



Pediatric Feeding and Dysphagia

Dear Fellow Feeders;

This is the end to another busy year for the feeding newsletter. I hope you have enjoyed the issues and that they have provided useful information, as well as provoked some new thinking with our feeding patients.

I have enclosed renewal information as well as a brief survey to help plan next year's topics. It seems that in every issue we run out of room and we want to know what information is most helpful to you. Please take a few minutes to fill it out!

Our website is coming along and should be up and running soon. It will be at

www.feedingnews.com.

thank you,

Krisi Brackett

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Pediatric Feeding and Dysphagia Newsletter
Hiro Publishing

Volume 2, Issue 4

April, 2002

Special Points of Interest:

- Current information
- New products
- Research and publications

Kineseo Taping and Feeding Intervention by Cathy Fox MS OTR/L, Private Practice, Frederick, MD, CFOXOT@aol.com

Dysphagia management is very complex and requires the careful sequencing of treatment interventions so that interfering factors and their secondary effects are minimized or eliminated.

While medical issues are being treated, therapists can begin work on the musculoskeletal alignment of the patient. This must be the first issue that is addressed, because the swallowing mechanism spans across multiple highly mobile joints and structures from the scapula to the base of the skull. Alignment of these structures is dependent upon the alignment and support of the musculoskeletal structures below it including the pelvis, spine, rib cage and shoulder girdle. In addition the muscles of the head and neck, many of which are the muscles of the swallowing mechanism are also involved in postural and righting reactions that occur on a continual basis. Appropriate alignment results in the develop-

ment, strengthening, and integration to these muscles in movement sequences and use in postural alignment. When this alignment is altered in form or function, the muscle length and tension relationship of the swallowing structures is altered.

This change in relationship is easily seen in patients who present with a posterior pelvic tilt, loss of the normal spinal curves, which results in a forward head posture. However, there are multiple other factors that can change this relationship. Treatment time spent on establishing a good base of support will insure that movement patterns practiced throughout the day will reinforce correct neck and head posture. This is actually "hands off" therapy, which will help your patient develop more appropriate muscle length and tension relationship of the swallowing structures.

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Editorial assistance provided by Elizabeth Crais Ph.D. CCC SLP, Division of Speech and Hearing Sciences, UNC-Chapel Hill

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Kinesio Taping and Feeding Intervention by Cathy Fox MS OTR/L, Private Practice, Frederick , MD, CFOXOT@aol.com

Treatment must first address the musculoskeletal alignment of the support structures for the swallowing mechanism including the pelvis, spine, rib cage, and shoulder girdle. Once alignment is obtained, the muscle length and tension relationship of the infrahyoid & suprahyoid muscles can be addressed. This is a critical factor since these muscles are not only involved in swallowing but are recruited in balance and postural movements and are frequently recruited for respiratory support. Because of these vital functions, treatment must be subtle, facilitory, and consistent.

I have used Kinesio Taping very successfully in my dysphagia practice because of the easy adaptability of this tape and techniques to this area of the body and the subtle way in which it works. Dr. Kenso Kase, D.C. of Japan, developed Kinesio Tape in 1973. He was trained as a chiropractor in the United States but has focused on kinesiology and conservative ways of treating traumatized and dysfunctional soft tissue. Kinesio Tape is made of elastic cotton tape with acrylic heat sensitive glue that is latex free and which can stretch to 130 – 140% of its resting length. Four major physiologic effects of Kinesio Taping include:

1. Supports the fascia and muscles
2. Removes congestion of lymphatic fluid and improves circulation
3. Helps to correct misalignment of the joint by reducing spasm and lengthening shortened muscles
4. Relieves pain or abnormal feeling on the skin & muscles

Common athletic taping techniques are inhibitory and require multiple layers of tape for stability. At the same time this type of taping decreases the mobility of the fascia and circulation around the joint and thus must be time limited. In contrast, Kinesio Tape is designed for mobility and can be worn over several days. The tape and the application techniques are primarily facilitory. By restoring the movement of the muscles you in turn facilitate the natural systems that exist such as venous and lymph circulation, which in turn helps the muscle continue to heal and help itself. Dr. Kase utilizes different application techniques based upon the desired outcome. Taping from origin to insertion without tension and with the tissue elongated will maintain length in the tissue as it moves into shortened positions. Convolutions occur in the tape as the muscle shortens and holds the skin and tissue up, allowing the physiologic effects to work. Taping from insertion to origin with some tension provides stability to the muscle, while still allowing mobility with the elastic properties of the tape.

