AHS Pediatric Eating And Swallowing (PEAS)

Community of Practice:
Thickening for Pediatric Dysphagia

Alberta Health Services
Pediatric Eating And Swallowing

1

Objectives

1. Role of thickened fluids in dysphagia management
2. Rationale for thickened fluids
3. Current scientific evidence for use of thickeners in pediatrics
4. Types of thickeners
   - Commercial
   - Infant Cereals
   - Food Purees
5. Medical considerations
6. Caregiver education

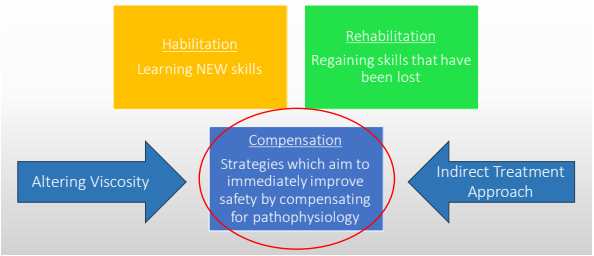
2

General Guidelines for Oropharyngeal Dysphagia Treatment Planning

- Goal: Maintain or facilitate skill development without compromising health in any way
- Step 1: Need to know anatomical or physiological problem
- Evidenced based decision making involves integrating:
  - Best clinical or research evidence available
  - Clinical expertise
  - Patient and family values
- Continually evolving…

3

Dysphagia Management Strategies



4

Altering Viscosity: Thickened Liquids

- One of the most used intervention strategies across the lifespan
- "Cornerstone" of treatment for thin liquid dysphagia (Lazenby-Paterson, 2020)
- "Fundamental" aspect of dysphagia management (Garcia, 2010)
- Benefit for many etiologies of dysphagia (Newman et al., 2016)

5

Altering Viscosity: Thickened Liquids

- Rationale:
  - ✓Slower transit = increased time to achieve airway closure
  - ✓More cohesive bolus = improved oral control
  - ✓Increased sensory input
  - ✓May normalize swallowing timing during the respiratory phase
  - ✓May lengthen the duration and magnitude of hyolaryngeal movement

(Vickers et al., 2016); (Lazenby-Paterson, 2020); (Goldfield et al., 2013); (Miles et al., 2018)

6

Altering Viscosity: Thickened Liquids Videofluoroscopic View

7

Thickened Liquids

With respect to **airway invasion,** research shows:

- ☑ PAS scores were lower
- ☑ Airway compromise was less deep
- ☑ Airway invasion was less frequent or even eliminated

(Newman et al., 2016; Kaneoka et al., 2016; Leder et al., 2013)

8

Thickened Liquids

- Reduced bradycardia and desaturations in bottle fed infants (Lee et al., 2023)
- By improving swallow safety and efficiency with of the use of thickened liquids:
  - ☑ Feeding tube placement may be avoided
  - ☑ Tube dependency may decrease
  - ☑ Pulmonary injury from recurrent aspiration may be prevented

(Gosa, Schooling, & Coleman, 2011); (Gosa & Corkins, 2015)

9

Thickened Liquids

- ☑ Thickening reduces acute respiratory illness hospitalizations and ED visits in infants with silent aspiration (Coon et al., 2016)
- ☑ Parent survey: most oropharyngeal dysphagia symptoms were improved after thickening (Krummrich et al., 2017)
- ☑ In infants with isolated laryngeal penetration, there was symptom improvement and decreased hospitalizations (Duncan et al., 2018)
- ☑ Reduce need for gastrostomy tube placement in children with aspiration (McSweeney et al., 2016)

10

So, what's the catch?

11

Thickened Liquids

- ☒ Can affect nutritional composition and create imbalances in diet (Cichero, 2013)
- ☒ Feeding efficiency and endurance (Gosa & Dodrill, 2017)
- ☒ Stability (e.g., amylase in saliva and breastmilk can break down some thickeners) = safety implications (Garcia, 2005)
- ☒ Increased risk of post-swallow pharyngeal residue (Mancopes et al., 2023)

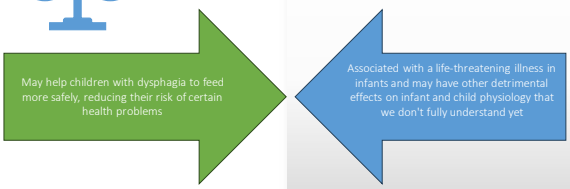
12

Thickened Liquids

- Contraindications in premature infants (NEC) (Beal, 2012)
- Aspiration of thickened liquids: more injurious, harder to clear (Nativ-Zeltzer, et al., 2018); (Nativ-Zeltzer, et al., 2021); & (Araie, et al., 2020)
- Tolerance/acceptance
  - Behavioral – refusal
  - Stooling changes (Mascarenhas, 2005)
- Cost and availability

