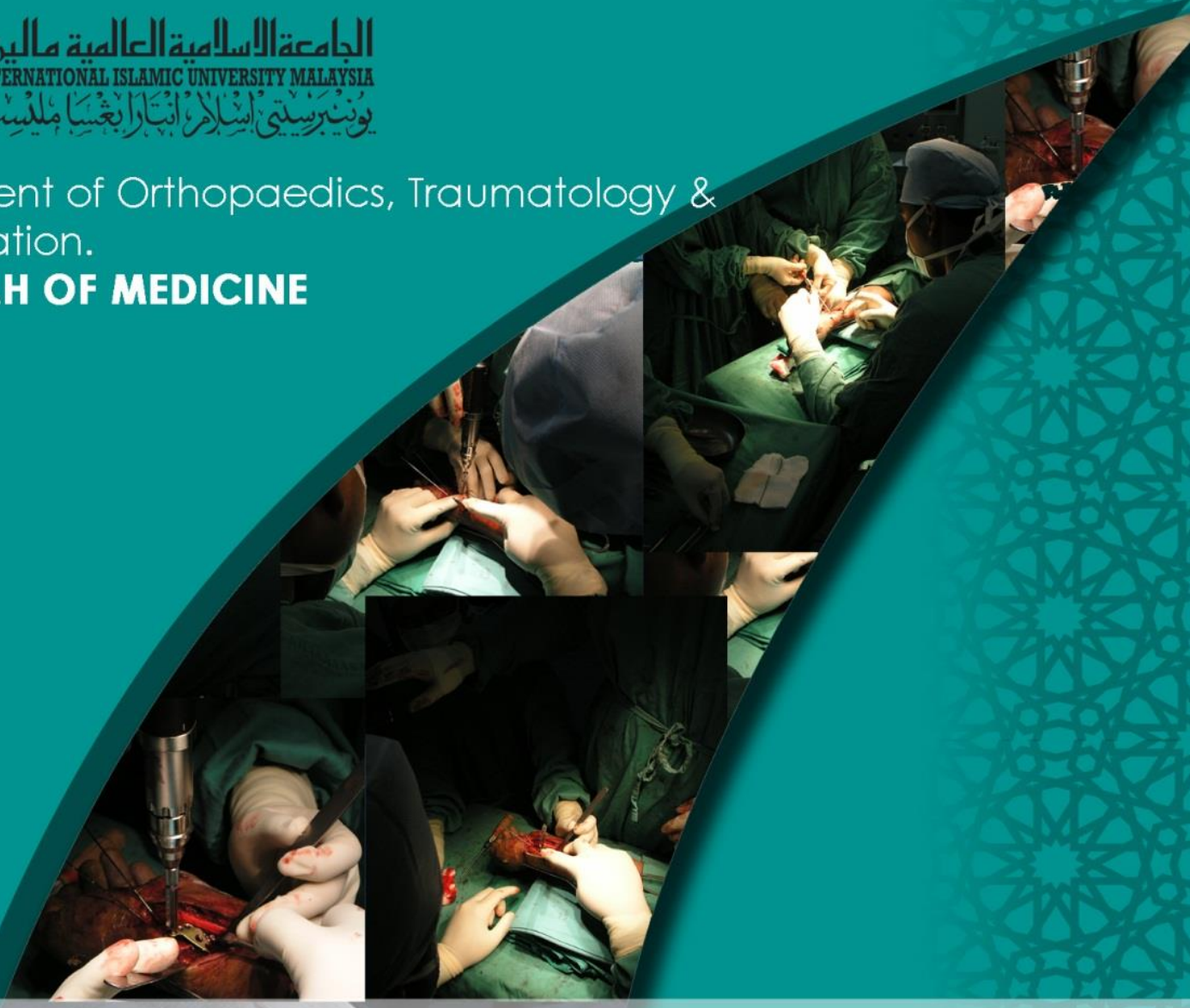
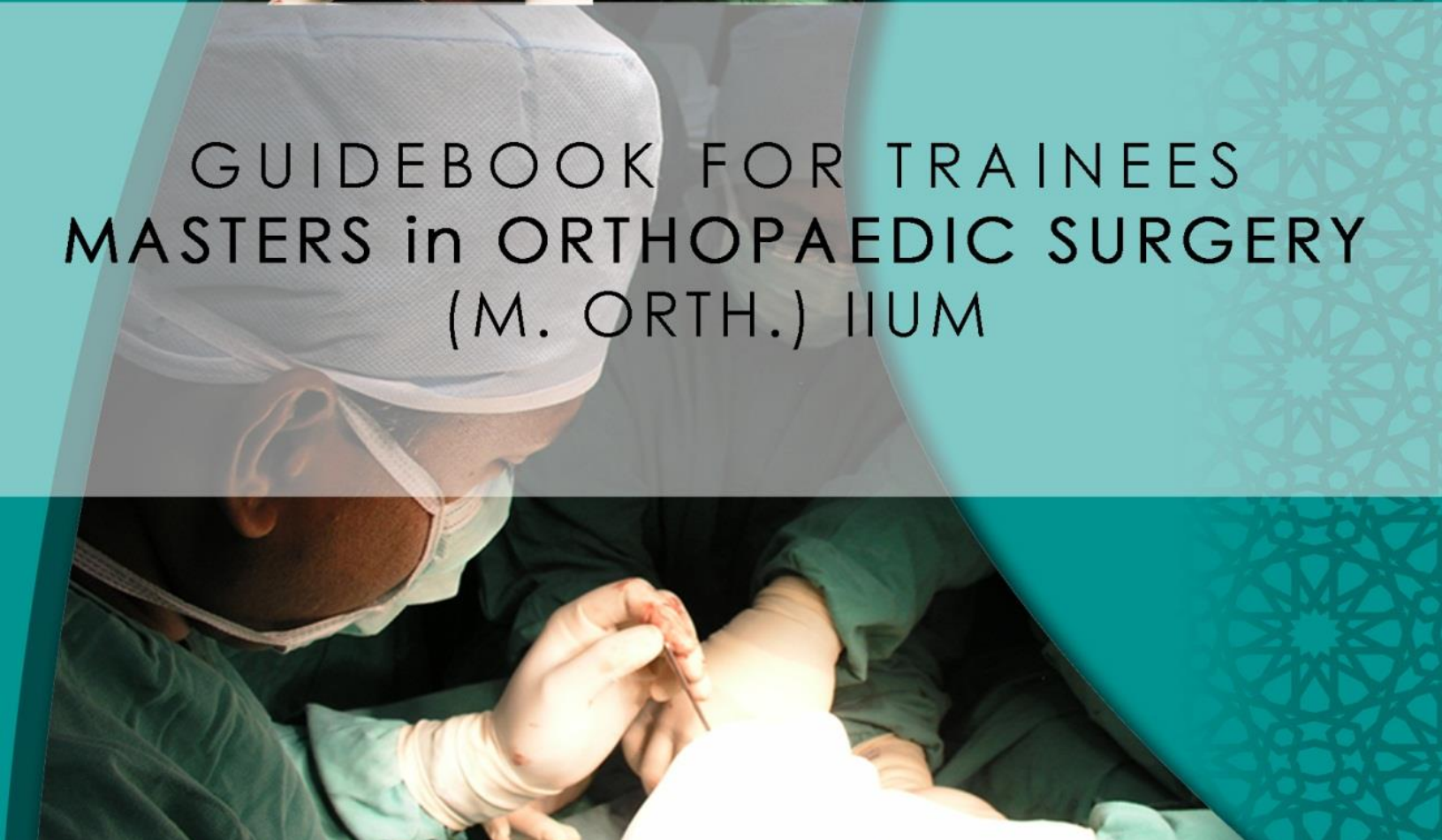
الجامعة الإسلامية العالمية ماليزيا
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA
يونيورسيتي إسلام انتارابغسا ملسيا

Department of Orthopaedics, Traumatology & Rehabilitation.
KULLIYYAH OF MEDICINE



GUIDEBOOK FOR TRAINEES
MASTERS in ORTHOPAEDIC SURGERY
(M. ORTH.) IIUM



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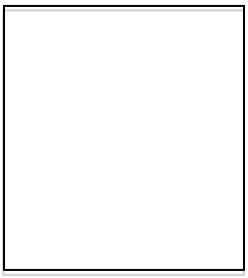


NAME	
GENDER	
DATE OF BIRTH	
UNDERGRADUATE DEGREE	
PREVIOUS HOSPITAL/CENTRE	
ADDRESS	
TELEPHONE NO.	
EMAIL ADDRESS	
SUPERVISOR	

TABLE OF CONTENT

MASTERS OF ORTHOPAEDIC SURGERY (M. ORTH)

1.0 INTRODUCTION

Education continues to be the top priority in Malaysia. The growth, development and progress of Malaysia depend on achieving excellence in education. Malaysia is committed to developing and providing world-class educational opportunities for everyone and the International Islamic University Malaysia is part of that quest and in so many ways is the most shining embodiment of that aspiration.

