



Pediatric Feeding and Dysphagia

Dear Fellow Feeders;

Dear Fellow Feeders,

We have reached the end of another subscription year! I hope you have enjoyed the newsletter and that it has provided ideas, challenges, and promoted discussion about the complicated issues facing our kids.

In this issue you'll find Dr. Morris discussing how to become a partner with the child in the meal process, a seasoned therapist and my good friend Cis Manno, MS SLP/CCC writes about lip closure, as well as articles about the use of proton pump inhibi-

tors, case histories, recommendations and research reviews.

This is the last issue in this volume. Please continue to support this endeavor by re-



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Special Points of Interest:

- Current information
- New products
- Research and publications
- Education

BECOMING A MEALTIME PARTNER

By Suzanne Evans Morris Ph.D., www.new-vis.com

Children share many aspects of their meals with another person. Infants and younger children are totally dependent upon an adult partner who selects the food, the time and place of the meal. They rely upon an adult or older child to prepare the food and physically bring it into the mouth. Without this assistance they would not survive.

Adults provide a model at the meal that serves as a mirror through which children measure their worth and develop perceptions of their inner abilities. When adults act with respect and trust, their children feel capable and move through difficult challenges with greater ease. When adults control children and respond only to their perceptions of the child's inabilities or misbehavior, children perceive themselves as inadequate. They frequently respond with fear and often challenge the adults to prove to themselves that they are capable.

Nourishment

Mealtime is at the core of the parent-child relationship. It is the vehicle through which nourishment is provided for both the child and adult. Nourishment is at the heart of the mealtime partnership. The essence of mealtime has little to do with the way in which a child eats or the type or amount of food eaten. Taking in physical nourishment orally is but one part of the picture. Nourishment includes the intake of physical nutrients to support the optimum growth and healing of the body. Nourishment is also required at the psychological and spiritual levels. The nourishment of the mind and spirit is more essential than that of the body. Children who are fed appropriate diets in a stressful and unloving interpersonal environment fail to benefit from the physical nutrients. They do not grow appropriately, lose weight and often die before the essential nourish-

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Editorial assistance provided by Elizabeth Crais Ph.D. CCC SLP, Division of Speech and Hearing Sciences, UNC-Chapel Hill and Cathy Fox MS OTR/L, Private Practice, Frederick, MD

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BECOMING A MEALTIME PARTNER

By Suzanne Evans Morris Ph.D.

ment of bonding and love is provided. Infants whose bodies and brains have been severely malnourished for years have blossomed cognitively in an environment of non-judgment and unconditional love. Although our understanding of the relationship between severe malnutrition and brain development would predict long-term brain damage and retardation, this has not been the case. Adults feel nourished when they are able to provide what their child needs and when the child eats well and happily. Their relaxed interaction with the child becomes an aspect of nourishment for the child. The child and parent co-create a cycle of nourishment that affects both individuals.

When the child is uncomfortable or does not feel safe or competent at the meal, the parent may respond with anxiety or stress. The child senses the parent's distress and responds with greater discomfort and resistance to eating. Parents often become frantic and temporarily lose their ability to find present solutions for their child because they are lost in their regrets of the past and their fear of the future. Each step creates a reverberating circuit of stress and distress for both the child and adult. The potential partnership is lost and mealtimes deteriorate into an unsatisfying and unfulfilling ordeal. Neither the child nor adult feels nourished when there is stress and distress.

The Essence of Partnership

All parents and professionals can develop or redevelop mealtime partnership skills with the infants and children in their lives. Becoming a more skilled Mealtime Partner involves conceptualizing the challenges of feeding and nourishing children in a different way.

Most adults are taught that they must get their children to eat specific amounts and types of food. If children do not eat or eat poorly, it becomes the adult's responsibility to exercise the child's muscles and modify the child's behaviors so that eating skills will improve. In trying to follow this type of approach most adults do not incorporate the inner knowledge that the child has of his own comfort level, interests, preferred learning style and readiness for the challenge that has been presented.

