Published online in http://ijam.co.in ISSN No: 0976-5921

International Journal of Ayurvedic Medicine, Vol 15 (4), 2024; 1057-1061

An Anatomical Study of *Drushtipatal (*Retina*)* with Special Reference to Fundus Photo and its Correlation with *Dehaprakruti*- An observational study

Research Article

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Abstract

As the *Prakruti* of an individual is unique to him and has various variations related to others, similarly the retinal patterns(structures) have uniqueness and has variations related to others. The study of retinal patterns through fundus photo is often a neglected aspect of physical examination (*Dehaprakruti*) but with practice and expertise, a good quality of fundus photo print can be obtained to analyse *Dehaprakruti* of an individual. Aim and Objective: To study the various patterns of fundus photo and its correlation with *Dehaprakruti*. Material and Method: 90 individuals of three different *Dehaprakruti* fulfilling the criteria of selection were examined and selected with each group of *Prakruti* containing 30 individuals. *Dehaprakruti Parikshan* was done with the help of standard proforma. Avoiding bias of both eye structures we have studied only single right eye of each individual through fundus photographs for variation in structural patterns of retinal vascular tortuosity, branching and fundal glow and observation are drawn. Discussion and Conclusion: There is a statistically significant correlation between *Vata* Pradhan *Dehaprakruti* and severe vascular tortuosity, severe vascular branching and blackish red fundal glow. There is a statistically significant correlation between Pitta Pradhan *Dehaprakruti* and moderate vascular tortuosity, moderate vascular branching and reddish fundal glow. There is a statistically significant correlation between *Kapha Pradhan Dehaprakruti* and mild vascular tortuosity, mild vascular branching and dull fundal glow. There is a statistically significant association of *Dehaprakruti* with retinal structural patterns.

Keywords: *Dehaprakruti, Drushtipatal,* Fundus photo, Retina.

Introduction

As *Prakruti* (Body constitution*)* is inherent characteristic property of an individual, it refers to the genetical determination of physical and mental makeup of an individual One of the very important concepts of Ayurveda is that one's basic constitution is fix throughout the life. (1) *Prakruti Parikshan* plays an important role in the examination of patients for preventive and curative aspects of many disorders. *Dashvidha pariksha* is explained by *aachayra charak* for *Aatur Parikshan* and *Prakruti* is one of them. (2) Every Vaidya acquires knowledge regarding disease by *Darshan* (Inspection*), Sparshan* (Palpation*)* and *Prashnan* (Interogation*)* where *Darshan pariksha* is done by *Netra*, hence organ *Netra* is much important. Our Bruhatrayi mentioned the different patterns of *Bahyanetra (External* eye*)* i.e., *Akshibhru* pattern (Eyebrow), *Pakshma* pattern(eyelashes), variation in *Shuklavarna* of *Shukla Mandal* (Sclera) as per different *Dehaprakruti*. (3) (4) (5). Every individual has unique retinal pattern. This uniqueness is based on genetical characteristics of each individual which are transferred genetically from one generation to the other.

Though our Acharyas have mentioned various anatomical *variations* in external eye (*Bahya Netranga)* as per types of *Prakruti*, but regarding internal eye i.e., *Drushtipatal* structures and its correlation with *Dehaprakruti* are not mentioned in *samhita*. This can be possible by screening the eye. The standard method of screening of eye is fundoscopy, to be specific the stereoscopic digital fundus photography which gives a clear magnified image of retina. (6) Insufficient literature on anatomy of *Drushtipatal* and its application for *Prakruti Parikshan* and to determine *Drushtipatalgat Doshbahulya* has initiated to make primary attempt of study. So, the present study is carried out to find out any correlation is present or not with various structural patterns in *Drushtipatal* (retina) with individuals *Dehaprakruti*. So present study is with to observe the variations in *Drushtipatal* in different *Dehaprakruti* if any. The study will further be useful to determine the *Doshabahulya* in *Drushtipatal* with respect to *Dehaprakruti*.

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Aim of the study

To study the various patterns of fundus photo and its correlation with *Dehaprakruti*.

Objectives

- Identifying the anatomical variations in retina through fundus photo according to types of Dehaprakruti.
- Identifying the *Doshaprabalya* of *Dehaprakruti* in retina.
- This will help in prevention and early diagnosis of different *Drushtipatalgat Vyadhies (Diseases* related to retina*)*.

