

Curriculum

FNB Fellowship



Spine Surgery

- ◆ Programme Goals and Objectives
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I. PROGRAMME GOALS AND OBJECTIVES

1. Programme Goal

The goal of the Spine Surgery Fellowship is to provide fellows with intensive training and broad exposure in diagnosis and treatment of common spinal disorders, and research. The fellow will learn to evaluate and treat routine and complicated areas of the spine: cervical, thoracic, lumbar, and lumbo-sacral, both surgical and non-surgical methods of treatment.

The Spine Fellowship offers comprehensive exposure to adult and pediatric surgical treatments and procedures including complicated deformities and injuries to the spine, degenerative and arthritic conditions, infections, tumors, metabolic diseases, trauma, and fractures. This Program is geared toward the orthopaedic /NS surgeon who is interested in building a foundation for treating the whole range of surgical spine conditions, including deformity, through the use of the most advanced methods and approaches.

Upon completion of Spine Fellowship, fellows are prepared to build surgical practices, focus more deeply on research, and teach at top academic medical centers and hospitals around the country and the world

Fellowship goal is to develop a spine surgeon capable of recognizing and managing a broad variety of spinal conditions.

- a) Develop a complete spine surgeon capable of critical thinking and recognizing and managing a broad variety of spinal conditions:
 - I. Degenerative conditions
 - II. Deformity
 - III. Tumors and infections
 - IV. Trauma
 - V. Adult and pediatric conditions
 - VI. Injections
- b) Obtain a detailed working understanding of cervical, thoracic, and lumbar anatomy as it pertains to normal anatomy, pathology, and the surgical and non-operative treatment of spinal disorders.
- c) Become familiar and comfortable with the usage of operative techniques of the spine, usage of implants and tools specific to spine surgery, and in the placement of spinal instrumentation in the spine.

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- d) Be exposed to and become skilled in a broad range of surgical skills to treat the spectrum of spinal pathology.
 - e) Learn to completely assess the patient with spinal disorders, including spine specific history taking, physical exam, evaluation of radiographic findings, and an understanding of the results of treatment and diagnostic modalities.

2. Programme Objectives

- a) To acquire the skills necessary to assess and manage patients who present with spine-related complaints.
- b) To be able to easily classify patients into general categories after the initial history and physical examination. Such categories include normals, patients with underlying pathological processes, and symptom amplifiers.
- c) To understand and be able to implement the additional studies necessary to render an accurate diagnosis based on that combination of parameters which would include history, physical examination, plain radiographs, and other laboratory tests and imaging studies.
- d) To develop the patient management skills necessary to easily manage a wide range of pathological patient interactions. Skills necessary to be learned include those needed to defuse the situation encountered with a hostile patient, a manipulative patient, and a patient who is markedly depressed.
- e) To recognize when additional surgical care would be counterproductive to patient rehabilitation.
- f) To develop the skills necessary to plan and perform warranted surgical procedures involving anterior and posterior approaches to the cervical, thoracic, and lumbar spine.
- g) To develop the surgical expertise needed to perform specialized surgery using a variety of implants.
- h) To develop skills as an investigator by designing, implementing, completing, and interpreting retrospective or prospective clinical studies, and in selected situations, basic science research projects.
- i) To thoroughly understand the nature of professional liability involved in the management of patients with spine complaints.
- j) To thoroughly understand the importance of record documentation and risk management.
- k) To exhibit professionalism at all times.

II. TEACHING AND TRAINING ACTIVITIES

The fundamental components of the teaching programme should include:

1. Case presentations & discussion- once a week
2. Seminar – Once a week
3. Journal club- Once a week
4. Grand round presentation (by rotation departments and subspecialties) once a week
5. Faculty lecture teaching- once a month
6. Clinical Audit-Once a Month
7. A poster and have one oral presentation at least once during their training period in a recognized conference

The rounds should include bedside sessions, file rounds & documentation of case history and examination, progress notes, round discussions, investigations and management plan) interesting and difficult case unit discussions.

