

Dr.NTR University of Health Sciences

Vijayawada

SYLLABUS

“POST DOCTORAL FELLOWSHIP COURSE

IN SPINAL SURGERY”

for the academic year 2018-19

FELLOWSHIP COURSE IN SPINAL SURGERY

1. **Proper name of the course:** Fellowship course in Spinal Surgery
2. **Duration of the course:** One year
3. **I. Eligibility criteria for admission:** M.S/D.N.B Orthopaedics, M.Ch/DNB Neurosurgery recognized by the Medical Council of India / National Board of Examinations.
II. Intake capacity: 2 per year

4. Complete curriculum of the course:

4.1. *Statement of Goals & Specification of Objectives:*

A. Goal:

The goal of this curriculum is to create a cadre of medical professionals who can evaluate and treat all types of diseases affecting the spine.

B. Objectives:

The objectives of the curriculum recommended for “Conditions of the Spine” are to enable the specialist to confidently, competently and cost-effectively evaluate and treat all patients with conditions of the spine. With the knowledge provided by this curriculum, the specialist should be able to diagnose a wide range of disorders, know when to order which diagnostic studies and how to interpret the results, know when and how to perform surgery, take post operative care and rehabilitate the patient, and also to know which pharmacologic and non-pharmacologic therapies are appropriate for the patient’s medical spine condition and prescription of the same.

4.2. *Course Content:*

Demonstrable competences at consultant level will be expected in the following fields:

- Perform a complete musculoskeletal and neurological examination of the spine;
- Arrive at an appropriate differential diagnosis
- Order and interpret appropriate laboratory, radiological and other diagnostic procedures;
- Produce an acceptable management plan;
- Display knowledge of and competence in treating surgical and medical complications;
- Provide a plan for patient follow-up.
- Exhibit proficiency in non-operative management of spinal pain and disability;
- Demonstrate technical competence in surgical decompression and spinal arthrodesis for degenerative, traumatic and neoplastic conditions of the cervical, thoracic and lumbar spine;
- Show capacity for the correct use of instrumentation for spinal disorders.
- Demonstrate a fundamental knowledge and understanding of the incidence, etiology, pathophysiology, natural history, diagnosis, investigation, management, prognosis, and complications of the disease processes affecting the spine;
- Participate in clinical spine research;
- Exhibit skills in the critical appraisal of scientific literature specifically in the design, methodology and evaluation of clinical studies.
- **General Topics:** Research methodology and Teaching methodology

5. SYLLABUS

I. General Issues of Spinal Disorders:

- A. History of spinal disorders
- B. Epidemiology of spinal disorders
 - 1. Prevalence of spine and limb pain
 - a. Occupational risk factors
 - b. Individual risk factors
 - c. Prevalence of disk degeneration and facet joint osteoarthritis
 - 2. Prevalence of other specific spine conditions
- C. Economics of spinal disorders
 - 1. Direct costs – medical
 - 2. Direct costs – non-medical
 - 3. Indirect costs
- D. Insurance systems and evaluation of disability and impairment
 - 1. Workers compensation and other disability insurance systems
 - 2. Relationship between pain, disability, and physical impairment
 - 3. Impairment rating
- E. Prevention and treatment of spine disorders
 - 1. Primary and secondary prevention
 - 2. Functional capacity evaluation, functional restoration, and work hardening
 - 3. Pain clinics and pain rehabilitation centers
 - 4. Pharmacologic management of acute and chronic back pain
 - a. Nonsteroidal anti- inflammatory drugs and acetaminophen
 - b. Tricyclic antidepressants
 - c. Opioids
 - d. Muscle relaxants
 - e. Intrathecal treatments
 - f. Anticonvulsants
 - g. Other medications
 - 5. Non-pharmacologic treatments
 - a. Minimally invasive surgery
 - b. IDET (Intradiscal Electrothermal Therapy)
 - c. Others
- F. Sensitivity, specificity, and value of
 - 1. Medical history
 - 2. Physical examination
 - 3. Imaging studies
 - 4. Neurophysiologic studies
- G. Specific clinical tools in the evaluation of patients with suspected spine problems
 - 1. Range of motion of various levels of the spine and joints
 - 2. Neurologic evaluation and signs
 - 3. Non-organic physical signs
- H. Pain and pain pathways
 - 1. Anatomy
 - 2. Physiology
 - 3. Psychology
- I. The role of orthoses for spine conditions
 - 1. Cervical
 - 2. Thoracic
 - 3. Lumbosacral
- J. Diagnostic studies used in the evaluation of spinal disorders
 - 1. Imaging of spinal disorders

