

## Galactosemia and speech disorders: What you can do to help your preschool or elementary school age child

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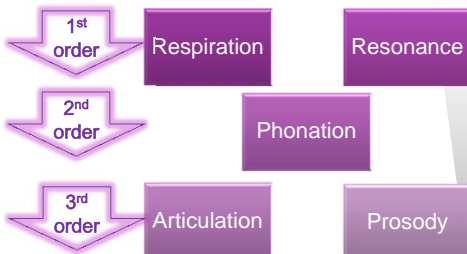
## What we will learn

1. Brief overview of treatment
2. Vocal Exercises-a treatment for voice
3. Dynamic Tactile Temporal Cueing-a treatment for speech



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## Hierarchy of subsystem treatments



"First order should be top priority. Do not treat 2nd or 3rd order levels until those on the first order are treated to criteria. Tx of the 1st order systems can be conducted simultaneously, when they are indicated and feasible" Dworkin, 1991, p. 31

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## Assessing articulation/phonology

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## Intelligibility & Comprehensibility

### 1. Intelligibility

- Degree to which a listener understands speech without seeing the speaker

### 2. Comprehensibility

- Degree to which a listener understands speech when you can see the speaker

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## Intelligibility – What's normal?

Lynch, Brookshire & Fox (1980), p. 102

### % UNDERSTOOD BY PARENTS:

- Child aged 1;6 = 25% intelligible to parents
- Child aged 2;0 = 50-75% intelligible to parents
- Child aged 3;0 = 75-100% intelligible to parents

### % UNDERSTOOD BY STRANGERS:

- Child aged 1;0 = 25% intelligible to strangers
- Child aged 2;0 = 50% intelligible to strangers
- Child aged 3;0 = 75% intelligible to strangers
- Child aged 4;0 = 100% intelligible to strangers

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### Intelligibility: 7 point rating scale

1. No noticeable differences from normal.
2. Intelligible though some differences occasionally noticeable.
3. Intelligible although noticeably different.
4. Intelligible with careful listening although some words unintelligible.
5. Speech is difficult to understand with many words unintelligible.
6. Usually is unintelligible.
7. Unintelligible

<http://faculty.washington.edu/21-1000-D-Galactosemia-and-Speech-Disorders-Potter/552/>

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### Treatment

For improving speech, including childhood apraxia of speech and childhood dysarthria

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### 3 papers in JSLHR addressing neural plasticity

This paper is the foundational information on neural plasticity and rehab

#### Principles of Experience-Dependent Neural Plasticity: Implications for Rehabilitation After Brain Damage

SUPPLEMENT

Jeffrey A. Kleim  
McKnight Brain Institute, University of Florida,  
Gainesville, and Brain Rehabilitation  
Research Center, Malcolm Randall  
VA Hospital, Gainesville

Theresa A. Jones  
University of Texas at Austin

Purpose: This paper reviews 10 principles of experience-dependent neural plasticity and considerations in applying them to the damaged brain.

Method: Neuroscience research using a variety of models of learning, neurological disease, and trauma are reviewed from the perspective of basic neuroscientists, but in a manner intended to be useful for the development of more effective clinical rehabilitation interventions.

Results: Neural plasticity is believed to be the basis for both learning in the intact brain and recovery after brain damage. This paper advances understanding of experience-dependent plasticity and its implications for rehabilitation.

Conclusion: This paper provides a conceptual framework for understanding experience-dependent plasticity and its implications for rehabilitation.

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### Principles of experience-dependent plasticity

1. **Use It or Lose It**  
Failure to drive specific brain functions can lead to functional degradation.
2. **Use It and Improve It**  
Training that drives a specific brain function can lead to an enhancement of that function.
3. **Specificity**  
The nature of the training experience dictates the nature of the plasticity.
4. **Repetition Matters**  
Induction of plasticity requires sufficient repetition.
5. **Intensity Matters**  
Induction of plasticity requires sufficient training intensity.