The following treatment program is being discussed with the recommendation that close monitoring of the ventilatory and swallowing patterns must be a constant part of the treatment process due to the potential disruption to the delicate control that some patients have without the ability to adapt. The oropharyngeal and ventilatory patterns are monitored for change as postural alignment is modified. The goal of adding Kinesio Taping to the treatment process is to help maintain the muscle mobility and proper stabilization outside of therapy. It is recommended that handling and mobilization of the muscle group precede taping to insure maximal progress.

The infrahyoid muscle alignment is addressed by first working to change the position of the clavicle and scapula. Taping to gain muscle length and movement is used first to release the muscles that result in internal rotation of the shoulders such as the teres major and minor. This is followed by elongation of the pectoral muscles. These must be done in combination to balance the release effect on humeral position. Taping may proceed to the upper trapezius and anterior/posterior scalene muscles. These muscles can be taped while tape is still providing input to the teres and pectoral muscles. Once all of the taped muscles are mobile, stabilization can be provided using reverse application of the tape from insertion to origin and adding tension. Taping can now proceed to the infrahyoid muscles. The taping technique will depend on the muscle length and need for stability. If the infrahyoid muscles are shortened, palpate the hyoid bone and apply the tape without tension, from the hyoid to the clavicles with the neck in an extended position. One piece of tape is applied at the hyoid and splits into two equal size pieces after passing over the thyroid cartilage. Taping from insertion to origin will stabilize the infrahyoid muscles and allow for elongation and mobilization to be-

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Case by Case...

Refusal to eat in a 2 year old boy with gastroesophageal reflux

- Diagnoses:
1. abnormal chromosome 8
 2. failure to thrive (FTT)
 3. g-tube for all nutrition
 4. chronic runny nose

Initial evaluation:

Oral-motor Skills: Intact structures. Immature oral motor pattern (sucking pattern using his tongue to mash food).

Swallowing: A modified barium swallow study done 4 months before reported trace aspiration of thin liquids.

Gastrointestinal issues: Will has a long history of gastroesophageal reflux and poor eating. At 6 months of age, he had a g-tube placed with nissen fundoplication for poor weight gain. Will was fed 8 ounces of Pediasure 4 times per day by g-tube and was very uncomfortable during feedings. His mother said that he often gagged, retched, and even vomited during tube feedings and that this had been happening since 6 months of age.

Ear, Nose, and Throat issues: constant runny nose and redness around the eyes.

Pulmonary: occasional upper airway congestion.

Behavior: Will refused all foods except occasionally tasting dry salty foods which he usually didn't swallow.

Intervention:

1. **GI Intervention:** Several changes were made to make Will's stomach more comfortable. His formula was changed to Peptamum jr., a hydrolyzed whey protein formula and tube feeds were changed to continuous at night. A Zevex backpack feeding pump was ordered for the patient. He is a small child but very active and the Zevex pump was small enough for him to wear allowing him to be tube fed but still run around. His doctor added zantac to help make the patient's stomach more comfortable.

Result: These changes immediately stopped his gagging and vomiting. The patient tolerated his feedings better and even became more interested in foods. His runny nose got better as did the redness around his eyes. He may have an allergy to milk protein.



2. **Behavioral Intervention:** Will began feeding therapy twice a week to improve his ability to accept foods and swallow them. A structured feeding plan was initiated with a reward for acceptance of bites. This was followed at home by his parents on a daily basis.

