

HEAD CIRCUMFERENCE AS PREDICTED BY FACIAL MEASURES IN MOUSE MODEL OF FASD

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Intrauterine exposure to ethanol produces a myriad of anomalies, many tied to the developing brain. Both dose and duration of exposure are suggested to have cumulative effects on brain growth; however, brain volume is difficult to obtain directly, so a commonly used indirect measure of brain volume has been the occipital frontal circumference (OFC) in humans (Malina and Bouchard). In this study, we investigated the relationship of craniofacial measurements and exposure histories against skull circumference in C57BL/6J (Jackson Laboratory) mice. Three alcohol treatment groups were used, which differed in dose of alcohol administered and/or the duration of treatment during gestation. All pups were surrogated at birth with normal dams and received microCT at postnatal day (P) 21. Individual measurement comparisons were made between treatment groups, a control sample of chow fed, and matching groups of pair-fed (isocalorically linked liquid diet). Linear craniofacial measurements were derived from micro-CT images, and a measure of head circumference was constructed using the MxView software (Philips). A multiple linear regression was used to evaluate the facial measurements that best predicted circumference. Variables explored were facial measurements as well as treatment and gender. The model, using a constant, mid facial depth, inner orbital width, and bigonial width predicted 68.8% of variance in circumference (N=164, $R^2=.688$, $p=.006$). In conclusion, a small set of facial measurements can moderately predict circumference in mice. However, in a small exploratory study, there is an indication that alcohol exposure is a significant factor in the degree to which circumference relates to total brain volume.

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