Children can help guide their own program when adults listen and respond in an interactive manner. The resulting interaction honors the input of both the child and the adult. From this is created a partnership that supports the child's ability to learn the specific components that support eating skillfully and nutritionally. One of the most important components involves implementing a division of responsibility at mealtimes in which children and adults assume different roles. Adults choose the specific food, location and time of the meal. Children choose what and how much they will eat. The adult role assumes a deep understanding of the child's physical, sensory, oral-motor and gastrointestinal needs in providing the components of a meal that facilitate success for the child. The child's role is built on trust and inner guidance of the eating process. It grows with the mealtime partnership as specific skills are developed and mastered.

Facilitating Change

The challenge to parents and professionals of children with feeding difficulties is to provide a loving and nourishing environment in which change can evolve. Change is always possible and always present. Readiness for a specific change depends on the individual child. Some children may be ready to make the transition from tube feeding to oral feeding. Others may be on the threshold of discovering an enjoyment of a wider variety of foods. Still others may be ready to move from an earlier pattern of feeding coordination such as sucking to a more mature pattern such as chewing. These changes will emerge for many children through their partnership with loving and knowledgeable parents and professionals who blend their understanding of the human body with the human spirit.

When therapists build their programs around the mealtime partnership, they engage both the child and parent as active participants in the process of change. They acknowledge that mealtimes involve a great deal more than taking in a specific number of calories or eating specific foods. Mealtimes include life skills as

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Maintaining Lip Closure

By Cecilia (Cis) Manno, CCC/SLP, cjmanno@erols.com
Private Practice, Yardley, PA

Providing dysphagia and oral motor treatment for my pediatric patients continues to be a learning experience for me. When you look in the speech and language catalogs there are a myriad of products to improve movement of the oral facial musculature for eating and speech production. The question is which ones do you purchase and do they really make an impact on motor movement? When selecting a product you need to know what movements and muscles you are trying to stimulate, how the muscles are activated, how to easily maintain these positions for function, and how well they fit into the client's oral cavity.

Many of the products that I have tried have been on a trial and error basis. That is I seem to get better and quicker results from some than others. This is written purely from a clinical viewpoint of treatment with over 20 years of experience.

When providing oral motor treatment my goals are to try to obtain normal to as close to normal muscle tone as possible, better movement patterns that are functional for feeding and speech purposes and to be able to maintain those patterns for the activity whether it be food containment or sound production. In many cases a child is able to attain a movement or posture but the ability to maintain this pattern for activity is what's required for functional activity.

Many of the children that I see have very low tone lips with difficulty holding flexion or rounding for production of the bilabials, using straws and utensils with active lip movement to draw the food in and to keep the lips together while chewing their food. A tool that I have been using for the last 2 years is the lip gym offered by Speech Dynamics (800-337-9049). It comes in both pediatric and adult sizes. It

is placed between the lips and the front teeth. The therapist pulls the ring forward while the child tries to actively keep it in their mouth.

The youngest child that I have used it with was 3 years old. Typically when beginning to use the lip gym, place it in the child's mouth so they can get used to it. Sometimes if children are very wary of it, begin by just placing it to the lips and shape acceptance of this tool. Then tug gently and tell them to keep it in their mouth. If they don't understand that, I will place my index finger and thumb over the upper and lower lips while I tug to show them how to keep it in their mouth.

As the child gets used to it you can begin to tug a little stronger and as the child resists your pulling you will see the orbicularis oris muscle activate. I teach the parents how to use the lip gym and it is carried over on a daily basis. I typically see a noticeable change in 2 weeks with more active use of the lips during eating, drinking and bilabial production.

Another tool that I have very recently begun to use is the ARK probe and Z-Vibe by ARK Therapeutic Services, Inc. (800-899-8055). This can help improve lip closure by using it under the top lip to improve sensation and begin the activity of drawing the lip down. I sometimes have the child say 'Oh' as I use the Z-Vibe within the lip circle to sustain the activity. I typically use this first and then go on to the lip gym to work on resistance. The ARK probe and massager is very small and fits into a child's mouth very nicely. Since it is so small it can also be used to activate various areas of the tongue without the child trying to chew on it. It also comes with a variety of tips for both pediatric and adult use. I hope these products are helpful to you as well.

BECOMING A MEALTIME PARTNER

By Suzanne Evans Morris Ph.D.