Result: Will has responded well to the structured feeding technique. In 3 months, he has gone from taking a dry spoon for a reward to taking 4 ounces of pureed food. His parents practice at home 3 times per day.

3. **Oral-Motor:** The patient used a sucking pattern and often had food stick to the top of his mouth or his teeth while eating. During his structured feeding, lateral placement of purees was used to improve lingual movement.

Result: Will has improved bolus formation and transfer without residue left in the oral cavity.

Follow-up: Will continues to do well in therapy with steady improvement. Now that he is accepting 3–4 ounces per feeding session, we are adding variety (2 different foods per meal) and a cup with a taste on it (to start him accepting a cup with a taste to his lips for a reward). The reward is now given after acceptance of 2 bites of puree, and a dip cup.

Discussion: Will has responded very well to therapy. The key to his improvement with acceptance of foods lies with the changes made to improve the comfort of his GI tract combined with a structured behavioral feeding technique practiced daily at home. His parents are thrilled with his progress, especially because he has spent the last year in oral-sensory therapy with no progress.

It was interesting that Will had a diagnosis of FTT while having a g-tube. Will's sister also has chromosome 8 abnormality and does not have feeding problems but is small. We now think that his small stature is related to the chromosome abnormality but his refusal to eat is not.

Behavioral Treatment of Feeding Problems: Why and How

MaryLouise E. Kerwin, Ph.D. Associate Professor, Department of Psychology, Rowan University, Kerwin@rowan.edu

Why are behavioral treatment approaches used with pediatric feeding problems? Answering this question requires an understanding of factors that cause and maintain feeding problems in children. In the past, research suggested that many feeding problems were caused by, or reflected, difficulties in the parent-child relationship, especially the mother-child relationship. More recent research suggests that some medical factors may have a larger role in contributing to feeding difficulties than previously recognized. While the medical basis for food refusal in a child with esophageal atresia seems obvious, the medical basis for some other feeding problems is less apparent. For example, what medical factors might explain the extremely limited diet of children with autism, or why a cognitively and developmentally typical three year old child will only eat pureed or smooth foods? Researchers are beginning to recognize the role of gastrointestinal function combined with muscle tone, movement and respiratory function on the developing child's feeding.

But what does a growing appreciation of medical factors have to do with behavioral treatment? Children, like adults, use behavior to communicate. Adults who do not want to speak to someone at a party might ignore someone's overtures to enter a conversation. Similarly, if children do not feel comfortable when they eat a certain texture of food, or a certain amount of food, they will likely refuse the food. Most parents, if not all parents, realize that refusal of the food communicates that the child is not interested in eating. In addition, parents know that children are often picky at one meal or another, but that children are supposed to be able to regulate calorie intake for growth if left to their own devices. Armed with this knowledge, most parents appropriately assume that the child is not hungry so they end the meal.

But what if the child's food refusal is not simply a temporary or momentary blip in self-regulation of calories? What if the food refusal indicates something is wrong? How do parents differentiate between the temporary blip and a meaningful signal? Research suggests that most children are picky eaters between three and five years of age, but that they outgrow it. So parents, appropriately so, given their knowledge and understanding, wait it out and remove offending foods from diets and end meals early. But what if the child's eating difficulty is a signal of an underlying medical problem? By the time the underlying problem is diagnosed and treated, the child has gotten into a pattern of refusal that often does not get better even after the underlying



problem has been treated. At this point, the child (and parents) often need to re-learn new ways of feeding through the use of behavioral treatments.

Many behavioral treatment programs for feeding problems are designed to increase food acceptance using positive reinforcement. In these programs, the child is presented with a bite of a non-preferred food. If the child accepts the bite of food, the child gets access to something positive for a brief period of time (e.g., a piece of preferred food or a favorite toy or activity). If the child does not accept the bite of non-preferred food, the bite of food is removed and time elapses (usually 20-30 seconds) before the presentation of the next bite. Occasionally, other components are added to the behavioral program to increase acceptance of non-preferred foods. If other components are added to the behavioral program, the program should be executed and monitored by a certified behavior analyst or similar professional with experience implementing behavioral treatment of feeding problems.

