

Infantile Positional Occipital Plagiocephaly from Child Safety Seats

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Recommendation: Systematic reviews find that excessive time spent in the supine position is responsible for the increased incidence of deformational plagiocephaly.ⁱ Overall, it seems that periodic changing of sleeping position, spending time holding the infant upright when the infant is awake, and reducing the time spent in car seats, carriers, and bouncy seats may help to reduce the risk of developing occipital plagiocephaly.

Background/Issue: Overall studies have shown an increase in the incidence of positional infantile occipital plagiocephaly (skull/head flattening)ⁱⁱ since 1993 in the United States from leaving infants in static supine positions for long periods of time. Most importantly evidence suggests that by leaving infants for “excessive” periods of time in car seats, carriers, and bouncy seats has been found to be a “possible” contributing factor of infantile occipital plagiocephaly. In addition, there seems to be very little patient education for new parents on the issue of infantile sleeping specifically in safety seats. Since the American Academy of Pediatrics issued a position paper in 1992 recommending that infants be placed on their backs or sides when sleeping to avoid the possible risk of SIDS, while this recommended practice has played a major role in reducing SIDS, unfortunately an increase of positional occipital plagiocephalyⁱⁱⁱ among infants has been associated with supine positioning practices.^{iv} Further positional occipital plagiocephaly has been shown to have increased 5-6 times since 1992 with an increase in torticollis as well^v.

Discussion:

The National Institute of Child Health and Human Development (CHHD), provides health education recommendations discussing positional occipital plagiocephaly. CHHD discusses the common causes to include:

- Too little time spent upright
- Too little Tummy Time¹, when baby is awake and supervised
- Too much time in car seats, carriers, and bouncy seats

To prevent positional occipital plagiocephaly CHHD recommends “Avoiding too much time in car seats, carriers, and bouncers while the infant is awake”.^{vi} They further suggest periodic changing of the infant’s sleeping head position by spending time holding the infant in an upright position when the baby is not sleeping as much as possible. Practitioners also provide recommendations on proper positioning not only while in the neonatal intensive care unit (NICU), but after discharge educating parents on proper positioning to prevent the risk of positional occipital plagiocephaly.^{vii} Their recommendations include spending minimal time in a car seat and to educate parents to

¹ *Tummy Time means allowing for your baby to be on his or her stomach while the baby is awake and someone is watching.*

avoid seating their infant in a car seat except for travel. However they further suggest that Dolicocephalic infants may benefit from additional time in an infant seat to help encourage maintaining the head in the midline position.^{viii}

Neonatal Care Practitioners: CEU's valid through January 2009 are available online through Medscape for neonatal care, perinatal care, pediatrics, primary care, and family practice nurses, advances practice nurses, nurse managers, and other clinicians who provide care for newborn infants. Their practice recommendations include those previously discussed, by the National Institute of Child Health and Human Development,^{ix} and further highlight the need for education and guidance for prevention.

While the International Chiropractors Association supports the correct use of child passenger safety seats, they also emphasize that these seats are not designed ergonomically for long term use inside the vehicle or for support while outside the vehicle and recommends not using these for such purposes.^x While this may increase risk for occipital plagiocephaly, may also increase the risk for subluxation and neuromusculoskeletal compromise. Whereas upon birth, infants have a primary curve² or "C shape" from the base of their head to their tailbone. However while with primary curve is preserved while in an infant carrier or car seat, with the infant's head flexed on their chest can compromise respiratory and digestive systems by reducing air flow or encouraging gas to build up inducing rigidity and reflux as their knees are flexed towards their abdomen and abdominal contents are compressed into their diaphragm.^{xi}

- **EPIDEMIOLOGY:** With the lack of consistent terminology, makes obtaining incidence of Infantile Positional Occipital Plagiocephaly difficult.^{xii}
- **RISK FACTORS:** Supine positioning-risk factors identified with the development of deformational plagiocephaly.^{xiii xiv xv xvi xvii xviii xix}
- **DEVELOPMENTAL ISSUES:** Since the development of the AAP recommended child care supine practices in 1992, those children are now grade and middle school aged. In 2000, Miller and Clarren found an increase of developmental delay in schoolaged children diagnosed with deformational plagiocephaly as infants.^{xx} Further, studies suggest that additional research is needed to identify long suspected problems such as orthodontic procedures, visual disturbances, scoliosis, and auditory from children with plagiocephaly.^{xxi}
- **AWARENESS:** In August, Plagiocephaly awareness week provides an opportunity to provide educational information to healthcare workers, CPS technicians, and new parents.