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diverse as communication, socialization, sharing family values and culture, celebration and sensory exploration. Specific therapeutic work to increase gastrointestinal and sensory comfort, to provide a stronger foundation of postural control, and to improve oral sensorimotor skills is a vital part of the process. However, when it takes place within a mealtime context it assumes a value to the child that stimulates an inner desire to learn and master new skills and become part of the larger mealtime community.

Case by Case...: When to refer your client to an intensive feeding program

We have all have had feeding clients on our caseload that have failed to progress in therapy. Recently, I have had 2 similar patients, both boys, ages 3 and 4 who were developing normally but who had severe food refusal. Both had similar courses of treatment and then successful resolution when they were referred to an intensive-feeding program.

Case 1: MZ MZ is a 31/2 year old boy with no known medical problems. He was referred to me at 3 years of age for severe food refusal (he had not swallowed a new food in 2 years) and failure to progress in oral-motor/sensory therapy for feeding. At the time of referral, MZ was accepting 3 foods; goldfish crackers, French fries, and vanilla custard.

MZ's medical and feeding problems began in the first year of life with chronic ear infections, tube placement at 7 months, volume limiting and irritability. At 9 months, he began refusing foods and showed no interest in textured foods. From the ages of 1 to 2 he would accept 6 foods (3 baby foods, goldfish, cheerios and french fries). At 2 he started in oral motor sensory feeding therapy (play in food, oral exercises, etc.) which he attended on a weekly basis for over one year with no success in the acceptance of food. His Mom expressed great frustration with his feeding issues. At 2 $\frac{1}{2}$, he was seen by GI and underwent an endoscopy which was read as normal. He then had an adenoidectomy and a 2nd set of tubes placed. At 3 he came to UNC.

Examination: MZ appeared to be a well-nourished boy with weight in the 90th percentile. Oral exam was unremarkable with intact motor function.

Course: We referred MZ back to pediatric gastroenterology for a trial treatment of acid suppressant medication. Based on his history of subtle GER plus severe food refusal we thought a trial on medication was appropriate. (Note that the GI physician would most likely have looked at this child, called him a picky eater, and sent him home were it not for the therapist advocating for intervention). After placement on Prilosec®, his mom felt that he was sleeping

better and eating more quantity of preferred food but not progressing to new foods. The physician then decided to do an endoscopy and a pH probe. Results from both were normal, however the probe was so aversive he did not eat well in the hospital and dropped a food after the test (dropped vanilla custard).

Therapy consisted of the initiation of a structured behavioral feeding plan. MZ was started on a dry spoon with 30-second reward for acceptance. He progressed to dip and full spoons of applesauce. Mom followed the protocol 2 -3 times per day at home. After 3 months he had progressed to applesauce but was not progressing to other purees. With the introduction of a new puree, he would tantrum, refuse, and cry.

At this point he was referred to the intensive feeding program at St. Joseph's Hospital in Paterson, NJ (www.feedingcenter.org). Even though he had 5 recommendations to attend such a program from medical professionals, his insurance company denied him 3 times for the program stating that it was a behavioral problem therefore not covered by medical insurance. With perseverance, his parents gathered their evidence (referrals, therapy notes, testing) and pursued their last recourse of a phone appeal. We had 15 minutes to make our case to a blind panel of physician's. They thankfully approved the referral! It is noted that it took 8 months to get him into the program. We tapered therapy down to maintain the structure but did not do weekly treatments due to lack of progress as an outpatient.

Outcome: After 4 weeks at St. Joe's, MZ was eating 30 foods (a combination of puree and chewable). His medication was increased and he went through an intense 4 weeks of structured feeding sessions per day plus PT for subtle shoulder rounding and decreased trunk rotation. The beginning was rough but his Mom said later that it was nothing she hadn't seen before (tantrumming, spitting, refusal, even vomiting) and that he turned a corner with the increase in Prilosec®. He was diagnosed with silent reflux. Today, MZ continues to progress and is no longer followed in therapy. He is monitored by a feeding team psychologist monthly for

Case by Case...: When to refer your client to an intensive feeding program

progress.

