
Pediatric and Adult MRI Atlas of Bone Marrow

Hakan Ilaslan • Murali Sundaram

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Normal Appearances, Variants
and Diffuse Disease States

 Springer

Hakan Ilaslan
Cleveland Clinic Lerner College of Medicine
Cleveland Clinic Department of Radiology
Cleveland, OH
USA

Murali Sundaram
Cleveland Clinic Lerner College of Medicine
Cleveland Clinic Department of Radiology
Cleveland, OH
USA

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Dedicated to my parents Elif and Mustafa Ilaslan for the emphases of their children's education and support of all their every endeavors; this is a small thank you.

Hakan Ilaslan

Dedicated to the memory of Gautam and for Aparna and Priya, in enduring gratitude.

Murali Sundaram

Foreword

Old maps often use the term “terra incognita” for regions that have not been explored, documented, or mapped. Cartographers have sometimes presumed that these “unknown lands” are home to fantastic, imaginary creatures, quite different from what is found in the known world.

Until relatively recently, the bone marrow was “terra incognita” for radiologists because with the exception of a few regions of cancellous bone, its contents were not visible to medical imaging. No radiographic, ultrasound, or even CT methods could reveal the composition and regional variations of the marrow.

MRI has started to shed some light into the black box of the bone marrow, although as the reader of this book will learn, our ability to discriminate among conditions by imaging alone remains limited.

In recent years, we have learned that all three of the major constituents of marrow – cancellous bone, fat, and the hematopoietic cell lines – are much more complicated than previously thought. Cancellous bone is now known to have a very complex relationship between structure and function. Often called “trabecular bone,” it is now clear that it only sometimes takes the form of “trabeculae.”

Marrow fat (and somatic fat as well) has recently taken center stage in a whole host of metabolic conditions, some of these are physiological and some pathological. For example, it now appears that fat plays an important role in insulin metabolism and cardiovascular disease.

The cellular elements are the most complex of all, being comprised of a host of different cell types, as well as their precursors.

MRI, for all its obvious complexity and sophistication, is still a rather limited tool to investigate this complexity, being mostly confined to images based upon T1 and T2 relaxivity, as well as gadolinium perfusion. It is amazing how well we are able to do by using these relatively simple tools, combined with a bit of anatomy and physiology!

That said, in my experience unexpected findings in the bone marrow are a frequent cause of diagnostic uncertainty and sometimes outright error among residents and practicing radiologists. They will benefit from this book.

Evaluation of bone marrow is difficult because of the dynamic nature of the organ. It varies from one anatomical location to another, may demonstrate substantial differences between individuals, and changes continuously throughout life both in normal physiological states and as a response to disease.

The atlas format is particularly well suited to this subject because it allows the authors to show many examples, spanning the spectrum of normal and abnormal states. They have drawn upon their vast clinical experience to provide many illustrations of each normal and pathological state.

The illustrations of marrow vascularity are particularly beautiful. There are excellent examples of the bone marrow in fetal MRI and many fine illustrations of age-related developmental changes in the extremities.

For those who are less familiar with bone marrow imaging, this book can be read in the conventional way – text first followed by images. For those more experienced, an interesting approach is to look at images first, form an impression, and then look to the text for answers and explanations.

However one chooses to interact with this book, there is much to learn. This book fills an important niche and will be much appreciated by the radiology community.

Daniel I Rosenthal, MD
Professor of Radiology
Harvard University
Cambridge, MA, USA

Vice Chair of Radiology
Massachusetts General Hospital
Boston, MA, USA

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Contributors

Hakan Ilaslan, MD Associate Professor of Radiology, Cleveland Clinic Lerner College of Medicine, Staff Radiologist, Cleveland Clinic Department of Radiology, Cleveland, OH, USA

S. Pinar Karakas-Rothey, MD Department of Diagnostic Imaging, University of California San Francisco Benioff Children's Hospital at Oakland, Oakland, CA, USA

Kambiz Motamedi, MD Professor of Radiology, University of California Los Angeles, Staff Radiologist, Department of Radiology, Ronald Reagan UCLA Medical Center, Los Angeles, CA, USA

Kathleen Ruchalski, MD Assistant Professor of Radiology, University of California Los Angeles, Department of Radiology, Ronald Reagan UCLA Medical Center, Los Angeles, CA, USA

Leanne L. Seeger, MD Professor of Radiology, University of California Los Angeles, Staff Radiologist, Department of Radiology, Ronald Reagan UCLA Medical Center, Los Angeles, CA, USA

Murali Sundaram, MD Professor of Radiology, Cleveland Clinic Lerner College of Medicine, Staff Radiologist, Cleveland Clinic Department of Radiology, Cleveland, OH, USA