Orthopaedics as a specialty is still in need of improvement in Malaysia. The number of orthopedic surgeons in Malaysia is approximately 700 serving a population of about 29 million people giving a ratio of 1:100,000, a far from the desired standard of 1:30,000 for a developed country. In addition, about two third are in the private sectors with only one third in the public sector. In 2018, there were an estimated 900 Orthopaedic surgeons in Malaysia, only half of whom served in public hospitals and universities. This gives a ratio of about 1 Orthopaedic surgeon per 40,000 population. Malaysia aims to be a developed nation by 2025, therefore the country will need to increase Orthopaedic surgeon numbers by at least 25% to meet the suggested World Health Organisation (WHO) ratio of 1:30,000.

Currently, there are 7 (6 public university and 1 private university) out of the 17 medical schools (9 Public and 8 Private) that have postgraduate training for orthopaedic surgery, namely IIUM, UKM, UM, USM, UPM and UNIMAS. We were the fourth university that been approved to start by the Ministry of Higher Education.

The aim of the postgraduate training programme in Orthopaedics and Traumatology are to help ease the shortage in this specialty and to realize the aspiration of the university and the country to produce a well-balanced professional in this field

2.0 COURSE OBJECTIVES AND LEARNING OUTCOMES

2.1 Objectives

i. To prepare trainees for the Orthopaedic Specialty Committee (OSC) Part 2 Examinations.
ii. To provide training programmes that will produce compassionate, knowledgeable and technically competent orthopaedic surgeons.
iii. To offer an Islamic perspective at the same time producing well-rounded and competent professionals with a good background in the art and science of medicine.
iv. To prepare new specialists with comprehensive in-house education and training in traumatology and orthopaedic surgery to make them able to better serve in the health services equipped with good knowledge and great attitude.

At the end of the four years programme in Master of Orthopaedic Surgery, the trainees will be able to achieve the knowledge of orthopaedics in terms of theory and surgical skills.

They will be able to work as an orthopaedic specialist and performed surgeries for the common cases in orthopaedics, like general trauma, basic arthroplasty, spine, pediatrics, hand & microsurgery and arthroscopy. The trainees also shall be competence to work at any hospital in Malaysia as a clinical orthopaedic specialist.

2.2 Learning Outcomes

The following characteristics and skills are expected of the trainees:

i. High intellectual and professional capability.
ii. Good character.
iii. Information Communication Technology (ICT) literate.
iv. Good problems solving skills.
v. Good communications skills.
vi. Creative thinking capability.
vii. Critical thinking capability.

viii. Highly motivated.
ix. Good decision-making ability.
x. Good attitude and responsible both to the profession and the community at large.

3.0 COURSE STRUCTURE AND FORMAT

3.1 Academic Year (Year 1 – Year 4)

The programme is divided into 4 years aimed at allowing progressive mastery of knowledge, skills and attitude, increasing responsibilities and independence.

Year 1

The general objective is to enable trainees to acquire knowledge of the basic medical sciences and principles of orthopaedic surgery. The trainees also should apply the knowledge in the clinical problem-solving and decision-making process in the management of patients, including performance of operative procedures under supervision.

Trainees will be rotated in General Surgery, Orthopaedics and Traumatology and Intensive Care posting.

Year 2

The general objective is to enable trainees to acquire knowledge, skills and develop good attitude appropriate for the management of patients in the various surgical orthopaedic subspecialties which will be useful in their general orthopaedic practice.

Year 3

The general objective is to enable the trainees to acquire knowledge, skills and develop attitude in the management of patients and the orthopaedic team in general orthopaedic surgery at the level of the registrar.

Year 4

The general objective is to enable the trainees to function as the senior registrar in the orthopedic team and to manage critically ill patients. The trainees will be able to perform as the right-hand person to the consultant.

3.2 Islamic Input in Orthopaedics Training

The programme aims to produce orthopaedic surgeons who will serve their patients and community with care and integrity. They will be equipped with not only scientific and clinical knowledge but also skillful to function effectively as an orthopaedic surgeon within the Islamic concept of the unity of knowledge and the spirit of tawhid. They will have a healthy critical faculty and possess the desire and skills to continue self-directed learning to keep up with future advances in medicine.

The quest of knowledge is a trust from ALLAH. This component is part of integrating Islamic knowledge into the medical science curriculum.

3.2.1 Objectives

To educate the trainees on Ibadah during the treatment of orthopaedics and trauma condition.

i. To inculcate the value of Islamic knowledge and understanding.
ii. To expose the trainees with practical and theoretical aspect of Islamic concept in dealing with patients.
iii. Islamization of knowledge.

3.2.2 Content

i. Biography of famous Islamic physician
ii. Islamic worldview in medicine
iii. Fiqh ibadah during illness
iv. Fiqh muamalat related to disease
v. Medical ethics and Islamic values

3.2.3 Course Programme

The programme will be spread throughout the four years of study. The trainees will be guided to write a case study or problem related to orthopaedics and Islamic jurisprudence (fiqh) in which the trainees need to have more innovative programme about the course.

4.0 COURSE PROGRAMME

4.1 Activities

The activities include:

- Seminars/ Tutorials
- Lectures
- Research works
- Case write-up
- Hospital work
- Dissertation
- Orthopaedic log book
- Clinical teaching
- Surgical teaching
- Journal review
- Specialized orthopedic teaching
- Islamic input workshops
- One case report or one project paper (compulsory)

The students must participate in the program as required to enable them to sit for the OSC Examinations.

4.2 Curriculum Structure

4.2.1 Course Programme/Study Plan

YEAR OF STUDY	COURSE AND COURSE CODE		DURATION	LOCATION
Year 1	*Orthopaedics and Traumatology I*	*ORT 7259*	Semester 1	Ministry of Health Hospitals/ IIUM / University Hospitals
	Research Methodology	*ORT 7281*		
	Islamic Input in Orthopaedic	*ORT 7114*		
	Orthopaedics and Traumatology II	*ORT 7279*	Semester 2	
	Research Methodology	*ORT 7281*		
	Islamic Input in Orthopaedic	*ORT 7114*		
	END OF YEAR 1 ASSESSMENT & REVIEW BY SUB-COMMITTEE FOR ORTHOPAEDIC TRAINING (SCOT)			
Year 2	*Subspecialty Posting*	*ORT ******	Semester 1	SASMEC @IIUM (MOH Hospital for Oncology Posting)
	END OF POSTING EXAMINATION			
	Subspecialty Posting	*ORT ******	Semester 1 & 2	
	END OF POSTING EXAMINATION			
	Subspecialty Posting	*ORT ******	Semester 2	
	END OF POSTING EXAMINATION			
	END OF YEAR 2 REVIEW BY SCOT			
Year 3	*Subspecialty Posting*	*ORT ******	Semester 1	SASMEC @IIUM (MOH Hospital for Oncology Posting)
	END OF POSTING EXAMINATION			
	Subspecialty Posting	*ORT ******	Semester 1 & 2	
	END OF POSTING EXAMINATION			
	Subspecialty Posting	*ORT ******	Semester 2	
	END OF POSTING EXAMINATION			
	END OF YEAR 3 REVIEW BY SCOT			
Year 4	*Subspecialty Posting*	*ORT ******	Semester 1	SASMEC @IIUM (MOH Hospital for Oncology Posting)
	END OF POSTING EXAMINATION			
	Subspecialty Posting	*ORT ******	Semester 1 & 2	
	END OF POSTING EXAMINATION			
	END OF YEAR 4 REVIEW BY SCOT			
	Elective *Or* *Repeat*	*ORT 7329* *ORT ******	Semester 2	SASMEC @IIUM
	EXIT EXAMINATION			

**** Rotation of Subspecialty posting (8 Subspecialties) during year 2, 3 & 4.***

4.2.2 Subspecialty Posting Couse Code.

No	***Subspecialty***	***Course Code***
1	Foot and Ankle	ORT 7349
2	Hand and Reconstructive Microsurgery	ORT 7359
3	Spine	ORT 7339
4	Advance Trauma	ORT 7319
5	Sport Surgery and Arthroscopy	ORT 7369
6	Arthroplasty and Joint Replacement Surgery	ORT 7419
7	Orthopaedic Oncology	ORT 7439
8	Paediatric Orthopaedics	ORT 7429

