

Comment on: Choroidal thickness changes after dynamic exercise as measured by spectral-domain optical coherence tomography

Sir,

We have read the article by Sayin *et al.* entitled as "Choroidal thickness (CT) changes after dynamic exercise as measured by spectral-domain optical coherence tomography (OCT)"^[1] with great interest. We would like to make some contributions that may broaden the discussion section on the factors influencing CT.

A number of systemic, local, and ophthalmologic anatomical and physiopathological factors and environmental conditions may affect CT.^[2] Contradictory results have been reported concerning the effects of the factors such as exercise and blood pressure on CT.^[3] Choroid has a unique embryological development and neurovascular anatomy.^[2] It has an intense network of sympathetic innervations. Furthermore, it has been shown that nerve growth factor regulates endothelial cell migration and proliferation during choroidal development. Choroidal microvessels are fenestrated although the fenestrae are not as frequent in choroidal capillaries as in the capillaries of other tissues. In addition, there are no desmin intermediate filaments in the choroidal pericytes, and there is a paucity of pericyte ensheathment.^[2]

The choroidal circulation is under autonomic neurogenic control.^[2] Decreases in choroidal blood flow are mediated by activation of sympathetic, efferent nerves that release noradrenaline, activating alpha 1-adrenoceptors on vascular smooth muscle cells. In turn, increases in choroidal blood flow are mediated by parasympathetic efferent nerves, which act via nitric oxide signaling. Moreover, human

studies reported changes in choroidal blood flow not only in the light-stimulated eye but also in the contralateral eye,^[4] indicating that the response of choroidal blood flow is under neural control.

Another important point is that hypothalamus is one of the centers responsible for autonomic nervous system (body temperature, systemic blood pressure, etc.), and it has complex interactions with other autonomic centers.^[5]

In the light of the aforementioned data, we suppose that the findings of this study may indicate that hypothalamus is one of the main centers responsible for CT, and it may affect CT through autonomic nervous system in exercising individuals by changing body temperature, systemic blood pressure, blood glucose, and blood concentrations of oxygen and CO₂. The choroid also receives rich innervation from trigeminal sensory fibers, which contain calcitonin gene-related peptide. They are thought to mediate light-evoked control of the choroidal circulation. Furthermore, when dark-adapted eyes were exposed to room light, choroidal blood flow increased.^[4] Therefore, lighting and light intensity of the room are important factors during OCT measurements, and it is very likely that they affect the test results. Standard room lighting is particularly important for patients who will participate in studies.

In conclusion, autonomic innervation and autoregulation of choroid are important for keeping the CT. The autoregulatory mechanisms of choroidal blood flow are extremely complex. The interplay of a number of systemic and local control mechanisms may be one of the major factors that affect the CT.

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Conflicts of interest

There are no conflicts of interest.

Salih Uzun, Umit Yolcu¹, Abdullah Ilhan¹

Department of Ophthalmology, Etimesgut Military Hospital,
¹Department of Ophthalmology, Mevki Military Hospital,
Ankara, Turkey

Correspondence to: Dr. Salih Uzun,
Eye Disease Service, Etimesgut Military Hospital,
Ankara 06200, Turkey.
E-mail: s.uzun84@gmail.com

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