The Use of Positioning to Reduce GERD in Young Children

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CLINICAL SCENARIO:

Two clinical scenarios motivated the team to find evidence investigating the effectiveness of interventions which had been recommended to the families.

- A 2 year old boy with "Leigh's Disease"
- A 5 month old infant boy with a diagnosis of 'Charge Syndrome'.

A recommendation from BC Children's Hospital (BCCH) medical staff had been made to both families that they should place their child on wedges inclined (head up) 30 degrees for sleep in order to reduce the symptoms of Gastroesophageal Reflux Disease (GERD). Our team supporting children in the community was asked to follow up with this intervention. Funding for one of the wedges was approved through the At Home Program (AHP); the other wedge was loaned to the family. Both the families were experiencing challenges maintaining children in the elevated position through the night. Parents were also questioning the effectiveness of this strategy.

Our team had questions regarding the effectiveness of the elevated position, the practicalities of maintaining it throughout the night, the appropriate angles to use and the risk of SIDS when using positioning devices in this way.

FOCUSED CLINICAL QUESTION:

Does sleeping in an inclined position, as opposed to sleeping flat, reduce the symptoms of reflux and GERD in children aged 0-5 years?

Our goal is to determine best practice when recommending positioning to decrease reflux symptoms (i.e. angle, prone/supine/side lying, and timelines).

SUMMARY of Search, Best Evidence appraised and Key Findings:

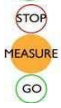
- Placing children in the semi supine position, as in an infant car seat, (with trunk and hip flexion) exacerbates GERD.
- There is no strong evidence that sleeping in the supine position with the head of the bed elevated reduces GERD. One recent pilot study, of low level evidence, found using a specialized bed to position an infant (3 weeks to 3 months old) in supine, elevated at 40 degrees, reduced the symptoms of GERD. This bed was considered appropriate only for infants under 4 months old.
- There is evidence that measured reflux is reduced by positioning an infant in prone, but conflicting evidence as to whether there is a difference between prone position flat versus prone position elevated at 30 degrees. However, the researchers stress that prone position should only be considered when the risk of SIDS is negligible or if the risk of death from GERD is greater than that of SIDS.
- Evidence suggests that left side down reduced reflux compared to supine. One study recommended that infants be placed on their right side for the first hour after feeding to promote gastric emptying and then switched to left side down thereafter to decrease reflux. However, clinical practice guidelines conclude that side lying is a very unstable position for infants and the use of pillows to maintain side lying is not recommended.
- Measured reflux in prone and left side down position has been found to be less than in right side down and supine positions. However, due to the risk of SIDS, prone & left lateral position should only be trialed for short periods while the child is awake and supervised.

CLINICAL BOTTOM LINE:

There is not sufficient evidence to say that sleeping in an inclined position as opposed to flat reduces the symptoms of reflux and GERD in children 0-5 years.

However, in infants less than 4 months old, the use of a Multicare A-R bed, providing 40 degrees elevation, may be considered.

Placing children who suffer from GERD, in semi supine positions with trunks and hips flexed, after feeding or for sleeping, should be discouraged (such as in a car seat).



Lying in prone or left side lying for short periods in a 'play' situation whilst awake, with adult supervision, can be tried with the child to see if the symptoms of GERD are reduced.

Ongoing discussion is recommended between tertiary and community professionals regarding best practice for positioning children with complex medical needs who are experiencing reflux and GERD.

Traffic light grading system. Novak 2012, 2010.

Limitation of this CAT: This critically appraised topic has not been peer-reviewed at this time.

Source: BC Centre for Ability, 2012: Reviewed by Sunny Hill Health Centre for Children, 2018.

