

**KHESAR GYALPO UNIVERSITY OF MEDICAL  
SCIENCES OF BHUTAN**



**CURRICULUM FOR MD RESIDENCY PROGRAM**

**IN**

**ORTHOPAEDIC SURGERY**

**FACULTY OF POSTGRADUATE MEDICINE**

**AND**

**ORTHOPAEDIC DEPARTMENT**

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## **1. PROGRAMME OVERVIEW**

The Orthopaedic Surgery Residency Training Program in Bhutan is organized under the auspices of Faculty of Postgraduate Medicine (FoPM), Khesar Gyalpo University of Medical Sciences of Bhutan. It requires the successful completion of four years of full-time training in the accredited teaching hospitals and regular evaluations and formal examinations to ensure that candidates will obtain the knowledge, skills and experience required for the provision of high quality care in Orthopaedics.

The mission of the Orthopaedic Residency Program is to ensure that all Orthopaedic residents possess sound knowledge, skills and experience through uniform high quality training to enable them to be competent Orthopaedic surgeons providing the highest level of quality care in Bhutan at par with the international standard. At the end of fourth year the residents are expected to manage all kind of trauma independently and general orthopaedic conditions.

The curriculum is structured over four years to give the residents adequate experience to develop the skills necessary to manage all kinds of orthopaedic problems. The training is an outcome-based education where the resident has to show targeted outcome at the end of the 4 years. During the four years the resident will be given gradually increasing responsibility and by the fourth year they will be functioning independently. Besides the clinical training the residents will be given weekly lectures to cover all the important topics prescribed in the curriculum. The residents will start their elective postings from first year onwards. In the second, third and fourth year the residents will be sent for elective posting to other universities outside the country to give them exposure in subspecialties that are not in Bhutan. The fourth year residents will have one month of regional/district posting where there is orthopedic facilities to give them the opportunity to function and learn in different settings.

The residents will have to maintain a proper logbook to record all the educational activities/procedures done over the four years. Monitoring and supervision will be carried all the time and feedbacks will be given to facilitate proper learning and development. At the end of three and half years the residents will have to complete the thesis and defend it before the final examination.

## **2. GOALS**

The goal of Orthopaedic residency is to produce competent, professional, compassionate and specialist in Orthopaedic surgery who is capable of practicing all types of general orthopaedic surgery efficiently and competently backed by scientific knowledge and skills.

### **3. OBJECTIVES OF THE COURSE**

- a) To impart knowledge on the principles and practices of orthopaedic surgery
- b) To train residents to acquire surgical skills necessary for the management of routine and emergency orthopaedic cases;
- c) To facilitate the development of clinical decision making and problem-solving skills;
- d) To infuse the sense of lifelong learning and acquire good surgical ethics.

### **4. LEARNING OUTCOME**

At the end of training, the trainee of orthopaedic residency programme will be able to:

- a) Demonstrate theoretical and practical knowledge related to orthopaedic surgery.
- b) Show Positive Attitude, professional habits, moral and ethics in their practice.
- c) Obtain good communication and interpersonal skills.
- d) Display technical and operative skills (critical thinking and reasoning).
- e) Apply clinical skills and judgment in patient care.
- f) Demonstrate generic professional and leadership skills.
- g) Illustrate an understanding of the values that underpin the profession of orthopaedic surgery and the responsibilities that comes with being a member of the profession.
- h) Illustrate the special attributes needed to be a orthopaedic surgeon.
- i) Exhibit commitment to their ongoing personal and professional development and practice using reflective practice and other educational processes;
- j) They should KNOW theoretically (level-1), SHOW how to do the basic surgical skill (level-2) and some DO it independently (level-3).

### **5. THE CORE COMPETENCIES**

**The Core Competency shall comprise of the following:**

1. Patient care
2. Medical knowledge
3. Practice-based learning and improvement
4. Interpersonal and communication skills
5. Professionalism.
6. Systems-based practice

#### **1. Patient Care**

Residents must be able to provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health. Residents are expected to:

- a. Communicate effectively and demonstrate caring and respectful behaviors when interacting with patients and their families;
- b. Gather essential and accurate information about their patients;
- c. Make informed decisions about diagnostic and therapeutic interventions, based on patient information and preferences, up-to-date scientific evidence and clinical judgment;

- d. Develop and carry out patient management plans;
- e. Counsel and educate patients and their families;
- f. Use information technology to support patient care decisions and patient education;
- g. Perform competently the medical and invasive procedures considered essential for the area of practice;
- h. Provide health care services aimed at preventing health problems and maintaining health;
- i. Work with health care professionals, including those from other disciplines, to provide patient-focused care.