For a parent, following through on behavioral programs for feeding problems can be difficult because it seems so unnatural. However, by the time a behavioral program is implemented, feeding is not fun for the child nor the parents. One purpose of behavioral programs is to connect positive events with acceptance of non-preferred foods. Once this connection occurs, children often begin to spontaneously taste new foods and eat more at family meals. While I may have made it sound easy, the success of most behavioral treatment programs depends on effective and active management of any past or current impediments to eating. In fact, once a behavioral program has been successful, the child's regression or lack of progress may indicate that the child's original, underlying medical problem is no longer managed. In summary, most feeding problems originate from an underlying medical issue; however, once the medical difficulty is identified and treated, the feeding problem often remains, necessitating behavioral intervention.

The Passy-Muir Valve and Swallowing Function

by Debra Suiter, Ph.D., CCC-SLP, Carl T. Hayden Veterans Affairs Medical Center

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Investigators have suggested an association between the presence of a tracheostomy tube and an increased risk of aspiration [1,2,3,4]. The incidence of aspiration in tracheostomized patients has been reported to be as high as 87% [4]. There are several possible explanations for why aspiration occurs in these patients, including: 1) decreased elevation and anterior rotation of the larynx due to anchoring of the trachea to the strap muscles and skin of the neck created by the inflated tracheostomy cuff [3,5,6,]; 2) esophageal wall compression created by impingement of the tracheostomy cuff on the esophageal wall [7]; 3) significant attenuation of the adductor vocal fold reflex resulting from a lack of airflow through the upper airway [8]; 4) gradual decrease in abductor vocal fold activity [8]; and/or 5) reduction in subglottal air pressure [9,10].

Several studies have indicated that placement of a one-way valve, such as the Passy-Muir Tracheostomy Speaking Valve (PMTSV), helps to eliminate or reduce aspiration in tracheostomized patients. Dettelbach, Gross, Mahlmann, and Eibling [11] studied 11 patients with various diagnoses, including central neurologic disease and partial laryngectomy. Each patient completed a modified barium swallow study both with and without the Passy-Muir valve. Patients were given thin liquids, thick liquids, paste consistencies, and/or cookies. Results indicated that all patients exhibited a significant reduction in aspiration when the valve was in place.

Stachler, Hamlet, Choi, and Fleming [12] obtained scintigraphic quantification of aspiration in patients with and without the Passy-Muir valve. The 11 patients in their study were either pre- or post-treatment for head and neck cancer. Scintigraphy was completed in conjunction with a modified barium swallow study. Results were consistent with Dettelbach and colleagues. Although the Passy-Muir valve did not eliminate aspiration for any of the patients, it did appear to significantly reduce the amount of aspiration.

Leder [13] examined the effects of the one-way speaking valve on swallowing function in 20 non-ventilator dependent tracheostomized patients using fiberoptic endoscopy. Subjects were observed swallowing with and without the valve in place. The endoscopic examinations revealed that all subjects who aspirated without the valve in place also aspirated with the valve. All subjects who did not aspirate without the valve also did not aspirate with the valve. The author concluded that the incidence of aspiration was not affected by use of a one-way valve. However, the author did not attempt to quantify the severity of aspiration. Thus, it is not clear if the valve had any effect on swallowing function.

A recent study [14] examined the effects of Passy-Muir valve placement on swallow physiology in non-ventilator dependent patients. Eighteen non-ventilator-dependent patients were examined using videofluoroscopy. Patients completed each examination with and without the Passy-Muir valve in place. Each was given thin liquid and pureed boluses to swallow. Swallows were analyzed for the presence of penetration or aspiration, the severity of penetration-aspiration based on an 8-point scale [15], seven swallow duration measures, hyolaryngeal excursion, and amount of oropharyngeal residue. Results indicated that the Passy-Muir valve significantly reduced the incidence and severity of aspiration. Seventeen of 18 patients who aspirated without the valve in place did not aspirate when the valve was placed. No significant changes in swallow duration measures or hyolaryngeal excursion were noted. The Passy-Muir valve actually increased the amount of residue on the tongue base, on the posterior pharyngeal wall, and at the cricopharynx. Thus, the reason for reduction in aspiration remains unclear.