Materials and methods

It is observational research including 90 healthy individuals. The study is being conducted at the Shalakya Tantra OPD of the Gov. Ayurved College in Nagpur. A *prakruti* assessment proforma was used to categorize 90 healthy individuals into three groups like *Vata Pradhan Dehaprakruti*, *Pitta Pradhan Dehaprakruti*, and *Kapha Pradhan Dehaprakruti*, each with 30 individuals. The questionnaire for *Prakruti Parikshan* included 30 questions that indicated the characteristics of *Vata* Pradhan *Dehaprakruti* by (a), *Pittapradhan Dehaprakruti* by (b) and *Kaphapradhan Dehaprakruti* by (c). More number of *Lakshanas* (Characters) out of 30 questions decided the *Pradhan Dosh Dehaprakruti* of an individual. Likewise, 90 healthy individuals with each group 30 persons were classified as-

- Group A: -*Vata Pradhan Dehaprakruti* - 30 individuals
- Group B:- *Pitta Pradhan Dehaprakruti* - 30 individuals
- Group C:-*Kapha Pradhan Dehaprakruti* – 30 individuals (*Prakruti parikshan* proforma is Annexure at the end of article.)

Individuals were registered from OPD of *Shalakya Tantra*, Government Ayurved college Nagpur suitably. General examination of eye was done. External examination was performed by using a handheld flash light. The eye was examined for the presence of extra ocular movement abnormalities or any other gross abnormality. Visual acuity was recorded with Snellen's chart and Landolt's ring chart for distant vision 6/6 and Near vision N/6 with or without spectacle. Using Automated noncontact tonometer, the intraocular pressure (IOP) was measured for both eyes of an individual.

Fundus photography

Considering fundus photography as the gold standard to document and diagnose the retinal structures, 45-degree 4 field photographs of all individuals for right eye were taken. The Zeiss Visucam fundus camera with visual digital image archiving system was used to photograph fundus of subjects. At least 6 mm pupil dilation (with tropic amide0.5% and phenylephrine 5%) was ensured before fundus photography. No image manipulation was done before or during data storage. Images were stored as uncompressed jpeg files. Coloured photoprints of these Fundus photo on photo paper were printed out and assessment were done for different structures on fundus photo. Fundus photographs was printed out on photopaper. Avoiding bias of both eye structures we have studied only single right eye of each individual through fundus photographs for variation in structural patterns of retinal vascular tortuosity, branching and fundal glow and observation were kept for analysis. Data obtained was categorized and analysed statistically by chi square test to search for association and correlation between *Dehaprakruti* and structures on retina.

Inclusion criteria

Participants those over 18 and under 40 willing to participate in study are chosen at random, regardless of gender, religion, geography, education level and occupation with distant vision 6/6 and near vision N/6, both with and without spectacles.

Exclusion criteria

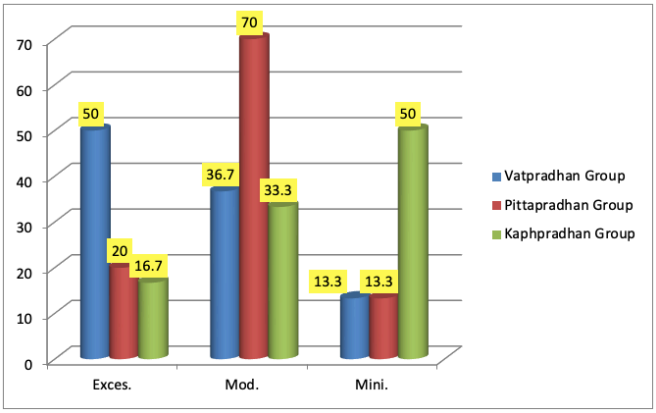
Participants those having Congenital eye anomalies with refractive or ocular disorders, Active eye infection, Media haze caused by corneal, lenticular, or vitreous opacity, obstructing fundus visualisation, Intraocular pressure greater than 25 mm Hg, Vitreous haemorrhage from any source, Posterior capsular opacity and Known cases of hypertension and diabetes are excluded from study.

