

Outcomes of patients with unicoronal craniosynostosis treated by endoscopic strip craniectomy

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Background: Unicoronal craniosynostosis (UCS) results in craniofacial deformities including recessed forehead, orbital dystopia, and angulation of the nose and face. This condition traditionally has been treated with bifronto-orbital advancement, but facial and nasal angulation can remain as a significant issue. Endoscopic strip craniectomy (ESC) and helmet therapy is being used more frequently to treat craniosynostosis. This study evaluated the change in fronto-facial asymmetry in infants with UCS who were treated with ESC.

Methods: This IRB-approved, retrospective study included 16 patients who underwent ESC and postoperative helmet therapy. Cranial anthropometric data was collected preoperatively and during follow-up visits after surgery. Pre-operative and follow-up photographs of patients were analyzed using ImageJ software. Craniometric analysis was conducted for forehead asymmetry (defined by difference of midline occipital to left frontal and midline occipital to right frontal measurements), nasal angulation, and facial angulation.

Results: The mean follow-up was 30 months. In the ESC patients, mean nasal tip angulation improved from 12.3 degrees preoperatively to 4.3 degrees at follow-up ($p < 0.001$). Mean facial midline angulation improved from 4.8 degrees preoperatively to 1.35 degrees at follow-up ($p < 0.001$). Forehead asymmetry improved from 8.4 mm preoperatively to 3.1 mm at follow-up ($p = 0.006$). The majority of the correction happened within the first 12 months but was maintained out to 30 month follow-up.

Conclusions: Our study provides evidence of statistically significant improvement of forehead asymmetry, nasal angulation, and facial angulation in patients who underwent ESC followed by helmet therapy.

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Key Words: unicoronal craniosynostosis, endoscopic strip craniectomy, facial asymmetry, nasal asymmetry