

## Short reports

# Reading disability and middle ear disease

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**SUMMARY** The association between specific reading disability and middle ear disease was investigated in a longitudinal study of 962 children followed from age 5 to 11. No significant differences were found in the prevalence of middle ear abnormalities between the reading disabled group (n=49) and the remainder.

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Several studies have reported a higher than normal prevalence of middle ear abnormalities in children with specific reading disability,<sup>1,2</sup> although the evidence is not entirely clear cut.<sup>3</sup> All the evidence to date, however, is based on referred samples and consequently may reflect referral biases. Furthermore, because these studies are cross-sectional, involving only one assessment of reading and middle ear state, it is difficult to determine whether an abnormality of the middle ear represents a transient or chronic disorder. The present longitudinal study investigated the prevalence of the disorder in a large sample of children followed from age 3 to 11. To obtain reliable information on middle ear problems audiological and otological data gathered at ages 5, 7, and 9 were combined. In addition, stable reading disorders were identified on the basis of reading and intelligence quotient (IQ) at ages 9 and 11.

### Method

The sample (described in detail by McGee and Silva<sup>4</sup>) consisted of those children enrolled in the Dunedin Multidisciplinary Health and Developmental Study. Medical, psychological, and educational assessments were administered at two yearly intervals from age 3 to 11.

Otomicroscopy was carried out by a trained examiner using a Sparta examining microscope at age 5 and a Zeiss Jena microscope at ages 7 and 9. Immediately after microscopy impedance audiometry was carried out 'blind' by a trained audiometrist using an Amplaid 704 tympanometer with Hewlett Packard XY plotter. The same audiometrist carried

out pure tone audiometry using an Interacoustics Screening Audiometer AS7 at ages 7 and 9 in a quiet, but not soundproof, room. Any child detected as having an appreciable ear or hearing problem was followed up by the Ear, Nose, and Throat Department of the Dunedin Public Hospital until the problem had resolved.

Specific reading disability was defined on the basis of scores on the Burt Word Reading Test and the WISC-R Performance IQ scale. Using the regression technique described by Yule *et al.*,<sup>5</sup> underachievement in reading was based on the discrepancy between a child's actual reading score and a predicted reading score based on age and IQ. The specific reading disabled group were designated as those children whose residual reading scores—actual minus predicted score—fell in the lowest 10% of the distribution. Those children who satisfied this criterion at both age 9 and 11 were designated as a stable specific reading disabled group (n=49).

### Results

Following Stewart *et al.*,<sup>6</sup> 962 children were divided into seven otological groups on the basis of data available from the study centre and the otolaryngology service between ages 5 and 9. The Table shows the prevalence of middle ear abnormalities in the specific reading disabled group and in the remainder of the sample.

A  $\chi^2$  test indicated that there were no significant differences in prevalence rates between the reading disabled group and the remainder of the sample ( $\chi^2=4.17$ ,  $df=6$ ,  $p=0.65$ ). Nor were there any significant results when the otological categories were collapsed according to either a stringent (persistent bilateral otitis media only) or lax (transient or persistent otitis media) criterion of middle ear disease.

### Discussion

The results from this study suggest that middle ear

Table Prevalence (n (%)) of middle ear abnormalities in reading disabled (n=49) and non-reading disabled children (n=913)

Otological grouping	Reading disabled	Non-reading disabled
Persistent bilateral otitis media with effusion with hearing loss greater than 25 dB	5 (10.2)	48 (5.3)
Persistent bilateral otitis media without appreciable hearing loss	2 (4.1)	43 (4.7)
Persistent unilateral otitis media with effusion	2 (4.1)	24 (2.6)
Transient unilateral or bilateral otitis media with effusion	8 (16.3)	110 (12.0)
No evidence of otitis media, but scarred tympanic membrane	5 (10.2)	133 (14.6)
C type tympanogram on at least one occasion, but no evidence of otitis media or B type tympanogram	20 (40.8)	429 (47.0)
Bilateral A type tympanograms at every assessment	7 (14.3)	126 (13.8)
Total	49 (100)	913 (100)

disease is unlikely to be an important determinant of specific reading disability. Previous reports of positive findings from cross-sectional studies may be attributable to referral biases, fallible retrospective report data, or unreliable single occasion assessment of reading and middle ear state. Another important point is that in previous studies reporting positive findings the reading disabled children have been largely untreated. It is noteworthy that the only negative finding reported that all reading disabled children studied had been examined and treated by an otolaryngologist.<sup>3</sup> Similarly, all children in the present study identified as having otitis media were

examined and treated by an otolaryngologist. Of the 98 children with persistent bilateral otitis media, 83 had tympanostomy tubes inserted on at least one occasion.

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## Cerebral atrophy and nephropathic cystinosis

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**SUMMARY** The management of end stage renal failure in cystinotic children is correlated with a longer survival, sometimes complicated with neurological abnormalities. Cranial computed tomography was performed in 10 patients and showed a significant atrophy; the pathogenesis of this damage remains unclear.

The full description of cystinosis is yet to be completed as until the last 15 years all those patients with cystinosis died early from end stage renal

failure; central nervous system involvement was not often reported as a late complication.<sup>1,2</sup> The patients' survival over the second or third decade may be complicated with neurological manifestations, and it has been shown that some patients with nephropathic cystinosis have abnormalities on cranial computed tomography.<sup>3</sup>

#### Patients and methods

Several types of neurological symptoms were noted in 10 cystinotic patients (group 1; mean (SD) age 14.2 (4.0) years), such as repeated seizures, tremor,