Observations

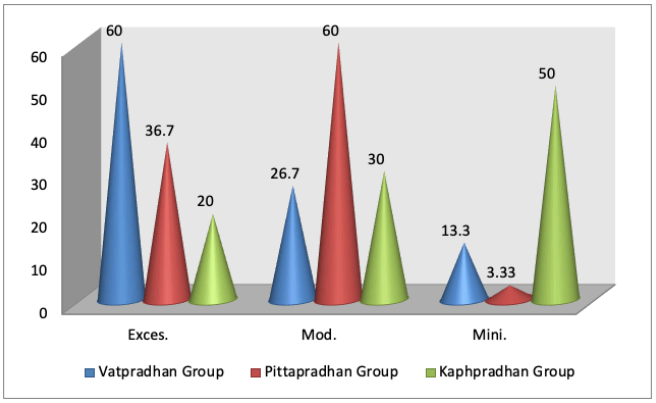
Data of 90 healthy individuals of 3 different *Dosha Pradhan Dehaprakruti* were observed for 3 different groups i.e., *Vat Pradhan Dehaprakruti, Pitta Pradhan Dehaprakruti, Kapha Pradhan Dehaprakruti.* With respect to general characteristics data obtained has been presented with the help of tables and graphs for easy understanding. In the studied sample of 90 individuals 38.9% were males and 61.1% were females and maximum were in the age group 21-25 years. Maximum 95.6% were of Hindu religion and maximum 60% were from middle class society. 93% were students and 7% individuals were having occupation service. 92% were unmarried and 8% were married. In *Vata Prakruti* group excessive vascular tortuosity found in 50%, moderate vascular tortuosity in 36.7% and minimum tortuosity found in 13.3%. In *Pitta Prakruti* group excessive tortuosity found 20%, moderate 66.7% and minimum 13.3% and in *Kapha Prakruti* group excessive tortuosity found 16.7%, moderate tortuosity found in 33.3% and minimum tortuosity found in 50% of participants. (Graph 1) (Table no.1) In *Vata Prakruti* group excessive vascular branching found in 60%, moderate vascular branching in 26.7% and minimum vascular branching found in 13.3% of participants. In *Pitta Prakruti* group excessive vascular branching found in 36.7%, moderate found in 60% and minimum vascular branching found in 3.3% and in *Kapha Prakruti* group excessive vascular branching found in

26.7%, moderate found in 33.3% and minimum vascular branching found 40%. (Graph 2) (Table no.2) In *Vata Prakruti* group blackish red fundal glow found in 66.7%, reddish glow in 6.7% and dull reddish glow found in 26.6%. In *Pitta Prakruti* group blackish reddish fundal glow found in 6.7%, reddish glow found in 83.3% and dull reddish found in 10% and in *Kapha Prakruti* group blackish red fundal glow found in 23.3%, reddish fundal glow found in 6.7% and dull reddish fundal glow found in 70%. (Graph 3) (Table no.3)

Graph 1: Showing distribution of Vascular Tortuosity in different *Dehaprakruti* groups

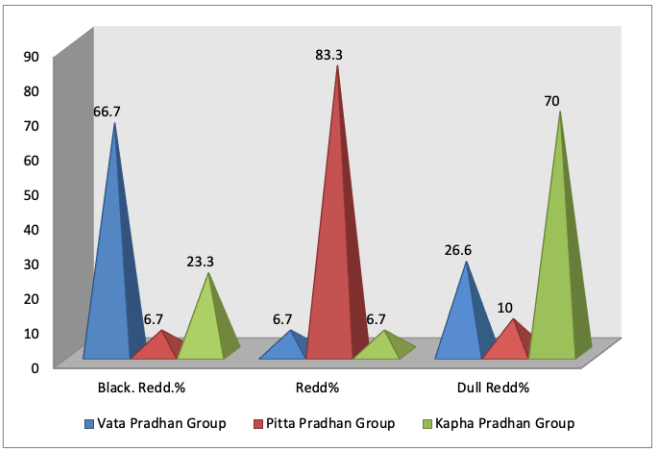


Graph 2: Showing distribution of Vascular Branching in different *Dehaprakruti*



groups

Graph 3: Showing distribution of Fundal Glow in different *Dehaprakruti* groups



Results

Dehaprakruti groups and vascular tortuosity

In *Vata Prakruti* group of 30 individual's excessive vascular tortuosity was found in 15 (50%) , moderate vascular tortuosities was found in 11 (36.7%) and minimum vascular tortuosity was found in 4 (13.3%). This difference was found statistically highly significant with p- value <0.001. In *Pitta Prakruti* group of 30 individual's excessive vascular tortuosity was found in 6 (20%), moderate vascular tortuosity was found in 20 (66.7%) and minimum vascular tortuosity was found in 4 (13.3%) individuals. This difference was found statistically highly significant with p- value <0.001. In *Kapha Prakruti* group excessive vascular tortuosity was found in 5 (16.7%), moderate tortuosity was found in 10 (33.3%) and minimum tortuosity was found in 15(50%) individuals. This difference was found statistically significant with p- value 0.024.(Table no. 1).

