Professional Undergraduate Curriculum

in

Orthopaedics and Traumatology

(MB ChB)

Department of Orthopaedics and Traumatology
Faculty of Medicine
The Chinese University of Hong Kong
Prince of Wales Hospital
Shatin, NT, Hong Kong SAR
China

2009/10
Welcome to the Department of Orthopaedics & Traumatology

Musculoskeletal diseases are highly prevalent conditions causing significant health threats for every individual. The axis of musculoskeletal teaching within our panel-based and patient-centered medical curriculum is designed so that students are capable of providing up-to-standard medical care for musculoskeletal conditions, at a professional level appropriate to that of a first-year medical practitioner, after their graduation and upon one-year internship training when they are expected to be knowledgeable, logical and empathetic doctors.

In order to achieve these objectives, students should learn from the patients and for the patients. “First-party” exposure to real clinical scenarios is essential. Practical management including investigation and treatment planning will be covered in details. Teaching will be carried out in the wards, clinics and operating theatres at both regional and peripheral hospitals.

This curriculum will let you know:
1. What you are expected to learn during the Orthopaedic Module and
2. What is expected from you in order to pass the End-of-Module Assessment and the orthopaedic part of the Med 5 Final Examination.

It contains the learning objectives of the orthopaedic module, the contents of what we will teach, the key messages that you are expected to know, the hands-on skills we expect you to demonstrate, the location of audio-visual learning materials that are available at your disposal as well as a reference list of recommended texts and literatures for your reading.

Learning orthopaedics is always exciting and rewarding. We hope you will have a most fruitful learning experience when going through the Orthopaedic Module!

Department of Orthopaedics and Traumatology
The Chinese University of Hong Kong
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Objectives of the Orthopaedic Module

Students will achieve the various learning objectives in phases.

After the Med 3 Orthopaedic module, you should be able to:-
1. perform bed-side assessment and **pick up red-flag signs** for patients with **common or clinically important** musculoskeletal complaints and disorders,
2. suggest a list of differential diagnoses and to determine the urgency of the problems and
3. recommend a list of investigations for that particular scenarios.

The Med 5 Orthopaedic Module is a continuation of the Med 3 module. You should consolidate what you have learnt at the Med 3 module. By the time you finish the Med 5 module, you should be able to:
1. perform radiological interpretation for common or clinically important musculoskeletal conditions
2. formulate treatment planning at a professional level appropriate to that of a first-year medical practitioner and
3. make a timely referral when the patient requires specialist’s care.

The curriculum contains a list of orthopaedic conditions. When not specified, the following items of the conditions should be studied:-
1. Definition and the etiology,
2. Applied pathology, pathoanatomy and pathophysiology,
3. Epidemiology,
4. Clinical features including symptoms and signs, both pathognomonic and non-pathognomonic,
5. Differential diagnoses,
6. Relevant investigation including x-ray imaging,
7. Evaluation of how the disease is affecting daily functioning and its psycho-social consequences
8. Holistic treatment planning (details of operative procedures are not required) and
9. Prognosis and potential complications

The curriculum is not meant to limit your scope of study. Instead, it is a guide for acquiring orthopaedic knowledge through a dynamic and logical process. Abundant opportunities of exposure to real clinical situations will be available throughout the Orthopaedic Module. As you strengthen the foundation in orthopaedic knowledge, you will crystallize what you see and incorporate that into your theoretical framework. That theoretical framework can then be applied to another clinical situation so that continuous improvement in the quality and standard of care can be achieved. As experiences accumulate, your skills and knowledge in orthopaedics will be further enhanced. In order to achieve all these, one needs to be scientific in analysis, critical in thinking and, most important of all, **ACTIVE IN LEARNING**, and **LOGICAL** in carrying out the above intellectual processes.
GENERAL ORTHOPAEDIC REFERENCE BOOKS


Netter’s Concise Atlas of Orthopaedic Anatomy Jon C. Thompson, Learning Systems

Basic and Advanced Items

**Basic Items:**
They are depicted in standard characters and correspond to the basic knowledge a medical student should acquire and the basic hands-on skills a medical student should master during the undergraduate program in orthopaedics. It represents the minimum level of competence a medical student should achieve before they graduate from the program.

