

Paediatric Radiology Rapid Reporting for FRCR Part 2B

Michael Paddock
Amaka C. Offiah

 Springer

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Michael Paddock
Sheffield Teaching Hospitals
Sheffield
UK

Amaka C. Offiah
Academic Unit of Child Health
Department of Oncology and Metabolism
University of Sheffield
Sheffield
UK

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*To Vaughan—for your unwavering faith,
support and unconditional love*

MP

To my husband and children—you know why

ACO

Foreword

I was delighted to be asked to prepare a foreword for this book written by my colleagues, Dr M Paddock and Dr AC Offiah. As the Training Programme Director for South Yorkshire, it is wonderful to see an enthusiastic radiology trainee producing high-quality teaching material, supported by an established consultant expert in their field of interest. Passing down knowledge continues the important cycle of learning and teaching with benefit to future generations of radiologists.

Reading this book is a must for any specialist trainee in radiology preparing for the final FRCR examination. Paediatric radiology is often an area that is neglected during revision when the RCR curriculum requires a very wide breadth of knowledge. Many trainees have limited exposure to paediatric radiology during their training, and there may have been an interval between a paediatric attachment and preparing for the FRCR 2B examination. Paediatric imaging does however form part of all FRCR examinations, and you will be assessed in this area. I have been an examiner at the Royal College of Radiologists for many years and there is a recognised reduced performance in questions related to paediatric imaging.

This book consists of cases set out in the style of the FRCR 2B Rapid Reporting examination. The high-quality images and attached notes are beautifully presented in a format that is easy to read. Your knowledge will be enhanced with what I think you will find to be an enjoyable learning experience. The carefully selected cases are either commonly seen in daily practice or are important to be aware of. This book will help you prepare for all components of the FRCR 2B examination (not just the Rapid Reporting element) and your future career as an independent practitioner.

Happy reading and good luck!

Ruth Batty
The Royal Hallamshire Hospital/Sheffield Children's Hospital
Sheffield, UK

Preface

Firstly, congratulations on passing the FRCR Part 2A—well done! Now to the FRCR 2B examination where the fun can really begin...

All three components of the 2B examination may contain a significant proportion of paediatric imaging. Candidates ‘struggle with interpretation of paediatric imaging—even for common paediatric pathologies’ as identified in the Royal College of Radiologists Examiners’ report. Better preparation in this component will also help you when faced with paediatric cases in the long case reporting and viva sections, and you will definitely get some!

The amount of paediatric radiology training up and down the country is variable, and some candidates may not feel adequately prepared to tackle paediatric imaging in the Rapid Reporting section of the examination. The reality is that the majority of radiologists will go on to work in District General Hospitals (DGHs) where paediatric imaging can feature prominently in the day-to-day workload of the department. Most children will initially present to and be imaged in DGHs, given that most do not live next to a dedicated paediatric tertiary centre.

The examiners need to make sure that you are a safe radiologist and that you are able to provide a sound radiological opinion which may contribute to effective patient management and care. This is what the 2B examination is assessing—your ability to use your knowledge and skills effectively and your preparedness to practise radiology safely as an independent practitioner.

We felt that there was a lack of dedicated paediatric radiology revision resources for the 2B examination, and we wrote this book to address that need. All radiographs are from standard day-to-day practice and have been collected over a 3-year period by one of the authors: the images range from the obvious buckle fracture to the subtle metaphyseal fracture (specific to physical child abuse) which is easily missed.

Following the answer key for each test, we have expanded on certain abnormal findings or normal variants to further enhance your learning. We have purposefully not used arrows or line diagrams to show you where or what the abnormality is—abnormal radiographs do not come with this in the examination or in real life. As clinical radiologists, we have described the abnormality, and where subtle, it has been magnified as you would do in the examination and in clinical practice. Being a text comprising of paediatric radiographs, the image quality is dependent on the limited dose used to acquire the images. Thus, the quality of some of the magnified

images in the explanations may be degraded but still remain adequate to sufficiently demonstrate the pathology. Where relevant, we have included tips for the viva examination. The references also include excellent pictorial reviews and links to educational websites so that you can get the most out of your revision.

We emphasise that the best practice for the Rapid Reporting section of the examination is to report paediatric radiographs and get them checked by your local paediatric radiologists. This book can be used to supplement your learning during normal working hours.

We are extremely grateful to Dr. Jonathan M. Smith and Dr. Robin Dale, specialty trainees on the Sheffield radiology training scheme, for their insight and feedback throughout the preparation of this book.

