A Model School Program

Auditory Processing Disorders

Carol A. Sullivan, M.S. CCC
Sullivan & Sullivan, Inc.; Garden City, NY
Speech-Language Pathologist
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Interactions of two professions

- **Audiologist**
  - Performs the assessment
  - Writes the reports
  - Determines the recommendations for treatment
  - Interprets the findings
  - Provides classroom amplification systems

- **Speech-Language Pathologist**
  - Makes the recommendations
  - Reads and interprets the reports in interdisciplinary meetings
  - Determines & delivers appropriate treatment in an educational setting
  - Participates in team that writes IEP.
  - Teaches related personnel
  - Monitors FM technology in classrooms
Treatment provided in two settings

- Clinical
  - Requires sound proof booth
  - Audiometer
  - Training by an audiologist/speech pathologist
  - Insurance implications

- Educational
  - Treatment can be provided in small groups
  - Most efficacious when adapted to curriculum
  - Classroom accommodations
  - Frequency of sessions fit school schedule
Inter-professional dialogue for implementing APD diagnosis and treatment

- Understanding theoretical concepts underlying APD
- Gaining a common understanding of vocabulary
- Establishing an agreement on referral processes
- Sharing a mutual knowledge of test tasks
- Experiencing the audiological battery
Difficulties without sufficient coordination of services

- Inappropriate referrals
- Reports with unfamiliar terminology
- Reports with varying conclusions
- Recommendations which are so broad they cannot be fully implemented
- Recommendations inappropriate for an educational setting
- Lessen parental stress projected onto both professions
Where do we begin?

- Educational process
  - Schools
    - Developing workshops with manuals for APD
      - Manuals divided into 6 sectors
        - Anatomy of hearing mechanism
        - Disorders related to anatomical sites
        - Speech perception
        - Sensory plasticity of brain
        - Referrals
        - Treatment
Workshops for allied professions

- Psychologists
  - Providing diagnostic information and interpretation
- Special Education Teachers
  - Teaching symptoms and test profiles
- Guidance Counselors
  - Giving an overview of APD
- Classroom Teachers
Experiential teaching for Speech Pathologists

- Provided by audiologists
  - Small seminars for speech-language pathologists which include the following:
    - Test description
    - Partial administration of audiological test battery
    - Discussion of test task and remediation
    - Describing patterns of functioning on similar processes
    - Development of coordinated plan for referrals and recommendations
Role of Educational Audiologists

- Teach principles of room acoustics
  - Website for evaluating room acoustics
- Classroom amplification
  - Selects Type
    - Sound Field
    - Personal FM systems
Audiological Report Writing for Speech Pathologists

- Write reports in a clear and descriptive manner
  - Examples:
    - SPEECH IN QUIET
      *This test assesses word recognition skills obtained in quiet.*
    - PHONEMIC SYNTHESIS TEST
      *This is a test of sound blending, which provides further information about auditory memory and sequencing.*
    - DICHOTIC DIGITS TEST
      *This test assesses binaural integration with a light linguistic load.*

Kooper, R. 2006
Write recommendations appropriate for educational settings

- Areas of Remediation
  - Classroom Accommodations
    - Increase acoustical access to information
      - May include FM system
      - Preferential seating
      - Reduction of unnecessary noise in room
      - Assess room acoustics
  - Creating a therapy plan
Team approach to a case study

- Student- Age 9 years
- Grade 4th
- Symptoms included:
  - Significantly delayed reading acquisition
  - Poor spelling
  - Difficulty listening in background noise
  - Listening when it involves memory
Evaluation Plan

Psychological Evaluation
- Results: WISC Verbal 112 Performance 97
  Full Scale I.Q. 104

Speech Language Evaluation
- Results: CELF-3 All subtests in average range

Educational Evaluation
- Reading – Grade 1.0 Spelling -CND
- Phonological-Orthographic Substitution Evaluation
  - Does not know short vowels
Referred to Audiologist for APD Evaluation

- Initial referral included:
  - Psychological Evaluation
    - I.Q.
    - Connors Observational Form- ADHD
  - Speech-Language Evaluation
  - Educational Evaluation
Results of APD Evaluation

- Peripheral Hearing within normal range
- **SCAN-C** Standard Score
  - Filtered Words 8
  - Auditory Figure Ground 10
  - Competing Words 5
  - Competing Sentences 6
  - Composite Standard Score 81
Report describing performance on the SCAN-C

- On all subtests, the scores for the right and left ear were combined into an overall score. Analyzing the scores from two ears the following scores were obtained.

  - Total right ear 60%
  - Total left ear 33%
Further test results

- Word recognition- 96% in Left ear 88% right ear

- SSW- High number of errors in both ears with higher # in left ear

- Frequency Pattern Test
  - Hum response 70%
  - Label “high/low” 10%
Dichotic Words Test

- On this test single syllable words are presented to both ears. Student had to repeat words heard.

<table>
<thead>
<tr>
<th>Right Ear</th>
<th>Left Ear</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free Recall</td>
<td>72%</td>
</tr>
<tr>
<td>Free Recall 2</td>
<td>68%</td>
</tr>
<tr>
<td>Right Ear 1st</td>
<td>76%</td>
</tr>
<tr>
<td>Left Ear 1st</td>
<td>64%</td>
</tr>
</tbody>
</table>
Conclusion and Treatment

- Diagnosis: Binaural Integration type of auditory processing disorder
- Referring student to an audiologist for dichotic listening training program

- Diagnosis: Auditory Decoding Deficit
- SLP’s will do an analysis of phonological error patterns underlying reading
Educational Plan

- Classroom accommodations will be made to improve listening abilities
- Note taker will be provided
- Speech therapy for improving left ear listening skills
- Pre-teaching of vocabulary
- Phonological evaluation
Teaching Listening Skills

- Teaching use of active listening skills in the classroom
  - Active listening requires focus and posture
  - Utilize tapes of music with lyrics partially printed out. Student fills in the missing words
  - Read paragraph that has low redundancy and ask questions requiring answers on paper
  - Utilize materials with similar formats to tests
Improving Left Ear Listening Skills

Method

- Use audio books as input for auditory training
- Deliver stimulus to left ear only
- Materials needed include
  - CD player
  - Headphones to deliver stimulus
  - Headphone cable Y-cord (Radio Shack 42-2570)
- Student listens to book-Therapist asks questions.
  - Grove, A. & English, K. EAR, Spring, 2005
Clinical Intervention

- Dichotic Training
  - Trains the weaker ear to perform at an equivalent level to the stronger ear
  - Technique similar to methods used with stroke patients for physical therapy
    - Reduced input to the stronger side
    - Enhanced input to the weaker side
    - Induces neural plastic changes that improve left ear performance
• Pre-therapy scores for right and left ears significantly different, $p < .001$
• Post-therapy scores for right and left ears not significantly different
• Pre-therapy vs. post-therapy scores for left ear significantly different, $p < .001$
Reading Intervention

- Analysis of phonology will be a basis for auditory training of short vowels
- Reading program will be adapted to provide sight words
- Coordination of goals between reading and speech
- Spelling exempt
- Pre-teaching of curriculum vocabulary
Team work with parents

- Parents are provided with an intervention plan
  - May benefit from karate, gymnastics or juggling
  - Music lessons
  - Verbal to motor transfers
- Parents are encouraged to participate in a newly established APD support group
- Print material is provided to parents to develop understanding of disorder
  - *When the Brain Can’t Hear*, Bellis, T.J. 2002
Team Work

- New opportunities to diagnose
- New treatment methods
- Increased understanding of sensory disorders and their affects of learning
- Science and technology merge to bring opportunities for change