

Please use citation:

Hancock, A., Friedman, I. Schulz, S., Bamdad, M., Youmans, G. Youmans, S. (2008). What is motor learning and how can it help speech? *ASHA seminar, Chicago, IL.*

*The following are excerpts from the ASHA presentation.*

Motor learning utilizes “a set of processes associated with practice or experience leading to relatively permanent changes in capability for movement” (Schmidt & Lee, 1999)

- Used to promote retention, accuracy, and consistency of learned motor skills
- Contribute to ability to perform the same movements many times with little-no cognitive effort
- **Acquisition** is a first step, but performance during **acquisition** is NOT a good index of **retention**
- Skill is **performed** during practice
- Skill is **learned** if retained after practice
- Pace varies for each individual (age, etiology, severity, responses), so very important to **USE CLINICAL JUDGMENT**
- **General rule:** make things **difficult** in early learning to maximize the learning result.
- Cognitive-motor **challenges** appear to be the way to effective motor learning (Kent & Strand, 2007)
- Thus far, research suggests these principles used in limb motor learning and relearning can be applied for oral motor (re)learning also.

Principle	Better for <i>Acquisition</i>	Better for <i>Retention</i>
<b>Practice Distribution</b>	Few sessions, short time	More sessions, over time
<b>Practice Schedule</b>	Blocked  Small, regular intervals	Random  Longer, variable intervals
<b>Phonetic context, prosody, rate in practice</b>	Consistent  Part of goal (/b/ in isolation 10x)	Variable  Specific to goal (bit, bat, bet)
<b>Feedback Type</b>	Knowledge of performance (tongue was too far out)  Extrinsic feedback	Knowledge of results (3 out of 4 correct)  Promotes self-monitoring
<b>Feedback Frequency</b>	Often	Rare, inconsistent, fade out
<b>Feedback Timing</b>	Immediate	Delayed
<b>Attention Focus</b>	Internal, Articulator oriented	External, Goal oriented

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## **Motor Learning Guided (MLG)**

Complete **step 1 for entire set of 5** stimulus cards, **then shuffle** the 5 cards and proceed to step 2 for each of those 5 cards, shuffle and go on to step 3.

Step 1: **Say together**, then

- a. Client repeats once (if wrong, go back to saying together)
- b-d. Client repeats 3 times, with 4 second pauses between  
Clinician says it, waits 4 seconds, provides # correct out of 3 attempts.

Step 2: **(random order) Clinician will verbally read card, wait 4 seconds, give Client card to read**

- a. Client repeats once (if wrong, clinician says it again)
- b-d. Client repeats 3 times, with 4 second pauses between  
Clinician says it, waits 4 seconds, provides # correct out of 3 attempts.

Step 3: **(random order) Client will read card aloud.**

- a. Client repeats once (if wrong, tell client to try it again)
- b-d. Client repeats 3 times, with 4 second pauses between  
Clinician says it, waits 4 seconds, provides # correct out of 3 attempts.

\* Client will say it again without looking at card.

\* Shuffle 5 cards, then client will say phrases in response to a question from clinician.

Step 4: Repeat steps 1-3 with **a different set of 5 stimulus cards**

Step 5: **Using both sets of cards (10 stimuli total), Client will read written card aloud (random order).**

- a. Client repeats once
- b-d. Client repeats 3 times, with 4 second pauses between  
Clinician says it, waits 4 seconds, provides # correct out of 3 attempts.

\*These steps are unique to Rosenbek's 8-step continuum, but added to this MLG protocol

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**Scoring\*:** (each production is scored using an 11 point multi-dimensional scale)

- 11 Accurate with LESS than 5 second delay
- 10 Delayed MORE than 5 seconds
- 9 Delay with groping/posturing
- 8 Self-corrects
- 7 Phonemic distortion/s of one or more words with LESS than 5 sec delay
- 6 Phonemic distortion/s of one or more words with MORE than 5 sec delay
- 5 Needs stimuli repeated
- 4 Incomplete. Similar characteristics (e.g., # syllables) but not the target
- 3 Error with LESS than 5 sec delay
- 2 Error with MORE than 5 sec delay
- 1 Perseveration (produces previous response)
- 0 No response

\*modified scoring suggested by Friedman et al. is different from LaPointe et al.'s scoring

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**Set 1:**

<b>Step 1: In unison</b>				
a.	a.	a.	a.	a.
b.	b.	b.	b.	b.
c.	c.	c.	c.	c.
d.	d.	d.	d.	d.
<b>Step 2: Clinician, 4 seconds, then client</b>				
a.	a.	a.	a.	a.
b.	b.	b.	b.	b.
c.	c.	c.	c.	c.
d.	d.	d.	d.	d.
<b>Step 3: Client reads card</b>				
a.	a.	a.	a.	a.
b.	b.	b.	b.	b.
c.	c.	c.	c.	c.
d.	d.	d.	d.	d.
no card:	no card:	no card:	no card:	no card:
To question:	To question:	To question:	To question:	To question:

**Set 2 (Step 4):**

<b>Step 1: In unison</b>				
a.	a.	a.	a.	a.
b.	b.	b.	b.	b.
c.	c.	c.	c.	c.
d.	d.	d.	d.	d.
<b>Step 2: Clinician, 4 seconds, then client</b>				
a.	a.	a.	a.	a.
b.	b.	b.	b.	b.
c.	c.	c.	c.	c.
d.	d.	d.	d.	d.
<b>Step 3: Client reads card</b>				
a.	a.	a.	a.	a.
b.	b.	b.	b.	b.
c.	c.	c.	c.	c.
d.	d.	d.	d.	d.
no card:	no card:	no card:	no card:	no card:
To question:	To question:	To question:	To question:	To question:

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## **Script Training Procedure**

1. Client-generated, relevant topics
2. Client and clinician write short scripts
3. Scripts divided into short phrases for training
4. 45-minute sessions, 2 times per week
5. Practice with tape recording at home 2 times per day, for at least 15 minutes per practice session
6. Script phrases were trained using a cuing hierarchy
7. 3 Scripts were practiced in a cumulative fashion

Cuing Hierarchy

**For Acquisition:** Block practice

1. Clinician modeled word/phrase
2. Client produced phrase in unison with clinician many times
3. Clinician gradually faded participation
4. Client independently produced phrase with cue card in place, 5-10 times.
5. Client produced phrase independently without cue card 5-10 times

**After Stable Production:** Random Practice

- Initiated when practice reached  $\leq 90\%$  accuracy for each phrase
  - Clinician pointed to cue cards in random order
- Random practice in conversation
- Homework: Shuffle cards before practice

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