## **2. Medical Knowledge**

Residents must demonstrate knowledge about established and evolving biomedical, clinical, and cognate (e.g. epidemiological and social-behavioral) sciences and the application of this knowledge to patient care. Residents are expected to:

- Demonstrate an investigatory and analytic thinking approach to clinical situations;
- Know and apply the basic and clinically supportive sciences, which are appropriate to Pediatrics.

## **3. Practice-based Learning and Improvement**

Residents must be able to investigate and evaluate their patient care practices, appraise and assimilate scientific evidence, and improve their patient care practices. Residents are expected to:

- a. Analyze practice experience and perform practice-based improvement activities using a systematic methodology;
- b. Locate, appraise, and assimilate evidence from scientific studies related to their patients' health problems;
- c. Obtain and use information about their own population of patients and the larger population from which their patients are drawn;
- d. Apply knowledge of study designs and statistical methods to the appraisal of clinical studies and other information on diagnostic and therapeutic effectiveness;
- e. Use information technology to manage information, access on-line medical information; and support their own education; and
- f. Facilitate the learning of students and other health care professionals.

## **4. Interpersonal and Communication Skills**

Residents must be able to demonstrate interpersonal and communication skills that result in effective information exchange and teaming with patients, patients' families, and professional associates. Residents are expected to:

- Create and sustain a therapeutic and ethically sound relationship with patients;
- Use effective listening skills and elicit and provide information using effective nonverbal, explanatory, questioning, and writing skills; and
- Work effectively with others as a member or leader of a health care team or other professional group.

## **5. Professionalism**

Residents must demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population. Residents are expected to:

- a) Demonstrate respect, compassion, and integrity; a
- b) Responsiveness to the needs of patients and society that supersedes self-interest;
- c) Be accountable to patients, society, and the profession; and a
- d) Be commitment to excellence and on-going professional development;
- e) Demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent, and business practices; and
- f) Demonstrate sensitivity and responsiveness to patients' culture, age, gender, and disabilities.

## **6. Systems-based Practice**

Residents must demonstrate an awareness of and responsiveness to the larger context and system of health care and the ability to effectively call on system resources to provide care that is of optimal value. Residents are expected to:

- Understand how their patient care and other professional practices affect other health care professionals, the health care organization and the larger society, and how these elements of the system affect their own practice;
- Know how types of medical practice and delivery systems differ from one another, including methods of controlling health care costs and allocating resources;
- Practice cost-effective health care and resource allocation that do not compromise quality of care;
- Advocate for high quality patient care and assist patients in dealing with system complexities; and
- Know how to partner with health care managers and health care providers to assess, coordinate, and improve health care and know how these activities can affect system performance

Professional attitudes and conduct require that Resident must also have developed a style of care, which is:

- Humane (reflecting compassion in providing bad news, if necessary; the management of the visually impaired; and recognition of the impact of visual impairment on the patient and society);
- Reflective (including recognition of the limits of his/her knowledge, skills and understanding);
- Ethical;
- Integrative (including involvement in an inter-disciplinary team for the care of children, the handicapped, the systemically ill, and the elderly); and
- Scientific (including critical appraisal of the scientific literature, evidence-based practice and use of information technology and statistics).