The specific effects of the Passy-Muir valve on swallow physiology have not been determined. Some believe that the valve may help increase subglottal pressure, which is diminished when the tracheostomy tube is open. Gross, Dettelbach, Zajac, and Eibling [9] measured subglottal air pressure with the tracheostomy tube open and with a Passy-Muir valve in place. Results indicated a ten-fold increase in subglottal pressure during swallowing with the Passy-Muir valve in place as compared with subglottal pressure with the tracheostomy tube open. These authors have suggested that a reduction in subglottal pressure is the main mechanism responsible for the high incidence of aspiration in tracheostomized patients [16].

It is possible that the Passy-Muir valve restores laryngeal and pharyngeal sensation because it allows for the flow of air through the upper airway. Improved sensation should lead to improved swallow safety. The effects of the Passy-Muir valve on laryngeal and pharyngeal sensation have not been studied.

Overall, most reports in the literature indicate that the Passy-Muir valve improves swallow safety. Caution should be used when deciding to feed a patient with a Passy-Muir valve in place, however, as valve placement may increase oral and pharyngeal residue. Clinicians who complete instrumental swallow examinations with tracheostomized patients should include several presentations with the Passy-Muir valve in place before making any decisions regarding the use of the valve as a compensation for reducing aspiration.

Q&A by Joan Arvedson, Children's Hospital of Buffalo

The VFSS debate (This will be 2-part series continuing in the next issue.)

Videofluoroscopic swallow studies (VFSS) is also referred to by other terms, but since Dr. Lefton-Greif and I wrote a book on this topic, I am going to take the liberty of using the term we selected. We came to this after a review of other terms, how descriptive they may or may not be for pediatrics, and how widely interpretable a term may be in this time period. So on to the questions, which you will all know are not likely to have "cut and dried" answers.

Question 1: Do you follow a strict protocol when doing a VFSS or do you vary your approach depending on the child?

The objectives of the VFSS are both diagnostic and therapeutic. I believe that one of the most critical aspects of planning a VFSS is to establish the pertinent questions to be answered in the examination which has a primary goal of delineating pharyngeal physiology that can aid in accuracy of diagnosis, which in turn provides a basis for management considerations. A standard protocol should be used whenever possible, although variations may be necessary. Protocols for adults have been well delineated, but those protocols usually are not directly applicable to infants and young children, or those with special needs. Variations may include changes in positioning, physical consistency of food, order of presentation of food types, method of bolus delivery, bolus volume, and temperature of food (Arvedson & Lefton-Greif, 1998).

The approach may be varied, but it is done in a way to have the best potential for getting maximum information in the shortest possible time. The fluoroscopic unit can not eliminate radiation exposure to the thyroid gland, and possibly the eyes, so one of the ways to protect the child is to minimize radiation exposure time. The child is positioned in a "typical" position initially for a lateral view. If positioning has been established as one of the problems, the child may then have to be positioned in an "optimal" position. The caregiver, usually a parent, and I determine the order of presentation of food and liquid. That is probably one of the most commonly varied parts of the test. I do NOT encourage 7-8 different chewable foods, which is what parents frequently bring. The differences in physiologic function among those fine gradations are not likely to alter decisions about safety of oral feeding with or without adaptations. I do not always start with thin liquid, although I would like to test that consistency early in the study, especially for children who are suspected to have residue in pharyngeal recesses (valleculae and pyriform sinuses) with thick and lumpy food or any other texture. I would prefer to have the pharynx "clean" when the child gets to the thin liquid, which is often perceived as a difficult consistency by clinicians and caregivers. The reality is that I typically ask the parent what the child is likely to take the best and give that first, then a more problematic texture. However, when you suspect that you may have limited tolerance and cooperation from the child, you'd better get the most troublesome texture first since that may be all you will get. There are also instances where a parent will say, "If she takes her bottle first, she won't want anything else." Results are not interpretable in any meaningful way if a child is fussy, crying, or pushing away.

