine
q. Clinical presentation
r. Investigations
s. Complications
t. Treatment

RESOURCES

1. Orthobullets (http://www.orthobullets.com)
2. Orthopaedic Knowledge Update - Spine 3, Jeffrey M. Spivak, Patrick J. Connolly, AAOS, Chapter 36 Page 339-351

LECTURE

This lecture will:
Demonstrate the various deformities and destructive patterns associated with inflammatory Spondylo-Arthropathies. Dangerous complications will be highlighted and the appropriate prevention or treatments discussed.

CASE PRESENTATION AND REINFORCEMENT

THEME 16: ORTHOPAEDIC CONDITIONS OF THE SPINE
SESSION 3:
APPROACH TO ADULT SPINAL DEFORMITIES AND DEGENERATION

Outcomes:
After studying the supplied teaching material and attendance of the lecture session - candidates should be able to:

1. Describe the degenerative changes found in the ageing adult spine - anatomical approach and natural history
2. Describe the concept of neurogenic claudication and distinguish this from vascular claudication
3. Discuss spondylolisthesis and spondylolysis
4. Describe the concept of sagittal balance and spino-pelvic parameters
5. Navigate through an methodical work-up of a patient with pain from degenerative changes and or adult deformity (reference to history, clinical examination and special investigations)

6. Management of degenerative spinal conditions and adult spinal deformity

RESOURCES

1. Orthobullets (http://www.orthobullets.com)


LECTURE

This lecture will:

- Elucidate the parameters influencing upright posture in relation to spinal degeneration and resulting deformity.
- The relationship between the Spine-, Pelvis and Lower Limbs and the erect posture will be highlighted.
- The influence of spinal degeneration and ageing will be discussed.
- Help you identify patients in this sub-group that will benefit from potential surgical intervention

CASE PRESENTATION AND REINFORCEMENT

REVIEW OF RADIOLOGICAL IMAGING RELATING TO THE SUBJECT MATTER
THEME 17:
MUSCULOSKELETAL CONDITIONS OF THE UPPER LIMB

AIM:
The aim of this theme is to deal with the common upper limb conditions. We will teach you the clinical sign, symptoms and which investigations are pertinent and when to do these relevant investigations. The appropriate management of these conditions will be emphasized and the complications and pitfalls will be highlighted. All the relevant information is provided in your notes under standardized headings. References have been provided for further reading.

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<td>Lecture</td>
<td>Approach to Shoulder Pain</td>
<td>Dr S Pretorius</td>
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<td>Dr S Pretorius</td>
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<td>3</td>
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<td>Approach to Degenerative Shoulder Conditions</td>
<td>Dr S Pretorius</td>
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<td>Dr A Ikram</td>
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<td>Lecture</td>
<td>Approach to Wrist and Hand Pain - Part 1</td>
<td>Dr S Pretorius</td>
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<td>Dr S Pretorius</td>
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<td>Lecture</td>
<td>Approach to Peripheral Nerve Conditions of</td>
<td>Dr A Ikram</td>
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THEME : 17 MUSCULOSKELETAL CONDITIONS OF THE UPPER LIMB

SESSION 1:
APPROACH TO THE PAINFUL SHOULDER

OUTCOMES:

1. Tabulate the causes of a painful shoulder
2. Make the diagnosis of referred pain to the shoulder and list possible causes.
3. Discuss how you will approach the painful shoulder
ANYTHING SPECIFIC YOU SHOULD DO?

Preparatory studies include revision of the functional anatomy of the shoulder, as well as the anatomy of the neck and chest cavity.
You must review the examination of the shoulder -

RESOURCES

BMJ. 2005 November 12; 331(7525): 1124-1128. Mitchell C

Case Presentation:
A detailed case discussion will done illustrating the need to distinguish shoulder pain from other pathology.

THEME: 17 MUSCULOSKELETAL CONDITIONS OF THE UPPER LIMB

SESSION 2:
APPROACH TO SHOULDER INSTABILITY AND FROZEN SHOULDER

Outcomes:

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

Frozen Shoulder:
1. Tabulate the conditions associated with Frozen Shoulder.
2. Tabulate the 3 phases of Frozen Shoulder.
3. Discuss the main differential diagnosis for Frozen Shoulder
4. Which special investigations are helpful in the diagnosis of frozen shoulder and why.
5. Understand, and able to explain to the patient what the treatment and prognosis would be for Frozen Shoulder.