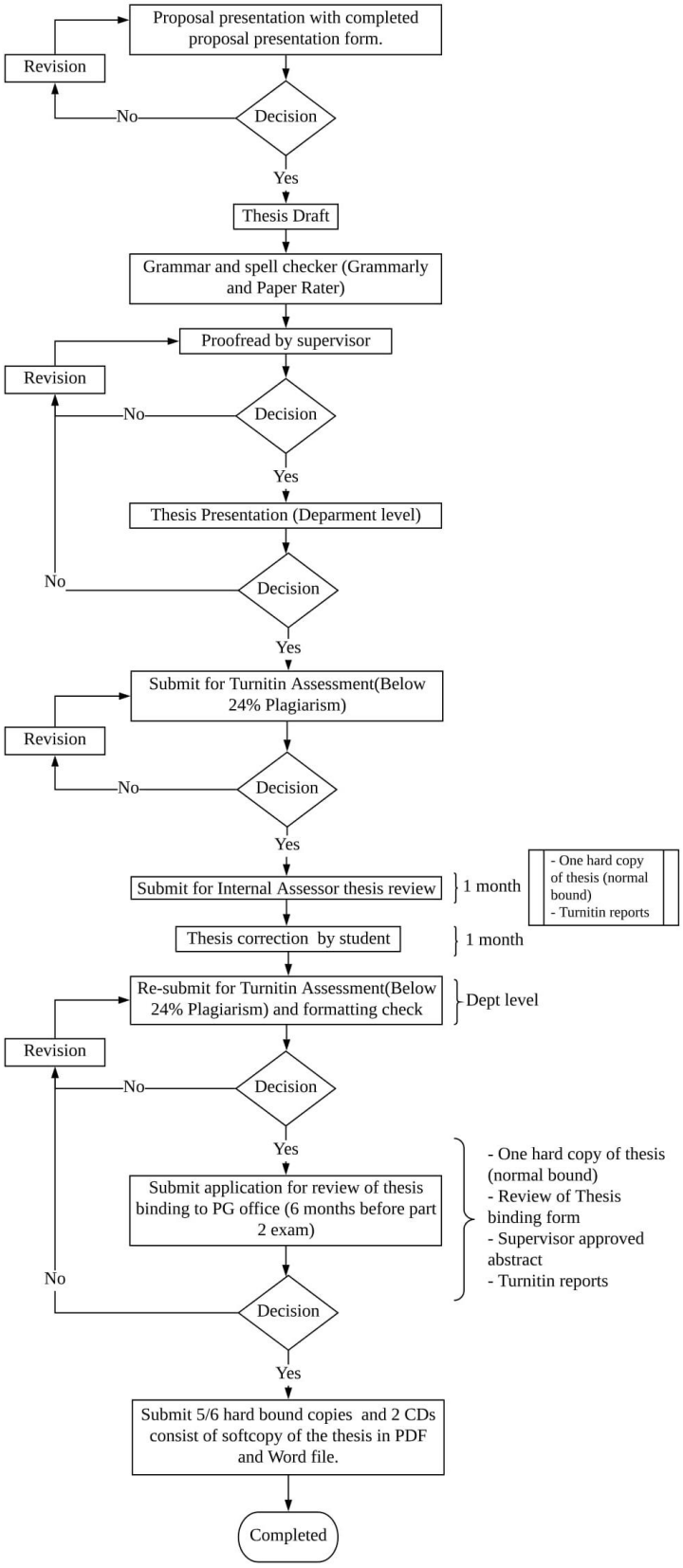
4.2.3 Dissertation

Dissertation Gannt Chart

	Year 1		**Year 2**		**Year 3**		**Year 4**	
	6 / 12	6 /12	6/12	6/12	6/12	6/12	6/12	6/12
Literature Review & Research Proposal								
Data Collection								
Evaluation & Submission								

**** Dissertation should be sent 8 months prior to the exit examination (Part 2 Exam)***

Flowchart for Dissertation Submission



4.2.4 Clinic

i. Year 1 students attend general pool clinic for 6 months.
ii. Students doing subspecialty rotation must attend the subspecialty clinic.
iii. Students doing subspecialty rotation attend the general clinic during days in which there is no OT or subspecialty clinic.
iv. A student in-charge of the clinic must be appointed on a daily basis to ensure all available students are present in the clinic and has to report to the clinic supervisor.

Year 2, 3 & 4 (SASMEC @IIUM) Clinic Schedule

Day	Clinic
Monday	General, Paediatric Ortho, Hand Microsurgery, Oncology, Advance Trauma
Tuesday	General, Arthroplasty, Sport Medicine
Wednesday	Spine, Sports Surgery
Thursday	General, Sport Shoulder, Hand Microsurgery, Advance Trauma
Friday	

4.2.5 Operation Theatre SASMEC @IIUM

Day	Week	OT 1	Trauma / Semi-Elective
Monday	1		
	2		
	3		
	4		
Tuesday	1	Ortho	Ortho
	2	Ortho	Ortho
	3	Ortho	Ortho
	4	Ortho	Ortho
Wednesday	1		
	2		
	3		
	4		
Thursday	1		Ortho
	2		Ortho
	3		Ortho
	4		Ortho
Friday	1	Ortho	
	2	Ortho	
	3	Ortho	
	4	Ortho	

4.2.6 Weekly Teaching Programme (Incampus)

Day	Activities		
	Morning		Afternoon
Monday	Morning Pass Over + Ward Round	Subspecialty clinic /OT / Teaching	Census / Short Case
Tuesday	Morning Pass Over + Ward Round	Subspecialty clinic /OT / Teaching	Subspecialty clinic /OT / Teaching / Pre-OP
Wednesday	Morning Pass Over + Ward Round	Subspecialty clinic /OT / Teaching	Subspecialty clinic /OT / Teaching
Thursday	Morning Pass Over + Ward Round	Subspecialty clinic /OT / Teaching	Radiology Census / Morbidity & Mortality Audit
Friday	Morning Pass Over + Ward Round	CME / Journal Club	Dissertation/ Research

5.0 SUPERVISION AND ROLE OF THE SUPERVISOR

Supervision is a dynamic process where the supervisor encourages and participates in the development of the trainee. Supervision is fundamental to the educational process and an imperative in the open learning programme set up.

The two major roles of the supervisor are to:

i. Evaluate the trainee's performance using appropriate methods of assessment.
ii. Establish a relationship that will help the trainee to self-actualize and become self-directed learners with high motivations.

Thus, it is the responsibility of the supervisor to:

- Have a good understanding and commitment to the programme to facilitate learning by the trainee
- Assist the trainee in monitoring the progress and be prepared for assessment exercises
- Ensure that the trainee satisfies all requirements of the programme
- Be a good role model and to continue upgrading the skills of the candidates in relevant areas

5.1 Candidate's Supervisor

The candidate's supervisor is the specialist who is directly in charge of the trainee for the duration of the posting as well as for the group of trainees assigned to him as mentor for the duration of the programme (4 years).

Tasks

i. Organizes tutorial and other academic activities such as CPC, X-ray conference, journal club, etc
ii. Supervises the trainee's progress by assessing the skills performance, log book entries and other criteria contained in the Supervisors Evaluation forms
iii. Evaluates case write-ups and promptly returns the comments to the trainees
iv. Conducts informal assessment and participates in formal examinations.
v. Submit supervisor's assessment reports to IIUM through the head of department.
vi. Provides guidance and mentoring by ensuring the students' needs are met (e.g required clinical practice, adequate time for study and rest etc), guides and supervises the trainee's research project or dissertation, including correcting the first draft before submission to IIUM 6 months prior to the part 2 examination.
vii. Liaise with programme supervisor regarding trainees (posting, problems etc).

5.2 Responsibilities of the Trainee

i. Values

There are values which trainees must develop and possess right from the start of the programme. While acknowledging that the trainees have specific learning needs, the trainee nevertheless must develop a sense of belonging to the unit they are attached to and to be committed as an integral part of the service team (to avoid the so called 'trainee' mentality), and function as an effective apprentice to the supervisor.

Trainees should not perceive "service" load as an obstacle to their learning and must place patient care first and foremost in all approaches and conscious of the aim to develop professional as well as managerial and leadership skills.

Trainees must accept that they have an obligation to provide service to the nation while undergoing and after graduating from the in-service programme.

ii. Training Objectives

Trainees are responsible for their learning. Learning is defined as the process that results in a relatively permanent change in behavior because of the acquisition of new knowledge, skills and attitudes. The supervisor role is to facilitate and guide and not to spoon-feed.

iii. Tasks

Each trainee is expected to:

i. Provide holistic and comprehensive patient care appropriate to the level of training, with full commitment and appreciation of the patient as human beings with feelings, families and other responsibilities.
ii. Appreciate cost of care by appropriately selecting investigations and treatment.

iii. Be directly responsible to the senior colleagues and consultant in patient care and other duties.
iv. Be aware and acknowledge the limitation in providing care and to seek and respect the guidance and consultation in the performance of duties from all members of the orthopaedics fraternity.
v. Develop effective interpersonal skills and mutual respect in the relationship with all members of the orthopaedics team.
vi. Participate actively in all activities of the unit (CPC, journal club, quality assurance & etc.)
vii. Continue learning as self-directed learners who are stimulated by problems presented by patients.
viii. Satisfy course requirement according to schedule and to constantly assess their own progress with the supervisor.
ix. Develop professional qualities of responsibilities, trustworthiness, availability, caring etc as described in the supervisor evaluation form.

6.0 ASSESSMENT

Assessment in Orthopaedics has three key purposes:

1. To encourage and monitor learning (through Formative tools).
2. 2. To evaluate whether the trainee is ready to progress through the stages of the programme (through Summative tools).
3. To generate and evaluate the evidence that the trainee is able to care for patients in a safe and effective way as a specialist.

Overall assessment

The assessment will be covered by summative and formative evaluation.

