

Research Article

Effect of Tratak in macular thickening with reference to Gherand samhita

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ABSTRACT:

Background: A Tratak exercise for eyes has advocated as beneficial to eye health, In some studies, effect of yoga exercises for eyes become every effective in conditions like intraocular pressure (IOP). The other aspects of yoga exercises in eye care management like the one ocular structure has not investigated yet.

Aim: The aim of this study is to evaluate the effect of Tratak yoga exercises for eyes with special reference to Gherand Samhita on the macular structure using the optical coherence tomography (OCT) and OCT angiography (OCTA) parameters.

Methods: Twenty-nine participants were included in this masked within participant comparison of healthy controls. Basic ophthalmic examination was performed, after which patients were evaluated for IOP, OCT, and OCTA before and after Tratak. OCT/A parameters that were evaluated for Average macular thickness (AMT) (μm), Central macular thickness (μm), Central choroid thickness (μm) vessel density (%) in the superficial, deep vascular layers, and in the choroid capillaries.

Results: IOP was significantly reduced (post Tratak IOP = 13.02 mmHg \pm 2.82 mmHg) from the initial value (pre Tratak IOP = 13.86 mmHg \pm 2.85 mmHg, $P = 0.02$). AMT significantly increased (post Tratak AMT = 275.40 μm \pm 10.85 μm) from the pre exercise measurement (pre Tratak AMT = 274.41 μm \pm 10.89 μm ; $P = 0.02$).

Conclusion: After Tratak as a yoga exercises, IOP significantly decreased and AMT significantly increased in healthy controls, suggesting an effect of these exercises on the macular thickness by this simple ayurvedic yogic kriya.

KEY WORDS: Tratak, macula, Optical Coherence Tomography, netra

INTRODUCTION:

Tratak: Tratak is a kriya with multiple benefits. Traditionally, it has been Practices by Yogis in different ways not only for its beneficial effects on the eyes but also for its tremendous effect on improving concentration

Origin and Meaning of Tratak

Trutak (त्रुत्क): Trut (त्रुत्) means that which is broken yet existing in one line, e.g. _ _ _ _ . The word Tratak is derived from the word truti (त्रुटी). Tratak is the

method of joining pieces which are linear, that is a method of creating a line of radiance with gradual efforts thus attempting to stabilize the gaze. When one says this occurs in half a nimesh, the nimesh or nimish refers to the duration required for the opening or closing of the eyelids. A 30th of a nimesh is known as a tatvar and a 100th of a tatvar is known as a truti.

Tru tiriyate (त्रु तीर्ययते), kakayate (काकयते) is a method of steadying one's gaze akin to a crow, that is

by fixing the gaze in one direction and turning around. Tratak also means gazing continuously at one point with the mind or eyes, without blinking. One is supposed to stare at the object of til it is impossible to keep the eyes open or til they start watering.

The object used for Tratak called as the 'object of tartan'. (That on which one meditates is known as the 'object of meditation).

Tratak Ayurvedic Reference

As per Hatha Yoga Pradika Chapter 2-

“ अथ तराटकम निरीक्षेन्निश्चल-दृशा सूक्ष्म-लक्ष्णं समाहितः ।
अश्रु-सम्पात-पर्यन्तमाद्यार्यैस्त्राटकं समृतम ” ॥ ३१ ॥

Being calm, one should gaze steadily at a small mark, till eyes are filled with tears is called Tratak by âchâryas.^[1]

“ मोह्यनं नेत्र-रो गाणां तन्दाद्रीणां कपाटकम ।
यत्तत्राटकं गोप्यं यथा हाटक-पेटकम ” ॥ ३२ ॥

Tratak destroys the eye diseases and removes sloth, etc. Keep It should secret very carefully, like a box of jeweler.^[2]

As per Gherandha samhita chapter 1

“ निमेषोन्मेषकं त्यक्त्वा सूक्ष्मलक्ष्यं निरीक्षनिरीक्षयेत्
पतन्तियावदश्रूणि त्राटकं प्रोच्यते बुधैः ” ॥ 54 ॥

One should continuously look at some small object till eyes tear is called as Tratak.

“ एवमभ्यासयोगेन शाम्भवी जायते ध्रुवम् । नेत्ररोगा विनश्यन्ति
दिव्यदृष्टिः प्रजायते ॥ 55

By practicing this technique, one can attain Sambhavi Siddhi very fast. It destroys all eye diseases and gives good vision.^[3]

Techniques of Performing Tratak

Candle Flame Tratak It's the type of external Tratak. Steps of doing candle flame Tratak are the following. Sit in a dark room with minimal or no disturbance, e.g., free from insects, drafts etc.

