

The book appears to be primarily written for graduate students and visual neuroscientists, including perceptual psychologists and computational modelers, who use different approaches to tackle the problem of brain plasticity, using the visual system as a model. The book tries to provide a coherent picture of visual system plasticity, and several important laboratories contributed to this goal. Giving a comprehensive picture, however, adds a further challenge because the field of cortical plasticity is very large. "Part I," which deals with the retina, seems more inclusive than "Part II," which deals with visual cortex. In "Part II," one would expect to find some contribution of several major laboratories that are very active in the field. In particular, techniques such as long-term potentiation/depression have been virtually ignored, and the role of molecules such as neurotrophic factors in modulating brain plasticity has not been given adequate weight.

The "Preface" promises suggestions on "future application of research findings from neural plasticity in the visual system with an emphasis on potential clinical uses and engineering within the biomedical sciences." This would have increased the relevance of this book for the neuroradiology audience, in particular if these topics were associated with neuroimaging of restorative plasticity. Unfortunately, these topics are not covered. Additional information linking plasticity to neuroimaging can be found in *Plasticity in the Human Nervous System: Investigations with Transcranial Magnetic Stimulation*, by Simon J Boniface and Ulf Ziemann (eds) (Cambridge University Press, 2003). Suggestions on the link between genes and possible neurotherapies can be found in *Plasticity in the Adult Brain: From Genes to Neurotherapy (Progress in Brain Research)*, by M.A. Hofman, G.J. Boer, A.J.G.D. Holtmaat, et al (eds) (Elsevier, 2001).

Overall, *Plasticity in the Visual System from Genes to Circuits*, despite its intrinsic limitations, is a useful complement for the neuroradiology audience because it provides insight on molecular mechanisms that underlie plasticity at different levels of the visual pathway.

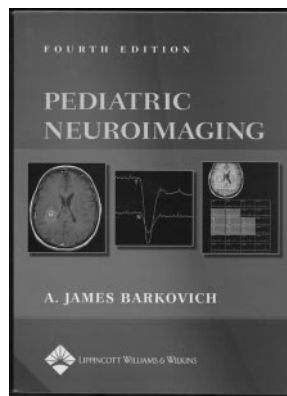
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## BOOK REVIEW

### Pediatric Neuroimaging, 4th ed.

A. James Barkovich, ed. Philadelphia: Lippincott Williams & Wilkins: 2005. 976 pages, 2561 illustrations, \$199.

The newest edition of Jim Barkovich's classic textbook *Pediatric Neuroimaging* represents an important update of his prior text, which was published in 2000. Not only is this edition longer by nearly 100 pages (now 976 pages), but it contains valuable information on state-of-the-art imaging, only a limited amount of which was present in prior editions. Looking back at the 3rd edition, one realizes that Dr. Barkovich recognized the need to include new and/or expanded areas such as spectroscopy and diffusion tensor imaging (DTI) because increasingly one uses more of these applications in daily neuroradiology practice. These additions, along with integration of genetics (when it is germane to the subject), make the book the most useful text in pediatric neuroimaging.



The text is divided into 12 chapters, all written by Barkovich (with some help in the endovascular area from Drs. Meyers and Halbach). A basically solo-authored book such as this is an increasing rarity these days when chapters in many other texts are farmed out. By writing this book himself, Barkovich has maintained a uniformity of style and writing, with duplication of information being present only when it was important to reiterate or re-emphasize certain details.

The chapter titles are exactly as they were in the 3rd edition: "Techniques and Methods in Pediatric Neuroimaging," "Normal Development of the Neonatal and Infant Brain, Skull, and Spine," "Toxic and Metabolic Brain Disorders," "Brain and Spine Injuries in Infancy and Childhood," "Congenital Malformations of the Brain and Skull," "The Phakomatoses," "Intracranial, Orbital, and Neck Mass of Childhood," "Hydrocephalus," "Congenital Anomalies of the Spine," "Neoplasms of the Spine," "Infections of the Nervous System," and "Anomalies of the Cerebral Vasculature: Diagnostic and Endovascular Considerations."

