



Curriculum

FNB Fellowship

2025



Paediatric Radiology

- ♦ Introduction
- ♦ Program Objectives
- ♦ Teaching and Training Activities
- ♦ Syllabus
- ♦ Log Book
- ♦ Recommended Textbooks and Journals



This page has been intentionally kept blank.



INDEX

S. No	Contents	Page No.
1.	Introduction	5
2.	Program Objectives	5
3.	Teaching & Training Activities	6
4.	Syllabus	7
5.	Log Book	10
6.	Recommended Textbooks And Journals	10



This page has been intentionally kept blank.



1. INTRODUCTION

The Paediatric Radiology Fellowship is a two-year advanced training program in clinical and research to prepare a fellow to bring diagnostic and interventional paediatric radiology expertise for an academic and specialty practice.

Paediatric Radiology is an upcoming subspecialty in the field of radiology for the diagnosis of various disease entities in infants and children. As the paediatric disease entities are significantly different from those in adults; the pathologies in adults cannot be extrapolated to children.

Moreover; neonatal medicine is a completely different sub-specialty; with unique problems of the neonates which needs diagnostic expertise of the radiologist. Paediatric medicine and surgery are ever-growing in their domain; with establishment of various sub-specialties (for example; paediatric neurology, paediatric pulmonology, paediatric nephrology, paediatric gastroenterology, paediatric endocrinology; genetics; neonatology; paediatric urology etc.).

Radiologists also need to keep pace with the advancement in knowledge. As accurate diagnosis is crucial for adequate management; development of paediatric subspecialty without a skilled paediatric Radiologist to provide an accurate and timely diagnosis is likely to face significant hindrance. The interventions in paediatric and neonatal ICUs require a high level of technical skill and expertise.

Thus, there is a growing need to start a fellowship in Paediatric diagnostic imaging and interventional radiology in order to create a core of dedicated young professionals equipped to provide expert diagnosis and minimally invasive procedures to provide quality patient care, education and research. In India, Paediatric radiology is practiced primarily as part of general radiology practice. There are only limited fellowship programs for dedicated paediatric Radiology training at present in India. It is therefore strongly desirable to start a dedicated fellowship program in this field.

2. PROGRAMME OBJECTIVES

To train fellowship students in clinical, diagnostic, and basic interventional paediatric radiology so as to enable them to make imaging diagnoses independently of all paediatric diseases and perform basic interventions in children and neonates, thus improving patient care. The structured training program would emphasize:



- on becoming conversant with advanced interpretation of all paediatric imaging modalities including radiography, sonography, CT-scan (including Dual-energy CT), MRI, fluoroscopy and DSA.
- Perform various procedures such as barium/dye studies, enema, voiding cysto-urethrography, genitogram etc.
- Perform and interpret ultrasound for various indications in children including familiarity with equipment, technical factors and various techniques.
- Interpret MRI examination of various diseases affecting children.
- To perform various paediatric interventional procedures such as USG guided biopsy and drainage procedures.
- Evidence-based decision-making.
- Development of desired technical expertise with emphasis on safety.
- Development of appropriate communication skills.
- Development of efficient interdisciplinary collaboration.
- Use of research methodology and skills in conducting clinical and experimental studies.
- The candidates would also be trained for the following:
 - Understand ethical issues in human research
 - Perform independently a research project and publish a scientific paper in an indexed journal.

3. TEACHING AND TRAINING ACTIVITIES

Academic Training:

Teaching Rounds	2 per week
Journal Club	1 per month
Seminar	1 per month
Clinical Case Discussion	1 per week
Pathology Meeting	2 per month
Research Review	1 per 3 months
Clinico-Radiological Meeting	6 per month

Clinical Training:

1. USG & guided interventions	5 months
2. Fluoroscopic Procedures	3 months
3. CT & guided interventions	4 months



4. MRI	4 months
5. DSA	1 month
6. Radiographs	3 months
7. Misc (NICU, Nuclear med, PICU, casualty)	2 months
8. Elective	1 month
9. Paediatrics & Paediatric Surgery (OPD imaging)	1 month

The fellow will work as a part of the paediatric imaging and interventional radiology services. The clinical training will involve patient evaluation and management of both indoor and outdoor patients, including the intensive care units.

4. COURSE SYLLABUS

Diagnostic Radiology:

Candidates will acquire an overall knowledge in Paediatric Radiology by reading standard textbooks, monographs and peer reviewed journals. A core syllabus is recommended but it does not purport to be either comprehensive or restrictive.

Anatomy and Pathophysiology

- Imaging anatomy of the brain
- Anatomy of head and neck, with special consideration of neonatal and childhood airway anatomy
- Anatomy of thorax: surgical and radiological; with emphasis on embryology
- Cardiac anatomy; their imaging counterparts
- Cardiac physiology and embryology
- Anatomy of bowel, liver, biliary tract, pancreas and other abdominal structures: Surgical and Radiological
- Functions of bowel, liver, biliary tract and pancreas
- Basics of urogenital tract anatomy and embryological development
- Disorders of development of upper and lower urinary tract, genitourinary system in male and females
- Physiology of adolescence; disorders of sexual development
- Basics of intersex disorders
- Basic paediatric musculoskeletal anatomy

Diagnostic Techniques:



- Conventional techniques: plain radiographs, Barium studies like MCU, RGU, Invertogram, evaluation of Hirshprung's disorder, TOF
- Ultrasound with Doppler and optionally US Elastography, use of sonographic contrast media
- Transcranial sonography; spinal sonography
- Computed Tomography including advanced applications like virtual bronchoscopy, CT enterography, CT angiography
- Training in paediatric protocols with focus on radiation safety
- Magnetic Resonance Imaging including advanced applications like MR Enterography, MRCP, Diffusion weighted MRI, MR angiography, MR spectroscopy, functional brain MRI, Perfusion MRI
- Training in abbreviated protocols to reduce imaging time under GA
- Per-operative cholangiography
- Intraoperative Ultrasound

