



Curriculum

FNB Fellowship

2025



Paediatric Orthopaedics

- ◆ Introduction
- ◆ Objectives of the Programme
- ◆ Teaching and Training Activities
- ◆ Syllabus
- ◆ Log Book
- ◆ Recommended Textbooks and Journals



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1. INTRODUCTION

The field of paediatric orthopaedics has seen a major breakthrough and is evolving rapidly. However still in our country there exists a huge gap between the requirement and availability of qualified, experienced, and dedicated paediatric orthopaedic surgeons. In order to bridge this gap, it is imperative that super specialty training programs in paediatric Orthopaedics care be initiated in India dedicated to care of musculoskeletal (bone, joint, back, or muscle) problems in children upto 18years of age.

2. OBJECTIVES OF THE PROGRAMME

- a. The program is intended to provide state of the art speciality expertise (diagnostic, medical, surgical, teaching and research) in children's Orthopaedic problems in a holistic, comprehensive manner for the growing child.
- b. It encompasses the cognitive component and its direct utilization, appropriately combined with the psychomotor skills in the care of a child with Orthopaedic problems.
- c. The program intends to groom the personality of the specialist as the one having the best of soft skills to connect and comfort the child and his/her family while treating the clinical condition.
- d. It is also intended to provide the experience and expertise in recognizing the rare illnesses and their management, which is customized for each patient.
- e. The program includes advanced research training in the subject and a constant studentship in the subject.
- f. Learning professionalism and teaching the undergraduate and post graduate Orthopaedics students are integral parts of the program.

3. TEACHING AND TRAINING ACTIVITIES

The Fellow will be directly mentored by course director and the responsibility of



the course exposure lies entirely with the hospital and the course director.

The academic program should include the following:

- a) Journal Club & critical appraisal: This would be a weekly academic exercise. Candidate will be expected to select articles for presentation from reputed Paediatric Orthopaedics journals and discuss their suitability for presentation with the moderator.
- b) Faculty Lecture
- c) Case presentations (List of suggested cases)

Long Cases	Short Cases
1) DDH	1) Cubitus Varus
2) TB Hip	2) Non-Union Fracture Lateral Condyle Humerus
3) Potts Paraplegia	3) Clubfoot
4) Scoliosis	4) Genu Valgus/ Varus
5) Perthes Disease	5) Osteomyelitis/ Non-union long Bones
6) Neglected Clubfoot	6) VIC

- d) Seminars
- e) Audit of the surgical cases which were operated in the department/unit will be presented per month and critical events during perioperative period discussed.
- f) ATLS & Basic Trauma Course certification is mandatory during the course.
- g) Poster/Paper presentation in State chapter /National/international conference – **at least one** during the course.
- h) Attendance in one State Chapter /National/ International Paediatric



Orthopaedic conference or Orthopaedic Conference with Paediatric Orthopaedics session - per year is mandatory. Representation in more than 1 educational activity will be encouraged.

- i) The student would be required to present at least 24 case discussions and 12 symposia at his/her department during the course.

4. SYLLABUS

1st YEAR

GROWTH AND DEVELOPMENT

- Normal Growth and Development
- Growth and Developmental Disorders
- Evolution of Proportionate Body Size
- Physical Growth and Developmental Milestones.

ORTHOPAEDIC HISTORY TAKING

- Chief Complaint, History of Present Illness Family History, Birth History
- History of Growth and Development.

ORTHOPAEDIC EXAMINATION OF PEDIATRIC PATIENT

- Recognizing Deformities, Joint Range of Motion
- Muscle Strength, Neurologic Assessment
- Screening Examinations – New-born and Childhood the Focused Examination.

BACK PAIN

- History and Physical Examination
- Diagnostic Studies, Differential Diagnoses.



IMAGING IN PEDIATRIC ORTHOPAEDICS

- Conventional Radiographic Procedures
- Normal Radiographic Variants of the Immature Skeleton
- Radiographic Techniques
- CT, MRI, Nuclear imaging etc.