SEARCH STRATEGY:

Terms used to guide Search Strategy:

- □ **P**atient/Client Group: Children aged 0-5years
- □ **I**ntervention: sleeping inclined
- □ **C**omparison: sleeping flat
- □ **O**utcome(s): reduced symptoms of GERD

Databases and sites searched	Search Terms	Limits used
- CINAHL - Medline - Pedro - Cochrane	- GERD. Gastroesophageal reflux. GOR. - Inclined positioning. Positioning. - Children. Infants. Ages 0-5 years - Combination of the above terms	- 2000 -2012 - Ages 0-5 - Humans only - English language

INCLUSION and EXCLUSION CRITERIA

Inclusion:

- Studies and papers 2000 onwards. English. All positions. Peer reviewed.

Exclusion:

- Studies and papers before 2000. Non-English language. Drug therapy only. Surgery related to GERD. Studies of older children only (over 5 years). Rare gastrointestinal diagnoses.

RESULTS OF SEARCH

The above search identified 22 articles which are in the reference list (*). These articles and papers were distributed and read by our team members. 11 articles were deemed to be relevant and are categorized as shown in Table 1. Levels of evidence are based on AACPDM Levels of Evidence Scales 2008 and AGREE II (Brouwers 2009).

Table 1: Summary of Articles Retrieved

Study Design/Methodology of Articles Retrieved	Level of Evidence	Number Located	Author (Year)
Synopses of synthesis, clinical practice guidelines	6/7 (on AGREE II)	2	Vandenplas and Rudolf (2009) Rudolf et al. (2001)
Systematic reviews of RCTs	1	1	Carroll et al. (2002)
Small RCTs n<100	2	3	Corvaglia et al. (2007) Van Wijk et al. (2007) Orenstein (2008)
Non randomized cohort	3	1	Omari et al. (2004)
Pilot study, case series	4	1	Vandenplas et al. (2010)
Synopses of single studies, literature reviews	5	3	Tighe and Beattie (2010) Martin et al. (2007) Orenstien (2000)

Source: BC Centre for Ability, 2012: Reviewed by Sunny Hill Health Centre for Children, 2018.

BEST EVIDENCE

The following 3 papers were identified as the 'best' evidence' and selected for critical appraisal. Reasons for selecting these papers were:

- **Vandenplas et al. (2009)** provides the most recent clinical practice guidelines, and has the greatest synthesized form of information located. It also has a high level of evidence rating 6/7 on the AGREE II critical appraisal tool.
- The **Carroll et al. (2002)** systematic review provides the highest level of evidence on the AACPDM Level of Evidence scale.
- The **Vandenplas et al. (2010)** has the greatest clinical relevance and applicability to our clinical question, although we need to consider that this study has a lower level of evidence.

The other studies in the table above were either less clinically relevant to our clinical question with respect to the intervention and the subjects, or it was difficult to isolate the effects of positioning, as studies evaluated a combination of feeding modifications and positioning. All the articles chosen for appraisal were peer reviewed.

SUMMARY OF BEST EVIDENCE

Description and appraisal of:

Pediatric Gastroesophageal Reflux Clinical Practice Guidelines: Joint Recommendations of the North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition (NASPGHAN) and the European Society for Pediatric Gastroenterology, Hepatology, and Nutrition (ESPGHAN). Y. Vandenplas and C. Rudolf. *Journal of Pediatric Gastroenterology and Nutrition.* Oct 2009. 49(4): 498-547.

Objective: To develop an international consensus regarding clinical practice guidelines for the diagnosis and management of GER and GERD in the pediatric population.

Study Design: Using the best available evidence from the literature search of 600 articles, the committee evaluated current diagnostic tests and therapeutic modalities for GER and GERD.

Participants: Pediatric Population - Children 0-19 (although for PICO purposes, only considering 0-5 population).

Outcome Measures (the first 3 are most relevant to our PICO):

- History and Physical Exam
- Esophageal pH Monitoring
- Combined Multiple Intraluminal Impedence (MII) and pH Monitoring
- Motility Studies
- Endoscopy and Biopsy
- Barium Contrast Radiography
- Nuclear Scintigraphy
- Esophageal and Gastric Ultrasonography
- Tests on Ear, Lung and Esophageal Fluids
- Empiric Trial of Acid Suppression as a Dx Test

Source: BC Centre for Ability, 2012: Reviewed by Sunny Hill Health Centre for Children, 2018.

