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Deformational plagiocephaly: An update


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Overview

- Background
- Update plagiocephaly
- Why the research?
- Survey 'flat-headed' babies
- Challenges – the study




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Background

Plagiocephaly or 'flat headed' babies

- The SIDS campaign is very successful - not in question.
- An unintended and unexpected outcome
- Most common craniofacial problem today



Incidence

- 5% in 1962 (Danby 1962)
- Now 46.6% in infants age 7-12 weeks (Mawji et al 2013)

Prevalence


- 1 in 2-300 USA 2004-2008 (20-30%) (Kluba et al 2014)
- In Texas 1999-2007 av increase of 21.2% per year (Shue et al, 2011)

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About plagiocephaly

History of plagiocephaly pre-1992

- Single case study 1918 (Schuller 1918)
- Helmet therapy for plagiocephaly (Clarren, 1981)



'Back to Sleep' campaign

- AAP recommendation 1992
- 'Non-prone' sleeping, updates to 2005


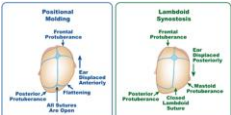

Literature - 1992 to present

- 'Huge explosion' of papers
- Multiple profession focused reviews
- Few controlled studies
 - only 2 RCT = One in 2014 - helmets should be discouraged (van Wijk, 2014)

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Deformational plagiocephaly

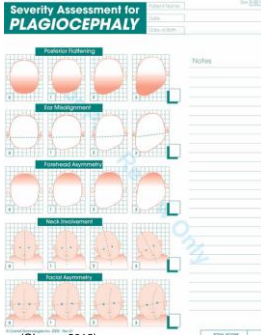
- Greek, *plagios* - askew, *kephale* - head
- 'Slanting head' (Schuller 1918)
- An acquired deformation of an intrinsically normal skull by sustained or excessive extrinsic forces (Shamji, 2012)
- MeSH Headings - evolution
- Differentiate lambdoid craniosynostosis – (note forehead and ears)

View 'norma verticalis'

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Severity Assessment for PLAGIOCEPHALY



Measurement tools

- Severity Scale (Argenta, 2004, Ohman 2012)
 - 0 = no asymmetry
 - 1 = mild
 - 2 = moderate
 - 3 = severe
- Five subcategories
 - Posterior flattening
 - Forehead asymmetry
 - Ear misalignment
 - Head tilt
 - Facial asymmetry
- Plagiocephalometry
- 3dMDCranial System - imaging

Risk factors (Joganic et al, 2009)

20,000 children treated for deformational plagiocephaly

- 2- and 3-way factor analyses for categorical frequency data
- Male patients
- Primiparity
- Fewer vertex, but more breech and transverse intrauterine presentations
- Twinning (specifically, dizygosity)
- Right-sided lateralization.

Did You Know?



Sleep position

- the single greatest predictor of lateralization

(Cranial Technologies, Inc, from 1990 to 2007)

Prevention Strategies

Advice from health professionals early (Lennartsson, 2011)

- Counter-positioning
- Prone play when awake and supervised

AAP Brochure

- "Tummy time is for babies who are awake and being watched"... 'build their own strength'

Australian Physiotherapy Association

- Positioning advice
- Tummy time to play or side lying

Latest - study in France (Cavaller and Picaud 2011)

- Multicentre control study (some limitations)
- Neonatal ward - education brochure
- Free play when awake



Why research?

Common knowledge to MCHN (early contact - newborns)

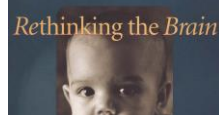
- Need evidence to influence policy (and medical world!)

Human development is both nature and nurture

- Knowledge = brain development, neuroscience
- Nature = Infant temperament
- Nurture = Environment

The brain is being built over time

- Learn through movement
- 'Infants can't wait' (Kathryn Barnard, 1938 – 2015)



Uncertainty around plagiocephaly effect on development

Effect on development

Controversial

- Arguably, no detriment to long term development
- BUT, concern has persisted

Now, a longitudinal study shows evidence of developmental delay in 3 year olds with plagiocephaly

- Reported delays in cognition, language, and parent-reported adaptive behaviour (BSID-III Bayley 3rd edition)
- Small effects on motor development

(Davis et al 1998, Dewey et al 1998, Darrah & Bartlett 2013) (Kane et al 1996, Knight et al 2013), (Collett et al 2014)



The industry?

