

Neosuture Formation after Endoscopic-Assisted Craniosynostosis Repair

Afshin Salehi, MD; Katie Ott, BA; Gary Skolnick, BS; Sybill Naidoo, PhD, RN, CPNP; Albert Woo, MD; Matthew Smyth, MD; Kamlesh B. Patel, MD.

Background: Continued fusion and synostosis of unaffected sutures has been noted after both traditional calvarial vault remodeling and endoscopic-assisted synostosis repair.^{1,2} Agrawal and colleagues identified reformation of the sagittal suture after strip craniectomy in 17% of their cases.³ In our experience, we have not observed a neosuture in patients after open calvarial vault reconstruction; however its presence has been recognized after endoscopic-assisted strip craniectomy and moulding helmet therapy. We aim to identify the rate of a neosuture in patients with craniosynostosis treated after endoscopic-assisted strip craniectomy.

Methods: A total of 146 endoscopic-assisted cases for nonsyndromic craniosynostosis were retrospectively reviewed between 2006 and 2013. Patients with a syndromic diagnosis and multi-suture synostosis other than bilateral coronal were excluded. Pre and one year postoperative head computed tomography scans were reviewed and patients that developed a neosuture were identified. Cephalic index (ratio of head width and length) preoperative and 1 year after the surgery were measured using calipers in patients with sagittal synostosis. A student t-test with significant value predetermined at $p < 0.05$ was used to calculate significant differences between the groups (Microsoft Excel 2010).

Results: Seventy-six patients (61 sagittal, 6 bilateral coronal, 5 unilateral coronal, 4 lambdoid) treated by endoscopic-assisted technique with pre and one year postoperative scans were identified. Neosuture development was seen in 23 patients (30%): 14 sagittal, 2 bilateral coronal, 4 unilateral coronal and 2 lambdoid synostosis (Fig. 1). No statistical difference in cephalic index was seen pre and 1-year postoperative in patients with sagittal synostosis. Pre and postoperative cephalic index in the neosuture group was 67.5% and 76.9%, while in the fused suture group it was 69.6% and 77.6%.

Conclusions: Neosuture development can occur after endoscopic-assisted strip craniectomy and molding helmet therapy for patients with craniosynostosis. Its relevance is still to be determined. Further studies are required to determine long-term outcomes comparing patients with continued fusion versus neosuture formation.

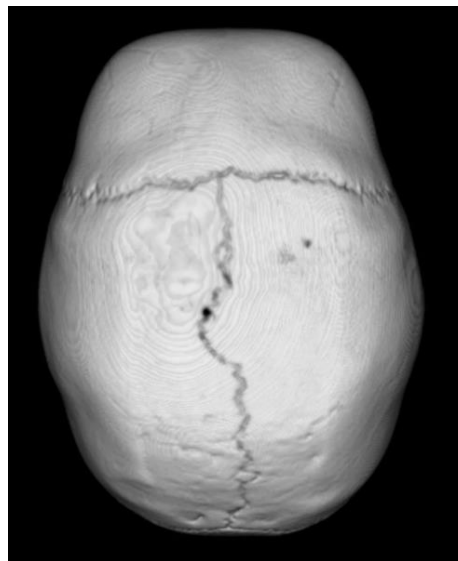
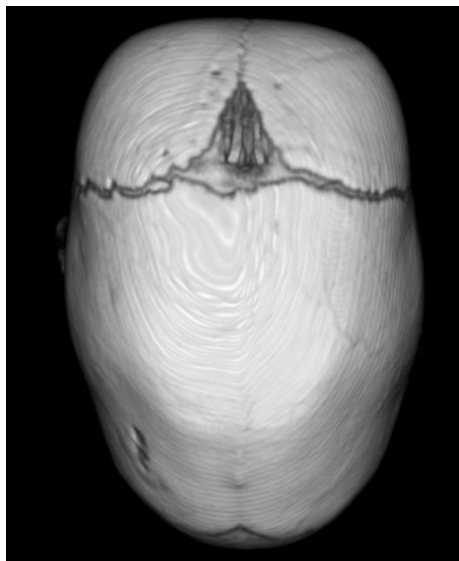


Figure 1. (Left) Preoperative CT scan showing sagittal synostosis. (Right) 1-year postoperative CT scan with neosuture formation.

1. Seruya M, Tan SY, Wray AC, et al. Total cranial vault remodeling for isolated sagittal synostosis: part I. Postoperative cranial suture patency. *Plastic and reconstructive surgery* 2013;132:602e-10e.
2. Yarbrough CK, Smyth MD, Holekamp TF, et al. Delayed synostoses of uninvolved sutures after surgical treatment of nonsyndromic craniosynostosis. *The Journal of craniofacial surgery* 2014;25:119-23.
3. Agrawal D, Steinbok P, Cochrane DD. Reformation of the sagittal suture following surgery for isolated sagittal craniosynostosis. *Journal of neurosurgery* 2006;105:115-7.

Disclosure/Financial Support:

None of the authors has a financial interest in any of the products, devices, or drugs mentioned in this manuscript.