Relationship of Crown heel length (CHL) and length growth velocity with Prakriti (Physical constitution) in Infants.(Clinical study)

Srivastava Niraj1, Gehlot Sangeeta2, Singh Sanjay3, Singh B.M.4
1Associate professor-Department of Kaumarbhritya/Balroga, Government Ayurvedic College, Varanasi (Sampurnanand Sanskrit University)
2Professor and head, Department of KriyaSharir, FOAy, IMS, BHU
3Associate professor, Department of Computer Science, IIT, BHU
4Professor and Head, Department of Kaumarbhritya/Balroga, FOAy, IMS, BHU

Corresponding Author:
Dr. Niraj Srivastava
Associate professor- Department of Kaumarbhritya/Balroga, Government Ayurvedic College, Varanasi (Sampurnanand Sanskrit University)

Received: May 10, 2018
Accepted: June 07, 2018

ABSTRACT
Prakriti is an important tool that explains individuality and has important role in prevention, diagnosis, in deciding the line of treatment of disease and forecast of future disorders. It explains unique but definite unchangeable traits, decided by specific and permanent configuration of Dosha in an individual. The Crown heel length (CHL) and Length growth velocity of infants are valuable indicator of health and development of infant.

Material & Methods:
Pakruti of 100 infants was assessed by Prakriti assessment performa developed by department of Kaumarbhritya/Balroga and department of KriyaSharira. Crown heel length (CHL) was measured with infantometer and data were analyzed to get the trends in accordance to individual Prakriti.

Observation & Result:
Result of this study shows that maximum Crown heel length (CHL) was found among Pitta-Kapha Prakriti infants while it was minimum in PittaPrakriti infants. Maximum length growth velocity was found in Pitta-KaphaPrakriti and minimum in Vata-Pitta Prakritis 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:
Pitta KaphaPrakriti individuals have maximum Crown heel length (CHL) and length growth velocity in this study due to Dhirdhgarsh characteristic of KaphaPrakriti. Vata-Pitta Prakriti has minimum growth velocity because in BhelaSamhita, it has clearly mentioned that VataPrakriti individuals are of short stature.

Keywords: - Prakriti, physical constitution, Infants, Crown Heel length (CHL), Length growth velocity.

INTRODUCTION: -
PrakritiDosh is present in a person since birth till death without changing. If changed, death is definite. This is mainly decided by a particular permanent configuration of Doshaat the time of conception and differs individual to individual. These specific types of DoshikaPrakriti can be identified in growing individuals1. The knowledge about the Prakriti is helpful in diagnosis of diseases2, management of disease3 and forecast of Dosha dependent disorders in future4. Knowledge of Prakriti guide the parents for prevention of expected disorders and deciding career of their wards at a very early age5.

AcharyaCharaka has described that these factors influencing the Prakriti determination as Sukra-ShonitaPrakriti (Characteristics of sperm and ova), Kala-GarbhasayaPrakriti (Time factor and condition of uterus), MaturaharaviharaPrakriti (Diet and code of conduct of mother) and PanchamahabwutavikaraPrakriti (Condition of Panchamahabwutavikara)6. Again AcharyaCharaka has described six Bhavaresponsible for the development of fetus, and can be considered as determinants in the development of human organism and its Prakriti7. Among all PrakritiEkdosaja are Heena (poor), the Dwandajapraakriti are Madhayama (moderate) and TridosajaPrakriti is Uttama (best or ideal). Vataja is Heena (poor), Pittaja is Madhayam (moderate) and Kaphaja is Uttama (best or ideal)8

Crow heel length and length growth velocity is an indicator of health, and development in infants, children and adolescents9. It is recommended for nutritional assessment in both individuals as well as large population groups10. Therefore, in view of above facts present study was carried out to explore relation between crown heel length and length growth velocity with Prakriti of infants.
Material and Methods –

Selection of Patients -

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)

Study was completed on Kaumarbhritoja/Balraga, 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 subjects were selected using simple random sampling and written informed consent was taken 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.

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

Inclusion Criteria -
The following inclusion criteria were considered for the registration of infants -

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), who were delivered by uncomplicated SVD (spontaneous vaginal delivery) and elective LSCS (lower segment Cesarean section) without showing any sign of fetal distress.