Dehaprakruti groups and vascular branching

In *Vata Prakruti* group excessive vascular branching was found in 18 (60%), moderate vascular branching was found in 8 (26.7%) and minimum vascular branching was found in 4 (13.3%) individuals. This difference was found statistically highly significant with p- value <0.001. In *Pitta Prakruti* group excessive vascular branching was found in 11 (36.7%), moderate vascular branching was found in 18 (60%) and minimum vascular branching was found in 1 (3.3%) individual. This difference was found statistically highly significant with p- value <0. 001. In *Kapha Prakruti* group excessive vascular branching was found in 6 (20%), moderate vascular branching was found in 9 (30%) and minimum vascular branching was found in 15 (50%) individual. This difference was found statistically significant with p- value 0.043.(Table no.2).

Dehaprakruti groups and fundal glow

In *Vata Prakruti* group blackish red fundal glow was found in 20 (66.7%), reddish fundal glow was found in 2 (6.7%) and dull reddish fundal glow was found in 8 (26.6%) individuals. This difference was found statistically significant with p- value < 0. 001.In *Pitta Prakruti* group blackish reddish fundal glow was found in 2 (6.67%), reddish fundal glow was found in 25 (83.3%) and dull reddish fundal glow was found in 3 (10%) individuals. This difference was found statistically significant with p- value < 0. 001.In *Kapha Prakruti* group blackish reddish fundal glow was found in 7 (23.3%), reddish fundal glow was found in 2 (6.7%) and dull reddish fundal glow was found in 21(70%) individual. This difference was found statistically significant p-value< 0.001. (Table no.3).

Table 1: Distribution of Vascular Tortuosity in different *Dehaprakruti* groups

Dehaprakruti	Nos.	Vascular Tortuosity						p-value
		Excessive	%	Moderate	%	Minimum	%	
Vata Prakruti group	30	15	50	11	36.7	4	13.3	<0.001, HS
Pitta Prakruti group	30	6	20	20	66.7	4	13.3	<0.001, HS
Kapha Prakruti group	30	5	16.7	10	33.3	15	50	0.024, S

Table 2: Distribution of Vascular Branching in different *Dehaprakruti* groups

Dehaprakruti	Nos.	Vascular Branching						p-value
		Excessive	%	Moderate	%	Minimum	%	
Vata Prakruti group	30	18	60	8	26.7	4	13.3	<0.001, HS
Pitta Prakruti group	30	11	36.7	18	60	1	3.3	<0.001, HS
Kapha Prakruti group	30	6	20	9	30	15	50	0.043, S

Table 3: Distribution based on Fundal Glow in different *Dehaprakruti* groups

Dehaprakruti	Nos.	Fundal Glow						p-value
		Blackish Red	%	Reddish	%	Dull Reddish	%	
Vata Prakruti group	30	20	66.7	2	6.7	8	26.6	<0.001, HS
Pitta Prakruti group	30	2	6.7	25	83.3	3	10	<0.001, HS
Kapha Prakruti group	30	7	23.3	2	6.7	21	70	<0.001, HS

