

"IULIU HAȚIEGANU" UNIVERSITY OF MEDICINE AND PHARMACY CLUJ-NAPOCA

RADIOLOGY

FOR MEDICAL STUDENTS

VOLUME I

2021

Faculty of Medicine

EDITOR: Sorin M. Dudea



UMF
UNIVERSITATEA DE
MEDICINĂ ȘI FARMACIE
IULIU HAȚIEGANU
CLUJ-NAPOCA

Sorin M. Dudea, MD, PhD, Professor of Radiology
Editor

RADIOLOGY FOR MEDICAL STUDENTS

VOLUME I

773707



SL4

Editura Medicală Universitară “Iuliu Hațieganu”
Cluj-Napoca

2021

Contents

PART I. INTRODUCTORY NOTIONS

1. Introduction. A brief history of radiology	
<i>Sorin M. Dudea</i>	3
2. Elemental physics and technique in conventional radiology	
<i>Călin Schiau</i>	5
3. The radiographic image	
<i>Ioana Bene, Anca Ciurea</i>	13
4. Contrast media in radiology	
<i>Anca Ciurea, Ioana Bene</i>	18
5. Ultrasonography	
<i>Sorin M. Dudea</i>	26
6. Physical and technical fundamentals in computer tomography (CT)	
<i>Diana Sorina Feier</i>	43
7. MRI physics	
<i>Andrei Roman</i>	49
8. Characteristics of imaging techniques	
<i>Călin Schiau</i>	65
9. Radiobiology	
<i>Andrei Roman</i>	80
10. Dosimetry and radioprotection	
<i>Andrei Roman</i>	86

PART II. THE MUSCULOSKELETAL SYSTEM

11. Radio-imaging examination methods of the musculoskeletal system	
<i>Carolina Solomon</i>	95
12. Radiologic anatomy of the bones	
<i>Manuela Lenghel</i>	100
13. Musculoskeletal semiology	
<i>Dan Vasilescu, Sorin M. Dudea</i>	105
14. Inflammations of the musculoskeletal system	
<i>Carolina Solomon, Manuela Lenghel, Sorin M. Dudea</i>	116

15. Osteoarthritis (arthrosis)	
<i>Carolina Solomon, Manuela Lenghel</i>	128
16. Tumors of the musculoskeletal system	
<i>Dan Vasilescu, Manuela Lenghel, Csaba Csutak</i>	136

PART III. THE EXCRETORY SYSTEM

17. Elemental anatomy of the excretory system	
<i>Sorin M. Dudea</i>	153
18. Examination methods and radiologic anatomy of the urinary tract	
<i>Sorin M. Dudea</i>	156
19. Kidneys and ureters: semiology and disease	
<i>Sorin M. Dudea</i>	167
20. Imaging in kidney transplantation	
<i>Andrei Lebovici</i>	193
21. The urinary bladder	
<i>Andrei Lebovici</i>	196

Part IV. THE RETROPERITONEUM

22. Retroperitoneum: anatomy, imaging and lymph nodes	
<i>Andrei Lebovici</i>	207
23. The adrenal glands	
<i>Andrei Lebovici</i>	212

Part V. THE GENITAL TRACT

24. Imaging techniques of the female genital tract	
<i>Csaba Csutak</i>	221
25. Imaging anatomy of the female genital tract	
<i>Csaba Csutak</i>	223
26. Imaging of uterine disease	
<i>Csaba Csutak</i>	229
27. Ovarian disease. Diagnosis algorithms	
<i>Diana Sorina Feier</i>	237

28. The prostate	
<i>Andrei Lebovici</i>	244

29. Testicular ultrasonography	
<i>Sorin M. Dudea</i>	252

Part VI. THE BREAST

30. Anatomy and imaging indications. The normal breast	
<i>Anca Ciurea, Ioana Boca</i>	263

31. The abnormal breast	
<i>Anca Ciurea, Ioana Boca</i>	273

PART VII. PARTICULARITIES OF RADIODIAGNOSTICS IN THE PEDIATRIC PATIENT: MUSCULOSKELETAL, URINARY AND DIGESTIVE SYSTEMS

32. The pediatric musculoskeletal system	
<i>Dan Vasilescu, Roxana Popa Stanila, Sorin M. Dudea</i>	285

33. The pediatric urinary tract	
<i>Roxana Popa-Stănilă</i>	293

34. The pediatric digestive tract	
<i>Diana Sorina Feier</i>	302

PART VIII. RADIOLOGY OF TRAUMA

35. Bone fractures	
<i>Anca Ciurea</i>	311

36. Muscle and tendon tears	
<i>Carolina Solomon</i>	325

37. Renal trauma	
<i>Anca Ciurea</i>	328