# If in Doubt, ~~don't~~ Do It!

## Paediatric Feeding EBP Group

2015

# Who Are We?

| Name | Setting | Role |
|---|---|---|
| Amanda Spirit-Jones | Disability - NGO | Leader and appraiser |
| Laura Mobbs | Disability - Government | Appraiser |
| Meily Choi | Health | Appraiser |
| Anne Hoffmann | Disability - Government | Appraiser |
| Dayna Ingram | Early Intervention - NGO | Appraiser |
| Jane Pettigrew | Health | Appraiser |
| Arbel Mordoch | Disability - NGO | Appraiser |
| Lisa Jacob | Disability - Government | Appraiser |
| Kim Truong | Early Intervention - NGO | Appraiser |
| Kylie Ryan | Disability - Government | Appraiser |

# Our PICO

| Population | Intervention | Comparison | Outcome |
|---|---|---|---|
| In children with Cerebral Palsy (CP) | how accurate is clinical evaluation (CE) | compared to instrumental assessment | in identifying aspiration? |

# Our Search

**Search Terms:**

- (child* OR pedia* OR paedia* OR infant*) AND (“cerebral palsy” OR neuro*) AND (swallow* OR dysphagi* OR feed*) AND (bedside OR clinic*) AND (assess* OR evaluat* OR exam*) AND (“instrumental (assess* OR evaluat*)” OR “modified barium swallow” OR MBS OR “videofluoroscopic swallow* study” OR Videofluoroscop* OR “video fluoroscop*” OR VFSS OR “cervical auscultation” OR “Fibreoptic Endoscopic Evaluation of swallow*” OR FEES) AND (aspirat* OR pneumonia OR chest)
- (child* OR p#ediatric* OR infant*) AND (“cerebral palsy” OR neuro*) AND (swallow* OR dysphagi* OR feed*) AND (bedside OR clinic*) AND (assess* OR evaluat* OR exam*) AND (“instrumental (assess* OR evaluat*)” OR “modified barium swallow” OR MBS OR “videofluoroscopic swallow* study” OR Videofluoroscop* OR “video fluoroscop*” OR VFSS OR “cervical auscultation” OR “Fibreoptic Endoscopic Evaluation of swallow*” OR FEES) AND (aspirat* OR pneumonia OR chest)
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- (child* OR pedia* OR paedia* OR infant*) AND (“cerebral palsy” OR neuro*) AND (swallow* OR dysphagi* OR feed* OR aspirat* OR pneumonia OR chest *) AND (assess* OR evaluat* OR exam* OR instrument* OR measure* OR diagnos* OR “modified barium swallow” OR MBS OR “videofluoroscopic swallow* study” OR Videofluoroscop* OR “video fluoroscop*” OR VFSS OR “cervical auscultation” OR “Fibreoptic Endoscopic Evaluation of swallow*” OR “Fiberoptic Endoscopic Evaluation of swallow*” OR FEES OR radio*) – TITLE ONLY
- Also utilised article reference lists

**Inclusion/exclusion criteria:**

- Children 0-18 years with cerebral palsy (if mixed participants, results of CP must be able to be extrapolated)
- Experimental article
- Compares clinical evaluation with instrumental assessment
- Article available in English

**Databases:** CINAHL, MEDLINE, SocINDEX, Psychology & Behavioural Sciences Collection, PsycINFO, PsycARTICLES, Education Research Complete, ERIC (Education Resource Information Center), Sage Journals, Proquest Central, Embase, Informit Health Collection, Maternity and infant care, Nursing@Ovid, ProQuest, AMED, PubMed, Google scholar, SpeechBITE, Cochrane Library, ASHA evidence maps.

