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Relationship between prakriti (physical constitution) and head circumference in infants: (clinical study)

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Abstract

Background: *Prakriti* is an important tool that explains individuality and it has important role in prevention, diagnosis, treatment of disease and forecast of future disorders. *Prakriti* is enumeration of body features, internal as well as external. The growth of head circumference is a valuable indicator of mental health and development in infant.

Material & Methods: 100 infants were registered for *Prakriti* assessment. Performa for *Prakriti* assessment in infants was developed by department of *Kaumarbhritya/Balroga* and department of *Kriya Sharira*. Head circumference was measured by measuring tape and data were analyzed to get the trends in accordance to individual *Prakriti*.

Observation & Result: Result of this study shows that maximum head circumference was found in *Kapha Prakriti* while it was minimum in *Vata Prakriti* infants. Maximum head circumference growth velocity was found in *Pitta Kapha* and *Kapha Prakriti* and minimum in *Vata Prakriti* as compared to different follow ups. On applying one way ANOVA and Post Hoc Bonferroni tests, significant variations were observed in all the pairs.

Discussion & Conclusion: *Vata Prakriti* individuals have predominance of *Ruksha*, *Laghu* and *Sukshma guna* so it have lowest head circumference. *Kapha Prakriti* individuals have highest head circumference due to *Mahalalata* characteristic of *Kaphaja Prakriti*. Maximum Head Circumference growth velocity was found in *Kapha* and *Pitta Kapha Prakriti* and minimum in *Vata Prakriti* infant. Not any study available for relation between infants *Prakriti* with head circumference and head circumference growth velocity

Keywords: *Prakriti*, Infants, head circumference, head circumference growth velocity

Introduction

Every man and women on the earth born with some or other physical and mental peculiarities which will remain with him or her through the life. Such features which required by birth itself are called *Prakriti*. These specific types of *Doshika Prakriti* can be identified in growing individuals [1]. The knowledge about the *Prakriti* is helps in diagnosis of diseases [2], management of disease [3] and forecast of *Dosha* dependent disorders in future [4]. Knowledge of *Prakriti* can guide the parents for prevention of expected disorders and deciding career of their wards at a very early age [5].

Formation of Deha Prakriti: - *Acharya Charaka*⁶ has described that these factors influencing the *Prakriti* determination as –

- 1) *Sukra-Shonita Prakriti* (Characteristics of sperm and ova)
- 2) *Kala-Garbhasaya Prakriti* (Time factor and condition of uterus)
- 3) *Maturaharavihara Prakriti* (Diet and code of conduct of mother)
- 4) *Panchamahabhutavikara Prakriti* (Condition of *Panchamahabhutavikara*).

Sushruta⁷ emphasizes only on the genetic factors as –

- 1) Status and *Dosha* of sperm
- 2) Status and *Dosha* of ovum are responsible for formation of *Prakriti* (Constitution)

Apart from the above mentioned factors, *Charaka*⁸ describes some other factors for *Prakriti* determination as -

- 1) *Jati Prasakta* (Racial/ Caste)
- 2) *Kula Prasakta* (Familial)
- 3) *Deshanupatinee* (Country)
- 4) *Vayonupatinee* (Natural change according to age)

- 5) *Kalanupatini* (Time)
 - 6) *Pratyatmaniyata* (Individual specific character)
- Vagbhata*⁹ has added seventh as strength (*Bala*) in this list.

Significance of Head circumference

Measuring head circumference (HC) in infants is a quick, simple, noninvasive, and reliable procedure for determining underlying brain size. This measurement is taken on children between birth to 6 years of age (the period of brain growth) Therefore, in view of above facts present study was carried out to explore a relation between head circumference and head circumference growth rate with *Prakriti* of infants.

Material and Methods

Selection of Patients: This Study was completed on *Kaumarbhritya/Balroga*, O.P.D., Sir Sunderlal Hospital, Institute of medical sciences (I.M.S), Banaras Hindu University (B.H.U) after obtaining approval from the

institutional ethics committee. The infants were selected after written informed consent and after offering sufficient explanation about the study and its aims. After proper screening *Prakriti* assessment was done as per predesigned Performa used in research work.

Ethical clearance- The ethical committee clearance number is dean/2011-12/392-A dated on 12/12/2011.