DEVELOPMENTAL DYSPLASIA OF THE HIP

- Definition, Etiology and Pathophysiology
- Natural History
- Clinical Presentation
- Imaging Studies
- Screening Criteria
- Treatment according to age
- Complications
- Reconstructive Procedures for Dysplasia
- Teratologic Dislocation of the Hip.

LEGG-CALVÉ-PERTHES DISEASE

- Definition, History, Etiology and Pathology
- Clinical Presentation
- Imaging Studies
- Classification Systems
- Differential Diagnosis
- Treatment
- Long-Term Prognosis.

SLIPPED CAPITAL FEMORAL EPIPHYSIS



- Incidence and Epidemiology
- Classification, Etiology and Pathology
- Clinical Features
- Imaging Studies
- Treatment
- Complications
- Long-Term Outcome

DISORDERS OF THE FEMUR

- Femoral Anteversion
- In-toeing

DISORDERS OF THE PERIPHERAL NERVOUS SYSTEM

- Hereditary motor and sensory neuropathies
- Sciatic Nerve Palsy
- Peroneal Nerve Palsy.

ARTHRITIS

- Joints and synovial fluid
- Juvenile Rheumatoid Arthritis
- Spondyloarthropathies
- Acute Transient Synovitis of the Hip
- Neuropathic Arthropathies
- Tuberculous Arthritis.

GENERAL PRINCIPLES OF ORTHOPAEDIC INJURIES

- Unique Properties of the Immature Skeleton
- Care of the Multiply Injured Child



- Open Fractures
- Compartment Syndrome
- Vascular Injuries
- Casts
- Child Abuse/Non accidental trauma

LOWER EXTREMITY INJURIES

- Pelvic and acetabular fractures
- Hip dislocations
- Femur fractures
- Knee injuries
- Leg & Ankle fractures
- The Foot – Tarsal / Lisfranc / Metatarsal injuries.

GAIT ANALYSIS

- Phases of Gait Temporal Parameters
- Neurologic Control of Gait and its function
- Gait Energy and kinematics
- Muscle Activity Kinetics
- Pedobarography
- Pathologic Gait
- Gait Analysis Laboratories

LIMP IN A PEDIATRIC PATIENT

- Abnormal Gait Patterns in Children
- Differential Diagnosis of Limping in Child
- Special Considerations Based on Age Group



ANESTHESIOLOGY

- Preoperative Evaluation of Children
- Sedation for the Pediatric Patient by Non-Anesthesiologists
- Acute Pain Management
- Post-operative pain management in children
- Regional Analgesia
- Strategies to Reduce Blood Transfusions

DISORDERS OF THE UPPER EXTREMITY

- Principles of Dressing and Splinting
- Principles of Reconstruction
- Congenital Anomalies
- Infections
- Obstetric Brachial plexus palsy
- Tumors of the Upper Limb
- Microsurgery.

DEVELOPMENTAL COXA VARA

- Epidemiology
- Clinical Features
- Radiographic Findings
- Pathophysiology
- Biomechanics
- Treatment.

DISORDERS OF THE KNEE

- Congenital Dislocation



- Patellofemoral Instability
- Discoid lateral meniscus
- Osgood-Schlatter disease
- Osteochondritis dissecans
- Genu Recurvatum
- Popliteal Cysts.

DISORDERS OF THE LEG

- Genu Varum
- Genu Valgum
- Tibial Torsion
- Bowing of tibia
- Congenital Pseudarthrosis of the Tibia and/or Fibula
- Hemimelia

DISORDERS OF THE FOOT

- Normal Variations
- Osteochondroses
- Congenital Deformities
- Neurogenic Abnormalities
- Toe Deformities

DISORDERS OF THE BRAIN

- Cerebral Palsy
- Definition, Etiology, Epidemiology
- Classification, Diagnosis
- Involvement of lower limb/ upper limb
- Spine involvement



- Gait analysis
- Pharmacologic therapy, Surgical management
- Physical therapy and rehabilitation
- Long term prognosis
- Ataxia Syndromes
- Basal Ganglion Syndromes
- Rett's syndrome
- Hereditary Spastic Paraparesis.

DISORDERS OF THE SPINAL CORD

- Myelomeningocele
- Dystrophic Syndromes
- Spinal Muscular Atrophy.

