Assessment of Superficial Vascular Density in the Unilateral Amblyopic Eyes by Using Optical Coherence Tomographic Angiography.

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ABSTRACT:

Objective: To assess the superficial vascular density (SVD) in the foveal avascular zone (FAZ) of the unilateral anisometropic amblyopic eye by utilizing the optical coherence tomography angiography.

Methodology: The present study was conducted during the period from February 2023 to November 2024, at the Institute of Ophthalmology at Liaquat University of Medical & Health Sciences (LUMHS) Jamshoro Pakistan. The participants included 50 children with unilateral anisometropic amblyopia was referred by the pediatric ophthalmology clinic of IOL LUMHS. All patients received a full eye checkup, which included testing their vision, assessing their refraction, measuring axial length, and examining both the front and back parts of the eye. An inbuilt proprietary software of OCTA was used to scan the 3 × 3-mm area of the foveal area to quantify the SVP at the horizontal and vertical axis.

Results: The two groups have shown a clear-cut distinction in visual acuity. The amblyopic eyes have a better corrected visual acuity of 20/ 64 {Logarithm of the Minimum Angle of Resolution; (logMAR) 0.51 ± 0.17}, with values ranging from 20/40 to 20/126 (logMAR 0.30–0.80). Conversely, the fellow eyes evidences better vision, with an average BCVA of 20/ 18 (logMAR −0.03 ± 0.05), which ranges between 20/ 15 and the 20/ 20 (logMAR −0.12 to 0.00). The overall, difference among the two groups was significant, with a mean logMAR gap of 0.54 (95% CI, 0.45–0.63; P < .001). Although the amblyopic eyes usually show hyperopia > 3 diopters. The two groups were not considerably different in terms of equivalent cylinder, sphere, or spherical refraction.

Conclusion: Amblyopic eyes showed greater hyperopia, shorter axial lengths, and reduced visual acuity, consistent with prior reports on anisometropic amblyopia. OCT-A revealed decreased superficial and deep capillary densities, suggesting microvascular alterations—particularly in the deep plexus—as potential biomarkers of amblyopia severity and therapeutic response.

Keywords: Amblyopic FAZ, OCT of amblyopic eyes, superficial vascular Density, superficial vascular plexus of amblyopic eyes.

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Introduction:

Over the past several years, amblyopia has been characterized by a decline in contrast sensitivity and visual acuity in one or both eyes, typically resulting from abnormal binocular interaction or visual deprivation. However, its exact pathogenesis remains unclear.[1] Some studies have suggested that dysfunction within the visual cortex and the lateral geniculate nucleus may contribute to the etiology of amblyopia.[2] According to a population-based survey, the prevalence of amblyopia among children ranges from 0.5% to 3.5%.[3] A recent meta-analysis of OCTA studies reported increased foveolar thickness in amblyopic eyes compared with normal eyes. Nevertheless, it remains uncertain whether this thickening is associated with alterations in blood flow or microvascular density.[4]

In recent years, OCTA has been employed to investigate the relationship between retinal thickness and perfusion in healthy populations, with these parameters increasingly used to explore retinal involvement in the development of amblyopia.[5,6] Importantly, OCTA enables quantitative assessment of the superficial vascular plexus (SVP) and deep vascular plexus (DVP),[7] allowing evaluation of the interaction between macular thickness and vessel density in amblyopic versus non-amblyopic eyes. Several authors have reported decreased SVP and DVP densities in amblyopic eyes,[8,9] though findings remain inconsistent due to heterogeneity in study designs.[6,10] If amblyopia is ultimately shown to alter macular structure or perfusion, this could substantially challenge current definitions and understanding of the condition.

Methodology:

This comparative observational case-control study was conducted at the Institute of Ophthalmology, Liaquat University of Medical and Health Sciences, Jamshoro, Pakistan, over a 25-month period from February 2023 to November 2024. Prior to initiation, approval was obtained from the hospital's Ethical Review Board, ensuring that all

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procedures adhered to established ethical and professional standards.

