HEALTH BASICS

Cranial sutures

Cranial sutures are flexible joints connecting the bones of the skull.

WHAT IT IS
Flexible joints between the bones of the skull

WHERE IT COMES UP
Newborn examinations, head-shape assessments, and imaging reports

WHY IT MATTERS
Allows skull growth around the developing brain

WHAT IT IS NOT
Not a disease or diagnosis

WHO TO ASK
A pediatrician, primary care clinician, or craniofacial service

HOW IT IS CHECKED
Head examination and measurements, with imaging when needed

Overview

Cranial sutures are strong, fibrous joints between the bones that form the skull. "Cranial" means related to the skull. A suture is a seam-like joint with very little movement.

Cranial sutures are normal anatomy, not a disease or diagnosis. They allow a baby's skull to change shape during birth and expand as the brain grows. Over time, the sutures become less flexible and may partly or completely fuse.

The main cranial sutures are:

The soft areas on a baby's head are called fontanelles . They are sometimes called "soft spots." Fontanelles are wider spaces where several sutures and skull bones meet. They are related to sutures but are not the same structure.

- Metopic suture: runs from the top of the forehead toward the nose
- Coronal sutures: run across the skull from each ear toward the top
- Sagittal suture: runs along the middle of the top of the skull
- Lambdoid sutures: run across the back of the skull
- Squamosal sutures: lie along the sides of the skull, above the ears

How it works

The skull is made from several bones rather than one solid shell. In babies and young children, connective tissue fills the narrow spaces between these bones. This tissue keeps the bones joined while allowing growth along their edges.

The growing brain is a major driver of skull growth. As the brain enlarges, new bone forms near the sutures. This increases the skull's size without requiring the bones themselves to stretch.

Sutures also help the skull briefly change shape during birth. A newborn's skull bones can overlap slightly as the head passes through the birth canal. This process is called molding . It can cause temporary unevenness or ridges that often settle after birth.

Different sutures mature at different times. There is no single age when every cranial suture "closes." The metopic suture usually fuses earlier than many of the others. Some suture lines may remain visible on scans well into adulthood, even when they no longer allow meaningful skull growth.

A fontanelle may look or feel slightly different depending on the baby's position, activity, and hydration. It may briefly appear fuller when a baby cries or lies flat. Clinicians interpret it together with the child's general condition, head growth, and development.

Why it matters for your health

In babies, the position and flexibility of the sutures help clinicians assess skull growth. During routine appointments, a clinician may look at the head from several angles, feel along the sutures and fontanelles, and measure the distance around the head. This measurement is called head circumference .

A steadily growing head that follows an expected pattern is generally more informative than one measurement by itself. Family head size, birth molding, sleeping position, and normal differences in skull shape can all affect appearance.

Cranial sutures also act as landmarks on X-rays, CT scans, and other images. Radiologists must distinguish normal sutures from fractures and from extra, harmless suture lines known as accessory sutures.

An imaging report that mentions a "patent" suture means the suture has not fused. "Suture fusion" means that bone crosses the joint. Neither phrase should be interpreted alone. Its meaning depends on the person's age, which suture is involved, head shape, and why the imaging was performed.

What can go wrong

Craniosynostosis is the early fusion of one or more cranial sutures. It is a medical condition; the sutures themselves are not. Fusion can restrict growth across the affected joint, causing the skull to grow more in other directions. The resulting head shape depends on which suture or sutures are involved.

Craniosynostosis may occur by itself or as part of a genetic syndrome. Some children have mainly a difference in head shape. Others may need assessment for pressure inside the skull, vision, breathing, hearing, feeding, or development. A specialist evaluation determines which concerns apply.

Positional skull flattening , also called positional plagiocephaly, is a common source of confusion. It develops when repeated pressure affects one part of a baby's skull. Unlike craniosynostosis, it usually does not involve a fused suture. Examination often distinguishes the two, although imaging may be used when the diagnosis remains uncertain.

Sutures or fontanelles that appear unusually wide can sometimes relate to delayed bone development, hydrocephalus, or raised pressure inside the skull. Hydrocephalus means excess fluid has built up in spaces within the brain. Wide sutures alone do not establish the cause.

Head trauma can produce a fracture that crosses or separates a suture. This is called a diastatic fracture . On imaging, normal or accessory sutures may sometimes resemble fractures, so interpretation by an appropriately trained clinician is important.

Arrange routine or prompt follow-up if you notice persistent head-shape asymmetry, a firm ridge with restricted growth across it, or head growth that appears unusually fast or slow. These findings have several possible explanations and are not, by themselves, a diagnosis.

Seek urgent medical assessment for a persistently tense or bulging fontanelle, especially with fever, unusual sleepiness, poor responsiveness, or repeated vomiting. After a head injury, emergency signs include a seizure, difficulty waking, worsening confusion, weakness, breathing difficulty, or repeated vomiting.

What you can do

If your baby's head shape concerns you, raise it at a routine health visit rather than trying to identify individual sutures yourself. A clinician can review birth history, sleeping position, head measurements, development, and changes over time.

You can keep a record of head circumference measurements taken by healthcare professionals. Photos from the front, side, back, and above-taken under similar conditions-may

help show whether a shape difference is changing. Do not press hard on a fontanelle or repeatedly feel for a ridge.

Useful questions include:

Most babies do not need imaging simply because their head is mildly uneven. When more information is needed, options may include ultrasound in young infants, skull X-rays in selected settings, or CT. CT shows the skull bones clearly but uses radiation, so clinicians consider whether it is necessary. Three-dimensional surface photography can document head shape without radiation, but it does not show whether a suture is fused.

If cranial sutures are mentioned as a normal finding on an imaging report and you have no related concern, there may be nothing you need to do. Ask the clinician who requested the scan if the wording is unclear.

- Which suture or area of the skull is causing concern?
- Does the shape look positional, or could a suture be fused?
- Is observation with repeat measurements appropriate?
- Would assessment by a craniofacial or pediatric neurosurgery service help?
- Is imaging needed, and what would it change?

Common questions

Can I feel my baby's cranial sutures?

You may feel soft spaces, slight edges, or temporary ridges. Birth molding can make sutures more noticeable for a time. Touch alone cannot reliably show whether a suture is fused.

Are fontanelles holes in the skull?

They are spaces between skull bones covered by strong tissue and skin. They provide room for growth and protect the structures underneath.

When do cranial sutures close?

They do not all close at one set age. The timing differs by suture and between people. Fontanelles also close on a different schedule from the deeper suture lines.

Does a flat area mean craniosynostosis?

Not necessarily. Position-related flattening is a common alternative explanation. Clinicians assess the overall shape, ear and forehead position, suture ridges, and growth pattern.

Can a helmet open a fused suture?

No. Helmet therapy does not reopen a suture that has fused. Helmets may be considered for selected cases of positional skull flattening, following assessment. Craniosynostosis requires specialist evaluation.

Do cranial sutures matter in adults?

They remain useful anatomical landmarks and can be seen on imaging. In most adults, their stage of fusion has no practical health effect unless imaging is being assessed after trauma or for another skull condition.

Sources

- Centers for Disease Control and Prevention. About Craniosynostosis
- National Health Service. Craniosynostosis
- Congress of Neurological Surgeons. Evidence-Based Guideline for the Diagnosis of Patients With Craniosynostosis
- American Academy of Pediatrics, HealthyChildren.org. Craniosynostosis: When a Baby's Head Has an Abnormal Shape
- Johnson D, Wilkie AOM. Craniosynostosis . European Journal of Human Genetics . 2011;19:369-376.