# Our Search

Database results:
**23 articles**

Somewhat relevant or interesting:
**13 articles**

Made the CAT cut:
**4 articles**

# Results

| Reference | Included in CAT? |
|---|---|
| Araujo et al (2014) | Yes |
| Baikie et al (2005) | No |
| Benfer et al (2015) *a & b* | No |
| De Matteo et al (2005) | No |
| Kim et al (2013) | No |
| Marrara et al (2008) | Yes |
| Mirrett et al (1994) | No |
| Morgan et al (2008) | No |
| Morton et al (1993) | Yes (info extrapolated) |
| Ozdemirkiran et al (2007) | No |
| Rogers et al (1994) | Yes (info extrapolated) |
| Selley et al (2000) | No |

# CAT article # 1 :

Araujo, BCL, Motta, MEA, de Castro, AG and de Araujo, CMT. (2014) **Clinical and Videofluoroscopic Diagnosis of Dysphagia in Chronic Encephalopathy of Childhood.** *Radiologia Brasileira,* 47(2):84-88

- 93 children with CP (not specified in article, confirmed via email w/ author)
- CE with cervical auscultation (CA) vs VFSS
- Thin fluid from cup and “puree” (extremely thick juice) from spoon
- CE suspected penetration/aspiration if: **crying, coughing, choking, vomiting, drowsiness, laboured breathing and changes in vocal quality**
- Results were difficult to understand, statistics were inconsistent, only puree data published
- **Puree: CE 6/91 aspirating, 4 of these aspirated on VFSS; additional 20 aspirated on VFSS;** 65/85 identified as not aspirating on CE did not aspirate on VFSS
- **Fluids (email results): CE 57/91 aspirating, 34 of these aspirated on VFSS, additional 18 aspirated on VFSS;** 13/31 identified as not aspirating on CE did not aspirate on VFSS
- **Clinical evaluation of aspiration with children with CP is difficult and unreliable, particularly with puree. Accuracy is enhanced through the use of VFSS**

# CAT article # 2 :

Marrara et al Marrara JL, Duca AP, Dantas RO, Trawitzki LVV, Lima RAC, Pereira JC (2008) **Swallowing in Children with Neurologic Disorders: Clinical and Videofluoroscopic Evaluations (Original Title: DeglutiçãO Em Crianças Com AlteraçõEs NeurolóGicas: AvaliaçãO ClíNica E VideofluoroscóPica).** *Pró-Fono Revista de Atualização Científica. 2008 outdez*; 20(4):231-6.

- 24 children with neurological impairment (implied to be CP). Poor translation to English
- CE with CA vs VFSS with fluids and puree
- No significant correlation of oral phase skills between fluid and puree.
- **No significant correlation of results of CE and VFSS during oral phase**
- **CE results correlated with excursion of hyoid and aspiration found during VFSS for both fluid and puree**
- CE results correlated with reduced laryngeal penetration during VFSS for puree
- Useful information detected with changes in CA from before swallow to during and after
- **CE with CA is useful in determining risk of aspiration and pharyngeal phase dysphagia and results are strengthened with VFSS**

# CAT article # 3 :

Morton, R.E., Bonas, R., Fourie, B., Minford, J. (1993) **Videofluoroscopy in the Assessment of Feeding Disorders of Children with Neurological Problems**. *Dev Med and Child Neur (35):388-395.*

- 14 children (11 w/ CP) all diagnosed as aspirating from CE and case history
- Detailed case history, CE and VFSS
- CE suspected aspiration if: **small for age stature, malnourished, severe feeding difficulties, mashed diet (could be thick puree), difficulties w/ liquids and mealtimes >30mins, choking, recurrent respiratory infections**
- **82% aspirated on VFSS, 18% did not.** Did not consider those missed by CE
- 56% found not to aspirate when modified positioning
- **VFSS is more sensitive/ accurate in identifying children who aspirate on food/fluids**
- **VFSS helps identify when aspiration occurs during the 3 phases of the swallow (i.e. before, during or after a swallow)**
- **VFSS gives insight to the effects of intervention strategies on swallowing abilities**

# CAT article # 4 :

Brian Rogers, Joan Arvedson, Germaine Buck, Paulette Smart, and Michael Msall (1994). **Characteristics of Dysphagia in Children with Cerebral Palsy**. *Dysphagia* 9:69-73