13

The Controversy: Opposing Truths



Sanchez, K. (2022, October 6). *Don't let thickener stick* [Review of *A systematic process for weaning children with aspiration from thickened fluids* by Wolter et al.] The Informed SLP. https://www.theinformedslp.com/review/don-t-let-thickener-stick

14

General Guidelines for Oropharyngeal Dysphagia Treatment Planning

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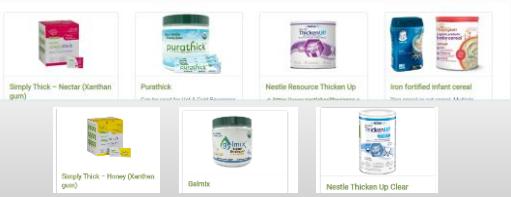
15

Thickener Options

- Can be found on the PEAS website under "Equipment and Supplies"
  PEAS | Equipment List (albertahealthservices.ca)



16

But Which One?

1. Patient Factors
   - Age of the child
   - What it is being mixed in
   - Allergies
   - Contraindications
2. Caregiver Factors
   - Affordability
   - Accessibility
   - Health literacy
   - Food ideology and beliefs

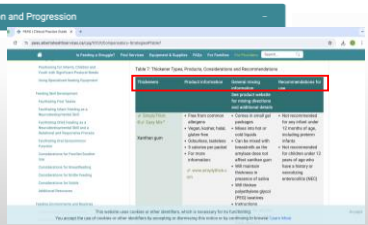
17

PEAS: Clinical Practice Guideline

For Providers / Clinical Practice Guide / Facilitating Safe Swallowing / Compensatory Strategies

Liquid Viscosity Modification and Progression

SEE TABLE 7



18

Nestle Thicken Up Clear (TUC)

Nestle Health Science Thicken Up ® Clear			
Modified corn and potato starch, maltodextrin, and xanthan gum	• Allergen awareness: may contain milk ingredients • Clear, tasteless, odourless • Kosher, Gluten-free, Lactose Free • Adds calories (5 kcal per 1.4g scoop) • For more information see: www.thickenupclear.com	• Comes as a powder • Mixes into hot or cold liquids • Thickens quickly • Will not thicken over time • Do not mix with breastmilk as amylase may break down the starch • Will maintain thickness in presence of saliva • Instructions for mildly thick (level 2), moderately thick (level 3), and extremely thick (level 4)	• Suitable for children at least three years of age *

Alberta Health Services – Maternal Newborn Child & Youth Strategic Clinical Network. (2020). *Pediatric Feeding Disorder: A Clinical Practice Guide (CPG) for Healthcare Professionals. https://peas.albertahealthservices.ca/cpg/10369/*

19

Simply Thick Easy Mix

THICKENERS	PRODUCT INFORMATION	GENERAL MIXING INFORMATION **See product website for mixing directions and additional details**	RECOMMENDATIONS FOR USE
SimplyThick ® Easy Mix™ **Xanthan gum**	• Free from common allergens • Vegan, kosher, halal, gluten-free • Odourless, tasteless • 5 calories per packet • For more information: www.simplythick.com	• Comes in small gel packages • Mixes into hot or cold liquids • Can be mixed with breastmilk as the amylase does not affect xanthan gum • Will maintain thickness in presence of saliva • Will thicken polyethylene glycol (PEG) laxatives • Instructions available for slightly thick (level 1), mildly thick (level 2), moderately thick (level 3) and extremely thick (level 4)	• Not recommended for any infant under 12 months of age, including preterm infants • Not recommended for children under 12 years of age who have a history or necrotizing enterocolitis (NEC)

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20

Gelmix

Gelmix™			
Tapioca maltodextrin and carob bean gum	• Free from common allergens • Tasteless, odourless, smooth • Organic, GMO free, arsenic free • Vegan, kosher, pareve • Gas and loose stool can be common in the first 2 weeks and usually resolves • Adds calories (10 kcal per 2.4g) • For more information: https://www.healthierthickening.com/gelmix-infant-thickener/	• Powder must be mixed into warm liquids • Can be mixed with breastmilk as the amylase does not affect the carob bean gum • Instructions for slightly thick (level 1) and mildly thick (level 2) available	• Not recommended for preterm infants less than 6 lbs or 42 weeks corrected age • Suitable for term infants after 42 weeks gestation and children (Meunier, et al., 2014) • Do not use if patient has galactosemia or an allergy to galactomannans • Guidelines suggest gum-based thickeners may also be used for gastroesophageal reflux management (Rosen, et al., 2019)