Retained (fortunately) is a "List of Disorders" in the very front of the book. With it, one can quickly search for a specific disease within a given category of disorders. This functions differently from an index (which also is present in its customary spot at the end of the book) because with this list, one can quickly find a disease of interest and the list is laid out in nearly a differential diagnosis format. So, for example, to glimpse at those "metabolic disorders that primarily affect gray matter," one has a list of 19 diseases that fall into this category. Another way one could use this list is to look at the name of a disorder and then think of the imaging findings. This would work for unusual disorders (eg, Salla disease or Wolfram syndrome) or more common diseases (eg, Kernicterus or hypoxic-ischemic encephalopathy).

Where has there been an expansion of information? Using the chapter "Toxic and Metabolic Brain Disorders" as an example, one notes some similar but not identical narratives and the use of prior and new figures (all incidentally of excellent quality). More important, there are improved and easier-to-read new case material often with MR spectroscopy, longer descriptions of some of the disorders, and inclusion of disorders not previously covered in the earlier edition. As an example of the text improvement, in the subheading "White Matter Disease with Non-Specific Patterns," nonketotic hyperglycinemia includes a new and previously unpublished case of a neonate in which not only are the standard MR images shown but also MR spectroscopy, showing the high glycine peak at 2.6 ppm. This case supplements another case of a 7-month-old boy with nonketotic hyperglycinemia that did appear in the 3rd edition. Another example is in maple syrup urine disease (acute phase), in which now is shown the spectra (abnormal peaks for branched chain amino acids and lactate) and restricted diffusion on diffusion-weighted imaging in the brain

stem, internal capsule, and posterior corona radiata. Deservedly with all the new techniques now available, this chapter, "Toxic and Metabolic Brain Disorders," has expanded from 85 to 113 pages, and the amazingly complete and updated bibliography includes 794 references, 341 more than those in the prior edition. This is typical of the refreshingly updated material one notes throughout the book in virtually every chapter. It is the weaving together of beautiful imaging, well written narratives, crisp new tables, and advanced technique that make this and all other chapters valuable.

As one would expect, the expanded 148-page chapter (68 pages more than the prior edition) "Congenital Malformations of the Brain and Skull" contains all the critical imaging information needed to understand the classic and unusual features of developmental brain anomalies. This chapter gives the reader explanations of why things look the way they do, not just the imaging appearance. The more inclusive tables is an important addition to this edition, particularly those tables that contain the tabulation of extracerebral lesions associated with neuronal migration disorders. Table 5-5 is 6 pages long and contains, in an easy-to-digest manner, complex information that is not easily obtainable from other sources. It divides the syndromes into a number of subgroups, including but not limited to chromosomal anomalies, dysmorphic syndromes, metabolic disorders (peroxisomal, mitochondrial, and cholesterol biosynthesis disorders), and multi-organ syndrome, among others. This has to be the most complete listing of such diseases to be found anywhere because it includes the genetic disruption, inheritance patterns, and the brain findings. A remarkable compilation indeed.

For those readers who are not daily engaged in the interpretation of pediatric neurology cases, one difficult area to sort

out and remember is the various milestones of brain sulcation, the chronology of myelination of various structures, and the timing of various synchondroses of the cervical spine. Barkovich does his best to help us by the inclusion of new tables and clear imaging, depicting all the stages/ages of development. Critical information on the changing spectra of the brain with maturation is important (although not substantially different from that in the prior edition) because the MR spectroscopy of a neonate's or child's brain cannot be evaluated without understanding how it differs from an adult spectra and what peaks are dominant at what age. The emergence of DTI has necessitated the new material on this subject, and baseline information on this and the variations on the theme of diffusion imaging are included.

Space does not permit the detailing of the other chapters and the many virtues of this textbook. To this reviewer's eye, Barkovich's 4th edition is the standard against which all other books in pediatric neuroradiology should be judged. No card-carrying neuroradiologist and no departmental library should be without this text. It is recommended in the highest possible terms.

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#### **BOOKS RECEIVED**

*Models of Seizures and Epilepsy.* Alsa Pitkänen, Philip A. Schwartzkroin, and Solomon L. Moshé, eds. Burlington, Mass: Elsevier–Academic Press: 2006. 712 pages, \$149.95.

*Psychoanalysis and Neuroscience.* Mauro Mancina, ed. New York: Springer: 2006. 438 pages, 75 illustrations.