Paediatric Tinnitus

By JOHN GRAHAM

WHEN I offered to speak on this subject I expected to review the literature, extract cases from my hospital's record system, and look for a few points of interest in a topic that had not come my way very often.

First, I found very little on the subject in the medical literature. An exception is a paper in 1972 by Nodar from Syracuse, New York, in which he studied a school population of about 2,000 over three years and found a 13 per cent incidence of tinnitus in normal children and a 59 per cent incidence in those who had failed audiometric screening tests.

There was also a paper by Glanville, Coles and Sullivan (1971) in which a family with objective tinnitus was described. One child of $2\frac{1}{2}$ had narrow-band tones of 5 and 8 kHz. coming from the left and right ears respectively. Pure tone audiometry showed nearly normal hearing for low frequencies, but a notch in each ear at the frequency of the objective tinnitus. Curiously the child did not seem to hear the tinnitus himself.

I was unable to extract any information on the subject from the record system of a large centre of paediatric audiology, so have had to collect data—like Dr. Nodar—from schools.

Although tinnitus may well be a common symptom in children with middle ear disease, I have concentrated on children with sensorineural deafness. To find an easily reachable population of deaf children, I approached the head teachers of the five main partially hearing units in Inner London that have children of secondary school age (12–18 years). They asked each class the direct question: 'Do any of you get noises in your ears?' It was explained that tinnitus does not include any of the sounds produced by hearing aids or coming from the child's surroundings.

The children with tinnitus were then asked to answer a written list of questions:

(a) Which ear the tinnitus came from.

(b) Whether the tinnitus was constant or intermittent.

(c) Whether it appeared when they were relaxed, tense or at any other regular time.

(d) Whether noise made the tinnitus worse or better.

(e) Whether they had ever had middle ear problems such as infections or glue ear.

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Last, they were asked to try to assess the severity of the tinnitus, by saying whether it worried them:

Not at all
Slightly
Sometimes
More severely

Then they were offered the opportunity to make their own comments.

Diagnoses

These were taken from the school records and may not be precise in every case. In all but five children deafness was certainly congenital or appeared in the neonatal period. The exceptions are three children with C.S.O.M. and two who are said to have become deaf after measles.

As might be expected, there were quite a large number, fourteen, in whom no firm diagnosis had been made.

There were ten known or suspected cases of hereditary deafness, six cases of perinatal anoxia, six of Rubella, and four with congenital middle ear malformation.

One child had had meningitis in infancy. There was one premature, low birth-weight baby and a single case of serous otitis media who had attended the partially hearing unit for a short time.

Bearing in mind the fact that these children were at partially hearing units it is not surprising that there was only one child with very profound deafness—she had had a combination of Rubella syndrome, birth anoxia and meningitis. The rest had moderately severe degrees of deafness, usually worse for high frequencies.

Results

Seventy-four children from five schools were sampled. Forty-six had tinnitus—that is 64 per cent.

The tinnitus was in the left ear in 10, the right ear in 13, and in both ears in 22. One child was not sure where the noise was coming from.

Hearing aids: 15 children had bilateral hearing aids, 16 wore one aid for the left ear only, 11 for the right ear only and 4 did not use an aid.

The tinnitus was intermittent in 44 cases and constant in only 2.

Eight children said the tinnitus tended to appear when they were tense or angry, 19 when they were relaxed and 3 said that their tinnitus appeared in both situations.

Noise made the tinnitus worse in 7, and better in 13. The remaining 26 noticed no change.

Three of the children had congenital atresia, with severe bilateral malformation of external and middle ears. A further 3 had chronic suppurative otitis media. Ten others had had episodes of acute otitis, or glue ear with or without operative treatment. This makes 16, or 22 per cent, with some

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form of middle ear problem, bearing this in mind: the tinnitus was pulsatile in 11 cases, which included only 5 of the group with middle ear problems. These 5 include all 3 cases of C.S.O.M., one who had an ossicular abnormality and 2 with 'glue' ear.

I wondered whether it might be possible to relate the tinnitus to the use of a hearing aid:

In the 23 children who had unilateral tinnitus, the tinnitus was in the ear in which they wore their aid in 11 and in the unaided ear in 5; 7 of this group wore bilateral aids. However, 9 of the children with unilateral tinnitus had a significant difference in hearing threshold between the 2 ears, and when I looked at the remaining 14 with symmetrical hearing loss the tinnitus was distributed equally between aided and unaided ears, in admittedly rather a small population, which suggests that the aids did not play a part in producing the tinnitus.

Now looking at those in whom there was a significant difference in hearing threshold between the two ears and unilateral tinnitus, in all but one child it was the better hearing ear that was affected. The exception was the child who had visited a unit on a temporary basis with 'glue' ear.

Subjective comments:

I asked the children whether their tinnitus came on regularly at any particular time.

Nine said that they noticed it at night going to sleep; 2 noticed it for a period as soon as they removed their hearing aids, 2 had tinnitus which seemed to be related to posture—coming on when they lay down; and in 4 it was always produced by audiometric testing.

It was difficult to decide how to judge the severity of the tinnitus, particularly when it was not present all the time; the simplest question to ask seemed to be how much the tinnitus bothered each child. The table shows their assessment of this on a scale from 0 to 3, and suggests that in about 40 per cent of the children tinnitus was severe enough to be disturbing.

Score	*Degree*	*No. of children*
0	Not worried by tinnitus	13
1	Slightly worried by tinnitus	14
2	Sometimes worried by tinnitus	13
3	Severely worried by tinnitus	6

Perhaps some of their comments give a clearer picture.

At least four children said that when they had an audiogram the test tones seemed to ring on for about 30 seconds; this made it hard for them to hear succeeding tones and the teacher in each case confirmed that these children were always hard to test. In one case the child said that he had severe tinnitus for half an hour after each audiogram, and 'it gets on my blooming nerves'. During the days after filling in the questionnaire, several

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children put their hands up in class to tell the teacher that their tinnitus had just begun. In most cases it seemed to last beyond the end of the lesson. One child said that his hearing improved when he had tinnitus but three said that when they had tinnitus they were unable to hear their friends' voices.

Two children said that they became dizzy and unsteady when they had tinnitus and in another two the tinnitus produced discomfort in their ears or head.

I discussed these results with the teachers, who suggested that tinnitus might be causing at least three problems:

(i) Children who seemed unable to give reliable audiograms (remember that these were 12–18-year-olds).
(ii) Tinnitus might be a reason for a child refusing to wear a hearing aid.
(iii) It might explain intermittent difficulties in concentration or episodes of disturbed behaviour.

To summarise:

In a small sample of deaf children with moderately severe hearing loss and of secondary school age 64 per cent were found to have tinnitus, usually intermittent, and in about 30 per cent it was bad enough to be a nuisance. When the tinnitus was unilateral it affected the better hearing ear.

I think it would be interesting to extend the survey and to include more profoundly deaf children.

One curious point is that—in London at least—these children seldom mention tinnitus of their own accord which is why it seems not to have been thought of as much of a problem.

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