METABOLIC AND ENDOCRINE BONE DISEASES

- Nutritional Rickets Neonatal Rickets
- Vitamin D-Resistant Rickets
- Miscellaneous Forms of Rickets
- Renal Osteodystrophy
- Hyper and hypo-parathyroidism
- Pseudohypoparathyroidism
- Scurvy
- Hypervitaminosis A, D
- Hypothyroidism
- Hypophosphatasia
- Pituitary dwarfism
- Idiopathic juvenile osteoporosis



- Osteogenesis Imperfecta.

BONE AND JOINT INFECTION

- Acute / Chronic Osteomyelitis
- Septic Arthritis
- Tubercular arthritis
- TB spine

HEMATOLOGIC DISORDERS

- Hemophilia

MUSCULOSKELETAL TUMORS

- General Principles of Tumor Management

BENIGN MUSCULOSKELETAL TUMORS

- Simple Bone Cyst
- Aneurysmal Bone Cyst
- Fibrous Dysplasia
- Osteofibrous Dysplasia of the Tibia and Fibula (Campanacci's Disease)
- Solitary Osteochondroma and Hereditary Multiple Exostoses
- Solitary Enchondroma
- Multiple Enchondromatosis (Ollier's Disease and Maffucci's Syndrome)
- Chondroblastoma
- Chondromyxoid Fibroma
- Osteoid Osteoma
- Osteoblastoma
- Histiocytosis X (Langerhans' Cell Histiocytosis)
- Nonossifying Fibroma and Fibrous Cortical Defect
- Primary Synovial Chondromatosis
- Pigmented Villonodular Synovitis
- Giant- Cell Tumor of the Tendon Sheath
- Dysplasia Epiphysealis Hemimelica (Trevor's Disease)



SPINAL INJURIES

- Cervical Spine Injuries
- Thoracic Spine Injuries
- Lumbar Spine Injuries

UPPER EXTREMITY INJURIES

- Clavicle fracture, Acromioclavicular Joint disruptions
- Scapula fracture
- Proximal Humerus fracture
- Shaft of Humerus fracture
- Elbow fractures (supracondylar, intercondylar, lateral condyle, medial epicondyle, olecranon, dislocation, proximal radius)
- Forearm fractures (Monteggia, radius & ulna, isolated radius & ulna, distal radius & ulna).
- Carpal injuries
- Metacarpals and Phalanges fractures

POLYTRAUMA MANAGEMENT

- Principles of ATLS
- Early total care
- Systemic inflammatory response syndrome
- ICU care basics
- Emergency surgical stabilization of fractures
- Taking care of open injuries

LIMB LENGTH DISCREPANCY

- Leg Length Inequality: Etiology, assessment, and treatment considerations
- Principles of Angular Deformity Correction in Children.



OPERATIVE PROCEDURES- Hands-on Skills

- Humerus Fracture: Reduction and Fixation with Elastic Nail
- Radial Head/Neck Fracture: Percutaneous /Open Reduction
- Forearm Fractures: Intramedullary nailing
- Digital Syndactyly Release
- Lateral Humeral Condyle Fracture: Fracture fixation including Open/Closed Reduction and Pinning.
- Forearm Fractures: Closed Treatment
- Closed Reduction and Pinning of Distal Radius Fractures
- Femur Fracture: Closed Reduction and Spica Cast
- Ponseti Method for Idiopathic Clubfoot Deformity
- Botulinum toxin administration in CP
- TA tenotomy
- Open TA lengthening
- Gastrosoleus lengthening
- Sequestrectomy in chronic osteomyelitis
- Drainage and lavage of septic joint
- Core biopsy for MSK tumors
- Supracondylar fracture percutaneous pinning
- Femur Fracture: Flexible Intramedullary Nailing
- Guided Growth - Hemiepiphysiodesis
- Femoral Lengthening with External Fixation
- Greater Trochanteric Transfer
- Submuscular Plating/Elastic nailing for Pediatric Femur Fractures
- Cerebral Palsy: Hamstring Lengthening
- Operative Treatment of Tillaux Fractures of the Ankle/Triplane Fractures