Place a candle at one arm distance in the front, and the flame should be at the level of the eyes. Sit in a comfortable posture for meditation e.g., siddh-asana/ Siddha yoni asana.

Place your hands over the knees in Gyanmudra or prana mudra. Relax the whole body and calm down by closing your eyes. Prepare to maintain the still position till the practice ends Open your eyes and start gazing at the candle. The ideal gazing is when eyes focused on the red tip of the wick. Maintain the gaze as long as possible. Blinking or strain over the eyes should be avoided. Stop when eyes start watering.

When To Practices Tratak

The following are some suitable conditions and timings to get the best results of your Tratak practice, Four to six o'clock in the morning after performing asana and pranayama. As in the morning, the mind is less fickle, and eyes are more active, which can enhance Tratak practice.

There is no specific time for Tratak, but it has found more effective when performed an empty stomach. When done late at night before going to bed and before chanting (Japa) or meditation, it helps to travel deep in mind.

Simultaneously Mantra (Japa) should do if you feel flooded with thoughts. If concentration gets difficult, imagine that you are breathing in a straight line, between the eyebrow center and Ajna chakra (third eye chakra) at the rear of the head.

Benefits of Tratak

Through Tratak, we learn the art of exclusion, where we focus our mind on one object only. This technique is a road to the inner paths, a journey of self-realization where lower and higher selves meet.

There are various scriptures mentioned in Gheranda Samhita, which explains the benefits of Tratak. Tratak not only elevates the spiritual self but also has wonderful effects on human physiology and psychology.

Psychological Benefits

1. Develops deep concentration and meditative power of the mind.
2. Calms the mind by removing vrittis (negative thought patterns) and prevent it from wandering here and there.
3. Helps in eliminating the suppressed thoughts, emotions, unfulfilled desires from the subconscious mind.
4. Develops telepathy, telekinesis, and clairvoyance.
5. Enhances the intuitive insight and provides excellent vision along with wisdom.
6. Boosts the determination and can treat depression.

Physiological Benefits

1. Cure all types of eye-related problems, e.g., eye-strain, headache, long and shortsightedness, astigmatism, etc
2. Eyes become capable of seeing inner truth and not only the external appearance
3. Channelize the working of the nervous system in one direction
4. Lowers the heart rate and respiration rate
5. Improves peripheral blood circulation
6. Quality of sleep gets better with Tratak practice

Spiritual Benefits

1. The practice of Tratak helps in attaining the Shambhavi Mudra. It further enables the practitioner to stimulate the third eye.
2. Practitioners reach the state of Dharana or contemplation.
3. Tratak practice helps in achieving a state of complete peacefulness.
4. An enraptured connection establishes with the ultimate state of a cosmic self in Tratak.
5. The concept of "believing only what is seen" discarded, and freedom from visual dominance attained.
6. Tratak helps in achieving the highest state of consciousness.

Tratak is nothing but yogic exercise, which is performed by normal individuals. Physical activities were reported to have beneficial effects on some of the major causes of blindness, such as glaucoma, age-related macular degeneration, and diabetic retinopathy. Exercise, such as jogging and cycling, were reported to affect both IOP^[4] and ocular hemodynamic parameters.^[5] Yoga, as a part of the traditional Indian system of medical practices, also been reported to affect ocular physiology in several aspects. In previous reports, yoga postures (headstand) induced increased intraocular pressure (IOP) that may affect patients with glaucoma.^[6] Eye fatigue score and IOP were reducing after yoga ocular exercises.^{[7][8]}

Yoga is gaining increasing popularity, and it is of interest to study the effects of the exercises on both healthy eyes and those affected by pathology. This is especially important since some ophthalmic conditions, such as glaucoma or diabetic retinopathy have tendency to deteriorate despite the good control of the risk factors. In this current report, we aim to study the effect of yoga exercises for eyes with special reference to Tratak in macular optical coherence tomography (OCT) and OCT angiography (OCTA)

parameters. To the best of our knowledge, this is the first report that investigates the effect of local bulbomotor exercise to the macular thickness and blood vessel density (VD).