Main Findings (related to positioning):

- There is conflicting evidence as to whether infants placed prone with the head elevated have less reflux than those kept prone but flat.
- The amount of reflux in supine infants with head elevated is equal to or greater than in infants supine and flat.
- The semisupine position (as attained in an infant car seat) exacerbates GER.
- Formula thickened with rice cereal was found to be more effective in decreasing the frequency of regurgitation than an upright position after feeds.
- Previously, in the 1980's prone position was recommended for the treatment of GERD in infants. However, concerns regarding prone position and SIDS required a reassessment of the benefits vs. risks.
- Prone positioning should only be used if the infant is observed and awake, particularly after feeds.
- Prone positioning during sleep can only be considered in infants when the risk of death from GERD outweighs the risk of SIDS.
- Prone positioning may be beneficial in children older than 1 year of age with GER or GERD whose risk of SIDS is negligible.
- Esophageal pH and combined pH/MII monitoring show that reflux is quantitatively similar in the left side down and prone positions. Measured reflux in these 2 positions is LESS than in the right side down and supine positions.
- One study recommended that infants be placed on their right side for the first hour after feeding to promote gastric emptying and then switched to left side down thereafter to decrease reflux.
- Side lying is a very unstable position for infants and the use of pillows to maintain a side lying position is not recommended.

Critical Appraisal: The AGREE 11 (Appraisal Guidelines for Research and Evaluation) was used to assess the quality of guidelines in this study. Using the Agree Instrument, we rated this article as a 6 out of 7 because we strongly agree that:

- The overall objectives, health questions and population of the guidelines were specifically described.
- The guideline development group includes individuals from most relevant professional groups and the target users of the guideline are clearly identified.
- The criteria for selecting evidence and the strengths and limitations of the body of evidence are both clearly described.
- The health benefits, side effects and risks have been considered in formulating the recommendations.
- There is an explicit link between the recommendations and the supporting evidence.
- The recommendations are specific and unambiguous.
- Key recommendations are easily identifiable.

Despite the high quality of evidence provided by these clinical practice guidelines, only one section (positioning) was relevant to our PICO question.

Summary/Conclusion: Evidence indicated the following:

- Positioning children in supine with heads elevated is NOT effective in reducing GER.
- Prone and left side lying positions are better than supine position as supine position tends to exacerbate the symptoms of GERD.

Prone position may be superior to supine, semi supine or side lying positions. However, prone position should only be considered when the risks for SIDS is negligible and in children over 1 year of age.

Source: BC Centre for Ability, 2012: Reviewed by Sunny Hill Health Centre for Children, 2018.

Description and appraisal of:

A Systematic Review of Nonpharmacological and Nonsurgical Therapies for Gastroesophageal Reflux in Infants. A.E. Carroll, M.M. Garrison and C. A. Dimitri. *Archives of Pediatrics & Adolescent Medicine.* 2002. 156(2): 109-113.

Objective of the Systematic Review: To conduct a systematic review of rigorously evaluated non-pharmacological and non-surgical therapies for GERD in otherwise healthy full term infants.

Study Design: The search strategy for the systematic review included searching online bibliographic databases including MEDLINE, EMBASE (January 1966 to November 2000), Cochrane collaboration and Clinical Trials databases (as of November 2000) for the terms gastroesophageal reflux and infants.

Inclusion Criteria: RCT's of non pharmacological and non surgical therapies in otherwise healthy infants. Cross over trials were included when the infants were randomly assigned to a treatment or control group. The study considered only studies of human infants and articles written in the English language. The review **excluded** studies if they included drug or surgical therapies, and if they were studies of infants with compound medical problems or preterm infants.

