

# Visceral Hyperalgesia and Esophageal Dysmotility for Solids in Older Infants Secondary to Gastroesophageal Reflux

Marjorie Meyer Palmer, M.A.

Speech Pathologist

Neonatal/Pediatric Feeding Specialist

# Course Objectives

- ◆ 1) Define characteristics and recognize visceral hyperalgesia in the older infant
- ◆ 2) Explain correlation between gastroesophageal reflux and visceral hyperalgesia
- ◆ 3) Understand why the feeding problems of these patients are often mis-diagnosed as “behavioral”

# Normal esophageal motility

- ◆ peristaltic speed = 3 cm/sec
- ◆ wave takes 4 seconds to traverse
- ◆ young infant has 12 cm of esophagus
- ◆ Santmyer swallow can induce swallow and esophageal peristalsis
- ◆ -Nelson Textbook of Pediatrics, 18th edition, 2007, p. 1542

# Definition of Gastroesophageal Reflux

- ♦contents of the stomach moves in a retrograde direction through the lower esophageal sphincter (LES) and up into the esophagus

Phrenoe  
lige

D



# Medical Conditions that Predispose an Infant to GER

- ◆ Cardiac defect
- ◆ Gastrointestinal tract problems
- ◆ Respiratory difficulties
- ◆ CNS dysfunction
- ◆ Prematurity

# Contributing Factors to GER

- ◆ supine position after meals
- ◆ increased intra-abdominal pressure from abnormal muscle tone, seizures, hip flexion, gas bloat
- ◆ decreased LES tone and pressure
- ◆ increased transient relaxation of LES
- ◆ hiatal hernia
- ◆ motility or structural abnormalities

# Types of GE Reflux

- ◆ Physiologic
- ◆ Functional
- ◆ Pathologic (GERD)

# Physiologic Reflux

- ◆ Emesis occurs infrequently
- ◆ Patients are rarely alarmed
- ◆ Stomach flu, food poisoning are examples

# Functional Reflux

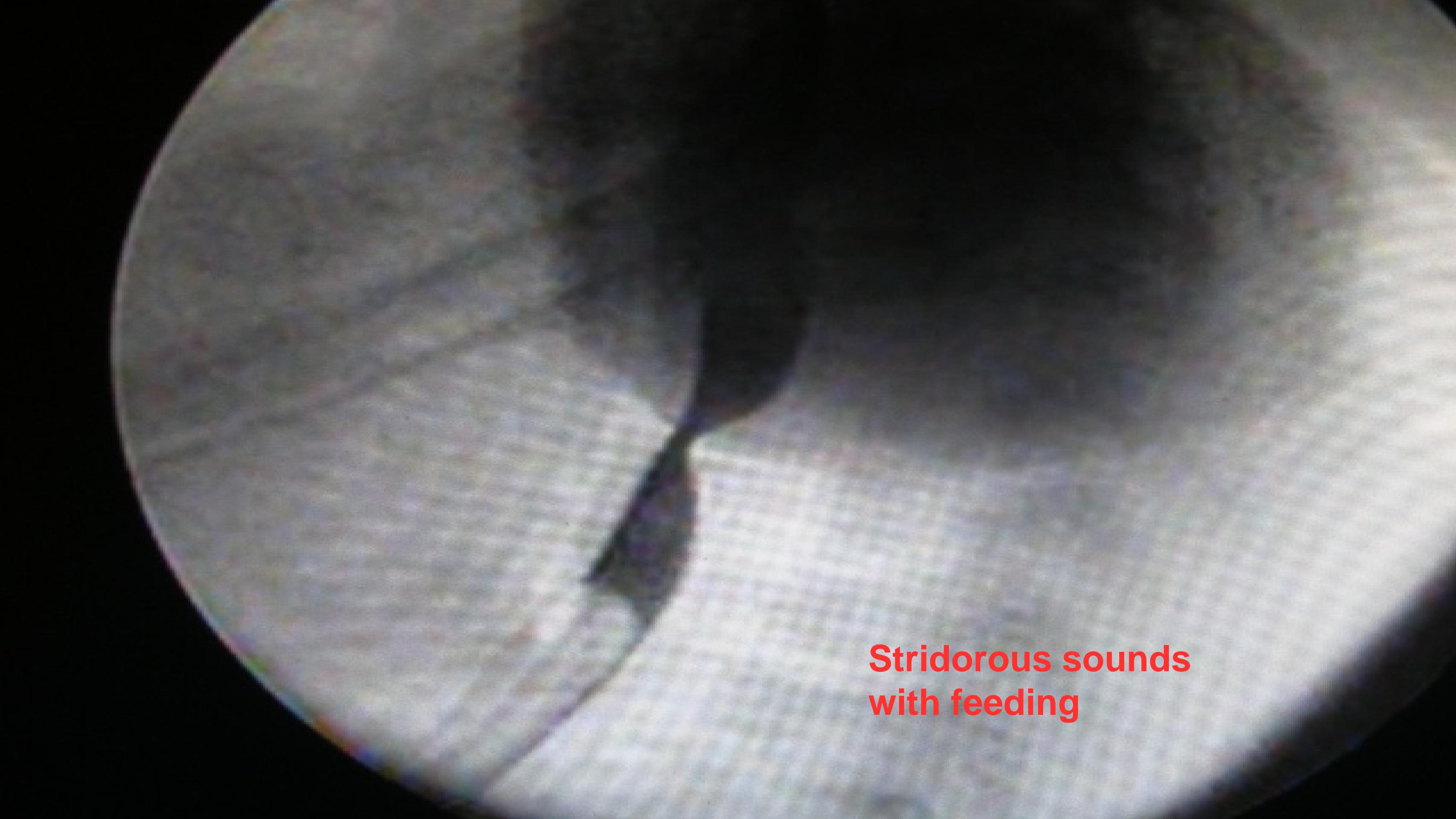
- ◆ frequent emesis
- ◆ vomiting occurs immediately after a feed; 30-45 minutes later
- ◆ patient may be concerned
- ◆ not associated with any other symptoms
- ◆ 40% show improvement w/i first 3 months
- ◆ 70% have no symptoms by 18 months

# Pathologic Reflux (GERD)

- ◆ infants have a physical problem as a result
- ◆ most common: FTT, aspiration pneumonia
- ◆ may contribute to reactive airway disease, obstructive apnea
- ◆ recurrent pulmonary problems, asthma

# Symptoms of GER

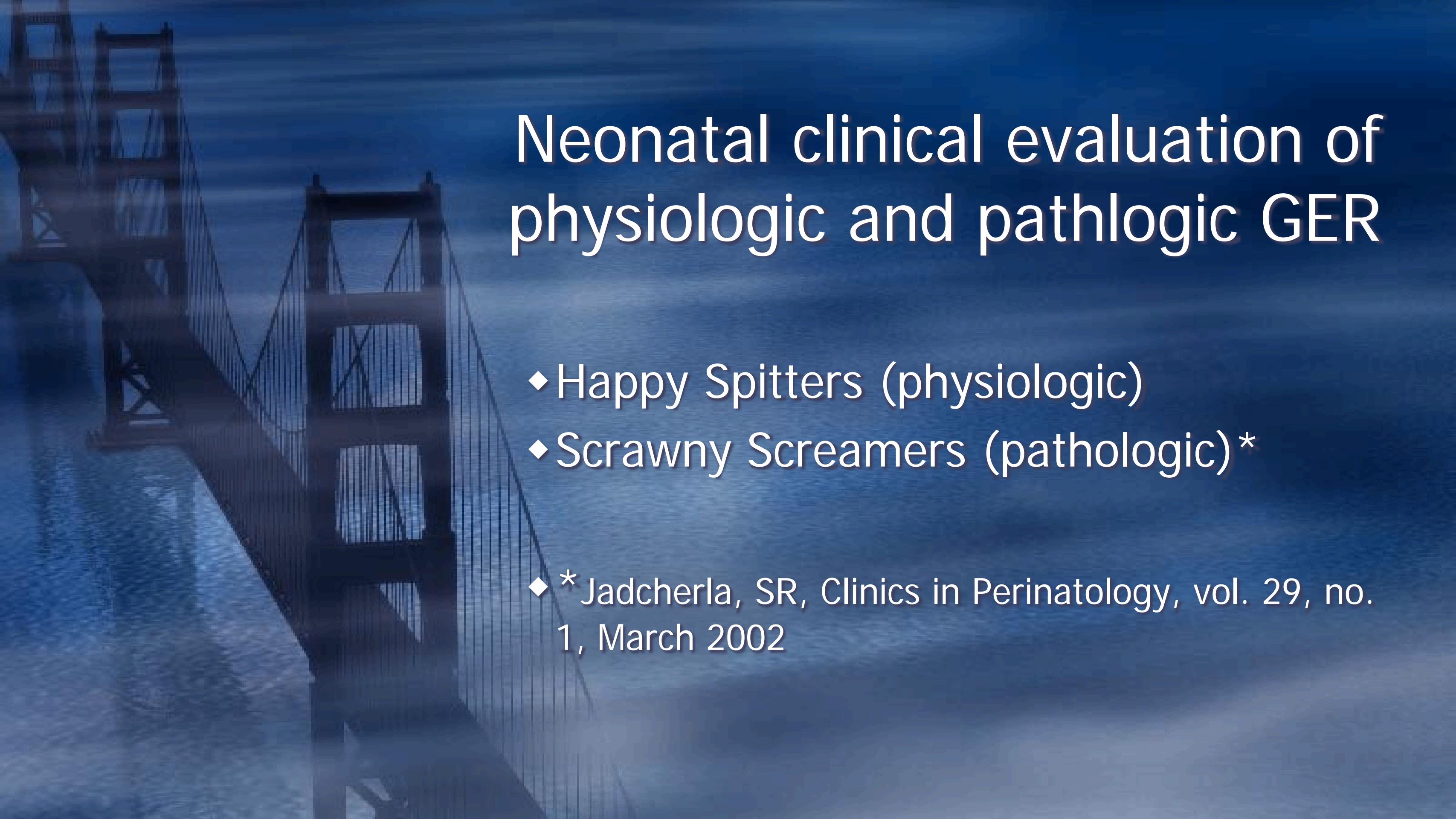
- ◆ emesis
- ◆ malnutrition
- ◆ irritability
- ◆ oral feeding problems
- ◆ cough, stridor, hoarseness, hiccups
- ◆ apnea, cyanotic episodes



**Stridorous sounds  
with feeding**

# Clinical Manifestations of GER

- ◆ projectile vomiting
- ◆ frequent wet burps with spitting up
- ◆ arching backward, head turning
- ◆ respiratory illness, poor pulmonary function
- ◆ limits oral intake, FTT



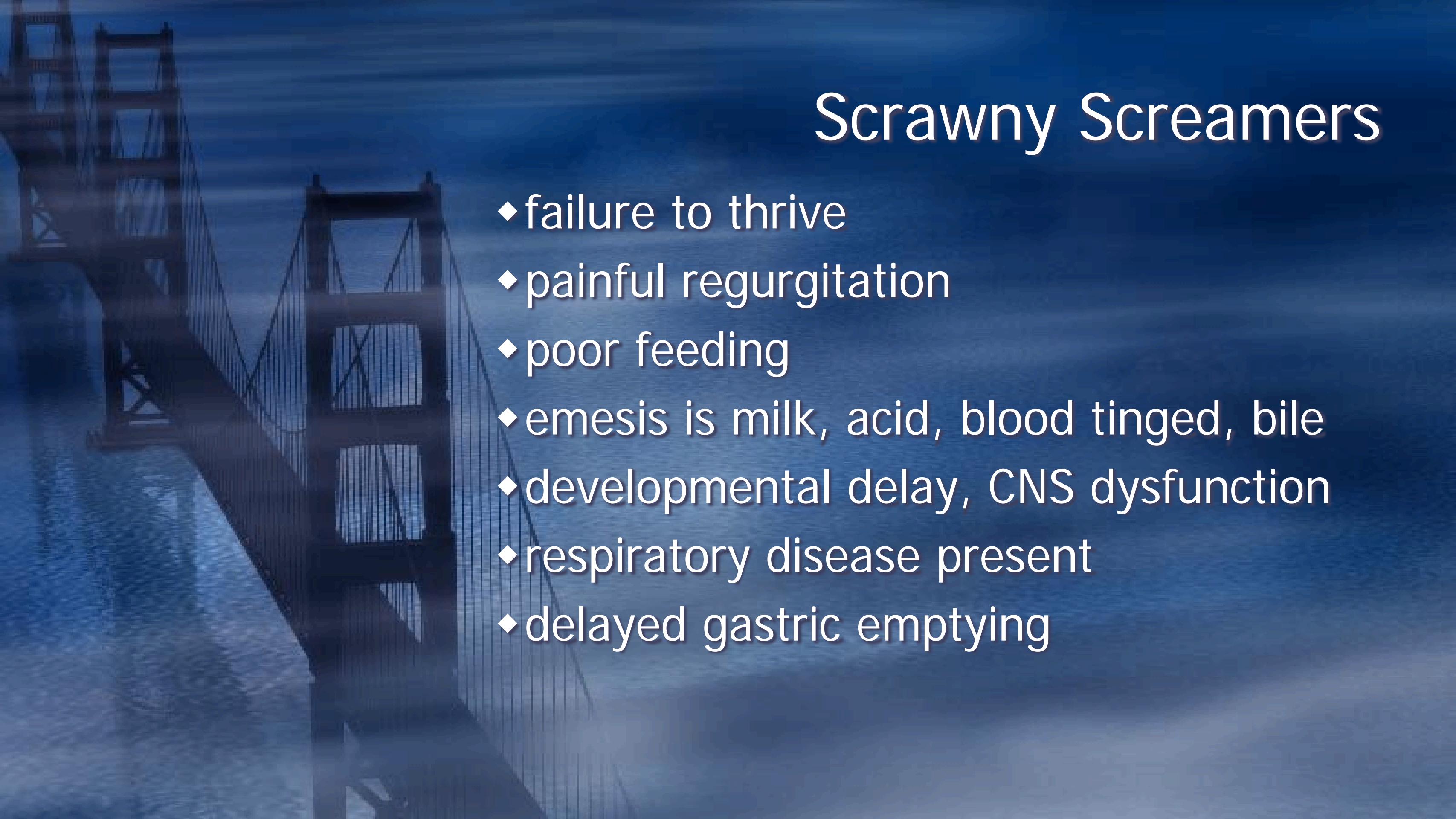
# Neonatal clinical evaluation of physiologic and pathlogic GER

- ◆ Happy Spitters (physiologic)
  - ◆ Scrawny Screamers (pathologic)\*
- 
- ◆ \*Jadcherla, SR, Clinics in Perinatology, vol. 29, no. 1, March 2002



# Happy Spitters

- ◆ good weight gain
- ◆ effortless regurgitation
- ◆ feeding well, orally  
emesis is usually milk curds or acid
- ◆ neurologically normal
- ◆ no respiratory disease



# Scrawny Screamers

- ◆ failure to thrive
- ◆ painful regurgitation
- ◆ poor feeding
- ◆ emesis is milk, acid, blood tinged, bile
- ◆ developmental delay, CNS dysfunction
- ◆ respiratory disease present
- ◆ delayed gastric emptying

# Definition of Esophageal Dysmotility

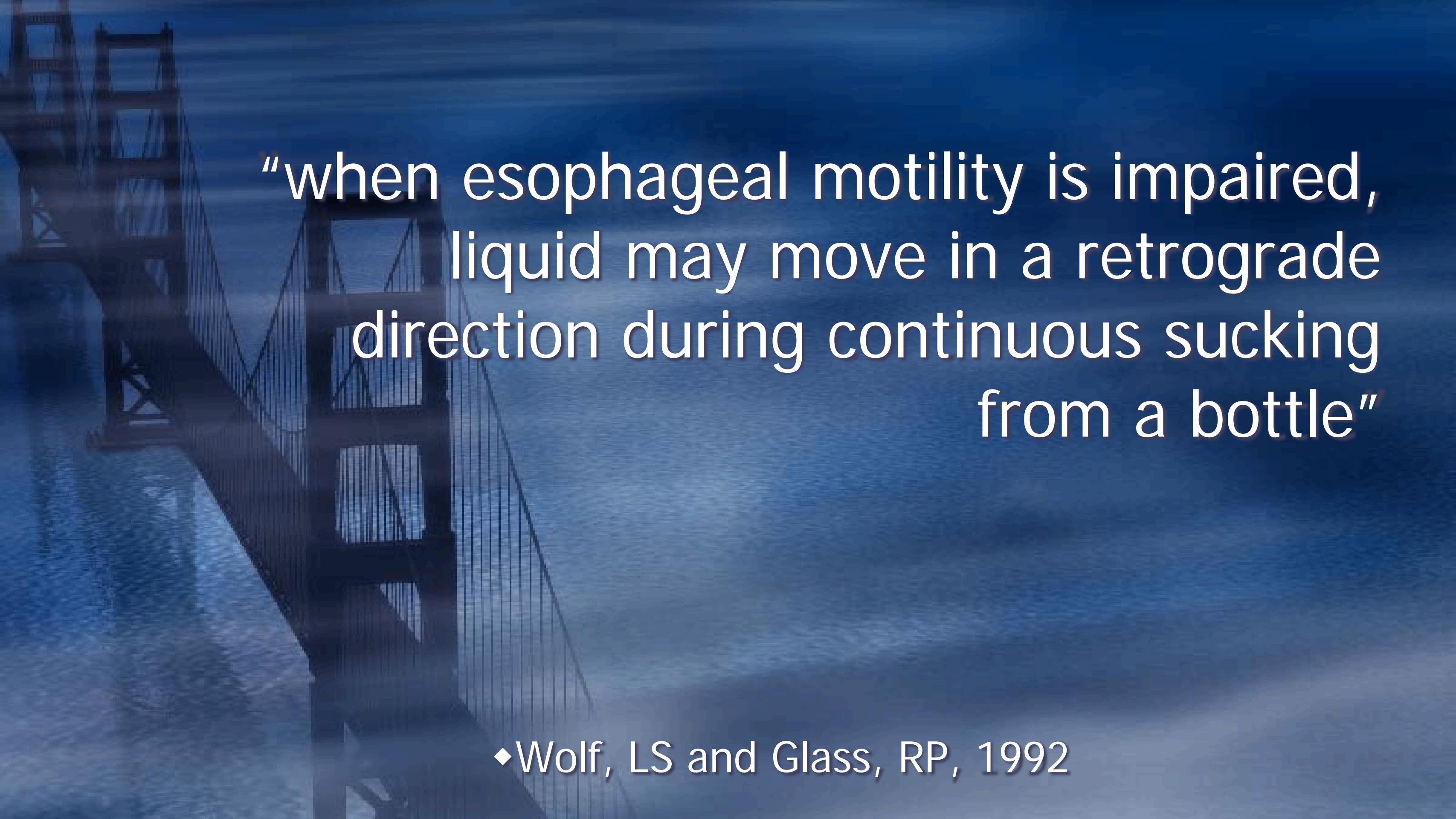
- ◆ Material moves slowly, in a retrograde direction, or does not clear

“Esophageal dysmotility has been correlated with gastroesophageal reflux”

- ◆ Martinez et. al., American J Gastroenterology, 1993

“Infants and toddlers with GER frequently demonstrate irregular esophageal contractions and/or diminished peristalsis...incomplete and ineffective peristaltic waves”

♦Goday et. al., J Pediatric Surgery, 2001



“when esophageal motility is impaired,  
liquid may move in a retrograde  
direction during continuous sucking  
from a bottle”

♦Wolf, LS and Glass, RP, 1992

# Clinical signs of esophageal dysmotility

- ◆ Child prefers to drink liquids (water)
- ◆ Hypersensitive gag when pureed food contacts tongue
- ◆ Gag often results in vomiting
- ◆ May gag “after” swallow, not before
- ◆ Child may manage those solids that dissolve during the oral phase of swallow

# Clinical signs of esophageal dysmotility (continued)

- ◆ avoids THICK foods
- ◆ biting/chewing skills intact
- ◆ avoids solids that do not dissolve during oral phase of swallow
  - ◆ meats
  - ◆ fresh fruits
  - ◆ vegetables

# Infant with esophageal dysmotility

- ◆ slow feeder
- ◆ may choke and gag with feeds
- ◆ regurgitation and/or vomiting may occur
- ◆ predisposed to developing a sensory-based oral feeding aversion after 3 months of age

# Infant with gastroischisis

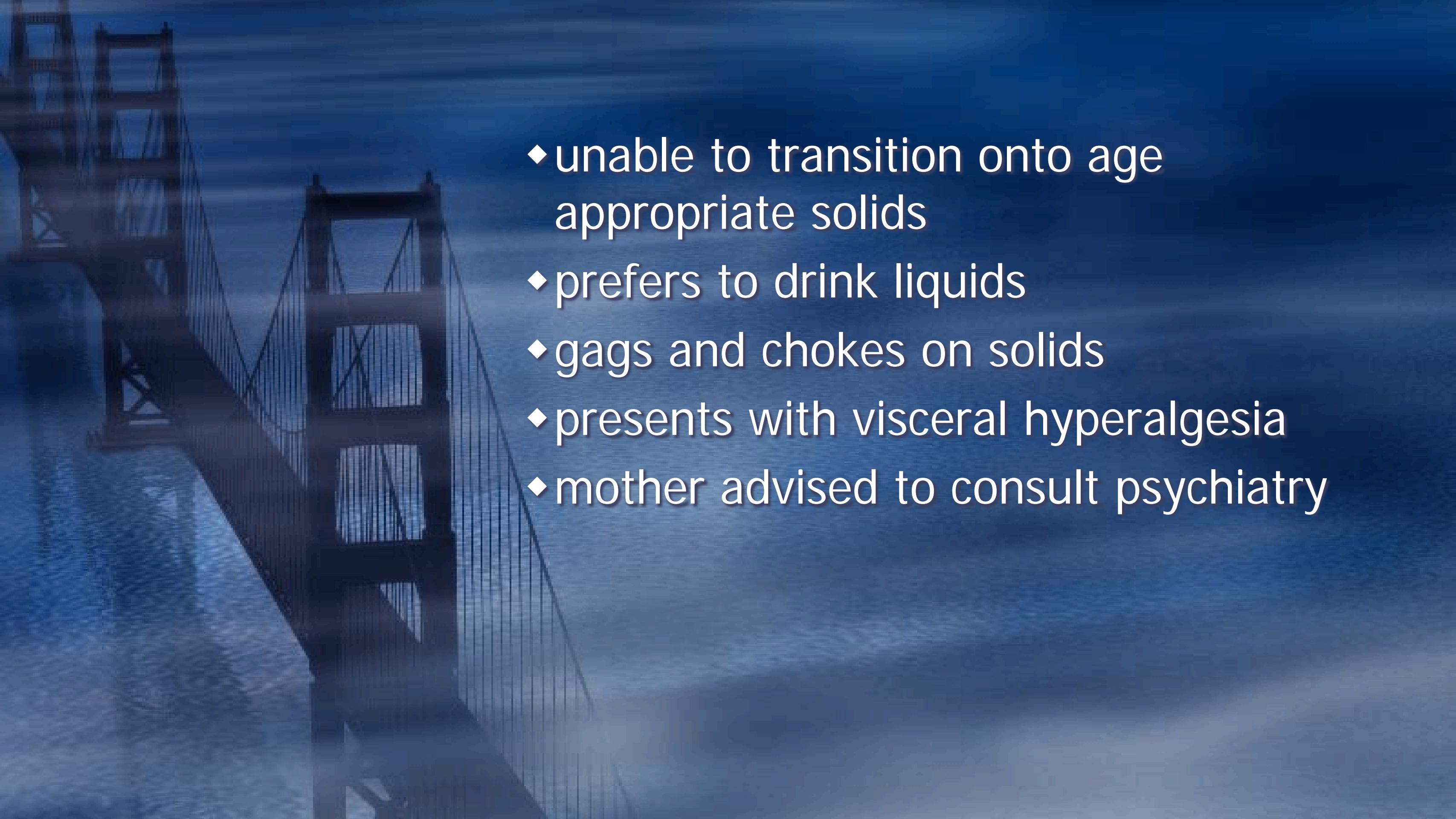
- ◆ chokes during feeding secondary to esophageal dysmotility

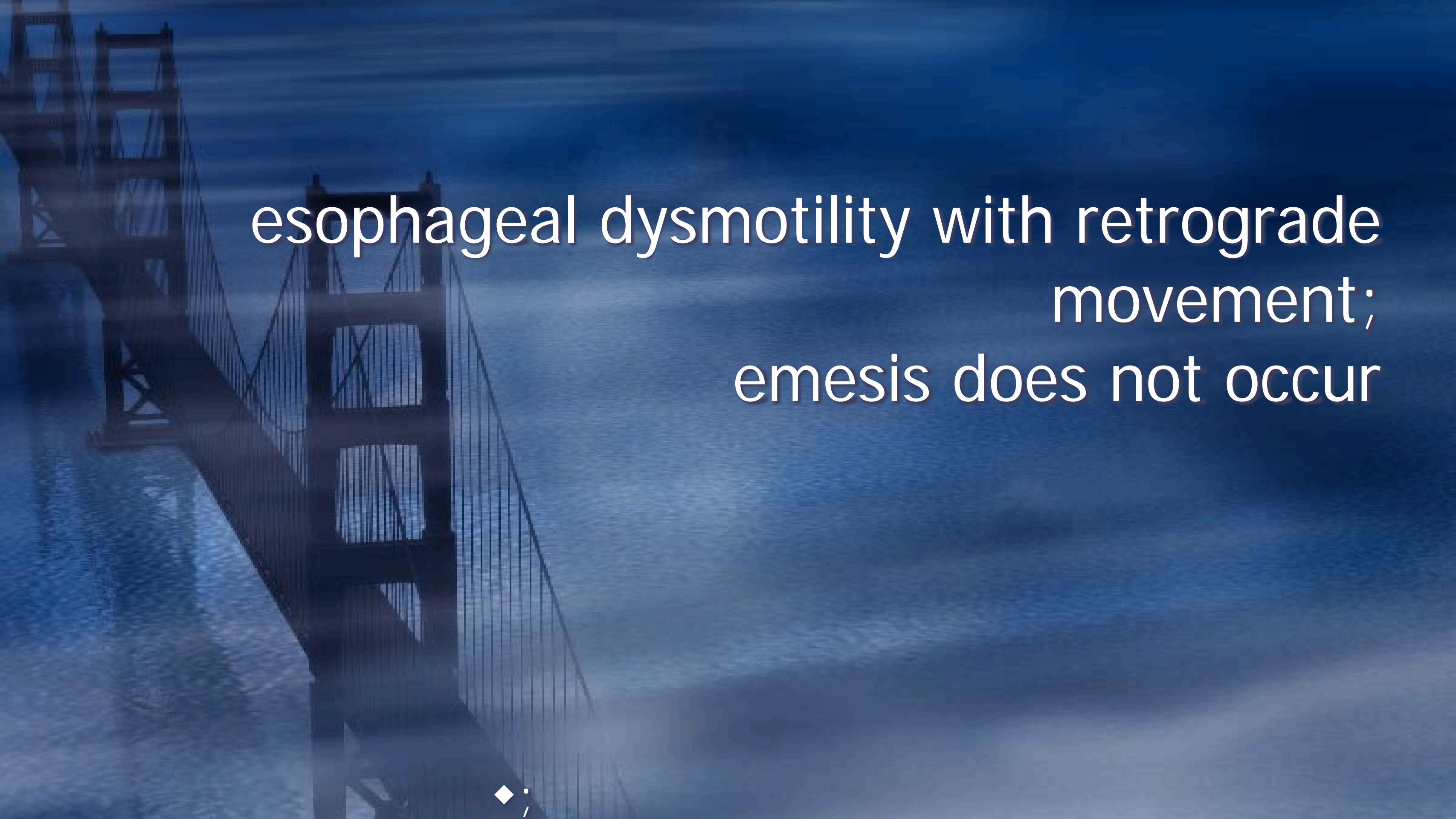
# Infant with VACTERL syndrome

- ◆ 8 weeks corrected age
- ◆ TEF repair-2 days of age
- ◆ mod-severe tracheomalacia
- ◆ fundoplication for GER-5 wks



