

Combined Plastic Surgical Reconstruction of Pediatric Scalp Injuries Associated with Craniocerebral Trauma

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Background: Timely, vascularized coverage of traumatic pediatric scalp defects may be required alongside neurosurgical treatment. A previously published 57-patient cohort reported outcomes after a combined reconstructive approach, but its numerical summary contains inconsistencies. Objective: To re-examine the published aggregate outcomes, clarify what can be inferred about a modified local-flap technique, and place the findings in a pediatric reconstructive context. Methods: We performed a secondary descriptive analysis of aggregate data published by Khodjaliyev and colleagues in 2026. The original report described 31 children treated with an improved approach and 26 comparison patients treated with a traditional approach at two emergency-care centers in 2022–2025. Integer counts were preferred to inconsistent printed percentages; exploratory group comparisons used two-sided Fisher exact tests. No patient-level data were accessed. Results: The source reported good or satisfactory outcomes for 26/31 (83.9%) in the improved group and 69.2% in the comparison group, equivalent to 18/26 patients if its percentage is accurate. The absolute difference was 14.7 percentage points (exploratory Fisher $p=0.220$). Implant exposure was described in 5/31 (16.1%) versus 8/26 (30.8%; $p=0.220$). Distal flap-tip necrosis was described in 0/31 versus 4/26 (15.4%; $p=0.038$), but event definitions, follow-up, and baseline comparability were insufficiently reported. The original conclusion mislabels 8/26 as 69.2% and 5/31 as 14.7%. Conclusions: The published

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experience supports the feasibility of coordinated neurosurgical and scalp reconstruction in selected children, but does not establish that the modified technique improves overall outcomes. Verification of the original case records and a clearly defined prospective endpoint are needed before making efficacy claims.

Keywords: pediatric scalp trauma; craniocerebral injury; local scalp flap; skin graft; Doppler mapping; secondary analysis; wound complications

Introduction

A traumatic scalp defect in a child can coexist with a skull fracture, exposed bone or dura, intracranial injury, and a contaminated wound. Treatment must prioritize stabilization and the neurosurgical indication while securing durable, well-perfused soft-tissue coverage. The pediatric scalp offers hair-bearing tissue with a useful vascular network but has limited laxity; donor-site appearance and subsequent growth add to reconstructive planning. An illustrative 2024 report described coordination between neurosurgery and plastic surgery for a large traumatic defect with exposed calvarium in a six-year-old child [2].

In 2026, Khodjalyev and colleagues published a series of 57 children aged 4–12 years treated at Andijan and Fergana emergency-care centers between 2022 and 2025 [1]. Their improved procedure combined Doppler-guided design of a U-shaped skin-galeal flap, modified corner sutures, and a skin graft to the secondary defect, after a neurosurgical stage as indicated. Because the report already contains the clinical observations, a new manuscript using these same patients must identify itself as a secondary analysis, cite the earlier work, and offer a materially different analytical question [1,7]. Our question is narrower: which aggregate outcomes are internally reproducible, and what can they support about reconstructive decision making?

Methods

We conducted a secondary descriptive reanalysis of the English-language publication by Khodjalyev et al. in *Journal of Modern Medicine*, issue 2(13), pages 302–306, 2026 [1]. The

available source was the published five-page article, including its two figures. We did not review original charts, photographs, consent forms, an ethics approval letter, or an independent database. This paper therefore does not claim to report a newly recruited clinical series, a revised patient-level analysis, or an externally validated clinical protocol. Contextual literature was selected from original pediatric or mixed-age scalp reconstruction studies and established pediatric traumatic brain injury guidance [2–6].

The source described 31 children in an improved reconstruction group and 26 in a conventional reconstruction group. The ages were reported collectively as 4–12 years. The published sequence for the improved group was debridement of nonviable scalp and soft tissue, Doppler localization of flap vessels, creation and rotation of a U-shaped local skin-aponeurotic flap, placement of two modified U-shaped sutures at the distal corners, edge suturing, grafting of the secondary defect with skin harvested from the thigh, and a pressure dressing. Neurosurgical management was performed within the same operative episode when needed. The paper mentioned skin temperature and transcutaneous oxygen measurements on postoperative days 1, 3, and 7. It did not provide individual perfusion values, dispersion measures, monitoring thresholds, defect areas, head injury severity by group, allocation rules, or a complete description of conventional surgery [1].

