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MANAGEMENT OF PLAGIOCEPHALY IN INFANTS IN PRIMARY CARE – A CASE STUDY

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ABSTRACT

Flat head in infants is a common complaint among parents, with many concerned about cosmesis and whether their child would eventually grow out of it. As primary care physicians who often encounter these queries from parents during routine developmental assessments, it is useful to understand how to pick up red flags, what advice to give, and when reassurance is all that is needed.

Keywords: Congenital, Hereditary, and Neonatal Diseases and Abnormalities, Craniofacial Abnormalities, Craniosynostoses, Musculoskeletal Abnormalities, Plagiocephaly

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INTRODUCTION

A Worried Parent

"Doctor, my daughter's head is flat on one side. Is there anything that I can do to make it round?"

History

A four-month-old baby girl, E, was brought by her mother for a routine developmental assessment. Her mother was concerned that she had a flat head. She was born a termed baby via normal vaginal delivery, without any significant antenatal or perinatal events. She had no past medical history. Her developmental milestones were appropriate. She was the only child. E's mother noticed that she liked to sleep and feed while facing her left side.

Physical Examination

E's growth parameters (height, weight, and OFC) were at the 50th percentile. She was an alert and cheerful baby. She had no abnormal facial features. There was flattening of her left occiput. Her left ear was positioned slightly anterior compared to her right ear. Her anterior fontanelle was flat and open. She had no strabismus. Her pupillary light reflex and red reflex were equal. She was able to fixate on a moving object, and her extraocular movements were normal. She had no torticollis. Her neurological examination was normal. She was able to prop herself up on her forearms when prone, and there was no head lag. Examination of the femoral pulses, hips, genitalia, and spine were unremarkable. Cardiac, respiratory, and abdominal examinations were normal.

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DISCUSSION

Abnormality of the head shape is a frequent concern of parents, with posterior head flattening being the most common complaint. While the majority of cases are due to positional plagiocephaly, in rare cases, it can be due to craniosynostosis. It is important to differentiate between the two conditions as they have significantly different clinical implications.[1]

Craniosynostosis is the premature closure of one or more cranial sutures. Craniosynostosis may be a result of metabolic, hematologic, or syndromic disorders, or teratogen exposure during pregnancy (secondary craniosynostosis).[2] Complications include progressive craniofacial distortion, neurological damage, and developmental delay.[3] Although the risk of increased intracranial pressure is higher with more sutures involved,[4] single-suture craniosynostosis is also associated with a higher incidence of neurodevelopmental delay in nonsyndromic children.[5-7] Surgical repair is often indicated.[8]

When there is premature closure of a unilateral lambdoid suture (refer to **Figure 1** and **Figure 2**), it is termed synostotic posterior plagiocephaly. This specific type of craniosynostosis results in ipsilateral posterior occipital flattening, which can appear similar to positional plagiocephaly. It is hence crucial to differentiate between the two.

Positional plagiocephaly (otherwise termed as deformational plagiocephaly, positional moulding, positional flattening, or positional head deformity), on the other hand, is generally benign, reversible, and does not require surgical intervention.[9] It presents as unilateral flattening of the posterior aspect of the head (refer to **Figure 3**). It is most often caused by prolonged pressure on one side of the developing skull, such as when infants are being placed to sleep in the supine position.[10]

Brachycephaly is another condition of abnormal head shape. However, unlike the conditions described earlier, occipital flattening in brachycephaly is symmetrical (refer to **Figure 3**). Its risk factors are similar to plagiocephaly as described below.

WHAT CAN I DO IN MY PRACTICE?

A diagnosis can be made clinically. Physicians should assess for risk factors for positional plagiocephaly in the antenatal and birth history of the child, such as multiple gestation, oligohydramnios,[11] premature birth, long labour, and assisted delivery.[8] Further history-taking may reveal that the child is repeatedly placed in the same sleeping or feeding position. Abnormal findings on physical examination and developmental assessment, such as motor delay, weakness, or hypotonia, may indicate a hypotonic muscle disorder that predisposes the child to positional plagiocephaly.[12] It is also important to examine for torticollis as it can be both a cause and consequence of the child's preference for one-sided positioning.

To differentiate between positional plagiocephaly and craniosynostosis, physicians should palpate the cranial sutures to ensure patency. In particular, they should pay attention to the lambdoid suture in order not to miss synostotic posterior plagiocephaly, which also presents as ipsilateral posterior head flattening (the lambdoid suture typically begins closure at 26 months, and only completes closure in adulthood).[8] Other typical findings of positional plagiocephaly include the displacement of the ipsilateral ear anteriorly (as opposed to the symmetrical ear position in lambdoid craniosynostosis), as well as a parallelogram head shape when viewed from the vertex (refer to **Figure 4**). The area of plagiocephaly is important. Anterior plagiocephaly should not be dismissed as positional as children rarely experience prolonged pressure to the anterior cranium. If the diagnosis is uncertain, referral to paediatric neurosurgery should be considered.