## 6. OVERVIEW OF THE ROTATIONS

|    | Activity                 | PG 1 YR  |         | PG 2 YR            |              | PG 3 YR   |          | PG 4 YR           |   |
|----|--------------------------|----------|---------|--------------------|--------------|-----------|----------|-------------------|---|
|    |                          | 1        | 2       | 3                  | 4            | 5         | 6        | 7                 | 8 |
| 1  | Generic curriculum       | 6 months |         |                    |              |           |          |                   |   |
| 2  | Surgery placement        |          | 1 month |                    |              |           |          |                   |   |
| 3  | Physical rehabilitation  |          | 1 month |                    |              |           |          |                   |   |
| 4  | Rheumatology             |          |         | 1 month (overseas) |              |           |          |                   |   |
| 5  | Anesthesia               |          | 1 month |                    |              |           |          |                   |   |
| 6  | District posting         |          |         |                    |              |           |          | 1 month           |   |
| 8  | Radiodiagnos and imaging |          | 1 month |                    |              |           |          |                   |   |
| 9  | Hand and microsurgery    |          |         | 2 months           |              | 1 ½ month |          | 1 month (oversea) |   |
| 10 | Arthroplasty             |          |         |                    | 1 1/2 months |           | 2 months | 1 month (oversea) |   |
| 11 | Sports medicine          |          |         | 1 1/2 months       |              | 2 months  |          | 1 month (oversea) |   |
| 12 | Spine                    |          |         |                    | 1 1/2 months |           | 2 months | 1 month (oversea) |   |
| 13 | Orthopaedic Oncology     |          |         | 1 1/2 months       |              | 2 months  |          | 1 month (oversea) |   |
| 14 | Traumatology             |          |         |                    | 2 months     |           | 2 months |                   |   |
| 15 | Pediatric orthopaedic    |          |         | 2 months           |              | 1 ½ month |          | 1 month (oversea) |   |

1. General Orthopaedics- 13 months
2. Hand and microsurgery: 3 and 1/2 months
3. Arthroplasty: 3 and 1/2 months
4. Sports medicine: 3 and 1/2 months
5. Spine: 3 and 1/2 months
6. Orthopaedic Oncology: 3 and 1/2 months
7. Pediatric orthopaedics: 3 and 1/2 months
8. Traumatology: 4
9. General surgery: 1 month
10. Rheumatology: 1 month (overseas)
11. Anesthesia: 1 month

- 12. Physical rehabilitation: 1 month
- 13. Elective overseas: 6 months

## **7. COURSE CONTENT**

### **Year 1: (semester 2)**

#### **KNOWLEDGE: To learn about**

- i. The historical perspectives of orthopedic surgery.
- ii. About basic orthopedic science
- iii. The anatomy and biomechanics of musculoskeletal system.
- iv. The principles of splinting and the splint materials
- v. The techniques and complications of the digital blocks.
- vi. The diagnosis and treatment of infection
- vii. The skill in history taking and examination
- viii. To get oriented to basic of orthopedic subspecialties
- ix. Surgical sterility and preparation
- x. To get familiarize with the orthopaedic surgery equipment and machines.
- xi. Basic musculoskeletal radiology
- xii. Post traumatic and post operative rehabilitation program
- xiii. Various kinds of nerve and regional blocks.

#### **SKILLS:**

- i. Should be able to know about the bone biology
- ii. Should know about the anatomy and biomechanics of musculoskeletal system in their practice
- iii. Should be able to diagnose the bone infection and treat them.
- iv. Perform clinical history and examination in surgical practice
- v. Carry out pre-operative evaluation of patients.
- vi. Carry out instrument arrangement and trolley layout.
- vii. Demonstrate skills in sterilization techniques (O.T Layout and Asepsis).
- viii. Perform skin Preparation-painting and draping
- ix. Exhibit the techniques of scrubbing and gowning.
- x. Should be able to perform all kinds of splinting and traction
- xi. Should be able to do the digital blocks and should be able to perform the minor procedures of the finger and toe tips.
- xii. Perform wound dressing and wound debridement
- xiii. Should know about post traumatic and post operative rehabilitation program, ambulatory aids, splints, orthosis, shoes and braces.



## Year 2:

### KNOWLEDGE

- i. To learn about the bone grafting technique
- ii. Should learn about the anatomy of tendons and its clinical application.
- iii. Learn about the principles of osteosynthesis- AO course (1 week)
- iv. Learn about the fractures and dislocations upper and lower extremities.
- v. Learn about the indications and contraindications of arthroplasty.
- vi. Learn about the fracture and dislocation around wrist.
- vii. Learn to examine the injured wrist.
- viii. Learn about the basic knowledge of the compressive neuropathy and nerve injury.
- ix. Learn about the finger tip injuries.
- x. Learn about the pediatric upper limb injury.
- xi. Learn about the arthropathy and rheumatology
- xii. Learn about the basic science of hip, knee and ankle.
- xiii. Learn about the biomaterials of hip and knee arthroplasty.
- xiv. Learn about the biomechanics of hip and knee joint.
- xv. Learn about the disease and conditions of the hip, knee and ankle joint.
- xvi. Learn about the metabolic bone diseases.
- xvii. Learn about the pediatric diseases and congenital anomaly.
- xviii. Learn about the spine injury.
- xix. Learn about the spine deformity and spine infection.
- xx. Learn about the introduction of orthopedic sports medicine.
- xxi. Learn about the anatomical structures in and around the knee joint.
- xxii. Learn about the orthopedic oncology.
- xxiii. Learn about diabetic foot.
- xxiv. Learn about the image interpretation of the bone tumor.
- xxv. Learn various method of arthrocentesis