Shoulder Instability:
1. Discuss the pathology and mechanism of injury for anterior shoulder dislocations
2. Define subluxation and dislocation.
3. Tabulate the physical signs and symptoms of an anterior dislocation.
4. Tabulate the physical signs and symptoms of a posterior dislocation.
5. Which special investigations are helpful in the diagnosis of instability and why.
6. Understand, and able to explain to the patient what the main aspects of treatment are for all the different types of shoulder dislocations.
7. Discuss a least one reduction technique for anterior shoulder dislocations.
RESOURCES


ANYTHING SPECIFIC YOU SHOULD DO?

During this session, the clinical and radiological aspects as well as treatment strategies for shoulder dislocations and Frozen Shoulder will be covered. You should know the clinical difference between anterior and posterior dislocations as well as the difference between Frozen shoulder and Rotator cuff tears.

Lecture

The lecture will include the following important clinical problems:

15. The treatment of anterior shoulder dislocations will be highlighted and discussed.
16. Frozen shoulder will be discussed with specific reference to Incidence diagnosis and Management.

Case presentations:

A series of case studies involving shoulder dislocations will be discussed.

THEME: 17 MUSCULOSKELETAL CONDITIONS OF THE UPPER LIMB

SESSION 3: APPROACH TO DEGENERATIVE SHOULDER PROBLEMS

Outcomes:

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

Rotator Cuff Impingement Syndrome:
1. Tabulate the names of the muscles that form the rotator cuff.
2. Discuss the presentation and evaluation for rotator cuff tears/impingement syndrome.
3. Discuss the differential diagnoses for rotator cuff tears/impingement syndrome.
4. Which special investigations or tests are helpful in the diagnosis of rotator cuff tears /impingement syndrome and why.
5. Understand, and able to explain to the patient what the treatment and prognosis would be for rotator cuff tears/impingement syndrome.

**Glenohumeral Arthritis:**
1. Tabulate the causes of Glenohumeral arthritis.
2. Discuss the presentation and evaluation for Glenohumeral arthritis.
3. Discuss the differential diagnoses for Glenohumeral arthritis.
4. Which special investigations or tests are helpful in the diagnosis of Glenohumeral arthritis and why.
5. Tabulate the x-ray findings of Glenohumeral arthritis.
6. Understand, and able to explain to the patient what the treatment and prognosis would be for Glenohumeral arthritis.
7. Tabulate the treatment options for an arthritic shoulder.

**Acromioclavicular arthritis:**
1. Discuss the pertinent anatomy of the AC joint.
2. Discuss the presentation and evaluation for Acromioclavicular arthritis.
3. Discuss the differential diagnoses for Acromioclavicular arthritis.
4. Which special investigations or tests are helpful in the diagnosis of Acromioclavicular arthritis and why.
5. Understand, and able to explain to the patient what the treatment and prognosis would be for Acromioclavicular arthritis.

**RESOURCES**

**AC JOINT: SURGICAL TREATMENT FOR ACROMIOCLAVICULAR JOINT OSTEOARTHRITIS: PATIENT SELECTION, SURGICAL OPTIONS, COMPLICATIONS, AND OUTCOME: DOSIMO S**

Current Reviews in Musculoskeletal Medicine June 2008, Volume 1, Issue 2, pp 154-160


**ANYTHING SPECIFIC YOU SHOULD DO?**

During this session, the clinical and radiological aspects as well as treatment strategies for degenerative shoulder conditions will be covered. You should know the clinical difference between arthritic shoulder problems and Rotator cuff tears.
Lecture

The lecture will include the following important clinical problems:

1. Acromioclavicular arthritis, Glenohumeral Arthritis and Rotator cuff will be discussed with reference to: Incidence diagnosis and Management.
2. The treatment of degenerative conditions will be highlighted and discussed.

Case presentations:

A series of case studies involving Acromioclavicular arthritis, Glenohumeral Arthritis and Rotator cuff will be discussed.

THEME: 17 MUSCULOSKELETAL CONDITIONS OF THE UPPER LIMB

THEME 4:
APPROACH TO ELBOW PAIN

OUTCOMES:

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

1. Tabulate the common causes of elbow pain.
2. Describe and interpret the radiological signs of the elbow arthritis.
3. Describe the management principles of elbow arthritis
4. Describe the Lateral Epicondylitis (Tennis Elbow) and its management.
5. Describe the Medial Epicondylitis (Golfer's Elbow) and its management.
6. Discuss the Olecranon bursitis and treatment thereof.