Longitudinal study was done on total 100 healthy infants on -

1. Registration was done at 10th day of life
2. Follow up 1- at the age of 45 days (1.5 month)
3. Follow up 2- at the age of 90 days (3 month)
4. Follow up 3- at the age of 180 days (6 months)
5. Follow up 4- at the age of 270 days (9 months)
6. Follow up 5 at the age of 365 days (12 months)

Cases were selected on the basis of following inclusion and exclusion criteria –

Inclusion Criteria-	Exclusion Criteria
<ol style="list-style-type: none"> 1. Infants, whose parents have given written informed consent for the participation in the study, 2. Full term and appropriate gestational age [FT (AGA)], healthy newborn baby (10th day after birth). 3. Who were delivered by uncomplicated SVD (spontaneous vaginal delivery) 4. Elective LSCS (lower segment Cesarean section) without showing any sign of fetal distress. 	<ol style="list-style-type: none"> 1. Newborn baby, if having any one of the following conditions, was excluded from the study 2. Whose parents were not willing for the participation in study. 3. Preterm, post term or full term [Small Gestational age (SGA)/ Large gestational age (LGA)] baby. 4. Any associated congenital anomalies at registration. 5. Infant who was suffering with any disease at registration or any life-threatening disorder observed on subsequent follow ups.

Assessment of Prakriti

For this study, a questionnaire was prepared on the basis of *Prakriti* characteristic mentioned in different textbooks of *Ayurveda* viz. *Charaka Samhita* ^[10], *Sushruta Samhita* ^[11], *Ashtanga Samgraha* ^[12], *Ashtanga Hridaya* ^[13], *Bhava Prakasha* ^[14], *Sharangadhar Samhita* ^[15], *Harita Samhita* ^[16], *Bhela Samhita* ^[17]. In questionnaire, only those *Doshika* characteristics were taken, which were related to the infants; while the others characteristics related to the adults were not considered. Assessment was made by analyzing obtained data filled by questionnaire and physical examination of subjects. All concerned characteristics were assessed by *Darshan* (Inspection), *Sparshana* (Palpation) and *Prasana* (questionnaire) *Pariksha* (examination) ^[18, 19]. Some characteristics were assessed by objective parameters such as skin temperature, skin color, weight, crown heel length, head circumference and chest circumference of baby etc. The proforma was designed in such a way that each trait/character described in texts was converted into corresponding simplified form/questions, yet keeping the original idea intact. Each question was allotted equal marks. It was finally found that *Vata* is having 17 traits/questions, *Pitta* is having 20 traits/Questions and *Kapha* is having 21 traits/questions. Scores of *Vata*, *Pitta* and *Kapha* in an individual was scored by using a 0/1 against V/P/K for each of the questions depending on a no or yes answer respectively and cumulative scores of V, P and K are calculated in each individual through the software ^[20].

Prakriti was determined on registered healthy infants on 10th day of life after calculation of sharing-percentage of *Vata*, *Pitta* and *Kapha*. After *Prakriti* assessment, subjects were further distributed as per their *Prakriti* into various categories, viz. *Vata*, *Pitta*, *Kapha*, *Vata-Pitta*, *Vata- Kapha*, *Pitta-Kapha* and *Vata-Pitta-Kapha Prakriti*. No subject, having *Sama-prakriti* or *Tridoshaja Prakriti*, was observed during the study period.

Head circumference: This measurement is most reliable parameter for brain growth of infants. This measurement is taken on children between births to 6 years of age²¹. Head circumference has great importance in developmental and neurological assessment. Infants, who were suspected on developmental testing of being mentally subnormal, or of having hydrocephalus, were excluded from this study.

Tool / Equipment for Head Circumference: It was done by a measuring tape formed of un-shrinkable, non-stretchable and flexible material.

Procedure

- The head circumference was measured as the maximum circumference of the head with measuring tape overlying the occiput and supraorbital ridge.
- An infant or child below the age of two years was held on the mother’s lap. The tape was moved up and down over the back of the head to locate the maximal circumference of the head and recorded.
- Three such measurements of the same child were taken and mean of data was considered as final data.



Fig 1: Measuring tap



Fig 2: Head circumference assessment

Statistical analysis of data

The obtained data of head circumference were categorized, as per the *Prakriti* of infants, and statistical analysis was done to get relationship of head circumference and head circumference growth velocity with the obtained *Prakriti*. The

analyzed data has been presented values of mean \pm standard error of mean (Minimum – Maximum), One Way ANOVA test, and Post-Hoc pairs (Bonferroni tests) values between different *Prakriti*. The statistical analysis of data was performed by using (SPSS) statistics software version 22.0.

Observations and results

Total 100 infants, irrespective to sex were registered on 10th day of life from the Kaumarbhritya/Balroga, O.P.D, Sir Sunderlal Hospital, Institute of Medical sciences (IMS), Banaras Hindu University (BHU) on the basis of inclusion and exclusion criteria of study after proper screening as per predesigned proforma. *Prakriti* of registered infants was assessed and its relation was explored in different follow ups context to head circumference and growth rate of head circumference.