The formative assessment includes: -

1. **Professional examination**: National Orthopaedic Specialty Committee Part 2 examination during final year (BAQ, Essay, OSCE, viva and clinical long case and short cases)

2. **End of subspecialty posting examination (every 4 months for year 2, 3 & 4);** Clinical and viva assessment

3. **Dissertation must be submitted 8 months before final professional examination.**

4. **Procedure Based Assessment (PBA)** – 3 per rotation

5. **Mini Clinical evaluation Exercise (Mini-CEX)** – 7 per rotation

6. **Case Based Dissuccion (CBD)** – 2 per rotation

7. **Clinical reports/case writeup;** Year 1 (2), Year 2,3 & 4 (1 every 4 months)

8. **Learning Agreement**

9. **Personal Portfolio**

The Summative assessment:

1. Logbook – Satisfactory number of cases performed
2. RAQI – Achieved milestone
3. Case write up – is submitted before each end of posting examination
4. Continuous assessment – Evaluation form
5. Student feedback survey- Kulliyyah and Department
6. Audit: census for patient discharge
7. Seminar
8. Organising local and international conferences
9. Radiology presentation conference
10. Research proposal presentation
11. International and local paper presentation

12. Hospital work – wards and surgical procedures
13. On call
14. Morning new case discussion presentation
15. Orthopaedic Specialty Clinic
16. Grand ward round
17. Pre-operative ward rounds
18. Clinical bedside teaching
19. Surgical skill teaching and scrubbing (operation theater)
20. Islamic input program
21. Tutorial
22. Journal review club
23. Morbidity and mortality review
24. Mentor –mentee system / Supervisor system
25. End of subspecialty posting examination

6.1 Periodic Clinical Competency Assessment

6.1.1 Orthopaedics Surgical Logbook

Several skills are listed in the Surgical Skills list. They are divided into two parts: skills in making diagnostic and management decisions and procedural skills. The numbers in the column indicate the target or expected competencies for the year of study.

Both the trainee and supervisor should use this table as a guide when filling out the Skill Assessment form.

Whenever a skill is performed, the trainee should fill out the form and get it certified immediately by the supervisor/surgeon who will award the level of competency.

Students are required to maintain an up-to-date record of the procedures they have performed or participated in, either as assistants or done on their own. The log book must be regularly updated.

6.1.2 Orthopaedics Case Write-up

Satisfactory completion of case write-ups is a criterion for promotion. Please refer to the objectives of the relevant year for the number of case write-ups to be submitted.

i. The trainees are required to write **10 clinical case** write-up which include the following areas:

   a) General orthopaedics
   b) Traumatology
   c) Infection
   d) Orthopaedic Oncology
   e) Arthroplasty
   f) Hand Surgery
   g) Sport Injury
   h) Spine Surgery
   i) Metabolic Disease
   j) Degenerative Disease
   k) Paediatrics Orthopaedics
   l) Islamic Input in Orthopaedics **(COMPULSORY)**

ii. Write a summary of the case and make sure all relevant data such as X-ray and other investigations are available.

iii. Review the literature regarding the problem, making an annotated bibliography.

iv. Show the first draft to the supervisor and modify the write-up as suggested and re-submit until the supervisor is satisfied that the write-up has achieved acceptable standards.

*One publication in a referred journal is equivalent to **TWO** case write ups.

6.1.3 External Supervisor's Evaluation Reports

Trainees should achieve a satisfactory level of competency at each posting or attachment. The evaluation reports will assess the trainees' performance in term of their cognitive skills, technical skills, decision making skills, communication skills, management and leadership skills, attitude and their professional conduct throughout the attachment.

Programme coordinator will be responsible to ensure that the reports are accessible and those who fail to achieve a minimum requirement or deemed unsatisfactory by their respective supervisor will be acted upon accordingly.

External supervisor should evaluate the trainees using PTEF (Postgradaute teaching evaluation form) every 6 months during year 1 and year 2.

6.1.4 Guidelines for Research Project and Dissertation

Every trainee will be given the opportunity to participate in a workshop on Research Methodology where they will develop skills in writing a research proposal, to conduct the research project and to report the findings.

i. Student needs to identify suitable topics for the research project and discuss the topics with your supervisor.
ii. Review the literature on the topic, keeping an annotated bibliography.
iii. Develop a research proposal with guidance from the supervisor.
iv. Present the proposal in your unit. The IIUM liaison supervisor will also be present at the presentation.
v. Submit the proposal to the Department of Orthopaedics, IIUM.
vi. Once the proposal is approved, ethical clearance should be obtained before data collection start.
vii. The completed dissertation must be submitted 6 months before the Part 2 examination. It must follow the Kulliyyah guidelines.
viii. Every trainee should give an oral presentation to the members of Department / Kulliyyah before submission for assessment by the Board of Examiners.

ix. Students are expected to present their findings at any orthopaedic meeting, the least being at the national level.

x. All dissertations **MUST** be submitted for oral presentation at least in National Orthopedic conferences.

xi. Each candidates needs to achieve minimum publication equivalent (PE 0.3; poster, non-indexed conference proceedings or any publications recognized by the kulliyyah)

6.2 Examinations

6.2.1 End Posting Examination

Distribution of Marks	
Clinical	50 %
Viva 1 (Principle Orthopedic) Viva 2 (Surgical orthopedic principle)	25% 25%

- **For year 2, 3 and Year 4, if the student failed for 2 end posting examination, they are required to do a remedial posting for 6 months. If they failed 3 or more end posting examination, they are required to repeat 1 academic year. (Amendment following Board of Studies Meeting 5th February 2013)**

6.2.2 Examination for the Degree of Master of Orthopaedic Surgery

The examination leading to the degree shall be as follow:

i. Part II Examination

No candidate shall be permitted to take the Part II Examination unless the following have been fulfilled:

i. Submitted logbook not later than two months before the Part II Examination
ii. Submitted the dissertation not later than eight months before the Part II Examination
iii. A candidate whose dissertation is deemed unsatisfactory by the Committee of Examiners may be referred for further work in his research report over a period of time to be determined by the Committee of Examiners except that such period of time as determined shall not exceed six months on any one occasion. At the end of the prescribed period the candidate shall be required to submit the research report for re-examination. A candidate who fails to submit the research report by the end of the prescribed period for re-examination shall be deemed to have failed the research report.
iv. A candidate shall be permitted to submit his research report for re-examination on not more than two occasions.
v. A candidate who fails the research report after the second re-examination shall be deemed to have failed the dissertation and shall not be permitted to repeat the programme of study except in special circumstances on the recommendation of the Kulliyyah of Medicine and with approval of the Senate.
vi. Obtained a written certification from the Head of Department responsible for the programme of study confirming satisfactory completion the prescribed training under supervision

6.2.3 Examination Components and Allocation of Marks.

i. Part II Examination

Complies with the Orthopaedic Specialty Committee Rules and Regulation (National Orthopaedic Curriculum (NOCC) Documents)

6.2.4 Requirements for Passing an Examination

A candidate shall be deemed to have passed the Examinations prescribed upon obtaining the following:

i. Part II Examination:
Complies with the OSC Rules and Regulation (NOCC Documents)

6.2.5 Re-Examination

i. Part II Re-Examination

- A candidate who has failed the Part II Examination may be permitted a re-examination on three separate occasions at six monthly intervals.

- The Part II Re-Examination shall consist of the same components and shall be assessed and graded in the same manner as prescribed for the Part II Examination.

- A candidate who fails the re-examination on the third occasion shall be deemed to have failed the Part II Examination and shall not be permitted to repeat the programme of study except in special circumstances on the recommendation of the Kulliyyah of Medicine and with approval by the Senate.

ii. A candidate who has passed the Re-Examination for the Examinations mentioned in paragraphs 5.2.4 (i) and (ii) shall be deemed to have passed the prescribed Examinations.

6.2.6 Award of Pass with Distinction in the Examination

A candidate may be awarded a Pass with Distinction in the Part II Examination with the following conditions:

i. Has obtained 75% or more of the aggregate marks in each of the prescribed examination;

ii. Has not failed in any component of the prescribed Examination;

and

iii. Has not repeated the prescribed Examination or any part of the programme of study except on medical or compassionate grounds approved by Kulliyyah.

6.2.7 Award of the Master of Orthopaedic Surgery with Distinction

A candidate may be awarded the degree of Master of Orthopaedic Surgery with distinction with the following conditions:

i. Has passed with Distinction in the Part II Examination;

ii. Has not failed in any component of the of the prescribed Examination;

and

iii. Has not repeated the prescribed Examination or any part of the programme of study except on medical or compassionate grounds approved by the Kulliyyah.

7.0 ANNUAL LEAVES, POSTPONEMENT, DEFERMENT / SUSPENSION AND TERMINATION

7.1 Annual Leaves

- Candidate's application for leave is subject to approval by Department.
- Leave is allowed up to 12 days per rotation or 2 weeks per semester for maternity/sick leave.
- Total day of leaves including medical leave, paternity and maternity leave are 28 days in a year.
- Only under special circumstances will leave exceeding this period is considered and will be determined on a case-by-case basis by the Department.

7.2 Postponement, Deferment / Suspension

- Postponement of registration into the programme (6 months or 1 year) is allowed but with valid reasons and with prior notification to the University/Department at least 1 month before the date of registration.

- A candidate who is already in the course may apply for suspension / deferment of 1 or 2 semesters but with valid reasons and with prior notification to the University / Department at least 1 month before the date of the Examination.

- Both the above situations must be approved by the Head of Department and then by the Secretariat of Postgraduate Studies in the Kulliyyah.