We extracted group sizes, favorable overall outcome, partial distal flap necrosis, wound infection, wound separation, and later exposure of an underlying implant where explicit counts

were given. When the comparison group favorable outcome was given only as 69.2%, we back-calculated 18/26 and mark that count as inferred rather than independently observed. We recalculated percentages as $100 \times \text{events} / \text{group size}$ and absolute risk differences as improved-group percentage minus comparison-group percentage. Two-sided Fisher exact tests were calculated from the reported two-by-two count

tables in SciPy; they are exploratory, unadjusted for baseline differences, and not substitutes for a prespecified primary analysis. Where an event or timing was ambiguous, no count or p value was inferred. The published chi-square statistics were not adopted because their counts and percentages did not reconcile. No formal systematic review or meta-analysis was undertaken.

Results

Reproducible aggregate outcomes

Outcome	Improved group n=31	Comparison group n=26	Interpretation
Good or satisfactory overall outcome	26/31 (83.9%)	18/26 (69.2%)*	Difference +14.7 percentage points; Fisher p=0.220.
Later exposure of underlying implant	5/31 (16.1%)	8/26 (30.8%)	Difference -14.6 points; Fisher p=0.220.
Partial distal flap-tip necrosis	0/31 (0%)	4/26 (15.4%)	Exploratory Fisher p=0.038; small numbers, no adjustment.
Reported wound infection	3/31 (9.7%)	2/26 (7.7%)	Descriptive only; ascertainment and timing unclear.
Wound separation	2/31 (6.5%)	Not reliably specified	No valid group comparison possible.

*Comparison-group favorable count is inferred from the published percentage (69.2% of 26); it is not explicitly tabulated as an integer in the source. Outcomes may overlap within patients and must not be summed.

The apparent overall favorable-outcome difference is $26/31 - 18/26 = 14.64$ percentage points, conventionally rounded to 14.7 points. The corresponding exploratory Fisher test is not statistically significant at a two-sided 0.05. The published procedure places the local vascularized flap over the principal defect while using a skin graft for the resulting donor or secondary wound [1]. That combination has a plausible reconstructive rationale: exposed bone or an implant may need tissue with its own perfusion, whereas a graft requires a vascularized recipient bed. Doppler localization can assist flap planning; a retrospective series of 38 patients assessed handheld Doppler for pedicled scalp reconstruction [4]. The source report describes

threshold. Likewise, the 8/26 versus 5/31 contrast for later implant exposure gives 30.8% versus 16.1%, not 69.2% versus 14.7%. The source's displayed chi-square values and claims of $p < 0.001$ for these contrasts cannot be reproduced from the reported counts. A lower observed rate of flap-tip necrosis is an interesting signal, but was one of several outcomes assessed without prespecification and cannot establish causality.

postoperative infrared temperature and transcutaneous oxygen monitoring, but its graphs have unclear labels and no patient-level values or variance, so no trend, diagnostic accuracy, or safe threshold can be calculated. The text states that oxygen values fell to a critical level by day 3, whereas the displayed bars rise from days 1 to 7; this contradiction should be reconciled from source measurement records.

Two other terms require correction before clinical reuse. The translated phrase "double

brain injuries” does not define an accepted diagnosis or severity category; “concomitant craniocerebral injury” is used here without assuming two distinct brain lesions. The original English calls a vascularized flap a “clot”; throughout this manuscript it is termed a skin-galeal flap. The original reference to “hypothermia” lacks temperature, duration, and whether it was local or systemic. It should not be presented as a validated flap-salvage maneuver, particularly because pediatric severe TBI guidance does not recommend prophylactic moderate systemic hypothermia over normothermia to improve overall outcome [5].

Discussion

The original cohort provides practical experience in coordinating soft-tissue coverage with neurosurgical care, but it cannot isolate the effect of the modified corner sutures. Surgical selection may have depended on defect size, available tissue, perfusion, bone or dural exposure, wound contamination, and intracranial injury severity, none of which were reported separately for the two groups [1]. Improved and conventional techniques may also differ in more than one component, including flap mapping, design, graft placement, and postoperative surveillance. Consequently, attributing an overall outcome difference solely to the modified sutures would exceed the data.