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21

Purathick

Purathick™			
Tara gum, tapioca maltodextrin	• Free from common allergens • Tasteless, odourless, smooth • Organic, GMO free • Vegan • Adds calories (10 kcal per 2.4g) • For more information: www.purathick.com	• Comes as a powder • Mixes into hot or cold liquids. May thicken faster with hot liquids • Shake to dissolve and let stand for 5 minutes • Can thicken over time • Instructions for slightly thick (level 1), mildly thick (level 2), moderately thick (level 3), and extremely thick (level 4)	• Suitable for children over 1 year of age • Do not use if patient has galactosemia or an allergy to galactomannans

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22

Nestle Thicken Up (Original)

Nestlé Health Science Thicken Up ® Original			
Modified corn starch	• Has been known to cause loose stools • Tasteless, odourless • Kosher, gluten-free, lactose-free, low residue • Adds calories (15 kcal per 4.5g) • For more information: www.nestlehealthscience.ca	• Comes as a powder • Do not mix with breastmilk as amylase may break down the starch • Can thicken over time • Do not mix with polyethylene glycol (PEG) laxatives as it will not maintain consistent thickness; consult your pharmacist	• Suitable for children at least three years of age *

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23

Amylase + corn starch caution

- Digestive enzymes in human breastmilk and saliva will break down starch-based thickener
- Thickened fluids turn to thin fluids
- Corn starch based thickeners can't be used with breastmilk

24

Infant Cereals

Iron fortified infant cereal (e.g. rice cereal, oat cereal)	• May contain common allergens • May provide excess carbohydrate and iron intake • Allergen awareness: many infant cereals contain milk ingredients	• Cannot be mixed with breastmilk as amylase may break down the starch • Inconsistent thickening to desired consistency with variable flow rate (Gosa & Dodrill, 2017) • Lack of standard recipes • Not recommended for use in a bottle related to viscosity issues	• Not recommended for dysphagia management • May be suitable for infants around 6 months of age (when solids would typically be introduced)

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25

Food Purees

- Not typically recommended as difficult to meet standard thickness
- Can be used around 4-6 months
- Create imbalances in diet-if displaces formula/nutrients in infant formula
- Constipation or loose stools

26

Medical Considerations: why, what, when and how…

- Why do I use thickener
- When can I use thickener
- What thickeners can I use when
- How do I monitor

27

Medical Considerations: why, what, when and how…

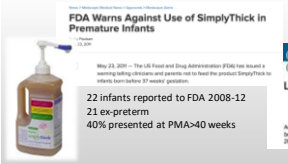
- Why do I use thickener
  - GERD and Oropharyngeal dysphagia are clinically indistinguishable
  - Use of thickeners in dysphagia patients can avoid the need for tube feeding
    - Tube feeding increases family burden of care and ER visits and hospitalization
  - Current GI guidelines recommend thickener before PPI for GER(D)
    - REMEMBER GER is frequently non-acidic in infants
  - Feeding intolerance in tube fed patients responds to thickening *more than a change in formula or use of PPI*

Key Physician role to exclude other diagnoses

28

Medical Considerations: why, what, when and how…

- When can I use thickener
  - NOT in preterm infants < 42 weeks corrected age
    - Time, feeding exposure and enteral nutrition support are safest options
  - In infants > 42 weeks corrected



22 infants reported to FDA 2008-12
21 ex-preterm
40% presented at PMA>40 weeks

29

Medical Considerations: why, what, when and how…

- When can I use thickener
- What thickeners can I use when
  - In infants > 42 weeks corrected
    - Gelmix; suitable for use with human milk
  - In infants > 4-6 months post conception
    - Cereal and food purees but is not suitable for use with human milk
  - In infants > a year and older
    - All gum-based thickeners
      - NOT Xanthum gum based if history of NEC
    - Corn based thickeners
    - Food based thickeners