Table 1: Showing head circumference (HC) of infants at registration and on subsequent follow-ups in different *Prakriti* –

Prakriti (n=100)	Head Circumference- HC (Cm)				
	Mean \pm SD (Min – Max)				
	Registration	FU1	FU2	FU3	FU4
I. Vata (n=5)	34.26 \pm 0.81 (33.7, 35.6)	36.48 \pm 0.93 (35.1, 37.6)	39.76 \pm 0.9 (38.8, 40.7)	42.76 \pm 0.8 (41.9, 43.6)	44.36 \pm 0.42 (43.9, 44.8)
II. Pitta (n=19)	34.52 \pm 0.41 (33.6, 34.9)	36.04 \pm 0.38 (35.3, 36.5)	38.83 \pm 0.47 (37.8, 39.8)	41.9 \pm 0.55 (41, 42.6)	43.24 \pm 0.55 (42.4, 44.1)
III. Kapha (n=22)	35.92 \pm 0.46 (34.7, 36.6)	38.44 \pm 0.51 (37.2, 38.9)	41.39 \pm 0.45 (40.4, 41.9)	44.64 \pm 0.53 (43.1, 45.2)	46.31 \pm 0.62 (44.8, 47.1)
IV. Vata-Pitta (n=12)	34.51 \pm 0.26 (34.1, 34.9)	36.46 \pm 0.34 (35.8, 37.2)	39.53 \pm 0.22 (39.2, 39.9)	42.8 \pm 0.54 (42.1, 43.8)	44.22 \pm 0.55 (43.4, 44.9)
V. Vata-Kapha (n=11)	35.25 \pm 0.8 (33.8, 36.5)	37.55 \pm 0.7 (36.4, 38.7)	40.66 \pm 0.65 (39.7, 41.7)	43.62 \pm 0.66 (42.4, 44.7)	45.02 \pm 0.69 (43.9, 46.2)
VI. Pitta-Kapha (n=31)	35.46 \pm 0.48 (34.7, 36.5)	37.9 \pm 0.53 (37, 38.9)	40.92 \pm 0.5 (40.3, 42.1)	44.15 \pm 0.56 (43.2, 45.5)	45.77 \pm 0.59 (44.7, 47.1)
One Way ANOVA	F = 29.134 p = 0.000 HS	F = 57.960 p = 0.000 HS	F = 68.643 p = 0.000 HS	F = 58.528 p = 0.000 HS	F = 70.073 p = 0.000 HS
Post Hoc test Pairs Bonferroni test	I vs III (p=0.000 HS) I vs VI (p=0.003 HS) II vs III (p=0.000 HS) II vs V (p=0.000 HS) II vs VI (p=0.000 HS) III vs IV (p=0.000 HS) III vs V (p=0.009 HS) III vs VI (p=0.029 S) IV vs V (p=0.012 S) IV vs VI (p=0.000 HS)	I vs III (p=0.000 HS) I vs V (p=0.005 HS) I vs VI (p=0.000 HS) II vs III (p=0.000 HS) II vs V (p=0.000 HS) II vs VI (p=0.000 HS) III vs IV (p=0.000 HS) III vs V (p=0.000 HS) III vs VI (p=0.006 HS) IV vs V (p=0.000 HS) IV vs VI (p=0.000 HS)	I vs II (p=0.007 HS) I vs III (p=0.000 HS) I vs V (p=0.021 S) I vs VI (p=0.000 HS) II vs III (p=0.000 HS) II vs IV (p=0.005 HS) II vs VI (p=0.000 HS) III vs IV (p=0.000 HS) III vs VI (p=0.02 S) IV vs V (p=0.000 HS) IV vs VI (p=0.000 HS)	I vs III (p=0.000 HS) I vs VI (p=0.000 HS) II vs III (p=0.000 HS) II vs V (p=0.000 HS) II vs VI (p=0.000 HS) III vs IV (p=0.000 HS) III vs V (p=0.000 HS) III vs VI (p=0.049 S) IV vs V (p=0.014 HS) IV vs VI (p=0.000 HS)	I vs II (p=0.005 HS) I vs III (p=0.000 HS) I vs VI (p=0.000 HS) II vs III (p=0.000 HS) II vs V (p=0.000 HS) II vs VI (p=0.000 HS) III vs IV (p=0.000 HS) III vs VI (p=0.024 S) IV vs V (p=0.026 S) IV vs VI (p=0.000 HS) V vs VI (p=0.008 HS)

This table showed maximum head circumference at registration and on subsequent follow ups in *Kapha Prakriti* infants except on fourth follow up it was in *Pitta Kapha Prakriti* while minimum head circumference was observed at registration and on subsequent follow ups in *Vata Prakriti* infants. On applying One Way ANOVA test, it was found

significant at registration and on all the follow ups. (p <0.001). When this was compared as per *Prakriti* on subsequent follow ups by Post Hoc test, significant variation was found as per *Prakriti* on almost all follow ups in almost all the pairs.