A local scalp flap can preserve hair-bearing coverage and protect deep structures when an adequate pedicle and arc of rotation exist. A secondary skin graft offers a means of closing the donor defect when tension-free primary closure is not possible. In a 54-patient mixed-age retrospective scalp and forehead reconstruction study, procedure choice reflected defect size, depth, and exposed structures; that cohort is useful for contextualizing the approach but cannot validate its outcomes in children with traumatic brain injury [3]. A reported six-year-old with extensive traumatic tissue loss was managed with a local artery-based scalp flap and donor-site graft after neurosurgical debridement, illustrating feasibility rather than comparative effectiveness [2]. A separate pediatric series of 26 scalp

reconstructions mainly concerned tissue expansion for burns and other causes; its elective or staged setting cannot be directly compared with acute trauma surgery [6].

For a future original comparative study, eligibility criteria should specify traumatic scalp defect depth and area, timing after injury, bone/dura or implant exposure, contamination, and TBI severity. The protocol should describe how each child was assigned to a technique, precisely distinguish index flap-tip necrosis from graft loss and wound infection, and define the timing of implant exposure. Standardized assessments at discharge, 30 days, 90 days, and a longer interval could capture flap survival, repeat surgery, infection, implant exposure, alopecia, and parent- or patient-reported appearance. Blinded outcome assessment, prespecified analysis, and a participant flow diagram would strengthen reporting under the STROBE framework [8]. If prior consent and ethics oversight covered secondary use, that documentation must be verified rather than assumed.

The limitations of this analysis follow from reliance on published aggregate figures. The exact clinical endpoint behind “good or satisfactory” is not defined, denominators for some complications are ambiguous, event categories may overlap, and the published figures do not establish distributions for perfusion measurements. The Fisher tests can only show what the printed binary counts imply under an unadjusted model. They cannot repair confounding, selective reporting, or discrepancies in the original records. A corrected original data table and access to de-identified records would permit a more informative adjusted analysis.

Conclusion

The published experience with 57 children shows that scalp and soft tissue reconstruction can be coordinated with neurosurgical treatment after craniocerebral trauma. The combined approach described in the original study uses Doppler-guided planning of a local skin-galeal flap, modified sutures at its distal corners, and a skin

graft to cover the secondary defect. Together, these steps provide a practical option for covering selected wounds while accounting for flap blood supply and the need to protect deeper cranial structures.

The reported outcomes, however, require cautious interpretation. Good or satisfactory results were reported in 26 of 31 children (83.9%) treated with the modified approach, compared with an estimated 18 of 26 (69.2%) in the comparison group. This is an absolute difference of 14.7 percentage points, but the difference was not statistically significant in the exploratory analysis (Fisher's exact test, $p = 0.220$). Later exposure of an underlying implant was reported in 5 of 31 children (16.1%) and 8 of 26 children (30.8%), respectively; this comparison was also not statistically significant ($p = 0.220$). Partial necrosis of the distal flap tip was reported in four comparison-group patients and none in the modified-treatment group. Although this finding warrants further study, the small number of events and the absence of adjustment for differences between groups prevent a causal conclusion.

Several gaps in the original report limit a stronger assessment. The groups were not described in sufficient detail to establish whether their wound sizes, injury severity, contamination, or implant exposure were comparable before surgery. The criteria for a "good or satisfactory" result and the duration of follow-up were not clearly defined. Some percentages and reported statistical values also conflict with the stated patient counts. These issues must be resolved from the original clinical records before the modified technique can be described as superior to conventional reconstruction. In conclusion, the combined approach is a promising reconstructive option for selected pediatric scalp injuries, but the available published data demonstrate feasibility more clearly than comparative effectiveness. A prospective study with defined eligibility criteria, standardized surgical techniques, documented baseline characteristics, and consistent follow-up is needed. Its outcomes should include flap survival, wound infection, implant exposure, repeat surgery, and long-term functional and aesthetic results.

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