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### Principles of experience-dependent plasticity

6. **Time Matters**  
Different forms of plasticity occur at different times during training.
7. **Salience Matters**  
The training experience must be sufficiently salient to induce plasticity.
8. **Age Matters**  
Training-induced plasticity occurs more readily in younger brains.
9. **Transference**  
Plasticity in response to one training experience can enhance the acquisition of similar behaviors.
10. **Interference**  
Plasticity in response to one experience can interfere with the acquisition of other behaviors.

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### Treating respiration

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### Expiratory muscle conditioning in children with low muscle tone and reduced vocal intensity

- 10 subjects (ages 8-14 yrs) with speech impairment
- Wore a face mask fitted with a resistor (2.5-7.5 cm H2O) 15 min a day, 5 days a week for 6 weeks.
- Expiratory muscle strength increased by 69%
- Subglottal pressure increased by 40%
- Sound pressure level improved at 2 weeks by 19%
- Conditioning the expiratory muscles with a face mask can improve respiratory muscle function and vocal performance in children with voice impairments related to low muscle tone.

Cerny FJ, Panzarella, KJ, & Stathopoulou E. (1997) Expiratory muscle conditioning in hypotonic children with low vocal intensity. *Journal of Medical Speech-Language Pathology*. 21-1000 D Galactosemia and Speech Disorders - Potter

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### Work on inhalation or exhalation?



<http://www.alimed.com/the-breather-1000> 21-1000 D Galactosemia and Speech Disorders - Potter

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## CHEST

Official publication of the American College of Chest Physicians



### Impact of Expiratory Muscle Strength Training on Voluntary Cough and Swallow Function in Parkinson Disease

Teresa Pitts, Donald Bolser, John Rosenbek, Michelle Troche, Michael Okun and Christine Gajdoska  
Chest. Prepublished online November 24, 2009; DOI 10.1378/chest.06-1389

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### Treating phonation

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### Treating respiratory and phonatory support

#### Sample protocol for vocal exercises

1. Sustained /ah/ x 10-15
  - Long as possible with good voice
  - Say "That was loud & long!"
2. Low to high glides /ah/ x 10-15
3. High to low glides /ah/ x 10-15
4. Imitate 5-10 functional words/phrases x 10
5. Tx: 4x/week for 4 weeks
6. Homework: 1x/day

Radio Shack sound meter



### Treating articulation

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## Treating articulation -EPG

completespeech.com

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## Ultrasound-EPG

Research

The Use of Ultrasound in Remediation of North American English /r/ in 2 Adolescents

Marcy Adler-Bock  
Barbara May Bernhardt  
Bryan Gick  
Pamela Escalvali  
University of British Columbia,  
Vancouver, British Columbia, Canada

Purpose: Ultrasound can provide images of the tongue during speech production. The present study set out to examine the potential utility of ultrasound in remediation of North American English /r/.  
single words and some phrases. Acoustic analysis showed an expected lowering of the third formant after treatment. A qualitative observation of posttreatment ultrasound images for accurate tongue shapes to be more

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## Treating articulation & prosody

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## Treating CAS

1. Dynamic Tactile Temporal Cueing (DTTC) (Strand et al., 2006)
2. Integral Stimulation Approach (Rosenbek et al., 1973)

- Originally designed for adults with acquired apraxia of speech
- Varies the temporal relationship between the clinician's model of the utterance and the child's response
- Allows the child to take increasing responsibility for assembling and retrieving motor plans while progressively decreasing the cueing

Caruso & Strand, 1999

### Dynamic Tactile Temporal Cueing (DTTC)

	Clinician	Client
1	Produce target utterance simultaneously with client	Produce target utterance simultaneously with clinician
2	Produce target utterance, then mouth while client produces it	Produce target utterance after clinician, while clinician mouths it
3	Produce target utterance without other cues	Repeat clinician's production-varying delay between model and response
4	Produce target utterance without other cues	Repeat clinician's production several times-varying delay between model and response
5	Present written target utterance on a card	Read target utterance from card presented
6	Present written target utterance, then remove	Produce target utterance after card has been removed
7	Ask client question to prompt target utterance	Respond to question with target utterance
8	Incorporate target utterance into role-playing	Produce target utterance volitionally during role-play

