The Stacking Model
Physiological, Motor & Behavioral Aspects of Feeding Therapy
Melanie Potock, MA, CCC-SLP

www.mymunchbug.com

ASHA Financial Disclaimer
- Melanie Potock owns 3 companies:
  - Chatter Bug LLC (therapy services)
  - My Munch Bug LLC (seminars/products)
  - Parenting in the Kitchen LLC (online parent and professional training)
- Melanie has received an honorarium for presenting this course today.
This is a BIG DEAL.

Four Foundations for Eating

1. Gastrointestinal Comfort & Physiology
2. Balanced Sensory Processing
3. Age Appropriate Gross & Fine Motor Skills
4. Positive Behavior

Consider the Whole Child

- Team of Experts
  - Pediatrician
  - GI
  - Allergist
  - Genetics
  - Cardiac Care
  - OT, PT, SLP, Oral Facial Myologist
  - Registered Dietician
  - BCBA
  - Child Psychologist
  - Teacher or Daycare Provider
  - Alternative Care
Stacking: How Feeding Disorders Develop

- Learned Behaviors
- Motor Skills
- Physiology
  - Includes Sensory Processing

Stacking: Physiology

- Physiology
  - Includes Sensory Processing

So what’s “normal”?

- Physiology
  - Includes Sensory Processing
Normal Growth in Children: Weight

<table>
<thead>
<tr>
<th>Age</th>
<th>Growth Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 4 months</td>
<td>1 ½ lbs. per month</td>
</tr>
<tr>
<td>4 to 10 months</td>
<td>1 lb. per month</td>
</tr>
<tr>
<td>10 to 24 months</td>
<td>½ lb. per month</td>
</tr>
<tr>
<td>2 to 8 years</td>
<td>3 to 4 lbs. per year</td>
</tr>
</tbody>
</table>

- Paul Desrosiers, M.D. Pediatric Endocrinologist, Arnold Palmer Hospital for Children Women

Normal Growth in Children: Height

<table>
<thead>
<tr>
<th>Age</th>
<th>Growth in Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 6 months</td>
<td>7 to 10 inches per year</td>
</tr>
<tr>
<td>6 to 12 months</td>
<td>6 to 7 inches per year</td>
</tr>
<tr>
<td>1 to 2 years</td>
<td>4 to 5 inches per year</td>
</tr>
<tr>
<td>2 to 3 years</td>
<td>3 to 4 inches per year</td>
</tr>
<tr>
<td>3 to 4 years</td>
<td>2 to 3 inches per year</td>
</tr>
<tr>
<td>4 to 10 years</td>
<td>2 inches per year</td>
</tr>
</tbody>
</table>

- Paul Desrosiers, M.D. Pediatric Endocrinologist, Arnold Palmer Hospital for Children Women

When Kids Don’t Grow

Failure to Thrive
FTT often used as a general, non-diagnostic term to describe a child with deficiencies in weight and height as compared to age related norms.

- 779.34 (FTT infancy/ICD-9) or P92.6 (ICD-10)
  - Under 28 days old

In the first year of life, 60-80% of children with FTT will have an organic etiology. [http://www.magicfoundation.org/www/docs/176/]

May also affect:
- Head circumference,
- Age appropriate motor skills
- Cognition

Non-organic vs. organic processes:
- These percentages may not be so clear cut.

Primary Growth Deficiencies
- Onset during pregnancy
  - Skeletal dysplasia
    - (e.g. Achondroplasia, Osteogenesis Imperfecta)
  - Chromosomal problems
    - (e.g. Turner Syndrome, Down Syndrome)
  - Dwarfism syndromes
    - (e.g. Russell-Silver, Cornelia de Lange, etc.)

Paul Desrosiers, M.D. Pediatric Endocrinologist, Arnold Palmer Hospital for Children Women
Organic FTT: Etiology (cont.)