RESOURCES

- Hand Surgery by Richard A Berger, Chapter 44 Tennis elbow by Gerrard Gabel
- Clinical orthopaedic Examination by Mc Rae, Chapter 5 the elbow page 79-93
- www.orthobullets.com

ANYTHING SPECIFIC YOU SHOULD DO?

For the preparation of this lecture you should know the anatomy of the elbow joint.

The aim of this session is to ensure that you are able to classify causes of elbow pain and describe the treatment options of different painful conditions of the elbow joint.
The objective of this session is to enable you to have a differential diagnosis of the elbow pain, history and clinical examination will be discussed to diagnose the different pathological elbow conditions and brief management principles will be discussed. The treatment methods will be discussed. The guidelines for surgery will be indicated and the possible complications discussed.

**Case Presentation**

Clinical case presentation of painful elbow will be shown and relevant questions will be asked to come to the diagnosis.

**OUTCOMES:**

1. Make the diagnosis of carpometacarpal osteoarthrosis of the thumb and prescribed treatment. Discuss the surgical indications.
2. Define a trigger finger and discuss the treatment.
3. Describe a Dupuytrans contracture of the hand, tabulate its associations and discuss the possible treatment modalities.
4. Make the diagnosis of De Quervains Tenosynovitis of the thumb and prescribed treatment. Discuss the surgical indications.
5. Define a ganglion and discuss the treatment.
6. Define a mallet finger and discuss the treatment.

**ANYTHING SPECIFIC YOU SHOULD DO?**

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 contents of the flexor and extensor compartments of the forearm.

You must review the examination of the wrist. You must also revise the functional anatomy of the wrist joint - the course of the tendons through the wrist, and also the wrist bones.
The lecture will include the following important clinical problems:

1. Painful hand conditions will be discussed with reference to: Incidence diagnosis and Management.
2. The treatment of these painful conditions will be highlighted and discussed.

RESOURCES

1. The Painful Hand And Wrist. CME March 1991 Vol. 9, No. 3 Page 300
2. Apleys System Of Orthopaedic And Fractures: The Wrist - Chapter 15, Page 296
3. Orthobullets

Case presentations:

A series of clinical scenarios will be given with Crossword Puzzle answers.

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. Describe a Boutonniere deformity and a swan neck deformity, and discuss the causes and treatment thereof.
RESOURCES

2. Apleys System Of Orthopaedics And Fractures. Chapter 3 And Chapter 16
3. Apleys System Of Orthopaedics And Fractures: The Wrist, Chapter 15, Page 296
4. Clinical Orthopaedic Examination: The Wrist, Mcrae, Chapter 6, Page 77
5. Apleys System Of Orthopaedics And Fractures. The Hand, Chapter 16, Page 311
6. Clinical Orthopaedic Examination, Mcrae, The Hand, Chapter 7, Page 95

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.

ANYTHING SPECIFIC YOU SHOULD DO?

The aim of this session is to enable you to identify and evaluate Rheumatoid Arthritis, 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 of the extensor mechanism of the fingers.

Lecture

This lecture deals with the causes, clinical diagnosis and treatment of Rheumatoid Arthritis. Inflammatory conditions of the wrist and finger joint as well as tendon conditions will be discussed. Deformities of the hand due to inflammatory conditions will be discussed. The common finger deformities such as Boutonniere and swan neck deformities will be discussed in depth.
THEME 7:
APPROACH TO PERIPHERAL NERVE CONDITIONS OF THE UPPER LIMB

OUTCOMES:

At the end of this session, you should be able to do the following:
1. Describe the types of nerve injuries and possible recovery chances in each type.
2. Describe clinical signs of Median nerve injury.
3. Describe the signs of Ulnar nerve injury.
4. Describe the signs of Radial nerve injury.
5. Describe the signs/symptoms and management Carpal Tunnel Syndrome.
6. Discuss the signs/symptoms of Cubital Tunnel Syndrome.

RESOURCES

- Greens Operative Hand Surgery 5th Edition
- Chapter 28 Nerve Compressions of upper extremity by Susan Mackinnon
- Chapter 31 Radial Nerve palsy by David P Green
- Chapter 32 Median Nerve palsy by TRC Davis
- Chapter 33 Ulnar Nerve Palsy by George A Anderson
- www.orthobullets.com

ANYTHING SPECIFIC YOU SHOULD DO?

The aim of this session is to ensure that you are able to understand the anatomy of nerve, able to diagnose nerve injuries and compression neuropathies.

The objective of this session is to enable you to have an understanding how to diagnose the nerve injuries and compression neuropathies, history and clinical examination will be discussed. Brief management principles of nerve injuries and compression syndromes will be discussed.