### SKILLS:

- i. Should be able to do autogenic bone grafting
- ii. Should be able to do physical examination of the tendons and able to diagnosed it.
- iii. Should be able to do the closed reduction techniques of shoulder, hip, elbow, ankle and wrist joint.
- iv. Perform the closed reduction technique of distal radius fracture.
- v. Able to preform the physical examination of DRUJ and conservative management.
- vi. Able to demonstrate the common surgical techniques of nerve injury.
- vii. Should be able to do the nerve injury grading and its diagnosis.
- viii. Should be able to do the conservative management of the pediatric upper limb injury.
- ix. Should be able to diagnose the compartment syndrome and its treatment.
- x. Should be able to know the principles of skin graft and flap.
- xi. Should be able to show tension band wiring and K wire technique.
- xii. Should be able to manage arthritis conservatively including inflammatory arthritis.
- xiii. Should be able to do the physical examination of hip, knee and ankle joints.

- xiv. Able to stabilize the spine injury cases.
- xv. Should be able to classify the fractures in adult and pediatric.
- xvi. Should be able to perform the thorough knee examination and diagnosed the condition.
- xvii. Should be able to take proper history taking in orthopedic tumor cases.
- xviii. Able to perform various arthrocentesis

### **YEAR 3:**

#### **KNOWLEDGE:**

- i. Learn about the surgical approaches of upper and lower limbs surgery.
- ii. Learn about the implant selection in the fractures.
- iii. Learn about the advantages and disadvantages of the each and every procedure.
- iv. Learn about the surgical management of supracondylar fracture in children.
- v. Learn about the fixation technique of olecranon
- vi. Learn about the options of treatment in the long bones of lower extremity
- vii. Learn about foot deformities and its orthosis.
- viii. Learn about the complications of the fracture
- ix. Learn about the complication of tendon injury
- x. Learn basic microsurgery.
- xi. Learn about the common bone tumor.
- xii. Learn about the management of the complex fractures.
- xiii. Learn about the diagnosis and prognosis of the pediatric diseases and congenital anomalies.
- xiv. Approach to adult spine trauma.
- xv. Approach to pediatric spine
- xvi. Approach to spine deformities
- xvii. Learn about spinal infection (pyogenic and TB)
- xviii. Learn about the management of problems around knee joint.
- xix. Should learn about the basic setting up of the arthroscopic procedure.
- xx. Learn about the principles of the bone and soft tissue tumors.
- xxi. Learn about the staging of tumor.
- xxii. Learn about the proper biopsy technique and its complications.

#### **SKILLS:**

- i. Should be able to perform plate osteosynthesis of the forearm fractures.
- ii. Should be able to do CRIF/ORIF of supracondylar fracture in children
- iii. Able to do ORIF with TBW or screw fixation in olecranon fracture.
- iv. Should be able to show IM nailing technique of femur and tibia.
- v. Should be able to do TBW in patella fracture.
- vi. Should be able to do external fixation in open fracture.
- vii. Should show how to do tendon transfer and nerve transfer.
- viii. Should be able to do a biopsy.
- ix. Should be able to do Fasciotomy in compartment syndrome.
- x. Should be able to show the choices of treatment for the complex fractures: treatment options and implant selections.

- xi. Should be able to treat most of the pediatric fractures (closed reduction, Casting or K wire pinning)
- xii. Should be able to show how to apply halo vest and Minerva cast.
- xiii. Should be able to treat spine infection conservatively.
- xiv. Able to treat the ligament injuries conservatively.
- xv. Should be able to do the closed biopsy.
- xvi. Should be able to read an image and give a differential diagnosis of the tumor.