- Secondary Growth Deficiency
  - Before Birth
    - Maternal high blood pressure, cigarette smoking, alcohol or drug use, seizure medicine use (Dilantin) or maternal infections/viruses
  - After Birth
    - Organic
      - GI Disorders/Diseases
      - Heart, Kidney, Liver Problems
    - Non-organic
      - Paul Desrosiers, M.D. Pediatric Endocrinologist, Arnold Palmer Hospital for Children Women

Non-Organic FTT

- The lag must be related to environmental disruption and must improve when the disruption is eliminated.
- By definition, there must be an absence of organic disorders to explain these deviations.

Non-Organic FTT: Etiology

- "An interactional disorder in which parental expectations, parental skills, and the resulting home environment are intertwined with the child's developmental capabilities."

Malnutrition due to inadequate calories, poor feeding techniques, emotional deprivation and even improper mixing of formula.
Feeding Disorders and Physiology: How to Take the FUN out of Function.

Food Allergies vs. Intolerances

IgE  IgG

Spit-up Happens.

- Gastroesophageal Reflux (GER)
  - "...the backwashing of stomach contents into the esophagus and throat during or after a meal."
  - Reflux 101, Jan Gambino, M.Ed. p. 9.
- NOT a disease
- GER in infancy is common
  - Poor trunk control in infancy
  - Stomach does not expand like adult’s
  - Lots of time lying down with full tummies
  - Short esophagus compared to adult’s
  - Reflux 101, Jan Gambino, M.Ed. p. 10.
GER - Causes

- LES Relaxation
- Poor Motility
- Immature Neurological System
- Over-Eating
- Hiatal Hernia
- Gastroparesis
- Food Intolerance/Allergy
- Constipation

Oh, My Tummy Hurts!

- **Shooter Marble** = Approximate stomach capacity of a newborn on Day 1
- **Ping Pong Ball** = Approximate stomach capacity on Day 3
- **Extra-Large Chicken Egg** = Approximate stomach capacity on Day 10
- **Softball** = Approximate stomach capacity of an adult

Gastroesophageal Reflux Disease (GERD)

- Defined as “...symptoms or complications of Gastroesophageal Reflux. Clinical manifestations of GERD in children include vomiting, poor weight gain, dysphagia, abdominal or substernal pain, esophagitis and respiratory disorders”

  - North American Society for Pediatric Gastroenterology, Hepatology and Nutrition (NASPGHAN)
Which is It?

**Infant GER**
- Normal condition
- Resolves during infancy
- Symptoms include regurgitation and vomiting
- Testing not needed
- Treatment is supportive and may include homecare

**GERD**
- Common childhood disease
- Chronic condition
- Symptoms cause complications
- Testing – may be needed
- Treatment may include:
  - Homecare
  - Diet changes
  - Medication
  - Surgery

What You Might Observe…

- Bad breath
- Weight loss
- Coughing
- Hoarse voice
- Stridor
- Drooling
- Hunger, then resisting feeding – typically after 2 oz.
- Sandifer’s Sign/Syndrome
- Arching/Extension during or after feeding
- Restlessness/Crying/Fussing during feeding

Eosinophil (E-o-'si-n-o-'nil)

**Associated Disorders**
- Rapidly emerging as a healthcare problem worldwide
- ICD-9 530.13 or ICD-10 K20.0
  - Eosinophilic Esophagitis (EoE is preferred term.)
- ICD-9 535.7 or ICD-10 K52.81
  - Eosinophilic Gastritis (EG)
- ICD-9 558.42 or ICD-10 K52.82
  - Eosinophilic Colitis (EC)
Quick Facts (www.apfed.org)

- Eosinophil: a type of white blood cell associated with allergies, parasites, and cancers
- What are Eosinophil Associated Disorders?
  - High numbers of eosinophils accumulate in body tissues causing inflammation and damage
  - Classified by body tissue where eosinophils accumulate
  - Diagnosed and monitored by tissue biopsies
  - Chronic diseases requiring long term treatment, with no known cure
  - Debilitating diseases leading to missed work, school, social outings
  - Delays in diagnosis are common

Eosinophilic Esophagitis (EoE)

- “Causes inflammation and damage to the esophagus, affecting the ability to eat”
- Estimated prevalence >1 per 2000
- Increase in new cases (2 – 10 fold) over the past 10 years
- Treatment may include limited diet, steroids and/or feeding tube
  - www.apfed.org