Finally, we wish you the best of luck in all components of the examination and your future careers. We hope that you will use this book as a future reference text, even after the examination. We welcome any comments, suggestions or feedback, and if you have any queries, please email us on paedsradrapidreporting@gmail.com.

Good luck!

Sheffield, UK

Michael Paddock
Amaka C. Offiah

Testimonies

I used this book in the run up to sitting the Final FRCR Part B examination in autumn 2018 and I believe it played an important role in obtaining a high score in the Rapid Reporting element. Most practice exam sets include a few paediatric radiographs, but no other resource on the market provides a concentrated bank of paediatric radiographs with which you can hone your skills. This makes it particularly useful for candidates like me, who had completed their paediatric rotation a long time before sitting the exam, or for those candidates who are not very confident in paediatric reporting. The explanations are thorough and provide some useful tips for the viva component of the exam, also.

Dr. Jonathan M. Smith

Unlike the online rapids packets I used, this book offers explanations which are really helpful for confidently identifying abnormalities and discounting normal findings unique to paediatric radiology. The discussions are also great for viva preparation. It definitely helped me to pass the FRCR 2B examination.

Dr. Robin Dale

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Abbreviations

ABC	Aneurysmal bone cyst
AFP	Alpha-fetoprotein
AIIS	Anterior inferior iliac spine
ALTE	Apparent life-threatening event
AP	Anteroposterior
ARPKD	Autosomal recessive polycystic kidney disease
ASIS	Anterior superior iliac spine
AVN	Avascular necrosis
β hCG	Beta human chorionic gonadotropin
BBI	Button battery ingestion
BRUE	Brief resolved unexplained event
CLE	Congenital lobar emphysema
CLO	Congenital lobar overinflation
CML	Classic metaphyseal lesion
CMV	Cytomegalovirus
CPAM	Congenital pulmonary airway malformation
CT	Computed tomography
CTPA	Computed tomography pulmonary angiogram
DDH	Developmental dysplasia of the hip
DGH	District General Hospital
DJ	Duodenojejunal
ED	Emergency Department
ETT	Endotracheal tube
FCD	Fibrous cortical defect(s)
FOOSH	Fall onto an outstretched hand
FRCR	Fellowship of the Royal College of Radiologists
GI	Gastrointestinal
GP	General Practitioner
HIV	Human immunodeficiency virus
HME	Hereditary multiple exostoses
ITU	Intensive therapy unit
LCH	Langerhans cell histiocytosis
MCDK	Multicystic dysplastic kidney
MIBG	Metaiodobenzylguanidine

MRI	Magnetic resonance imaging
NAI	Non-accidental injury
NEC	Necrotising enterocolitis
NGT	Nasogastric tube
NICE	National Institute for Health and Care Excellence
NOF	Non-ossifying fibroma
NRSTS	Non-rhabdomyosarcoma soft-tissue sarcoma
NSAID	Non-steroidal anti-inflammatory drug
OCD	Osteochondritis dissecans
OI	Osteogenesis imperfecta
ORIF	Open reduction and internal fixation
PDA	Patent ductus arteriosus
PET-CT	Positron emission tomography-computed tomography
PSIS	Posterior superior iliac spine
RCR	Royal College of Radiologists
RTA	Road traffic accident
SCFE	Slipped capital femoral epiphysis
SLE	Systemic lupus erythematosus
SUFE	Slipped upper femoral epiphysis
TOF	Tracheo-oesophageal fistula
VSD	Ventricular septal defect

About the Authors

Michael Paddock is a final year specialty registrar on the Sheffield radiology training programme, training in general and paediatric radiology.

He completed an EPSRC-funded Biomedical Imaging MSc during his undergraduate medical training at Guy's, King's and St Thomas's School of Medicine at King's College London. After graduating, he undertook foundation training in Dorset followed by clinical paediatric training on the North-West London rotation, including a post at Great Ormond Street Hospital for Children. This led onto an NIHR Academic Clinical Fellowship in clinical radiology at the University of Sheffield which he completed alongside his core clinical radiology training, in addition to completing a Postgraduate Certificate in Clinical Research, whilst successfully attaining the FRCR.

He led a prospective clinical research study assessing fetal brain development using *in utero* magnetic resonance imaging, in addition to conducting research in the imaging of suspected physical child abuse. He has numerous first-author publications and has won national and international research awards for his work.

Amaka C. Offiah is a reader in Paediatric Musculoskeletal Imaging at the Academic Unit of Child Health, the University of Sheffield, and an honorary consultant paediatric radiologist at Sheffield Children's Hospital.