All participants (or their parents in the case of minors) were personally approached and provided with a clear explanation of the study objectives, the procedures involved, and their rights as research volunteers. Written informed consent was obtained only after participants had sufficient opportunity to ask questions and fully comprehend the information presented. It was ensured that the conduct of all participants within this study adhered to applicable laws and the principles of Good Clinical Practice.

For current study amblyopia was defined as the intraocular difference of spherical equivalent that is greater than 2.0 diopters. All children aged 6-15 years old having unilateral anisometric amblyopia visited for regular checkup were considered for the present study. All other types of amblyopia, apart from anisometropic amblyopia, were excluded from the study. Participants with a history of ocular surgery or coexisting ocular diseases that could influence macular thickness were also excluded, as were children who were uncooperative during examination.

All the participants gone through a series of ophthalmologic examinations. The process began with measurements of visual acuity. The visual acuity includes unaided vision, aided vision, and best corrected visual acuity. They are obtained through cycloplegic refraction. Additionally, the axial length was recorded for each participant to support further analysis of ocular characteristics. Basic squint assessment test, were executed to know any latent or manifest deviations in eye alignment. The extraocular movements were carefully observed to assess the full range and coordination of eye motion. Moreover, each participant received a detailed ophthalmic evaluation using slit-lamp biomicroscopy along with fundoscopy. The refraction was analyzed using an Auto Refractometer. The IOL Master device was used to measure axial length. All the participants had gone through the swept-source OCT-A imaging (Triton DRI-OCT; Topcon, Inc.). The swept-source OCT-A imaging that utilizes 1050-nm light source. The equipment was operating at 100,000 A-scans per second. Also, the segmentation of superficial plexus was carryout with an inner boundary positioned an outer boundary 15.6 µm beneath the inner plexiform layer and 2.6 µm beneath the internal limiting membrane. On the other hand, the volumetric OCT scans centered on the fovea were secured over a 3 × 3 mm region. The image consisting of 320 × 320 A-scans in both horizontal and vertical directions. The quantification of the FAZ area was done as superficial vascular plexus images. Within the superficial retinal plexus, the vascular density was estimated using device's proprietary software, including measurements for the superior, inferior, nasal, temporal, and central regions. To minimize confounding artifacts the only superficial capillary plexus was assessed that was caused by shadow projection from the deeper capillary layers. The FAZ dimensions were assessed along the horizontal and vertical axes in each amblyopic and non -amblyopic eye.

Statistical Analyses:

SPSS version 20 used for all statistical analysis. Qualitative variables were summarized as frequencies and percentages to present the findings in a clear and meaningful way; while quantitative variables were expressed as mean values accompanied by their standard deviations.

To compare vascular deviation among the unilateral amblyopic eye and the contralateral eye of the same individuals, a paired sample t-test was applied, as this test is specifically designed to assess differences within matched pairs. For comparisons involving categorical variables among the two research groups, the chi-square test was used to decisive if any observed disparity were statistically meaningful. Because axial length and refractive power could influence vascular measurements, a one-way analysis of covariance was carried out to see for these potential confounding factors and provide a more accurate assessment of the true associations.

The vascular density percentage (VD%) was calculated using equation given below:

$$VD\ (\%) = \frac{Va}{(Ri - FAZA)} \times 100$$

Where, VA= vascular area in pixels, RI region of interest, and FAZA = foveal avascular zone area, in pixels. This equation helps us figure out how something is measured compared to the area we are looking at. The P-value shows us how likely it is to get these results by chance. If the P-value is, then 0.05 we consider the findings to be statistically significant. This means that the P-value of 0.05 is our threshold. We use this threshold to make sure that what we learn from the data is careful and trustworthy. The P-value is important because it helps us understand the results. We want to be sure that the results are real and not just a coincidence.

Results:

The detailed demographic information and clinical profiles of all individuals included in the study are summarized comprehensively in Table 1. The present study includes 50 subjects (both eyes), comprising 25 amblyopic eyes and 25 contralateral eyes. Among individuals having amblyopia, the 26% were male and the 24% were female. The mean age at diagnosis of 11 ± 4.2 years.