I usually stay with a lateral view only. However, if there is a strong indication or suspicion of asymmetry or perhaps enlarged tonsils, a frontal view may add pertinent information. There are other "online" adaptations that may be needed for children with tracheostomy, those who are ventilator dependent, or those who have severe scoliosis/kyphosis. For example, if a child with a tracheostomy has a speaking valve, but does not always use it at meal time, information obtained (with the valve on and also off) would be helpful for management decisions.

Remember, this study is not intended to simulate a meal time experience, but to gain definitive descriptive and, in some instances, quantitative information about timing, coordination, and strength of swallowing with focuses on oral transit, onset of pharyngeal phase, pharyngeal transit, and entry into the upper esophageal sphincter at a minimum. Of course, one notes chewing skills, where appropriate, and bolus formation, but one should be able to get the pertinent information during a clinical evaluation.

Question 2: Do you add food to your barium?

Yes, although I think of it as adding just enough barium to the food to make a contrast and allow the child to take food as typically as possible. We all know that simply by bringing a child into the radiology suite, we no longer have anything

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Spotlight on Intensive Feeding Programs: The Markus Institute

Pediatric Feeding Disorders Program at the Marcus Institute and Emory University

Address: 1920 Briarcliff Rd.
Atlanta, GA 30329
Phone: (404) 727-9400
Fax: (404) 727-9550
Website: www.marcus.org

Mission: The Pediatric Feeding Disorders Program provides an interdisciplinary approach to the assessment and treatment of feeding disorders. It is one the first to combine medical expertise and behavioral psychology to treat feeding problems.

Clinical Director: Cathleen Piazza, Ph.D.

Medical Director: Amy Pakula, MD

Lead Clinicians: Cathleen Piazza, Ph.D. & Meeta Patel, Ph.D.

Multidisciplinary Team:

- developmental pediatrics
- pediatric gastroenterology
- nursing
- behavioral psychology
- feeding therapists: clinical specialists and behavior data specialists
- nutrition
- occupational therapy
- social work and support services

Structure of the Program

CONTINUUM OF SERVICES: The program provides services to children from birth to age 21. Diagnoses include (but are not limited to) failure to thrive, developmental disabilities, gastroesophageal reflux, prematurity, delayed gastric emptying. Each child moves through the continuum based on his or her individual needs.

FEEDING CLINIC: The child and family attend a two-hour evaluation in which the team (a) obtains a medical history and physical, (b) observes child and family interactions during mealtime, (c) assesses the child's oral motor status, (d) obtains nutritional information, and (e) assesses the family's ability to participate in the program.

DAY TREATMENT PROGRAM: For children whose feeding problems require daily intensive therapy, but who do not need around-the-clock medical supervision. The child attends the program Monday through Friday from 8:30 a.m. to 5 p.m. The program involves intensive feeding sessions of three to five meals per day (4-5 hours of feeding therapy); medical and nutritional monitoring; and caregiver training and support. The program is approximately eight weeks.

OUTPATIENT PROGRAM: For children who graduate from the day treatment program or for children whose feeding problems could be treated through less intensive therapy. During these sessions, the parent reports on the child's progress at home. Relevant team members provide feedback. The parent and child also may practice the feeding techniques recommended by the team. Parents are expected to maintain records on the child's feeding behaviors and use the recommendations at home discussed during the session.

Admission Process: All patients who are admitted to either the day treatment or outpatient program must be evaluated in the feeding clinic and have a referral from a physician. Once a referral has been obtained, the patient will be scheduled for the feeding clinic. We currently treat 6 day treatment patients at a given time. This number will increase to 10 when we move to our new facility. There is a waiting list for the day treatment and outpatient programs, but this fluctuates month to month.