Developmentally Normal Toddler with  
esophageal dysmotility for solids

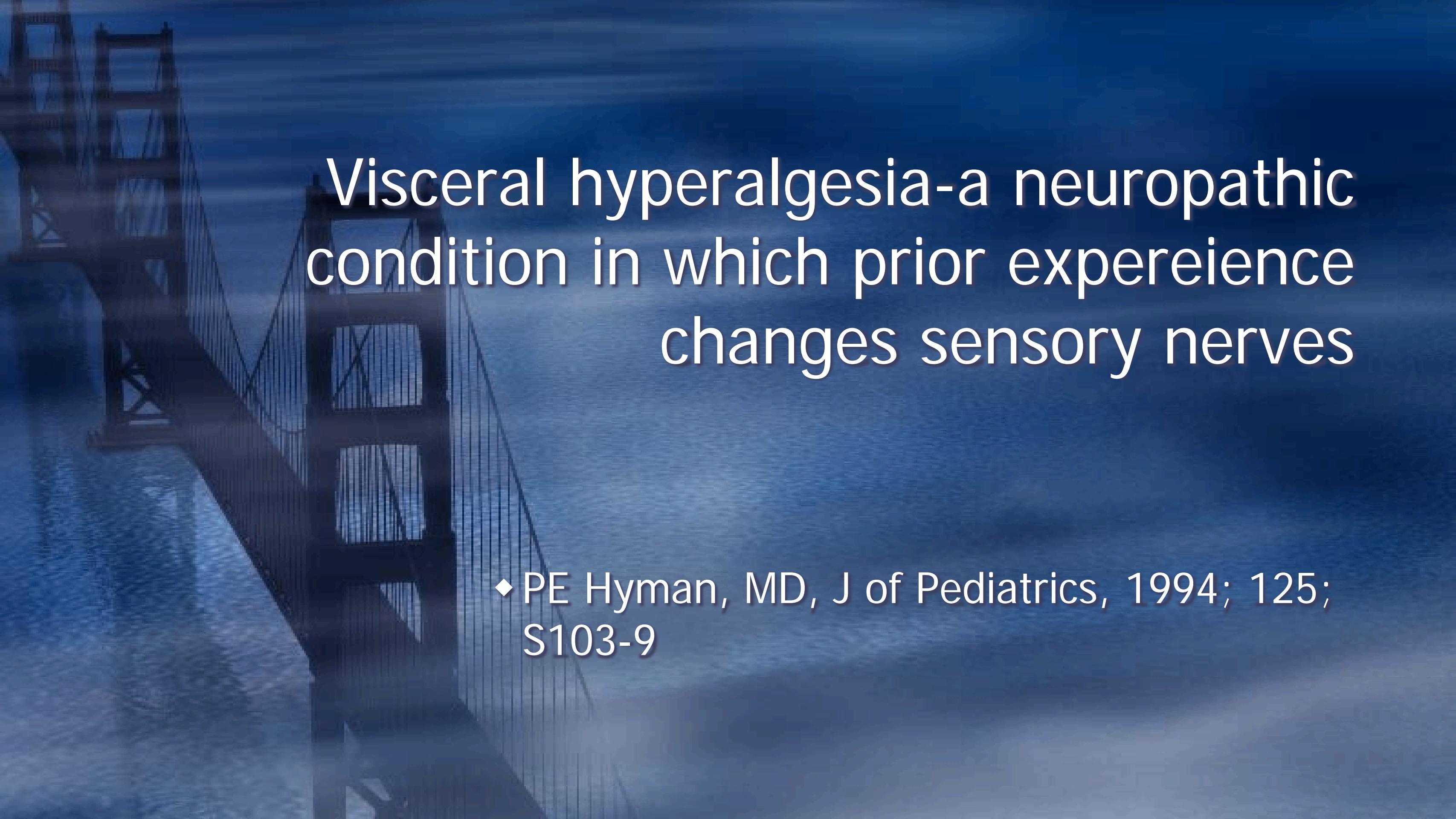
- 
- ◆ unable to transition onto age appropriate solids
  - ◆ prefers to drink liquids
  - ◆ gags and chokes on solids
  - ◆ presents with visceral hyperalgesia
  - ◆ mother advised to consult psychiatry



esophageal dysmotility with retrograde  
movement;  
emesis does not occur

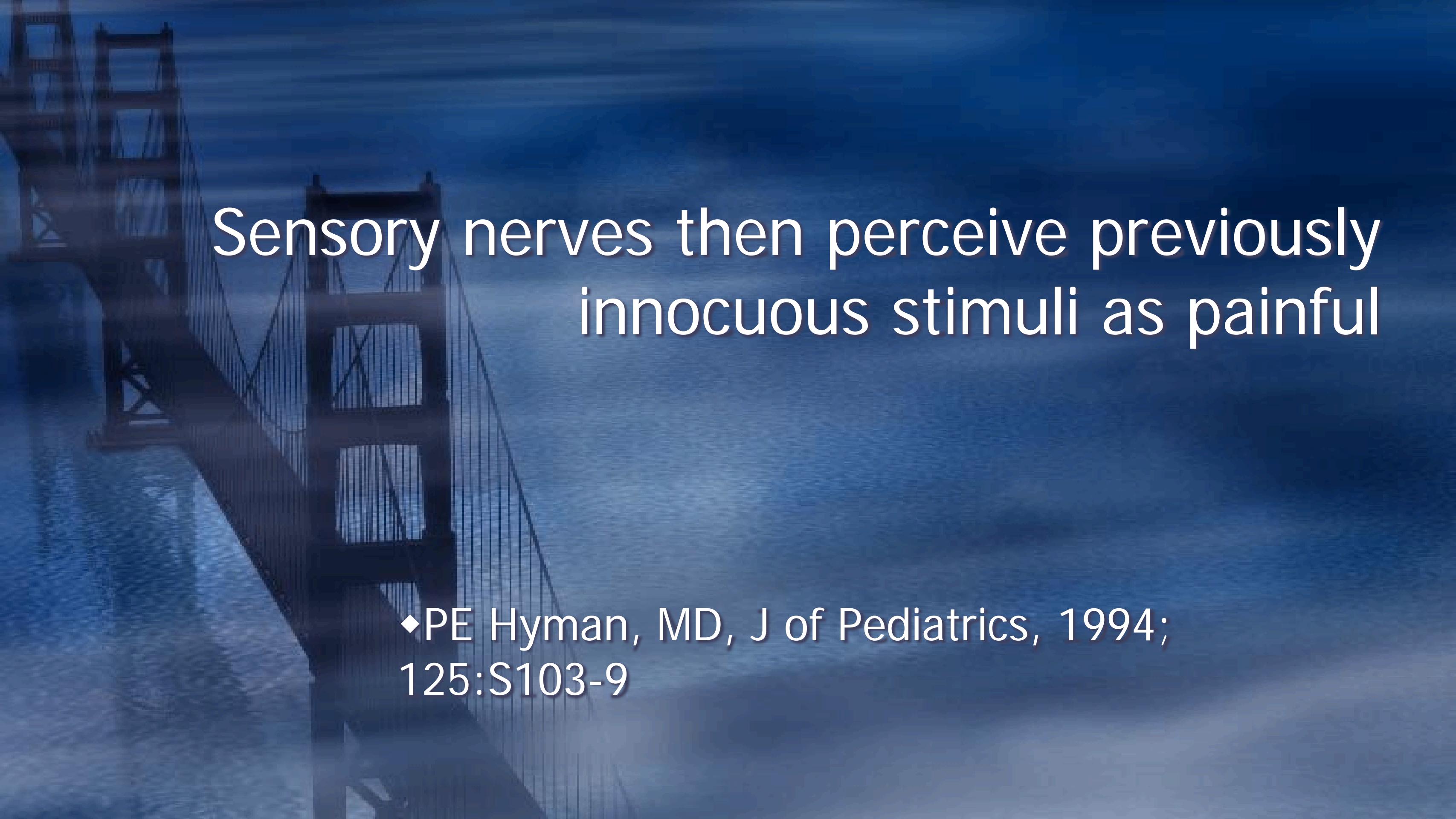
# Definition of Delayed Transition onto Solids

- ◆ 3-6 months - pureed foods
- ◆ 8-10 months- crispy, crunchy solids
- ◆ 10-12 months- small cubes of fruits, meats, vegetables



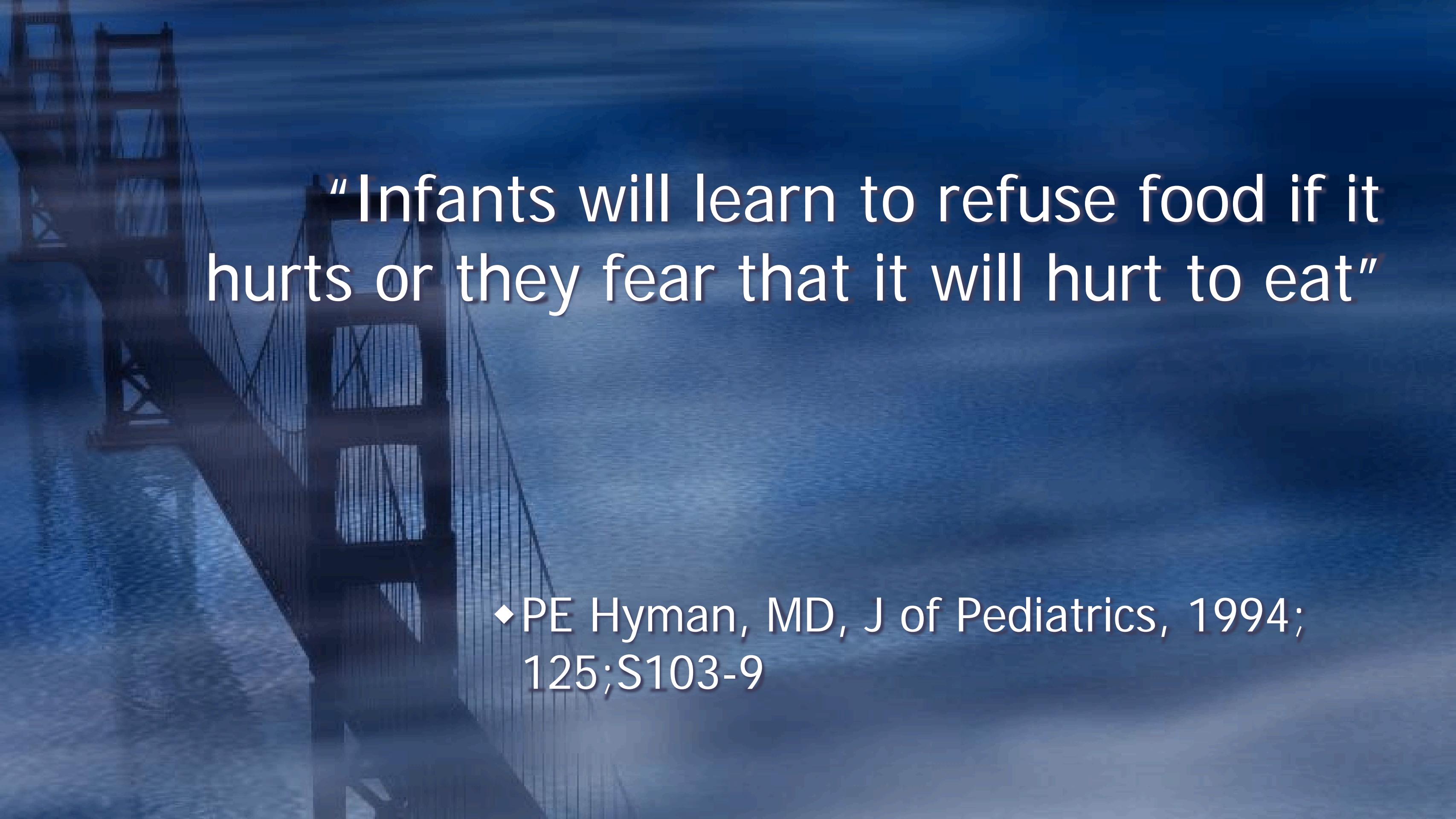
# Visceral hyperalgesia-a neuropathic condition in which prior expereience changes sensory nerves