² *Infant flexing their head towards their chest and flexing their legs to their abdomen at their hips.*

- **ADDITIONAL LINKS:** The following are a few links regarding this issue:

http://www.nichd.nih.gov/health/topics/positional_plagiocephaly.cfm

<http://www.icapediatrics.com/reference-articles.php>

www.caringforkids.cps.ca/babies/FackToSleep.htm

www.caringforkids.cps.ca/babies/Flatheads.htm

www.cps.ca

www.cheo.on.ca/english/5030.html

www.plagiocephaly.org

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- i Lima D. *The management of deformational plagiocephaly: a review of the literature. Journal Prosthetics & Orthotics.* (2004) Vol.16, Num.4S, pp.9-14.
- ii Johns, FR, Jane JA, Lin KY. *Surgical approach to posterior skull deformity. Neurosurg Focus* 9(3), 2000.
- iii Reese S. *A dangerous diagnosis. Parenting.* 1996;10:25-26.
- iv Argenta LC, David LR, Wilson JA, Bell WO. *An increase in infant cranial deformity with supine sleeping position. J Craniofac Surg.* 1996;7(1)5-11.
- v Hummel P, Fortado D. *Impacting infant head shapes. Adv Neonatal Care.* 2005;5(6):329-340.
- vi US Department of Health and Human Services, National Institutes of Health, National Institute of Child Health and Human Development. *SIDS Risk Reduction. Washington, DC: US Department of Health and Human Services; 2006. NIH Publication No. 06-6005.*
- vii Hummel P, Fortado D. *Impacting infant head shapes. Adv Neonatal Care.* 2005;5(6):329-340.
- viii Op cit
- ix US Department of Health and Human Services, National Institutes of Health, National Institute of Child Health and Human Development. *SIDS Risk Reduction. Washington, DC: US Department of Health and Human Services; 2006. NIH Publication No. 06-6005.*
- x Vallone S. *Infant car seat safety: what you should know. Chiropractic Pediatrics: A publication of the ICA Council on Chiropractic Pediatrics.* Spring 2007
- xi Vallone S. *Infant car seat safety: what you should know. Chiropractic Pediatrics: A publication of the ICA Council on Chiropractic Pediatrics.* Spring 2007
- xii Lima D. *The management of deformational plagiocephaly: a review of the literature. Journal Prosthetics & Orthotics.* (2004) Vol.16, Num.4S, pp.9-14.
- xiii Boere-Boonekamp MM, Van der Linden-Kuiper LT. *Positional preference: prevalence in infants and follow-up after two years. Pediatrics* 2001;107:339-343.
- xiv Littlefield TR, Kelly KM, Pomatto JK, et al. *Multiple birth infants at higher risk for deformational plagiocephaly: is one twin at greater risk? Pediatrics* 2002;109:19-25.
- xv Hutchinson BL, Thompson JM, Mitchell EA. *Determinants of nonsynostotic plagiocephaly: a case-control study. Pediatrics* 2003;112:1-13.
- xvi Littlefield TR, Pomatto JK, Beals SP, et al. *Efficacy and stability of dynamic orthotic cranioplasty: an eight year investigation. In: Whitaker LA, ed. Craniofacial Surgery VII. Bologna, Italy: Monduzzi Editore; 1997:109-111.*
- xvii Argenta LC, David LR, Wilson JA, et al. *An increase in infant cranial deformity with supine sleeping position. J Craniofac Surg* 1996;7:5-11.
- xviii Chaddock WM, Kast J, Donahue DJ. *The enigma of lambdoid positional molding. Pediatr Neurosurg* 1997;26:304-311.
- xix O'Broin ES, Allcutt D, Earley MJ. *Posterior plagiocephaly: proactive conservative management. Br J Plast Surg* 1999;52: 18-23.
- xx Miller RI, Clarren SK. *Long-term developmental outcomes in patients with deformational plagiocephaly. Pediatrics* 2000;105:1-5.
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