Strip craniectomy for sagittal craniosynostosis treatment

- The incidence of subsequent high intracranial pressure in patients undergoing early, open, and wide strip craniectomy for sagittal synostosis
- Head Shape After Sagittal Craniosynostosis Surgery: Open Versus Endoscopic Strip Craniectomy
- Surgery of craniosynostosis: a historical review
- Non-syndromic craniosynostosis
- Long-term parental satisfaction and cosmetic, ophthalmological, and cognitive outcomes after sagittal strip craniectomy with barrel stave osteotomies and occipital release
- Minimally Invasive Versus Open Cranial Vault Remodeling Procedures for Single-Suture Craniosynostosis: What Do We Know?
- Morphology and outcomes in combined sagittal and unilateral coronal synostosis
- Clinical Reference Strategy for the Selection of Surgical Treatment for Nonsyndromic Sagittal Craniosynostosis: A Systematic Review and Network Meta-Analysis

A linear Strip Craniectomy for sagittal craniosynostosis treatment is performed, excising the sagittal suture from the coronal suture to the lambdoid suture, preferably within the first 3–6 months of life. The width of the strip should be at least 3 cm; no proof exists that interposing artificial substances (e.g. silastic sheeting over the exposed edges of the parietal bone) retards the recurrence of synostosis. Great care is taken to avoid unintended durotomy with potential injury to the underlying superior sagittal sinus. The child is followed and reoperated if fusion recurs before 6 months of age. After ≈ 1 yr of age, more extensive cranial remodeling is usually required

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The most common approaches used today for the correction of sagittal craniosynostosis involve a large craniectomy and extensive cranial vault remodeling. Although these techniques yield very good cosmetic results, they have significant drawbacks. They are lengthy, expensive, associated with significant blood loss, universally require transfusions, and often result in prolonged hospitalization.

Sagittal craniosynostosis has been treated using both cranial remodeling techniques and modification of the sagittal strip craniectomy.

The increased incidence and success of strip craniectomy with postoperative helmet therapy in the treatment of sagittal craniosynostosis has been documented by multiple centers throughout the country and world.

Skin incision

The skin incision may be longitudinal or transverse.

Prone position on a soft U-shaped headrest in a sphinx-like position. Bicoronal zig-zag incision approximately 3 cm posterior to the coronal suture. Dissection by planes. Opening of the periosteum. Biparietal craniectomy over trephines on both sides of the midline, removing the sagittal suture with a width of 4 cm parasagittal bilaterally. Subsequent corrective osteotomies at both parietals to increase the diameter of the cranial vault without reaching the temporal bone. Extraction of the occipital cap

for remodeling with radial osteotomies and subsequent adaptation to the parietal osteotomies. Frontal radial osteotomies to reduce frontal bossing. Fixation of the osteotomies (sagittal suture bar placed in transverse fragments along the cranial vault) with absorbable material to allow cranial remodeling and increase the biparietal cranial diameter. Hemostasis. Placement of a size 8 round drain without vacuum fixation with silk. Closure by layers, subcutaneous with Vicryl 3-0, skin with continuous suture blocked with absorbable 3-0.

Endoscopic Strip Craniectomy

see Endoscopic strip craniectomy.

Renier's H technique

Renier's H technique

Case series

A total of 238 patients underwent ESC. Follow-up information was available for 182 patients. The average age at the time of the operation was 4.5 months and the mean duration of follow-up was 49.6 months. The average post procedure radiologic follow-up (22 patients) was 40.7 months.

The mean cranial index (CI) increased from 0.68 to 0.75 ($p < 0.001$) after ESC. Also, mean NFA increased from 127 to 133° ($p < 0.001$). Five patients (2.7%) required a second operation due to symptomatic cranial growth restriction. Reoperation occurred at an average of 26.5 months after the initial procedure. The most common symptom reported was headache. ESC is effective in treating nonsyndromic sagittal synostosis. It significantly improved NFA without the need for direct frontal bone resection or frontal orbital osteotomy and significantly increased CI without adjunctive helmet treatment. Patients should be followed for at least 5 years after surgical correction as symptomatic restenosis, although rare, can occur [1].

2012

Gociman et al. present here 5-year experience with correction of sagittal synostosis using a minimally invasive strip craniectomy followed by postoperative cranial vault helmet molding.

The first 46 of 67 children treated for sagittal synostosis had at least 1 year of postoperative follow-up and were included in the analysis. There were 33 boys and 13 girls. Patients' mean age at surgery was 3.1 months, and the mean weight was 6.1 kg. The mean operative time was 75 minutes. The estimated blood loss during the procedure was 56 mL. Eight patients received blood transfusions during surgery (17.4%) and 3 patients received after surgery (6.5%). There were no significant postoperative complications. The mean hospitalization was 2.2 days. Excellent aesthetic outcomes were noted in all patients. The change in cranial index from a preoperative value of 0.7 to 0.8 postoperatively was virtually stabilized 3 months after the surgical intervention. Significantly better

correction rates were observed in the youngest patients.Because of its excellent attributes, minimally invasive strip craniectomy followed by postoperative helmet molding is likely to become the preferred treatment modality for the correction of sagittal synostosis [2].

Case reports

Friel et al., report a child with a postoperative implantation intradiploic epidermoid cyst following a strip craniectomy, a complication, that to our knowledge, has not been reported.

This clinical report involves a 3-year-old boy with a scaphocephalic appearance who was transferred to our center following an interstate adoption. He underwent a strip craniectomy with helmet therapy in infancy. On presentation to our facility the chief complaint was a scaphocephalic appearance. Preop computed tomography scans showed areas of bone gaps along the sagittal suture.

The child was brought to the operating room for a mid-vault expansion. At surgery, a large intradiploic epidermoid cyst was noted on the posterior aspect of the area of the sagittal suture, immediately beneath to posterior incision for the strip craniectomy. The cyst extended through the inner table of the skull and necessitated split cranial grafts to aid in the reconstruction.

The authors present a patient with an iatrogenic intradiploic epidermoid cyst of the posterior skull following strip craniectomy, which has not been previously been described in association with strip craniectomy. This patient underlies the importance of a strong working relationship between craniofacial surgery and neurosurgery [3].

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3)
Friel MT, Hidalgo J, Shiflett JM. Iatrogenic Intradiploic Epidermoid Cyst Following Strip Craniectomy for Sagittal Craniosynostosis. J Craniofac Surg. 2017 Feb 7. doi: 10.1097/SCS.0000000000003504. [Epub ahead of print] PubMed PMID: 28178101.