Cost: The cost for day treatment is approximately \$900-\$1000 per day. The cost for outpatient treatment is between \$150-\$200 per hour. Insurance companies generally cover services.

The Facility: Currently, the Markus Institute is a 35,000 sq. foot office building located 3 miles north of Emory University in Atlanta, GA. The Marcus Behavior Center comprises approximately 83% of the Markus Institute and houses a specialized physical plant including 4 padded treatment rooms with one-way observation, 9 additional treatment rooms with one-way observation, 2 adapted classrooms, 3 medical exam rooms, 1 nurses station, and 3 play rooms. The Center is equipped with 2 specialized pantries. Housing for families is not provided on-site. If families are coming from out of town they may stay in nearby hotels or apartments. Discounted rates may be available at local hotel/apartments through their corporate relations department.

Feeding Schedule: Patients are scheduled for 3-5 meals per day (4-5 hours of feeding therapy/day). Food is provided for all feeding sessions. However, parents are required to bring food during the first day of admission. We present foods that can be heated in a microwave or conventional oven. Families may opt to bring food items from home, if they would like their child to eat specific foods that are not available in our pantry. Tube feedings will be administered during regularly scheduled times. Tube feedings are not decreased/eliminated until the child is consistently eating some volume by mouth.

Caregiver Involvement: Caregiver training and participation is a critical component of the program. Generally, caregivers will feed the child for the first few days of the admission; however, after the first few days the therapists will begin to conduct all feeding sessions. This gives the therapists an opportunity to assess the child's feeding problem. Caregivers are encouraged to observe all feeding sessions through the one-way mirror. Once an appropriate treatment has been developed, the therapists will begin to train all caregivers to implement the feeding treatment. The therapists will also train teachers or other feeders during the admission as well. During the last week of admission, the therapists provide additional training to the family and teachers in the child's home and school.

Outcome: The Pediatric Feeding Disorders Program achieves a high degree of success with its patients. Over 86% of patients' feeding problems have been resolved or significantly improved by the time of discharge. In addition, the majority of children once dependent on supplemental feedings, are discharged independent of tube feedings, or dependent for less than 30 percent of nutritional or fluid needs. The majority of patients maintain their gains and continue to improve during follow-up.

Follow-up: All patients who are admitted to the day treatment program continue services in the outpatient program. Initially, patients receive treatment once a week but as the child begins to progress, visits are decreased to once every 2 weeks, once a month, every 3 months, every 6 months and so on. The level of follow-up we provide depends on the child's progress. Follow-up services are provided until the child exhibits

Q&A by Joan Arvedson, PhD. continued

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typical even when a parent continues to be present and does the feeding. There is no way that one can simulate 100% exactly what the child takes anyway. Even a minimal amount of barium sulfate in whatever form is used is going to change the "product." There is some controversy about whether aspiration on barium sulfate mixed with food is more problematic to pulmonary status than barium contrast alone or just mixed with water. Data are needed in infants and children. It would also help to know if children do respond more readily when they get their own food, even if "tainted" with barium sulfate, than those for whom the contrast would be introduced in more controlled ways as in most adult studies.

My clinical experience with children and their families over the past 15 years in relation to this question is that parents feel that what they see on the imaging study more closely reflects what their child does and what their concerns are if they can bring their own food. We, meaning all of us, need to collect data on our patients so we can be more evidence based in our practice.

Question 3: What do you view during the test?