Participants: 10 articles met the inclusion criteria. In these 10 studies, the total number of infants studied (n) were 291, though no meta analysis was possible. The two articles relevant to positioning (our PICO question) have treatment and control groups of 100 and 9 (Orenstein 2000 and Orenstein 2008), with ages of 4-26 weeks and 5-20 weeks respectively.

Intervention Investigated: 43 studies were identified as relevant, of which 10 met the selection criteria: 2 RCTs studied positioning, 3 studied thickened food, 4 studied formula changes, and one studied non-nutritive sucking.

Outcome Measures: The outcome measured in all 10 studies included was 'reflux duration and frequency' - GERD being defined as reflux into the esophagus of pH less than 4.0 for at least 5% of the time, and diagnosed using a pH probe.
Main Findings: Results from the 2 studies specific to positioning are as follows:

- Oreinstein (1983) found that compared to prone positioning, positioning infants at 60 degree elevation in an infant seat was found to increase reflux.
- Orienstein (1990) found no significant difference in reflux between prone in flat position and prone with head of bed elevated 30 degree.

Authors' Conclusions: There is no evidence to support elevating the head of the bed to reduce the amount of reflux, and evidence suggests that positioning in a car seat actually exacerbates reflux. Through this review, the authors emphasize to practitioners that many of the interventions have no proven efficacy and that although they are not proven unsafe, they often carry hidden burdens. The outcome measure using a pH probe 'although used for diagnostic criteria in research and clinical practice, may or may not adequately correlate with symptomatic reflux in infants' (pg 110).

Critical Appraisal: The systematic review includes only rigorously evaluated studies with higher level of evidence, and the review describes a sound methodology, suggesting validity in its findings. However, as the number of well designed clinical trials of non pharmacological and non surgical therapies is small, and only 2 studies specifically evaluate positioning interventions, a potential effect of these therapies may have been missed because of small sample size.

Most of the studies have used pH probes to diagnose and monitor GERD. Although the probes are an objective measure, not subject to bias, they may not reflect the clinical symptoms, which are of most interest and significance to the families. Although blinding may not be feasible in a study of infant positioning, the results of a pH probe are unlikely to be affected by parent provider knowledge of allocation.

Summary/Conclusion: There is no evidence to support elevating the head of the bed to reduce the amount of reflux, and evidence suggests that positioning in a car seat at 60 degrees actually exacerbates reflux. There is no significant difference between prone positioning lying flat and prone lying inclined at 30 degrees on GERD in infants.

Description and appraisal of:

A preliminary report on the efficacy of the Multicare AR-Bed in 3-week-3-month old infants on regurgitation, associated symptoms and acid reflux. Y. Vandenplas, J. De Schepper, S. Verheyden, T. Devreker, J. Fanckx, M. Peelman, E. Denayer, B. Hauser. *Archives of Dis Child.* 2010. 95: 26-30.

Objective of the Study: To evaluate the efficacy of a 40 degree supine body position using the AR-Bed on regurgitation associated symptoms and acid reflux.

Study Design: Open, single-intervention pilot study.

Participants: N=30. Participant characteristics prior to inclusion: 55% male, 45% female; Median age range 1.5 months; exclusively breastfed 6 (20%); partially breastfed 8 (27%). Participants included were: healthy, term-born infants between 3 weeks and 3 months old, >4 regurgitation episodes a day for at least 2 weeks duration, infant distress time related to feeding or <1hour postprandial, food refusal, sleep difficulties, back arching or irritability during feeding. Anti-reflux medications were discontinued 3 days prior to the start of the study. Those excluded included those with bilious vomiting, gastrointestinal bleeding, consistently forceful vomiting, failure to thrive, diarrhoea, constipation, fever, lethargy, macro or microcephaly, seizures, documented or suspected genetic/metabolic syndrome.

Intervention Investigated: Intervention period: 1 week; infant left in MC-AR Bed at 40 degrees as long as tolerated between feeds, and the mean duration was 12.91 hours a day.