The training program would focus on knowledge, skills and attitudes (behavior), all essential components of education. It is being divided into theoretical, clinical and practical in all aspects of the delivery of the rehabilitative care, including methodology of research and teaching.

- a) **Theoretical:** The theoretical knowledge would be imparted to the candidates through discussions, journal clubs, symposia and seminars. The students are exposed to recent advances through discussions in journal clubs. These are considered necessary in view of an inadequate exposure to the subject in the undergraduate curriculum.
- b) **Symposia:** Trainees would be required to present a minimum of 20 topics based on the curriculum in a period of two years to the combined class of teachers and students. A free discussion would be encouraged in these symposia. The topics of the symposia would be given to the trainees with the dates for presentation.
- c) **Clinical:** The trainee would be attached to a faculty member to be able to pick up methods of history taking, examination, prescription writing and management in rehabilitation practice.

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- d) **Bedside:** The trainee would work up cases, learn management of cases by discussion with faculty of the department.
- e) **Journal Clubs:** This would be a weekly academic exercise. A list of suggested Journals is given towards the end of this document. The candidate would summarize and discuss the scientific article critically. A faculty member will suggest the article and moderate the discussion, with participation by other faculty members and resident doctors. The contributions made by the article in furtherance of the scientific knowledge and limitations, if any, will be highlighted.
- f) **Research:** The student would carry out the research project and write a thesis/ dissertation in accordance with NBE guidelines. He/ she would also be given exposure to partake in the research projects going on in the departments to learn their planning, methodology and execution so as to learn various aspects of research.

III. SYLLABUS

1. Basic & Applied Sciences

- Anatomy
- Physical Examination
- Examination of Back Pain
- Radiologic Imaging of the Spine
- Diagnostic Evaluations
- General Considerations for Spine Surgery Including Consent and Preparation. General Surgical Principles, Guidelines for Informed Consent, Patient Positioning for Surgery, Equipment Needed, and Postoperative Considerations
- Surgical Approaches
- Cervical and Cervicothoracic Instrumentation
- Lumbosacral Instrumentation
- Bone Graft and Bone Substitute Biology
- Neurological Monitoring in Orthopedic Spine Surgery

2. Cervical Spine

- Closed Cervical Skeletal Tong Placement and Reduction Techniques

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- Halo Placement in the Pediatric and Adult Patient
 - Anterior Odontoid Resection: The Transoral Approach
 - Odontoid Screw Fixation
 - Anterior C1-C2 Arthrodesis: Lateral Approach of Barbour and Whitesides
 - Anterior Cervical Corpectomy/Discectomy
 - Anterior Resection of Ossification of the Posterior Longitudinal Ligament
 - Anterior Cervical Disk Arthroplasty
 - Occipital-Cervical Fusion
 - C2 Translaminar Screw Fixation
 - Posterior C1-C2 Fusion: Harms and Magerl Techniques
 - Lateral Mass Screw Fixation
 - Cervical Pedicle Screw Fixation
 - Posterior Cervical Osteotomy Techniques
 - Posterior Cervical Laminoplasty

3. Thoracic Spine

- Anterior Thoracic Discectomy and Corpectomy
- Anterior Thoracolumbar Spinal Fusion via Open Approach for Idiopathic Scoliosis
- Operative Management of Scheuermann's Kyphosis
- Resection of Intradural Intramedullary or Extradural Spinal Tumors
- Endoscopic Thoracic Discectomy
- VEPTR Opening Wedge Thoracostomy for Congenital Spinal Deformities
- Posterior Thoracolumbar Fusion Techniques for Adolescent Idiopathic Scoliosis
- Thoracoplasty for Rib Deformity
- Complete Vertebral Resection for Primary Spinal Tumors

4. Lumbar Spine

- Sacropelvic Fixation
- Posterior Disk Herniation
- The Lateral Extracavitary Approach for Vertebrectomy
- Osteotomy Techniques (Smith-Petersen and Pedicle Subtraction) for Fixed Sagittal Imbalance
- Spondylolysis Repair
- Surgical Treatment of High-Grade Spondylolisthesis
- Interspinous Process Motion-Sparing Implant