2nd YEAR

MALIGNANT MUSCULOSKELETAL TUMORS

- Osteogenic Sarcoma Parosteal Sarcoma
- Chondrosarcoma
- Ewing's Sarcoma
- Fibrosarcoma
- Soft tissue sarcoma
- Metastatic Tumors (Neuroblastoma, Wilm's)
- Synovial Sarcoma

SKELETAL DYSPLASIAS

- Achondroplasia and Hypochondroplasia
- Multiple Epiphyseal Dysplasia (MED)
- Diastrophic Dysplasia
- Mucopolysaccharidoses
- Spondyloepiphyseal dysplasia
- Melorheostosis
- Metaphyseal Chondrodysplasia
- Idiopathic Juvenile Osteoporosis
- Pyknodysostosis
- Osteopetrosis
- Progressive Diaphyseal Dysplasia
- Cleidocranial Dysostosis
- Osteogenesis imperfecta
- Infantile Cortical Hyperostosis.

DISORDERS OF THE NECK



- Developmental Anatomy, Characteristics of pediatric cervical spine
- Congenital Torticollis
- Cervical Deformity with Pain, Acquired Torticollis
- Cervical Kyphosis
- Cervical Instability.

SCOLIOSIS

- Definition
- Classification of Scoliotic Curves
- Idiopathic Scoliosis: Adolescent / Infantile / Juvenile
- Congenital Spinal Deformities
- Other Causes of Scoliosis – neurofibromatosis
- Management and Complications.

KYPHOSIS

- Postural Kyphosis
- Scheuermann's Disease

Neglected/Untreated conditions

- Old, untreated hip dislocation
- Old, untreated elbow dislocation
- Neglected clubfoot
- Non-union lateral condyle Humerus
- Neglected physal injuries with deformity of wrist, elbow, knee and ankle
- Neglected /untreated scoliosis, kyphosis

OTHER ANATOMIC DISORDERS OF THE SPINE

- Spondylolisthesis
- Lumbar Disk Herniation



- Slipped Vertebral Apophysis
- Transitional Vertebra (Bertolotti's) Syndrome.

POLIOMYELITIS

- Etiopathogenesis
- Treatment: Acute, convalescent and sequelae
- Management of specific deformities: hip, knee, ankle and foot, trunk, shoulder, elbow and forearm.

MUSCLE DISEASES

- Muscular Dystrophies
- Myotonic Dystrophy
- Myasthenia Gravis
- Metabolic diseases of muscle
- Polymyositis and dermatomyositis
- Pyomyositis
- Miscellaneous Muscle Diseases.

ORTHOPAEDIC RELATED SYNDROMES

- Marfan's syndrome
- Stickler's syndrome
- Congenital Contractural Arachnodactyly
- Homocystinuria
- Nail-Patella syndrome
- Larsen's Syndrome
- Apert's Syndrome
- Down's Syndrome
- Neurofibromatosis
- Fibrodysplasia Ossificans Progressiva



- Ehler's Danlos Syndrome
- Gaucher's Disease
- Arthrogryposis Multiplex Congenita
- Freeman-Sheldon (Craniocarpotarsal dysplasia)
- Cornelia de Lange's syndrome
- Rubinstein-Taybi syndrome
- Otopalatal Digital syndrome
- Proteus syndrome
- Klippel-Trenauney syndrome
- Metatrophic Dwarfism
- Camptomelic dwarfism
- Ellis-Van Creveld syndrome

LIMB DEFICIENCIES

- Normal limb development – Embryology and genetics
- Classification of limb deficiencies
- Congenital upper and lower limb deficiencies
- Acquired limb absences
- Multilimb deficiencies
- Management: general concepts of prosthetics and specific considerations.