Exclusion Criteria

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.

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

Assessment of Prakriti -

For this study, a questionnaire was prepared on the basis of Prakriti characteristic mentioned in different textbooks of Ayurveda viz. Charaka Samhita11, Sushruta Samhita12, Ashtanga Samgraha13, Ashtanga Hridya14, Bhava Prakasha15, Sharangadhar Samhita16, Harita Samhita17, Bhela Samhita18. In questionnaire, only those Doshik 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)19, 20. Some characteristics were assessed by objective parameter such as skin temperature, skin color, weight, crown heel length, head circumference and chest circumference of baby. 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 software5.

The formula, used for the calculation of Particular Prakriti characteristics in infants (%) -

% of particular Dosa i.e. V, P or K =

\[
\frac{\text{Number of manifested characteristics of particular Dosa}}{\text{Total number of manifested characteristics of particular Dosa}} \times 100
\]

Prakriti was determined on registered healthy infants on 10th day of life after calculation of sharing percentage of Vata, Pitta and Kapha21. 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-Kapha and Vata-Kapha.
Assessment of crown heel length (CHL) in infants-

In the present study, crown heel length was measured by infantometer. Few precautions were taken before assessment of crown heel length in baby as-

1. The hands of examiner should be properly washed and prewarmed.
2. Examination was done by keen observation and patience in a quiet and calm position.
3. During the examination soft toys like rattle, soft ball etc. were used to create a friendly environment in a well-lit room having temperature between ~30 to 32 °C.
4. To get accurate assessment of jaundice and cyanosis, curtains of yellow or blue color in the examination room were not used.

Crown heel length (CHL) assessment: Length of an infant was assessed by infantometer. A character selected for assessment was Alpa Kaya, Dirghadarshi etc.

Tool / Equipment for CHL Assessment-

Harpenden's infantometer was used for CHL assessment. It consists of a horizontal wooden board limited by two vertical planks perpendicular to the two ends. At one end, planks is fixed to the wooden board (head piece) while the other end is a movable vertical plank for adjusting the infant's length (foot piece). There is a calibrated reading strip in the middle of the board on which the length of baby can be read directly. The infantometer is designed to measure a length up to 100 cm, with a precision of 1 mm.

Procedure: Baby was placed, in supine position, on the infant measuring board and assistant was asked to hold the child's head in the Frankfort plane. The head was positioned in the Frankfort plane when the crown touches the headpiece. A gentle traction was applied to bring the head in contact with the fixed headpiece. Baby's legs were holding down with one hand and foot piece was moved with the other. Position of the child's shoulders and hips were maintained at right angles to the long axis of the body. A gentle pressure on the knees was applied to straighten the legs and to prevent the knees from flexing. Movable footboard was kept firmly against the child's feet with the soles flat on the board and the toes pointing directly upwards.

Statistical analysis of data:- The obtained data of crown heel length were categorized, as per the Prakriti of infants, and statistical analysis was done to get relationship of crown heel length and length growth velocity with the obtained Prakriti. The analyzed data has been presented values of mean ± 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 (I.M.S), Banaras Hindu University (B.H.U) 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 crown heel length.
<table>
<thead>
<tr>
<th>Prakriti (n=100)</th>
<th>Crown heel length (Cm)</th>
<th>Mean ± SD (Min – Max)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Registration</td>
<td>FU1</td>
</tr>
<tr>
<td>Vata(n=5)</td>
<td>49.8 ± 1.09 (48, 51)</td>
<td>53.12 ± 1.12 (52.1, 54.7)</td>
</tr>
<tr>
<td>Pitta(n=19)</td>
<td>49.21 ± 0.53 (48, 50)</td>
<td>52.51 ± 0.59 (51.4, 53.6)</td>
</tr>
<tr>
<td>Kapha(n=22)</td>
<td>50.77 ± 0.68 (50, 52)</td>
<td>54.7 ± 0.59 (53.2, 55.9)</td>
</tr>
<tr>
<td>Vata-Pitta (n=12)</td>
<td>49.41 ± 0.99 (48, 51)</td>
<td>52.93 ± 0.8 (51.9, 54.7)</td>
</tr>
<tr>
<td>Vata-Kapha(n=11)</td>
<td>49.72 ± 0.64 (49, 51)</td>
<td>54 ± 0.82 (52.8, 55.2)</td>
</tr>
<tr>
<td>Pitta-Kapha(n=31)</td>
<td>51.09 ± 0.74 (50, 52)</td>
<td>55.24 ± 1.08 (53.3, 56.9)</td>
</tr>
</tbody>
</table>