Collaboration with SLP or OT with feeding expertise critical

30

Medical Considerations: why, what, when and how…

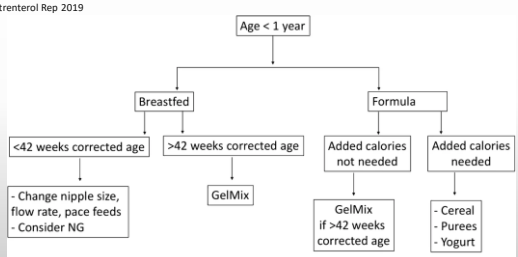
- How do I monitor
  - Child and family acceptance
  - Hydration & under and over nutrition
  - Key clinical outcomes based on indication
  - Bowel habits
  - Drug interactions
  - Medical complications

Collaboration with family, SLP, OT and RD essential

31

Clinical algorithm for thickening feeds for infants

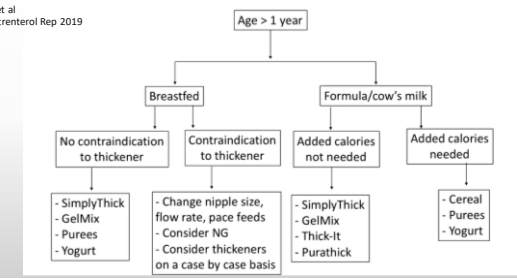
Duncan et al
Curr Gastrenterol Rep 2019



32

Clinical algorithm for thickening feeds for young children

Duncan et al
Curr Gastrenterol Rep 2019



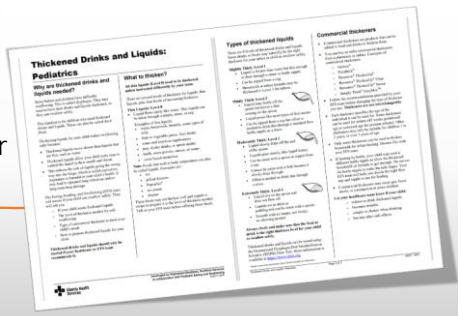
33

Thickener Teach

- **Education about thickened fluids**
  - Relate to the patient - instrumental and/or clinical findings
  - Thickener levels
- **Overview of thickener options (handout)**
  - Review of each thickener
  - Discussion of risk/benefits and off-label use
  - Importance of discussing their selection with physician
  - Costs/coverage/prescription considerations
  - Samples and ordering information
  - Mention of cereal or food puree options in some cases
- **IDDSI flow testing instructions**

34

Thickener Teach



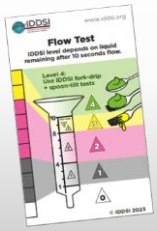
35

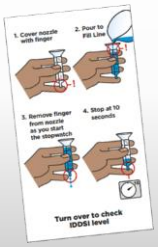
IDDSI Mapping

- International Dysphagia Diet Standardization Initiative (IDDSI)
  - Global standard
  - Standardized terminology and definition to describe thickened liquids and modified food textures for all ages
  - Continuum of 8 levels (0-7)
  - Levels 0-4 refer to liquids
  - Levels 5-7 refer to foods

36

IDDSI Pediatric Resources





37

Mysterious Interactions

- Art or Science?
  - Interaction between thickener, different types of formula, nipples, and time
- **Must evaluate the effort required to effectively suck and swallow the desired thickness in relation to the bottle nipple opening and flow rate (Gosa & Dodrill, 2017)**
- Note: The Dr. Brown's Specialty Feeder is not compatible with thickened fluids

38

Caring Solutions

- IDDSI funnels
- Thickener samples
  - Patients can request samples on www.caringsolutions.ca for $5.00, and receive a **$5.00 off coupon** that can be used on a future order
  - **Free Samples of Gelmix and Purathick** with promo code
- Sysco and Hydra+ pre-thickened juices & water

39

Thickening Summary

- Trial conservative management strategies FIRST
- Check the effectiveness of thickeners using instrumental assessment
- Understand the pathophysiology that you are treating
- Recommend the smallest amount of thickener
- Compensatory strategy, not a long-term solution
  - Bridge gap between continuing to orally feed while recovering or improving/developing

40

Thickening Summary

- Plan to wean upon initiation and as soon as safe to do so
  - Shortest amount of time that we can
  - Gradual changes usually best
- Right thickener for the right patient
  - Inform families of risks and state of the evidence
- Physician consultation
- Impact on infant's gastrointestinal tract, microbiome, and health remains largely unknown, although there likely is an effect (Indrio et al., 2017)

41

PEAS Community of Practice | June 13, 2024

Thank you!

Questions & Comments?

42