

# Cranioplasty prognosis

Cranioplasty prognosis can be assessed across several domains reflecting both clinical effectiveness and patient-centered results. The procedure, performed after decompressive craniectomy or to repair skull defects, has neurological, functional, cosmetic, and complication-related implications.

## □ Domain 1: Neurological Recovery

- Improvement in cognitive function, consciousness, and motor performance.
- Restoration of cerebral perfusion, metabolism, and CSF dynamics.
- Common assessment tools: NIHSS, neuropsychological testing.

## □ Domain 2: Functional Outcome

- Tools:
  - Glasgow Outcome Scale (GOS)
  - Modified Rankin Scale (mRS)
  - Functional Independence Measure (FIM)
- Reflects autonomy, activities of daily living, and care needs.

## □ Domain 3: Cosmetic and Psychological Satisfaction

- Restoration of body image, self-esteem, and social reintegration.
- Particularly relevant in younger patients.
- Evaluated via PROMs and patient interviews.

## ⚠ Domain 4: Complications

- Infection (5–20%): more common with alloplastic materials or early cranioplasty.
- Bone flap resorption: especially in pediatric and autologous bone cases.
- Other risks: seizures, hematomas, hydrocephalus, implant migration.

## ♥ Domain 5: Health-Related Quality of Life (HRQoL)

- Includes mobility, communication, cognition, emotional well-being.
- Tools: EQ-5D, SF-36, disease-specific QoL instruments.

## □ COAST Study Core Outcome Set (2025)

A standardized Core Outcome Set for cranioplasty after stroke or TBI was proposed by the [COAST study](#) (Mee et al., Brain & Spine, 2025), including:

- Neurological function
- Cognitive performance

- Seizure incidence
- Surgical complications
- HRQoL

Recommended timepoints: baseline, 3 months, 12 months.

**Summary Table**

Domain	Assessment Tools / Indicators	Timepoints
Neurological recovery	GCS, NIHSS, cognitive testing	Pre-op, 3-12 months
Functional status	GOS, mRS, FIM	3, 6, 12 months
Complications	Infection, bone resorption, seizures, hydrocephalus	Immediate-12 months
Cosmetic satisfaction	PROMs, interviews, satisfaction scales	1, 3, 6 months
Quality of life	EQ-5D, SF-36, disease-specific PROMs	3-12 months

**Consensus methodology research**

In a multi-phase [consensus methodology](#) including [systematic review](#), [qualitative study](#), two-round [Delphi process](#), and final [consensus meeting](#). Mee et al. from Cambridge, Oulu, Madrid, Ibadan, Bristol, Cali, Winnipeg, Perth, Modena, London, Lund, Worcester (MA), Adelaide, Milan, Norwich published in the **Journal: \*Brain & Spine\*** to develop an internationally agreed-upon core outcome set (COS) for [cranioplasty](#) following a [decompressive craniectomy](#) for [stroke](#) or [traumatic brain injury](#). The COAST study successfully defined a 20-item core outcome set across four domains (life impact, pathophysiological manifestations, [resource](#) use/economic impact, [mortality](#)) based on structured [consensus](#) among a wide range of global [stakeholders](#). This COS aims to enhance the [consistency](#) and [comparability](#) of future cranioplasty studies <sup>1)</sup>.

**Critical Review**

The COAST study represents an ambitious and commendable effort to bring standardization to an under-structured field—[cranioplasty outcomes](#). By following the COMET methodology and involving a multidisciplinary and international panel, it enhances the legitimacy and breadth of the final COS.

**Strengths:** - Wide stakeholder inclusion ensures diverse perspectives (patients, surgeons, allied health professionals). - Rigid adherence to established consensus-building methodology. - The scale of participation (153 individuals across 16 countries) and structured Delphi rounds followed by a consensus meeting reflect robust procedural rigor. - A focused categorization of outcomes into clinically meaningful domains is pragmatic.

**Weaknesses:** - No formal validation of the selected outcomes in prospective cohorts—feasibility and sensitivity remain theoretical. - Regional representation appears skewed toward academic centers in high-income countries; the extent to which the COS reflects the realities of resource-limited settings is unclear. - The study refrains from discussing any potential conflicts between patient-centered outcomes and those favored by clinicians, nor does it address the weighting or prioritization of these 20 outcomes. - Lack of granularity in reporting stakeholder-specific scoring trends reduces interpretability of consensus dynamics.

**Final Verdict:** Solid methodology but lacks immediate translational validation. It is an important foundational step for future research standardization, though not yet a clinical tool. A validation phase in real-world clinical trials is critical.

**Takeaway for Practicing Neurosurgeons:** Begin familiarizing yourself with the COAST COS as a reporting standard, especially when engaging in clinical research on cranioplasty. It does not yet influence clinical decision-making directly.

**Bottom Line:** Methodologically sound initiative establishing a consensus-based framework for cranioplasty outcomes, but clinical adoption will hinge on future validation studies.

**Rating:** 7/10

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1)

Mee H, Korhonen TK, Castaño-Leon AM, Adeleye A, Allanson J, Anwar F, Bhagavatula ID, Bond K, Clement C, Rubiano AM, Grieve K, Hawryluk G, Helmy A, Honeybul S, Iaccarino C, Lagares A, Marcus H, Marklund N, Muehlschlegel S, Owen N, Paul M, Pomeroy V, Shukla D, Servadei F, Viaroli E, Warburton E, Wells A, Timofeev I, Turner C, Whiting G, Hutchinson P, Kolias A. A core outcome set for cranioplasty following [stroke](#) or [traumatic brain injury](#) - The COAST study. Brain Spine. 2025 Jun 1;5:104288. doi: 10.1016/j.bas.2025.104288. PMID: 40585434; PMCID: PMC12205645.

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