The focus is on the pharynx, with tongue in view anteriorly, soft palate posteriorly and superiorly while trying to avoid the orbits of the eyes (tough with moving targets), posterior pharyngeal constrictors, and the hypopharynx and upper esophageal sphincter inferiorly in the lateral view. The coning should remain constant for most of the study. I encourage one "pass" as a bolus is moving through the esophagus down to the lower esophageal sphincter. This view allows for a basic statement about esophageal transit, making clear it is not an indepth study of esophageal function. In children with a fundoplication, the lower esophageal view adds particularly important information about intactness and/or tightness of the fundoplication. Some children who describe food getting stuck or are suspected of having dysphagia for solids will also show slow esophageal transit or perhaps an area of obstruction. The view of the esophagus is screening for this VFSS, although the total study is diagnostic evaluation. If something is found that "flags" another problem, the child would be referred for the appropriate diagnostic procedure.

Arvedson, J.C. & Lefton-Greif, M.A. (1998) *Pediatric Videofluoroscopic Swallow Studies: A professional manual with caregiver guidelines*. San Antonio, TX: Communication Skill Builders, a division of Psychological Corporation.

On the Research Front.....

Newman, LA, Keckley, MA, Peterson, MC, & Hamner, A. Swallowing function and medical diagnoses in infants suspected of dysphagia. *Pediatrics* 2001; Dec, Vol 108, no. 6.

Objective : To examine swallowing function in infants with suspected dysphagia. Babies with suspected swallowing problems were referred for modified barium swallow studies.

Methods: 43 infants were looked at during modified barium swallowing studies. Swallowing was looked at to determine how many infants had laryngeal penetration, aspiration (and the response to aspiration), or nasopharyngeal backflow and why this happened. The infant's medical diagnoses were looked at to see if diagnoses that are alike might cause the same kinds of swallowing problems.

Results: More than half of the babies had some penetration, aspiration, and nasopharyngeal backflow. However, this didn't happen until after the infant had already taken several swallows. Most infants had silent aspiration. However, all the babies were able to clear their airway after laryngeal penetration. Babies born prematurely had more liquid go

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gin to occur in the suprahyoid muscle. Stabilizing the hyoid bone and extending the neck can elongate the suprahyoid muscles. However, this must be done with extreme caution due to the hyoid position and the sensitive circulative structures in this area.

With progressive mobilization and taping, the ventilatory and oropharyngeal motor patterns must be observed to monitor changes and the patient's ability to adapt and utilize the changes. Movement experiences using the new muscular mobility and alignment should be increased to integrate the changes into postural alignment and movement patterns. Frequent reassessment is required to insure that the releases/mobility that is obtained is integrated appropriately with improved postural alignment and not resulting in fixing or abnormal stabilization patterns.

Once treatment has progressed to this point you are ready to begin intensive intra-oral work for lingual mobility and control. Working inside the mouth before having the musculoskeletal alignment and stability to support it will result in limited improvement and continued use of immature patterns. Kinesio Taping techniques can add a new dimension of consistency and integrated progress for your patients with dysphagia and oral motor dysfunction.

For more information on Kinesio Tape including articles and training courses log onto:
www.kinesiotape.com.

The Passy-Muir Valve and Swallowing Function

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.On the Research Front.....



(Continued from page 8)

into their noses than full term babies.

Conclusion: This study showed that most infants who were thought to have a swallowing problem showed some type of abnormality during their MBSS. The problems tended to happen after the child started eating and not in the first few swallows. Therefore, when a child has this kind of test, it should last long enough to see several swallows. Also, because many of the babies had silent aspiration, it would be difficult to tell if the baby was having a problem just by watching them feed without a MBSS.

Thoughts: So far, there are no studies that look at the typically developing infant swallow. This type of investigation is exciting because there is so little research being done on babies and swallowing. This study suggests that infants who were having medical problems and suspected of having swallowing abnormalities did have abnormal swallows. The authors can hypothesize the reasons behind abnormal swallowing but at this point we do not know. In fact, laryngeal penetration in the infant is thought to be a normal occurrence by many doctors and therapists.

To alter a child's diet is an important decision and it's crucial to look at the child's overall health and breathing history (pneumonias, bronchitis, congestion, asthma), as well as the information gathered from a swallow study when thinking of making changes. Infants and children need to practice swallowing to develop their skills. The decision to change a child's diet is a serious one and should only be made after careful consideration.