Outcome Measures:

- Gastroesophageal Reflux Questionnaire-Revised (I-GERQ-R)
- Parent Diaries
- 24 h Esophageal pH Monitoring
- Parent and Physician 10-point Scale

Main Findings:

- Significant improvement with the use of the BC-AR Bed ($p<0.0001$) was found using the I-GERQ-R.
- Incidence of regurgitation at baseline decreased after 1 week by >50% based on parent report.
- For the 15 infants that had the pre and post pH monitoring, there was a significant decrease in the reflux index (14.43 vs. 8.81 respectively; p=-.002).
- Based on the 22 participants who completed the study the majority of parents and physicians were satisfied with the results as rated by the 10-point scale.

Authors' Conclusions: "The MC-AR Bed with 40 degree inclination supine position decreased regurgitation in a statistical and clinical significant way in 22/30 infants presenting with frequent regurgitation and reflux-associated symptoms in whom dietary change and anti-reflux medications had failed" (p 28).

Critical Appraisal: A strength of the study was that it used different outcome measures that were objective and subjective, reflecting clinical presentation and parent perspective.

We considered this to be a low level of evidence pilot study due to the following reasons:

- Sample of convenience.
- Small sample size and high drop-out rate (8 discontinued within the first 48 hours).
- The study was for a short period i.e., 1 week.
- It was an open study with no comparison group.
- We query if there may be a vested interest (the authors designed the bed in collaboration with the company Peos).

The results may be a result of the design of the bed rather than just the degree of elevation.

Summary and Conclusion: The AR-Bed with 40 degree inclination in supine position decreased reflux and regurgitation in infants 3 weeks to 3 months old. The research was a pilot study and is considered low level evidence. The bed is very costly, not available in North America, and is applicable to a small age range (less than 4 months old).

Table 2 : Characteristics of included studies

	Study 1 Vandenplas (2009)	**Study 2** Carroll (2002)	**Study 3** Vandenplas (2010)
Intervention investigated	600 articles reviewed by a team of gastroenterologists and epidemiologists to determine an international consensus on diagnosis and management of GER in the pediatric population.	Systematic review of non-pharmacological and non surgical therapies for GERD in infants. 2 relevant papers; 1)Positioning upright (60deg) in infant seat 2) positioning in prone inclined at 30 degrees …to reduce reflux	The effect of supine positioning in 40 degree in AR-Bed for infants presenting with frequent regurgitation, reflux-associated symptoms and acid reflux.
Comparison intervention	Prone/ elevated vs prone flat Supine flat vs supine elevated Left side vs right side lying.	vs prone positioning flat	Non (open, single intervention pilot study)
Outcomes used	Hx and physical exam Esophageal pH monitoring Combined multiple Intraluminal Impedance (MII) and pH monitoring	Reflux duration and frequency; pH probe measurements value less than 4.0	Infant Gastro-esophageal Reflux Questionnaire.Rev • Parent Diaries • 24 hr oesophageal pH monitoring (pre and post) • Parent and Physician 10-point satisfaction scale
Findings related to clinical question	The amount of reflux in infants supine with head elevated is equal to or greater than in infants supine and flat. The semi supine position (as attained in an infant car seat) exacerbates GER. There is evidence that left side down reduced reflux compared to supine. One study recommended that infants be placed on their right side for the first hour after feeding to promote gastric emptying and then switched to left side down thereafter to decrease reflux. However, clinical practice guidelines conclude that side lying is a very unstable position for infants and the use of pillows to maintain side lying is not recommended. Reflux is quantitatively similar in the left side down and prone positions. Measured reflux in these 2 positions is LESS than right side down and supine positions. However side lying is a very unstable position and the use of pillows to maintain a side lying position is not recommended. Prone positioning should only be acceptable if the infant is observed and awake- particularly after feeds. Prone positioning when sleeping should only be considered in children older than 1 year of age with GER/GERD and whose risk of SIDS is negligible. Prone position should only be considered when the risk of SIDS is negligible or if the risk of death from GERD is greater than that of SIDS.	Positioning upright (60 deg) in infant seat exacerbates reflux. No difference in reflux between infants in the prone position and those in prone position with head of bed elevated at 30 degrees	MC-AR Bed with 40 degree inclination supine position decreased regurgitation in 22/30 infants in which dietary change and anti-reflux medications were ineffective

Source: BC Centre for Ability, 2012: Reviewed by Sunny Hill Health Centre for Children, 2018.