TS: A second but similar case

TS was referred at 4 years of age for severe food refusal. He accepted chicken nuggets, grapes, and fruit chews and also had not swallowed a new food in 2 years. He was referred for food refusal after poor progress in oral-motor/sensory therapy for over one year. Medical history included 50 doctor visits for cough, congestion, and colds. TS had difficulty feeding from infancy with poor tolerance of formulas (ended up on Nutramagin), colic, vomiting, crying, volume limiting, slow bottle feeding, and poor transition to textures. He had chronic ear infections, 2 sets of tubes placed, and poor weight gain. He had his tonsils removed at age 3. Bowel patterns ranged from constipation to diarrhea.

Examination: TS appeared to be a well-nourished boy. Oral exam was unremarkable with intact motor function.

Course: A pediatric GI consult was pursued. TS was placed on Prilosec® and underwent an endoscopy and pH probe with normal results, except for allergy testing which blood was drawn during the endoscopy. He was diagnosed with a corn and rice allergy. His mother eliminated fructose and all chicken nuggets that were corn meal based from his diet.



Based on the therapist's history with these patients, a trial of a structured behavioral feeding plan was initiated but recommendations were made for the intensive feeding program from the start. Again, they were denied citing "picky eating" as the cause of his feeding issues. Over 7 months, TS progressed to apple sauce but would not transition to other foods in therapy throwing tantrums, crying, and becoming upset with multiple attempts. A similar course to MZ ensued, which included 3 appeals, multiple doctor recommendations and a 15 minute phone appeal. Then, TS was approved for the NJ program! Therapy was decreased to maintain structured feeding but without new demands.

Outcome: After 3 weeks in the program, 4 feedings per day, and a medication change, TS was eating 17 new foods with appropriate volumes and was discharged. He did not require out patient feeding therapy but will be monitored for continued progress.

Lessons:

What I have learned from these 2 similar patients is that successful outcomes for this type of feeding problem are often dependent on good medical management in combination with structured feeding plans. It is often difficult to get complete medical management of subtle GI symptoms due to varying treatment philosophies. Some parents are unable to carry out the structured feeding plans but this was not the case with these 2 families. My general rule is a 3 -4 month trial of therapy and if the child is not progressing, I start the ball rolling toward intensive treatment options. Both of these children had spent years in therapy only to be corrected in 3-4 weeks (plus follow up) of an intensive program! We need to educate our GI and primary care physicians on these programs because there are not enough of them. Frankly, many children are unable to progress in out-patient therapy alone especially if only seen 1-2 times per week. It is especially difficult for the children without major medical problems because they "look so good" as far as weight and appearance. Advocate for these patients! Therapists need to know and understand the GI symptoms and how they relate to function of the mouth. The physicians will put the children on medicines but it is our job to tell them how it's making a difference.

Proton Pump Inhibitors (PPI) and Pediatric Use by Krisi Brackett MS SLP/CCC

References:

<http://www.medicinenet.com> (Medical Author: Omudhome Ogbu, Pharm.D., Medical Editor: Jay W. Marks, M.D.)
www.bupa.co.uk
www.prevacid.com
www.nexium-us.com
www.priloseconline.com

The association of GI problems such as gastroesophageal reflux and feeding issues has been well established in the literature. In an effort to treat underlying GI disorders, many children are being given PPI's or proton pump inhibitors for the treatment of gastroesophageal reflux. It is important for feeding therapists to understand these medicines because you will often see patients who will not be able to progress toward oral feeding until the GI problem is under control. Therefore, it is our job to assist the physician and families by ensuring that the medicines are being given properly and that clinical symptoms are improving. Just what are these medicines, how do they work and who is safe to take them?

What are proton pump inhibitors (PPIs) and how do they work?

The stomach produces acid to help break down food so it is easier to digest. In certain circumstances, this acid can irritate the lining of the stomach and duodenum (the top end of the small intestine), causing indigestion and even ulceration and bleeding. The proton pump inhibitors work by completely blocking the production of stomach acid. They do this by inhibiting (shutting down) a system in the stomach known as the proton pump. The full name for this system is hydrogen-potassium adenosine triphosphate enzyme system.

What are they for?