**Advanced Items:**
The advanced items are depicted in small characters in italics. They are for those who incline to pursue more into the field of orthopaedics. Students aiming at awards and excellent marks in the examination should study these Advanced Items on top of the Basic Items.
### Hands-on Skills in Physical Examination

<table>
<thead>
<tr>
<th>General Clinical Skills</th>
<th>Minimum requirement</th>
<th>Advanced requirement</th>
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<tbody>
<tr>
<td>a) History</td>
<td>take a good history with relevance to musculoskeletal complaints to accurately define the anatomical location of the disorder, the etiology, the complication, the background and to assess the extent and to prognosticate the musculoskeletal condition</td>
<td></td>
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<tr>
<td>b) General examination</td>
<td>Detection of stigmata of medical diseases eg anemia, jaundice, emaciation Height, weight and other growth parameters assessment (segmental length, armspan) Detection of dysmorphic features, recognize dwarfism (rickets in particular), and describe truncal deformity in the frontal plane (scoliosis) and sagittal plane (hyper or hypo-lordosis or kyphosis) recognize Leg Length Discrepancy.</td>
<td>features of achondroplasia &amp; acromegaly test for ligamentous laxity: Carter-Wilkinson criteria</td>
</tr>
<tr>
<td>c) Examination of lumps / swellings &amp; Ulcers</td>
<td>comment on the characteristics and the tissue plane involved and the relationship with local structures. Comment on whether such swellings are aggressive or non-aggressive in nature describe an ulcer in details:- comment on whether it is healthy/unhealthy, healing or non-healing ulcer.</td>
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<td>d) Neurovascular Assessment</td>
<td>palpate peripheral pulses and assess peripheral perfusion by noting the capillary refill, tissue turgor, skin color and surface temperature . recognize wet and dry gangrene. assess venous circulation and to distinguish between venous edema and lymphedema. assess for DVT in the leg neurological assessment: sensation and dermatome motor power and myotome muscle bulk, fasciculation, tone, jerks, Babinski sign, ankle clonus signs of peripheral nerve palsy Tinel’s sign</td>
<td>comment on limbs at risk for impending ischaemia or gangrene</td>
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<tr>
<th>Upper Limb</th>
<th>Minimum requirement</th>
<th>Advanced requirement</th>
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<tr>
<td>a) Shoulder</td>
<td>palpate bony landmarks – acromion, coracoid, lateral &amp; medial end of clavicle, scapular spine, blade, proximal humerus</td>
<td>Testing of individual rotator cuff muscles</td>
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<tr>
<td></td>
<td>demonstrate range of motion</td>
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<td></td>
<td>demonstrate impingement of rotator cuff, Hawkin’s impingement sign, painful arc, scapulohumeral rhythm</td>
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<td>tests for shoulder instability including the Apprehension test.</td>
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<td>Tests for bicipital tendinitis,</td>
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<td>b) Elbow</td>
<td>palpate epicondyles, lateral condyle, olecranon process of ulna and the radial head.</td>
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<td>comment on varus &amp; valgus deformity. (Carrier’s angle)</td>
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<td>demonstrate tests for Tennis Elbow and Golfer’s elbow.</td>
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<td>palpate ulnar nerve at the cubital tunnel.</td>
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<td>measure range of motion at the elbow joint and degrees of forearm rotation (supination and pronation).</td>
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<td></td>
<td>Assess collateral ligamentous laxity</td>
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<td>c) Hand &amp; Wrist</td>