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### Dynamic Tactile Temporal Cueing (DTTC)

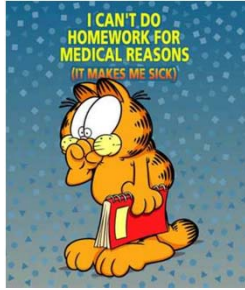
#### Stimulus Selection

- Severe motor planning deficits
  - ↓
  - 5-6 words/utterances
- Moderate motor planning
  - ↓
  - 8-10 words/utterances
- Primarily phonological deficits-
  - ↓
  - 10-15 words/utterances

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## Helpful Homework Hints

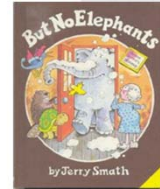


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## But NOT on Tuesday...

1. Tell child, "One day/week DO NOT do speech homework. Which day do you choose?"



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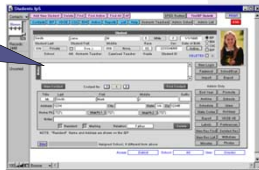
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## What about Oral Motor Exercises?

### 1. Oral Motor Exercises

Present Levels

Is -2 SD below peers in whistle blowing?



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## Oral Motor Exercises

### 1. What about strengthening?

Iowa Oral Performance Instrument (IOPPI)

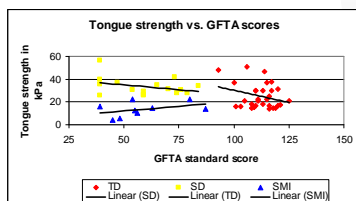
- Children with speech delay do not have weaker tongue strength (Bradford, Murdoch, Thompson, Stokes, 1997)
- Most children with CAS do have weaker tongue strength (Bradford, Murdoch, Thompson, Stokes, 1997; Murdoch, Attard, Ozanne, Stokes, 1995)

But...

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## Relationship between tongue strength & GFTA-2 scores



Sudbury et al. (2006)

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## Oral Motor Exercises

### 1. Chris Spencer | #65



2. Height: 6-3
3. Weight: 312

### 1. Nate Burleson | #81



2. Height: 6-0
3. Weight: 198

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### Evidence Against Oral Motor Exercises for Improving Speech

1. Forrest, K. (2002) Are Oral-Motor Exercises Useful in the Treatment of Phonological/Articulation Disorders? *Seminars in Speech and Language*, 23 (1), 15-25.
2. Hodge, M. M. (2002) Nonspeech Oral Motor Treatment Approaches for Dysarthria: Perspectives on a Controversial Clinical Practice. *Perspectives on Neurophysiology and Neurogenic Speech and Language Disorders*, 12 (4), 22-28.
3. Lof, G. L. (2003) Oral Motor Exercises and Treatment Outcomes. *Perspectives on Language Learning and Education*, 10 (1), 7-11.

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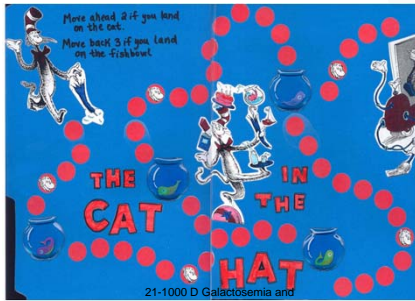
### Games to reinforce repetitive practice

Created on file folders

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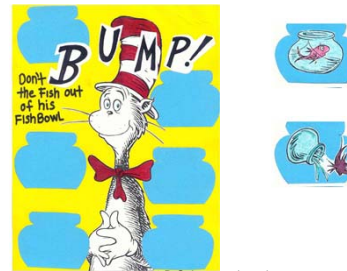
### Cat in the Hat



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### Cat in the Hat



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### Contact information

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