- a. Plane and dynamic x-rays (motion)
- b. Magnetic resonance imaging of the spine
- c. Computed tomography of the spine
- d. Myelography with computed tomography
- e. Angiography of the spine
- f. Nuclear medicine scans for tumor, fracture, and infection
- g. Discography
- 2. Electromyography and nerve conduction velocity testing for nerve root and anterior horn cell involvement
- 3. Somatosensory evoked potentials
- 4. Blood tests
- 5. Diagnostic injections
- K. Evidence-based assessment of old, new, and controversial therapies

II. Specific Conditions Affecting the Spine:

- A. Degenerative disk and joint disease of the spine
 - 1. Disk anatomy and physiology
 - 2. Facet joints, muscles, ligaments, and bones
 - 3. Medical management of spinal spondylosis
 - 4. Indications for surgery
- B. Metabolic bone disease
 - 1. Osteoporosis
 - 2. Osteomalacia
 - 3. Paget's disease
- C. Rheumatic disorders
 - 1. Rheumatoid arthritis
 - a. Upper cervical subluxations
 - 2. Ankylosing spondylitis
 - a. Fracture dislocation
 - b. Upper cervical subluxations
 - c. Cauda equina syndrome as a late, non-compressive complication
 - 3. Psoriatic arthropathy
 - 4. Enteropathic arthropathy
 - a. Crohn's disease
 - b. Ulcerative colitis
 - 5. Reactive arthritis
 - a. Reiter's syndrome
 - 6. Other conditions
- D. Infectious diseases of the spine
 - 1. Pyogenic infections
 - a. Disk space, epidural, osteomyelitis
 - 2. Granulomatous infections
 - a. Tuberculosis of the spine (Pott's disease)
 - b. Coccidioidomycosis
 - c. Blastomycosis
 - d. Cryptococcosis
 - e. Aspergillosis
 - 3. Parasitic infections
- E. Infectious diseases of the spinal cord and nerve roots
 - 1. Myelitis due to viruses
 - a. Poliomyelitis
 - b. Herpes zoster
 - c. Rabies
 - d. HTLV I
 - e. HIV
 - 2. Myeloradiculitis secondary to bacteria

- a. Syphilis
 - b. Lyme disease
 - c. Meningomyelitis
 - d. Abscess of spinal cord
- F. Non-infectious myelitis
 - 1. Multiple sclerosis
 - 2. Post-infectious, parainfectious, and post-vaccinal myelitis
 - 3. Associated with vasculitis
 - 4. Subacute necrotizing myelitis
 - 5. Radiation-induced myelitis
- G. Spinal injury
 - 1. Penetrating
 - 2. Non-penetrating
 - 3. Fractures
 - 4. Delayed effects
- H. "Whiplash"
- I. Tumors of the spine
 - 1. Primary and secondary tumors of the spinal canal
 - a. Meningioma
 - b. Neurofibroma
 - c. Glioma
 - d. Ependymoma
 - e. Lipoma
 - f. Epidermoid, dermoid, teratomas
 - g. Hemangioblastomas
 - h. Metastatic tumor
 - 2. Primary and secondary tumors of the spine
 - a. Osteochondroma
 - b. Osteoblastoma
 - c. Osteoid osteoma
 - d. Aneurysmal bone cyst
 - e. Hemangioma
 - f. Giant cell tumor
 - g. Eosinophilic granuloma
 - h. Plasmacytoma
 - i. Multiple myeloma
 - j. Osteosarcoma
 - k. Ewing's sarcoma
 - l. Chordoma
 - m. Chondrosarcoma
 - n. Lymphoma
 - o. Metastatic tumor
- J. Syringomyelia
 - 1. Associated with Arnold-Chiari malformation
 - 2. Associated with neoplasms
 - 3. Associated with previous spinal cord injury
 - 4. Idiopathic
- K. Vascular diseases of the spinal cord
 - 1. Spinal vascular anomalies
 - a. Dural arteriovenous fistula
 - b. Intradural arteriovenous malformations
 - 2. Spinal cord infarction
 - 3. Hematomyelia unassociated with vascular malformation
- L. Miscellaneous spinal cord diseases
 - 1. Subacute combined degeneration

