Curriculum for

Post-Doctoral Fellowship Course

in

**MUSCULOSKELETAL RADIOLOGY**

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**SRI AUROBINDO UNIVERSITY**

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# FELLOWSHIP IN MUSCULOSKELETAL RADIOLOGY

**SYLLABUS**

TRAINING SPECIFIC OBJECTIVES

The fellow will become familiar with the presentations, imaging findings, differential diagnosis, complications, and management of disease processes related to MSK pathologies.

These processes include, but are not restricted to the following:

Congenital abnormalities and bone dysplasia

Infectious diseases (acute and chronic)

Inflammatory disorders

Neoplastic diseases (benign or malignant), including detection, staging, and follow-up

Vascular disorders, involving the soft tissue and osseous structures.

Musculoskeletal manifestation of metabolic, endocrine, and depositional diseases.

Traumatic & iatrogenic injuries

Emergencies: including investigation of acute septic joint and acute trauma.

Pathology encountered by the following clinical disciplines shall be included (although not limited to these areas):

Orthopedic surgery

Rheumatology

Spine surgery

MSK oncology

Radiographic Artifacts:

Knowledge about causative factors can be used to remove such artefacts. Eg: grid artefacts lines on x-ray.

Learn steps to reduce metallic artefacts by implants in CT and MRI in post operative cases.

Normal Skeletal Anatomy and Radiographic Positioning : apart from routine radiography, Special views like flexion and extension, stress and dynamic views

Measurements in Skeletal Radiology : very useful in detecting various abnormalities. Eg. angle measurement in DDH, FAI and scoliosis assessment,

Congenital Anomalies and Normal Skeletal Variants : Ascertain that indolent findings which could be mistaken to be more sinister lesions. With familiarity of such findings unnecessary imaging and surgeries can be avoided.

Skeletal trauma

grading and classification of all fracture and dislocation,

precautions and care while handling injured cases,

-detect unstable injuries and provide such information at the earliest.

Emergency trauma: determine non skeletal injuries like intracranaial, abdominal, vascular injuries, tension pneumothorax etc.,

Bone tumours: Benign and tumor-like Processes: the don’t touch lesions which are self limiting and need no intervention to be detected as far as possible.

Bone tumours : Malignant Indeterminate and aggressive lesions which need further evaluation for staging.

Hematologic, myeloproliferative and similar disorders:

assessment of disseminated metastasis, determine the primary, myeloma,

Nutritional, metabolic and endocrine related diseases of the skeleton: osteoporotic, hyperparathyroidism, flurosis, etc,

Skeletal dysplasias and malformation syndromes

Joint arthritides: various degenerative, infective and inflammatory

Bone and soft-tissue infection:

Familiarise with features common in different infections, to differentiate Pyogenic or tuberculosis.

Apply multimodality approach, in Osteomyelitis, although MRI would define extent of involvement and abscess well, CT scan can exactly give additional information about the Sequestrum.

Follow up imaging to assess healing response.

Imaging of soft tissues:

Tumours, vascular abnormalities, and infections. Diagnostic and therapeutic USG guided aspiration and biopsies performed for evaluation of superficial abscess and solid tumours.

Paediatric musculoskeletal radiology: nonaccidental injury, green stick, Salter Harris and green stick fractures, etc.,

Spine : varied spectrum of routine studies include degenerative disc disease/ canal stenosis, sacroiliitis, listhesis, spondylodisctis, scoliosis, injury, metastasis, intraspinal and bone tumours, myelopathy.

Joint imaging: Knee : can learn about arthritis, different types of meniscal and ligament injuries, transient patellar dilocation

Joint imaging: Shoulder: recurrent dislocation, rotator cuff tear, tendinosis, labral tears, adhesive capsulitis

Joint imaging: wrist: ganglion cyst, TFCC/ intercarpal ligament tear, carpal tunnel,

Joint imaging: hip FAI, AVN , perthes, Slipped capital femoral epiphysis, idiopathic chondrolysis

Joint imaging: elbow : tendinosis, artristis, injuries etc.,

Joint imaging: ankle: impingement, tendon / ligament tears, osteochondritis dessicans

Foot disorders: foreign bodies, Osteomyelitis, charcot’s joint,

Scoliosis to assess the severity and to exclude associated intraspinal lesions and spinal cord anomalies.

Recent advances: Diffusion tensor imaging, Cartilage mapping etc.,

Interventional diagnostic and therapeutic techniques: verebroplasty, diagnostic aspiration, fluoroscopy image guided biopsies, USG guided nerve blocks,

Special procedures: Myelogram, arthrogram, urogram, cystogram, CT angiogram,

Post operative assessment: for failed back syndrome, ACL reconstruction, assess healing of spondylitis and union of fractures

**TRAINING SCHEDULE:**

State-of-the-art equipment includes 64-slice CT, 1.5-T MRI, PET/CT, Gamma Imaging, digital radiography, US, Digital Mammography, Perfusion MRI , MR Spectroscopy, DSA intervention.

**ULTRASOUND (4 weeks)**

The fellow should be competent in performing and reporting the standard sonographic procedures for MSK, including joints, tendons, muscles, ligaments and nerves

The fellow will be expected to personally scan patients, and train the technologist on scanning at a later phase in the fellowship.

The fellow should be aware of the indications and contraindications for US- guided MSK procedures.

The fellow should discuss the interventional procedures with the attending staff before starting the procedure.

At an early stage of the fellowship, the fellow should perform the procedures under supervision, and without supervision once competent.

**CT SCAN (8 weeks)**

The fellow should prescribe, supervise, interpret and report all routine MSK CT examinations.

The fellow should be familiar with various CT protocols tailored to MSK diseases.

The fellow should be familiar with specialized examinations, such metal artifact reduction.

The fellow should become comfortable with manipulating the imaging data at dedicated 3D workstations for both interpretation and illustration.

The fellow should learn the application of Dual-energy CT applications pertinent to MSK.

The fellow should be aware of the indications and contraindications for CT and fluoroscopic-guided MSK procedures.

At an early stage in the fellowship, the fellow should perform CT and fluoroscopic procedures under supervision, and without supervision once competent.

**MRI (16 weeks)**

The fellow should be familiar with practical physical principles related to MSK imaging.

o The fellow should be intensely involved in direct supervision of examinations, working with technologist to make the necessary adjustments to parameters and protocols as the studies are being performed.

The fellow should be competent in the indications and precautions for the use of a variety of MR contrast agents and indications of sedation when needed.

The fellow should be aware of proper post-processing of imaging data.

All cases should be reviewed by the attending consultant before reporting.

**CONVENTIONAL RADIOGRAPHY (16 WEEKS)**

This should cover all varieties of such examinations, including out-patient, in- patient, intraoperative, and emergency studies of the musculoskeletal system.

The fellow should perform quality control on the technique and make a critique on the radiographic procedures.

**ELECTIVE ROTATION (8 weeks)**

This increases flexibility, by enhancing exposure to certain facets of the program or to allow work in areas of particular interest to the fellow, such as in PET-CT, interventional radiology, and pathology. This period should have some relevance to the field of MSK radiology and should be performed in an accredited institution.

* 64 Slice CT : Three sessions per week
* 1.5T MRI : three sessions per week
* Ultrasound : two session per week
* Xray : Three session per week
* Nuclear Medicine (PET CT & GammaCT) : one sessions per week
* Flexible session for simple imaging-guided interventional procedures
* General cross section radiology (reporting / procedures) : three session per week
* Study / meetings : one session per week
* Research / audit : one session per week