#### **Year 4:**

#### **KNOWLEDGE**

- i. Learn about the treatment and complications of the plate osteosynthesis of the forearm fractures.
- ii. Learn about the surgical techniques of the proximal humerus and distal humerus fracture.
- iii. Learn about the reduction techniques in fracture neck and intertrochanteric fracture of hip.
- iv. Learn about the fixation techniques around the hip and distal femur.
  - v. Learn about the future directions and controversies in proximal humerus fractures.
  - vi. Should learn about the total arthroplasty techniques (Hip, Knee, Shoulder and Elbow).
  - vii. Learn about the management of diabetic foot both conservative and surgical.
- viii. Learn about the amputations.
  - ix. Learn about the athlete ankle pathology and its rehabilitation.
  - x. Learn about the management of Adult and Pediatric BPI.
  - xi. Learn about the non-microsurgical coverage and replantation of the upper limb.
  - xii. Learn about the deformities of upper limb and contractures.
  - xiii. Learn about the management of rheumatoid hands.
  - xiv. Learn about the pediatric diseases: diagnosis and treatment
    - xv. Learn about the surgical techniques in cervical spine injury and diseases
    - xvi. Learn about the surgical techniques in thoracic and lumber spine.
    - xvii. Learn about the management of the spinal deformity.
    - xviii. Learn about the ligament reconstructions around the knee joint
    - xix. Learn about the rotator cuff disease.
    - xx. Learn about the metastatic bone disease.
    - xxi. Learn about the excision techniques of tumor.

#### **SKILLS**

- i. Should be able to do plate and screws fixation in all the upper and lower extremities fractures.
- ii. Should be able to manage fracture clavicle either operatively or non-operatively.
- iii. Should be able to do internal fixation of the fracture neck of femur and intertrochanteric fracture.

- iv. Should be able to do hemiarthroplasty of the hip.
- v. Able to do antegrade and retrograde IM nailing techniques in femoral fracture.
- vi. Should be able to do IM nailing in tibia fracture.
- vii. Should be able to fix the fractures around the ankles.
- viii. Should be able to demonstrate the techniques of arthroplasties.
- ix. Should be able to do total contact casting.
- x. Should be able to do all types of amputations.
- xi. Should be able to do taping technique.
- xii. Should be able to do arthrodesis of wrist, knee, hip and ankle.
- xiii. Should be able to manage DRUJ problem surgically.
- xiv. Should be able to repair a tendons and its rehabilitation.
- xv. Should be able to repair a major nerve and vessels.
- xvi. Should be able to do local flaps and skin grafts.
- xvii. Able to do the corrective surgeries and contracture release.
- xviii. Should be able to do incisional and excisional biopsies.
- xix. Should be able to do an excision of the benign tumors.
- xx. Should be able to treat common pediatric problems (e.g club foot and DDH)
- xxi. Should be able to do CRIF/ORIF in all kinds of pediatric fractures.
- xxii. Should be able to do pedicle screw fixation of the lumber spine.
- xxiii. Should be able to drain the epidural abscess.
- xxiv. Should be able to diagnosed the spinal deformity and manage conservatively.
- xxv. Should be able to do a mirel scoring and decide management of the metastatic bone disease.
- xxvi. Should be able to do curettage and fixation with bone cement.
- xxvii. Should be able to do marginal excision.

## 8. TEACHING AND LEARNING ACTIVITIES

Every student shall attend teaching and learning activities during each year as prescribed by the department and not remain absent himself /herself from work without valid reasons.

A list of teaching and learning activities designed to facilitate students acquire essential knowledge and skills outlined is given below. Depending on the facilities available, any or all of these methods may be employed.

- a) **Lectures:** Lectures are to be kept to a minimum. They may, however, be employed for teaching certain topics.
- b) **Journal Club:** Recommended to be held once a fortnight. The presentations would be evaluated using checklists and would carry Weightage for internal assessment.
- c) **Subject Seminar:** Recommended to be held once a month. Every candidate must present on selected topics at least 3 times a year and a total of 12 seminar presentations in Four

years. The presentations would be evaluated using check lists and would carry Weightage for internal assessment.

- d) **Student Symposium:** Recommended as an optional multi disciplinary programme. The evaluation may be similar to that described for subject seminar.
- e) **Ward Rounds:** Ward rounds may be service or teaching rounds.
- i. **Service Rounds:** Postgraduate students and Interns should do ward rounds every day for the care of the patients. Newly admitted patients should be worked up by the PGs and presented to the seniors the following day.
  - ii. **Teaching Rounds:** should have 'grand rounds' for teaching purpose.
- f) **Inter Departmental Meetings:** with departments of Pathology, Radio-Diagnosis and other departments as deemed relevant and necessary.
- g) **Teaching Skills:** Postgraduate students must teach under graduate students (Eg. medical, nursing)/ interns by taking demonstrations, bed side clinics, tutorials, lectures etc.
- h) **Continuing Medical Education Programmes (CME):** At least 2 CME programmes should be attended by each student in 4 years. Mandatory to present one clinical paper at the annual medical conference before sitting for the exit exams.