Preparatory study should include revision of upper limb neurology from the basic anatomy books and understanding of nerve supply to the different upper limb muscles.

Lecture

This lecture discusses the nerve anatomy, type of nerve lesions and their chances of recovery. You will learn how to diagnose the Median, Ulnar and Radial Nerve injuries. Clinical examination and assessment of compression neuropathies of upper limb will be discussed. The treatment methods will be discussed. The guidelines for surgery will be indicated and the possible complications discussed.

Case Presentation
Pictures of Clinical cases of median & ulnar nerve palsy will be shown and diagnostic signs will be illustrated.
THEME 18:
MUSCULOSKELETAL CONDITIONS
OF THE LOWER LIMB

AIM:
This theme will enable you to recognize and evaluate clinical presentations and radiological investigations pertaining to the lower limb as applicable to disease conditions and deformities thereof, and to formulate a meaningful therapeutic plan. A general approach of managing patients with hip, knee, ankle and foot pain will be provided. Common sports injuries in the athlete will also be highlighted. All the relevant information is provided in your notes under standardized headings. References have been provided for further reading.

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<td>Sports Injuries</td>
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<td>Dr N Terblanche</td>
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<td>Dr N Terblanche</td>
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<td>Lecture</td>
<td>Approach to Metatarsalgia</td>
<td>Dr N Terblanche</td>
</tr>
<tr>
<td></td>
<td>23/7/2014</td>
<td>Revision</td>
<td>Theme 18</td>
<td>Dr H de Jongh</td>
</tr>
<tr>
<td></td>
<td>8:00 – 8:45</td>
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<td>Dr N Terblanche</td>
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</table>

THEME 18: MUSCULOSKELETAL CONDITIONS OF THE LOWER LIMB

SESSION 1:
APPROACH TO ADULT HIP PAIN

OUTCOMES

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

1. Describe the clinical presentation of true hip pain.
2. Explain the Trendellenberg and Thomas test.
3. Discuss osteoarthritis as a cause of polyarthritis.
4. Tabulate the causes of avascular necrosis.
5. Understand the pathological process in avascular necrosis.
6. Discuss radiological signs of osteoarthritis and avascular necrosis.
7. Discuss the conservative treatment of osteoarthritis of the hip.
8. Discuss indications for surgical intervention in osteoarthritis and avascular necrosis of the hip.
9. Tabulate surgical options available for osteoarthritis and avascular necrosis of the hip.
10. Briefly discuss total hip arthroplasty.
11. Briefly discuss femoral acetabular impingement.

After this session, you should have sufficient information to advise a middle-aged patient with a grade 3 painful hip and osteoarthritis about the advantages and disadvantages of surgery to the hip, as well as the conservative modalities available.

RESOURCES

Textbook: Apleys system of Orthopaedics and fractures

Web Reference: http://www.orthobullets.com

THEME 18: MUSCULOSKELETAL CONDITIONS OF THE LOWER LIMB
SESSION 2: APPROACH TO ADULT HIP PAIN

OUTCOMES

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

1. Discuss the clinical presentation of true knee pain.
2. Discuss degenerative conditions of the knee.
3. Discuss knee instability and meniscal tears.
4. Discuss conservative treatment of osteoarthritis of the knee.
5. Discuss surgical options and indicating there-of.
6. Discuss anterior knee pain and iliotibial band friction syndrome in athletes.

RESOURCES:

Textbook: Apleys system of Orthopaedics and fractures

Web Link: http://www.orthobullets.com

Case Studies and Reinforcement
Case studies illustrating the concepts discussed in this lecture will be shown.
OUTCOMES

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

1. Discuss the classification of exercise-related lower leg pain.
2. Discuss the differential diagnosis of ERLLP.
3. Discuss bone stress injuries.
4. Discuss tibial periostalgia (shin splints).
5. Discuss chronic compartment syndromes.

RESOURCES

Textbooks:
- Brukner and Khan – Clinical Sports Medicine
- Apley System of Orthopaedics and fractures

Web Link: http://www.orthobullets.com

Case Studies and Reinforcement
A series of case studies illustrating the concepts discussed in this lecture will be shown.

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

ANYTHING SPECIFIC YOU SHOULD DO?
Before this session you have to revise the sessions of Theme 15. (Especially the session on Gait). This will enable you to understand the pathologic processes that we encounter when assessing a limping child. Study the article “M.W.Beresford, A.G. Clearly: Evaluation of a limping child. Current Paediatrics 2005; 15, 15-22”, before attending this session.