One Way ANOVA

Post Hoc test Pairs

Bonferroni test

This table showed maximum CHL at registration and on subsequent follow ups in Pitta-kapha Prakriti infants while minimum CHL was observed at registration and on subsequent follow ups in Pitta 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, significant variations were found as per Prakriti in following pairs: I vs VI (p=0.007), II vs III (p=0.000), II vs VI (p=0.000), III vs IV (p=0.000), III vs V (p=0.004), IV vs VI (p=0.000) while significant variations as per Prakriti on all the follow ups were found almost in all the pairs. These details can be seen from the table number 1.

Table No.2 Showing relation of CHL, Growth Velocity of infants at registration and on subsequent follow ups in different Prakriti-

<table>
<thead>
<tr>
<th>Prakriti(n=100)</th>
<th>Crown Heel length (cm)</th>
<th>Mean ± SD (Min – Max)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FU1 - Reg</td>
<td>FU2 – FU1</td>
</tr>
<tr>
<td>Vata (n=5)</td>
<td>1.156 ± 0.1 (0.99, 1.26)</td>
<td>1.154 ± 0.062 (1.08, 1.25)</td>
</tr>
<tr>
<td>Pitta (n=19)</td>
<td>1.162 ± 0.073 (1, 1.25)</td>
<td>1.163 ± 0.064 (1.07, 1.25)</td>
</tr>
</tbody>
</table>
Growth velocity for CHL was seen maximum and minimum in Pitta-Kapha (1.204 ±0.037) and in Vata – Pitta and Vata-KaphaPrakriti infants between registration and FU-1 respectively. Change in CHL during this period was found significant (p <0.005) between Vata-Pitta and Pitta-KaphaPrakriti infants as well as between Vata-Kapha and Pitta-Kapha infants as shown in table number 2.

Discussion:
The present study proves the significant relation between Prakriti of infants and crown heel length. Presently, Crown heel length measurements in children are considered as important tools for the assessment of growth and development including nutritional status. Some studies have been carried out on anthropometric parameters in adults to know the relation with Prakriti 23,24, but in infants no such study was carried out particularly in relation to Prakriti. Therefore, concerned anthropometric parameters viz. crown heel length and their growth velocity used to know the variation in accordance to Prakriti types. In this study, variation in crown heel length, 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, mean crown heel length was found minimum among Pitta Prakriti and maximum in Pitta-Kapha Prakriti different follow ups. Maximum length growth velocity was found in Pitta-Kapha Prakriti and minimum in Vata-Pitta Prakriti compared to different follow ups.

These findings seem to support the concept of Ayurveda that Vata Prakriti individuals are Krishna (lean and thin) 25; it means, they will have lower growth velocity due to predominance of Vata, having Raksha, Laghu, and Khara Guna 26, results in relatively less growth while Kapha Prakriti individuals are Dirghadarshi (tall look) 27 and Guru, Sheeta, Snigdha, Sthira and Picchila Gunathat contributed in gain better weight velocity. In Bhela Samhita, it has been clearly mentioned that Vata Prakriti individuals are of Alpasharira 28 (short stature) and Krishna-sharira 29.
Study limitations and Future direction:-
The sample size of this randomized study is small (100 infants). It is longitudinal study over a limited period. It is only an observational study without any specific diet. Extensive well stratified studies in a large sample of volunteers and infants would give a clearer categorization of Prakriti.

Conclusion:
Pitta KaphaPrakriti individuals have maximum Crown heel length (CHL) and length growth velocity in this study due to Dirghdarshi characteristic of KaphaPrakriti. Vata-Pitta Prakriti has minimum growth velocity because in BheLaSamhita, it has clearly mentioned that VataPrakriti individuals are of short stature.

Source of support- Nil
Conflict of interest- None Declared

References:


