Sociodemographic Disadvantage in Cranioplasty: Differences in Presentation, Not in Care or Outcomes

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Objectives: To evaluate whether sociodemographic factors are independently associated with cranioplasty reconstructive material selection, timing, and postoperative outcomes.

Methods:
A retrospective cohort study was conducted on patients undergoing primary or revision cranioplasty at the University of Maryland Medical Center between 2023 and 2025. Exposures were insurance type, Area Deprivation Index (ADI) quartile, and race. Outcomes included alloplastic material use, time from primary surgery to cranioplasty, postoperative complications, length of stay, and non-home discharge.

Results:
Among 218 patients, mean age was 46.2 ± 17.0 years; 65.5% were male, 48.2% were White, 38.1% were Black, and 43.1% had public insurance. Publicly insured patients were younger (40.5 vs 50.7 years, $p<0.001$), and more often presented after trauma compared to privately insured patients (58.7% vs 41.3%, $p<0.001$). Insurance type was not independently associated with alloplastic material use, complications, length of stay, or non-home discharge ($p=0.82$, 0.88, 0.81, 0.24, respectively). Time to cranioplasty was longer for publicly insured patients ($p=0.01$) but not after adjustment for indication ($p=0.33$). No associations were detected between race or ADI and any outcome (material use by race, $p=0.38$; by ADI, $p=0.84$). Revision cranioplasty was associated with postoperative complications (adjusted OR, 4.35; 95% CI, 1.81 to 10.52; $p<0.001$); revision prevalence did not differ significantly by insurance, race, or ADI quartile.

Conclusion:
Within this single-institution cohort of patients who underwent cranioplasty, measured sociodemographic factors were not independently associated with material selection, timing, or measured postoperative outcomes. Revision status was associated with higher complication odds and may inform perioperative risk stratification. These findings suggest surgical complexity rather than socioeconomic factors drives complication risk.