Proton pump inhibitors are used to heal stomach and duodenal ulcers. They are also used to relieve symptoms of esophagitis and severe gastroesophageal reflux. In combination with certain antibiotics (e.g. amoxicillin and clarithromycin), proton pump inhibitors are used to get rid of *Helicobacter pylori* infection (a bacterial infection of the stomach), which is thought to be one of the main causes of recurring stomach ulcers.

Side effects

The proton pump inhibitors generally don't cause many problems. The most common side effects are diarrhea, feeling or being sick, constipation, gas, abdominal pain and headaches. Very rarely they can also cause allergic reactions, itching, dizziness, swollen ankles, muscle and joint pain, blurred vision, depression and a dry mouth. A problem that can occur with long-term use of proton pump inhibitors is stomach infections. Stomach acid helps to kill microscopic organisms (microbes) such as bacteria in the stomach. Because proton pump inhibitors completely stop acid production using them can lead to a growth of microbes in the stomach. Care should be taken in using a PPI with children who have liver or kidney problems.

Interactions with other medicines

PPIs interact with few drugs. The absorption into the body of some drugs is affected by the presence of acid in the stomach, and because PPIs reduce acid in the stomach, they may affect the absorption of these drugs. Other medicines or herbal remedies with should not be taken with a proton pump inhibitor, including those you have bought without a prescription, before talking to your child's doctor or pharmacist.

- The effects of phenytoin (Dilantin, an epilepsy medicine) and warfarin (for preventing blood clots) are increased by some of the proton pump inhibitors.
- The absorption of the antifungal drugs ketoconazole and itraconazole are reduced by proton pump inhibitors.
- The breakdown of diazepam (Valium) in the body may be blocked by some of the proton pump inhibitors so that there is an increased effect of diazepam.

Proton Pump Inhibitors (PPI) and Pediatric Use by Krisi Brackett MS SLP/CCC

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How to use a proton pump inhibitor

The proton pump inhibitors are only available on prescription. They come as tablets, capsules, powder to be made into a suspension, and injections. They are usually taken for 1-2 months but may need to be taken for longer. Once the child stops taking a proton pump inhibitor, the symptoms might come back. If the child vomits blood or you notice something that looks like coffee grounds in the vomit or black tarry stools, see your child's doctor immediately, as these are signs of intestinal bleeding.

Common proton pump inhibitors

- Omeprazole (Prilosec®)
- Esomeprazole (Nexium®)
- Lansoprazole (Prevacid®)

Are there differences among PPIs?

PPIs are very similar in action and there is no evidence that one is more effective than another. They differ in how they are broken down by the liver and their drug interactions. The effects of some PPIs may last longer and they, therefore, may be taken less frequently.

Specific Info: Pediatric Use:

- **Prevasid (Lansoprazole):** On 8/5/2002, this was approved for short term pediatric use for treatment of GER and esophagitis in children from ages 1 – 11 years old. Prevasid is currently the only PPI that comes in an oral suspension formula (strawberry flavored). The most frequently reported side effects in kids were constipation (5%) and headache (3%). All 3 types of Prevasid come in 15 mg and 30 mg doses (recommended 15 mg for kids under 30 kilos and 30 mg for kids over 30 kilos once per day).

Comes in:

1. Capsule: sprinkle granules into 1 tablespoon applesauce, pudding, cottage cheese, yogurt, and strained pears or mix with 2 oz. of apple, orange, or tomato juice. It should not be given with other foods or liquids. If administering through a NG tube, mix granules with 40 ml. of apple juice, inject, flush tube with apple juice. Do not use other liquids.
2. Strawberry flavored orally disintegrating tablet (chewable)
3. Oral suspension packet (mix with H₂O for strawberry flavor) Do not split oral suspension packet in half, must be used at once. Empty packet into container with 2 tablespoons H₂O, stir and drink. Do not use with food or other liquids or through a g-tube because it can clog the tube.

Prilosec:

Prilosec has been tested on kids ages 2-16 for the treatment of acid related GI disorders. It comes in 10mg., 20mg, and 40mg capsules. Adverse effects were similar to adults taking the medication, however unique to pediatrics were events of the respiratory system and otitis media. Prilosec should be taken on an empty stomach in an acidic medium and the child should wait 45 minutes -1 hour before eating . Do not open, chew, or crush Prilosec capsules, swallow each Prilosec capsule whole. Prilosec also contains lactose as a preservative so if a child is lactose intolerant it may cause a reaction.

