

Normative Data for Vascular Density in Superficial and Deep Capillary Plexus Assessed by Optical Coherence Tomography Angiography

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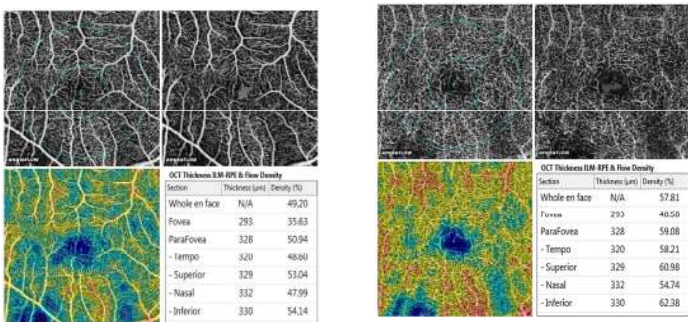
INTRODUCTION

To establish normative data of Vascular density (VD) and the foveal avascular zone (FAZ) at superficial (SCP) and deep capillary plexus (DCP) using OCT angiography (Optovue).

METHODS

Retrospective chart review of healthy patients who had undergone imaging using the split-spectrum amplitude decorrelation angiography algorithm (SSADA) on the OCT-angiography system version 2015.100.0.35.

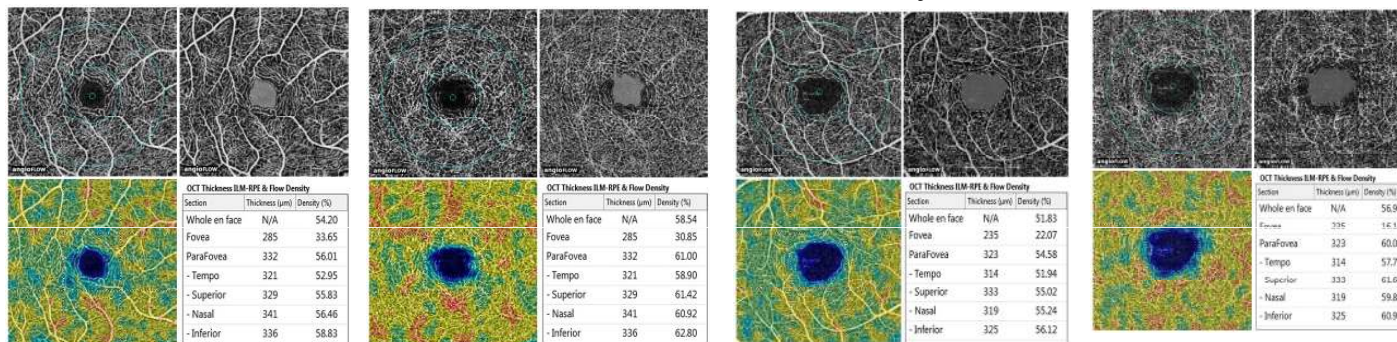
OCT-A, healthy subject, ETDRS 10° central macula



Optical coherence tomography Angiography, another healthy subject with a small foveal avascular zone, at the superficial capillary plexus (age: 54, group 2).
 A: ETDRS grid on 10° central Macula
 B: The Foveal avascular zone (translucent white color) is very small in this case (0.06 mm²).
 C: Normal virtual colored Macular Vascular Density (49.20% whole en face).

Optical coherence tomography Angiography, same healthy subject (figure 3) at the deep capillary plexus
 A: ETDRS grid on 10° central macula
 B: The Foveal avascular zone is the central non-flux zone (translucent white color) is larger than at superficial level (0.087 mm²).
 C: Normal virtual colored Macular Vascular Density (57.81%)

SSADA Normal Vessel Density



OCTA healthy subject at the SCP FAZ central non-flux zone (translucent white color) normal in this case (0.201 mm²) Vessel Density (54.20%)

same healthy subject at the DCP FAZ is larger than at superficial level (0.396 mm²) Vessel Density (58.54%)

OCTA healthy subject at the SCP FAZ (is very large (0.489 mm²)). Vessel Density (51.83%)

same healthy subject at the DCP FAZ is larger than at superficial level (0.76 mm²) Vessel Density (56.96%)

RESULTS

135 eyes of 70 (51% of men). Mean age was 48.3 (SD 17.5 years) The ages were divided into 3 age groups: group I: 20 to 39 years of age, group II: 40 to 59 years of age, group III: 60 years and older

At the SCP:
 VD : 52.58±3.22%
 FAZ : 0.28±0.1 mm²

At DCP:
 VD : 57.87±2.82%
 FAZ : 0.37±0.12 mm².

VD was higher in DCP than in SCP (p<0.05) in all subfields, in all groups
 FAZ area was lower in group 3 (p<0.05)

Interobserver reproducibility: (0.78 to 0.99 in SCP, 0.67 to 0.92 in DCP)
intraobserver repeatability: (0.64 to 0.93 in SCP and 0.63 to 0.87 in DCP) were both excellent.

DISCUSSION AND CONCLUSION

- Our results give perfect interobserver repeatability and substantial intraobserver reproducibility in each plexuses and confirm that the age-related decrease in FAZ area could be due to atrophic and occlusive changes in the macular capillaries.
- Our normative database of FAZ and vascular density could help recognizing any early changes in macular capillary bed and abnormalities of the vascular arcade surrounding the FAZ, thus differentiating healthy eyes from macular vascular diseases.

REFERENCES

Jia Y, et al. Split-spectrum amplitude-decorrelation angiography with optical coherence tomography. Opt Express. 2012
 Samara WA et al. Correlation of foveal avascular zone size with foveal morphology in normal eyes using optical coherence tomography angiography. Retina. 2015