CURRENT PRACTICE AND LOCAL EXPERT OPINION

A sample of expert opinion in the local medical community suggests an awareness that the standard recommendation that infants and young children with GERD are positioned in supine with their heads raised to sleep is not supported by the available evidence. There is also widespread acknowledgement that this recommendation is difficult and stressful for families to implement.

Queen Alexandra (QA) Centre for Children's Health, Victoria

In 2006, the Evidence Based Practice (EBPG) at Queen Alexandra Centre for Children's Health reviewed the effectiveness of positioning children in supine with head elevated to 30 degrees in the treatment of GER. They found that there was insufficient evidence for positioning children under the age of two in supine with their heads elevated, as this position was not effective in reducing GER. There was some evidence that positioning the child in prone or left lateral lying does help to reduce GER symptoms; however, these positions are contraindicated by the risk of SIDS.
Overall, the QA EBPG made the following recommendations:

- Children at risk of SIDS and those under one year of age should be positioned in supine for sleep and no elevation of the head of the crib is necessary.
- Equipment that encourages trunk flexion, e.g. car seats should be avoided following feeding and during sleep as the compression may aggravate reflux symptoms.
- Prone and left lateral positioning may be trialled for short periods when the child is awake and under close adult supervision.
- For children over the age of one year who are no longer at risk for SIDS, prone and left lateral positions can be used as there is some evidence to suggest an amelioration of GER symptoms. Elevating the head of the bed may also have some benefit (need research specific to this age group)

The Complex Feeding Team, BC Children's Hospital, Vancouver

Rochelle Stokes, OT with the Complex Feeding Team (CFT), explained that, by the time they see children, they are older and the wedge seems to cause more difficulties than good as the children tend to roll to the bottom of the bed. At this point, the CFT recommend discontinuing use of the wedge. She noted that they "have looked for and not found good evidence for the use of the wedge and research on positioning".

Dr. Avinashi, the GI doctor with the Complex Feeding Team, summarized his take on positioning for infants with GERD, noting that a head elevated position "does seem to work but at home the risk is always in the balance with the child sliding down" (V. Avinashi, personal communication, May 8, 2012). Dr. Avinashi summarized the evidence on sleep position for children with GER in a recent grand rounds presentation.

Dr. Avinashi indicated that, in a primary care setting, the following strategies were reported to reduce arching, regurgitation and crying by over 70 % after two weeks and eliminated symptoms in 24 % of infants (Avinashi, 2012):

- Prone position when the infant is awake.
- Head of the bed raised (does not specify the degree of incline) so that the infant is more upright.
- Smaller and more frequent meals.

For children over the age of one year and/or no longer at risk of SIDS, the following positions may be trialed:

- Left lateral decubitis sleeping position
- Raise the head of the bed.

Neonatal Intensive Care Unit (NICU), BC Children's Hospital (BCCH), Vancouver

Meghan Steward, OT with NICU at BCCH, noted that the degree of angle to recommend is the major issue right now at their centre. Traditionally, the tube feeding booklet given to families at discharge has recommended a 30 degree incline and the doctors typically advise this. However, nurses and clinicians tend to prescribe the more realistic 20 degree incline as "families lose their minds trying to manage a 30 degree incline even if they use a sling." Meghan has not recommended a 30 degree incline in over 5 years as she does not feel that the science supports this and families are unable to implement it.