Table 2: Showing Head circumference (HC) growth velocity of infants at registration and on subsequent follow-ups in different *Prakriti*

Prakriti (n=100)	Head circumference growth velocity (cm/day)				
	Mean \pm SD / (Min – Max)				
	FU1 - Regs	FU2 – FU1	FU3 – FU2	FU4 - FU3	FU4- Reg
I. Vata (n=5)	0.615 \pm 0.045 (0.57, 0.66)	0.638 \pm 0.014 (0.62, 0.65)	0.341 \pm 0.016 (0.34, 0.38)	0.163 \pm 0.003 (0.16, 0.17)	37.07 \pm 0.002 (40.2, 33.4)
II. Pitta (n=19)	0.628 \pm 0.043 (0.57, 0.7)	0.644 \pm 0.067 (0.53, 0.77)	0.349 \pm 0.02 (0.31, 0.39)	0.166 \pm 0.004 (0.16, 0.18)	37.53 \pm 0.001 (35.3, 31.9)
III. Kapha (n=22)	0.646 \pm 0.057 (0.51, 0.7)	0.652 \pm 0.059 (0.53, 0.77)	0.355 \pm 0.015 (0.34, 0.38)	0.164 \pm 0.007 (0.15, 0.18)	39.98 \pm 0.002 (41.0, 33.8)
IV. Vata-Pitta (n=12)	0.626 \pm 0.053 (0.53, 0.69)	0.649 \pm 0.057 (0.57, 0.77)	0.346 \pm 0.015 (0.31, 0.38)	0.166 \pm 0.004 (0.16, 0.17)	37.66 \pm .001 (38.6, 35.3)
V. Vata-Kapha (n=11)	0.633 \pm 0.044 (0.57, 0.69)	0.647 \pm 0.036 (0.59, 0.71)	0.349 \pm 0.019 (0.33, 0.38)	0.165 \pm 0.002 (0.16, 0.17)	37.58 \pm 0.002 (39.5, 30.0)
VI. Pitta-Kapha (n=31)	0.659 \pm 0.037 (0.57, 0.77)	0.652 \pm 0.066 (0.51, 0.77)	0.364 \pm 0.018 (0.34, 0.39)	0.168 \pm 0.005 (0.16, 0.17)	39.65 \pm 0.001 (040.3, 35.7)
One Way ANOVA	F = 1.531 p = 0.188	F = 0.522 p = 0.759	F = 2.936 p = 0.017	F = 0.592 p = 0.706	F = 17.911 p = 0.000 HS

This table shows growth velocity of head circumference from registration to different follow ups. When the change of head circumference was compared at different follow up to assess the growth velocity, it was maximum in *Kapha Prakriti* or *Pitta-Kapha Prakriti* and Minimum in *Vata Prakriti*.

Discussion

The present study proves the significant relation between *Prakriti* and head circumference (HC) of infants. Presently, head circumference measurements in children are considered as important tools for the assessment of developmental and neurological status.

In this study, variation in head circumference, of infants, at registration and subsequent follow ups, is found significant ($p < 0.001$) as per their *Prakriti* revealed by applying ANOVA test. On applying Post Hoc test, variation in these parameters was found significant between different pairs. However head circumference was found minimum among *Vata Prakriti* and maximum in *Kapha Prakriti* and *Pitta Kapha Prakriti* in different follow ups.

In the study of growth velocity *Vata Prakriti* infant shows minimum weight gain during the subsequent follow ups and *Pitta Kapha* and *Kapha Prakriti* have shown higher growth velocity during the follow ups. These findings is due to predominance of *Vata*, having *Ruksha*, *Laghu*, and *Sukshma Guna*²³ results in relatively less growth while *Kapha Prakriti* individuals are *Mahalalata* (Broad forehead)²⁴ and *Guru*, and *Saandra Guna* of *Kapha Prakriti* contributed in well development of body parts.

Conclusion

Vata Prakriti individuals have lowest head circumference while *Kapha Prakriti* individuals have highest head circumference. Maximum Head Circumference growth rate was found in *Kapha* and *Pitta Kapha Prakriti* and minimum in *Vata Prakriti* infant.

