

CRANIOPLASTY APPROACHES AND OUTCOMES IN LOW-MIDDLE INCOME COUNTRIES: A SYSTEMATIC REVIEW

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OBJECTIVE

- The majority of techniques to perform cranioplasty can be expensive, especially for patients and surgeons in low and middle-income countries (LMIC)
- The purpose of this study is to provide the sole systematic review outlining surgical techniques and outcomes of cranioplasty in LMIC

METHODS

- A systematic review was conducted according to Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) guidelines
- All complete studies describing cranioplasty procedures in developing countries or LMIC as self-described in papers or defined by the United Nations’ published “List of Least Developed Countries”
- PubMed query resulted in 38 articles and 13 met inclusion criteria
- The 13 papers representing 10 unique LMIC nations included a total of 363 patients

RESULTS

Figure 1. Number of patients per cranial defect etiology

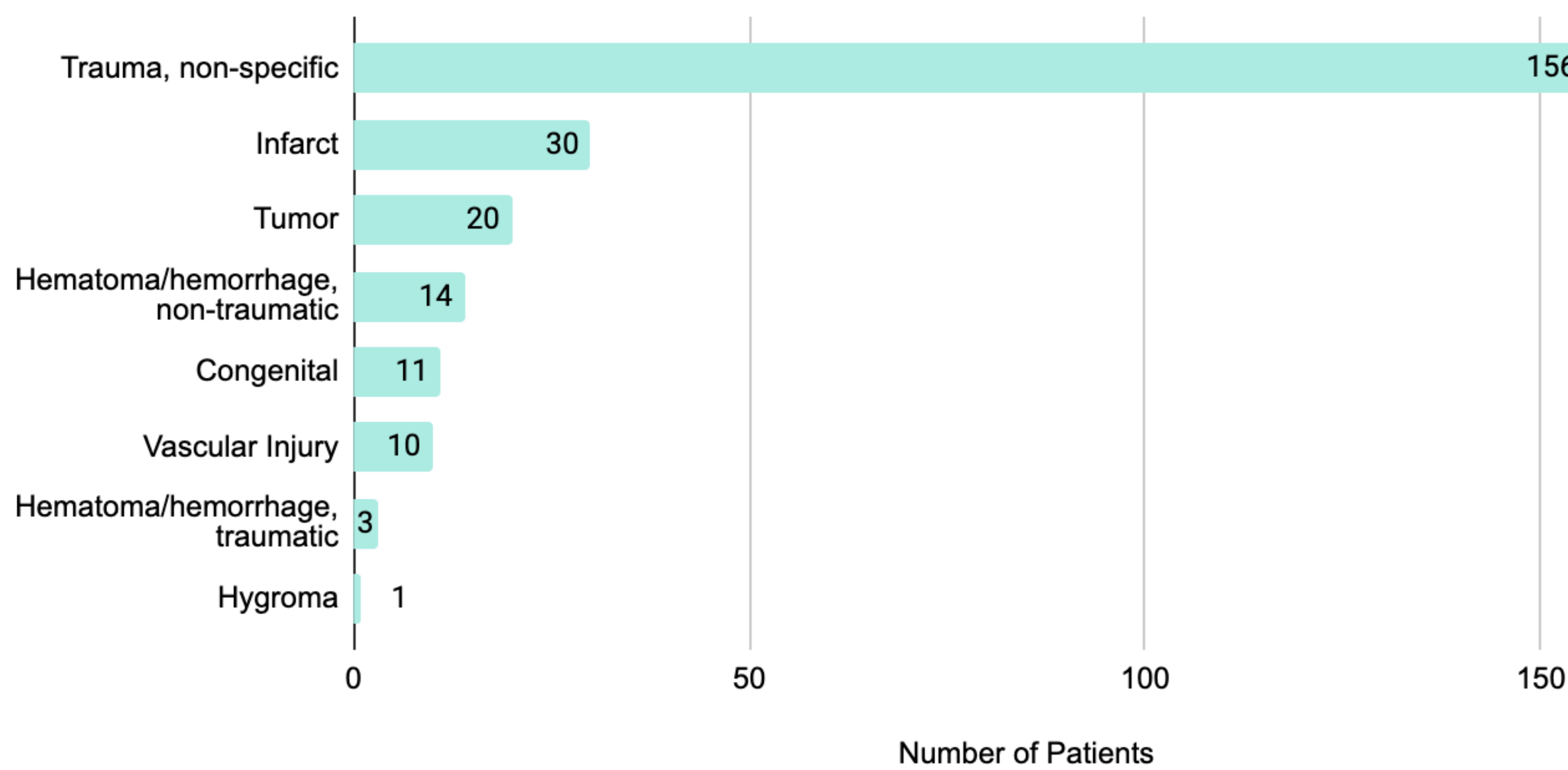
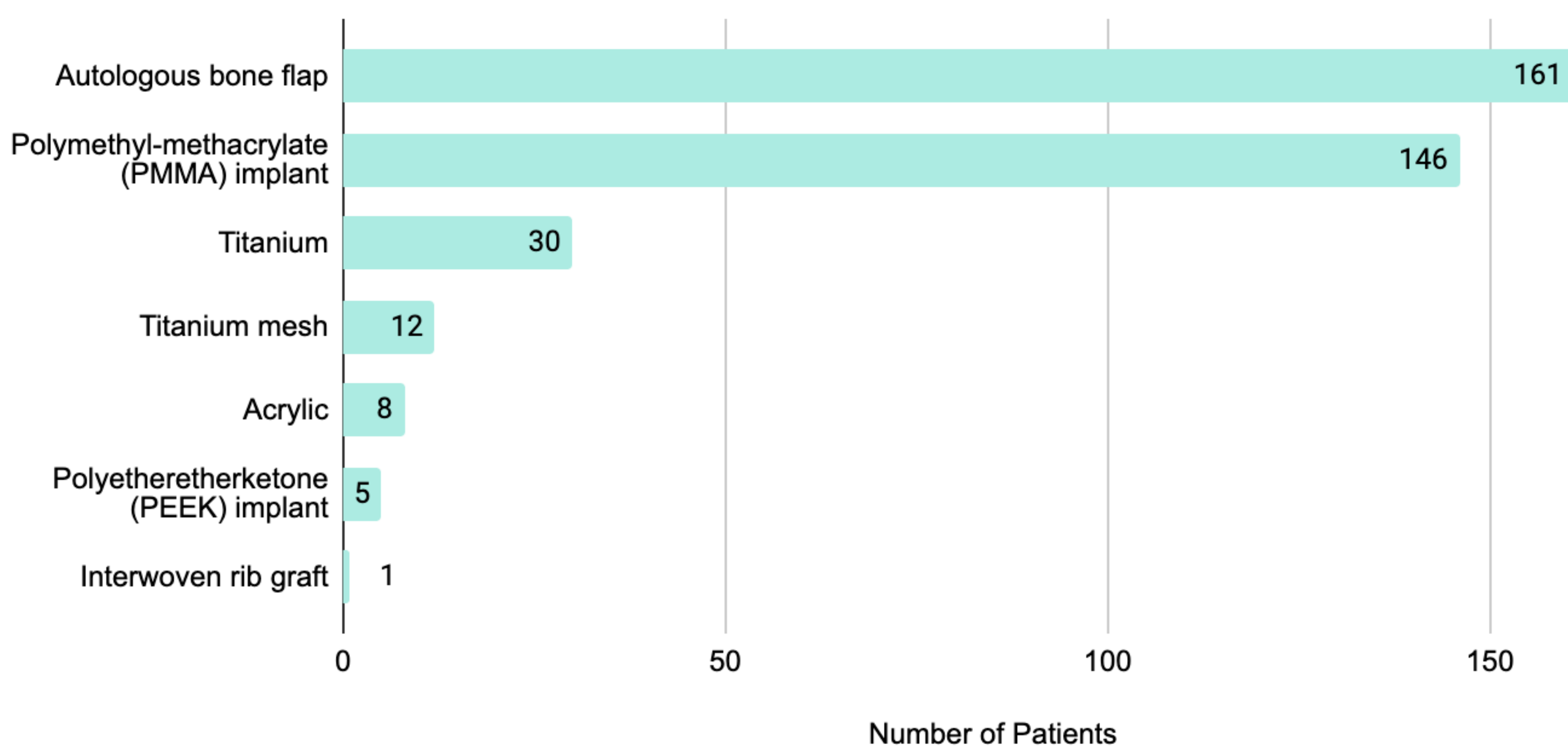


