



## COMMENTARY

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## Complications and Outcomes of a Patient in Cranioplasty

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### Description

Cranioplasty is a surgical procedure intended to correct cranial abnormalities brought on by prior trauma or procedures, such as decompressive craniectomy. The procedure involves filling the damaged area with a variety of materials, typically a portion of patient bone or a synthetic material. After administering anaesthesia and antibiotics to the patient, a cranioplasty is performed by making an incision and reflecting the scalp. The cerebral defect is fully exposed by reflecting the temporalis muscle and removing the surrounding soft tissues. On the cranial defect, the cranioplasty flap is applied and fastened then the wound is closed. The first cranioplasty procedure dates back to 3000 BC and was closely related to trephination. The treatment is currently carried out for both cosmetic and practical reasons. Cranioplasty can fix a sunken scalp and avoid additional problems like the “syndrome of the trephined” by restoring the normal form of the skull. Risks associated with cranioplasty include bacterial infection and bone flap resorption.

### Applications in medicine

The procedure has cosmetic value because patients' typical cranium shapes are restored rather than a sunken skin flap, which might make them feel less confident.

As the surgery gives the skull structure and safeguards the brain from harm, it also has therapeutic significance. Normal cerebral blood flow dynamics, intracranial pressure, and Cerebro Spinal Fluid (CSF) dynamics are all returned after surgery. Some people's neurological function may be enhanced *via* cranial surgery. Additionally, it can lessen the frequency of headaches brought on by trauma or past surgery.

In the literature, there is disagreement on when a cranioplasty should be performed. The interval between a craniectomy and a cranioplasty is typically between

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6 months and a year, according to some literature, but according to others, the two procedures should be performed more than a year apart.

Numerous factors influence when a cranioplasty should be performed. It takes time for the incision from the prior surgery to heal and for any infections to be cleared out (both systemic and cranial). According to some research, early cranioplasty is linked to both an increased risk of infection and hydrocephalus due to the disruption of wound healing. On the other hand, there is proof that early cranioplasty can prevent “syndrome of the trephined” problems such as altered cerebral blood flow and aberrant cerebrospinal fluid hydrodynamics. Other study found that varying operational timings had no discernible impact on the infection rate.

### Risks

The likelihood of complications following cranioplasty surgery ranges from 15% to 41%. It is unknown why this procedure has a higher risk of complications than other neurosurgery procedures. Patients who are older and male have increased rates of complications. Bacterial infection, bone flap resorption, wound dehiscence, hematoma, seizures, hygroma, and cerebrospinal fluid leaks are complications following cranioplasty.

The likelihood of bacterial infections during cranioplasty surgery is between 5.8% to 12.8%. A number of variables influence the likelihood of infection, including the materials used during the procedure. Using titanium is linked to a decreased infection rate, whether it's custom-made or using a mesh; on the other side, substances like methyl methacrylate and autologous bone are linked to a higher likelihood of infection. The site of the procedure is another risk factor for bacterial infection. Bifrontal cranioplasties have been linked to noticeably greater incidence of infection and reoperation. Additional infection risk

factors include prior infections, sinus contact with the surgery site, devascularized scalp (loss of blood supply to the scalp), prior procedures, and the nature of the damage.

Another complication of cranioplasty is bone resorp-

tion, which has a complication incidence of 0.7% to 17.4%. When the autologous graft becomes devitalized and loses its blood supply, or when scar tissue or soft tissues are left on the margin of the cranial defect after cranioplasty, bone resorption happens.