<td>comment on hand deformities – swan neck, boutonniere, mallet finger, Heberden’s node, gouty tophi., claw hand and wrist drop.</td>
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<td></td>
<td>describe hand deformity in rheumatoid arthritis</td>
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<td>thenar wasting, interosseous wasting</td>
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<td>trigger finger, FDS Vs FDP action, test for Carpal Tunnel Syndrome (Tinel’s sign, Phalen’s and reverse Phalen’s Test).</td>
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<td>palpate anatomical snuff box, radial and ulnar styloid process. de Quervain’s test for stenosing tenosynovitis.</td>
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<td>demonstrate range of movement at the finger joints and wrist joint complex. (flexion, extension, radial and ulnar deviation, forearm supination and pronation)</td>
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<td>test for circulation : Allen’s test</td>
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<td>demonstrate key grips -, precision pinch, lateral, pulp pinch, power grip.</td>
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<td>measurement of grip strength with dynanometer.</td>
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<td>demonstrate patient dexterity in activities of daily living (buttoning, putting on clothes, using chopsticks, picking up coins etc).</td>
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<td>Volkmann’s contracture, Dupuytren’s contracture</td>
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<td>Test for DRUJ</td>
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<td>d) Neurological Examination</td>
<td>assess and determine the level of lesion of axillary, radial, ulnar and median nerve – motor and sensory. demonstrate Froment’s sign, intrinsic muscle action, thumb opposition, Horner’s syndrome,</td>
<td>differentiation from cervical radiculopathy assessment of thoracic outlet syndrome: Roos’ test</td>
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<tr>
<td>Lower Limb</td>
<td>Minimum requirement</td>
<td>Advanced requirement</td>
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<td>a) Hip Joint</td>
<td>Assessment of gait, square the pelvis, assess leg length discrepancy, (true and apparent length), tibial Vs femoral shortening. Must be able to palpate the bony landmarks around the hip (anterior and posterior superior iliac spines, pubic tubercle, the greater trochanter and ischial tuberosity). locate femoral pulse. demonstrate Flexion deformity ( Thomas’ test ), psoas stretch test, demonstrate Range of Hip Motion. perform the Trendelenburg’s test.</td>
<td>Bryant's triangle &amp; Nelaton’s line. Ortolani's and Barlow's tests.</td>
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<tr>
<td>b) Knee Joint</td>
<td>comment on swellings / effusion. (fluid displacement, fluid thrill, patellar tap) and quadriceps wasting; comment on knee deformity namely genu varus and valgus. palpate bony landmarks – patella, fibular head, tibial tuberosity, patellar tendon, the supra-patellar pouch, medial and lateral femoral condyles and tibial condyles common bursae around the knee. detect a Baker’s cyst. test for anterior cruciate stability and posterior cruciate stability. collateral ligaments stability. McMurray’s test and Apley’s test for meniscal injury. assessment of extensor mechanism: power of knee extension patellar instability: lateral shift test, apprehension test range of motion of the knee. crepitus on passive movement power of quadriceps and hamstrings</td>
<td>synovial thickening.</td>
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</table>
### c) Foot and Ankle
- Must be able to palpate the anatomical landmarks around the ankle – medial and lateral malleoli, navicular bone, and calcaneus, locate the tibialis posterior
demonstrate ankle and sub-talar range of motion.
check for integrity of TA (Thompson’s Test )
comment on foot deformities – equinus, foot drop, clubfoot, pes planus

### d) Lower Limb Neurology
- test the function of femoral, sciatic, common peroneal and tibial nerve.
gait:- normal gait pattern Trendelenburg’s gait antalgic gait foot drop gait short limb gait