2. Spinal arachnoiditis (chronic adhesive spinal arachnoiditis)
3. Caisson disease (decompression sickness)

III. Cervical Spine-Specific Considerations:

- A. Anatomy, pathology, and biomechanics of the cervical spine
- B. Cervical radiculopathy syndromes
 1. Clinical, imaging, and electrophysiologic findings
 2. Non-operative approaches (physical therapy and other modalities, cervical traction, orthoses, and injections)
 3. Indications for surgery
 - a. Anterior versus posterior approach
- C. Cervical myelopathy
 1. Clinical, imaging, and electrophysiologic findings
 2. Non-operative therapy
 3. Decompression
 - a. Anterior versus posterior approach
 - b. To fuse or not to fuse
- D. Congenital anomalies of the cervical spine
 1. Basilar impression
 2. Atlanto-axial instability
 3. Fusion
 4. Klippel-Feil syndrome
 5. Cervical ribs
- E. Postoperative cervical spine pain with or without instability
- F. Miscellaneous – achondroplasia

IV. Thoracic Spine:

- A. Anatomy, pathology, and biomechanics of the thoracic spine
- B. Thoracic disk herniation
 1. Non-operative approaches
 2. Indications for surgery
- C. Thoracic myelopathy
- D. Congenital anomalies of the thoracic spine
- E. Postoperative thoracic spine pain with or without instability
- F. Kyphosis
 1. Causes
 2. Non-operative care
 3. Indications for surgery
 4. Surgical approaches
- G. Scoliosis
 1. Causes
 2. Non-operative care
 3. Indications for surgery
 4. Surgical approaches
- H. Miscellaneous – achondroplasia

V. Lumbosacral Spine:

- A. Anatomy, pathology, and biomechanics of the lumbosacral spine
- B. Availability of evidence-based clinical practice guidelines
 1. AHRQ and others
- C. Acute and chronic lumbar disk herniation
 1. Clinical, imaging, and electrophysiologic findings
 2. Non-operative approaches (physical therapy and other modalities, spinal manipulation, orthoses, and injections)
 3. Indications for surgery and Surgical approaches
- D. Lumbar spinal stenosis

1. Clinical, imaging, and electrophysiologic findings
2. Non-operative approaches
3. Indications for surgery
 - a. Decompression with or without fusion
- E. Congenital anomalies of the lumbosacral spine
- F. Spondylolisthesis
 1. Classification
 2. Non-operative treatment
 3. Indications for surgery and Surgical approaches
- G. Postoperative lumbosacral pain with or without instability
- H. Cauda equina syndrome
- I. Compression fractures-conservative, invasive, and injection therapy (vertebroplasty)
- J. Operative surgery on spine
 1. General Introduction and Principles of Minimally Invasive Spine Surgery
 2. Image-Guided Spinal Navigation: Principles and Clinical Applications
 3. Anterior Cervical Foraminotomy
 4. Posterior Cervical Foraminotomy and Laminectomy
 5. Posterior Cervical Instrumentation and Fusion
 6. Thoracoscopic Discectomy
 7. Thoracic and Lumbar Kyphoplasty
 8. Thoracoscopic Deformity Correction
 9. Paracoccygeal Transsacral Access to the Lumbosacral Junction for Interbody Fusion and Stabilization
 10. Facet Joint Anatomy and Approach for Denervation
 11. Facet Joint and Epidural Injections
 12. Discography and Endoscopic Lumbar Discectomy
 13. Discectomy and Laminectomy
 14. Combining Minimally Invasive Techniques for Treating Multilevel Disease as well as Adult Degenerative Scoliosis
 15. Transforaminal Lumbar Interbody Fusion (TLIF)
 16. Lateral Approach for Anterior Lumbar Interbody Fusion (XLIF and DLIF)
 17. Anterior Lumbar Interbody Fusion (ALIF)
 18. Percutaneous Pedicle Screw Placement for Spinal Instrumentation
 19. Iliac Crest Bone Graft Harvest and Fusion Techniques
 20. Technologies for Use in Indirect Distraction Procedures

VI. Teaching and Research : The fellows should actively participate in undergraduate /nursing teaching programs as and when required, and become part of the research team in conducting studies related to spine surgery.

