

To Study The Correlation of Foot Length and Gestational Age in New Born Babies

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Abstract :

Introduction : Accurate assessment of gestation maturity is not possible in all newborn infants especially when they are sick and need intensive care support. Gestational age is important for prediction of morbidity, mortality and further management. **Objective :** To study the correlation between foot length and gestational age among preterm, term and post-term neonates. **Methods :** 60 new-borns, born over a period of 6 months were included in the study. Gestational age was assessed by antenatal USG scan and babies were grouped into term, preterm and post-term. Correlation of foot length with gestational age was statistically analysed. Foot length measurements were done using a Vernier caliper within 48 hours after birth. Results: Out of 60 neonates, being 20 of each preterm, term and post term average foot length were 5.6cm, 7.4cm and 8.35cm, respectively. The foot length is directly proportional to gestational age.

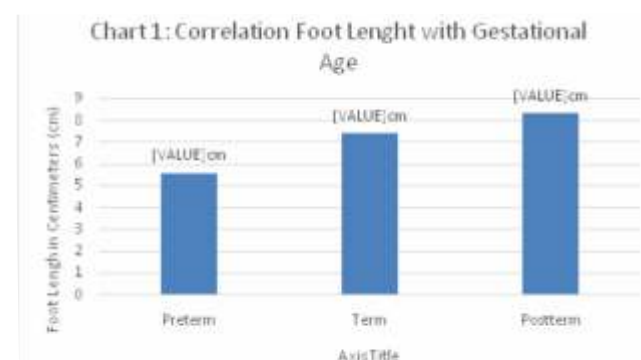
Introduction : Accurate assessment of gestation maturity is not possible in all newborn infants especially when they are sick and need intensive care support.⁽¹⁾ The foot of the

newborn is usually readily accessible for measurement, even in incubators. It has been shown that foot length measurement is particularly valuable in premature babies who are so ill that conventional anthropometric measurements cannot be carried out due to the incubator and intensive care apparatus.⁽²⁾ To determine gestational age in newborn, clinicians rely on various prenatal and postnatal indicators such as first trimester ultrasound and last menstrual period.⁽³⁾ USG is out of reach of many poor patients. Different scoring systems use a number of neurological and physical criteria which are suitable for doctors but are cumbersome to use at remote places by paramedical staff.⁽⁴⁾ Foot length is simple to measure and do not require much expertise.⁽⁵⁾

Objective : To study the correlation of foot length and gestational age among preterm, term and post-term neonates.

Methods : Sample size and duration: 60 new-borns born over a period of 6 months. Gestational age was assessed by antenatal USG scan and babies were grouped into term, preterm and post-term. Correlation of foot length with gestational age was statistically analysed. Foot length measurements were done using a Vernier caliper within 48 hrs after birth. The foot length was measured from heel to tip of great toe ensure that no pressure is exerted on soft tissue. The foot was placed in manner to attain the lateral position the ankle was held and the finger was placed on the dorsum of foot so that a grasp reflex would not be elicited, as this would shorten the measurement. There was no significant difference between right and left foot. But universally right foot was measured.

Results : Out of 60 neonates, being 20 of each preterm, term and post-term average foot length were 5.6cm, 7.4cm and 8.35cm, respectively. The foot length is directly proportional to gestational age.



Gestational Age (WK)	Number of Babies	Foot Length (MM)	Standard deviation
27	1	50	0
28	1	55	0
29	2	56.5	1.7
30	6	58.8	2.9
31	3	60	0
32	6	60.6	2
33	9	64.7	1.1
34	4	65.4	2.4
35	3	70	0
36	1	70	0
37	10	74.5	1.3
38	4	77	2.2
39	2	80	0.6
40	3	82.9	0.8
41	3	85.2	0.6
42	2	87.9	0.9

Discussion : Foot length of 74.20mm was identified from linear regression analysis as the cutoff point corresponding to a gestational age of 37 weeks. foot length of 7.0 cm serves as a reliable index of prematurity. The current study demonstrated a significant degree of correlation between Foot length and birth weight, crown heel length and head circumference in term and preterm infants. In term Large for gestational age and post-term infants, co-relation was poor. James et al demonstrated a positive linear correlation between and other indices of babies of gestational age 26 - 42 weeks.⁽⁶⁾

They concluded that birth weight and crown-heel length could be estimated from a measurement of foot length. Gohil et al carried out a similar study with a larger sample.⁽⁷⁾

They found foot length correlated well with birth weight, crown heel length, and head circumference. They suggested when it is difficult to weigh or measure the body

length accurately, foot length can serve as a useful measurement to assess a baby quickly in neonates nursed in incubators and receiving intensive care. This makes the measurement of foot length in ill babies an important issue. Foot length has been proved useful in other clinical conditions.⁽⁸⁻¹¹⁾

Anderson et al a reported relationship between foot length and stature showed little change with increasing age from 1-18 years. The length from heel to toe maintained the same relationship with the length from heel to head at all ages (during which the foot was increasing in size).⁽¹⁰⁾

Mercer et al showed that ultrasonography measurement of fetal foot length was useful in the assessment of gestational age.⁽¹¹⁾ They concluded that fetal foot length is a reliable parameter for use in the assessment of gestational age and is particularly useful when other parameters do not accurately predict gestational age, for example, hydrocephalus, anencephaly, and short-limb dysplasia. Markowski et al also showed that foot length was positively related to gestational age.⁽¹²⁾

Pospisilova-Zuzakora reported that fetal foot length was related positively to fetal body length.⁽¹³⁾ A study by Embleton et al showed that foot length was the best predictor of naris-midtracheal length.⁽¹⁾ They concluded that foot length is a reliable and reproducible predictor of nasotracheal tube length and is at least as accurate as the conventional weight based estimation.

Conclusion: Foot length is a simple and reliable anthropometric measurement to assess gestational age in preterm and term neonates. It can be a very useful tool for peripheral health care workers in identifying and referring to high risk new born.

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