Emmett: Eosinophilic esophagitis
Moments later…

Food Protein-Induced Enterocolitis Syndrome (FPIES)

- A disease of infants and young children
- Symptoms typically only consist of gastrointestinal symptoms.
  - No hives, swelling or itching visible “outside”
  - No respiratory symptoms (runny nose, sneezing, coughing, or wheezing)
  - Traditional allergy tests (IgE) = negative

FPIES

- Timing of Symptoms
  - Occur shortly after consuming the culprit food
  - Vomiting starts within 2 hours after eating the causative food and diarrhea typically starts within 5 hours
  - Symptoms are SEVERE
    - Vomiting and diarrhea causes low blood pressure and dehydration
    - Child can go into shock
    - Monitoring in Emergency Room
      - Steroids
      - Intravenous Fluids
      - Daniel More, MD at about.com
To see how severe, watch little Jack.

http://www.youtube.com/watch?v=24nHsxopOyw

FPIES

- Typically, resolves around age 3
- Until then:
  - Breast milk (often with mother on special diet) or hydrolyzed casein infant formulas
  - Typically, no:
    - Milk
    - Soy
    - Oats, Rice or Barley
    - Legumes
    - Poultry
  - Unfortunately, many other foods, depending on child

Physiology that Impacts Motor Skills

- Tethered Oral Tissues
  - Tongue Tie
  - Upper Lip Tie
What’s a “Normal” Tongue Tie?

Tongue Tie (Ankyloglossia)

- The International Affiliation of Tongue-tie Professionals defines tongue-tie as:

Understanding the Language of Tongue Tie and Lip Tie

- Frenum or Frenulum
  - Pronounce with short or long E

- Release of Tongue Tie
  - Frenotomy: to cut frena
  - Frenectomy: to remove part of tissue of frena
  - Frenoplasty: to change tissue of frena

American Academy of Pediatrics

- 4 Types: How closely attached is the tongue tip and the leading edge of frenulum?
- Type 1:
- Type 2:
- Type 3:
- Type 4:

Kotlow Dx Criteria
Kidsteeth.com

Tonguetie.net
Lip Tie

- Upper Lip Tie (ULT)

Dr. O’Callahan and colleagues (2013) found that 37% of babies with tongue tie also had a current ULT.


What’s “Normal” Lip Tie?

ULT: Kotlow Kidsteeth.com
Know HOW to Examine Kidsteeth.com

What are We Looking For? Tongue Tie

- Heart Shaped Tongue – sometimes!
- Where does the frenum attach?
  - Floor of mouth – ideal
  - Lower alveolar ridge – tongue tie
  - Submucosal – tongue tie
- How long is the “free” section of frenum?
- How elastic and pliable is it?

What Might be Observed: Tongue Tie
What Might be Observed: Lip Tie

- Limited mobility of upper lip

ASHA Position Statement

The decision to clip the frenulum is a medical decision made by physicians and is not in the scope of practice for speech-language pathologists. The SLP may play an evaluation and treatment role from a speech, feeding or swallowing standpoint, but ultimately the decision—as it is a medical procedure—is up to the physician.

ASHA July 2015

Sensory Processing

Includes Sensory Processing

Physiology

Includes Sensory Processing
Sensory Integration

- Sensory Integration difficulties
  > “...the ability to take in information through senses (touch, movement, smell, taste, vision and hearing), to put it together with the prior information, memories and knowledge stored in the brain, and to make a meaningful response”
  > Linda C. Stephens, MS, OTR/L

- “Sensory Processing Disorder”
  > Lucy Jane Miller, Ph.D., OTR (STAR Center, Denver)

Sensitivity Secondary to Medical Interventions

How Does SI Impact Eating?

- Seven Senses
How to Eat an Orange

“How sensory integration puts it all together. Imagine peeling and eating an orange. You sense the orange through your eyes, nose, mouth, the skin on your hand and fingers, and also the muscles and joints inside your fingers, hands, arm and mouth...All the sensations from the orange and all the sensations from your hands and fingers somehow come together in one place in your brain” which allows you to make decisions on how to peel and eat the orange.