Nexium

Nexium comes in 20 and 40 mg capsules. They should be taken at least one hour before meals on an empty stomach and at the same time every day. The capsules should also be swallowed whole, never chewed or crushed. If you have a hard time swallowing capsules, you can empty a capsule into a tablespoon of applesauce. The applesauce should be eaten right away and never stored for later use. The pellets should not be chewed or crushed. Pediatric information was not available on the website.

Note: Physician's are using all three PPI's in children. We have seen the best results when the medication is taken on an empty stomach with the recommended approved foods and then wait an hour before eating. The medicines need to go into an acidic environment because other foods may prematurely break down the medicine before it reaches the intestine where it will be time released.

Recommendations: Healthy Sprinkles by Krisi Brackett MS SLP/CCC

I tried these on my 2 year old and he loved them. They taste good and may be a way to introduce some new tastes and nutrients to your child's diet!

Healthy sprinkles are 100% pure raw fruits and vegetables that have been powdered and packaged into sprinkable shakers. They were developed by a mom who could not get her child to eat vegetables. Her son suffers from oral-motor dyspraxia, autism, and allergies. There are 7 kinds of sprinkles: peas, green beans, spinach, veggie (a mix of the three), fruity (blueberries, raspberries, and strawberries), pineapple, and onion. Beany sprinkles are in development. There are no preservatives, fillers contaminants or additives and they have a one year shelf life after purchase.

Quantity amounts are as follows: five peas would equal about 1/4 of a teaspoon of sprinkles. Almost a cup full of peas is squeezed into one bottle...the same applies to the cut green beans. The fruit comes out to equal 3/4 of a cup in each shaker and the spinach would equal just over a cup per bottle.

www.healthysprinkles.com or email questions to info@healthysprinkles.com

Comments and corrections:

A reference from our research section was printed incorrectly in January 2003. The correct reference is as follows: Hussain, MD, Sunny and DiLorenzo, MD, Carlo, Motility disorders. Diagnosis and treatment for the pediatric patient. Pediatric Clinics North Am. 2002 Feb; 49(1):27-51.



Catherine Shaker's MS SLP/CCC email address was omitted from her article on Preterm feeding in the January 2003 issue. She can be reached at CShaker@covhealth.org

Comment on Bioelectric Feedback Article:

Just wanted to alert you that research in this area is inconclusive. When reviewed in the Dysphagia special interest news letter Dec. 2002, the methodology used by Freed in her most recent study (Electrical stimulation for Swallowing Disorders Caused by Stroke) was described as containing "significant threats to validity" that render "the conclusions inapplicable to clinicians and patients..." The Dysphagia Journal did a review as well (Vol. 17, Number 4, 2002) emphasizing that "important design flaws" limit the validity of the findings. Until better research data is available we need to be careful in describing bioelectrical treatment as an effective treatment for swallowing disorders. There is always a placebo effect to any treatment and many of the children we see at The Children's Hospital in Denver demonstrate improved swallow function over time with no intervention except the implementation of modified diets. Freed will need to tease out these variables as well as others in her research to show the validity of her intervention and so far that has not been the case.

Thanks for your time,

Jackie Frazier, coordinator of the swallowing Disorders Clinic, The Children's Hospital, Denver CO

Research:

Salvatore S and Vandenplas Y. Gastroesophageal Reflux and Cow Milk Allergy: Is There a Link? *Pediatrics* 2002; 110:972-984.

This article offers a thorough review of research related to gastroesophageal reflux (GER) and cows milk allergy (CMA). A cow's milk allergy is defined as a negative reaction to consuming a milk product (like vomiting, diarrhea, crying and irritability), but also can be seen as a reaction from the immune system. Both of these conditions are frequently reported in babies less than a year, and can continue into the toddler years. Most of the research notes that, by the age of 3, 90% of children will have outgrown these conditions. The authors conclude that in a high percentage of cases, GER is related to the presence of cow's milk allergy, and GER could be brought on by CMA itself. Both of these conditions often cause much parental stress and anxiety, so accurate diagnosis is important. If the baby is breastfeeding, mother usually alters her diet, and if the baby is consuming formula, a different formula is tried. Of interest, they found breastfeeding babies tended to have lower incidences of CMA and GER than formula-fed babies. This article offered one of the best explanations of the different types of milk proteins and their role in GER.