- Prior to OCT-A measurements, amblyopic eyes were found to have substantially shorter axial length, higher refractive power, and poorer best-corrected VA In comparison with contralateral eyes ($p < 0.001$ for all comparisons).
- The average value superficial FAZ area calculated was 0.329 ± 0.163 mm² in amblyopic eyes and 0.298 ± 0.132 mm² in contralateral eyes. The FAZ was larger significantly in the amblyopic group in relative to the fellow eye group (i.e., $P = 0.027$).
- In the 3 × 3 mm scans, the d standard deviation overall SCP density was lower in amblyopic eyes (22.7% ± 6.0%, $P < 0.05$) compared with fellow eyes (25.3% ± 5.5%, $P < 0.05$). The mean (SD) parafoveal SCP density was 48.50% ± 3.64% in amblyopic eyes and 49.01% ± 3.33% in fellow eyes.

The mean (SD) foveal DCP density was 32.8% ± 6.3% in amblyopic eyes and 34.2% ± 5.9% in fellow eyes ($P < 0.05$ for each; Table 2). The mean (SD) parafoveal DCP density was 51.0% ± 4.21% in amblyopic eyes and 51.85% ± 4.12% in fellow eyes.

Table No1: The clinical and demographic Characteristics results of the present study.

Characteristic	Amblyopic Eyes (n = 25)	Fellow Eyes (n = 25)	p value
Age (years)	11 ± 4.2 (6 to 15)	11 ± 4.2 (6 to 15)	
Gender (no.)			
Male	26	26	
Female	24	24	
Spherical equivalent (D)	+3.50 ± 2.20 (+0.5 to +6.0)	+0.25± 1.25 (-0.25 to +0.75)	<0.001
BCVA (Snellen lines)	0.4 ± 0.2 (0.05 to 0.7)	1 (1 to 1)	<0.001
Refraction (D)	+5.13 ± 2.54	+1.05 ± 1.96	<0.001
Axial length (mm)	21.3 ± 1.1	22.78 ± 1.36	<0.001

Table No 2. The Vessel Density in Amblyopic and Fellow Eyes.

Macular Area	Amblyopic Eyes mean ±SD	Fellow Eyes mean ±SD	p-value
Vascular Density Superficial Capillary Density percentage (SCD%)			
Foveal	21.9 ± 5.4	23.7± 5.7	0.033
Parafoveal	49 ± 4.1	51.8 ± 2.2	0.033
Temporal	49.6 ± 4.5	50.6 ± 2.5	0.215
Superior	51.4 ± 4.2	52.4 ± 3.3	0.272
Nasal	50.3 ± 3.6	51.8 ± 2.4	0.499
Inferior	50.4 ± 4.8	52 ± 2.7	0.38
Deep Capillary Density percentage (DCD %)			
Foveal	36.2 ± 5.9	35.4 ± 7.9	0.243
Parafoveal	52.9 ± 3.6	53.9 ± 3.9	0.043
Temporal	53 ± 3.7	53.9 ± 4.1	0.012
Superior	52 ± 3.9	53.8 ± 3.9	0.005
Nasal	53 ± 4.0	54.9 ± 3.7	0.030
Inferior	51 ± 5.8	52.4 ± 4.9	0.042
FAZA (mm^2)	0.314 ± 0.08	0.308 ± 0.0	0.042

The multiple linear regression analyses revealed meaningful patterns within the observed data of the present study. Both foveal SCP and DCP vessel densities represent strong positive relationships with inner retinal thickness. This indicate that the higher vessel density tended to correspond with a thicker inner retina. This relation was supported by the standardized beta coefficients (β = + 0.615 for SCP and β = + 0.653 for DCP). The two findings are statistical significance at $P < 0.05$.

On the other hand, the foveal avascular zone (FAZ) area had an inverse association with inner foveal thickness. The negative standardized beta value (β = −0.709) depicts that larger FAZ areas were linked to thinner inner foveal regions. This correlation was also significant statistically with the $P < 0.05$.

