Head circumference

- Association of fetal growth trajectory with mitochondrial DNA copy number in the cord blood of newborns: evidence from a birth cohort
- Long Sleep Duration Is Associated with Fetal Brain Parameter Extreme Values: A Prospective Cohort Study
- The effect of maternal anemia on different anthropometric parameters of newborns - A case-control study
- The impact of overweight-obesity on heart rate variability among Indian adults - A cross-sectional study
- Relationship between human milk oligosaccharides concentrations and physical growth of infants within the first six months of life
- Association between feeding patterns and physical growth of late preterm infants aged 0-5 months of correction age
- Human breast milk fortification with human milk fortifier vs preterm infant formula: A systematic review and meta-analysis
- Fenton Third-Generation Growth Charts of Preterm Infants Without Abnormal Fetal Growth: A Systematic Review and Meta-Analysis

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Accurate head circumference (HC) measurement is essential when assessing neonates and infants. Tape measure HC measurements are prone to errors, particularly when performed by parents/guardians, due to individual differences in head shape, hair style and texture, subject cooperation, and examiner techniques, including tape measure placement and tautness. There is, therefore, the need for a more reliable method.

The primary objective of a study was to evaluate the validity, reliability, and consistency of HC app measurement compared to the current standard of practice, serving as a proof-of-concept for use by healthcare professionals.

They recruited infants attending the neurosurgery clinic, and parents/guardians were approached and consented to participate in the study. Along with the standard head circumference measurement, measurements were taken with the head circumference app (HC app) developed in-house, and we also collected baseline medical history and characteristics. For the statistical analysis, we used RStudio (version 4.1.1). In summary, we analyzed covariance and intraclass correlation coefficient (ICC) to compare the measurement's within-rater and inter-rater reliability. The F test was used to analyze the variance between measurements and the Bland-Altman agreement, t-test, and correlation coefficients were used to compare the tape measurement to the measures taken by the HC app. We also used nonvalidated questionnaires to explore parental or guardians' experiences, assess their views on app utility, and collect feedback.

The total number of recruited patients was 37. Comparison between the app measurements and the measurements with a tape measure showed poor reliability (ICC=0.177) and wide within-app variations (ICC=0.341). The agreement between the measurements done by parents/guardians and the tape measurements done by the researcher was good (ICC=0.901). Parental/guardian feedback was overall very positive, with most of the parents/guardians reporting that the app was easy to use (n=31, 84%) and that they are happy to use the app in an unsupervised setting, provided that they are assured of the measurement quality.

They developed this project as a proof-of-concept study, and as such, the app has shown great potential to be used both in a clinical setting and by parents/guardians in their own homes [1].

A single “normal” head circumference, that one lies within two standard deviations above and below the mean for age and sex, may prove misleading, since it gives no clue as to the rate of head growth. Serial head circumference measurements should, therefore, be a routine part of the physical examination of infants and children. When such measurements are plotted on the composite graphs, abnormal growth patterns are readily discernible. The rapid upward deviation may signify correctable conditions, such as hydrocephalus, subdural hematomas, or effusions. Marked slowing or arrest of head growth offers a poor prognosis for mental development. But even a single measurement outside the range of normal should lead to further evaluation of the child.

Birth to 36 months: Boys Head circumference-for-age and Weight-for-length percentiles

Boys Head Circumference

Girls Head Circumference

In children, deviations from the normal range of head circumference (HC) have traditionally been related with cerebrospinal fluid dynamics abnormalities. In adults, this neglected parameter is helpful in the diagnosis and understanding of the pathophysiology of some CSF abnormalities. It has been demonstrated that HC is related to height. Because humans have increased in stature dramatically during the last 50 years, pediatric charts for head growth physiology and normal HC values in adults should be reevaluated.

HC obtained in Spanish adult people are greater than those reported in the classical Nellhaus graphs in both men and women aged 18. These findings should be considered in the management of hydrocephalus in adults today [2].

After Shunt

Shunt-treated children have smaller head circumferences at 2 and 3 years of age than healthy children. Low weight, short height, etiology of intraventricular hemorrhage, and frequent shunt valve revisions are predictors for decreased head circumference. Prospective, randomized studies comparing skull growth using fixed and adjustable pressure-regulated shunt valves and flow-regulated valves are needed [3].

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2)
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3)
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