TEST

Head circumference

Head circumference measures around a child's head to track growth over time.

WHAT IT MEASURES
Distance around the widest part of a child's head

SAMPLE
None

FASTING NEEDED?
No

HOW LONG IT TAKES
Usually less than one minute

RESULTS IN
Immediately; no laboratory processing needed

USED FOR
Screening and monitoring head growth in young children

MAIN LIMITATION
Tape placement can change the measurement

Overview

Head circumference is the distance around the widest part of a baby's or young child's head. A healthcare professional measures it with a flexible, non-stretch tape.

The measurement is usually plotted on a growth chart for the child's age and sex. This helps show how head growth compares with that of other children and, more importantly, how it changes over time.

Head circumference is a screening and monitoring test. It cannot diagnose a condition by itself. A measurement that is higher or lower than expected may reflect normal family traits, measurement error, the child's age at birth, or a health condition that needs further assessment.

This article covers measurement after birth. Fetal head circumference measured during pregnancy is estimated using ultrasound and is a different test.

Why the test is ordered

Head circumference provides indirect information about growth of the skull and brain during early childhood. It is commonly recorded alongside weight and length or height.

The test may be ordered to:

Doctors may use the terms microcephaly for a head that is much smaller than expected and macrocephaly for one that is much larger. These labels are based on growth charts and clinical context; the measurement alone does not explain why the head is that size.

- establish a measurement soon after birth
- monitor head growth during routine child health visits
- recheck an unexpected measurement
- investigate a change in the child's growth pattern
- support an assessment of development, skull shape, or neurological symptoms

Who should have the test

Head circumference is usually measured in newborns and during routine health visits in infancy. The exact schedule and the age at which routine measurement stops differ between healthcare systems.

A child may need additional measurements if they:

For a premature baby, results may be considered using gestational age or corrected age. Corrected age accounts for how early the baby was born.

- were born prematurely
- have an unusual head shape
- have concerns about growth or development
- have a head measurement that changes noticeably between visits
- are being monitored for a known medical or genetic condition

How to prepare

No fasting or special preparation is needed. Feeding, medicines, sleep, and the time of day do not usually affect the result.

Remove hats, headbands, clips, or bulky hairstyles if possible. Hair does not need to be cut or shaved.

Bring any growth records from previous clinics, especially if the child has recently moved or receives care in more than one place. Previous measurements help show whether the head is following a steady growth pattern.

What happens during the test

The child may sit on a caregiver's lap or lie down. A healthcare professional places a flexible tape around the widest part of the head. The tape usually passes just above the eyebrows and ears and around the most prominent part at the back of the head.

The tape should sit snugly without pressing into the skin. The professional may move it slightly to find the largest measurement and may repeat the process to check the result.

The number is recorded, usually in centimetres, and plotted on an age- and sex-appropriate growth chart. The test normally takes less than a minute, although an active or unsettled child may need a little longer.

Understanding your results

A growth chart converts the measurement into a percentile or another standardised score. A percentile describes how the measurement compares with a reference group. For example, it does not represent a percentage of normal growth or brain function.

There is no single universal normal head circumference. Interpretation varies with age, sex, gestational age at birth, the growth chart used, family characteristics, and the child's wider clinical context. Laboratory ranges do not apply because this is not a laboratory test. Pregnancy and most medicines do not directly affect a postnatal tape measurement.

The pattern over time is often more useful than one number. A child may naturally remain near a higher or lower percentile, particularly when close relatives have similar head sizes. A noticeable change across the chart may prompt a repeat measurement and further assessment, but it is not automatically evidence of a problem.

Head circumference is considered with weight, length or height, development, skull shape, symptoms, and examination findings.

What affects the results

Small differences in technique can meaningfully change the recorded number. Common

causes include:

Birth can temporarily affect head shape. Moulding occurs when skull bones overlap slightly during delivery. Scalp swelling can also increase the measurement. These changes often settle, so a later measurement may differ even when growth is healthy.

Prematurity affects interpretation because a baby born early has had less time to grow before birth. Using chronological age instead of corrected age may make the result look more unusual than it is.