Conservative Management

In the absence of developmental delay or neuromuscular conditions accounting for the head deformity, mild isolated positional plagiocephaly can be managed with a change in positioning.[13] Caregivers should be educated on alternative feeding positions and the need to decrease the time that the child spends lying supine.[12] Often, as the child grows and develops motor skills, less pressure is placed on the occiput and the deformity improves.[14] In more serious cases of positional plagiocephaly, the child develops shortening of the ipsilateral sternocleidomastoid muscle as a result of preference for one-sided positioning, resulting in torticollis. Paediatric physiotherapy is helpful in teaching caregivers exercises to lengthen the sternocleidomastoid muscle.[12]

Indications for Referral

If the positional plagiocephaly does not improve after two to three months of conservative management, the child should be referred to paediatric neurosurgery for imaging to confirm patency of sutures, as well as for a prescription for head orthosis[12] (refer to **Figure 5** and **Figure 6**). Children with an abnormal head shape should also be referred to neurosurgery if the diagnosis is uncertain.

Prevention

Finally, prevention of positional plagiocephaly is more important than early treatment. As primary care physicians conduct routine developmental assessments, they have an important role to play in educating caregivers in appropriate positioning of infants to prevent positional plagiocephaly (e.g., alternating feeding and sleeping positions, prone positioning during supervised play).

A PARENT'S REQUEST FOR REFERRAL

Despite reassurance and advice, E's mother was still worried and requested for a specialist referral. E was seen by neurosurgery at five months old and was diagnosed with positional plagiocephaly. She was managed conservatively with repositioning techniques. The paediatric neurosurgeon advised E's caregivers that although helmet therapy was an option, it was unnecessary as the "infant skull is soft, it would mould and reshape".

Figure 1. Fetal head at term showing fontanelles and lambdoid suture.

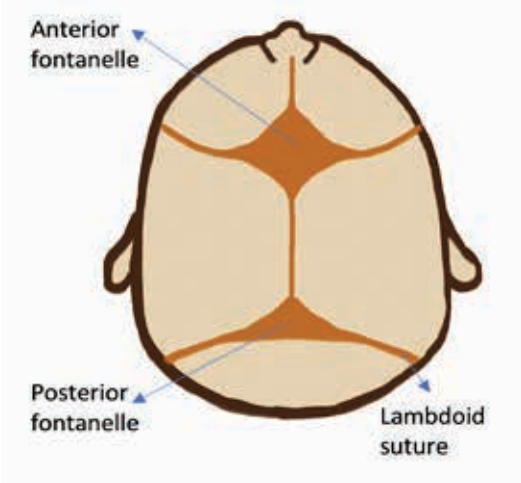


Figure 2. Premature fusion of a unilateral lambdoid suture causes synostotic posterior plagiocephaly.

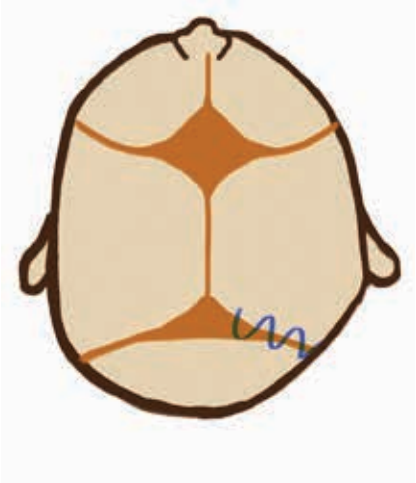


Figure 3. Comparison of head shape abnormalities of plagiocephaly (unilateral, asymmetrical) and brachycephaly.

