EARS - Early Auditory Reading Success

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An estimated 2 or 3% of school age children have auditory processing disorder (APD). Early identification of APD for these children can contribute to enhanced academic performance, including reading success. We implemented a screening program initially in four Title I schools of a public school district to detect peripheral auditory dysfunction as well as auditory processing disorder in at risk kindergarten children. The program is referred to as Early Auditory Reading Success (EARS) because the goal is to identify auditory processing disorder in a timely fashion with immediate intervention to develop fundamental reading skills. An indirect result of the EARS program was the development a more efficient screening protocol for identifying peripheral auditory dysfunction in the younger school aged population. Also as a result of the EARS program, we have now successfully implemented a quick and objective screening protocol in Head Start Programs in two counties. The outcome of the EARS program, as documented one year after its implementation, is the successful identification of kindergarten children at risk for reading failure due in part to auditory processing difficulties, and effective intervention for auditory and reading deficits using a multiple-component strategy.

To date, there are no published investigations of screening for auditory function in kindergarten children (< 6 years of age). Guidelines for audiologic screening of children birth to 5 years of age published by the American Speech-Language-Hearing Association (ASHA) mention the consideration of otoacoustic emissions, but rely entirely on behavioral auditory procedures and protocols (Diefendorf, 2005). In a paper describing a study of over 1000 first grade children, Lyons, Kei, & Driscoll (2004) conclude: "when the results of a test protocol, which incorporates both DPOAEs and tympanometry, were used in comparison with the gold standard of pure-tone screening plus tympanometry, test performance was enhanced. In view of its high performance, the use of a protocol that includes both DPOAEs and tympanometry holds promise as a useful tool in the hearing screening of schoolchildren, including difficult-to-test children." (p. 702). We extended this hearing screening approach to the kindergarten population.

The EARS program was designed to address the following three research questions: What combination of auditory measures (pure tone audiometry, tympanometry, and otoacoustic emissions) is most efficient for screening hearing and auditory processing in kindergarten children? Can the outcome of screening for auditory processing disorders contribute to detection of children at risk for reading failure? Is intensive intervention for children with auditory processing and reading readiness deficits effective in preventing reading failure and in promoting academic success? The EARS program was initially proposed and implemented in four public elementary schools within the Alachua County School District during the 2004/2005 and 2005/2006 academic years. The program was initially funded by various sources as a special project. Each participating school met Title 1 criteria meaning free breakfast and lunch provided to the majority of the children in the school. The program included 322 children 5 years of age with 139 female and 153 male. For comparison of outcome data, three control Title I schools of similar socioeconomic status and student populations were included for data analysis. Only three were included

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because only three of the participating EARS schools completed the standardized testing used for outcome data in this study.

Due to the success of the initial EARS program, the School Board of Alachua County incorporated it as a formally funded part of the county's core curriculum for reading, after the EARS program was approved by the Florida Center for Reading Research. As a result, in the 2006/2007 academic year nine schools that meet Title 1 and Reading First criteria are enrolled in the EARS program. EARS outcome data are presented in this paper for the children from the 2004/2005 and 2005/2006 academic years. Outcome data at collected at the end of the first grade year are also summarized for the children from the 2004/2005 kindergarten year.

There are five basic components of the EARS program:

1. All kindergarten children are screened for hearing sensitivity and auditory processing.
2. Soundfield FM amplification systems are installed in all kindergarten classrooms.
3. All kindergarten children complete Earobics computer based program for developing auditory and pre-reading skills.
4. Classroom teachers receive in-service training on phonological awareness and auditory skills, which they focus on for 15 minutes daily with students in small groups.
5. Children with abnormal performance on the Staggered Spondaic Words (SSW) test receive intensive one-on-one or small group instruction on auditory and pre-reading skills.

Hearing screenings were completed during the first part of the academic year, including peripheral hearing and auditory processing. Auditory processing disorder (APD) is broadly defined as a deficit in processing of information that is specific to the auditory modality (Jerger & Musiek, 2000). Peripheral hearing was screened using a typical screening protocol including otoscopy, tympanometry, otoacoustic emissions (OAEs), and pure tone audiometry. Screening of auditory processing was completed using a dichotic listening procedure, specifically the first 20 test items of the Staggered Spondaic Words (SSW) test. The SSW was chosen due to the availability of sufficient normative data for children 5 years of age. Screenings for language and reading readiness were also completed using the Early Reading Screening Inventory (ERSI) (Lombardino, Morris, Mercado, DeFillipo, Sarisky, & Montgomery, 1999). The ERSI is a well-accepted measure of reading readiness that was found to correlate highly with results of auditory processing screening. The Dynamic Indicators of Basic Early Literacy Skills (DIBELS), a screening measure of reading readiness, was used because it is routinely given at four intervals to all kindergarten children in the state of Florida. The DIBELS was administered by school personnel with no knowledge of the EARS program.

Results of screening showed that pass and fail rates for pure tone audiometry were highly correlated with pass and fail rates for tympanometry and OAEs, supporting the use of a combination of results of tympanometry and OAEs alone (without pure tone screening) for screening peripheral hearing kindergarten children. The fail rate for the SSW was an alarming 46% while the combined fail rate for peripheral screening measures (pure tone audiometry, tympanometry, and OAEs) was 35%. For kindergarten children participating in the EARS program, DIBELS outcome data showed differences in reading readiness in comparison to data for children in the control schools. The greatest differences were seen in more advanced reading skills such as oral language vocabulary and reading comprehension. On these measures, children in the EARS schools placed in the 40th and 57th national percentile ranks respectively while children in the control schools were in the 21st and 38th national percentile. It is important to note that the control schools were also Title 1 and Reading First schools already receiving some type of (non-EARS) intensive reading intervention due to their classification. Another encouraging finding was that for the EARS schools oral reading fluency skills were established in 56% (over half) of the students with 27% emerging and 17% showing deficit. In contrast, in the control schools 45% (less than half) had established oral reading fluency skills while 37% were emerging and 18% were showing deficits in this area.

Multiple Tiers of Reading Instruction Models: Conventional (e.g., Torgesen, 2005) vs. Early Intervention (EARS)

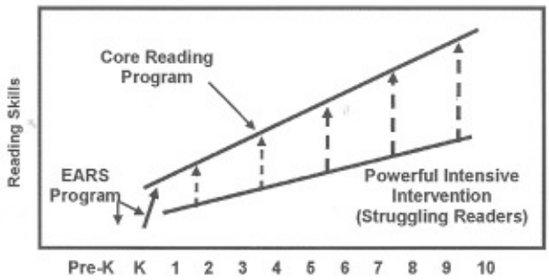

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Figure 1 (on page 8) shows a model of the normal progression of students through the core reading curriculum, and the widening gap between successful readers and those who would be considered "struggling" readers. The EARS program is unique in that early and intensive multi-component intervention is initiated for children at risk for reading failure. With this early intervention approach, children are able to reach a level of reading success with their peers in kindergarten and first grade rather than struggling with reading and falling further behind their peers in reading abilities.

In conclusion, the results of auditory processing screening can be used to identify children at risk for reading and academic failure. All kindergarten children in Title 1 schools benefit from the following interventions: adequate acoustic learning environment (classroom), enhancement of phonologic awareness instruction by the classroom teacher, and therapy for auditory processing and pre-reading skills (Earobics). Intensive intervention for children with auditory processing and phonologic awareness deficits improves early literacy skills. The program offers effective intervention for kindergarten children at risk for reading failure.

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