Optical Coherence Tomography

Optical coherence tomography (OCT) is a noninvasive imaging technique that provides real-time two- and three-dimensional images of scattering samples with micrometer resolution. Mapping the local reflectivity, OCT visualizes the morphology of the sample, in real time or at video rate. In addition, functional properties such as birefringence or blood flow may be detected and used for improved diagnosis. In ophthalmology, OCT is accepted as a clinical standard for diagnosing and monitoring the treatment of a wide range of retinal diseases. With increased image acquisition speed, real-time or video-rate imaging is feasible, which has enabled optical microangiography, i.e., visualization of retinal and choroidal blood flow. Such label-free optical microangiography might be feasible as an adjunct modality to fluorescence-based angiography. In this review, the fundamental principles of OCT imaging and its main functional extensions are introduced. The part is followed by a discussion of ophthalmic OCT. Finally potential emerging modalities are discussed briefly.