Applegren et al. sought to determine the relationship between mild-to-moderate trigonocephaly and anterior cranial volume using a noninvasive laser shape digitizer (STARscanner) in patients with abnormal head shape. An IRB-approved retrospective review of a prospectively maintained database and medical records was performed. Two hundred three patients less than 1 year of age with abnormal head shape were categorized as having a metopic ridge with mild-to-moderate trigonocephaly, metopic ridge without trigonocephaly, or no ridge. Measurements of cranial volume, circumference, and symmetry were calculated by the STARscanner, which quantifies three-dimensional shape of the cranial surface. Measures were analyzed using a series of analyses of variance and post-hoc Tukey honest significant difference.

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The authors results showed ACV was significantly reduced in patients with mild-to-moderate trigonocephaly compared with those without metopic ridge (P=0.009), and trended toward significance compared with those with a ridge but without trigonocephaly (P=0.072). The ratio of anterior-to-posterior cranial volume was significantly reduced in those with mild-to-moderate trigonocephaly compared with those without metopic ridge (P=0.036).

Patients with milder anterior cranial deformities demonstrated an association between a metopic ridge with mild-to-moderate trigonocephaly and reduced anterior cranial volume ¹⁾.

The STARscanner for evaluation of surgical outcomes in metopic craniosynostosis patients who underwent fronto-orbital advancement with pre- and postoperative STARscanner imaging at Texas Children's Hospital was performed. Two patients were identified and evaluation and discussion of the data produced by the STARscanner was undertaken. A novel symmetry index created by the authors, called the anterior-posterior volume ratio (APVR), was discussed for use in metopic synostosis patients. The postoperative growth metrics demonstrated an interval increase compared with the preoperative data. The anterior symmetry ratio, posterior symmetry ratio, overall symmetry ratio, cranial vault volumes, cranial vault asymmetry index, and cephalic ratio were not found to be useful in evaluating resolution of dysmorphology after fronto-orbital advancement in metopic synostosis. The APVR does not characterize dysmorphology, but may help show degree of expansion of the anterior cranial vault after fronto-orbital advancement.

The STARscanner imaging device does not appear to have significant utility in characterizing head shape for surgical outcomes assessment in metopic synostosis. The minor utility of this device may be that it is a safe and fast way to derive growth parameters for both short-term and long-term follow-up of cranial vault remodeling ²⁾.

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STARscanner

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