### Spine

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<td></td>
<td>palpate spinous processes and check for muscle spasm- Posterior spinal muscles, trapezius, sternomastoid and muscles around the shoulder girdle.</td>
<td>extra myelopathic signs: finger escape, Lhermitte’s test, myelopathic hand</td>
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<td>demonstrate cervical spinal motion.</td>
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<td>Radiculopathy sign: Spurling Myelopathic signs: Hoffmann's test, 10 seconds test, inverted supinator reflex,</td>
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<td>b) Dorso-lumbar spine</td>
<td>identify scoliosis, kyphosis, lordosis and gibbus.</td>
<td>localize vertebral level – C7-T1, T12-L1, lombo-sacral junction.</td>
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<td>demonstrate motion at the lumbar spine.</td>
<td>Assessment of trunk shift with plumb line</td>
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<td>demonstrate the straight leg raising test, Lasègue’s test, cross straight leg raising, bowstring, femoral stretch test, psoas stretch test</td>
<td>the FABERE test for SIJ</td>
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<td>Adam’s forward bending test</td>
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<td>c) Sacrum and Pelvis</td>
<td>demonstrate tests for sacro-iliac joint strain – pelvic compression.</td>
<td>localize SI joint and palpate for tenderness.</td>
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<tr>
<td>d) Spinal Neurological Examination</td>
<td>recognize and demonstrate signs of upper and lower motor neuron lesion, cord compression at any level. correlate root values with functional motor segments (eg C5- Shoulder abduction, T-1 small muscles of the hand etc). – both for upper and lower limbs. Must be able to perform motor and sensory neurological assessment. locate level of disc prolapse after identifying the neurological deficit. lumbar canal stenosis</td>
<td>localize level of cord compression. identify central cord syndrome, Brown-Sequard syndrome, cauda equine syndrome</td>
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Common Orthopaedic Complaints

The differential diagnoses and approach to the following musculoskeletal complaints and scenarios:-

1 Musculoskeletal Pain (Acute and chronic)
   a. Neck pain
   b. Shoulder pain
   c. Elbow pain
      d. Wrist pain
   e. Painful small joints of the hand
   f. Back pain
   g. Hip pain
   h. Knee pain
      i. Ankle pain
      j. Heel pain

2 Musculoskeletal deformity
   a. Torticollis
   b. Scoliosis
   c. Elbow deformity
   d. Fingers and hand deformity
   e. Knee deformity
      f. Ankle and foot deformity

3 Limping gait

4 “My child is not walking right”

5 “numbness / paraesthesia”

6 motor neurological symptom

7 Skin ulcer

8 a patient admitted with trauma

9 “Lumps and bumps”
Specific Topics under each Subspecialties

Bone and Joint Infection

1. Acute infections (acute osteomyelitis and septic arthritis) and chronic infections (chronic osteomyelitis and tuberculous arthritis)
   a. Factors that affect the response to treatment: host factor, local tissue factor, and nature of organism
   b. Tuberculous and non-tuberculous
   c. Infection in children

2. Necrotizing fasciitis

3. Other specific conditions
   a. Infections complicating total joint replacement or internal fixation of fractures
      a. Incidence, causes and presentation
      b. Diagnosis
      c. Principles of management
      d. Prevention
   b. Infections related to drug addiction
      a. What infections can occur with drug addiction
      b. Presentations
      c. Management

Adult Knee and Hip Arthritis

1. Mono and polyarthritis

2. Degenerative arthritis

3. Rheumatological conditions with orthopaedic implication
   a. The classification
   b. Ankylosing spondylitis
   c. Rheumatoid arthritis
   d. Psoriasis

4. Gout and pseudogout

5. Avascular necrosis of femoral head

Orthopaedic Traumatology

1. To have an in-depth knowledge of common musculoskeletal injuries including geriatric fractures, multiple trauma and open fractures.

