Positional Plagiocephaly Diagnosis

The simplest way to assess the severity of plagiocephaly is to use a diagonal caliper during physical examination, which measures the difference between the diagonal lengths on each side of the head. A diagonal caliper is a cost-effective tool; however, there may be errors between the measurements, which can reduce the accuracy of evaluating the severity of plagiocephaly. Moreover, the difference between the diagonal lengths may be reduced by the scalp or hair of the patient, and the error can be large when the patient markedly when the measurements are being recorded. A study reported that errors in the readings recorded by different examiners may be as high as 2.2 mm on an average and that imaging data can aid in reducing such errors when measuring the difference in the diagonal length [1) 2)]

Difference of 9–12 mm and more than 12 mm in the cranial vault asymmetry are defined as mild to moderate and severe asymmetry, respectively.

The cranial vault asymmetry index is used to determine the severity of positional plagiocephaly and can be calculated as shown below. An index >3.5 indicates severe asymmetry [3) 4) 5)]

Imaging

No evidence-based guidelines exist for the imaging of patients with positional plagiocephaly.

The National Library of Medicine Medline database and the Cochrane Library were queried with the use of MeSH headings and key words relevant to imaging as a means to diagnose plagiocephaly. Abstracts were reviewed, and an evidentiary table was assembled summarizing the studies and the quality of evidence (Classes I-III). Based on the quality of the literature, a recommendation was rendered (Level I, II, or III).

A total of 42 full-text articles were selected for review. Of these, 10 were eliminated; thus, 32 full-text were manuscripts selected. There was no Class I evidence, but 2 Class II and 30 Class III studies were included. Three-dimensional cranial topographical imaging, ultrasound, skull x-rays, computed tomography, and magnetic resonance imaging were investigated.

Clinical examination is most often sufficient to diagnose plagiocephaly (quality, Class III; strength, Level III). Within the limits of this systematic review, the evidence suggests that imaging is rarely necessary and should be reserved for cases in which the clinical examination is equivocal. Many of the imaging studies were not designed to address the diagnostic utility of the imaging modality, and authors were actually assessing the utility of the imaging in longitudinal follow-up, not initial diagnosis. For this reason, some of the studies reviewed were downgraded in Level of Evidence. When needed, 3-dimensional cranial topographical photo, skull x-rays, or ultrasound imaging is almost always sufficient for definitive diagnosis. Computed tomography scanning should not be used to diagnose plagiocephaly, but it may be necessary to rule out craniosynostosis. The full guidelines document can be located at https://www.cns.org/guidelines/guidelines-management-patients-positional-plagiocephaly/Chapter_2 [6)].

[1) 3)] Zonenshayn M, Kronberg E, Souweidane MM. Cranial index of symmetry: an objective semiautomated measure of plagiocephaly. Technical note. J Neurosurg. 2004;100(5 Suppl Pediatrics):537–40.

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Mazzola C, Baird LC, Bauer DF, Beier A, Durham S, Klimo P Jr, Lin AY, McClung-Smith C, Mitchell L, Nikas D, Tamber MS, Tyagi R, Flannery AM. Congress of Neurological Surgeons Systematic Review and Evidence-Based Guideline for the Diagnosis of Patients With Positional Plagiocephaly: The Role of Imaging. Neurosurgery. 2016 Nov;79(5):E625-E626. PubMed PMID: 27776086.