- ◆ PE Hyman, MD, J of Pediatrics, 1994; 125; S103-9



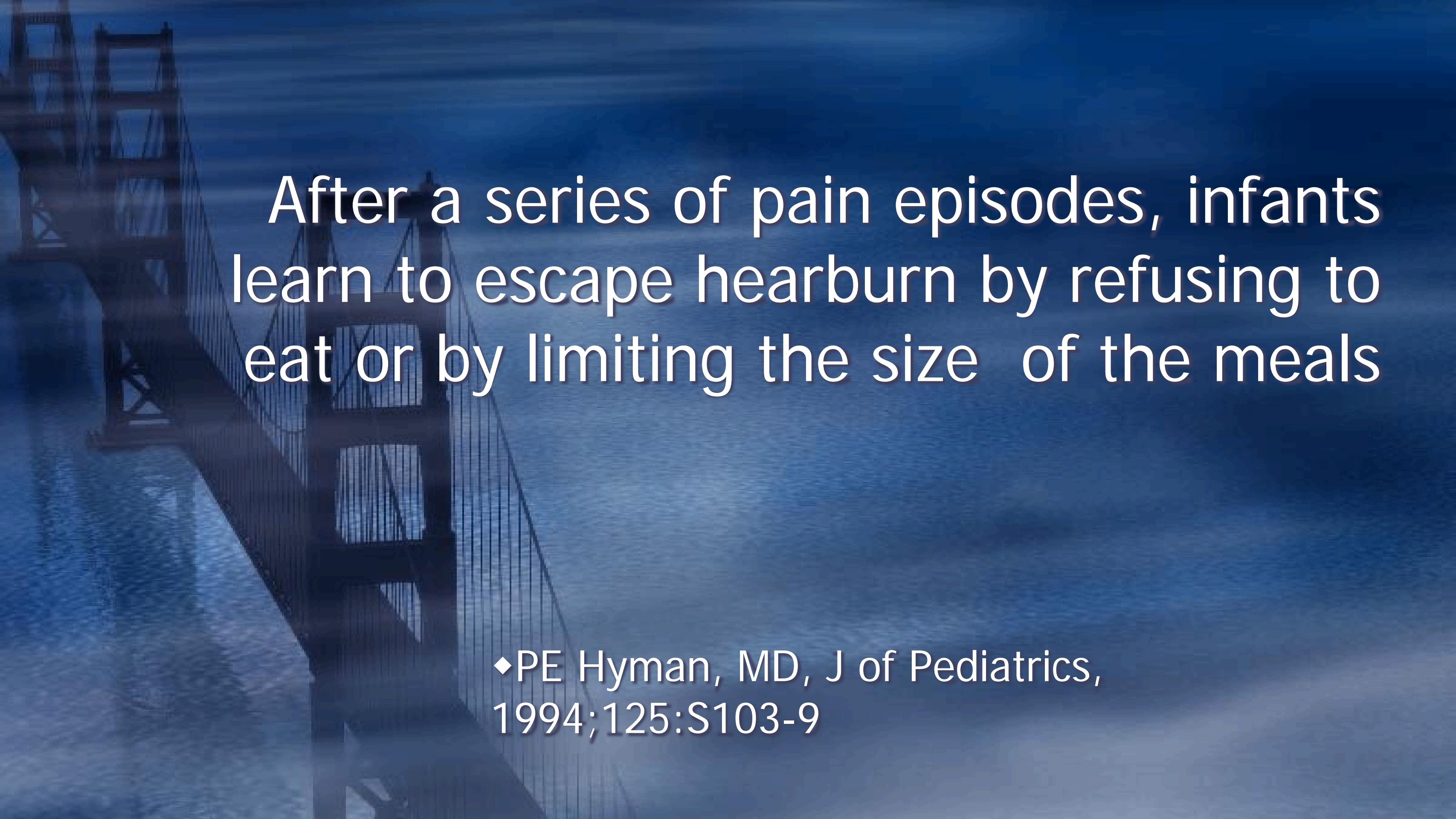
Sensory nerves then perceive previously  
innocuous stimuli as painful

- ◆ PE Hyman, MD, J of Pediatrics, 1994;  
125:S103-9



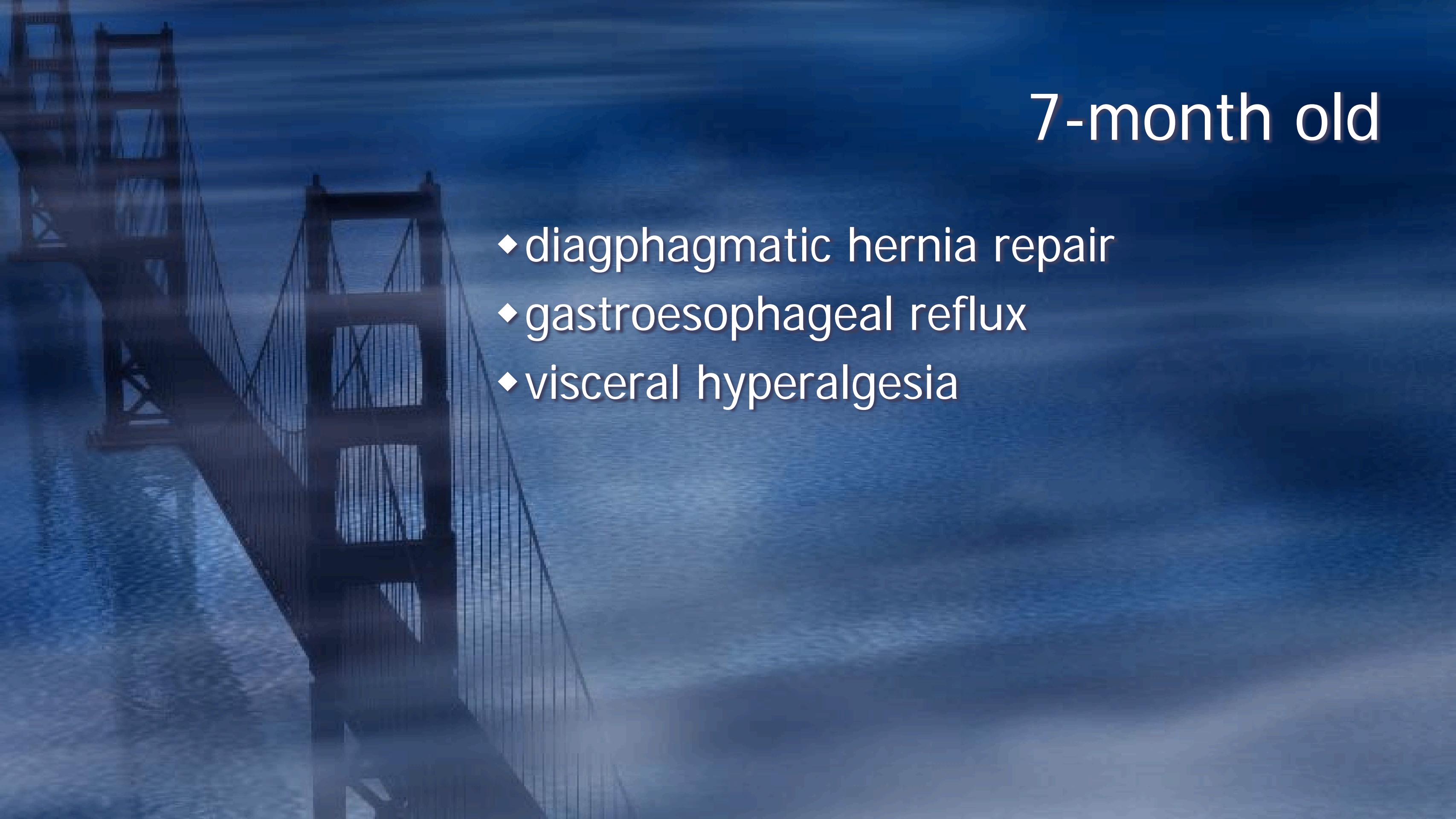
“Infants will learn to refuse food if it hurts or they fear that it will hurt to eat”

- ◆ PE Hyman, MD, J of Pediatrics, 1994;  
125:S103-9



After a series of pain episodes, infants learn to escape heartburn by refusing to eat or by limiting the size of the meals