These relationships offer important insights into the structural vascular interplay within the macular region. These observations gives a clear relation that greater vascular density within the foveal microcirculation tends to accompany thicker inner retinal structures. On the other had enlargement of the FAZ is related with diminished foveal thickness. The reduction in visual acuity was related with reduce foveal SCP vessel density (standard β = −0.268, P = 0.001). Also, the reduction in visual acuity was related the parafoveal temporal (standard β = − 0.257, P ≤ 0.044), nasal (standard β = − 0.205; P ≤ 0.044), and inferior quadrants (standard β = − 0.249, P ≤ 0.044). Additionally, reduced VA was observed in the rela-

tion with bigger FAZ area (standard β = + 0.195; P = 0.008). As all comparisons yielded p-values greater than 0.05, that means the vessel thickness of superficial and deep capillary plexuses, the overall findings for both the foveal and parafoveal regions showed no meaningful statistical differences. To better understand whether more localized variations existed within the parafoveal area, this region was examined in greater detail by dividing it into individual quadrants. This additional level of analysis revealed that the superior parafoveal quadrant behaved differently from the others. In that specific quadrant, In each the superficial and deep capillary layers, the amblyopic eyes demonstrated noticeably lower vessel densities. These reductions were strong as to reach statistical significance, with P < 0.05.

For instance, whenever the dimensions of the FAZ area was compared between amblyopia group and the control group, the measurements were remarkably similar. Outside of this localized finding, the study did not uncover major structural differences in the macular microvasculature. The average FAZ area in eyes with amblyopia was recorded as 0.251 ± 0.1 mm², while the control eyes measured slightly larger at 0.291 ± 0.1 mm². But this change had no statistical significance (P = 0.23), indicating that FAZ size remained largely consistent across both populations.

A similar pattern was observed when evaluating subfoveal thickness. The mean retinal thickness beneath the fovea measured 250.6 ± 27.8 μm in the amblyopic eyes. even though there was a little numerical variation. This variation carried no statistical weight, as shown by a P-value of 0.93. Overall, aside from the reduced vascular density identified specifically in the superior parafoveal quadrant, the structural and microvascular measurements across the two groups remained broadly comparable, suggesting that amblyopia may influence certain localized vascular features without substantially altering global macular parameters.

Discussion:

In the present study of 25 children that comprises mean age 11 ± 4.2 years and range 6 to 15, amblyopic eyes exhibited markedly greater hyperopia (spherical equivalent + 3.50 ± 2.20 D vs. + 0.25 ± 1.25 D; P < 0.001), reduced best -corrected visual acuity (BCVA 0.4 ± 0.2 vs. 1.0; P < 0.001), higher overall refraction (+ 5.13 ± 2.54 D vs. +1.05 ± 1.96 D; P < 0.001), and significantly shorter axial length (21.30 ± 1.10 mm vs. 22.78 ± 1.36 mm; P < 0.001). These differences underscore the ocular biometric disparities among amblyopic and other eye. This pattern is like what other studies have found. When kids have anisometropic amblyopia the amblyopic eyes usually have a bigger problem seeing things far away and are also a bit smaller than the other eyes. The amblyopic eyes tend to be more hyperopic and have axial lengths compared to the other eyes the fellow eyes in kids, with hyperopic anisometropic amblyopia.[11] For example, Cass and Tromans reported similar results using A-scan ultrasound, and Patel et al. arrived at comparable conclusions using IOL Master measurements.[12] In one cohort of 13 children, anisohyperopic amblyopic eyes were approximately 1.49 mm shorter in axial length than their fellow eyes (p = 0.001).[11]

However, findings are not entirely consistent across all studies. Some research, such as a study comparing myopic and hyperopic anisometropic amblyopic eyes, discover negligible variation in axial length or macular thickness among amblyopic and non-amblyopic eyes.[13] This variability may stem from disparity in methodology, age range, amblyopia subtype, and refractive status across populations.

Table 2 reveal modest yet statistically significant vascular dissimilarity among amblyopic and contralateral eyes. Generally, it indicates Reduced superficial capillary density (SCD) at the fovea in amblyopic eyes (21.90 ± 5.4% vs. 23.7 ± 5.7%, p = 0.033). Also show Lower deep capillary density (DCD) across parafoveal, temporal, superior, nasal, and inferior quadrants (all p < 0.05). Moreover, it displays Slightly increased FAZ area in amblyopic eyes (0.314 ± 0.08 mm² vs. 0.308 ± 0.07 mm², p = 0.042).