## 9. EXAMINATION SYSTEMS:

| Examinations                                | Schedule        | Components                       |             |   |                  |                       | Total marks | Weightage <sup>‡</sup> |
|---|-----------------|----------------------------------|-------------|---|------------------|-----------------------|-------------|------------------------|
|   |                 | Written                          |             | Practical   |                  |                       |             |                        |
| Institute Examination I                     | End of 1st Term | MCQ<br>50%                       | SAQ<br>50%  | OSPE 100%   |                  |                       | 200 marks   | 10                     |
| Institute Examination II                    | End of 4th Term | MCQ<br>50%                       | SAQ<br>50%  | OSCE<br>50%   | Long case<br>50% | 2 short cases<br>50 % | 300 marks   | 20                     |
| Submission of Thesis                        | End of 6th Term | (i) Written contents: 100 marks* |             |   |                  |                       | 200 marks   | 10                     |
|   |                 | (ii) Oral /viva voce: 100 marks* |             |   |                  |                       |             |                        |
| University Examination                      | End of 8th Term | Paper I                          |             | 1 Long case: 100 %<br>2 short cases: 100 %<br>Instrument/imaging: 100 %<br>Viva voce: 100 % |                  |                       | 700 marks   | 60                     |
|   |                 | MCQ<br>100%                      | SEQ<br>100% |   |                  |                       |             |                        |
|   |                 | Paper II                         |             |   |                  |                       |             |                        |
|   |                 | SEQ 100 %                        |             |   |                  |                       |             |                        |
| Cumulative marking for the Award of Degrees |                 |                                  |             |   |                  |                       |             | 100                    |

**Note:**

- a) \* Thesis will be assessed for (i) written contents for 100 mark; and defence of thesis during viva voce - for 100 marks and both will carry a weightage of 10 marks for the final award of degree.
  - b) ‡ Cumulative weightage for the purpose of award of degrees will be computed as 10, 20, 10, and 60 percentages respectively for the Institute Examinations I, Institute Examinations II, Thesis, and the University Examinations.
  - c) MCQ: Multiple choice questions;
  - d) SAQ: Short answered questions;
  - e) OSPE: Objective structured practical examinations;
  - f) OSCE: Objective structured clinical examinations;
  - g) There will be yearly assessment examination for all the orthopaedic residents.
  - h) Basic orthopaedic science exam will be conducted at the end of 4<sup>th</sup> semester (MCQs).
- 
- To have 4 written papers for the final/exit/university exam as follows (Paper II- SEQ):  
Paper I: Traumatology, infections and metabolic bone disease.  
Paper II: pediatric/hand/ orthopaedic oncology  
Paper III: Arthroplasty/arthroscopy/spine  
Paper IV: Recent Advances in orthopaedics

**10. THESIS:**

To follow the generic guidelines on Thesis.

**11. SUGGESTED TOPICS FOR ELECTIVE OUTSIDE**

1. *Hand and micro surgery*
2. *Joint Replacement surgery*
3. *Sports medicine*
4. *Orthopedic Oncology*
5. *Pediatric Orthopaedic*
6. *Spine surgery*
7. *Rheumatology*

**References:****1. Main textbooks:**

- I. Campbell's operative orthopaedic (4 volumes)
- II. Rockwood and Wilkin's: Fractures in children
- III. Rockwood and Green's: Fracture in Adults
- IV. Lovell and Winter: Pediatric orthopaedic
- V. Green operative hand surgery

- VI. Orthopaedic Basic science: foundations of clinical practice(AAOS)
- VII. Surgical exposure in orthopaedic- The Anatomic approach: Hoppenfield

**2. Additional readings**

- I. Orthopaedic Knowledge Update:- Spine, pediatric and trauma(AAOS)
- II. Instructional Course Lectures (AAOS)

**3. Journals (hinari)**

- I. Journal of bones and joints surgery(American)
- II. Journal of bones and joints surgery(British)
- III. Journal of Hand Surgery(American)
- IV. Journal of Hand Surgery(British)
- V. Journal of Trauma
- VI. Spine journal