Figure 1

Figure 2

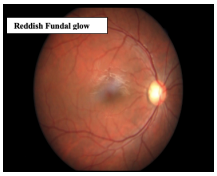


Figure 3

Discussion

A description of "*Sarvendriyaanam Nayanam pradhanam*" is given by Acharya Sushruta ,the first person to describe the anatomy of the eye in terms of the size and shape of different anatomical components. (7) In Samhitas *Acharayas* have mentioned the importance of *Netra* (eye) and its various anatomical characteristics in terms of *Netrabhru* (Eyebrow), *Pakshma* (Eyelid), *Shukla Mandal* (Sclera) and movement of *Netra* (Eye) and all about *Bahya Netrang* (External eye) according to different types of *Dehaprakruti*.(8) According to Acharyas, prakriti affects the size, structure, physical appearance, shade, lashes, activity, and some particular characteristics of the eyes. These possess person's unique constitutional peculiarities. There are different types of anatomical features of eyes in the different *prakriti* which can influence the superior, inferior, temporal and nasal side field of vision. (9) But regarding *Abhyantar Netra* (Structures of internal eye) and *Drushtipatal* (Retina) not find much more literature mentioned. Every individual has unique retinal pattern. This uniqueness of retinal pattern is based on genetical characteristics of each individual which are transferred genetically from one generation to other. (10) The present study deals with to observe the variations in *Drushtipatal* (Retina) in different *Dehaprakruti*. Among 180 eyes of 90 individuals, we have assessed only right eye of each individual and that are 90 eyes to avoid any kind of bias from other different eye. Of these 90 eyes fundus photographs were assessed for anatomical changes in *Drushtipatal (*Retina) in terms of vascular tortuosity, branching and fundal glow of prepared three grouped *Dehaprakruti* i.e., *Vata Pradhan Dehaprakruti*, *Pitta Pradhan Dehaprakruti* and *Kapha Pradhan Dehaprakruti*. These significant difference in *Vata Pradhan, Pitta Pradhan* and *Kapha Pradhan Dehaprakruti* are found as per the *Samhita* description in terms of vascular tortuosity, vascular branching and fundal glow.

Excessive vascular branching and vascular tortusity found in *Vata Pradhan Prakruti* followed by moderate in *Pitta Pradhan Prakruti* and minimum in *Kapha Pradhan. Prakruti* i.e., for *Vata Pradhan Dehaprakruti* the *lakshanas* (symptoms) and *Gunas* (Characteristics) have stated that '*Bahutwa'* i.e., abundance in tendons and veins, (11) which we have found in our study. While in *Kapha Pradhan Prakruti* due to its *Manda (*Slowness*)* and *Sthira (*Stability*) Guna* minimum vascular branching and vascular tortuosity is observed. (12) In our samhita while explaining the normal features and characteristics of *Rakt dhatu*. *Aacharya chkrapani* has mentioned that ,according to *Prakruti* there is difference in colour of *Vishudha Rakta dhatu* (non-vitiated blood) (13) As we know the retina is vascular organ so normally fundal glow is red in colour but as per *Prakruti* slight difference in red colour is observed which is significantly found in our study and i. e. blackish red fundal glow in *Vata Pradhan Prakruti*, *Reddish fundal glow in Pitta Pradhan Prakruti* and dull reddish fundal glow in *Kapha Pradhan Prakruti*. In *Pitta Pradhan Dehaprakruti* group was fundal glow is reddish in colour, which may be because of '*Tej' Guna* of *Pitta Pradhan Dehaprakruti*. (14) In *Kapha Pradhan* group the vascular tortuosity and branching found minimum in

numbers but fundal glow was found dull reddish in colour. It may be because of *Manda* and *Sheeta* guna of *Kapha* which have developed dullness of reddish glow of fundus.

Conclusion

Anatomical variations were seen in retina (*Drushtipatal*) of an individual of different *Dehaprakruti*. Retinal patterns can be summarised and grouped as different *Dehaprakruti*. There is a statistically significant association of *Dehaprakruti* with retinal structural patterns. There is a statistically significant correlation between *Vata Pradhan Dehaprakruti* and severe vascular tortuosity, severe vascular branching and blackish reddish fundal glow. There is a statistically significant correlation between *Pitta Pradhan Dehaprakruti* and moderate vascular tortuosity, moderate vascular branching and reddish fundal glow. There is a statistically significant correlation between *Kapha Pradhan Dehaprakruti* and mild vascular tortuosity, mild vascular branching and dull fundal glow. In this study correlation is established between *Vata, Pitta* and *Kapha Pradhandosha Dehaprakruti* only, but the dominant *Doshabahulya* influences the variations in structural patterns of retina. This study was carried out with 90 individuals and it was an attempt made to establish correlation between structural patterns of retina and *Pradhandosha Dehaprakruti*.

Scope for future research

In future better correlation can be established with taking large sample size and all groups of *Dehaprakruti* and more parameters of structural patterns of retina (*Drushtipatal*).

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