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Tape Rule Measurement of Foot Length as Proxy for Vernier Digital Calliper in Estimating Gestational Age among Nigerian Neonates

Mesure de la Longueur du Pied à l'Aide d'une Règle à Ruban en Remplacement du Pied à Coulisserie Numérique de Vernier pour l'Estimation de l'Âge Gestationnel chez les Nouveau-Nés Nigériens

¹O. Kuponiyi, ^{1*}T. Ogunlesi, ¹A. Adekanmbi, ¹O. Akodu, ¹M. Olowonyo

ABSTRACT

BACKGROUND: Estimating gestational age at birth could be challenging, particularly in settings where the expertise to use conventional methods is lacking. The use of the postnatal foot length has been proposed for this purpose. The ideal tool for measuring foot length, the Vernier Digital Calliper, is not readily available in resource-poor settings.

OBJECTIVE: To determine the degree of correlation between postnatal foot length measurement using a Vernier Digital Calliper and a tape measure in the estimation of gestational age among Nigerian neonates.

METHODS: Neonates aged 0 to 48 hours without lower limb deformities were studied. The Gestational age was determined using the New Ballard Scoring method. The Foot length was measured as the distance between the tip of the second toe and the heel using both the Vernier Digital Calliper (FL_C) and a non-elastic, flexible tape measure (FL_T). The measurements were subjected to statistical comparisons.

RESULTS: A total of 260 newborn infants comprising 140 preterm and 120 term babies were studied. The foot length measurements using both the calliper and tape measure progressively increased with gestational age. FL_T was consistently relatively higher than FL_C across gestational ages. The relationship between the two tools was $FL_C = 3.05 + (0.9 \times FL_T)$ for preterm babies and $FL_C = 23.39 + (0.6 \times FL_T)$ for term babies. The Cronbach's Alpha correlation ranged from 0.775 to 0.958 across the gestational ages. The degree of agreement between the tools ranged from -2.03 to -1.34 with a mean difference of -1.68 ($t = -9.67$, $p < 0.001$).

CONCLUSION: There is a high level of intra-gestational age reliability between caliper measurements and tape measurements, the latter can be suitably used as a suitable proxy for the former in the measurement of postnatal foot length in the estimation of gestational age at birth. **WAJM 2023; 40(3): 345–350.**

Keywords: Estimated Gestational Age, Digital Calliper, Foot Length, Prematurity.

RÉSUMÉ

CONTEXTE: L'estimation de l'âge gestationnel à la naissance peut s'avérer difficile, en particulier dans les contextes où l'expertise nécessaire à l'utilisation des méthodes conventionnelles fait défaut. La longueur du pied postnatal a été proposée à cette fin. L'outil idéal pour mesurer la longueur du pied, le pied à coulisse numérique de Vernier, n'est pas facilement disponible dans les régions à faibles ressources.

OBJECTIF: Déterminer la corrélation entre deux méthodes de mesure de la longueur du pied postnatal dans l'estimation de l'âge gestationnel chez les nouveau-nés nigériens.

MÉTHODES: Des nouveau-nés âgés de 0 à 48 heures sans déformation des membres inférieurs ont été étudiés. L'âge gestationnel a été déterminé à l'aide de la méthode New Ballard Scoring. La longueur du pied a été mesurée comme la distance entre l'extrémité du deuxième orteil et le talon à l'aide d'un pied à coulisse numérique de Vernier (FLC) et d'un mètre ruban souple non élastique (FLT).

RÉSULTATS: Au total, 260 nouveau-nés, dont 140 prématurés et 120 nés à terme, ont été étudiés. Les mesures de la longueur du pied à l'aide du pied à coulisse et du mètre ruban augmentent progressivement avec l'âge gestationnel. La FLT était toujours relativement plus élevée que la FLC, quel que soit l'âge gestationnel. La relation entre les deux outils était la suivante : $FLC = 3,05 + (0,9 \times FLT)$ pour les prématurés et $FLC = 23,39 + (0,6 \times FLT)$ pour les enfants nés à terme. La corrélation alpha de Cronbach allait de 0,775 à 0,958 selon l'âge gestationnel.

CONCLUSION: Le mètre ruban est un substitut adéquat au pied à coulisse pour la mesure de la longueur du pied postnatal. **WAJM 2023; 40(3):345–350.**

Mots clés: Âge gestationnel estimé; Pied à coulisse numérique; Longueur du pied; Prématurité.

¹Department of Paediatrics, Olabisi Onabanjo University Teaching Hospital, Sagamu, Ogun State, Nigeria.

*Correspondence: Professor Tinuade Adetutu Ogunlesi, Department of Paediatrics, Olabisi Onabanjo University Teaching Hospital, Sagamu, Ogun State, Nigeria. P. O.Box 652, Sagamu-121001NG. E-mail: tinuade.ogunlesi@oouagoiwoye.edu.ng