2. Classification and clinical features of fracture:-
   a. Anatomic location
b. intra-articular or extra-articular

c. morphology:- spiral, transverse, oblique, comminuted, greenstick fracture

d. degree of displacement

e. Open and close fractures: the importance of soft tissue vascularity;

f. Stress fracture

g. Pathological fracture

3 Fracture healing

4 Interpretation of x-ray of fractures / dislocations

5 Principles of acute management and subsequent definitive management including reduction, immobilization (holding) and rehabilitation

6 Complications of fractures

7 Common fractures and dislocations:
   a. Long bone fractures- femoral /tibial fractures-functional/minimally invasive treatment;
   b. Geriatric fractures- femoral neck or trochanteric fractures
   c. Intra-articular fractures- principles of treatment
   d. Distal radius fracture: Colles’ fracture
   e. Dislocations of shoulder, elbow and hip joints
   f. Monteggia fracture dislocation

   g. Galeazzi fracture dislocation
   h. Forearm fracture
   i. Scaphoid fracture

8 Comprehensive management of patients with fractures
   a. Initial assessment and resuscitation procedures
   b. Initial treatment like pain control, splintage
   c. Investigations
   d. Principles and choices of different treatment modalities,
   e. Medico-social aspect
   f. Rehabilitation :- multi-disciplinary approach with physiotherapist, occupational therapist, orthotist

   g. Prevention of complications
   h. Prevention of fractures: Community Program

9 Compartment syndrome and Volkmann’s contracture

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**Common Sport Injuries and Related Problems**

1 Importance of physical activity for health, potential side effects of excessive activity such as overuse or traumatic sports injuries

2 Knee problem
   a. Medial collateral ligament tear
   b. Lateral collateral ligament tear
   c. Anterior cruciate ligament tear
   d. Posterior cruciate ligament tear
   e. Meniscal injury
f. Patellar dislocation and subluxation
g. Chondromalacia patellae
h. acute knee hemarthrosis

3 Ankle problems:-
a. Ankle sprain including anterior talo-fibular ligament injury
b. Rupture of tendoachilles

4 Shoulder problems:
a. Shoulder dislocation and instability
b. Multidirectional instability + general laxity
c. Impingement, supraspinatus tear and other rotator cuff tears
d. Frozen shoulder
e. Bicipital tendinitis

5 elbow
a. Tennis elbow
b. Golfer’s elbow

6 others
a. Osgood-Schlatter, other osteochondritis: Sever’s disease,

7 Enthesopathy

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Paediatric Orthopaedics

1 Bone growth:-
a. Concept of bone growth: children should not be treated as small adults
b. primary and secondary ossification centers at the elbow
c. importance of growth plates

2 Adolescent Idiopathic Scoliosis

3 DDH
4 Slipped capital femoral epiphysis
5 Transient synovitis of hip
6 Idiopathic clubfoot
7 Chronic juvenile arthritis

8 Children’s injury and fracture
a. Differences between children Vs adult fractures
b. Healing and remodeling of fractures in children
c. Growth disturbances resulting from injuries to growth plates
d. Commonest fractures in children
   a. distal radius
   b. Supracondylar fracture of distal humerus
   c. forearm shaft
   d. femoral and tibial shaft
   e. Epiphyseal injury
f. Non-accidental injury
g. Pull elbow
**Disorders and Injuries of the Spine**

1. Conditions leading to neck or back pain
   - Non-specific soft tissue strain
   - Specific soft tissue injuries (disc, capsule)
   - Bony injuries- vertebral collapse, spondylolysis, avulsion fractures and fracture dislocation
   - Degeneration eg cervical spondylosis, lumbar spondylosis
   - Tumor,
   - Infection (Pyogenic, TB)
   - Other inflammatory conditions e.g. Ankylosing Spondylitis, Rheumatoid Arthritis
   - Specific Pathology eg facet joint disorder
   - Pain due to nerve compression, mechanical instability
2. Prolapsed intervertebral disc (PID)
3. Spinal stenosis
4. Neurogenic claudication (compared with vascular claudication)
5. Spondylolisthesis and spondylolysis
6. Kyphosis (multiple collapse of spine, Scheuermann’s disease, postural)
7. Cervical radiculopathy and myelopathy
8. Lumbar radiculopathy
9. Cauda equina syndrome
10. Management and complications of spinal cord injury

**Common Hand Problems**

1. History, physical signs and radiological features of common injuries:
   a. Domestic injuries: lacerations by glass or knife, and door crush injury.
   c. Industrial injuries: severe injuries caused by power instruments and machines, the principles of replantations.
d. Traffic accidents and fall.