7.3 Termination of Candidature

The candidate may decide voluntarily to terminate his tenure in the course. Otherwise, termination is as follows:

- Infringement of Act and Regulations as stipulated by IIUM.
- Violation of civil law and order.
- Problems with attitude and behavior.
- Unsatisfactory performance or deterioration in study.
- Mental or physical disability.
- Indulgence in subversive activities.
- Procurement of examination questions and answers.

8.0 SPECIAL COURSE

The trainees are expected to participate in the following courses in the first two years:

8.1 Compulsory Courses

i. Basic Orthopaedic Skill Course
ii. Research Methodology
iii. Islamic Input in Medical Practice

8.2 Optional Course

i. Good Clinical Practice Workshop
ii. Advance Trauma Life Support
iii. Basic Surgical Skill Course

9.0 COURSE SYNOPSIS AND LIST OF TEXT- BOOKS/REFERENCES

9.1 Phase I: Basic Medical Science

9.1.1 Applied Anatomy

Trainees will be required to have knowledge of the structure and function of all systems of the body as applicable to common clinical conditions. A basic knowledge of histology will be required in order to understand the function of tissues and organs as well as growth, degeneration and repair. Details of embryology will not be required other than an understanding of the embryological basis of congenital anomalies which are compatible with life, but which may require surgical intervention either in the neonatal period or later in life.

i. Upper Limb

- Bones, joints, muscles, vessels, lymphatic drainage and nerves
- Hand, forearm, arm, shoulder, pectoral girdle, breast, axillary and scapular region
- The anatomy of extensile exposures of the bones and joints of the upper limb
- The anatomy related to surgical management of breast carcinoma
- The anatomy of brachial plexus injuries and its clinical signs
- The anatomy of the rotator cuff injuries
- The anatomy of entrapment neuropathies

ii. Lower Limb

- Bones, joints, muscles, vessels, lymphatic drainage and nerves
- Foot, lower leg, thigh, gluteal region
- The anatomy of surgical approaches to the hip joint, knee joint and ankle joint
- The anatomy of vascular anastomosis of the lower limb for trauma and atherosclerosis
- The anatomy of the lower limb as it relates to external fixation
- The anatomy of the knee injuries

iii. Head and Neck

- Scalp, skull, cerebrum, cerebellum, mid brain, brain stem
- Face, eyes, ears, nose
- Mouth, pharynx, larynx
- Neck
- Bones, joints, muscles, vessels, nerves and cranial nerves.
- Anatomy related to skull fractures and complications
- Anatomy of cerebral circulation
- Anatomy of facial palsies
- Anatomy of ocular palsies
- Anatomy of facial fractures and complications
- Anatomy of the larynx as it related to deglutition, respiration, and intubations
- Anatomy of thyroidectomy and complications
- Anatomy of the movement of the neck
- Anatomy as it relates to cervical spine injuries
- Anatomy of lymphatic drainage of head and neck malignancies.

iv. Throrax

- Chest wall, ribs, diaphragm
- Airways and lungs
- Heart and great vessels
- Mediastinum
- Anatomy of thoracic surgical approaches
- Anatomy of congenital malformations
- The circulatory anatomy of the heart and lungs related to bypass surgery

v. Abdomen

- Abdominal wall and peritoneum
- Liver, spleen, intestines, pancreas, kidneys and ureters
- Aorta and vessels
- Anatomy of inguinal ligament and hernia repair

- Anatomy of common surgical procedures: cholecystectomy, gastrectomy, appendicectomy, colectomy, bowel resection, nephrectomy.
- Anatomy of congenital malformations
- Abdominal vascular anatomy.

vi. Pelvis

- Bones, joints, muscle nerves, vessels
- Urinary and reproductive organs
- Congenital malformations
- Anatomy of urolithiasis and surgical treatment

vii. Spine

- Bones, joints, Vertebral column
- Spinal cord and nerves
- Anatomy of traumatic paraplegia

viii. Tissues and Structures

- Skin, mucous membrane, subcutaneous tissue, deep fascia
- Muscles, tendons, ligaments, joints, cartilage
- Peripheral nerves, vessels and lymphatic
- Anatomy of common pedicle and free flaps
- Anatomy of surgical skin incisions

ix. Surface Anatomy

- Basic Embryology of limbs and spine Notochord, mesoderm, endoderm, limb formation, totipontential, pluripotential.
- Comparative Anatomy of the Child - Epiphyseal plates, proportions, growth, osteology of the child

x. Anatomy of Regional Anaesthesia

- Ankle block, digital block, wrist block, flexor tendon block, axillary block, femoral n. block

9.1.2 Physiology

The trainees will have to emphasize on the pathophysiology and treatment of fundamental clinical problems, such as organ failure, increased intracranial pressure and shock. Detailed knowledge related to the surgical specialties such as bone metabolism or the detailed biochemistry of secretion and control of hormones will be required.

i. Cellular Physiology

- Cellular function and signalling
- The genome and its expression
- Basic actions of cellular poisons
- Cell division and

ii. Body fluid and electrolytes physiology

- Distribution and control of body fluid
- Osmotic pressure
- Oncotic pressure
- Fluid and electrolyte management in the postoperative period
- Fluid resuscitation of the traumatised patient
- Fluid resuscitation in the diabetic patient
- Sodium homeostasis
- Potassium homeostasis

iii. Acid Base Balance

- Buffer systems
- Respiratory regulation
- Renal regulation
- Interpretation of arterial blood gases
- Changes with pathology: Vomiting, renal failure, hepatic failure, respiratory failure
- Changes during surgery and trauma

iv. Respiratory System

- Normal respiratory mechanism
- Lung volumes
- Functional residual capacity
- Compliances
- Changes in gaseous composition
- Gaseous exchanges
- Oxygen delivery and transport
- Carbon dioxide transport
- Central/peripheral control of respiration
- Cyanosis
- Hypoxia and hypoxemia
- Changes during anaesthesia
- Surgery to the chest wall
- Pneumathorax
- Flail chest
- Respiratory failure
- Adult respiratory distress syndrome (ARDS)
- Post operative hypoxemia

v. Cardiovascular System

- Physiology Mechanism of circulation: Cardiac circle and output
- Determinants of myocardial performance
- Central venous pressure and Pulmonary artery wedge pressure
- Venous return
- Valsava manoeuvre
- Control of blood pressure
- Shock Coronary blood flow
- Cerebral blood flow
- Hepatic blood flow
- Renal blood flow
- Pulmonary circulation
- Autoregulation
- Myocardial action potentials

- Myocardial muscle properties
- Myocardial failure

vi. Renal System

- Renal functions
- Counter current multiplier system
- Glomerular filtration rate
- Creatinine and Renal clearance
- Excretion of bicarbonate
- Excretion of urea
- Endocrines functions of kidney
- Chronic renal failure

vii. Blood and Hematologic System

- Composition of blood and role of its components
- Coagulation pathway
- Bleeding
- Anaemia
- Compatibility testing of blood
- The immune system
- Abnormal conditions of blood-haemophilia, sickle cell, Caisson disease

viii. Alimentary System

- Swallowing
- Digestion
- Gastric secretion
- Bile
- Control of digestion
- Small bowel function
- Large bowel function
- Functions of liver
- Carbohydrate metabolism
- Fat metabolism
- Protein metabolism

- Iron metabolism
- Vitamins
- Malabsorption syndrome
- Post gastrectomy syndrome

ix. Nervous System

- Resting membrane potential
- Propagation of action potential
- Blood brain barrier
- Effect of anaesthesia agents
- Pain and its management
- Nerve repair
- Autonomic nervous system
- Glasgow coma scale
- Brain stem death
- Changes with intracranial pressure

x. Muscle and Neuromuscular Junctions

- Skeletal and smooth muscle
- Physiology of neuromuscular transmission
- Muscle contraction
- Muscle spindles

xi. Endocrine System

- Hormones
- Insulin and regulation of blood glucose level
- Thyroid hormones and its regulation
- Calcium metabolism
- Adrenal gland
- Hypothalamic- pituitary- adrenal axis

xii. Miscellaneous Topics

- Metabolism response to trauma
- Nutrition of surgical patients

- Heat Exhaustion

9.1.3 Pathology

The trainees will be expected to have a sound knowledge of the principles of pathology and microbiology (including virology) in an orthopaedics context, including inflammation, infection and neoplasia, the response of the tissues to injury, disturbances of growth (metaplasia, atrophy, hypertrophy and hyperplasia) degenerative process, and repair and regeneration. With regard to common and important conditions encountered in the major orthopaedics specialties, the candidate will be expected to have a broad knowledge of the pathology and principles of management.