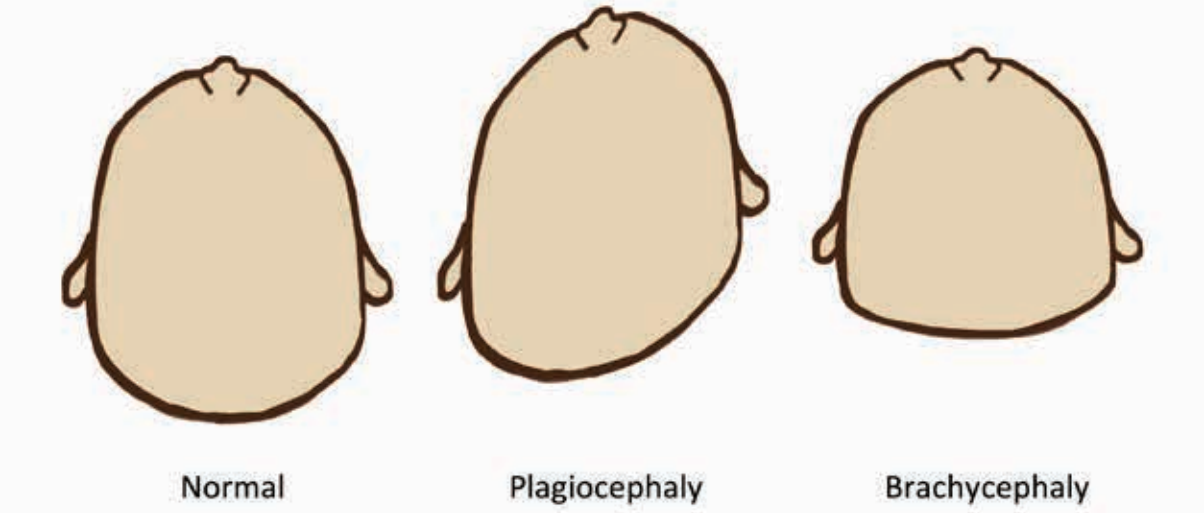


Figure 4. Superior view of the head: positional plagiocephaly has a parallelogram shape, as compared to synostotic plagiocephaly, which is trapezoid shaped.[1,12] The ipsilateral ear is also displaced anteriorly in positional plagiocephaly.

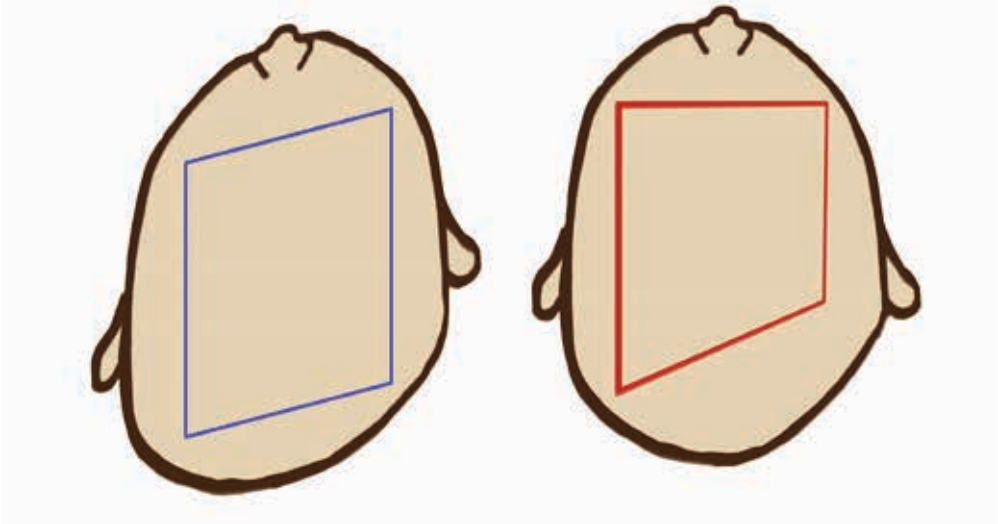


Figure 5. Illustration of head orthosis.

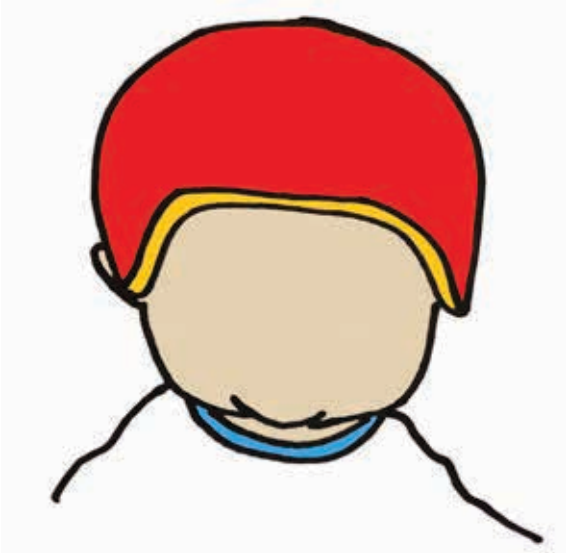
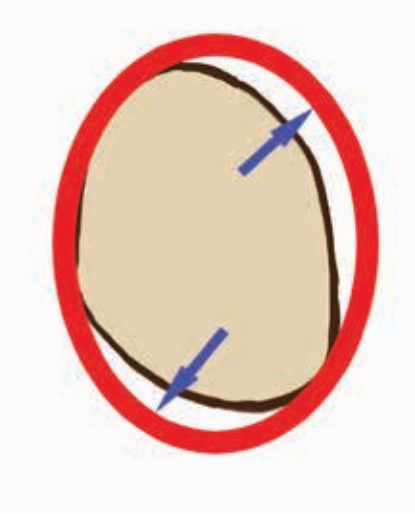


Figure 6. Superior view inside head orthosis. Head growth is redirected into the areas that are flat.



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LEARNING POINTS

- **Posterior plagiocephaly is most commonly due to positional plagiocephaly, but it is important to exclude craniosynostoses, which can be complicated by craniofacial distortion, neurologic damage, and developmental delay.**
- **Mild positional plagiocephaly resolves spontaneously, or with simple repositioning techniques.**
- **More severe cases of positional plagiocephaly may result in torticollis, which would require physiotherapy. A referral to paediatric neurosurgery would be warranted if the condition does not improve.**