A systematic review encompassing 17 studies reports that amblyopic eyes tend to have lower vascular density in both superficial and deep plexuses, particularly in parafoveal and peri foveal zones, with significant differences in foveal DCP density among amblyopic and contralateral eyes. Notably, no crucial disparity in FAZ area were found in these comparisons.[14] Some authors observed no crucial differences in FAZ area or vascular density among amblyopic and control or contralateral eyes. For example, multiple pediatric studies found largely normal FAZ and perfusion metrics in amblyopia.[15] One study noted that amblyopic eyes had a smaller FAZ area[16] than fellow eyes—but only after correcting for ocular magnification due to shorter axial length. Without such correction, the FAZ may appear larger, which may explain variability in findings across studies.[17] A population-based study in Hong Kong introduced new OCT-A metrics—like FAZ circularity, fractal dimension (FD), and vessel density index (VDI)—as potentially more sensitive indicators. We in our study establish decreased FAZ circularity and FD, and increased VDI in amblyopic eyes, correlating with poorer visual acuity, even when FAZ area and plain vessel density showed no difference.[18] A longitudinal study of anisometropic myopic amblyopia reported significant increases in vessel density across superficial, deep, and choriocapillaris plexuses following successful treatment indicating that some vascular changes may be reversible with visual rehabilitation.[19] Another cohort study of Saudi children found that amblyopia therapy did not significantly alter FAZ area over one year. While amblyopic eyes showed greater perimeter reduction than fellow eyes, and fell short in statistical significance.[20]

The results of the present study in hyperopic anisometropic amblyopia, the amblyopic eye is usually more hyperopic and shorter, which may contribute to its reduced visual acuity. particularly the reduced parafoveal and regional DCD and enlarged FAZ align with the broader trend in the literature showing reduced vascular density in amblyopia, especially in the deep capillary plexus, while FAZ area findings remain inconsistent[(14,15)]. The foveal SCD reduction shows that there is blood flow in a small area, which could mean the nerves there are not fully developed. This is called " sparing deficits." The FAZ enlargement, even if it is small might be because the blood vessels in the fovea are not fully formed. The differences, in what different studies found could be because they used methods. For example, some studies might have corrected for the length of the eye when looking at the images.[17] The observation of deep capillary density reductions across most quadrants also corroborates the meta-analysis finding that DCP vessel density is more consistently affected in amblyopia compared to the superficial layer.[14] Furthermore, your findings raise the possibility that advanced OCT-A metrics (like FAZ circularity, fractal dimension, or VDI) might provide deeper insights into microvascular alterations, as evident in the Hong Kong

study where conventional measures were less informative.[18]

Consistent reductions in DCP density and alterations in FAZ morphology could serve as early biomarkers of amblyopia severity or treatment response, especially when using advanced metrics. There is a lot of variation, in the results of studies. This shows how important it is to correct for magnification, which is also known as length and to control the quality of the images. We also need to use automated and reproducible OCT-A analysis. Some studies have found that the density of blood vessels can get better with treatment. So it is an idea to keep track of these things over time. This can give us markers of how well a treatment is working. The key is to look at the density and other parameters over time to see how they change with treatment and this is where OCT-A analysis comes in specifically the vascular density and other parameters of the vascular density.[19] It remains undetermined whether microvascular deficits cause amblyopia or reflect neural underdevelopment. Future longitudinal and interventional studies are needed.

Conclusion:

In the present study, amblyopic eyes exhibited significantly greater hyperopia, shorter axial lengths, and reduced visual acuity compared to the fellow eyes. These findings are consistent with previous reports on anisometropic amblyopia. OCT-A analysis further demonstrated decreased superficial and deep capillary densities, particularly within the parafoveal and regional quadrants. Variability in earlier studies may be attributable to differences in methodology, image magnification correction, and study populations. Importantly, our results reinforce the view that microvascular alterations especially within the deep plexus may serve as potential biomarkers of amblyopia severity and therapeutic response.

