



ISSN: 2456-4419

Impact Factor: (RJIF): 5.18

Yoga 2018; 3(2): 530-533

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www.theyogicjournal.com

Received: 04-05-2018

Accepted: 06-06-2018

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Relationship between prakriti (physical constitution) and chest circumference in infants. (Clinical study)

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Abstract

Background: The purpose of Ayurveda has been described as to protect the health of a healthy person and to eliminate the ailments of a diseased man. In Ayurveda *Prakriti* is an important tool that explains individuality and it has important role in prevention, diagnosis and treatment of disease. *Prakriti* have relation with Anthropometric data such as weight, length, chest circumference and chest circumference. The crossed tape method was used for measuring chest circumference.

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*. Chest circumference was measured by measuring tape by crossed tape method and data were analyzed to get the trends in accordance to individual *Prakriti*.

Observation & Result: Result of this study shows that maximum chest circumference was found in *Kapha Prakriti* in all follow up but at registration period *Pitta- Kapha* have maximum chest circumference while it was minimum in *Vata Prakriti* infants on registration and subsequent follow ups. Maximum chest circumference growth rate was found in *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 they have lowest chest circumference. *Kapha Prakriti* individuals have highest chest circumference due to *Sthula vaksha* and *Prithupina vaksha* characteristic of *Kaphaja Prakriti*. Maximum Chest Circumference growth velocity was found in *Kapha* and minimum in *Vata Prakriti* infants. Not any study available for relation between infants *Prakriti* with chest circumference and chest circumference growth velocity.

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

Introduction

Prakriti is determined at the time of union of *Shukra* and *Shonita* according to the predominance of *Dosha* prevailing at the time of conception. *Kashyapa* has explained that the fetus is nourished by the mother so identical type of *Prakriti* of human being is formed from embryonic life. These *Prakriti* are of three types having *Vata, Pitta* and *Kapha* as pillars. 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]. According to *Charaka* person of different *Prakriti* i.e. *Vatala, Shleshmala* or *Pittala* etc. can be identified with the following characters formed out of different *Gun*as of *Vata, Pitta* and *Shlesma Dosha*.

Formation of Deha Prakriti: *Acharya Charaka*^[6] has described that these factors influencing the *Prakriti* determination in fetus 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*).

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Sushruta [7] 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)

Significance of Chest circumference

Chest circumference or thoracic diameters is an importance parameter of assessment of growth and nutrition status. At birth it is 2-3cm less than chest circumference. At 6 to 12 months of age both become equal. The present study was carried out to explore a relation between Chest circumference and chest circumference growth rate with *Prakriti* of infants.

Material and Methods

Selection of Patients

This Study was completed on *Kaumarbharitya/Balroga*, OPD,

Sir Sunderlal Hospital, Institute of medical sciences (IMS), Banaras Hindu University (BHU) after obtaining approval from the institutional ethics committee. 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)] and healthy newborn baby. 3. 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. Whose parents were not willing for the participation in study. 2. Preterm, post term or full term [Small Gestational age (SGA)/ Large gestational age (LGA)] baby. 3. Any associated congenital anomalies. 4. 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 different physical, physiological and psychological characteristic of *Prakriti* mentioned in different textbooks of Ayurveda [8-15]. In questionnaire, only those *Doshika* characteristics were taken, which were related to the infants; while the others characteristics such as psychological questionnaire were excluded from this Performa.

- All concerned characteristics were assessed by *Darshan* (Inspection), *Sparshana* (Palpation) and *Prasana* (questionnaire) *Pariksha* (examination) [16].
- Some characteristics were assessed by objective parameters such as skin temperature, skin color, weight, crown heel length, chest circumference and chest circumference of baby etc.
- The performa 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 [17].

Prakriti assessment was done in 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*. *Sama-prakriti* or *Tridoshaja Prakriti*, was not observed during the study period.

Chest circumference measurement

Chest circumference or thoracic diameter is an important parameter for assessment of growth and nutritional status.