'Downstream' measures!

'Google' - should I worry if my baby hates tummy time? (9 million 'hits')

Studies are turning to cost containment

The industry!!!



<http://www.cranialtech.com/> 100,000 patients 1990-2015

Aim

- To determine how big a problem plagiocephaly is among Victorian health practitioners

Take a step BACK



Survey of maternal child health nurses and paediatric physiotherapists about 'flat headed babies'

Maternal Child Health Nurses n=177, (Midwives n=25)

Physiotherapists n=16

- Metropolitan (62%), Regional (16%) Rural (26%)

Experienced professionals

- 77% had assessed more than 50 infants in the previous 12 months



Survey (cont)

ALL respondents saw infants with plagiocephaly

- 67% at age 6 – 8 weeks
- Numbers of infants seen with plagiocephaly (last 12 mths)
 - n=11–25 (34%),
 - n=25-50 (24%),
 - >50(15%)

Referral patterns:

- Physiotherapist (157)
- Specialist clinic RCH (99)
- Paediatrician (69)



Survey (cont)

Other referrals

Comments (n = 64)

- GP for further referral (47%)
- Chiropractor/Osteopath (45%)

Prevention

- 99% - implemented prevention strategies
 - RCH physiotherapy department handout
- 66% - thought strategies were evidence-based
- 66% - thought current prevention effective



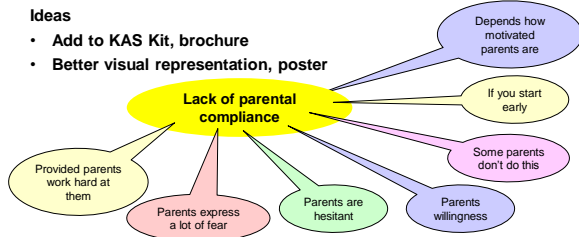
Survey (cont)

Comments on prevention effectiveness

- 43% 'sometimes ... depending ... could be better ...'
- 50% mentioned lack of parental compliance with tummy time

Ideas

- Add to KAS Kit, brochure
- Better visual representation, poster



Challenge - 'A new look' at motor development

Subjects – a normative study

- 200 term infants, looking at time of acquisition of head control
- Advertisement in MCH Centres

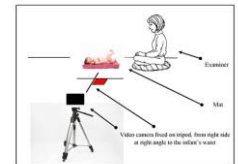
Method

Longitudinal observational video study

- Aged 1-4 months
- 3 sessions
- 4-8 weeks, 9-12 weeks, 13 – 16 weeks
- max time 30 minutes

Questions for parents

- birth history
- awareness of 'flat headed' babies



ATTACHMENT 4

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INVITATION TO PARTICIPATE

Project

Evaluation of the development of head control in infants aged 9 – 12 months

Researchers: Drs Elizabeth Williams, Professor Mary Galvin

You are invited to take part in this study investigating the acquisition of a movement skill that develops in babies called 'head control', particularly for head held erect against gravity. This is the ability of your infant to hold their head in place when lying on their tummy, a skill not present in the newborn baby.

You will be provided with a Parent Language Statement which contains detailed information regarding this study. The aims of the statement are to clearly and openly explain all the procedures involved in the study. You are free to ask questions about any information in the statement.

We will request you to complete a short questionnaire and would like to videotape your baby, in a relaxed or sleep state, every 3-4 weeks, from a maximum of 9 till at least 12 months. No child will be 12 months, or a further 6th to 12 months. Family members are welcome to be present at the sessions.

Once you understand the information and if you agree to take part in the study, you will be asked to sign the accompanying Consent Form.

For further information

Contact: Liz Williams
Phone: 0312 509 7244
E-mail: e.williams@unimelb.edu.au



Infant aged 3 months: pilot study 1



Infant aged 4 months pilot 2



Update on plagiocephaly

Discussion and questions ???

Conclusion

- Support SIDs prevention campaign
- 'Back to Sleep' - yes
- Problems with plagiocephaly prevention
- Movement skills infants 0-4 months

Inform better plagiocephaly prevention

- Build on existing prevention strategies



THANK YOU
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