OPERATIVE PROCEDURES- Hands on Skills

- Hip arthrography
- Adductor tenotomy hip
- Hip Spica cast under General Anaesthesia for DDH
- Open reduction of DDH
- Surgical correction of Sprengel's Deformity



- Shoulder secondary procedures for Brachial Plexus Birth Palsy
- Tendon transfers in Obstetric brachial plexus injuries
- Centralization in radial club hand
- Innominate Osteotomies in DDH
- Legg-Calve-Perthe's disease : Femoral osteotomy in LCPD
- Shelf acetabuloplasty
- Percutaneous pinning SCFE
- Surgical hip dislocation with modified Dunns procedure in SCFE
- Tibial/ Femoral Lengthening with External Fixator systems
- OGI- Multiple Osteotomy with Intramedullary Rod Fixation
- Arthroscopic ligament reconstructions of knee
- Arthroscopic assisted fracture fixations of knee and ankle
- Osteochondritis Dissecans Fixation
- Resection of Talocalcaneal/ Calcaneonavicular Tarsal Coalition
- Osteotomies of the Foot for Cavus Deformities
- Osteotomy for the Correction of Valgus Foot Deformities
- Operative fixation of pediatric pelvic fractures
- Operative fixation of pediatric spine fractures / Scoliosis correction
- Operative management of pediatric spine tuberculosis
- Correction of secondary spine deformities in infections/syndromes/metabolic conditions
- PMSTR in clubfoot
- JESS fixator in clubfoot
- Operative management of pediatric limb deficiencies.
- Tibialis Posterior Tendon Transfer
- Split Transfer of the Tibialis Anterior Tendon
- Patellar Instability: MPFL reconstruction/tibial tubercle osteotomy



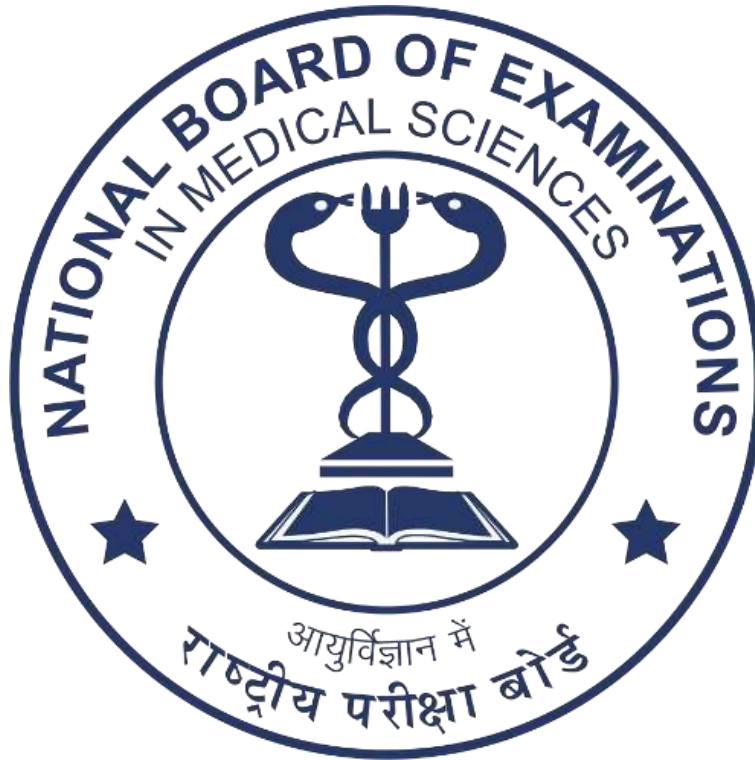
- Cerebral Palsy: Distal Rectus Femoris Transfer

5. LOG BOOK

- The student will maintain a “log book” of all the cases and procedures done. The student will also keep a record of seminars, journal clubs, and clinical meetings performed by him in the logbook.
- Entry of all surgical cases assisted/performed (routine and emergency)
- The entry in the logbook should include: name, age, gender, surgical procedure, any special technique used or finding, if present, should be detailed.

6. RECOMMENDED TEXTBOOKS AND JOURNALS

- Lovell & Winters Pediatric Orthopaedics
- Tachdjians Pediatric Orthopaedics
- Principles of deformity correction - by Dror Paley
- Campbells Operative Orthopaedics
- Rockwood & Wilkins fractures in children
- Journal of Pediatric Orthopaedics
- Journal of Pediatric Orthopaedics-B
- Journal of Children’s Orthopaedics
- Indian Journal of Orthopaedics
- Orthopedic Clinics of North America.



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