The normal cell

i. Cellular Injury and Tissue Response to Injury

- Acute and chronic inflammation
- Healing and repair

ii. Fluid and Hemodynamic Derangements

- Haemorrhage, haemostasis, and thromboembolism
- Oedema, hyperaemia and congestion
- Shock
- Infarction
- Embolism

iii. Immune System

- The immune system
- Hypersensitivity reactions
- Transplant rejections
- Autoimmune diseases
- Immunodeficiency disorders
- Amyloidosis

iv. Infections

- Infectious agents
- Host barriers to infectious agents
- Pathogenesis of infectious diseases
- Diagnosis of infectious diseases

v. Neoplasta

- Nomenclature
- Carcinogenesis and Molecular Basis of Cancer
- Characteristics of benign and malignant tumours
- Biology of tumour growth
- Clinical features and laboratory diagnosis of cancer

vi. Genetic and Pediatric Disorders

- Mutations
- Mendelian disorders
- Cytogenetic disorders
- Congenital anomalies
- Paediatric disorders
- Diagnosis of genetic disorders

vii. Environmental Diseases

- Environmental Pollution
- Tobacco
- Chemical agents
- Physical agents
- Ionizing radiation
- Nutritional disorders

The following topics are common conditions encountered in clinical practice and students are encouraged to read them for further understanding of pathological disorders

viii. Respiratory System

- Obstructive and restrictive lung diseases
- Pulmonary infections
- Tumours
- Disorders of the upper respiratory tract

ix. Cardiovascular System

- Ischaemic heart disease
- Heart failure
- Valvular heart diseases
- Congenital heart diseases

x. Vascular Disorders

- Normal vessels and response to injury
- Atherosclerosis
- Hypertensive
- Aneurysms and dissection
- Vasculitis
- Venous diseases

xi. Gastrointestinal Disorders

- Disorders of the oesophagus
- Gastritis, ulcers and tumours
- Tumours of the small and large intestines
- Disease of the appendix

xii. Liver and Biliary Tract

- Jaundice and hepatitis
- Cirrhosis and liver failure
- Gallbladder diseases

xiii. Pancreas

- Exocrine pancreatitis
- Endocrine pancreas

xiv. Renal System

- Manifestations of renal diseases
- Glomerular disorders
- Diseases of the tubules and the interstitium
- Acute and chronic renal failure
- Hypertensive renal disease
- Urinary outflow obstruction

xv. Musculoskeletal System

- Fractures
- Bone infections
- Bone tumours
- Metabolic bone disorders
- Diseases of the joints
- Soft tissue tumours
- Myopathies

xvi. Haematopoietic System

- Red cell disorders
- White cell disorders
- Bleeding disorders

xvii. Endocrine System

- Pituitary
- Thyroid
- Parathyroid
- Pancreas
- Adrenal

xviii. The breast

- Jaundice Tumours of the breast
- The male breast
- Fibrocystic changes

xix. The Male Genitalia

- Scrotum, testis and epidydimia
- Prostatic disorders
- Sexually transmitted diseases

xx. **Diseases of Ageing**

9.1.4 Principle of Surgery

The trainees will be tested on knowledge of the general principle in the practice of surgery.

i. Perioperative Management

- Metabolic and Nutritional Support
- Fluid & electrolyte management
- Nutrition in the surgical patient
- General surgical complications
- Respiratory failure
- Acute renal failure
- Systemic inflammatory response syndrome (SIRS)
- Multiple organ dysfunction syndrome (MODS)

ii. Surgical Techniques and Technology

- Surgical Wounds
- Classification of surgical wounds
- Principles of wound management
- Pathophysiology of wound healing
- Principles of safe surgery

- Incisions and wound closure
- Diathermy, laser, principles of cryosurgery
- Sutures and ligature materials
- Basic surgical instruments
- Tourniquets in the Operating Theatre
- Indications for tourniquet use
- Tourniquet application
- Effects and complications of tourniquets

iii. Good Clinical Practice and Legal Issues

- Evidence Based Surgical Practice
- Decision making in surgery
- Statistics
- Principles of research and clinical trials
- Management Aspects of Surgical Practice
- Clinical audit
- Clinical governance
- Medico-legal aspects of surgery

iv. Clinical Microbiology

- Surgical Microbiology
- Sources of surgical infection
- Principles of asepsis and antisepsis
- Modern Antibiotic Usage
- Commonly used antibiotics
- Preoperative prophylaxis
- Antibiotic resistance
- Surgery in Hepatitis and HIV Carriers
- Blood-borne viruses
- Universal precautions
- Surgical precautions
- Immunization

v. Emergency Medicine and Trauma

- Pathophysiology of Trauma
- Shock and cardiovascular physiology
- Metabolic response to injury
- Adult respiratory distress syndrome (ARDS)
- Traumatic Oedema and Compartment Syndrome
- Diagnosis and treatment of Environmental Emergencies
- Hypothermia
- Heat exhaustion
- Management of a radiation incident

vi. Principles of Oncology

- Epidemiology of Common Cancers
- Common cancers
- Screening Programmes
- Clinico-Pathological Staging of Cancer
- Principles of Cancer Treatment
- The role of surgery â€“block dissections
- Radiotherapy
- Chemotherapy
- Hormone therapy
- Immunotherapy
- Palliative Care
- The palliative care team
- Pain and other symptoms

9.1.5 Biomaterials & Biomechanics

i. Biomaterials

- Definition
    - Characteristics: Biocompatibility, Bioinert

- Types of Material
  - Metal
    - Stainless Steel
    - Cobalt Chrome Alloys
    - Titanium
  - Non-metal
    - Polymers such as polyethylene, hydroxylapatite
    - Ceramics such as alumina
    - Composites
- Mechanism of Material failure
  - Corrosion
  - Fatigue
  - Wear
- Material Properties
  - Load and Forces
  - Stress and Strain
  - Stress and Strain Curves (Yield point, Ultimate strength, Breaking point, Plastic deformation and Youngâ€™s Modulus)
  - Strength
  - Elasticity
  - Plasticity
  - Ductility
  - Toughness
  - Brittleness
  - Viscoelastic

ii. Biomechanics

- Kinetic and kinematic
- Newtonâ€™s Law: First, Second and Third
- Forces and Moment (torque)
- Work and Energy
- Friction

- Biomechanics of Musculoskeletal Tissues
    - Bone
        - Mechanical properties
        - Mechanism of fractures
        - Strain theory on fracture healing
    - Ligament and Tendons
        - Mechanical properties
        - Mechanical properties of synthetic replacements
    - Natural and Artificial joints
        - Hip biomechanics
        - Knee biomechanics
        - Spine biomechanics

- Biomechanics of Fracture Fixation
    - Tissue response to implants
        - Properties of screws, plates, nail
    - Plates vs nail (in terms of rigidity and function)
    - Concept of load sharing and sparing
    - Factors of Internal Fixation failure
    - External Fixation
        - Factors enhancing stability

- Hip Biomechanics
    - An understanding of the lever arms, muscles and body weight forces that produce the joint reaction force in both normal and abnormal hips
    - An understanding of the application of these principles to replacement arthroplasty
    - Knowledge of the biocompatibility and mechanical properties of materials in common use in total hip arthroplasty

- Knee Biomechanics
    - The mechanics of the patello-femoral mechanism
    - Axis of Knee Joints
    - The medial and lateral weight-bearing joints and their inter-relationship

- The cruciate and collateral ligaments and other ligamentous and muscular supports
- Menisci and articular cartilage

- Spine Biomechanics
  - Basic knowledge of the biomechanics of the cervical and lumbosacral spines
  - An understanding of the biomechanics of spinal instability as applied to trauma, tumour, infection and spondylolysis/listhesis
  - A knowledge of the basic mechanics of spinal instrumentation

9.2 Part II: Orthopaedics Clinical Subspecialty Rotation

9.2.1 Orthopaedics Experience

The trainees must have adequate exposure to handle the surgery in Traumatology and Orthopaedics problems which are common in Malaysia. The trainees should document their surgical experience in the log book. The kinds of surgery handled by trainees to be documented are:

i. Upper limb

- Humerus
- Supracondylar
- Olecranon
- Radius/Ulna
- Distal Radius
- Hands

ii. Lower limb

- Hip
- Knee
- Ankle
- Femur
- Tibia / fibula

- Foot

iii. General Principle

- Principle of Fractures and Dislocation
- Multiply Injured Patient
- Principle of Internal Fixation
- External Fixation
- Healing and Musculoskeletal Tissues
- Open Fractures
- Complications of Fracture
- Pathological Fractures

iv. Upper Extremity

- Fracture and Dislocation of the Hand
- Fracture and Dislocation of the Wrist
- Fracture of the Radius and Ulna
- Fracture and Dislocation of the Elbow
- Fracture of the Humerus
- Fracture of the Clavicle
- Fracture and Dislocation of the Glenohumeral joint
- Fracture and Dislocation of the Scapula
- Injuries of the acromioclavicular and sternoclavicular joint

v. Spine

- Fracture and Dislocation of the cervical spine
- Fracture and Dislocation of the thoracolumbar spine

vi. Lower Extremity

- Fracture of the Pelvic Ring
- Fracture of the Acetabulum
- Fracture and Dislocation of the Hip
- Fracture of the Shaft of Femur
- Fracture of the Knee
- Fracture of the Patella
- Injuries of the Knee