- Dr. A. Jean Ayres

Young Explorers

- Oral exploration

Kids STOP Exploring Due To…

- Orofacial Myofunctional Disorders
- GERD
- Medical Issues/Interventions
- Food Allergies/Intolerances
- Behavior Challenges
- Sensory Difficulties
- Delayed Motor Skills
Importance of Getting Messy

“We told her to STOP playing with her food and just EAT it!”

Stacking: Motor Skills

Motor Skills

Physiology

Includes Sensory Processing
Age Appropriate Gross Motor Skills

- 6 Months

Stability means...

- Assurance
- Adherence
- Backbone
- Balance
- Cohesion
- Constancy
- Dependability
- Determination
- Security
- Soundness
- Steadfastness
- Steadiness
- Strength
- Support

What Happens at the Hips...

- Lips
- Cheeks
- Tongue
- Jaw
- Neck
- Shoulders
- Trunk
- Knees
- Ankles

The Stacking Model
Just one example...
What senses do we need?

Perfection!

Standard High Chair - Adaptations
Spinal Muscular Atrophy 2 (SMA2)

Kids always seek out a way to be stable!

♫ Head, Shoulders, Trunk & Hips ♫
Fine Motor Skills Include…

**Oral Motor Skills**

Oral Motor Development is always rooted in Gross Motor Development

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Stack Two: Oral Motor Skills

**Motor Skills**

**Physiology**

Includes Sensory Processing

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Intro to Swallowing…Suckling.

- **Infants**
  - Suckle
  - Anterior/posterior movement
  - Stimulated by touch receptors in lips and back of mouth
  - Process: "Sealing and unsealing the back third of the tongue to extract liquid from breast or bottle."

  > Diane Bahr, MS, CCC-SLP
  > Nobody Ever Told Me (or my Mother) That!
**Mature Swallow**

- Babies develop a mature swallow at 1 year
  - Reflexive suckling/sucking integrates between 6 and 12 months. Limit "dream feeding!"
- Tip of tongue elevates to alveolar ridge
- Lateral margins elevate
- Wave-like motion from tip to posterior
- A mature swallow is a clean swallow

**Tongue Thrust**

- Mild to significant
- Protraction – retraction pattern
- Pumping motion
- Food spreads and/or moves forward

**Tongue thrust can co-exist with...**

- Mouth breathing
- Short, upper lip
- High, narrow palate
- Open-mouth chewing
- Closed-mouth chewing
- Inability to swallow pills
- Snoring
- Allergies
- Large tonsils/large adenoids
- Lip licking
- Angle of jaw line
- Drooling
- Milk moustache
- Hyperactive gag
- Dental malocclusion
- Thumb/finger sucking
- Short lingual frenulum
- Neurological problems
- Developmental problems
Orofacial Myofunctional Disorder

- Atypical muscle movements of the mouth and face

- May affect:
  - teeth alignment
  - speech development
  - physical appearance
  - feeding skills

Katie

Katie: age 3

The Stacking Model
To Develop a Mature Swallow

- Master straw drinking between 9 to 12 months
  - Shorten straw as soon as possible
- Step away from the sippy cup!
- Pacifiers: Blue Soothies
  - Limit paci to bedtime after age one
  - Pacifier Fairy visits by age 2 (at the latest)
- Thumb sucking
  - Limit after age 1
  - Stop by age 3

How Kids Develop Any Kind of Skill

"Positive Practice X Rate of Maturation"

Peggy Eicher, MD
Hanging in there? Questions?

Stacking: Learned Behaviors

Creating Positive Behaviors around Food

- Worth Repeating! First, always support:
  - GI comfort & physiology
  - Balanced sensory processing system
  - Age appropriate motor skills

- Second, observe and identify:
  - The relationship between the child’s behavior and those factors that influence that behavior
The Principles of ABA: Family Dynamics

What is ABA anyway?

