

Measurement helps craniofacial surgeons better evaluate children with skull deformity

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A baby's skull is made of several plates of bone that fuse together over time to form a single structure. Previous research has shown that approximately one in 2,000 babies have plates that fuse too early—a condition called craniosynostosis—causing cranial deformities that can lead to learning impairments and other neurodevelopmental problems. Craniofacial surgeons across the country differ on when surgical intervention is needed for some abnormalities. Now, researchers at the University of Missouri School of Medicine are recommending a new method to help determine when surgery is needed.

"Children with a condition known as metopic craniosynostosis develop a vertical ridge in their foreheads due to a premature fusing of the cranium's frontal bones," said Arshad Muzaffar, M.D., professor in the Division of Plastic Surgery at the MU School of Medicine and senior author of the study. "This can create increased pressure on the brain that can lead to neurodevelopmental disorders and learning problems. However, depending on the severity of the skull abnormality, recommendations on when to surgically intervene vary among craniofacial surgeons. At MU, we take a multidisciplinary approach that incorporates a measurement known as 'cephalic width-intercoronal distance ratio.'"

The study included 104 infants diagnosed with metopic craniosynostosis and who received CT scans at MU between 2006 and 2012. The children were divided into two groups: those who were recommended for surgery and those who were recommended for close observation. The babies'

skull development was evaluated using five existing standard cranial measurements.

In addition to these standard measurements, the researchers evaluated the cephalic width-intercoronal distance ratio, which indicates how narrow the front of the skull is compared to the back. When the ratio is above a certain value, the measurement shows a potential need for surgery. The measurement can be performed at no additional cost to the patient.

Muzaffar cautioned, however, that the ratio should not be the only factor when making a decision about surgery. Instead, it should be used as one component of a suite of data gathered from a comprehensive, multidisciplinary evaluation which, when taken together, helps the team make recommendations regarding the need for surgical treatment.

"While it may not be a suitable measurement for all craniosynostosis patients, in certain cases in which the premature fusion of the frontal bones is not as pronounced, surgeons can benefit by adding the cephalic width-intercoronal distance ratio to their evaluation," said Muzaffar, who also serves as the director of craniofacial and pediatric [plastic surgery](#) at MU. "We feel this is another tool to help treatment centers around the country make surgical decisions in cases that do not present a clear course of action. It is a quick, easy-to-perform objective measurement that provides extra insight to ensure patients receive care at the most appropriate time."

The study, "Evaluating Children with Metopic Craniosynostosis: The Cephalic Width-Intercoronal Distance Ratio," recently was published in the July 2016 issue of *The Cleft Palate-Craniofacial Journal*. Research reported in this publication was supported by the MU School of Medicine and the MU Division of Plastic Surgery. The researchers have no conflicts of interest to declare related to this study.

More information: Thomas W. McEwan et al. Evaluating Children With Metopic Craniosynostosis: The Cephalic Width-Intercoronal Distance Ratio, *The Cleft Palate-Craniofacial Journal* (2016).

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