METHODS:

The study protocol of this experimental within participant comparison of healthy controls was approved by the ethics committee of our hospital (Approval no. 31/30-1) and was in accordance with the tenets of the declaration of Helsinki. All participants signed informed consent before study enrollment. We recruited 31 participants. Participants with diabetes, uncontrolled hypertension, ametropia >6 D, ocular pathology except for cataracts and dry eye, intraocular surgery except remote LASIK and cataract, and those with IOP measurements >21 mmHg were excluded from the study. One eye was included in the study (the right eye, unless there was significant pathology or poor image quality).

Participants underwent the following ophthalmic examination – Best-corrected visual acuity (BCVA), autorefractometry (Shin-Nippon, K-900), slit-lamp examination, IOP, OCT, and OCTA of macula without using mydriatics. Blood pressure (BP) was also initially evaluated. After the initial examination, participants did the Tratak yoga exercises. Tratak guided the participants with specific time, duration and period with daily recording sheet. The procedure lasted 10 min and consisted of a short relaxation technique, slow and continuous movements with stretching of the bulbomotor muscles in maximal horizontal, vertical, diagonal, right side, and left-side circular movements of the eyeballs. After the Tratak, participants did "palming" or warming one's eyes by previously rubbing the palms without applying any pressure to eyeballs. Participants were instructed to breathe deeply and slowly (PRANAYAM) during the initial relaxation and between the various ocular exercises. Following the exercise participants underwent IOP, BP, OCT, and OCTA measurements again.

IOP was measured in a sitting position using air puff Tonometry (Keeler). BP was evaluated using a brachial automatic device (Omron). Systolic (SBP) and diastolic BP (DBP) were recorded and mean arterial pressure (MAP) was calculated using the following formula:

$$(1) \text{MAP} = (\text{SBP} - \text{DBP})/3 + \text{DBP}$$

From the IOP and BP values, we calculated mean ocular perfusion pressure (MOPP) using the formula:

$$(2) \text{MOPP} = 2/3\text{XMAP} - \text{IOP}$$

For the OCT and OCTA measurements, we applied swept-source OCT (Atlantis, Topcon, Tokyo, Japan). We used the automatic program of the device for the retinal thickness map (Early Treatment of Diabetic Retinopathy Study grid) of the macula including 12 radial sections of the macula and for the central choroidal thickness (CCT) measurement. All 12 radial sections were evaluated for any pathology. The full-retinal thickness boundaries were from the internal limiting membrane to the outer boundary of the retinal pigment epithelium. Parameters that were included in the study were - average macular thickness (AMT) (μm), central macular thickness (CMT) (μm), and CCT (μm). OCTA measurements were evaluated in a macular 3×3 area of retinal superficial and deep, and of choriocapillaris vasculature slabs. One experienced operator did all the OCT and OCTA measurements (GD). We used image J for image binarization to evaluate percentage of VD of the entire region. One experienced and masked investigator (JK) analyzed the OCTA images.

Image quality was secured by including the images with signal strength of at least 60. Quality of images was categorized considering the presence of artifacts such as vessel doubling, motion, blink, and other artifacts. Images were categorized into three groups: good (absence of artifacts), fair (cumulative presence of artifacts in $< \frac{1}{4}$ of the image), and poor (cumulative presence of artifacts in more than $\frac{1}{4}$ of the image). Images categorized as poor were excluded from the study. A masked reviewer (ST) determined the quality of images. Intraoperator reproducibility was checked by performing five consecutive OCT and OCTA measurements in five participants by the same investigator.

The Paired t-test was used to analyze the differences between the first and second measurements. $P < 0.05$ was considered as statistically significant.

RESULTS:

Initially, 32 participants were recruited. Three participants were excluded from the study owing to diabetes and high myopia. In the study group, six participants had well-controlled hypertension, one subject was post LASIK (preoperative spherical equivalence = -2.75 D) and two participants were pseudophakic. The mean age of the enrolled participants was 51 years (standard deviation [SD] = 14.20), there were 20 male and 9 female participants, the body mass index was 24.31 (SD = 4.11), mean BCVA was 0.99 decimal units (SD = 0.04), mean spherical equivalence was -0.51 D (SD = 1.59D).

We were able to obtain IOP measurements pre- and post- Tratak in all participants. OCT measurements were taken in all participants; however, in two participants, the measurements were excluded because of poor image quality and eccentric fixation. There were 10 OCTA images with good quality, 9 images with fair quality, and 10 images with poor quality. The 19 OCTA images with good and fair quality were included in the study. Mean coefficients of variation for the OCT and OCTA parameters were as follows: AMT = 0.33%, CMT = 1.10%, superficial vascular layer VD = 1.64%, deep vascular layer VD = 3.17%, and choroidal VD = 0.77%.

