Evaluating the "Cushion Effect" Among Children in Frontal Motor Vehicle Crashes.

BACKGROUND: The "Cushion Effect," the phenomenon in which obesity protects against abdominal injury in adults in motor vehicle accidents, has not been evaluated among pediatric patients. This work evaluates the association between subcutaneous fat cross-sectional area, quantified using analytic morphomic techniques and abdominal injury.

METHODS: This retrospective study includes 119 patients aged 1 to 18 years involved in frontal impact motor vehicle accidents (2003-2015) with computed tomography scans. Subcutaneous fat cross-sectional area was measured and converted to age- and gender-adjusted percentiles from population-based normative data. Multivariable analysis determined the risk of the primary outcome, Maximum Abbreviated Injury Scale (MAIS) 2+ abdominal injury, after adjusting for age, weight, seatbelt status, and impact rating.

RESULTS: MAIS 2+ abdominal injuries occurred in 20 (16.8%) of the patients. Subcutaneous fat area percentile was not significantly associated with MAIS 2+ abdominal injury on multivariable logistic regression (adjusted Odds Ratio, 0.86; 95% CI, 0.72-1.03; p=0.10).

DISCUSSION: The "cushion effect" was not apparent among pediatric frontal motor vehicle crash victims in this study. Future work is needed to investigate other analytic morphomic measures. By understanding how body composition relates to injury patterns, there is a unique opportunity to improve vehicle safety design.