

STRONG CHILDREN'S RESEARCH CENTER

Summer 2015 Research Scholar

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ABSTRACT

Title: *Routine Assessment of Linear Growth in Preterm Infants*

Background: Though greater attention has been placed on ensuring optimal weight gain and head growth in preterm infants, suboptimal linear growth has also been associated with poorer neurodevelopmental outcomes. Given our observations that length measurements receive less attention during clinical care, and that seemingly wide variability exists in those measurements week-to-week, we sought to determine whether routine length measurements obtained in our NICU achieved a pre-determined level of agreement with gold-standard length measurements.

Objective: To determine the agreement between routine length measurements and those obtained using a stadiometer in preterm infants.

Design/Methods: Any infant in the NICU between 5/27/2015 and 7/30/2015 born <32 0/7 weeks and deemed stable was eligible for measurement. Routine length measurements, obtained using a paper tape measure by staff, were compared with those obtained by study personnel using a length board (Stadiometer). Study measurements were performed weekly and obtained within 48 hours of routine measurements. To determine whether agreement existed between the two techniques, an *a priori* level of agreement was set at ± 0.5 cm. To determine if accuracy of measurements are a function of the measurement instrument (stadiometer vs. tape measure) or the measurement technique (one person vs. two people), we measured a subset of 24 infants using two people with the tape measure and two people with the stadiometer. Statistical analysis included a Bland-Altman plot to test for agreement, one-sided and paired t-tests to evaluate for significance.

Results: There were 38 unique infants who had at least one pair of measurements throughout the study, totaling 97 measurements. These patients' mean gestational age at birth was 28 weeks with an average birth weight of 1092 grams. Of these 97 measurements, only 28% of routine measurements were found within *a priori* agreement (± 0.5 cm) of the length board measurements. Furthermore, only 62% of measurements pairs were within 1 cm. The absolute mean difference was significantly different from 0.5 (0.98, 95% CL 0.86-1.13, $p < 0.0001$). The secondary study supports lack of agreement between the tape measure and length board despite controlling for technique.

Conclusion: These data suggest a lack of agreement between routine length measurements and those using a length board, though routine measurements do not appear to consistently over- or underestimate length in preterm infants. We speculate that this difference is likely related to the device itself, and is unrelated to the number of individuals obtaining the measurement. While the overall trend in linear growth can be ascertained with either technique, it appears length board measurements provide greater consistency, which may ultimately prove valuable for clinical decision-making.