This is a wonderful opportunity to quickly revise and consolidate your understanding of the principles of resuscitation.

Case presentations:
A series of case studies involving patients with a limp will be presented and discussed.

THEME 18: MUSCULOSKELETAL CONDITIONS OF THE LOWER LIMB

SESSION 5:
APPROACH TO MEDIAL ARCH PAIN OF THE FOOT:

OUTCOMES
At the end of this session, you should have an approach to Medial Arch Pain to the foot. The topic will be discussed under the following headings:

1. Tibialis Posterior Tendon Insufficiency (Adult Acquired Flat Foot Syndrome)
2. Midfoot Arthritis (Primary or Secondary Osteoarthritis)
3. Rheumatoid Arthritis (Causing Pes Planus or a Flat foot)
ANYTHING SPECIFIC YOU SHOULD DO?

Patients with midfoot pain are frequently seen in Orthopaedic foot clinics as well as in GP practices- a clear understanding of the topic is important to recognise these conditions, in order to initiate treatment and refer them appropriately. Revise the notes on this topic prior to the lecture. The didactic lecture will only illustrate the pertinent aspects of the topic.

Case presentations:

A series of case studies involving patients with medial arch pain of the foot will be presented and discussed

THEME 18: MUSCULOSKELETAL CONDITIONS OF THE LOWER LIMB

SESSION 6: APPROACH TO METATARSALGIA:

OUTCOMES:

At the end of this session, you should have an approach to Metatarsalgia (Forefoot Pain). Metatarsalgia will be discussed under the following headings:

- Hallux Related
  - Hallux Valgus
  - Hallux Rigidus
  - Sesamoid pathology
- Lesser toe Causes
  - Claw, Hammer and Mallet toes
  - Bunionette
  - Metatarsal Phalangeal joint instability
  - Stress fractures
  - Morton's neuroma
- Referred pain
  - Tarsal tunnel Syndrome
RESOURCES

1. http://www.orthobullets.com/user/dashboard?id=all&specialty=7&menu=topic

ANYTHING SPECIFIC YOU SHOULD DO?

Metatarsalgia can be a very daunting condition to diagnose and treat. A clear approach to this important topic is thus needed. Please revise the notes on this topic prior to the lecture. The didactic lecture will only illustrate the pertinent aspects of the topic.

Case presentations:

A series of case studies involving patients with metatarsalgia will be presented and discussed.
THEME 19: APPROACH TO ARTHRITIS

AIM:

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.

OVERVIEW OF THE THEME

<table>
<thead>
<tr>
<th>Session</th>
<th>Date</th>
<th>Activity</th>
<th>Topic</th>
<th>Lecturer</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>22/7/2015</td>
<td>Lecture</td>
<td>Approach to a patient presenting with musculoskeletal complaints</td>
<td>Dr R du Toit</td>
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<td>2</td>
<td>23/7/2015</td>
<td>Lecture</td>
<td>Rheumatoid arthritis (RA)</td>
<td>Dr R du Toit</td>
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<td>3</td>
<td>23/7/2015</td>
<td>Lecture</td>
<td>Approach to Mono-Arthritis (MO) and Osteo-Arthritis (OA)</td>
<td>Dr L du Plessis</td>
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<td>11:00 - 11:45</td>
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<td>4</td>
<td>23/7/2015</td>
<td>Lecture</td>
<td>Crystalarthropathies</td>
<td>Dr L du Plessis</td>
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<td>5</td>
<td>23/7/2015</td>
<td>Interactive</td>
<td>Interactive session</td>
<td>Dr D Whitelaw</td>
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<td>23/7/2015</td>
<td>Lecture</td>
<td>Spondylo-arthropathies</td>
<td>Dr R du Toit</td>
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<td>7</td>
<td>24/7/2015</td>
<td>Lecture</td>
<td>Infections and rheumatology</td>
<td>Dr R du Toit</td>
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<td>8</td>
<td>24/7/2015</td>
<td>Lecture</td>
<td>Soft tissue rheumatism and generalised pain</td>
<td>Dr B Viljoen</td>
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<td>9</td>
<td>24/7/2015</td>
<td>Lecture</td>
<td>Paediatric rheumatism (i)</td>
<td>Dr M Esser</td>
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<td>Lecture</td>
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<td>27/7/2015</td>
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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 and auto-immunity.

ii) The basic physiology of pain.

iii) The basic structure of the joint (synovial joint and vertebral discs) and its nourishment.
RESOURCES


ii) DVD: Rheumatological examination techniques (Dr Alan Tooke) and podcasts on tutorials:

https://fmhspod.sun.ac.za

Log in using: tyg\yourSUname as User Name; then enter your SU password and click on LOGIN.
Go to Resources, Bachelor’s Degrees, Medicine. Click on the + next to Clinical Tutorials; Scroll down to Rheumatology.