After completing radiology training in Sheffield, she moved to London to Great Ormond Street Hospital for Children and the Institute of Child Health, where she obtained her PhD in the imaging of suspected inflicted injury. She returned to Sheffield as an HEFCE-funded clinical senior lecturer in the Academic Unit of Child Health. She was promoted to reader in January 2015 and is a Fellow of the Higher Education Academy (FHEA).

In addition to over 80 original scientific publications, over 20 peer-reviewed review articles and 10 book chapters, she has co-authored two 'highly commended' textbooks: *A Radiological Atlas of Child Abuse* and *Fetal and Perinatal Skeletal Dysplasias: An Atlas of Multimodality Imaging*. She is chairperson of the European Society of Paediatric Radiologists' (ESPR) Child Abuse Taskforce and the Skeletal Dysplasia Group for Teaching and Research. She has been an expert witness in over 200 cases of suspected child abuse and was the first female and first paediatric radiologist to be appointed the Royal College of Radiologists Roentgen Professor.

Introduction

Purpose of the Rapid Reporting Component of the 2B FRCR Examination

Emergency Department (ED) imaging constitutes a significant proportion of most radiologists' workload. The Rapid Reporting component of the examination assesses candidates' ability to decide rapidly if an image is normal or abnormal and to provide a diagnosis if the image is abnormal. It is important to be able to confidently state when an abnormality is present and exclude it when it is not.

The examination contains 30 radiographs to be reported. The majority of the images are musculoskeletal/extremity radiographs in addition to some chest and abdominal radiographs, as would be expected in a typical ED reporting session. We have replicated this brief, except that all the radiographs are paediatric, ranging from neonates to adolescents.

Structure

Candidates will have 35 min to report all 30 images and denote each image as either normal or abnormal. Each image contains one significant diagnosable abnormality which is *not* complex; as such, differential diagnoses should not be offered. Any anatomical variants (and minor age-related degenerative change in adults) should be recorded as normal. Images will be viewed on a single monitor.

For those radiographs that demonstrate a well-recognised fracture pattern in which two fractures would be expected to occur together, you will be expected to identify and write down *both* fractures to get the mark. This is stated in the Royal College of Radiologists (RCR) Part 2B Spring 2016 Examiners' Report, available at https://www.rcr.ac.uk/sites/default/files/spring2016_cr2b_examiners_report.pdf.

Scoring

Candidates have the opportunity to attain 1 mark per image and thus a maximum of 30 marks. The scoring system used is outlined below and is taken directly from the RCR website:

Image type	Candidate response	Mark
Normal image	Correctly classified	+1
	Incorrectly classified (appropriate false positive)	+½
	No answer given	0
Abnormal image	Correctly classified and correctly identified	+1
	Correctly classified but incorrectly identified	0
	Incorrectly classified (false negative)	0
	No answer given	0

What is an **appropriate** false positive? Consider a radiograph designated as ‘normal’ by the examiners. The candidate denotes the image as ‘abnormal’ and writes the diagnosis of ‘metaphyseal spur’, for example. As stated above, whilst normal variants should be categorised as ‘normal’, the examiners *may* review the radiograph in question and *may* award the candidate half a mark if they agree—however, this will be at the discretion of the examiners.

Subsequently, the total marks attained in the Rapid Reporting component are converted into an overall mark between 4 and 8 as outlined in the table below:

Total marks	Overall mark
00–24	4
24½	4½
25–25½	5
26–26½	5½
27	6
27½–28	6½
28½–29	7
29½	7½
30	8

This score is combined with the scores from the long reporting and the viva examination (two stations are taken over 1 h). Candidates will be given a score of 4–8 in each of the four sections, of which the pass mark in each section is 6, giving an overall pass mark of 24. Additionally, candidates must obtain a mark of 6 (or above) in *at least* two of the four sections to pass the FRCR 2B examination overall.

All candidates should aim for a minimum score of 27/30 (90%) in the Rapid Reporting component to achieve a converted overall mark of 6. Whilst this component is thought of as the most difficult, it is possible for candidates to score full marks and receive a converted overall mark of 8. This can contribute significantly to the final overall score when combined with the scores from the long reporting and viva examination and emphasises the importance of scoring highly in this component.

We encourage all candidates to read all the available Examiners Reports in preparation for their upcoming examination sitting. The latest information pertaining to all components of the examination, the format, the scoring system of each component and the overall scoring allocation, along with guidance for candidates, particularly in light of the recently introduced image-based examination delivered on a digital platform, can be found on the RCR website which should be checked regularly for updates—please see the references.