**12. LOG BOOK**

**The residents will have to maintain a log book of all the procedures they have carried out independently, assisted, or observed during the training period.**

| SL.no | Procedures                   | Minimum no. of procedures performed | SIGNATURE |
|-------|------------------------------|-------------------------------------|-----------|
| 1     | Application of POP           | 100                                 |           |
| 2     | LA injection                 | 20                                  |           |
| 3     | Hematoma block               | 20                                  |           |
| 4     | Closed reduction of fracture | 20                                  |           |
| 5     | Shoulder joint reduction     | 15                                  |           |
| 6     | Elbow joint reduction        | 20                                  |           |
| 7     | Hip joint reduction          | 10                                  |           |
| 8     | Knee joint reduction         | 10                                  |           |
| 9     | Ankle joint reduction        | 15                                  |           |
| 10    | Wound debridement            | 20                                  |           |
| 11    | External fixation            | 5                                   |           |
| 12    | Excision of soft tissue mass | 5                                   |           |
| 13    | Aspiration of the hip joint  | 10                                  |           |

|    |                                       |    |  |
|----|---------------------------------------|----|--|
| 14 | Aspiration of the knee joint          | 10 |  |
| 15 | Aspiration of ankle joint             | 5  |  |
| 16 | Aspiration of wrist                   | 5  |  |
| 17 | Application of halovest               | 5  |  |
| 18 | Application of Minerva cast           | 5  |  |
| 19 | Application of skull tong             | 5  |  |
| 20 | Application of the skeletal traction  | 10 |  |
| 21 | Application of skin traction          | 20 |  |
| 22 | Proximal humerus fracture surgery     | 15 |  |
| 23 | Humerus fracture surgery              | 15 |  |
| 24 | Distal humerus fracture surgery       | 15 |  |
| 25 | Olecranon fx surgery                  | 15 |  |
| 26 | Forearm fx sugery                     | 20 |  |
| 27 | Distal radius fx surgery              | 15 |  |
| 28 | Carpal bones fx surgery               | 5  |  |
| 29 | Metacarpals and phalangeal fx surgery | 15 |  |
| 30 | Tendon repair surgery                 | 20 |  |
| 31 | Limb Amputation                       | 10 |  |
| 32 | Skin Grafting                         | 3  |  |
| 33 | Fasciotomy                            | 10 |  |
| 34 | Fracture neck surgery                 | 15 |  |
| 35 | Intertrochanteric fx surgery          | 15 |  |
| 36 | Femural shaft fx surgery              | 15 |  |
| 37 | Distal femur fx surgery               | 15 |  |
| 38 | Proximal tibia fx surgery             | 15 |  |
| 39 | Tibia fx surgery                      | 10 |  |
| 40 | Brachial block                        | 5  |  |
| 41 | Spinal anesthesia                     | 5  |  |



|    |                                 |    |  |
|----|---------------------------------|----|--|
| 42 | Ankle fx surgery                | 15 |  |
| 43 | Foot fracture fx                | 15 |  |
| 44 | Achilles tendon repair surgery  | 10 |  |
| 45 | Toe nail excision               | 15 |  |
| 46 | Finger tip surgery              | 10 |  |
| 47 | I and D                         | 20 |  |
| 48 | Excision of benign bone tumor   | 10 |  |
| 49 | Club foot casting               | 10 |  |
| 50 | Percutaneous tenotomy           | 5  |  |
| 51 | Hip spica application           | 20 |  |
| 52 | Arthroscopy                     | 10 |  |
| 53 | Arthroplasty                    | 10 |  |
| 54 | Local flap surgery              | 10 |  |
| 55 | Microsurgery                    | 5  |  |
| 56 | Cervical spine surgery          | 10 |  |
| 57 | Thoracic spine surgery          | 10 |  |
| 58 | Lumbar spine surgery            | 10 |  |
| 59 | Pedical screw fixation          | 10 |  |
| 60 | Spine tumor removal             | 5  |  |
| 61 | Application of body cast/jacket | 5  |  |
|    |                                 |    |  |

### 13. THE AWARD

On successful completion of the residency training, acceptance of the thesis and after passing the examinations will lead to obtaining the Doctor of Medicine (MD) in Orthopaedic Surgery from the Khesar Gyalpo University of Medical Sciences of Bhutan.