After Tratak yoga for eyes, IOP was significantly reduced (POST TRATAK IOP = 13.02 mmHg \pm 2.82 mmHg) from the initial value (PRE TRATAK IOP = 13.86 mmHg \pm 2.85 mmHg, $P = 0.02$) [Table 1]. AMT significantly increased (POST TRATAK AMT = 275.40 μm \pm 10.85 μm) from the PRE Tratak measurement (Pre Tratak AMT = 274.41 μm \pm 10.89 μm ; $P = 0.02$). All the other clinical parameters pre- and post-exercise were not significantly different [Table 1].

Table No. 1: Showing results Pre and Post Tratak

	Pre	Post	P
Mean arterial pressure	89.69 (11.32)	88.07 (12.65)	0.14
Intraocular pressure	13.86 (2.85)	13.02 (2.82)	0.02*
Mean ocular perfusion pressure	45.93 (6.99)	45.61 (8.05)	0.69
Average macular thickness	274.41 (10.89)	275.40 (10.85)	0.02*
Central retinal thickness	244.41 (21.73)	245.55 (20.25)	0.60
Central choroidal thickness	250.37 (62.62)	254.89 (68.17)	0.37
Superficial retinal vascular density (%)	48.13 (2.21)	48.30 (2.06)	0.72
Deep retinal vascular thickness (%)	48.89 (2.85)	48.64 (1.84)	0.69
Choriocapillary vascular density (%)	66.99 (0.73)	66.93 (0.66)	0.72

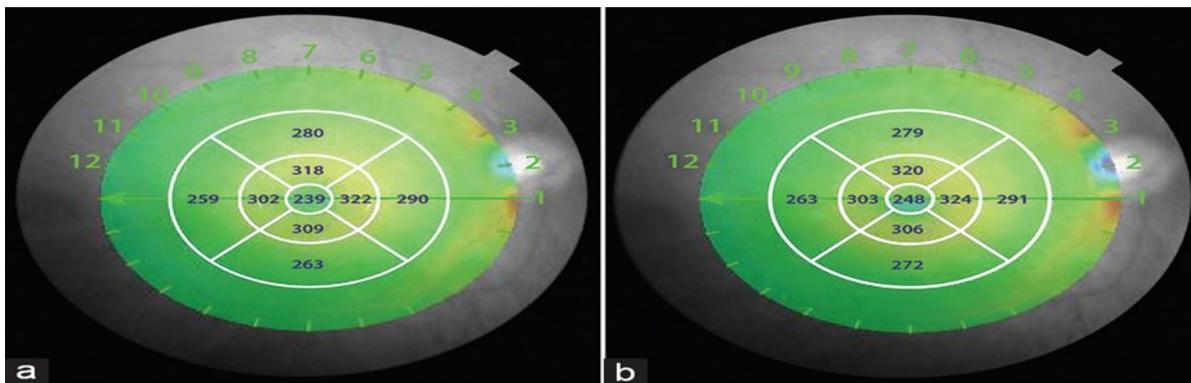
*Statistically significant difference

The results from this study indicate that IOP decreased, whereas average retinal thickness of the macula (AMT) increased after yoga exercises for eyes. In this report, we confirm previous cross-sectional and longitudinal results showing that IOP is reduced after yoga exercises for eyes.^{[7],[9]} The effect of the exercise on the reduction of IOP may be multifactorial. The exercises that were practiced in this study involved slow deep breathing that was reported to increase oxygen saturation in blood.^[10] Hyperoxia, on the other hand, reduces IOP.^[11] Bulbomotor muscles were maximally and

continuously stretched in all directions that may also act as a pump action becomes more efficient in intraorbital venous outflow. At the end of the exercise, warming of eyes was applied, and heat was also reported to reduce IOP in healthy controls.^[12]

Figure 1: Macular thickness map of the right eye, at presentation (a) and after Tratak for eyes (b). Central retinal thickness increased from 239 μm at presentation (a) to 248 μm after Tratak for eyes (b). Average retinal thickness increased from 280.9 μm at presentation (a) to 283.6 μm after Tratak (b)

Figure No. 1: Showing Macular thickness map



Average retinal thickness at macular region has significantly increased after Tratak exercises for eyes in this study [Figure 1], Diurnal variations of full retinal thickness were previously reported to be non significant.^[13] IOP reduction was correlated with increased macular thickness in patients after glaucoma filtering surgery suggesting that decreased IOP may be related to the AMT increase in our study.^[14] On the other hand, 10 min of moderate intensity exercise was also reported to decrease IOP and axial length.^[15] Axial length inversely correlated with retinal thickness measurements^[16] suggesting that a short-term decrease of axial length may also have influenced the measurement of macular thickness in our study.