Figure 2. Number of patients per cranioplasty defect repair method



PATIENT OUTCOMES

- Mean time to cranioplasty: 5.64 months (range: 6 weeks - 1 year)
- Mean follow-up time: 14 months (range: 3 days - 78 weeks)
- Five studies reported complication rates ranging 3 - 10.7%, including: infection (45%), wound dehiscence (20%), seizures (10%), hematoma (10%), CSF leak (5%), flap exposure (5%), and extradural collection (5%)
- Seven studies reported patient satisfaction of 69 patients, with 82.6% (57 patients) determining their cosmetic appearance to be satisfactory

CONCLUSIONS

- We report an overwhelming use of autologous bone flaps and PMMA implants for cranioplasty in LMIC due to their resource availability and cost-effectiveness
- In high income countries, the use of titanium or PEEK implants has superseded the use of certain cranioplasty techniques, such as PMMA implants, but not without significant cost
- PEEK or titanium 3D printers can range in cost from \$37,000 to \$310,000 USD, and prefabricated implants can cost up to \$10,000 USD, which can be unaffordable for regular use in LMIC
- Due to the limited follow-up of the studies, there is limited data regarding patient satisfaction with cosmesis and complication rates of cranioplasty in the setting of LMIC; thus, the true impact of cost-saving cranioplasty decision-making is unknown

