PROCEDURE

Craniosynostosis repair

Craniosynostosis repair is surgery that reshapes a child's skull after one or more skull seams close too early.

PURPOSE
Correct skull shape and support brain growth

PROCEDURE TYPE
Therapeutic surgery using open or minimally invasive techniques

WHERE IT IS DONE
Operating theatre

ANAESTHESIA
General

HOW LONG IT TAKES
One to six hours, based on technique and complexity

PREPARATION
Fasting and medication review; follow your hospital's instructions

RECOVERY
One to five hospital days; avoid driving until cleared

MAIN RISKS
Bleeding, infection, spinal-fluid leak, need for further surgery

RESULTS
Immediate reshaping; skull growth followed through childhood

Overview

Craniosynostosis repair reshapes a child's skull after one or more sutures-the flexible seams between skull bones-close too early. The operation creates room for brain and skull growth, improves head shape, and may reduce the risk of pressure building inside the skull.

A pediatric neurosurgeon and craniofacial or plastic surgeon usually operate together during infancy. The technique and timing depend on the affected sutures, the child's age and head shape, and whether a genetic syndrome is involved.

Why the procedure is performed

Surgery may be offered to:

Children with several closed sutures or a craniofacial syndrome may need treatment in stages.

Craniosynostosis repair is not used for common positional flattening caused by regularly resting on one area of the head. Positional flattening does not involve a fused suture.

- Give the brain and skull room to grow
- Improve head and facial shape
- Treat or reduce the risk of raised pressure inside the skull
- Protect vision or other functions affected by restricted growth

Who should and should not have it

Repair may be appropriate when a specialist craniofacial team confirms craniosynostosis and expects meaningful benefit. The decision considers skull shape, brain growth, skull pressure, vision, development, and the likely effects of waiting.

Observation may be reasonable for selected mild or uncertain cases, including an isolated forehead ridge without significant skull narrowing, provided the child is followed closely.

Surgery may be delayed if your child has an active infection, an illness that makes anaesthesia unsafe, or an uncorrected blood-clotting problem. Heart, lung, or other conditions may need treatment first.

Endoscopic repair is generally limited to young infants whose skulls are growing rapidly. It requires several months of helmet treatment and frequent fitting appointments. If this cannot be managed, open surgery may be more suitable.

How to prepare

Follow the treating facility's instructions, which are tailored to your child and take priority over general guidance.

Your child must stop eating and drinking before general anaesthesia. Follow the hospital's exact fasting times and contact the team if anything is unclear, because incorrect fasting can delay surgery.

Tell the team about all medicines, vitamins, supplements, allergies, bleeding problems, and previous reactions to anaesthesia. Do not stop prescribed medicines unless instructed. Report a recent cough, fever, rash, or infection.

Blood tests are usually performed. The team will discuss the possibility of a transfusion because blood loss can occur, especially during open surgery.

Bring comfort items and loose clothing that will fit over swelling. If endoscopic surgery is planned, ask when helmet fitting begins and how often adjustments are needed.

What happens during the procedure

Your child receives general anaesthesia and is continuously monitored.

During open cranial vault remodeling, surgeons make a scalp incision, remove and reshape selected skull bones, and secure them in a better position. Absorbable plates, screws, or stitches may be used.

During endoscopic repair, surgeons use a camera and narrow instruments through small incisions. They remove bone around the fused suture, allowing the skull to expand as the brain grows. A fitted helmet then guides growth over the following months.

The surgeons protect the membrane covering the brain and do not remove or reshape brain tissue. After the incision is closed, your child goes to a recovery area, intensive care unit, or specialist ward.

Recovery and what to expect afterward

Pain is treated with medicine. Sleepiness, irritability, and swelling of the scalp, forehead, or eyelids are common. Swelling after open repair may worsen before improving.

Feeding usually restarts with breast milk, formula, or clear fluids, followed by normal foods as tolerated. Nausea or reduced appetite can occur after anaesthesia.