Limitations:

This study has several limitations. The cross-sectional design, as with most observational studies, restricts the ability to establish causality. In addition, potential confounders such as axial length, refractive error, and image magnification may influence outcomes and therefore must be carefully controlled to avoid misinterpretation. Finally, the vascular assessment was restricted to macular parameters, while parafoveal and choriocapillaris changes were not explored, limiting the scope of vascular analysis.

References:

1. Avram E, Stănilă A. Ambliopia funcţională [Functional amblyopia]. Oftalmologia. 2013;57(4):3-8. Romanian. PMID: 24844030.
2. Hess RF, Thompson B, Gole G, Mullen KT. Deficient responses from the lateral geniculate nucleus in humans with amblyopia. Eur J Neurosci. 2009 Mar;29 (5):1064-70. doi: 10.1111/j.1460-9568.2009.06650.x. PMID: 19291231; PMCID: PMC2695153.
3. McKean-Cowdin R, Cotter SA, Tarczy-Hornoch K, Wen G, Kim J, Borchert M, Varma R; Multi-Ethnic Pediatric Eye Disease Study Group. Prevalence of amblyopia or strabismus in asian and non-Hispanic white preschool children: multi-ethnic pediatric eye disease study. Ophthalmology. 2013 Oct;120(10):2117-24. doi: 10.1016/j.ophtha.2013.03.001. Epub 2013 May 19. PMID: 23697956; PMCID: PMC4848013.
4. Li J, Ji P, Yu M. Meta-analysis of retinal changes in unilateral amblyopia using optical coherence tomography. Eur J Ophthalmol. 2015 Sep-Oct;25(5):400-9. doi: 10.5301/ejo.5000583. Epub 2015 Mar 19. PMID: 25837638.
5. Yu J, Gu R, Zong Y, Xu H, Wang X, Sun X, Jiang C, Xie B, Jia Y, Huang D. Relationship Between Retinal Perfusion and Retinal Thickness in Healthy Subjects: An Optical Coherence Tomography Angiography Study. Invest Ophthalmol Vis Sci. 2016 Jul 1;57 (9):OCT204-10. doi: 10.1167/iovs.15-18630. PMID: 27409474; PMCID: PMC4968770.
6. Cheung CY, Li J, Yuan N, Lau GYL, Chan AYF, et al. Quantitative retinal microvasculature in children using swept-source optical coherence tomography: the Hong Kong Children Eye Study. Br J Ophthalmol. 2018 Jun 28:bjophthalmol-2018-312413. doi: 10.1136/bjophthalmol-2018-312413. Epub ahead of print. PMID: 29954785.
7. Kaizu Y, Nakao S, Arima M, Hayami T, Wada I, et al. Flow Density in Optical Coherence Tomography Angiography is Useful for Retinopathy Diagnosis in Diabetic Patients. Sci Rep. 2019 Jun 17;9(1):8668. doi: 10.1038/s41598-019-45194-z. PMID: 31209251; PMCID: PMC6572797.
8. Lonngi M, Velez FG, Tsui I, Davila JP, Rahimi M, et al. Spectral-Domain Optical Coherence Tomographic Angiography in Children With Amblyopia. JAMA Ophthalmol. 2017 Oct 1;135(10):1086-1091. doi: 10.1001/jamaophthalmol.2017.3423. PMID: 28910439; PMCID: PMC5710487.
9. Yilmaz I, Ocak OB, Yilmaz BS, Inal A, Gokyigit B, Taskapili M. Comparison of quantitative measurement of foveal avascular zone and macular vessel density in eyes of children with amblyopia and healthy controls: an optical coherence tomography angiography study. J AAPOS. 2017 Jun;21(3):224-228. doi: 10.1016/j.jaapos.2017.05.002. Epub 2017 May 10. PMID: 28501447.
10. Chen W, Lou J, Thorn F, Wang Y, Mao J, Wang Q, Yu X. Retinal Microvasculature in Amblyopic Children and the Quantitative Relationship Between Retinal Perfusion and Thickness. Invest Ophthalmol Vis Sci. 2019 Mar 1;60(4):1185-1191. doi: 10.1167/iovs.18-26416. PMID: 30913291.
11. Patel VS, Simon JW, Schultze RL. Anisometropic amblyopia: axial length versus corneal curvature in children with severe refractive imbalance. J AAPOS. 2010 Oct;14(5):396-8. doi: 10.1016/j.jaapos.2010.07.008. PMID: 21035064.
12. Demircan S, Gokce G, Yuvaci I, Ataş M, Başkan B, Zararsiz G. The assessment of anterior and posterior ocular structures in hyperopic anisometropic amblyopia. Med Sci Monit. 2015 Apr 25;21:1181-8. doi: 10.12659/MSM.893979. PMID: 25910432; PMCID: PMC4422113.
13. Taşkıran Çömez A, Şanal Ulu E, Ekim Y. Retina and Optic Disc Characteristics in Amblyopic and Non-amblyopic Eyes of Patients with Myopic or Hyperopic Anisometropia. Turk J Ophthalmol. 2017 Jan;47(1):28-33. doi: 10.4274/tjo.54289. Epub 2017 Jan 17. PMID: 28182148; PMCID: PMC5282538.
14. Feng K, Yu X, Zhang J, Yang Z, Chen X, Kang G. Evaluation of Retinal Microvascular Features in Patients with Amblyopia Based on Optical Coherence Tomography Angiography: A Systematic Review and Meta-Analysis. Ophthalmic Res. 2023;66(1):862-877.

