

Predictors of Cranial Molding in Preterm Infants

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- **Purpose/Hypothesis:** There is a high prevalence of symmetric and asymmetric cranial molding deformities in preterm infants at term equivalent age (TEA). The purpose of this study was to determine if there is a correlation between days spent on CPAP and the severity of asymmetrical and symmetrical head deformities among preterm infants.
- **Subjects:** 20 infants with birth gestational age ≤ 32 weeks and stable on room air, low-flow nasal cannula, or high-flow nasal canula, at the time of measurement.
- **Materials/Methods:** Cranial index (CI), and cranial vault asymmetry index (CVAI) were measured at TEA by a trained physical therapist, using orthopedic cranial calipers. Retrospective chart review was performed to collect demographic data, days on CPAP, days on mechanical ventilation, the presence and grade of intraventricular hemorrhage (IVH), and whether asymmetry was documented by PT and OT in the week prior to the measurement.
- **Results:** Overall, 11/20 (55%) infants in this cohort had a CI of <76 , indicating presence of dolichocephaly, and 10/20 infants in this cohort had asymmetric molding present as indicated by CVAI measures. Higher grades of IVH were significantly correlated with lower CVAIs ($p=0.0277$). In other words, infants with a higher grade of IVH had less asymmetry. Furthermore, infants without IVH were found to have higher CVAI, or more asymmetry, at TEA, although this association was not statistically significant ($p=0.0561$). No significant correlations between cranial molding and the other tested variables were found.
- **Conclusions:** In a small cohort of preterm infants, respiratory support did not appear to have an impact on cranial molding. This likely indicates that infant positioning has a greater impact on infant head shape. We also observed an association between cranial molding and IVH that should be explored further in future studies.
- **Clinical Relevance:** This study demonstrates that positioning may have a greater impact on cranial molding in preterm infants. Future research would benefit from recording the positional preferences and positioning of the patient upon arrival at the bedside to determine if there is a correlation between positional preference and cranial deformities. We also observed an association between increased severity of IVH and symmetrical head shapes, which has not been previously reported. Further research is required to understand the implications of IVH and how symmetrical cranial molding may be correlated with IVH. Abnormal cranial molding, including dolichocephaly and plagiocephaly are associated with abnormal motor development later in life. It is important to understand factors which may increase the risk of abnormal cranial molding, in order to establish the best methods for prevention.