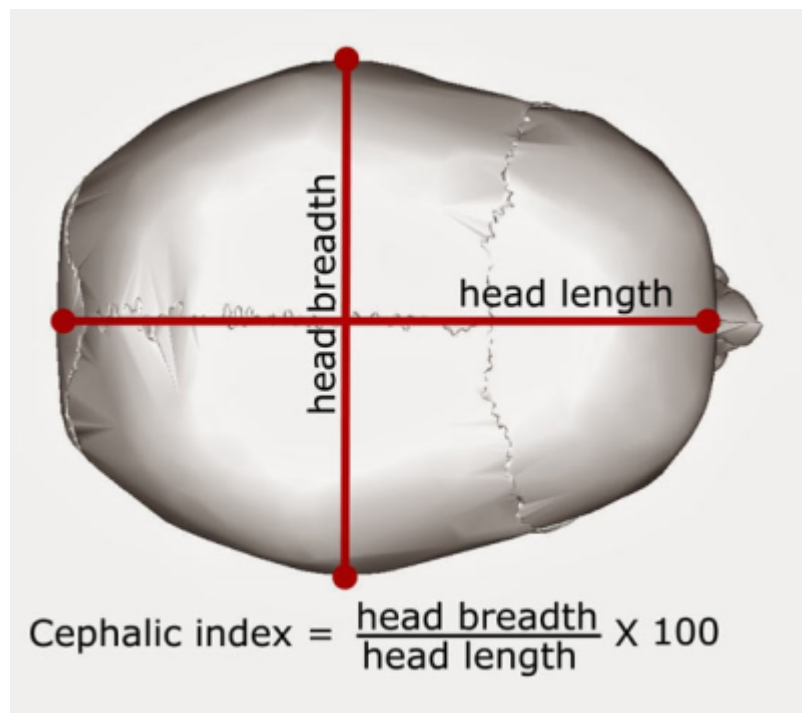


Cephalic index



The cephalic index or cranial index is the ratio of the maximum width of the head of an organism multiplied by 100 divided by its maximum length (i.e., in the horizontal plane, or front to back).

The cephalic index (CI) of the head can be measured manually using a caliper, the original technique, but it is also possible to determine it using skull X-ray, 2DCT and 3DCT images, 3D photo and with help of plagioccephalometry (PCM).

The manual caliper determination is statistically compared with other measuring methods for [scaphocephaly](#) patients (n = 39).

The CI mean differences for the most representative data are sequentially 3.74, 2.16, 1.09 and 0.97 for the 2DCT, PCM, 3D photo and 3DCT techniques. The CI 2DCT values show a significant difference ($p < 0.01$) in reference to CI manually, while the other techniques show a $p > 0.05$.

The conclusions are that significantly different results are achieved when using 2DCT relative to the manual caliper determination. No significant difference is observed between the 3D techniques and the manual method ¹⁾.

Pindrik et al., hypothesize that normative values of the new indices as well as for established measures like the [cephalic index](#) can be drawn from the evaluation of CT scans of normal individuals.

High-resolution 3D CT scans obtained in normal infants (age 0-24 months) were retrospectively reviewed. Calvarial measurements obtained from advanced imaging visualization software were used to compute cranial indices. Additionally, [metopic sutures](#) were evaluated for patency or closure.

A total of 312 participants were included in the study. Each monthly age group (total 24) included 12-18 patients, yielding 324 head CT scans studied. The mean cephalic index decreased from 0.85 at

age 0-3 months to 0.81 at 19-24 months, the mean frontoparietal index decreased from 0.68 to 0.65, the [metopic index](#) from 0.59 to 0.55, and the towering index remained comparatively uniform at 0.64 and 0.65. Trends were statistically significant for all measured indices. There were no significant differences found in mean cranial indices between sexes in any age group. Metopic suture closure frequency for ages 3, 6, and 9 months were 38.5%, 69.2%, and 100.0%, respectively.

Radiographically acquired normative values for anthropometric cranial indices during infancy can be used as standards for guiding preoperative decision making, surgical correction, and postoperative helmeting in various forms of [craniosynostosis](#). Metopic and towering indices represent new cranial indices that are potentially useful for the clinical evaluation of metopic and bicoronal synostoses, respectively. The present study additionally shows that metopic suture closure appears ubiquitous after 9 months of age ²⁾.

¹⁾

van Lindert EJ, Siepel FJ, Delye H, Ettema AM, Bergé SJ, Maal TJ, Borstlap WA. Validation of cephalic index measurements in scaphocephaly. *Childs Nerv Syst.* 2013 Jun;29(6):1007-14. doi: 10.1007/s00381-013-2059-y. Epub 2013 Mar 7. PubMed PMID: 23468203.

²⁾

Pindrik J, Molenda J, Uribe-Cardenas R, Dorafshar AH, Ahn ES. Normative ranges of anthropometric cranial indices and metopic suture closure during infancy. *J Neurosurg Pediatr.* 2016 Dec;25(6):667-673. PubMed PMID: 27589596.

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