- Fracture of the Tibia and Fibula
- Fracture and Injuries of the Ankle
- Fracture and injuries of the Food

vi. Paediatric Orthopaedics

- Embryology
- Skeletal Dysplasia
- Chromosomal and Teratologic Disorder
- Metabolic Bone Disease
- Hematopoietic Disorder
- Metabolic Bone Disease
- Birth Injuries
- Cerebral Palsy
- Neuromascular Disorder
- Paediatric Spine
- Hip
- Knee
- Foot
- Upper limb

vii. General Orthopaedics

- Biomechanics
- Basic Principle
- Joint Biomechanics
- Metabolic Bone Disease
- Arthritis
- Osteonecrosis
- Orthopaedic Infection
- Imaging Studies in Orthopaedics

viii. Joint Replacement

ix. Orthopaedic Sport Medicine

x. Foot and Ankle Disorder

xi. Hand & Reconstructive Microsurgery

- Congenital anomalies of the hand and upper limb
- Rheumatoid disorder of the hand and wrist
- Tendon transfer
- Amputation of the hand and wrist including fingertip injuries
- Tumors of the hand and wrist
- Tendon injuries
- Replantation
- Infection
- Nerve entrapment and injury
- Ligamentous injury of the hand and wrist
- Fracture dislocation in the hand and wrist

Procedure

- Carpal tunnel release
- Tendon repair
- Excision of ganglion
- Release of trigger finger
- Replantation
- Drainage for infection
- Fixation of fracture
- Nerve repair
- Vascular repair

xii. Spinal Surgery

xiii. Orthopaedic Oncology

xiv. Orthopaedic Rehabilitation

xv. Advanced Trauma

- Polytrauma and multiple fracture
    a. Physiological changes – SIRS, CARS, MODS
    b. Principle of management

    c. ISS (Injury severity score) and Mangled Extremity Score
    d. Damage control orthopaedic
- Open fracture
    a. Principle of management
        i. Resuscitation
        ii. Thorough debridement / fasciotomy
        iii. Temporary wound dressing - VAC
        iv. Early soft tissue coverage
        v. Early bone reconstruction
        vi. Rehabilitation
    b. Mangled extremity score
- Complex periarticular fracture:
    a. Proximal femur
    b. Supracondylar
    c. Tibial plateau
    d. Tibial plafond
- Non-union and infected non-union:
    a. Diagnosis
    b. Investigation
    c. Principle of management
- Osteomyelitis:
    a. Classification – Cierny and Mader
    b. Investigation
    c. Principle of treatment:
        i. Surgical margin
        ii. Local antibiotic
        iii. Soft tissue reconstruction
        iv. Bone reconstruction
- Limb deformity:
    a. Alignment test and Deformity planning
    b. Acute and gradual correction
    c. Bone transport
    d. Lengthening / shortening
- Soft tissue reconstruction (LOCAL FLAP):
    a. Gastrocnemius flap

b. Fasciocutaneous flap
c. Sural flap

- Concept of angiosomes and blood supply to the skin
- Operating Skills
    1. Identify perforators
    2. Debridement of open fracture
    3. Spanning external fixator
    4. Ilizarov fixator:
        i. Frame construct
        ii. Safe corridor
    5. LRS (Limb reconstruction System)
    6. Close reduction technique:
        i. Fixator assisted
        ii. Polar screw
    7. MIPO
    8. Reduction of articular fracture
    9. Local flaps:
        i. Fasciocutaneus perforator base
        ii. Gastrocnemius
        iii. Sural flap
    10. Bone graft:
        i. Iliac crest and posterior iliac crest
    11. Complex periarticular fracture:
        i. Supracondylar
        ii. Tibia plateau
        iii. Tibial plafond

9.2.2 Orthopaedic Imaging

Modern orthopaedics practice depends heavily on imaging techniques. An orthopaedic surgeon must be able to:

i. Interpret routine musculoskeletal imaging.

ii. With the help of radiologist, to give input that could facilitate orthopaedics management.

The important areas that must be covered are:

Diagnostic

- Plain X-rays
- Ultrasound
- Contrast Radiology
- Computed Tomography (CT scan)
- Magnetic Resonance Imaging (MRI)
- Bone Scan
- Interventional radiology

9.2.3 Orthopaedics Conference / Seminar

The candidates are requested to present a seminar based on the topics given. A lecturer will be responsible in arranging the conference. It is compulsory for all candidates to attend the conference and should be involved actively during the conference.

List of Conference/Seminar topics are:

i. Basic Sciences:

- Bone Healing and Bone Grafting
- Multiple Injuries
- Polytrauma
- Amputation
- Open Fractures

ii. Paediatric Orthopaedics:

- Hip
- Developmental Dysplasia of the Hip (DDH)
- Perthes Disease
- Slipped Capital Femoral Epiphysis (SCFE)

- Congenital Anomalies of the Upper and Lower Limb
- Congenital Talipes Equinovarus (CTEV)
- Neuromuscular disorders
- Paediatric Trauma
- Infection in Paediatric Orthopaedics
- Tumour in Paediatric Orthopaedics
- Congenital Anomalies of the Hip and Knee

iii. Orthopaedic Infection

- Diabetic foot
- Muscular skeletal infection
- Tuberculosis
- Osteomyelitis
- Myelioidosis

iv. Hip

- Osteoarthritis
- Avascular Necrosis
- Osteotomy
- Joint Replacement Surgery

v. Knee:

- Osteoarthritis
- Osteotomy and Joint Replacement
- Arthroscopic Surgery
- Ligamentous Injuries and Reconstruction

vi. **Spine**:

- Spinal deformities
- Spinal Infection
- Cervical Spine Injuries
- Thoracolumbar Spine Injuries
- Spinal Cord Injuries and Rehabilitation

vii. Musculoskeletal Tumour:

- Soft Tissue Tumour
- Primary Bone Tumour
- Bone secondaries

viii. Hand

- Fractures of the Hand and Wrist
- Tendon Injuries and Repair
- Tendon Transfer
- Peripheral Nerve Injuries
- Brachial Plexus Injuries
- Replantation

ix. Basic Biomechanics

x. Orthoses and Prosthetics

xi. Surgical Approaches

- Upper Limb
- Lower LImb
- Spine

9.2.4 Journal Review

The lecturers or supervisors are responsible for organizing the meeting. The candidates are required to present new articles from selected journal. The candidates are requested to give their opinion or critique during presentation.

9.2.5 Case Presentation

The lecturer or supervisor will determine the cases for discussion.

9.2.6 Pathology and X-Ray Conference

The candidates are responsible to present and participate in these conferences.

9.2.7 Clinical Specialty Training:

i. Arthroplasty:

- Prof Dr. Ahmad Hafiz Zulkifly
- Asst Prof. Dr. Muhammad Haidar Nasuruddin
- Dr. Kow Ren yi

ii. Spine

- Prof. Dr. Zamzuri Zakaria
- Asst Prof. Dr. Rajandra Kumar Karupiah
- Asst. Prof. Dr. Loh Li Loong

iii. Hand and Reconstructive

- Assoc. Prof. Dr. Kamarul Ariffin Khalid
- Asst. Prof. Dr. Raffael Ismail

iv. Oncology

- Dr. Mohamed Azril Mohamed Amin (Visiting Lecturer)

v. Pediatric Orthopaedics

- Assoc. Prof. Dr. Mohd Shukrimi Awang
- Asst. Prof. Dr. Ardilla Hanim Abdul Razak
- Asst. Prof Dr. Nik Alyani Nik Abdul Adel

vi. Advance Trauma & Limb Reconstruction

- Prof. Dr. Nazri Mohd. Yusof
- Assoc. Prof. Dr. Ahmad Fadzli Sulong

vii. Foot & Ankle

- Prof. Dr. Aminudin Che Ahmad

- Asst. Prof. Dr. Mohd Adham Shah Ayeop
- Dr. Muhamad Syafiz Ahmad Ismani

viii. Sports Surgery

- Prof. Dr. Aminudin Che Ahmad
- Asst. Prof. Dr. Khairul Nizam Siron@Baharom
- Dr. Khairul Mohd Khalid
- Asst. Prof. Dr. Muhammad Harith Rosdi (Sport Medicine Specialist)
- Asst. Prof. Dr. Salmah Anim Abu Hassan (Rehab Physician)

ix. General Orthopedic and Trauma

- Prof Dr. Ahmad Hafiz Zulkifly
- Prof. Dr. Zamzuri Zakaria
- Prof. Dr. Nazri Mohd. Yusof
- Prof. Dr. Aminudin Che Ahmad
- Assoc. Prof. Dr. Kamarul Ariffin Khalid
- Assoc. Prof. Dr. Mohd Shukrimi Awang
- Assoc. Prof. Dr. Ahmad Fadzli Sulong
- Asst. Prof. Dr. Ardilla Hanim Abdul Razak
- Asst. Prof. Dr. Raffael Ismail
- Asst. Prof. Dr. Khairul Nizam Siron@Baharom
- Asst. Prof. Dr. Mohd Adham Shah Ayeop
- Asst Prof. Dr. Rajandra Kumar Karupiah
- Asst. Prof Dr. Nik Alyani Nik Abdul Adel
- Asst. Prof. Dr. Muhammad Haidar Nasuruddin
- Asst. Prof. Dr. Loh Li Loong
- Dr. Khairul Mohd Khalid
- Dr. Muhamad Syafiz Ahmad Ismani
- Dr. Kow Ren Yi
- Asst. Prof. Dr. Muhammad Harith Rosdi (Sport Medicine Specialist)
- Asst. Prof. Dr. Salmah Anim Abu Hassan (Rehab Physician)