2. The 3 phases of management for hand injuries:
   a. **First aid**: control of swelling, control of bleeding, immobilization, pain relief, psychological support, preservation of amputated part.
   b. **Definitive management**: principles and choice between operative and non-operative management.
   c. **Rehabilitation**: principles of rehabilitation including work capacity evaluation and vocational rehabilitation.

3. Outcome measurement of hand injuries:
   a. Physical capacity: range of movement and strength at various joints, sensation
   b. Functional: dexterity, functional sensibility, functional evaluation of hand (such as use of common objects)

4. Familiarize with typical presentations, and common causes of pain, paraesthesia, lumps and bumps in the upper limb and hand and the principles of management on these conditions.
   a. de Quervain’s disease, trigger finger, lateral and medial epicondylitis, Mallet finger
   b. The concept of cumulative trauma disorders
   c. Nerve entrapments, carpal tunnel syndrome, cubital tunnel syndrome, thoracic outlet syndrome
      i. The concept of Double Crush Syndrome
   d. Wrist pain: carpal instability, triangular fibrocartilage complex tears, Kienbock's disease
   e. Common lumps and bumps: ganglion, giant cell tumor of the tendon sheath, nerve sheath tumors, lipoma, dermoid

5. Dupuytren’s contracture
6. Tendon injury
7. Acute infection
8. Nerve injuries
9. Brachial plexus injury
10. median nerve palsy
11. Radial nerve palsy
12. Ulnar nerve palsy
13. Axillary nerve palsy
14. Sciatic nerve palsy
15. Femoral nerve palsy
16. Common peroneal palsy
17. Reflex sympathetic dystrophy / complex regional pain syndrome I and II

**Orthopaedic Rehabilitation**

1. Meaning of impairment, disability and handicap
2. To understand the role of clinician in the multidisciplinary approach for rehabilitation
3. Prosthetic Rehabilitation of lower limb amputee
4. Rehabilitation for patients with spinal injury, amputation, joint reconstruction; multiple trauma
Foot and Ankle Injuries and Disorders

1. Hallux valgus,
2. Rheumatoid foot
3. Diabetic foot
4. Ankle sprain
5. Achilles tendinitis
6. Plantar fasciitis
7. Bunions
8. Hammer and claw toes
9. Flat foot
10. Ingrowing toenail
11. Ischemia – acute and chronic

Musculoskeletal Tumors

1. The principles of operative Vs non-operative management for benign bone and soft tissues tumors. (Giant Cell Tumor, Simple Bone Cyst, Exostosis)
2. The principles of treatment (surgical, chemotherapy and radiotherapy) for malignant tumors
3. The basis of clinical staging and its application in the management.
4. The concept of limb salvage:- its contraindications and limitations.
5. The concept of marginal, intralesional, wide local, and radical excision for musculoskeletal tumors.
6. The role of adjuvant therapy, neo-adjuvant therapy and palliation.
7. Overall management of metastatic disease.
8. Classic osteosarcoma and its management

Miscellaneous

Metabolic bone disease
1. Osteoporosis
2. Ricket and osteomalacia
3. Hyperparathyroidism
4. Renal osteodystrophy
5. Paget’s disease
6. Neurofibromatosis
7. Marfan’s syndrome
8. Achondroplasia
9. Osteogenesis imperfecta
Useful Information

Web-Page
Department http://www.ort.cuhk.edu.hk
Departmental Teaching http://teaching.ort.cuhk.edu.hk
Orthopaedic Learning Center http://www.olc-cuhk.org

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