doi: 10.1159/000529857. Epub 2023 Mar 14. PMID: 36917963.
15. Liu C, Zhang Y, Gu X, Wei P, Zhu D. Optical coherence tomographic angiography in children with anisometropic amblyopia. BMC Ophthalmol. 2022 Jun 20;22 (1):269. doi: 10.1186/s12886-022-02486-9. PMID: 35725409; PMCID: PMC9208140.
16. Chung, Y.W., Shin, S.Y. & Yim, H.B. Macular superficial vascular density on optical coherence tomography angiography in children with unilateral anisometropic and bilateral hyperopic amblyopia. Sci Rep.2023; 13, 12879. doi:10.1038/s41598-023-40025-8
17. Araki S, Miki A, Goto K, Yamashita T, Yoneda T, Haruishi K, Ieki Y, Kiryu J, Maehara G, Yaoeda K. Foveal avascular zone and macular vessel density after correction for magnification error in unilateral amblyopia using optical coherence tomography angiography. BMC Ophthalmol. 2019 Aug 5;19(1):171. doi: 10.1186/s12886-019-1177-z. PMID: 31382925; PMCID: PMC6683430.
18. Wong ES, Zhang XJ, Yuan N, Li J, Pang CP, Chen L, Tham CC, Cheung CY, Yam JC. Association of Optical Coherence Tomography Angiography Metrics With Detection of Impaired Macular Microvasculature and Decreased Vision in Amblyopic Eyes: The Hong Kong Children Eye Study. JAMA Ophthalmol. 2020 Aug 1;138(8):858-865. doi: 10.1001/jamaophthalmol.2020.2220. PMID: 32584368; PMCID: PMC7317658.
19. AttaAllah HR, Abdelaziz STA, Mohamed AAM, Ibrahiem MFK. Assessment of macular microvascular changes in children following treatment of anisometropic myopic amblyopia using optical coherence tomography angiography. Graefes Arch Clin Exp Ophthalmol. 2023 Sep;261(9):2689-2699. doi: 10.1007/s00417-023-06055-8. Epub 2023 Apr 13. PMID: 37052667; PMCID: PMC10432315.
20. Sesma G, Al Mairi T, Khashoggi HF, AlDhahi SI, Aljohar F, Khandekar R, Awad A. Evaluation of Foveal Avascular Zone After Strabismic and Anisometropic Amblyopia Therapy in Saudi Children Using Optic Coherence Tomography Angiography: A Cohort Study. Clin Ophthalmol. 2023 Dec 8;17:3775-3784. doi: 10.2147/OPTH.S435252. PMID: 38094509; PMCID: PMC10716010.

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Mahtab Alam Khanzada	Critical review, approval of manuscript.