Improving Speech Production in Profound Apraxia Using MLG and AAC

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Apraxia of Speech Characteristics
(Peach, 2004; Duffy, 2005)
- impaired sequence and coordination of muscle movements
- articulatory errors
- prosodic abnormalities
- unequal and abnormal stress
- articulatory groping
- initiation difficulties

Treatments for AOS
- 8-step continuum
  - Deal & Florence, 1978; Rosenbek, Lamme, Ahern, Harris & Wertz, 1973
- metronomic pacing technique
  - Wambaugh & Martinez, 2000, Decker, Abkarian & Johns, 1988
- Prompts for Restructuring Oral and Muscular Phonetic Targets (PROMPT)
  - Bose, Square, Schlosser, & Lieshout, 2001
- sound production treatment
  - Wambaugh, West & Doyle, 1998; Wambaugh, Martinez, McNeil & Rogers, 1999; Wambaugh, 2000

Motor Learning Guided Approach (MLG)
(Hageman, Simon, Backer, & Burda, 2002)
- manipulates principles of feedback and practice to embody theories of motor learning
  - Schmidt and Bjork, 1992
- hierarchical approach with models from clinician that are faded through a series of steps
  - random practice
  - treatment stimuli similar to target behaviors
  - imposed delay after target attempts
  - reduction of feedback to 30% with emphasis on knowledge of results

Augmentative and Alternative Communication (AAC)
- Clinical case studies reveal that use of a speech-generating device (particularly for adults with severe apraxia and mild-moderate aphasia) can enhance spoken productions.
  - Lasker, Sterwalt, & Hageman, 2005
- Training and practice with computer-based systems can enhance oral production in people with aphasia.
  - McCull, Shelton, Wennrich, and Cox, 2000
  - Aftonomos, Steele, Appelbaum, and Harris, 2001

Purpose
The current study evaluated the effectiveness of MLG, in combination with daily practice using a voice-output AAC system, for improving spoken productions in a person with severe apraxia of speech.
Participant JW

- 50 year old male
- 5 years post a series of 3 left cerebrovascular accidents and subsequent treatment
- received an “inappropriate” voice-output AAC device in 2002 which he found to be unusable
- previous military career, corrections officer, and sheriff
- evaluation in April, 2006 revealed severe-profound apraxia of speech without limb or oral apraxia
- mild aphasia, severe right hemiparesis
- currently resides with his sister in a distant city and drives 2 hours to attend weekly treatment

Stimuli

- 20 trained and 20 untrained targets selected by clinicians and client
  - matched trained and untrained stimuli (in terms of structure)
- trained targets consisted of:
  - CV combinations – pea, lie, lay, bee, for
  - multisyllabics – Renzo, Paula, amen, okay
  - two-word phrases – how much, no way
- MLG treatment sessions began with random elicitation of all 20 of the treatment items as a measure of motor retention
  - a rating of 5 or better was considered correct production

Scoring System for Retention Probes

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>None</td>
</tr>
<tr>
<td>1</td>
<td>Stuttered, immediate feedback required, few repetitions required</td>
</tr>
<tr>
<td>2</td>
<td>Slowly, more repetitions required, mild feedback needed</td>
</tr>
<tr>
<td>3</td>
<td>Repetitions given, immediate feedback, slight hesitation</td>
</tr>
<tr>
<td>4</td>
<td>Repetitions given, immediate feedback, no hesitation</td>
</tr>
<tr>
<td>5</td>
<td>Correct production</td>
</tr>
</tbody>
</table>

Treatment Session (MLG) Procedure

- Clinician randomly selects 5 of 20 treatment stimuli.
- Clinician models a target drawn randomly from the group of 5 stimuli.
  - Client repeats the target.
  - Client produces 3 additional attempts of the target with an imposed delay between each attempt.
  - Clinician repeats target after client’s 3rd attempt.
- Clinician provides knowledge of results.
- Upon completion of the 5 stimuli in the group, process repeated without clinician model.
- Treatment continues in groups of 5 until all 20 treatment stimuli have been done.

Home-Based Treatment

- Between weekly sessions, the client practiced treatment targets for 30 minutes a day on his voice-output AAC device.
- Targeted items were programmed into the device (Dynamo by DynaVox Systems) and he followed a protocol that was similar to the MLG treatment protocol.
- Roughly every third session, the untreated probe items were also tested.
Results

- The client began Cycle 2 with production of only two words 5 or above on the MLG scale among the trained and untrained targets.
- During initial probe, most targets were unintelligible or not elicited at all.
- Within the first three weeks 8 out of 20 of the words were being produced at an intelligible level.
- At the end of the second cycle, 16 of the 20 words were produced at an intelligible level.

“Real Life” Changes

- The client began verbalizing in group situations.
- Client attempted novel and trained words in other contexts outside of treatment sessions.
- Increased overall verbal output as measured by observation and sister’s report.
- Client highly motivated to continue speech treatment.

Discussion

- Results from this study suggest that MLG and AAC approaches were effective at improving production of treatment targets for client with profound AOS.
- Previous treatment approaches had been unsuccessful with this client.
- Success related to:
  - repeated opportunities for practice
  - limited feedback from clinician (similar to voice-output device)
  - helped client develop self-evaluation skills

Current Client Status

- current presentation shows data from Cycle 2
- client has completed Cycle 3 and is participating in Cycle 4
- regularly attending weekly group treatment sessions in clinic
- has continued to show improvement in attempting and approximating verbal productions in group and in 1:1 conversations
- up to 40 verbal attempts in a recent group session
- has recently acquired a new speech generating device (Say-it! SAM Communicator by Words+)

Future Research Planned

- to validate reliability of scoring process
- adaptation to speech productions may occur as clinician interacts with client during sessions
- to investigate combined protocol (MLG and AAC) with clients who have a range of severities of apraxia of speech

References

References cont.