EDITORIAL

Is the helmet doing most of the job in the endoscopic correction of craniosynostosis?

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THE introduction of endoscopy to the surgical treatment of craniosynostosis in 1998 by Jimenez and Barone revived linear synostectomies that had been practically abandoned.^{1,2} Indeed, strip craniectomies were revealed to have limited effectiveness in ensuring appropriate remodeling of the skull and appeared to be negatively weighted by a relatively high incidence of premature reossification. The pushing forces of the growing brain are the main factors for postoperative expansion of the skull toward a normal volume and morphology. However, these forces are not sufficient in all cases, especially if the operation is performed late in life when the resistance of the cranial bones has already increased and abnormal vectors of growth have been created by the secondary modifications of the skull base.³

To overcome the limits of linear craniectomies, more extended surgical procedures were developed at the end of the last century to actively reshape the skull without relying on merely the expansile forces of the developing brain. These techniques, still largely used in all pediatric neurosurgical centers, allow immediate correction of the skull deformity and intracranial hypertension by appropriately expanding the cranial volume and reconstructing the skull vault during the operation.⁴ These techniques, however, are negatively weighted by the major risk of excessive intraoperative blood loss and more extensive postoperative scars compared with those of endoscopic procedures. Furthermore, the endoscopic procedure can be utilized at a younger age than open reconstruction of the calvaria, thereby ensuring a more physiological postoperative cranial development.

Nowadays, the debate mostly confronts the two techniques, the endoscopic and open procedures, in terms of morphological outcomes. Functional evaluation of the long-term results of endoscopic treatment is still beginning. However, the real comparison is not between two surgical techniques, but between a surgical technique (the

open approach) and a surgical technique (the endoscopic approach) plus the action of the helmet. Use of the last device is implicit in all papers but never emphasized as a correct comparison would require. What transformed the past “ineffective” linear craniectomies into the current “effective” synostectomies, if not the application of the helmet? Indeed, the two techniques do not differ significantly in terms of fused suture excision or accompanying vertical linear cuts on the parietal bones, as performed to correct sagittal synostosis, decrease their resistance, and favor transverse growth of the skull. In other terms, the crucial role is that exerted by the application of the helmet.

Actually, other minimally invasive surgical techniques lead to similar results without using an endoscope.⁵ The paper by Mohanty et al.,⁶ in this issue of *Neurosurgical Focus*, correctly associates the surgical technique and the cranioplastic effect due to the use of the remodeling helmet in its title, “Ultra-early synostectomy and cranial remodeling orthoses in the management of craniosynostoses,” giving them a similar emphasis. However, the authors take a further step by stressing the main advantage of endoscopic treatment, the possibility to carry out surgical correction at a younger age than that suggested for open procedures. They operated on 25 infants, 11 at or younger than 2 weeks of age, 8 between 3 and 4 weeks of age, and 6 between 5 and 8 weeks of age. The operation was successful and well tolerated in all 17 infants presenting with single-suture synostosis. Excision of the fused suture and its osseous border was easier because of the thin bone and positively weighted by minor blood loss compared with that observed in operations on older infants. The operative time was shorter, and postoperative recovery was quicker. All these infants received the maximal benefit because the helmet could easily meld the abnormal skull owing to the thinner calvarial bones and the absent or still minor asymmetrical deformities that

develop progressively in infants with craniosynostosis prior to surgical treatment. Ultra-early synostectomy was less rewarding in the 8 infants with multisutural synostosis or syndromic syndromes due to excessive intraoperative blood loss; in some cases, this led to interruption of the procedure or the inability to affect the progress of craniosynostosis, resulting in the need for multiple subsequent operations. All infants underwent postoperative 3D CT, an examination that could be questioned due to the extremely young age of the patients.

In summary, the importance of this paper consists of the demonstration that anticipating surgical correction in infants with unisutural synostosis is not only possible but also advantageous. Such a conclusion implies the necessity of early referral of affected infants and major awareness of pediatricians and parents. In addition, the article stresses the role of cranial remodeling orthoses in determining a positive cosmetic outcome. This further demonstration of the role of helmets for infants who have undergone synostectomy may also encourage early surgical treatment of simple craniosynostoses in countries where endoscopes are unavailable, because synostectomy can be performed with minimally invasive surgical techniques that do not require sophisticated surgical tools.

<https://thejns.org/doi/abs/10.3171/2021.1.FOCUS2125>

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Disclosures

The author reports no conflict of interest.

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DOI: 10.3171/2021.1.FOCUS2125.