- ◆ PE Hyman, MD, J of Pediatrics, 1994;125:S103-9

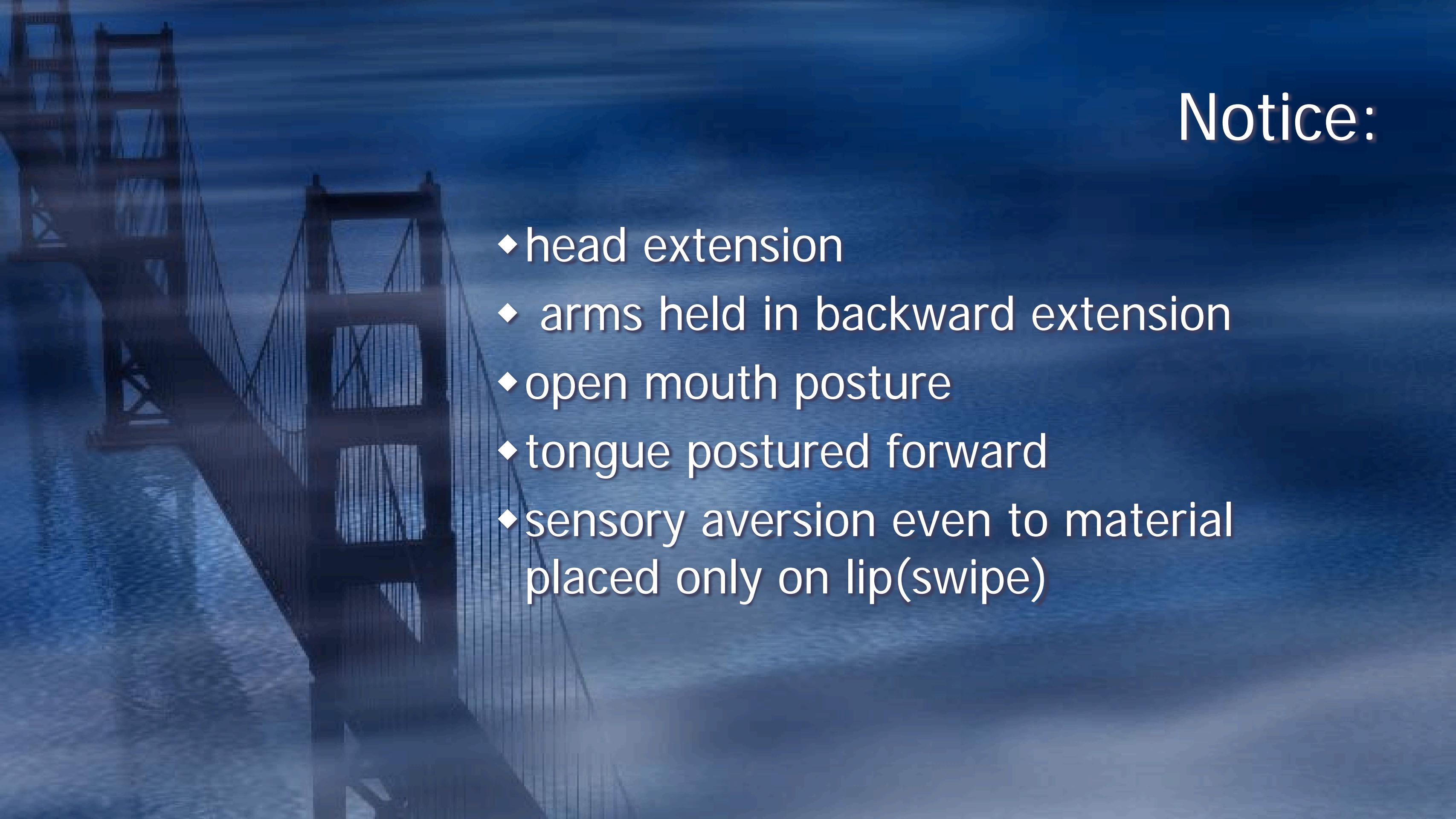


7-month old

- ◆ diaphragmatic hernia repair
- ◆ gastroesophageal reflux
- ◆ visceral hyperalgesia

# 12 month old (9 mos. PCA)

- ◆ 28-week gestation
- ◆ chronic lung disease
- ◆ intubated for 11 weeks
- ◆ takes 1 1/2 hrs to drink 7-8 oz bottle
- ◆ cries, gags, vomits with pureed foods