Keep activity quiet initially. Follow instructions about bathing, tummy time, childcare, school, sports, and incision care. Prevent falls and knocks to the head. If a helmet is prescribed, follow its wearing and cleaning schedule.

An adult should drive your child home. Older patients must not drive until cleared and no longer taking medicines that cause sleepiness.

Hospital stays are often shorter after endoscopic repair. Discharge depends on pain control, drinking or eating, wound condition, and stable observations. Ask before surgery about expected time away from childcare, school, or work.

Risks and possible complications

Possible complications include:

Helmet treatment can cause pressure spots and skin irritation, making regular fitting checks important.

Open repair allows more immediate reshaping but usually involves a longer operation, more swelling, and greater potential blood loss than minimally invasive repair. Your teams will explain the risks specific to your child.

- Bleeding or the need for a transfusion
- Infection of the wound, bone, or deeper tissues
- A tear in the brain's protective covering and spinal-fluid leakage
- Problems related to general anaesthesia
- Poor wound healing, scarring, or hair loss near the incision
- Incomplete correction or the skull bones joining again too soon
- Injury to the brain, eyes, nerves, or blood vessels
- The need for another operation

Results and follow up

The skull is reshaped during surgery, although swelling may initially hide the result. Head shape becomes clearer as swelling settles and the skull grows.

Follow-up usually continues through childhood. The team may assess head growth, skull shape, development, vision, the scar, and signs of raised skull pressure. Imaging is used when it could change care.

After endoscopic repair, regular helmet appointments are essential so the helmet can be adjusted as the head grows.

Children with several fused sutures or a syndrome may need additional surgery and follow-up for breathing, hearing, vision, dental development, or facial growth.

Alternatives

Options depend on the child's age and type of craniosynostosis:

A molding helmet alone and medicines cannot reopen a fused suture.

- Close observation: May suit selected mild or uncertain cases but does not reopen a fused suture.
- Endoscopic repair with helmet treatment: Uses smaller incisions and often has a shorter recovery, but is mainly available in early infancy and requires months of helmet use.
- Open cranial vault remodeling: Allows direct reshaping and can be used in older babies, but usually involves more blood loss, swelling, and recovery.
- Spring-assisted surgery: Springs gradually widen the skull and later require removal.
- Cranial distraction: An implanted device gradually expands the skull and is later removed, often in complex cases.

When to call your healthcare team

Some swelling, bruising, tiredness, and mild discomfort are expected. Use the routine contact number for questions about helmet fit, scar care, activity, appointments, or slowly improving symptoms.

Contact the surgical team urgently if your child has:

Call emergency services for trouble breathing, a seizure, severe bleeding, loss of consciousness, or if your child is very difficult to wake.

- Fever or chills, using the team's temperature threshold
- Increasing redness, warmth, swelling, pain, or drainage at the incision
- Clear watery fluid leaking from the wound or nose
- Repeated vomiting or difficulty keeping fluids down
- Swelling that suddenly worsens after starting to improve
- New unusual sleepiness, irritability, weakness, or vision changes
- Helmet pressure sores, blisters, or skin breakdown

Common questions

Will my child be asleep?

Yes. General anaesthesia keeps your child unconscious and continuously monitored.

Can I drive my child home?

A responsible adult can drive after discharge. Arrange another driver if you are too tired. Older

patients must wait until the team clears them.

How painful is it?

Pain is expected, particularly during the first few days, but medicine usually controls it. Tell the team if pain worsens or is not controlled.

When will I know whether it worked?

Surgeons assess the reshaping immediately, but swelling may hide it. The result develops over months as the skull grows.

Will my child need a helmet?

A helmet is usually essential after endoscopic repair but is not routinely needed after every open operation.

Will another operation be needed later?

Many children need one repair. Further surgery may be needed for restricted growth, persistent shape concerns, or complex or syndromic craniosynostosis.

Sources

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