Hints and Tips

Revising for the Part 2B examination seems like a daunting task, but, as with anything, organisation and preparation are key.

Below are a few hints and tips to help prepare you for your up-and-coming examination sitting:

- Treat the examination as if you were at work and report the radiographs as you would in daily practice.
- Before the exam, report as many radiographs as possible and get them checked by consultant radiologists: this is the only way to receive feedback on your practice and to identify areas for development. Where areas for improvement have been identified, report more of these radiographs and get them checked.
- Best practice, both in the examination and in clinical practice, is to state the side of the abnormality. Given the time limitations in the examination, (L) and (R) can be written in place of ‘left’ and ‘right’, respectively. Additionally, writing # in place of ‘fracture’ is acceptable and will also save time.
- Develop review areas for each body part: there are a number of resources and ‘checklists’ available online.
- If unsure, denote the radiograph as ‘normal’.
- Completing each test in this book within the allotted 35 min (be strict with the timing) will give you the realistic practice needed to succeed in this component of the examination.

Further Reading

The Royal College of Radiologists (2018) Accessed April 2018:

- Final FRCR Part B Examination – Purpose of Assessment Statement. https://www.rcr.ac.uk/sites/default/files/cr2b_purpose_of_assessment_statement.pdf
- Final Examination for the Fellowship in Clinical Radiology (Part B) – Scoring System. https://www.rcr.ac.uk/sites/default/files/docs/radiology/pdf/CR2B_scoring_system.pdf
- Final FRCR Part B Examination. <https://www.rcr.ac.uk/clinical-radiology/examinations/final-frcr-part-b-examination-0>

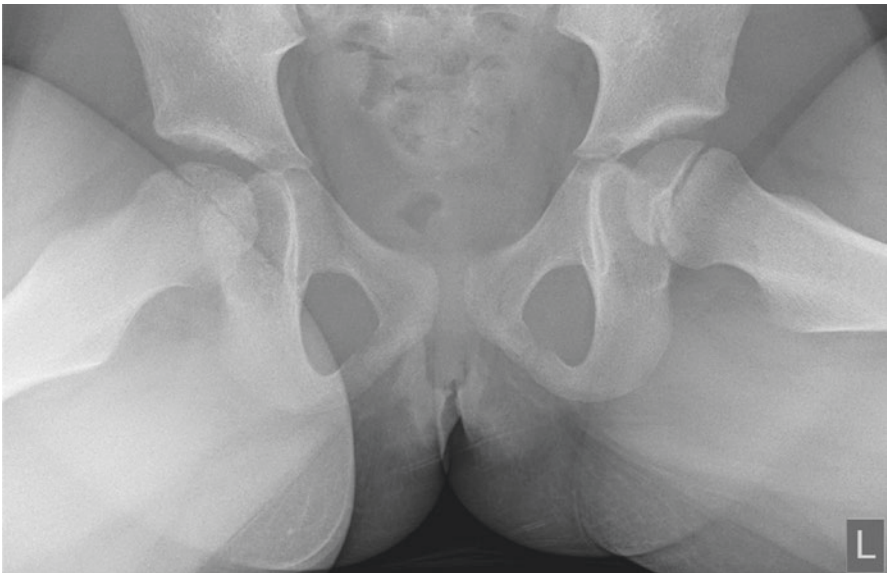
- Examiners Reports. <https://www.rcr.ac.uk/clinical-radiology/examinations/final-frcr-part-b-examination/examiners-reports>
- Final Examination for the Fellowship in Clinical Radiology (Part B) – Guidance Notes for Candidates. https://www.rcr.ac.uk/sites/default/files/cr2b_candidate_guidance_notes_0.pdf

Test 1

1

1.1 Images

Image 1



Normal	Abnormal	Diagnosis/Abnormality (only if abnormal)

Image 2



Normal	Abnormal	Diagnosis/Abnormality (only if abnormal)

Image 3

Normal	Abnormal	Diagnosis/Abnormality (only if abnormal)

Image 4



Normal	Abnormal	Diagnosis/Abnormality (only if abnormal)

Image 5

Normal	Abnormal	Diagnosis/Abnormality (only if abnormal)

Image 6



Normal	Abnormal	Diagnosis/Abnormality (only if abnormal)

Image 7

Normal	Abnormal	Diagnosis/Abnormality (only if abnormal)