Tool / Equipment for Chest Circumferences

It was done by measuring tape, which was formed of unshrinkable, non-stretchable and flexible material. The crossed tape method as for chest circumference measurement is used for measuring chest circumference.

Procedure

1. Infant was placed in the lap of mother with bared chest and abducted arms slightly to permit passage of the tape around the chest.
2. The tape was passed around the chest of the infants at level of nipples i.e. 4th costosternal joints.
3. The chest circumference in a horizontal plane was taken, midway between inspiration and expiration but this is not practically possible in infants.

Thereafter, anthropometric data, as per the *Prakriti* of infants, were categorized. Then statistical analysis was done to get any relationship of chest circumference with *Prakriti*. All the measurement were done in *Prakriti-Vikriti* assessment lab, OPD No-25, Indian medicine wing, SS hospital BHU.



Fig 1: Measuring tape



Fig 2: Chest circumference measurement

Statistical analysis of data

The obtained data of chest circumference were categorized, as per the *Prakriti* of infants, and statistical analysis was done to get relationship of chest circumference and chest circumference growth velocity with the obtained *Prakriti*. The statistical analysis of data was performed by using (SPSS) statistics software version 22.0.

Observations and results

Total 100 infants 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). *Prakriti* of registered infants was assessed by designed Performa and its relation was explored in different follow ups context to chest circumference and growth rate of chest circumference.

Table 1: Chest circumference (CC) of infants at registration and subsequent follow-up in different *Prakriti*

Prakriti (n=100)	Chest Circumferences –CC (Cm)				
	Mean ± SD (Min – Max)				
	Registration	FU1	FU2	FU3	FU4
i. Vata (n=5)	32.24 ± 0.8 (31.5, 33.4)	34.50 ± 1.04 (33.7, 36.1)	37.52 ± 1.59 (36.5, 39.9)	41.02 ± 1.46 (39.9, 43.3)	43.66 ± 0.46 (43.2, 44.3)
ii. Pitta (n=19)	32.28 ± 0.55 (31.5, 33.5)	34.73 ± 0.68 (33, 35.7)	37.97 ± 0.52 (37, 39)	41.63 ± 0.59 (40.7, 42.6)	42.67 ± 0.6 (41.7, 43.9)
iii. Kapha (n=22)	32.45 ± 6.49 (3.5, 34.6)	36.76 ± 0.52 (35.8, 37.7)	40.63 ± 0.49 (39.8, 41.9)	44.39 ± 0.35 (43.7, 44.9)	45.74 ± 0.56 (44.6, 46.9)
iv. Vata-Pitta (n=12)	32.5 ± 0.66 (32, 34.5)	34.82 ± 0.37 (34.1, 35.6)	39.56 ± 2.82 (38.3, 48.5)	42.31 ± 0.37 (41.8, 42.8)	43.53 ± 0.59 (42.7, 44.9)
v. Vata-Kapha (n=11)	33.21 ± 1 (31.5, 34.7)	35.89 ± 1.18 (32.7, 37.1)	39.69 ± 0.67 (38.9, 40.9)	43.48 ± 0.64 (42.5, 44.3)	44.7 ± 0.55 (43.8, 45.8)
vi. Pitta-Kapha (n=31)	33.28 ± 0.52 (32.4, 34.3)	36.32 ± 0.53 (35.4, 37.3)	39.78 ± 1.78 (30.6, 41.5)	43.68 ± 0.46 (42.9, 45.3)	45.02 ± 0.51 (44.1, 46.8)
One Way ANOVA	F = 0.412 p = 0.839	F = 34.447 p = 0.000 HS	F = 7.315 p = 0.000 HS	F = 64.518 p = 0.000 HS	F = 78.496 p = 0.000 HS
Post Hoc test Pairs Bonferroni test		I vs III (p=0.000 HS) I vs V (p=0.037 S) 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=0.01 HS) IV vs V (p=0.004 HS) IV vs VI (p=0.000 HS)	II vs III (p=0.000 HS) II vs V (p=0.015 HS) II vs VI (p=0.001 HS)	I vs III (p=0.000 HS) I vs V (p=0.000 HS) I vs VI (p=0.000 HS) II vs III (p=0.000 HS) II vs IV (p=0.021 S) 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) IV vs V (p=0.000 HS) IV vs VI (p=0.000 HS)	I vs II (p=0.009 HS) I vs III (p=0.000 HS) I vs V (p=0.01 S) I vs VI (p=0.000 HS) II vs III (p=0.000 HS) II vs V (p=0.000 HS) III vs IV (p=0.000 HS) III vs V (p=0.000 HS) III vs VI (p=0.000 HS) IV vs V (p=0.000 HS) IV vs VI (p=0.000 HS)