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- Anterior Lumbar Interbody Fusion
 - Transforaminal Lumbar Interbody Fusion
 - Transposas Approach for Thoracolumbar Interbody Fusion
 - Lumbar Total Disk Arthroplasty
 - Kyphoplasty
 - Minimally Invasive Exposure Techniques of the Lumbar Spine
 - Hemivertebrae Resection
 - Lumbar Internal Laminectomy
 - Minimally Invasive Presacral Retroperitoneal Approach for Lumbosacral Axial Instrumentation

5. **Miscellaneous**

- Spinal Cord and Nerve Root Monitoring
- Bone Grafting and Spine Fusion
- Medical Complications in the Adult Spinal Patient
- Trunk Range of Motion and Gait Considerations in Patients with Spinal Deformity

6. **Biomechanics**

- General Considerations of Biomechanical Testing
- Basic Pedicle Screw and Construct Biomechanics.
- Biomechanics of Three-Dimensional Scoliosis Correction
- Treatment Considerations and Biomechanics of the Lumbosacral Spine

7. **Spinal Anatomy**

- Normal Sagittal Plane Alignment
- Microscopic Approach to the Posterior Lumbar Spine for Decompression
- Minimal Access Techniques Using Tubular Retractors for Disc Herniations and Stenosis
- Anterior Cervical approaches
- Jaw-Splitting Approaches to the Upper Cervical spine
- The Modified Anterior Approach to the Cervicothoracic Junction
- Transsternal Approaches to the thoracic spine
- Anterior Exposure of the Thoracic and Lumbar Spine Down to L4
- Anterior Approaches to the Distal Lumbar Spine and Sacrum
- Direct Lateral Approach to the Lumbar Spine

8. Spinal disorders

- Cervical State of the Art Evaluation of Axial Neck Pain. Who is a Surgical Candidate and Who Isn't:
- How to Manage the Nonoperative Treatment, How to Work Up the Pathology
- Cervical Radiculopathy: Clinical Evaluation and Nonoperative Treatment
- Cervical Spondylosis and Radiculopathy
- Cervical Myelopathy
- Foramen Magnum Decompression disorders
- Revision Cervical Spine disorders
- Thoracic and Lumbar Degenerative Disorders
- Evaluation of Thoracic and Lumbar Axial Back Pain
- Evaluation of Thoracic and Lumbar Radicular Pathology. Who Is a Surgical Candidate and Who is not
- Use of Discography to Evaluate Lumbar Back Pain with an Eye Toward Surgical Treatment
- Revision Laminectomy
- Techniques for Dural Repair
- When to Consider ALIF, TLIF, PLIF, PSF, or
- Motion-Preserving Techniques
- Motion-Preservation Techniques (Other Than Disc Arthroplasty)
- Transforaminal Lumbar Interbody Fusion/Posterior Lumbar Interbody Fusion
- Spondylolisthesis
- Sacro-Pelvic Morphology, Spino-Pelvic Alignment, and Spinal Deformity Study Group Classification
- Scoliosis
- Adult Spinal Deformity
- Dysplastic and Congenital Deformities
- Spinal Dysraphism – Embryology, Pathology, and Treatment
- Thoracic Insufficiency Syndrome
- Congenital Anomalies of the Cervical Spine in Children:
- Paralytic and Neuromuscular Scoliosis
- Kyphosis and Postlaminectomy Deformities
- Ankylosing Spondylitis/Thoracolumbar Deformities
- Cervicothoracic Extension Osteotomy for Chin-On-Chest Deformity
- The Role of Osteotomies in the Cervical Trauma
- Spinal trauma – cervical, thoracic and lumbar