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References

1. Agnivesha. Charaka Samhita. English translation by Sharma RK, Dash B. Viman Sthan Chaukhambha Sanskrit series office, Varanasi. 2010; 2(8):95.
2. Agnivesha. Charaka Samhita. English translation by Sharma RK, Dash B. Viman Sthan. Chaukhambha Sanskrit series office, Varanasi. 2010; 2(6):16.
3. Agnivesha. Charaka Samhita. English translation by Sharma RK, Dash B. Sutra Sthan, Chaukhambha Sanskrit series office, Varanasi. 2010; 1(10):11.
4. Vagbhata, Astanga Hriday. English translation by Srikantha Murty KR, Sutra sthana, Chaukhambha, Krishnadas Academy Varanasi. 2015; 1(1):10.
5. Srivastava, Niraj, Singh Praguna, Gehlot Sangeeta, Singh Sanjay, Singh BM. Basics for the development of prototype research software relevant to infants' *Prakriti* assessment for *Vikriti* management and possible future disorders. Int. J Res. Ayurveda Pharm. 2017, 8(1).
6. Agnivesha. Charaka Samhita. English translation by Sharma RK, Dash B. Viman Sthan, Chaukhambha Sanskrit series office, Varanasi. 2010, 1(8):95.
7. Sushruta. Sushruta Samhita. English translation by Sharma P.V, Sharir sthan, Chaukhambha Vishvabharati,

8. Agnivesha. Charaka Samhita. English translation by Sharma RK, Dash B. Indriya Sthan Chaukhambha Sanskrit series office, Varanasi. 2010; 2(1):5.
9. Vagbhata. Astanga Samgraha. English translation by Srikantha Murty KR, Sharir sthana, Chaukhambha Orientalia, Varanasi. 2001; 2(8):22.
10. Agnivesha. Charaka Samhita. English translation by Sharma RK, Dash B. Viman Sthan, Chaukhambha Sanskrit series office, Varanasi. 2010; 1(8):96-100.
11. Sushruta. Sushruta Samhita, English translation by Sharma P.V, Sharir sthan, Chaukhambha Vishvabharati, Varanasi. 2005; 2(4):64-76.
12. Vagbhata. Astanga Samgraha, English translation by Srikantha Murty KR, Sharir sthana, Chaukhambha Orientalia, Varanasi. 2001; 2(8):6-14.
13. Vagbhata, Astanga Hridaya, English translation by Srikantha Murty KR, Sharir sthana Chaukhambha, Krishnadas Academy Varanasi. 2015; 2(3):85-103.
14. Bhavmishra. Bhavprakasha, commentary and English translation by Sitaram Balusu, Chunekar KC, Purvakhanda Chaukhambha Orientalia, Varanasi, 2006; I(4):54-58,
15. Sharangadharacarya, Sharngadhara Samhita. English translation by Rao G. Prabhakar, 1st edition, Purva khanda Chaukhambha Sanskrit sansthan, Varanasi. 2013; (6):21-23.
16. Harita. Harita Samhita. English translation by Pandey Gyanendra, Pratham sthana Chaukhambha Sanskrit series office, Varanasi. 2016; 1(5):17-22.
17. Bhela, Bhela Samhita. English translation by Krishnamurty K.H, Viman sthana, Chaukhambha Vishvabharati, Varanasi. (reprint year) 2008; 4:16-25,
18. Sushruta. Sushruta Samhita, English translation by Sharma P.V, Sutra sthan Chaukhambha Vishvabharati, Varanasi. 2005; 2(10):4.
19. Vagbhata, Astanga Samgraha. English translation by Srikantha Murty KR, Sutra sthana, Chaukhambha Orientalia, Varanasi. 2001; 2(1)45, 1.
20. Srivastava N, Gehlot S, Singh S, Singh BM. Do the anthropometric parameters vary as per *Prakriti* (Physical constitution) of Infants; International Journal of Innovative Knowledge Concepts, December, 2017, 5(12).
21. Gupta P. Clinical methods of Pediatrics, Published by CBS Publication & Distribution, New Delhi; 110002 (India), 2007 edition.
22. Piyush Kumar Tripathi, Sangeeta Gehlot. "A Physioanatomical study of *Prakriti*, ID- 21024805, www.luiu.com, 2017, 69-70.
23. Agnivesha, Charaka Samhita. English translation by Sharma RK, Dash B. Sutra Sthan Chaukhambha Sanskrit series office, Varanasi. 2010; 1(1):59.
24. Bhavmishra, Bhavprakasha. Commentary and English translation by Sitaram Balusu, Chunekar KC, Purvakhanda Chaukhambha Orientalia, Varanasi. 2006; 1(3):70.