Several reports analyzed the effect of Yoga exercises, Netrya diet, and vitamins on glaucoma.^{[17],[18]} Moderate exercise and a balanced diet that involved moderate coffee consumption and intake of fruits and vegetables which rich in vitamins and having a properties of netrya according to Ayurveda were considered beneficial for glaucoma patients.

In a randomized and controlled study, patients with glaucoma who practiced 45 min meditation daily for 6 weeks achieved significant reduction of IOP and stress markers and improvement in brain

oxygenation and quality of life.^[19] Impaired retinal oxygen extraction and a decline of retinal ganglion cells were associated with age,^[20] whereas aerobic exercise protected the retinal function and photoreceptor damage from light injury in mice.^[21] This suggests that treatments including changes in life style other than medication and invasive procedures may affect the course of ophthalmic diseases. The results from these studies suggest that TRATAK may also be investigated as a potential alternative care for patients with glaucoma and other age-related ophthalmic diseases.

Although moderate exercise is considered beneficial in patients with glaucoma, specific physical exercises such as headstand, weight lifting, squats, wearing of goggles during swimming, etc., were reported to transiently increase IOP.^[22] Therefore, it is important to define which exercises may be risky and which may be favorable for certain ophthalmic conditions.

We refrained using the Goldmann applanation tonometry method for measuring IOP to avoid using eye drops and to abbreviate measurement time. However, air puff tonometry that was used in this study is a reliable method that was significantly correlated to Goldmann tonometry.^[23] OCTA measurements in this study were undertaken without

pupillary dilation because tropicamide 0.5% was suggested to affect retinal capillary blood flow.^[24] This may have been the reason for the poor quality of some of the images that were discarded from the evaluation and may have weakened the power to detect change in the OCTA parameters after Tratak. Furthermore, because Tratak exercises for eyes are not only movements of the bulbomotor muscles, but also involve relaxation, slow deep breathing, and eye warming, we are not able to discern which one of these components of the exercise had the effect on the parameters that we evaluated.

Nevertheless, our study shows for the first time an impact of Tratak for eyes with special reference to Gherand Samhita on macular thickness. Although we found a statistically significant effect of the Tratak and yogic kriya to the macular thickness, the effect was small. Therefore, longitudinal studies would be beneficial to study the effects of the Tratak when practiced on a regular basis. We believe that this study may be relevant for future investigation of various exercises on ocular physiology and blood perfusion. It may also be relevant as a possible adjunct treatment of patients with glaucoma and other ocular vascular and degenerative pathology.

CONCLUSION:

We report that IOP significantly decreased and average retinal thickness of the macula significantly increased after Tratak yoga for eyes in healthy controls. Further prospective studies involving a larger study group are necessary to evaluate other effectiveness and safety of the Tratak.

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Conflicts of interest:

There are no conflicts of interest.

REFERENCES:

- [1] Hata Yoga Pradipika chapter 2 shloka no 31,
[2] Hata Yoga Pradipika chapter 2 shloka no 32

