OCT Angiography
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- Time-domain
  - Commercially available in the US in 2002
  - Zeiss Time-domain OCT (Carl Zeiss Meditec, Dublin, CA)

- Spectral domain technology in 2006
  - FDA approval in 2006
  - Vastly improved resolution
  - Motion correction technology

- Instruments
  - Optovue Avanti
  - Zeiss CIRRUS
  - Heidelberg Spectralis
  - Topcon 3D – FDA approval July 2007

- Swept source OCT
  - Faster – less motion artifact
  - Invisible light source

- Instruments
  - Topcon DRI OCT Triton
    - FDA approval in January 2018
    - posterior and anterior segment OCT, color, and red free imaging. FA and FAF photography available on the Plus model. OCTA available outside of the US
  - PLEX Elite 9000, Carl Zeiss Meditec, FDA approval for research November 2016
• OCT Angiography
  • Images retinal blood flow

• Technology
  • Zeiss AngioPlex – FDA approval, September 2015
  • Optovue AngioVue – FDA approval February 2016; AngioAnalytics and 3D PAR (projection artifact removal) FDA approval June 2018
  • Heidelberg Spectralis OCTA – FDA approval September 2018
  • Topcon DRI OCT Triton
    • Swept source OCT
    • Angiography option not available in the US

• Traditional imaging modalities for retinal blood flow

• Fluorescein angiography (FA)
  • Introduced in 1961
  • Risks with injection of a dye involve nausea, vomiting, and anaphylactic shock
  • Change in use among retinal specialists in recent years

• Indocyanine green (ICG)
  • Used occasionally
  • Evaluation of the deeper choroidal circulation

• OCTA advantages over traditional imaging modalities
  • Better delineating of the foveal avascular zone (FAZ)
  • Better imaging of capillary dropout
• Disadvantages of OCTA as compared with traditional imaging modalities
  • Poor technique for peripheral imaging
  • Unable to show leakage, pooling, or areas of very slow flow such as aneurysm

• Review the appearance of retinal layers on OCT and the location of vascular zones
  • Superficial capillary plexus or network – lies in the nerve fiber layer or ganglion cell layer
  • Deep capillary plexus – lies in the inner nuclear layer near the outer plexiform layer

• OCTA imaging
  • Check for artifact, media opacity, high refractive error, truncation, shadowing, and accurate segmentation
  • Pay attention to foveal avascular zone, vessel density numbers, capillary dropout, and microaneurysms

• Case studies – most commonly used for AMD, diabetic retinopathy, glaucoma, and vascular occlusive disease

• Diabetic retinopathy
  • Capillary dropout
  • Foveal avascular zone
  • Neovascularization

• Macular degeneration
  • Detection of CNVM
  • Caution with segmentation as retinal cytoarchitecture may be disrupted, especially with larger drusen
• Glaucoma
  • Visualize decreased papillary, peripapillary, and macular perfusion in glaucoma eyes compared with normal eyes

• Other conditions
  • Trauma
  • Branch vein occlusion