THEME 19: APPROACH TO ARTHRITIS

SESSION 1: APPROACH TO A PATIENT PRESENTING WITH MUSCULOSKELETAL COMPLAINTS

OUTCOMES

At the end of this session, the student should:

i) Have knowledge of the following basic concepts:
   a. Be able to distinguish between articular and extra-articular pain.
   b. Be able to distinguish between inflammatory and non-inflammatory (mechanical) pain.
   c. Have insight into the significance of the onset, site and distribution of joints affected by arthritis.

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

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

iv) be able to provide an appropriate differential diagnosis for a patient presenting with an oligo- or polyarthritis

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 especially in the hands

iii) Be able to recognise the extra-articular manifestations of RA
iv) Have a basic knowledge of how RA is diagnosed, including the interpretation of the relevant special investigations such as serology and radiology.

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

### THEME 19: APPROACH TO ARTHRITIS

#### SESSION 3: APPROACH TO MONOARTHRITIS(MO) AND OSTEO-ARTHRITIS (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

vii) Know when to refer a patient with OA.

### THEME 19: 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) Have a thorough understanding of the epidemiology of gout

iii) Know the causes of hyperuricemia: primary and secondary (especially drugs)

iv) Be able to describe the clinical manifestations of hyperuricemia

v) Have knowledge of the dietary guidelines for a patient with gout

vi) Be able to give a differential diagnosis of gout (both acute- and chronic -)

vii) Have an approach to the management of acute gout

viii) Know the indications for uric acid lowering therapy

ix) Be able to give dietary guidelines to a patient with gout

x) Have a basic knowledge of the other crystal arthropathies [ CPPD; hydroxyapatite ]
THEME 19: APPROACH TO ARTHRITIS

SESSION 5: INTERACTIVE SESSION

OUTCOMES

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

SESSION 6: SPONDYLOARTHROPATHIES

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 an understanding of the terms enthesitis and dactylitis.
iv) Have a thorough knowledge of the clinical picture of ankylosing spondylitis (AS)
v) Be able to differentiate between mechanical and inflammatory back pain (clinically Be able to describe the basic radiological differences between AS and osteoarthritis of the back.
vi) Have an understanding of the term "specific reactive arthritis" (ReA)
vii) Have knowledge of the clinical features of a ReA
viii) Have a basic knowledge of the clinical patterns of joint involvement in psoriatic arthritis
ix) Have a basic knowledge of the clinical features of an enteropathic arthritis

SESSION 7: INFECTIONS AND RHEUMATOLOGY

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 common rheumatological manifestations associated with HIV.
ii) Have insight into the impact of HIV infection on the serological markers and clinical manifestations of rheumatological conditions.
iii) Have knowledge of the different rheumatological manifestations that may follow a streptococcal infection.
iv) Be able to briefly discuss the rheumatological manifestations of Lyme disease and Brucellosis.

v) Have knowledge of the viral arthritides, including hepatitis B and C, rubella and human parvovirus B19.

vi) Be able to briefly discuss fungal joint and bone diseases.

---

### THEME 19: APPROACH TO ARTHRITIS

#### SESSION 8: SOFT TISSUE RHEUMATISM AND GENERALISED PAIN

**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, as well as organic and functional pathology.

iii) An approach to pain in the elderly.

iv) Basic knowledge of Fibromyalgia, especially related to:
   a) The symptoms which characterize fibromyalgia.
   b) The associated conditions.
   c) The role of special investigations.
   d) A rational approach to treatment and prognosis.

v) Should understand the concept of Soft Tissue Rheumatism, where the pathology lies, what the basic pathophysiology is and how to distinguish it from joint pathology.

vi) Knowledge of the common examples of Soft Tissue Rheumatic conditions:
   a) Rotator Cuff Syndrome
   b) Lateral and Medial epicondylitis
   c) De Quervains tenosynovitis
   d) Trochanteric bursitis
   e) Achilles tendinitis
   f) Anserine bursitis