Gastric emptying time is thought to play a big role in the development of GER. The amount of fluid, how many calories a formula contains, and the type of protein present in the formula, all seem to affect gastric emptying time. Children who are constipated frequently tend to have higher incidences of GER and CMA. The different types of proteins present in baby formulas, along with breast milk protein were all compared in relation to the prevalence of CMA and GER. It was concluded that if a true cow's milk allergy was diagnosed, that a pure amino acid formula (a formula where a protein is synthetically made to match protein you would normally find in a formula, but where there is no risk of creating an allergy) should be used. A dichotomy table outlining a decision-making process for diagnosing and treating GER and CMA was provided.

Jacobi, C., Agar, W. S., Bryson, S., Hammer, L.D. (2003), Behavioral validation, precursors, and concomitants of picky eating in childhood. *Journal of Am. Acad. Child Adolescent Psychiatry*, 42:1, January.

The aim of this study was to validate the concept of parent reported picky eating using laboratory based measures and to identify both child and parental precursors and concomitants of picky eating. Parent reported picky eating was defined by a positive answer to the question, "is your child a picky eater?" at 4 and 5 years of age. The authors used a 3 step procedure; first, the relationship between behavioral measures of picky eating and parent reported picky eating was examined, second, the child and parental precursors of pickiness was looked at, and lastly, associations between parental attitudes and behaviors as well as the child's temperament were explored. Results indicated that picky eaters ate fewer foods and were more likely to avoid vegetables. Picky girls decreased their caloric intake between ages 3.5-5.5, whereas all other children increased their caloric intake. Picky eaters demonstrated a different sucking pattern with fewer sucks per feeding session at weeks 2 and 4. Finally picky children displayed more parent-reported negative affect than non-picky children. Their conclusion is that parentally reported picky eating is associated with a consistent pattern of inhibited and selective eating beginning in infancy.

Wenzl, T.G., Moroder, C., Trachterna, M., Thompson, M., Silny, J., Heimann, G., Skopnik, H. (2002), Esophageal pH monitoring and impedance measurement: a comparison of two diagnostic tests for gastroesophageal reflux. *Journal of Pediatric Gastroenterology and Nutrition*, 34:519-523, May.

The standard diagnostic tool for measuring gastroesophageal reflux is the pH probe which assesses acid material in the esophagus. It does not document the reflux of other fluid movement in the esophagus. In this study, the pH probe study was compared with simultaneously obtained intraesophageal impedance measurement (IMP), a pH-independent method of detecting bolus movement within the esophagus (multi-site). Intraluminal impedance measurement of multiple sites can detect bolus movements in the esophagus and can detect the direction of the leading edge of the bolus. In this study a single custom made flexible catheter with a pH sensitive antimony electrode and 7 impedance electrodes representing 6 impedance channels was used. 50 infants with reflux symptoms were measured. Results indicated that during 318 hours of recording in 50 infants, 1, 887 episodes of reflux occurred according to IMP. Only 282 of the IMP determined episodes were acid reflux episodes. Among the 270 pH probe determined episodes using the standard criteria of acid reflux, only 153 were associated with retrograde bolus movement according to the IMP. Retrograde movement did not accompany the other 117 episodes. The authors estimate (with specified criteria) that the predictive value of the pH probe to be at 60%. They conclude that most reflux episodes that occur in infants are undetectable by standard pH probe monitoring. The most frequent reason for the failure of the pH probe to detect reflux seen by the IMP was too short a duration of acid reflux episodes (less than 15 seconds). The most frequent reason for false positive detection of acid reflux on the pH probe was a misinterpretation of pH drops during deglutition or during the clearance of a previous episode of GER.

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607-B North Greensboro Street
Carrboro, NC 27510
www.feedingnews.com
one: 919-967-2070
Fax: 919-843-3280
Email: Kbracket@mail.unch.unc.edu

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