Current practice at the NICU is to order a 27 inch (crib width) wedge from the foam shop if a 20 degree incline is recommended. Alternately, wedges of 15 degrees or less are ordered, as they are finding that the lower the incline, the greater the ease of implementation. Sometimes, no elevation is recommended. Overall, Meghan is "torn re: wedge use" (M. Steward, personal communication, June 26, 2012).

Consensus seems to highlight the gap between marginal evidence and what has been standard practice for many years. Local experts are actively questioning 'what has always been done' and revising recommendations to more accurately reflect the evidence and families' real life capabilities in order to ensure better outcomes.

IMPLICATIONS FOR PRACTICE, EDUCATION AND FUTURE RESEARCH

Firstly, it is important to acknowledge that positioning is only one of the non-pharmacological, non-surgical interventions recommended, and strategies such as thickening of feeds are also considered effective in conjunction with positioning (Arguin, 2004). As described in our clinical scenarios, and is evident in the expert opinion received from our community, positioning in supine position with the head of the bed elevated to up to 30 degrees after feeding and during sleep continues to be recommended and equipment, such as wedges, funded. However, there is an increasing awareness that this intervention may not be supported by current research, and consequently it appears that there is ambiguity amongst professionals and an inconsistency in recommendations to families. In our search for evidence, we have drawn similar conclusions and guidelines to those made at QA in Victoria (Gmitroski, 2006), concluding that there is insufficient evidence to support positioning children in supine with the head of the bed elevated to reduce the symptoms of GERD.

Presently wedges, inclining beds, and sleep devices to position children in safely elevated positions, are a large expense to families, private funders, insurers or government agencies, e.g. AHP. Anecdotally, parents report that the management of this intervention is often frustrating; a reduction of the incline to 10-15 degrees is often a more realistic solution. As Caroll, 2001:112 states, "Although no evidence suggests that these non- proven therapies are unsafe, they often carry hidden burdens. Wedges (devices that keep infants sleeping at an incline) can be expensive and cumbersome to use and reliance on them may lead to undue anxiety on occasions when parents fail to use them".

Although the appraised pilot study (Vandenplas, 2010) showed that the A-R bed, which positions very young infants at 40 degrees elevated, may be effective in reducing GERD, the infant bed would not be applicable to children on our caseload, as they are rarely referred to the BC Centre for Ability prior to 4 months of age. This bed is also not available in the North American market.

We must, however, be very cautious in using the CAT findings from the current evidence, as it is very apparent in our review of the literature that the populations studied are primarily very young infants without complex neurological and medical issues. At the BC Centre for Ability, we are working with children with complex medical needs and developmental delays. Considering that it is well documented that 'there is an increase in the frequency and severity of GERD in infants and children with neurological impairments including developmental delay' (Vandenplas, 2009), and children with cerebral palsy are at particularly high risk of GERD (Del Guidance, 1999), it is unnerving that there is actually a paucity of literature examining positioning as a treatment for GERD in these children. Considering the heterogeneous population of children we serve, and within the constraints of carrying out research within our clinical roles, small scale single subject research studies may be the most realistically performed, to indicate if indeed the same recommendations apply to children with significant medical/neurological needs.

It is also proposed that in our scheduled review of this CAT in January 2014, we broaden our search parameters to include older children and also focus on children with complex medical needs.

A working group within the community with representation from hospital and tertiary facilities could be beneficial in forming consensus guidelines for this conservative treatment of GERD, so we can be clear and evidence based in the information and recommendations we are providing to the families that we serve.

The outcome of this CAT is not to make definitive recommendations, but it is to provide our therapists at the BC Centre for Ability with knowledge of the current literature. Dissemination of the present guidelines will enable us to be active contributors in the discussion required between health professionals in our community, with respect to positioning children with complex medical needs and neurological conditions who have symptoms of GERD, and to better advocate for parents who are struggling with recommendations which are often difficult to implement.

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*** denotes 22 ARTICLES which were located in the literature search**
(see p. 3)

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