- [3] Gheranda Samhita chapter no 1 shloka no.54/55
[4] Yan X, Li M, Song Y, Guo J, Zhao Y, Chen W, *et al.* Influence of exercise on intraocular pressure, Schlemm's canal and the trabecular meshwork. *Invest Ophthalmol Vis Sci* 2016; 57:4733-9.
[5] Vo Kim S, Semoun O, Pedinielli A, Jung C, Miere A, Souied EH. Optical coherence tomography angiography quantitative assessment of exercise-induced variations in retinal vascular plexa of healthy subjects. *Invest Ophthalmol Vis Sci* 2019; 60:1412-9. Baskaran M, Raman K, Ramani KK, Roy J, Vijaya L, Badrinath SS. Intraocular pressure changes and ocular biometry during Sirsasana (headstand posture) in yoga practitioners. *Ophthalmology* 2006; 113:1327-32.
[7] Dimitrova G, Trencova A. The short-term effect of yoga ocular exercise on intra-ocular pressure. *Acta Ophthalmol* 2017;95:e81-2.
[8] Gupta SK, Aparna S. Effect of yoga ocular exercises on eye fatigue. *Int J Yoga* 2020;13:76-9.]
[9] Gupta SK, Aparna S. Effect of yoga ocular exercises on intraocular pressure. *Yoga Mimamsa* 2019;51:48-53.
[10]Bilo G, Revera M, Bussotti M, Bonacina D, Styczkiewicz K, Caldara G, *et al.* Effects of slow deep breathing at high altitude on oxygen saturation, pulmonary and systemic hemodynamics. *PLoS One* 2012;7:e49074.
[11]Hosking SL, Harris A, Chung HS, Jonescu-Cuypers CP, Kagemann L, Roff Hilton EJ, *et al.* Ocular haemodynamic responses to induced hypercapnia and hyperoxia in glaucoma. *Br J Ophthalmol* 2004;88:406-11.
[12]Dimitrova G, Gjorgjioska A, Ilievska T, Grkova-Mishkovska E, Ljubic A, Purelku M, *et al.* The effect of infra-red light on intraocular pressure. *Arq Bras Oftalmol* 2019;82:85-6.
[13]Read SA, Collins MJ, Alonso-Caneiro D. Diurnal variation of retinal thickness with spectral domain OCT. *Optom Vis Sci* 2012;89:611-9.
[14]Sesar A, Cavar I, Sesar AP, Geber MZ, Sesar I, Laus KN, *et al.* Macular thickness after glaucoma filtration surgery. *Coll Antropol* 2013;37:841-5.
[15]Read SA, Collins MJ. The short-term influence of exercise on axial length and intraocular pressure. *Eye (Lond)* 2011;25:767-74.
[16]Röck T, Bartz-Schmidt KU, Bramkamp M, Röck D. Influence of axial length on thickness measurements using spectral-domain optical coherence tomography. *Invest Ophthalmol Vis Sci* 2014; 55:7494-8.

- [17]Zhu MM, Lai JSM, Choy BN, Shum JW, Lo AC, Ng AL, et al. Physical exercise and glaucoma: A review on the roles of physical exercise on intraocular pressure control, ocular blood flow regulation, neuroprotection and glaucoma-related mental health. *Acta Ophthalmol* 2018;96:e676-91.
- [18]Al Owaifeer AM, Al Taisan AA. The role of diet in glaucoma: A review of the current evidence. *Ophthalmol Ther* 2018;7:19-31.
- [19]Gagrani M, Faiq MA, Sidhu T, Dada R, Yadav RK, Sihota R, et al. Meditation enhances brain oxygenation, upregulates BDNF and improves quality of life in patients with primary open angle glaucoma: A randomized controlled trial. *Restor Neurol Neurosci* 2018;36:741-53.
- [20]Bata AM, Fondi K, Szegedi S, Aschinger GC, Hommer A, Schmidl D, et al. Age-related decline of retinal oxygen extraction in healthy subjects. *Invest Ophthalmol Vis Sci* 2019;60:3162-9.
- [21]Lawson EC, Han MK, Sellers JT, Chrenek MA, Hanif A, Gogniat MA, et al. Aerobic exercise protects retinal function and structure from light-induced retinal degeneration. *J Neurosci* 2014;34:2406-12.
- [22]McMonnies CW. Intraocular pressure and glaucoma: Is physical exercise beneficial or a risk? *J Optom* 2016;9:139-47.
- [23]Demirci G, Erdur SK, Tanriverdi C, Gulkilik G, Ozsutcu M. Comparison of rebound tonometry and noncontact airpuff tonometry to Goldmann applanation tonometry. *Ther Adv Ophthalmol* 2019;11:2515841419835731.
- [24]Harazny JM, Schmieder RE, Welzenbach J, Michelson G. Local application of tropicamide 0.5% reduces retinal capillary blood flow. *Blood Press* 2013;22:371-6. Back to cited text no. 24
- [25]ARTICLE Year : 2020 | Volume : 13 | Issue : 3 | Page : 223-226 Immediate effect of Yoga exercises for eyes on the macular thickness Dimitrova Galina¹, Chihara Etsuo², Shoji Takuhei³, Junichi Kanno³, Ljubic Antonela⁴, Lazarova Olivera¹, Gjorgjiovska Ana¹, Kemera Dushan¹¹ Department of Ophthalmology, City General Hospital, Skopje, North Macedonia² Senshokai Eye Institute, Uji, Japan³ Department of Ophthalmology, Saitama Medical University, Iruma, Saitama, Japan⁴ Department of Ophthalmology, Medika Plus Polyclinic, Skopje, North Macedonia.

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