Training program:

Duration of Course – one year

The posting of the candidates is as follows.

- Anatomy : 2weeks
- Physiology: 2 weeks
- Pathology: 2 weeks
- Radiodiagnosis: 4 weeks
- Rehabilitation medicine: 2 weeks
- Orthopaedics: 4 weeks
- Spinal surgery: 8 months

VII. Presentations:

In addition to attending all the academic sessions, the candidate needs to make a minimum number of presentations in these academic sessions during the training period of 1 year

	Frequency #
Presentations	
a. Seminars / Symposia	1 per month
b. Journal club	1 per month
c. Clinical case conference	1 per month
d. Research conference at state level - 1	
e. Research conference at national level - 1	
f. Bedside presentation	1 per month
g. Interdepartmental meeting	1 per month
h. Grand rounds	1 per week
i. Mortality meeting and audit meeting	1 per month
j. Record meetings	Once in 2 weeks
k. Teaching learning process will also take place during the daily ward rounds and during teaching rounds	
# May be increased if required.	

6. Log book

The fellows shall maintain a Record Book (Log Book) of the work carried out by them on day to day basis & training program undergone during the period of training including details of procedures carried out independently or assisted by the candidate. The log book will be checked by the faculty members imparting the training. Candidates will be required to produce log book duly certified by the guide at the time of practical examination.

7. Development of attitude:

It is a very important aspect of management of patients with spinal problems. It would be the constant endeavor of the faculty to develop desirable attitudes in the PG trainees during the course by personal examples, interaction and group discussion. Constant watch will be maintained during their work in the wards to ensure that this objective is being met. Although there will be no formal evaluation of attitude, some aspects of this domain would be covered during the formative evaluation for continued internal assessment.

8. Text books and reference books:

- Best evidence for spine surgery: 20 cardinal cases - Neuro surgery by Jandial, Rahul
- Minimally invasive percutaneous spinal techniques
- Spinal arthroplasty – Vaccaro, Alexander
- Spine secrets plus – Devlin, Vincent J.
- Spine surgery: techniques, complication avoidance and management – Benzel, Edward.
- Surgery: a competency based companion - Mann

- Surgical anatomy and techniques to the spine – Kim, Daniel
- Surgical Management of spinal deformities – Errico, Thomas.
- Tumors of the Spine – Kim, Daniel.
- Operative techniques – spine surgery – Vaccaro, Alexander
- Rothman – Simeone the spine – Herkowitz, Harry
- Acute brain and spinal cord injury evolving paradigms and management – Anish Bhardwaj, Dilantha B. Ellegala, Jeffrey R.Kirsch.
- Diseases of the Brain, Head & Neck, Spine - Diagnostic Imaging and Interventional Techniques - J. Hodler, G.K. von Schulthess, Ch.L. Zollikofer.
- Low back pain Pathogenesis and Treatment - Edited by Yoshihito Sakai
- Minimally Invasive Spine Surgery - A Practical Guide to Anatomy and Techniques - Burak Ozgur, Edward Benzel, Steven Garfin
- Nonfusion technologies in spine surgery – Marek Szpalski, Robert Gunzburg, Jean-Charles Le Huec, Marco Brayda-Bruno.
- Pitfalls in Cervical Spine Surgery - Avoidance and Management of Complications - Luca Denaro, Domenico D'Avella, Vincenzo Denaro.
- Reconstruction of Upper Cervical Spine and Craniovertebral Junction - Petr Suchomel, Ondrej Choutka.
- Spinal Trauma: Imaging, Diagnosis, and Management - Schwartz, Eric D.; Flanders, Adam E.
- Core knowledge in Orthopaedics – Alexander R. Vaccaro.
- Surgery for Low Back Pain - Marek Szpalski, Robert Gunzburg, Björn L. Rydevik, Jean-Charles Le Huec, Jean-Charles Le Huec, H. Michael Mayer.

9. List of Journals (Previous three years):

- Seminars in Spine surgery
- The spine journal
- Surgical Neurology

E – Journals:

- Neurology

- Neurology Clinics of North America
- Lancet neurology.