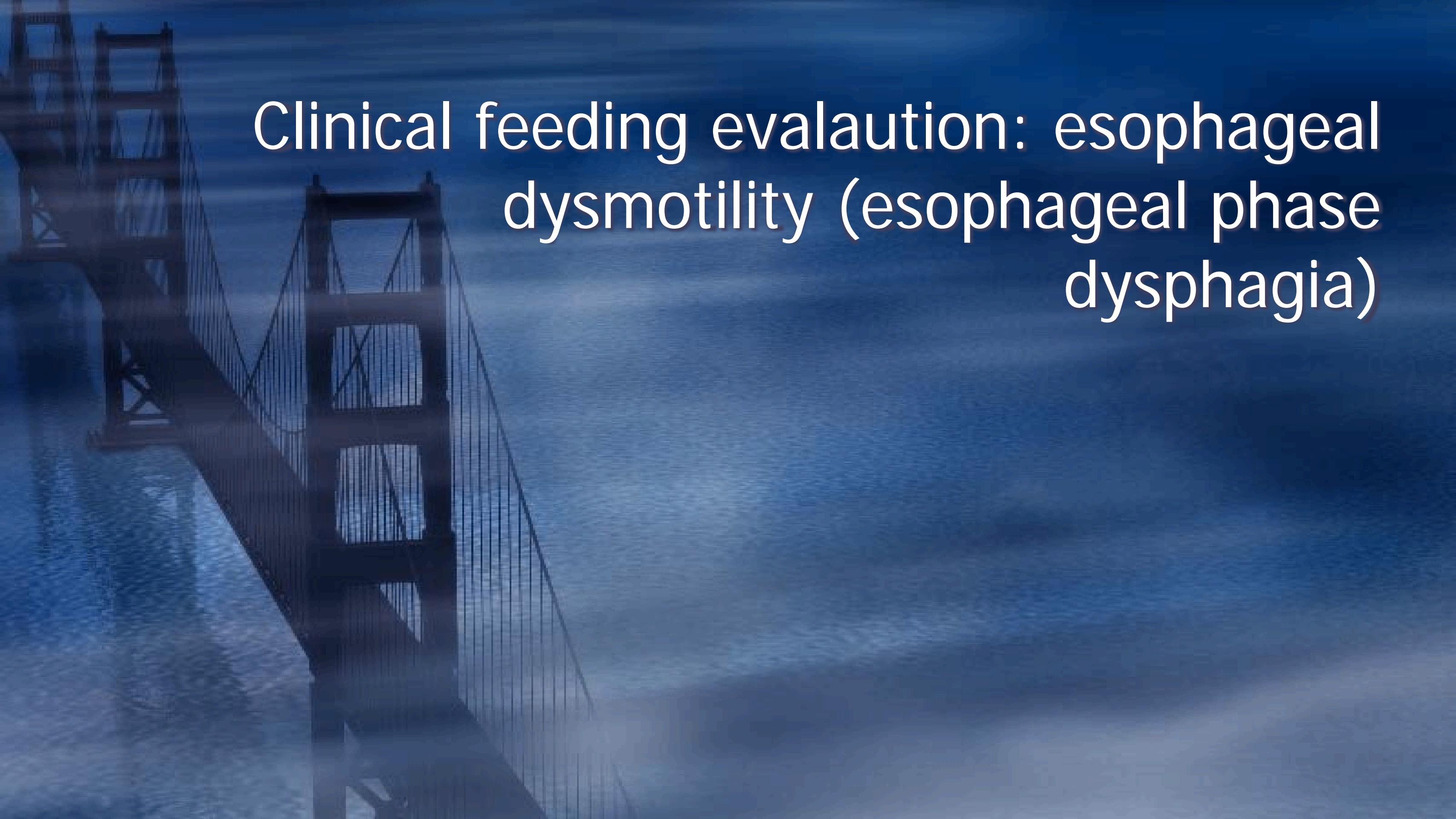


# Notice:

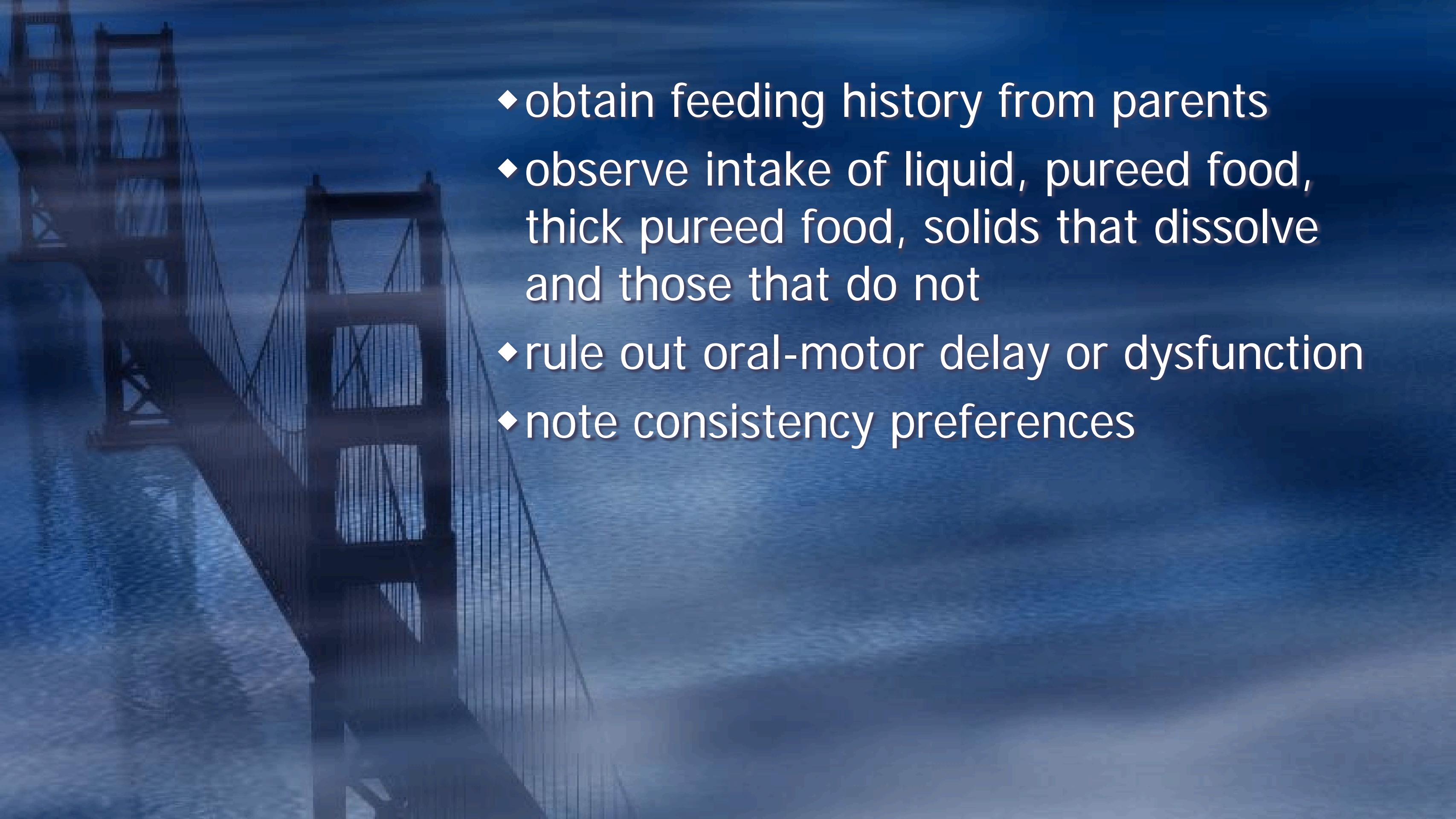
- ◆ head extension
- ◆ arms held in backward extension
- ◆ open mouth posture
- ◆ tongue postured forward
- ◆ sensory aversion even to material placed only on lip(swipe)

# Child with a diaphragmatic hernia repair

- ◆ delayed triggering of the pharyngeal swallow with pureed foods
- ◆ does not yet eat solids
- ◆ this is NOT a behavior problem...it is an esophageal phase dysphagia



Clinical feeding evalaution: esophageal  
dysmotility (esophageal phase  
dysphagia)

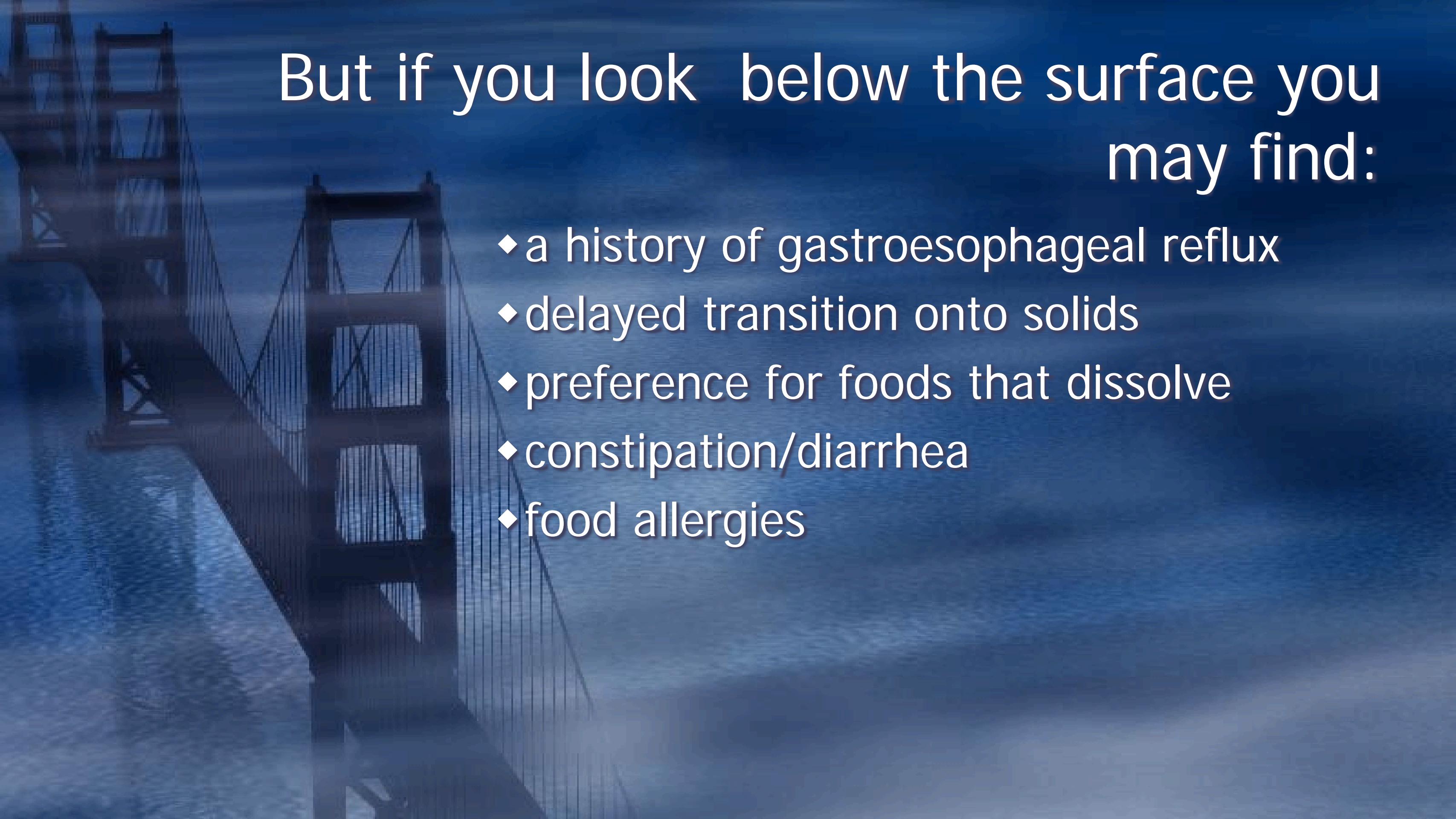
- 
- A dark, atmospheric photograph of a suspension bridge, likely the Golden Gate Bridge, at night. The bridge's towers and cables are visible against a dark sky, with some light reflecting off the water below.
- ◆ obtain feeding history from parents
  - ◆ observe intake of liquid, pureed food, thick pureed food, solids that dissolve and those that do not
  - ◆ rule out oral-motor delay or dysfunction
  - ◆ note consistency preferences

# Esophageal Dysmotility

- ◆ child is interested in solids but unable to swallow
- ◆ mastication is in place and child manages “crispy, crunchy” solids
- ◆ avoids all solids that do not dissolve easily
- ◆ avoids THICK foods
- ◆ may gag or vomit with solids
- ◆ usually considered a “behavior” problem

# Food for Thought

- ◆ It is easy to dismiss a feeding problem as being simply “behavioral” when we do not understand the cause



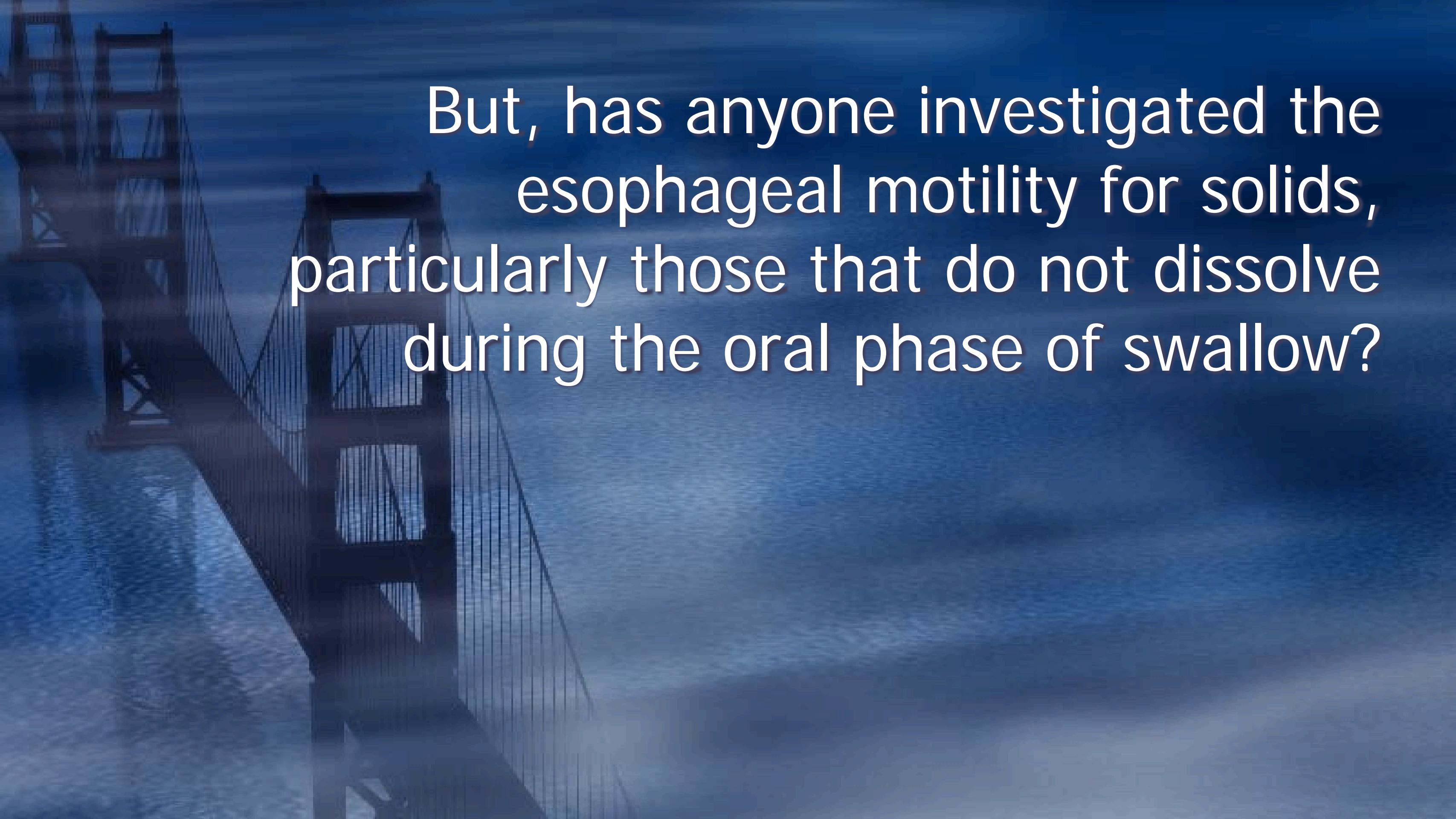
But if you look below the surface you  
may find:

- ◆ a history of gastroesophageal reflux
- ◆ delayed transition onto solids
- ◆ preference for foods that dissolve
- ◆ constipation/diarrhea
- ◆ food allergies

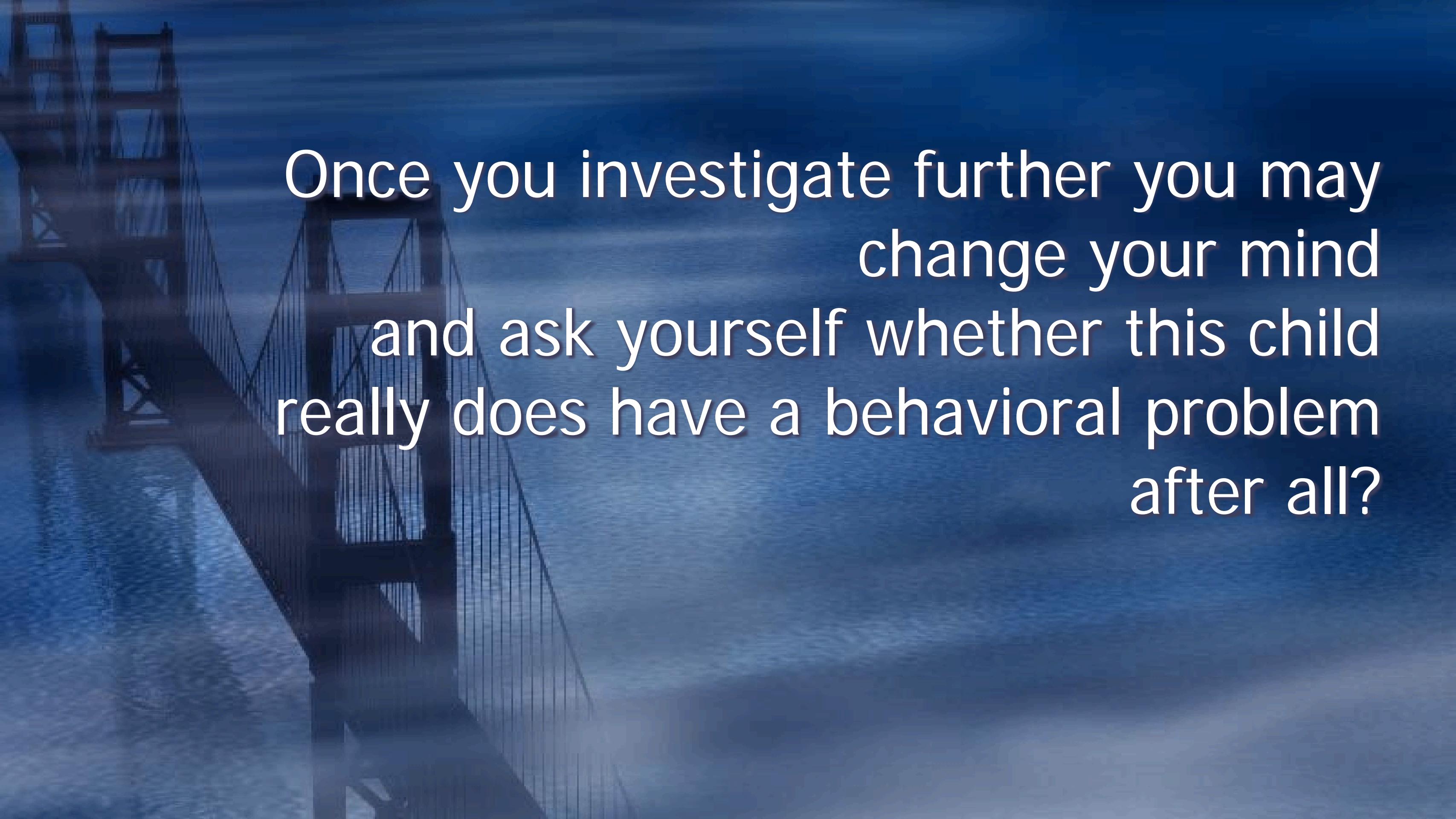


and when you look further....

- ◆ oral-motor skill development is normal
- ◆ developmental milestones are normal
- ◆ even the upper GI study was normal!!!



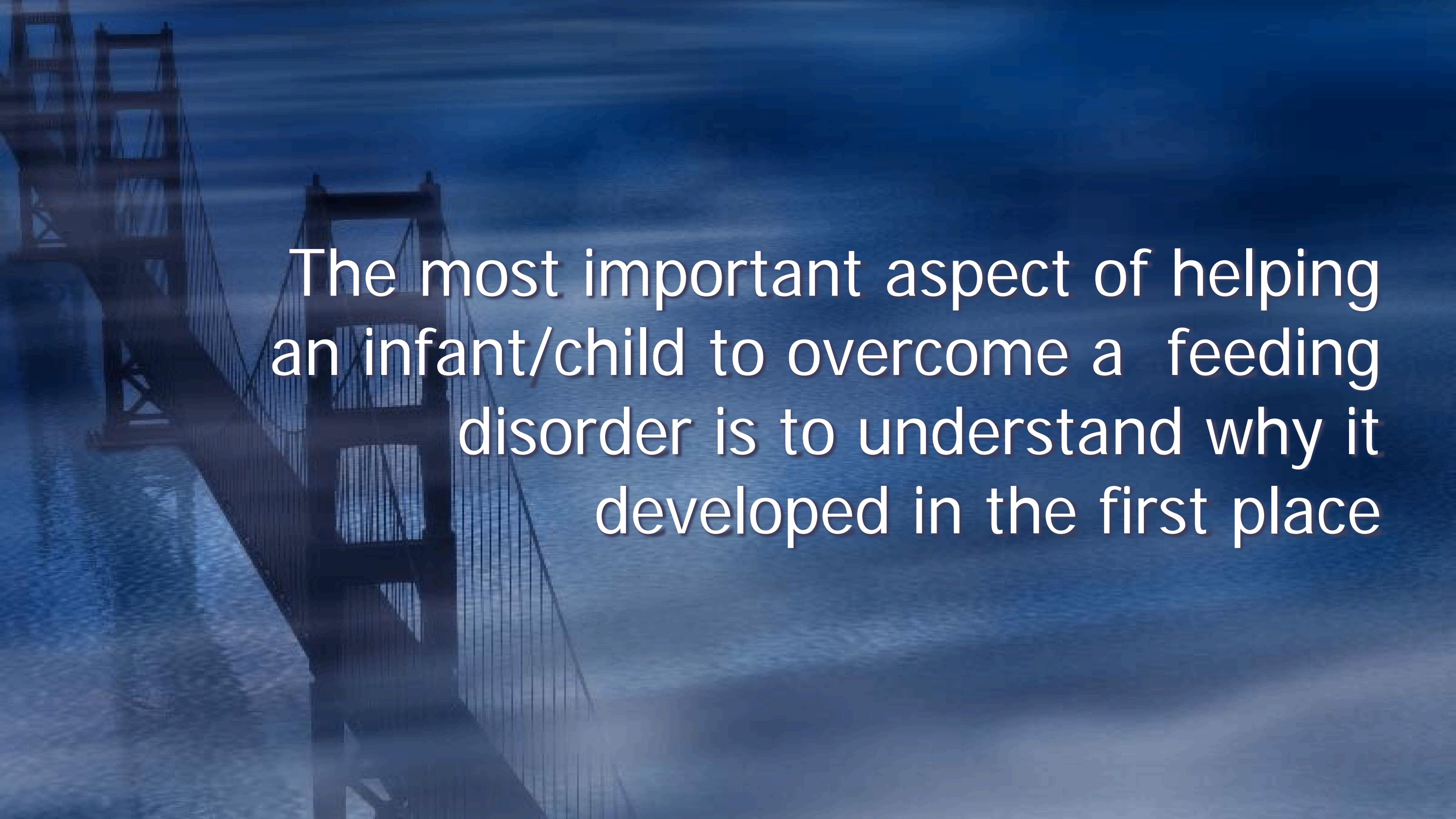
But, has anyone investigated the esophageal motility for solids, particularly those that do not dissolve during the oral phase of swallow?



Once you investigate further you may  
change your mind  
and ask yourself whether this child  
really does have a behavioral problem  
after all?

A dark, atmospheric photograph of a suspension bridge, likely the Golden Gate Bridge, at night or in low light. The bridge's towers and cables are visible against a dark sky. The water below reflects the bridge's structure.

Remember to explore all underlying  
possibilities before you make your final  
decision



The most important aspect of helping an infant/child to overcome a feeding disorder is to understand why it developed in the first place