Handbook of Pediatric Retinal OCT and the Eye-Brain Connection

by Cynthia A. Toth, MD; Sally S. Ong

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We were excited to have been asked to review this book as one of us (BSK) has worked with the age range and diversity of conditions noted in this book for almost two decades and the other reviewer (EB) is very involved with OCT methodologies and interpretation with an adult population.

The editor’s intent for the book, as noted in the Forward by Dr. Hartnett, was to provide a compact format that will be useful to eye care providers, vision scientists and others who work with this population by providing clear explanations and high-quality images.

To our knowledge, this is the first comprehensive book on pediatric OCT. The more recent development of portable / handheld devices combined with spectral domain - optical coherence tomography (SD-OCT) with fixation controls and scanning laser ophthalmoscopy image capture has provided the foundation for researchers, eye care providers and vision scientists to utilize this technique for very young children. Shwetha Mangalesh, a research fellow at Duke, shares why utilizing this image capture format is so important; “…the retina is an extension of the diencephalon, pointing to the potential for OCT imaging to revolutionize the diagnosis and monitoring of retinal, optic nerve, and neurological diseases in infants.” (p.87)

The textbook has 10 sections with a total of 70 concise chapters. There are 28 individuals who provided content, nine who provided images and two who provided both content and images. The vast majority of contributors are from Duke University. While a book essentially from one institution can be a negative, in this case, it seems to be a positive. Chapters flow in an organized manner and with one voice. Further, the chapters build on each other with minimal unnecessary redundancy. It is clear that this is a team who have a passion for what they are doing and a desire to share what they have learned with their colleagues.

The first three sections provide foundational knowledge and research considerations regarding pediatric OCT as both the pediatric patient as well as the growth of the eye and the development of the pediatric retina itself are important considerations for data capture and interpretation. Chapters 4-6 of the book focus on Optical Coherence Tomography (OCT) acquisition protocol, structural change analysis and possible artifacts that may influence OCT image interpretation. Table 6.1 is especially useful in clinical practice, as
it outlines all potential artifacts and provides well-annotated examples of each. One of the strengths of the book is the inclusion of OCT-Angiography, its interpretation and disease-specific examples. OCT-Angiography is a non-invasive imaging technology that provides structural and functional information about retinal neuro-vascular unit. OCT-A also has potential connections to cerebral neuro-vascular unit and neurological diseases.

The following sections cover inherited retinal diseases, vitreoretinal and vascular diseases, uveitis and infectious diseases, trauma and retinal detachment, tumors and hamartomas, abnormalities of development, and optic nerve abnormalities and diseases. The list of the diseases is very inclusive, well categorized and discussed in the same manner providing the reader with background, brain connection, clinical features, OCT features, ancillary testing and treatment. Inclusion of “the brain connection” section for multiple retinal and optic nerve disorders is another significant strength of the book, as the authors explore this ground-breaking area in the fields of Optometry and Ophthalmology.

We were impressed with the quality of OCT images in the book, especially considering the pediatric patient population. Figures are well annotated and appropriately labelled with arrows accurately pointing to the discussed retinal layers abnormalities. Even though the book includes a comprehensive list of diseases, we wished there would be a bit more detailed discussion on pathophysiology of these disorders.

There are some minor editing errors throughout the book that should be considered in the future printings. For example, the title for Section 7 uses word “Retial” instead of “Retinal”. Also, chapter 66 contains few labeling errors, such as missing “A, B, C” labeling for images in Figure 66.2, but images are discussed as “A”, “B”, and “C”. Also, the same chapter contains a few grammatical errors, such as “peripapillart” instead of “peripapillary.”

Overall, we believe that this book represents a well-annotated and comprehensive atlas of various retinal, macular and optic nerve diseases commonly seen in the pediatric population. There are over 200 high-quality labeled scans and images, making it one of the most inclusive handbooks in Pediatric Retinal OCT. We would highly recommend this book as a go-to resource in a busy clinical setting.

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