Radiological & Imaging Evaluation:

Brain

- Congenital anomalies of development
- Infections
- Imaging in seizures
- Leukodystrophies and other white matter disorders
- Neoplastic lesions
- Pituitary and parasellar lesions
- Functional MRI of brain
- Transcranial sonography, sonography of spine

Head and neck

- Congenital anomalies of branchial arch development
- Congenital anomalies involving the orbits
- Salivary gland pathologies
- Infections
- Thyroid pathologies in children and adolescents
- Cystic lesions of head and neck and vascular malformations
- Neoplastic lesions: head and neck including the orbits

Thorax

- Congenital malformations of the lung, including mediastinal cysts



- Imaging in respiratory distress in the newborn: medical and surgical
- Imaging in surgical conditions of paediatric chest
- Infections: immunocompetent and immunocompromised children
- Diffuse lung Diseases in neonates and children
- Paediatric lung masses, mediastinal and chest wall masses
- Anomalies of diaphragm
- Pleural diseases

Hepatobiliary system

- Diffuse liver diseases
- Focal liver Lesions: inflammatory, benign and malignant tumors
- Causes of obstructive jaundice in neonate and children
- Congenital disorders of biliary tree
- Inflammatory and neoplastic pathologies of paediatric biliary tree

Pancreas

- Congenital
- Inflammatory- Acute & chronic Pancreatitis, Autoimmune Pancreatitis
- Neoplasms: Carcinoma, Neuroendocrine tumors, Cystic tumors

Gastrointestinal system

- Congenital anomalies of upper and lower GIT
- Radiological evaluation of upper and lower GI obstruction in neonate and children
- Radiological evaluation of constipation in children
- Hirschsprung's disease
- Lower GI bleed in children
- Inflammatory lesions
- Anorectal malformations

Genitourinary system

- Congenital anomalies of upper and lower urogenital system
- Radiology in intersex disorders
- Inflammatory lesions
- Neoplastic lesions

Endocrinology and adolescent imaging



- Ultrasonographic evaluation of changes in uterus and ovaries in puberty
- Bone age estimation
- Disorders of pubertal development: precocious and delayed puberty
- Congenital anomalies of uterus and ovaries
- Imaging in undescended testis
- Abnormalities of adrenals and pituitary in children
- Polycystic ovarian disease

Musculoskeletal system

- Skeletal dysplasias: approach and diagnostic algorithm
- Trauma to the growing skeleton
- Inflammatory arthropathies: radiograph, USG and MRI
- Paediatric bone and soft tissue tumors
- Non-accidental injuries of childhood

5. LOG BOOK

A candidate shall maintain a log book of procedures (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 previously 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 the logbook.

- 1) Personal profile of the candidate
- 2) Educational qualification/Professional data
- 3) Record of case histories
- 4) Procedures learnt
- 5) Record of case Demonstration/Presentation
- 6) Every candidate, at the time of practical examination, will be required to produce the 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 a log book, the result will not be declared.
- 8) Presentations in conferences, manuscripts submitted, accepted



6. RECOMMENDED BOOKS & JOURNALS

- 1) Caffey's paediatric diagnostic imaging: Brian D Coley; 12th Edition (Elsevier)
- 2) Paediatric Imaging: the fundamentals. Lane F Donnelly. 1st edition (Saunders)
- 3) Paediatric neuroimaging. James A Barkovich (Lippincott Williams Wilkins)
- 4) Paediatric Neuroradiology. Paolo Tortori-Donati and Andrea Rossi; 2005 (Springer)
- 5) Magnetic resonance imaging of the brain and spine. Scott W Atlas. 4th Edition. (Lippincott Williams Wilkins)
- 6) Fetal and perinatal skeletal dysplasias: an atlas of multimodality imaging. Christine M Hall, Amaka C Offiah, et al. 2012 (Radcliffe publishing)
- 7) Practical imaging, paediatric genitourinary. Hank Baskin. (Practical imaging)
- 8) Textbook of Radiology and Imaging by David Sutton (Churchill Livingstone).
- 9) Diagnostic Radiology by Grainger & Allison's (Churchill Livingstone).
- 10) Radiology Review Manual by Wolfgang Dahnert (Lippincott Williams & Wilkins).
- 11) Clinical imaging. An atlas of differential diagnosis by Ronald L Eisenberg (Lippincott Williams & Wilkins).

JOURNALS

1. Paediatric Radiology
2. American Journal of Roentgenology
3. Radiographics
4. Radiology
5. Journal of Magnetic Resonance Imaging
6. Applied Radiology
7. Indian Journal of Radiology and Imaging
8. Radiology Clinics of North America
9. Journal of Computer Assisted Tomography



10. British Journal of Radiology
11. Journal of Radiology Case Reports
12. European Journal of Radiology
13. Diagnostic and Interventional Radiology
14. Investigative Radiology
15. Journal of Vascular and Interventional Radiology
16. Seminars in Interventional Radiology
17. Seminars in ultrasound, CT and MRI
18. Indian journal of Paediatrics
19. Indian Paediatrics



**NATIONAL BOARD OF EXAMINATIONS IN MEDICAL
SCIENCES**

**Ministry of Health & Family Welfare, Govt. of India
Medical Enclave, Ansari Nagar, New Delhi- 110029**