---

### THEME 19: APPROACH TO ARTHRITIS

#### SESSION 9 AND 10: PAEDIATRIC RHEUMATOLOGY

**OUTCOMES**

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

1. The core symptoms and signs of juvenile idiopathic arthritis (JIA)
2. The criteria and relevant investigations on which this diagnosis is based
3. The commoner musculoskeletal complaints of childhood in the differential diagnosis of JIA
4. The morbidity associated with these conditions and the importance of making an early diagnosis
5. A basic treatment approach for JIA

THEME 19: APPROACH TO ARTHRITIS

SESSION 11: INTERACTIVE SESSION

OUTCOMES

The students will be given the opportunity to use their knowledge to solve clinical problems
THEME 20:
APPROACH TO CONNECTIVE TISSUE DISEASES

AIM:

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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<tr>
<td>1</td>
<td>27/7/2015</td>
<td>Lecture</td>
<td>Recognising a patient with a connective tissue disease</td>
<td>Dr M Manie</td>
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<tr>
<td>2</td>
<td>27/7/2015</td>
<td>Lecture</td>
<td>Systemic Lupus Erythematosus (SLE)</td>
<td>Dr F Bouwer</td>
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<tr>
<td>3</td>
<td>27/7/2015</td>
<td>Lecture</td>
<td>Systemic sclerosis and inflammatory myopathies</td>
<td>Dr M Manie</td>
</tr>
<tr>
<td>4</td>
<td>27/7/2015</td>
<td>Lecture</td>
<td>Sjogrens syndrome and vasculopathies</td>
<td>Dr M Manie</td>
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<tr>
<td>5</td>
<td>27/7/2015</td>
<td>Interactive</td>
<td>Interactive session</td>
<td>Dr D Whitelaw</td>
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THEME 20: APPROACH TO CONNECTIVE TISSUE DISEASES

SESSION 1: RECOGNISING A PATIENT WITH A CONNECTIVE TISSUE DISEASE

OUTCOMES

At the end of this session, the student should:

i) Understand the term connective tissue disease in relation to rheumatic diseases.

ii) Appreciate the features common to most connective tissue diseases.

iii) Appreciate the importance of early referral to a specialist if such a condition is suspected.

iv) Have insight into common manifestations of connective tissue diseases
At the end of this session, the student should:

i) Have basic knowledge of the epidemiology of SLE (and be able to identify population subgroups at greatest risk for development of SLE.)

ii) Be able to briefly discuss the role of genetic, environmental and hormonal factors in the pathogenesis of SLE.

iii) Understand the role of classification criteria in the diagnosis of SLE, including their strengths and weaknesses.

iv) Have an understanding of the multi-systemic nature of the disease and the wide spectrum of clinical presentations, with knowledge of the most common clinical manifestations.

v) Know the warning signs of a SLE flare.

vi) Have basic knowledge of the importance and limitations of serological testing in a patient with SLE.

vii) Recognise the importance of early referrals for these cases.

viii) Be able to briefly discuss the therapeutic role of anti-malarial agents in SLE.

ix) Be aware of the clinical events required to make a diagnosis of the antiphospholipid syndrome (APS), as well as it’s association with SLE.

At the end of this session, the student should:

i) Know the classification of systemic sclerosis

ii) Understand the contribution of skin, vascular and immunological abnormalities in the pathogenesis of scleroderma.

iii) Know the classification of the inflammatory myopathies

iv) Know the organ systems which are mainly affected by the above diseases.
THEME 20: APPROACH TO CONNECTIVE TISSUE DISEASES

SESSION 4: SJOGREN’S SYNDROME AND VASCULITIS

OUTCOMES

At the end of this session, the student should:

i) Know the difference between primary and secondary Sjogrens syndrome.

ii) Know how to confirm the diagnosis of Sjogrens syndrome

iii) Know the cardinal organ manifestations of Sjogrens Syndrome.

iv) Know the core principles of the management of Sjogrens syndrome

v) Know the classification of vasculitis with respect to vessel size sub-type with at least one example of each.

vi) Know the common organ manifestations of each sub-type of vasculitis

vii) Know which drugs are used in the different vasculitides.

