Handheld OCT Comes of Age

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Little is known about the course of normal human foveal development, mainly because of the lack of availability of donor eyes from infants. Current knowledge is based upon the histological examination of very few eyes at a limited number of time points. The advent of optical coherence tomography (OCT) has had a major impact on the investigation and management of adults and older children with retinal disorders, and the recent development of handheld portable devices will allow high-resolution retinal imaging in infants and young children. Optical coherence tomography evaluation of the fovea in infants (including those born preterm) and young children is an alternative approach to investigating foveal development. There is a good correlation between OCT imaging and the limited histological studies that are available. Previous OCT studies in infants and children have involved small numbers of subjects or limited time points. In this issue, Lee et al. report the results of a comprehensive study of the OCT appearance of the central retina in 261 subjects from infancy to adult life. Each scan was manually segmented, and the thickness of the individual layers was correlated with gestational age. Thus the authors were able to ascertain the developmental trajectory of each layer. One surprising finding was that foveal development was not complete until adolescence, much later than previously thought.

There is much current interest in assessing retinal structure in young children and how this is affected by genetic disorders or environmental insults such as those associated with preterm birth. For inherited retinal disorders where new treatments such as gene therapy are being evaluated, OCT findings will be important for patient selection and for monitoring toxicity and treatment effect. The age-related normative database and information about the trajectory of retinal development identified in this study are thus very important. The effect of any novel therapy will need to be assessed against the normal developmental changes in the retina during childhood. This is not an issue with adults, as the retinal structure is stable as development is complete. It is likely that novel therapies for retinal dystrophies will be more effective in early disease so that clinical trials will involve young children; knowledge of normal retinal development will be critical.

References