9.2.8 List of Recommended References:

Part 1:

i. ***Lasts Anatomy: Regional and Applied***
Edited by Chummy S. Sinnatamby
10th Edition Pub Churchill Livingstone
London

ii. ***Gray's Anatomy***
Edited by Henry Gray, Lawrence H. Bannister
38th Edition Pub Churchill Livingstone
London

iii. ***Grant's Atlas of Anatomy***
Edited by Anne M.R. Agur, Ming J. Lee, James E. Anderson
11th Edition Pub Lippincott Williams & Wilkins
Philadelphia 2004

iv. ***Netter Atlas of Human Anatomy***
Edited by Frank H. Netter
3rd Edition Pub ICON Learning System
2002

v. ***The Developing Human – Clinically Oriented Embryology***
Edited by Keith L Moore, TVN Persaud
7th Edition Pub Saunders
Pennsylvania 2003

vi. ***Textbook of Medical Physiology***
Edited by Arthur C, M.D. Guyton, John E. Hall
10th Edition Pub Saunders
Pennsylvania 2000

vii. ***Review of Medical Physiology***
Edited by William F. Ganong
21th Edition Pub McGraw Hill

New York 2003

viii. ***Robbin's Pathologic Basis of Disease***
Edited by Ramzi S. Cotran, Vinay Kumar, Stanley L. Robbins
6th Edition Pub Saunders
Pennsylvania 1999

ix. ***Walter and Israel General Pathology***
Edited by Walter J.B
7th Edition Pub Saunders
Pennsylvania

x. ***Basic & Clinical Pharmacology***
Edited by Bertram G. Katzung
8th Edition Pub McGraw-Hill
New York 2000

xi. ***Harper's Illustrated Biochemistry***
Edited by Robert K. Murray, Darryl K. Granner, Victor W. Rodwell
26th Edition Pub McGraw-Hill
New York 2003

xii. ***Jawetz, Melnick & Adelberg's Medical Microbiology***
Edited by Geo F. Brooks, Janet S. Butel, Stephen A. Morse
23rd Edition Pub McGraw-Hill
New York 2004

xiii. ***Clinical Surgery in General***
Edited by R.M. Kirk, Averil O. Mansfield, John P.S. Cochrane
3rd Edition Pub; Churchill Livingstone
London

Part 2:

i. ***Campbell's Operative Orthopaedic***
Edited by Canale, S. Terry
10th Edition Pub; Mosby
Pennsylvania 2004

ii. ***Review of Orthopaedic***
Edited by Mark. D. Miller
4th Edition Pub; Saunders
Pennsylvania 2004

iii. ***Operative Hand Surgery***
Edited by David P. Green
4th Edition Pub Churchill Livingstone
London

iv. ***Fracture in Adults***
Edited by Rockwood,Green and Wilkin
5th Edition Pub Lippincott William and Wilkins
Philadelphia 2003

v. ***Fracture in Children***
Edited by Rockwood and Wilkins
5th Edition Pub Lippincott-Raven
Philadelphia 2003

vi. ***Surgical Exposure in Orthopaedics – The Anatomic Approach***
Edited by Stanley Hoppenfeld, Plet Deboer, Hugh A., Thomas
3rd Edition Pub Lippincott William and Wilkins
Philadelphia 2004

vii. ***Skeletal Trauma: Fractures, Dislocations, Ligamentous Injuries (2 – volume set)***
Edited by Bruce Browner, Jesse Jupiter, Alan Levine, Peter Trafton
3rd Edition Pub Saunders
Pennsylvania 2003

viii. ***Principle of Orthopaedic Practice***
Edited by Roger Dee
2nd Edition Pub McGraw Hill
New York

ix. ***Orthopaedics: A Comprehensive Study Guide***
Edited by S., M.D. Feldman, Kenneth J., M.D. Koval, Andrew S., M.D. Rokito, Joseph D. Zuckerman
Pub McGraw Hill
New York

9.2.9 List of Lecturer

Lecturer	Email Address	Department
Prof. Dr. Ahmad Hafiz Zulkifly	ahafiz@iium.edu.my	Orthopaedics, Traumatology & Rehabilitation
Prof. Dr. Aminudin Che Ahmad	aminudinc@iium.edu.my	
Prof. Dr. Nazri Mohd. Yusof	nazriyusuf@iium.edu.my	
Prof. Dr. Zamzuri Zakaria	zamzuri@iium.edu.my	
Assoc. Prof. Dr. Kamarul Ariffin Khalid	k.ariffin@iium.edu.my	
Assoc. Prof. Dr. Mohd. Shukrimi Awang	shukrimi@iium.edu.my	
Assoc. Prof. Dr. Ahmad Fadzli Sulong	bethrezen@iium.edu.my	
Asst. Prof. Dr. Ardilla Hanim Abdul Razak	dillahanim@iium.edu.my	
Asst. Prof. Dr. Raffael Ismail	raffaelismail@iium.edu.my	
Asst. Prof. Dr. Khairul Nizam Siron @ Baharom	Khairul.nizam@iium.edu.my	
Asst. Prof. Dr. Mohd Adham Shah Ayeop	adhamshah@iium.edu.my	
Asst Prof. Dr. Rajandra Kumar Karupiah	drkumarmd@iium.edu.my	
Asst. Prof Dr. Nik Alyani Nik Abdul Adel	nikalyani@iium.edu.my	
Asst. Prof. Dr. Muhammad Haidar Nasuruddin	drhaidar@iium.edu.my	
Asst. Prof. Dr. Loh Li Loong	lawrencelll@iium.edu.my	
Asst. Prof. Dr. Muhammad Harith Rosdi	harithrosdi@iium.edu.my	
Asst. Prof. Dr. Salmah Anim Abu Hassan	anim@iium.edu.my	
Dr. Muhamad Syafiz Ahmad Ismani	syafizhamad@iium.edu.my	
Dr. Kow Ren Yi	Renyi_kow@iium.edu.my	
Dr. Mohamed Azril Mohamed Amin	drazril@gmail.com	Orthopaedics (KPJ Pahang)- Visiting Lecturer
Prof. Dato'. Dr. Ariff Osman	ariff.osman@iium.edu.my	Anaesthesiology
Prof. Dr. Mohd Basri Mat Nor	m.basri@iium.edu.my	
Prof. Dr. Naznin Muhammad	naznin@iium.edu.my	Basic Medical Science
Prof. Dr. Mohamed Imad Al-Deen Mustafa Mahmoud	imad@iium.edu.my	
Dr. Nor Zamzila Abdullah	zamzila@iium.edu.my	
Assoc. Prof. Dr. Norlelawati Abdul Talib	noleata@iium.edu.my	
Dr. Ahmad Marzuki Omar	marz@iium.edu.my	

Assoc. Prof. Dr. Khairul Azhar Jaafar	kazhar@iium.edu.my	Internal Medicine
Prof. Dr. How Soon Hin	joanchua@iium.edu.my	
Prof. Dr. Mohamed Saufi Awang	saufiawang@iium.edu.my	Neurosurgeon
Assoc. Prof. Dr. Aziz Nather	aziz_nather@nuhs.edu.sg	Orthopaedic (National University Hospital Singapore)
Prof Dato' Dr. Mohamad Abdul Razak	mrazak@acms.edu.my	Orthopaedic (University of Cyberjaya)
Prof. Dr. Azian Abd Aziz	azian@iium.edu.my	Radiology
Prof. Dr. Azmi Mohd Nor	azmimn@iium.edu.my	Surgery
Prof. Dr. Nasser Muhammad Amjad	nasser@iium.edu.my	
Assoc. Prof. Dr. Wan Ishlah Leman	islah@iium.edu.my	
Assoc. Prof. Dr. Junaini Kasian	junaini@iium.edu.my	

This guidebook is prepared by:

1. Prof. Dr. Nazri Mohd Yusof
2. Prof. Dr. Aminudin Che Ahmad
3. Prof. Dr. Zamzuri Zakaria
4. Prof. Dr. Ahmad Hafiz Zulkifly
5. Assoc. Prof. Dr. Shukrimi Awang
6. Assoc. Prof. Dr. Kamarul Ariffin Khalid
7. Dr. Mohamed Azril Mohamed Amin

Typesetting & design by:

1. Br. Faisal Razul Razali
2. Br. Muhamad Ezham bin Zainal Abdullah
3. Sr. Hani Munyati Mohamed Sooudin

Revised and updated in 2023 by:

1. Asst. Prof. Dr. Ardilla Hanim Abdul Razak
2. Br. Muhamad Ezham bin Zainal Abdullah

Contact info:
Department of Orthopaedics, Traumatology & Rehabilitation,
Kulliyyah of Medicine,
International Islamic University Malaysia,
Jalan Sultan Ahmad Shah, Bandar Indera Mahkota,
25200 Kuantan, Pahang

Tel: +609 5911954 Fax: +609 514 4451
E-mail: orthopaedic@iium.edu.my
Website: https://www.iium.edu.my/kulliyyah/kom/orthopaedics-traumatology-rehabilitation