Different growth charts may produce different percentiles from the same measurement. Charts may be based on different populations or age groups. A genuine family tendency toward larger or smaller heads can also make a result look unusual without making the measurement itself incorrect.

- placing the tape at a slightly different level
- failing to measure the widest part of the head
- using a tape that stretches
- leaving a gap between the tape and the scalp
- pulling the tape too tightly
- measuring over thick hair, clips, or headwear
- rounding the number differently
- movement during the measurement

Accuracy and limitations

Head circumference is simple and useful, but it is not a precise measurement of brain size or development. It does not show the structure of the brain, fluid spaces, skull bones, or the cause of an unusual growth pattern.

A single measurement can miss a developing concern because it does not show the rate of growth. It can also suggest a problem when none is present because of tape placement, temporary changes after birth, chart selection, or normal family variation.

Repeating the measurement carefully improves confidence. Looking at several measurements over time reduces the chance that one inaccurate number will drive interpretation.

If more information is needed, a clinician may assess development, measure the parents' head circumferences, or arrange specialist review. Ultrasound through the soft spot, magnetic resonance imaging (MRI), computed tomography (CT), or genetic tests may sometimes be

appropriate. These tests answer different questions and are not routine replacements for head circumference measurement.

Risks and complications

The test does not use needles, radiation, or sedation and has no known physical complications. Some babies may briefly become unsettled when the tape is placed around their head.

What happens next

If the measurement follows a steady pattern and there are no other concerns, it is usually recorded and checked again at the next routine visit.

An unexpected result is commonly measured again before further decisions are made. The clinician may review earlier growth records and assess weight, length, development, skull shape, the soft spots between the skull bones, and family head sizes.

Routine follow-up or referral may be arranged when a measurement remains unusual or the growth pattern changes. Depending on the findings, this could involve a paediatrician, neurologist, genetic specialist, or skull-shape team.

The number alone is rarely an emergency. Seek urgent medical assessment if a baby has a bulging soft spot while calm together with fever, repeated vomiting, unusual sleepiness, or a marked change in behaviour. Call emergency services for a seizure, serious breathing difficulty, or if the child is difficult to wake. A soft spot can temporarily look fuller during crying, so this finding is assessed together with the child's overall condition.

Common questions

Can I measure my baby's head at home?

You can, but home measurements are easy to misplace by a centimetre or more. Use a non-stretch tape, measure the widest part, and repeat it. Do not rely on a home number to diagnose a problem; bring concerns to the child's routine healthcare visit.

Does hair affect the result?

Fine or short hair usually makes little difference. Thick hair, braids, clips, hats, and headbands can interfere with tape placement and should be moved or removed where possible.

Why did the percentile change?

A small change may come from normal growth, measurement technique, rounding, corrected age, or use of a different chart. A larger or continuing change is usually checked with repeat measurements and the child's wider assessment.

Does a large head mean there is a problem?

Not necessarily. Some healthy children have larger heads because this runs in their family. The growth pattern, development, symptoms, examination, and family measurements help determine whether further assessment is needed.

Does a small head mean the brain is not developing normally?

The measurement alone cannot answer that. Some children naturally have smaller heads, while others need further assessment. Development and the change in head size over time are important parts of interpretation.

Can feeding, exercise, or the time of day change the result?

No meaningful preparation is needed. Feeding, physical activity, and time of day do not usually alter head circumference, although movement can make the measurement harder to take accurately.

Sources

- World Health Organization. Child Growth Standards: Head circumference-for-age.
- Centers for Disease Control and Prevention. Using WHO Growth Standard Charts.
- National Institute for Health and Care Excellence. Suspected neurological conditions: recognition and referral. NICE guideline NG127.
- Harris SR. "Measuring head circumference: Update on infant microcephaly." Canadian Family Physician. 2015;61(8):680-684.
- Villar J, Cheikh Ismail L, Victora CG, et al. "International standards for newborn weight, length, and head circumference by gestational age and sex: the Newborn Cross-Sectional Study of the INTERGROWTH-21st Project." The Lancet. 2014;384(9946):857-868.