- 90 children with CP and dysphagia (93% severe CP)
- VFSS vs comprehensive case history, CE screener (parent interview)
- Parent reported coughing, choking, trouble breathing 57%
- Oral phase dysphagia 90%
- Delayed swallow 97% (in pharynx for >3sec)
- Multiple swallows 83%
- Pharyngeal residue 58%
- Aspiration 38% (97% silent 50% before or during, 50% after; 94% trace)
- Pharyngeal phase dysphagia and aspiration most commonly not present for all consistencies (liquid 96%, puree 48%, solid 24%)
- **Those whose parents report coughing, choking, trouble breathing 49% aspirated, 22% did not**
- **Parents under-report feeding difficulties**
- **Pharyngeal residue and reduced pharyngeal motility were the only significant features associated with aspiration**

# Clinical Bottom Line…

There is **low level evidence** which indicates that **clinical evaluation has high sensitivity and low specificity in identifying aspiration** when compared to Videofluoroscopic Swallow Study (VFSS). **VFSS was presumed to be the gold standard assessment** in identifying aspiration for all studies included in our CAT.

# Predicting Aspiration

- 16 clinical signs of oropharyngeal dysphagia (OPD) in children w/ CP: gagging, coughing, choking, vomiting, throat clearing, multiple swallows, wheezing, stridor, rapid or laboured breathing, wet breathing, gurgly voice, rattly chest, snuffly nose, eye tearing, circumoral cyanosis/duskiness[3]
- Wet breathing and coughing good clinical markers for aspiration on thin fluids but not puree[3,5,6]
- Coughing alone not sufficiently discriminative in 18-36 months; coughing on a few textures, over a number of mealtimes or alongside other signs maybe a better indicator of OPD[3]
- Significant risk of silent aspiration in severe CP[5,6,8]
- Silent aspiration risk increased with reduced or uncoordinated pharyngeal motility[6,8]
- Oral phase dysphagia not significant predictor of aspiration[8]
- Delayed swallow not significant predictor of aspiration[8]
- Easier to detect aspiration during CE with fluids rather than solids[1,5] - CE detected 92% of aspirators and 46% non-aspirators w/ fluids[5] CE detected 33% of aspirators and 65% of non-aspirators on solids (confirmed by VFSS) [5]
- Puree/solids less likely to be aspirated than fluids[1,5,8]
- Correlations between CE and VFSS higher when clinicians reported to be sure of their assessment [5]
- CE with CA (data taken before, during and after swallow) appears to somewhat increase accuracy of aspiration detection [1,7]
- Increase in CP severity increases risk of prevalence *and* severity of OPD [3,6]
- Parent report on signs is a feasible screening method with parent training[12]

# Clinical Evaluation Tools

- OPD was assessed using the Schedule for Oral Motor Assessment (SOMA)[14], Dysphagia Disorders Survey (DDS)[15], Pre-Speech Assessment Scale (PSAS)[16]
- SOMA, DDS and PSAS had strong agreement for inter- and intra-rater reliability
- SOMA: best specificity (identified 100% of non-OPD), low sensitivity (identified 53% of OPD – misses mild)
- DDS and PSAS: high sensitivity (identified 100% of OPD), low specificity (identified 47% and 70% respectively of non-OPD). Overly sensitive (identified 50% and 37% respectively typical children having OPD when had age appropriate skills)

*Benfer et al (2015)b*

# Other Instrumental Assessments/Screeners

**Salivagram** was most frequently positive for aspiration followed by VFSS. Milk scan was least frequently positive. Poor agreement in identifying aspiration, suggests each tool assesses different mechanisms of aspiration or have high rates of false negative and positive results.[2]

**Pulse oximetry** (PO) as screener for dysphagia. PO may be able to moderately discriminate between those with and without dysphagia. PO not reliable in identifying aspiration but clinicians may find it useful alongside clinical evaluation.[9]

**Surface Electromyography** on submental muscle complex (under chin) used as screener for dysphagia compared with CE. Assessed for volume at which multiple swallows begins - termed “dysphagia limit” (reported to be useful in adults). Dysphagia limit lower in CP than typical children however 5/12 achieved “normal” dysphagia limits despite diagnosis of dysphagia in CE. Does not appear to be reliable in identifying aspiration.[11]