This table showed maximum chest circumference at registration is *Pitta-Kapha Prakriti* and on subsequent follow ups in *Kapha Prakriti* infants while minimum chest circumference was observed at registration and on subsequent

follow ups in *Vata Prakriti* infants. On applying One Way ANOVA test, it was not found significant at registration while significant variations were observed on all the subsequent follow ups (p<00.001).

Table 2: Chest circumference (CC) growth velocity of infants at registration and on subsequent follow-up in different *Prakriti*

Prakriti (n=100)	Chest Circumference (cm/day)				
	Mean ± SD (Min – Max)				
	FU1 - Reg	FU2 – FU1	FU3 – FU2	FU4 - FU3	FU4 -Reg
I. Vata (n=5)	0.639 ± 0.045 (0.57, 0.68)	0.651 ± 0.04 (0.59, 0.69)	0.354 ± 0.037 (0.3, 0.39)	0.166 ± 0.005 (0.16, 0.17)	42.07±.002 (45.6, 38.8)
II. Pitta (n=19)	0.653 ± 0.039 (0.53, 0.71)	0.659 ± 0.063 (0.52, 0.79)	0.357 ± 0.023 (0.32, 0.4)	0.167 ± 0.003 (0.16, 0.18)	40.12±.002 (41.4, 33.4)
III. Kapha (n=22)	0.657 ± 0.042 (0.53, 0.71)	0.675 ± 0.058 (0.54, 0.79)	0.369 ± 0.024 (0.32, 0.4)	0.168 ± 0.004 (0.16, 0.18)	51.11±.025 (62.3, 42.6)
IV. Vata-Pitta (n=12)	0.641 ± 0.033 (0.56, 0.67)	0.661 ± 0.031 (0.59, 0.7)	0.358 ± 0.024 (0.33, 0.4)	0.167 ± 0.017 (0.12, 0.2)	42.75±.003 (44.6, 35.3)
V. Vata-Kapha (n=11)	0.651 ± 0.024 (0.62, 0.68)	0.662 ± 0.06 (0.59, 0.8)	0.353 ± 0.015 (0.34, 0.38)	0.166 ± 0.004 (0.16, 0.17)	44.61±.002 (46.1, 40.3)
VI. Pitta-Kapha (n=31)	0.668 ± 0.047 (0.57, 0.79)	0.661 ± 0.041 (0.61, 0.79)	0.366 ± 0.03 (0.32, 0.43)	0.166 ± 0.004 (0.16, 0.18)	45.16±.001 (45.8, 41.1)
One Way ANOVA	F = 1.659 p = 0.152	F = 1.111 p = 0.360	F = 0.540 p = 0.745	F = 0.113 p = 0.989	F = 1.876 p = .106
Post Hoc test Pairs					

This table showed maximum chest circumference growth rate is found in *Pitta Kapha Prakriti* during first follow ups and in rest other follow ups *Kapha Prakriti* have maximum growth rate. *Vata Prakriti* have minimum growth rate during all follow ups.

Discussion and Conclusion

Chest circumference measurements are important indicator for developmental and neurological status. In this study, Chest 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* ^[18] results in relatively less growth while *Kapha Prakriti* individuals are *Sthula vaksha* and *Prithupina vaksha* (Broad chest) ^[19]. *Guru*, and *Saandra Guna* of *Kapha Prakriti* contributed in well development and compactness of body parts.

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