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- Tumor and Osteomyelitis
 - Neurological Complications
 - Reconstruction of Complex Spinal Wounds
 - Vascular Complications
 - Postoperative Early and Late Wound/Implant Infections
 - Cerebrospinal Fluid Fistula and Pseudomeningocele
 - Pseudarthrosis in Spinal Deformity Surgery
 - Legal Implications and Unresolved Postoperative Spine Pain
 - Medical Complications Associated with Spinal Surgery
 - Syringomyelia
 - Computed tomography (CT)-based navigation
 - Fluoroscopy-based navigation
 - Fluoroscopic 3-D navigation .
 - Interspinous devices
 - Degenerative/rheumatic disorders and deformities

9. Surgical instruments and implants

- Anaesthesia and positioning
- Surgical technique
- Postoperative management
- Errors, hazards, and complications
- Treatment principles in rheumatoid instability of the cervical spine

10. Biomechanical characteristics of different non-fusion methods

- Dynamic stabilization system (Dynesys) versus rigid fixators
- Interspinous implants (X-Stop, Coflex, Wallis, Diam)
- Total posterior-element replacement system (TOPS)
- Total disc prostheses
- Prosthetic disc nucleus (PDN)
- Tissue engineered collagen matrix nucleus replacement
- Biostatistics, Research Methodology and Clinical Epidemiology

IV. COMPETENCIES

1. Academic Career Training

In addition to clinical care and research, Fellows develop strong teaching and organizational skills necessary to participate in an academic career. To this end, Fellows work closely with Residents on the Service to coordinate patient care. The Fellows—along with an Attending Surgeon—conduct monthly sessions in psychomotor skills to instruct Residents and physician assistants in operative techniques. Fellows also prepare literature for these sessions. Techniques for running a practice are taught by observing Attendings during office hours and through a series of practice management sessions. Academic Career Training. In addition to clinical care and research, the Fellow develops strong teaching and organizational skills necessary to participate in an academic career

2. Learning

The fellow presents all pre-and post-operative cases from the previous and upcoming week in a PowerPoint presentation. All faculty members participate and critically analyze each case with attention directed toward proper indications, treatment and coding. Every implant is critically reviewed and spinal alignment and balance are critiqued.

Each fellow will have the opportunity

- Make a number of case presentations.
- Reading textbooks and articles
- Assistance in the operating room
- Participation in the clinic
- Participation in pre operative discussions
- Participation in research projects
- Writing article in journals
- Assistance in Training & Education, participating in conferences, CME, Seminars

During two year-long program, Fellows develop in-depth experience in the surgical and non surgical management of complex spinal disorders of the cervical, thoracic and lumbar spine. This includes spinal deformity, trauma, tumors and degenerative diseases in adults and children.

Each Fellow works closely with Attending surgeons as well as Residents and assisting in the diagnosis, treatment, and management of a multitude of conditions affecting the spine.

3. Teaching

The fellow and resident on the spine service give a monthly talk on various spinal disorders to the orthopaedic surgery residents.

4. Research

The fellows are required to complete at least one publishable research project. They work with our research coordinator and individual attending. They may participate in clinical or basic science research projects. They are encouraged to submit and present their work at national and international meetings.

V. LOG BOOK

A candidate shall maintain a log book of operations (assisted / performed) during the training period, certified by the concerned post graduate teacher / Head of the department / senior consultant. This log book shall be made available to the board of examiners for their perusal at the time of the final examination.

The log book should show evidence that the before mentioned subjects were covered (with dates and the name of teacher(s) The candidate will maintain the record of all academic activities undertaken by him/her in log book.

1. Personal profile of the candidate
2. Educational qualification/Professional data
3. Record of case histories
4. Procedures learnt
5. Record of case Demonstration/Presentations
6. Every candidate, at the time of practical examination, will be required to produce performance record (log book) containing details of the work done by him/her during the entire period of training as per requirements of the log book. It should be duly certified by the supervisor as work done by the candidate and countersigned by the administrative Head of the Institution.
7. In the absence of production of log book, the result will not be declared.



आयुर्विज्ञान में राष्ट्रीय परीक्षा बोर्ड
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