**Exeter Dysphagia Assessment Technique** (involves electrodes and microphones) to assess respiration patterns and physiology of swallow (does not assess risk of aspiration or swallow safety). Under strict conditions (small sips of thin fluid given via a spoon) EDAT can identify differences between the respiration patterns of typical children and those with CP+dysphagia. Function use of this tool is unclear.[13]

# Our Reflection

- Dysphagia severity and prevalence of OPD and aspiration increases as CP severity increases
- OPD is under-reported by parents of children w/ CP
- Silent aspiration with severe CP more prevalent than expected
- CE provides valuable information and is central as a primary assessment in dysphagia to aid clinical decision making, however, there are limitations
- CE has high sensitivity but low specificity - we tend to be overly cautious
- Accuracy of CE may be dependent on level of expertise of the assessor
- CE more accuracte at identifying normal swallow than disordered swallow
- Results of assessments may be affected by a number of variables e.g. bolus delivery, carer, timing, volume consumed, fatigue, positioning, environment
- Access to VFSS is essential to our clinical practice in appropriately managing children with CP
- Further studies evaluating the effectiveness of clinical evaluations are required as there is minimal information into strategies that should be followed if instrumental assessments are not available
- Fiberoptic Endoscopic Evaluation of Swallowing (FEES) was not evaluated in any articles that we looked at however this instrumental assessment may be a viable tool for assessing aspiration in children with CP

# Application to Our Practice: E$^3$BP

- CE of mealtimes should form part of our comprehensive assessment for children with CP
- CE may be enhanced by:
  - Detailed background information incl. chest health history
  - Clinician's experience and training
  - Conducting cervical auscultation and pulse oximetry
- VFSS is useful in confirming presence or absence of aspiration if not clear from CE
- There are limitations of VFSS:
  - Exposure to radiation
  - Only a snapshot
  - Unfamiliar environment and routine
  - Presence of contrast – changes taste and texture
  - Stressful
  - Difficulty obtaining referral
  - Limited access

***When in doubt do, rather than when in doubt don't***

# A Bit of Technology

| Technology | Pros | Cons |
|---|---|---|
| **Webex** | Can see each other<br>Can share computer screen | Subscription required (accessed through workplace)<br>Setup time consuming – works best if use same site and same computer<br>Video can be slow depending on internet connection<br>Requires webcam, microphone and speakers |
| **Teleconferencing** | Very easy to use – no technical difficulties<br>Not affected by internet connection | Subscription required (accessed through our academic link)<br>Information can get lost without visual cues<br>Can be difficult to tell who's talking<br>Sometimes microphone amplification low |
| **Evernote** | Free (basic account)<br>Great for storing documents online for quick easy access by all members – does not take up local/email storage | Members required some training – can be difficult to navigate<br>Easy to accidentally delete comments/files |
| **Google Docs** | Free<br>Great for storing documents<br>Documents can be edited online<br>Documents can be exported as doc, ppt, pdf etc.<br>Saves all previous versions<br>Can see who has edited (theoretically) | Everyone needs a Google account<br>Can be fiddly enabling permission to edit<br>Have to share every document individually<br>Formatting can be tricky online |
| **Skype for Business** | Can see each other<br>Can share computer screen and documents<br>Setup and invitations much easier than Webex | Subscription required (accessed through workplace)<br>Video can be slow depending on internet connection<br>Requires webcam, microphone and speakers |

# Next Year


- The leading contender for our background question in 2016 is:

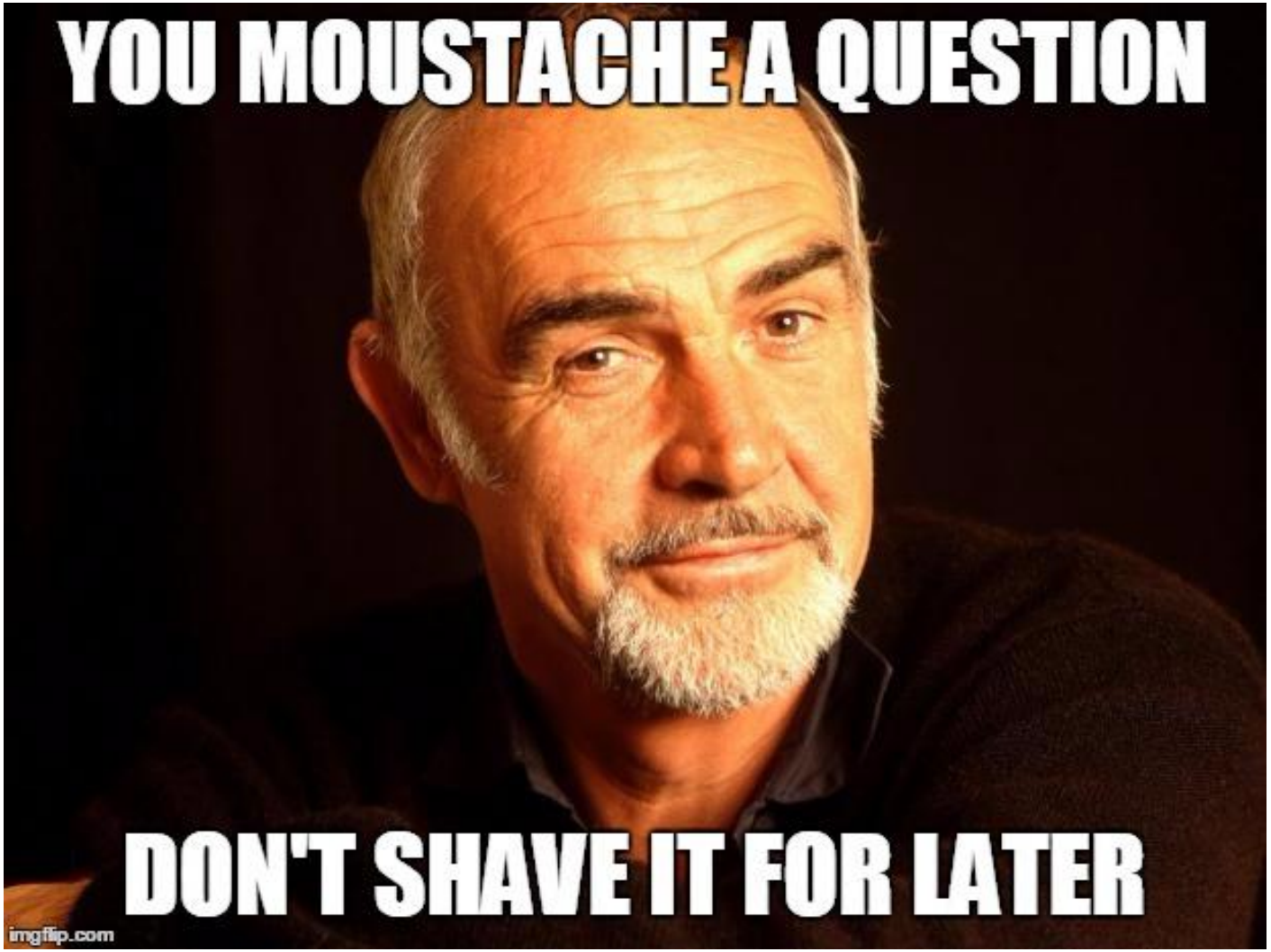
  “Does providing opportunities to swallow food and fluid promote motor learning specifically in relation to improved swallow coordination and airway protection?  If so, how long is needed, how frequently (i.e. daily, number of times a day) and is there carry over from one consistency to another (e.g. purees to fluids)?”

- We are always interested in new passionate members – email Amanda Spirit-Jones aspiritjones@cerebralpalsy.org.au

- 5 meetings annually. Meetings likely to be held at Cerebral Palsy Alliance, Prairiewood – next meeting **Tuesday 16th February 1:30-4:30pm**

# Thank You

- All our hard working and dedicated group members!
- Dr. Leigha Dark and Assoc. Prof. Bernice Mathisen – our Academic Links
- Our librarian Annette O’Brien and others who helped source full text articles
- All our workplaces for encouraging us to maintain best practice and allowing us the time to be involved in the EBP network
- NSW EBP Network Steering Committee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