SESSION 5: INTERACTIVE SESSION

OUTCOMES

The students will be given the opportunity to use their knowledge to solve clinical problems.
THEME 21: TREATMENT OF RHEUMATOLOGICAL CONDITIONS

AIM OF THEME

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

OVERVIEW OF THE THEME

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<tr>
<td>1</td>
<td>28/7/2015</td>
<td>Lecture</td>
<td>Pharmacology</td>
<td>Dr B Viljoen</td>
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<td>2</td>
<td>28/7/2015</td>
<td>Lecture</td>
<td>Paramedical (OT, physio, SW)</td>
<td>Dr D Whitelaw</td>
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<td>3</td>
<td>28/7/2015</td>
<td>Revision</td>
<td>Slide Show</td>
<td>Dr D Whitelaw</td>
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THEME 21: TREATMENT OF 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 commonly occurring rheumatological conditions, with regards to indications, contra-indications and common side-effects:
   a. Analgesics
   b. NSAIDs
   c. Cortico-steroids
   d. DMARDS (Chloroquine, Metotrexate, Sulfasalazine, Azathioprine)
   e. Allupurinol
   f. Colchicine

ii) Be aware of drugs that need regular monitoring via blood tests.

iii) Have insight in to the limitations of some of the drugs used in chronic inflammatory arthritis

iv) Have a basic knowledge of the new therapeutic agents used in chronic inflammatory conditions (Biologics - TNF α inhibitors, IL-6 inhibitor, Rituximab) with regards to basic indications, limitations and potential side-effects.

Resources: Pharmacology by Rang, Dale, Ritter and Moore 5th Edition, Chapter 16
THEME 21: TREATMENT OF RHEUMATOLOGICAL 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: SLIDE SHOW REVISION

The students will be given the opportunity to use their knowledge to solve clinical problems.
THEME 22:
THE ROLE OF OCCUPATIONAL THERAPY AND
PHYSIOTHERAPY IN REHABILITATION

AIM:
This session deals with the Rehabilitation of Musculoskeletal patients. The role of Physiotherapy
and Occupational Therapy will be highlighted. All the relevant information is provided in your
notes under standardized headings. References have been provided for further reading.

BACKGROUND KNOWLEDGE

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

OVERVIEW OF THE THEME

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<tr>
<td>1</td>
<td>28/7/2015</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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<tr>
<td>2</td>
<td>28/7/2015</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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THEME 22: 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.
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
ME 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: 27 APRIL – 1 MAY 2015**

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### WEEK 19: 11 - 15 MAY 2015

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<td>**T8 - (1) ** Welcoming &amp; Introduction</td>
<td>**T8 - (S6) ** Orthopaedic Special Investigations - Radiology</td>
<td>**T9 - (S3) ** Approach Orthopaedic Trauma Patient - Complications Part 1</td>
<td>**T10 - (S1) ** Approach to Shoulder &amp; Arm Trauma</td>
<td>**T11 - (S4) ** Approach to Knee Trauma</td>
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<td>**T8 - (S2) ** Terminology</td>
<td>**T8 - (S7) ** Principles of Nuclear Medicine</td>
<td>**T9 - (S3) ** Part 2</td>
<td>**T10 - (S2) ** Approach to Elbow &amp; Forearm Trauma</td>
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<td>**T9 - (S4) ** Approach Orthopaedic Trauma Patient - Paediatric</td>
<td>**T10 - (S3) ** Approach to Wrist, Hand &amp; Tendon Trauma</td>
<td>**T11 - (S6) ** Approach to Foot and Ankle Trauma</td>
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<td>T12 - (S1) Management of Wounds and Lacerations</td>
<td>T13 - (S5) Approach to Chronic Musculoskeletal Infections</td>
<td>T14 - (S3) Approach to Benign Bone Tumors</td>
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<td>T13 - (S6) Approach to Infective Conditions of the Spine</td>
<td>T14 - (S4) Approach to Malignant and Metastatic Bone Tumours</td>
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<td>11:00-11:45</td>
<td>T20 - (S2) SLE</td>
<td>T22 - (S1) OT &amp; PT Rehabilitation of Orthopaedic Conditions</td>
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<td>12:00-12:45</td>
<td>T20 - (S3) Systemic Sclerosis and Inflammatory Myopathies</td>
<td>T22 - (S2) OT &amp; PT Guidelines for Referral</td>
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<td>13:00-13:45</td>
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<td>14:00-14:45</td>
<td>T20 - (S4) Sjogrens Syndrome and Vasculopathies</td>
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<td>T20 - (S5) Interactive Session</td>
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Coloured Codes for Orthopaedic Lectures:

<table>
<thead>
<tr>
<th>Dr du Toit</th>
<th>Dr ICM Robertson</th>
<th>Dr A Ikram</th>
<th>Dr S Pretorius</th>
<th>Dr J Jordaan</th>
<th>Dr IPS Terblanche</th>
<th>Dr J Davis</th>
<th>Dr G du Preez</th>
<th>Dr D Hugo</th>
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