- 3 characteristics
  - **Applied** = the behaviors targeted for change are those that are APPLIED to real-life applications.
  - **Behavior** = Not "some abstract diagnosis" but based on scientifically established principles of learning.
  - **Analysis** = Based on objective data to determine what effect, if any, the intervention is having on behavior.

  - Albert J. Kearny, 2008

B. F. Skinner

- **Contingency of Reinforcement**
  1. "An occasion upon which behavior occurs"
  2. "The behavior itself"
  3. "The consequence of the behavior"

  - Skinner, 1968
ABC

- Antecedent: a stimulus that is already in place before the target behavior occurs. Often, this is what cues the behavior.
- Behavior: may be desired or undesired
- Consequence: usually occurs immediately after the target behavior

Consequences & Consistency

- If consequences are consistent, or at least occur with some regularity, they will have an impact on how frequently the behavior occurs.
- Operant Conditioning: the underlying principle of ABA and consistent consequences.
  - Albert J. Kearney

Behavior

“If a dead man can do it...”
- Ogden Lindsley
When it works, ‘cause you can’t help but do it right.

Examples:
- Grocery store meltdowns
- Food jags

When it doesn’t work: When there is no consistency.

“You Must Unlearn What Your Have Learned”
Wait for it…

Faith – “unlearning” via ABA

Want to understand more about ABA and Feeding Therapy?

Please attend:

Feeding Therapy: It’s Not Just about Swallowing and Case Studies and Problem Solving

Course Calendar on My Munch Bug.com
Making Sense? Questions?
Teaching Open Cup and Straw Drinking

REVISITING Stack Two: Oral Motor Skills

Motor Skills

Physiology

Includes Sensory Processing

Step Away from the Sippy Cup!

- Except for when it’s recommended due to aspiration or other medical concerns.
- Or for a short time – if you want to.
- But, it’s not part of the developmental process.
- May influence palate formation, developing a mature swallow pattern and other oral myofunctional concerns if used for prolonged periods.
- ASHA (ashasphere) 1/9/2014 Potock
- Straw drinking at 9 months if developmentally ready. (Remember, what is feeding?)
Straw Drinking 101

Criteria before Teaching Straw Drinking

Spoon-feeding with ease, either self-feeding or with parent presenting the spoon.

Steps to Teach Straw Drinking

See handout
Baby P: 6 months, 3 weeks old

Baby P: one week later

What Straw?
One Year Later

Sucky Cups

Bionix SafeStraw™
Almost an Open Cup…

Teaching Open Cup Drinking

Prep: Open Cup Drinking

- Glass “baby food” jar
  - Coban™ around it for added grip (optional)

- Fill with H2O to bottom of “threads”
  - Add splash of color (e.g. Orange Juice)
Chaining: Open Cup Drinking

- Teach 1st Link to Chain
  - Lift up, set down, stay dry
- Add 2nd Link
  - Threads to lips, sip
- Add 3rd Link
  - Set on “tummy” Most Kids Miss This Step
- Add 4th and final Link
  - Set on table

REVISITING Stack Two:
Fine & Oral Motor Skills

Motor Skills

Physiology

Includes Sensory Processing

Teaching
Self-Spoon Feeding
**Spoons: Different Types for Different Tykes**

![Spoons Image]

**Numnumdips.com**

![Numnumdips Image]

**Dip, Dip, Dip!**

- Nut butter thinned with yogurt and a little honey (if over one year of age)
- Nut butter and a jar of banana puree
- Cottage cheese, ricotta cheese or cream cheese thinned with plain yogurt
- Soups plus potato flakes
- Ricotta in the blender with applesauce and banana puree
- ANY veggie/fruit puree plus “thick” calories
Textures: Different Strokes for Different Folks

Baby Dipper

Jacob
Finger Feeding

- Baby Led Weaning: A Developmental Perspective
- How Kids First Explore Food
- The Importance of Getting Messy
- Pincer Grasp Development
  - Strategies

Top Tips for Developing Fine Motor Skills for Finger Feeding

First, always establish stability!
- Pincer Grasp – Cheerio® Therapy

- Chewing Skills

Questions?
Bon Appétit! Thank You!