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PREVALENCE OF MUSIC-INDUCED HEARING LOSS

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1. INTRODUCTION

Reproducing systems for music used over the past 30 years have a capability of creating sound levels greatly in excess of agreed limiting levels for industrial noise. Many articles in the popular press and in scientific journals have warned of the consequent danger to hearing. However, few patients have attended a large specialist London hospital during this period with more than minimal permanent changes in their hearing sensitivity attributable to these noise sources among an approximate 10,000 new cases of deafness seen each year. In the context of pop music the resulting hearing loss is less prevalent than nodules on the larynx of vocal performers.

2. ASSESSMENT OF HEARING LOSS

Hearing threshold determination in the range 250 to 8000Hz, following a clinical examination of the ears, is the routine method of assessment. While it is accepted that the disability is greatest in hearing and understanding speech that is at greater than threshold level, speech audiometry is rarely used in the diagnosis or assessment of noise-, or music-, induced hearing loss as it is very time-consuming and adds little information to the pure-tone audiogram.

Frequency and time resolution are also affected in some types of hearing disorder but their investigation is usually restricted to research. The suggestion has been made that excessive noise exposure occasionally might impair frequency resolution without affecting the threshold sensitivity but this has been discounted by Hinchcliffe [1] who suggests that this syndrome is due to an auditory stress disorder.

3. NOISE-INDUCED HEARING LOSS (NIHL)

Hearing sensitivity decreases slowly with increasing age, the highest frequencies being most affected. The effect of exposure to most continuous or to impulsive industrial noises, and to gunfire, appears first in the 3 to 6kHz region and increases rapidly in the initial stages with increasing exposure. There is a considerable variation in individual susceptibility to both ageing and noise exposure which causes difficulty in differentiating their relative

contributions in older subjects who have not had hearing tests prior to noise exposure. As well as permanent hearing loss from noise exposure, there are temporary effects lasting minutes, hours or even longer depending on the individual and the amount of noise. These temporary effects from broad-band noise usually affect the whole range of audiometric test frequencies.

Some 30% of those who suffer NIHL also have noise in the ears (tinnitus) which causes additional handicap. Tinnitus is measured by subjective frequency and loudness matching of the perceived noises. A review of NIHL was given in 1987, Knight [2] prior to the Noise at Work Regulations 1989 came into force.

There are many other possible causes of hearing loss apart form noise exposure and ageing. These include genetic factors, damage to the foetus, childhood and adult infections and many drugs used to treat them. Without full medical and work histories with pre-exposure audiometry it is impossible to assess the probable importance of these other influences. It is estimated that 7.5 million people in the UK have some degree of hearing loss and, at the end of 1992, a total of 0.5 million will already have received compensation for occupational deafness, Coles [3].

4. MUSIC-INDUCED HEARING LOSS

Concern at the possibility of amplified music being responsible for producing hearing loss began in Britain with an article in World Medicine, Anon [4], describing tests on 15 professionals (including 10 pop musicians) who had been exposed to the loudest pop groups. In the 14 younger people, the greatest hearing loss was recorded between 2 and 6kHz and was 20-25dB in a bass guitarist; many of the musicians however suffered tinnitus after playing.

Fearniin 1972 started a series of investigations into the hearing of several hundred young people who were exposed to loud music. His results , Fearn [5] showed a statistically significant, yet slight, difference in average hearing thresholds between those exposed to noise and a control group. The effect existed from 0.5 to 8kHz and was less than 5dB, the smallest step on the audiometer. It should be compared with a possibly similar (temporary) effect reported by Coles and Knight [6] found in those exposed for weeks to the ambient noise and motion of ships. It was identified later in young people who were engaged in daily vigorous exercise, amounting to almost 5dB onaverage throughout the range of audiometric test frequencies. The time scale of recovery was not determined except that on average recovery was complete after 3 weeks respite from noise and vigorous exercise.

An unpublished study was conducted by the present author in 1973 when 19 sound recording engineers from 13 studios were examined otoscopically and audiometrically. Three ears were excluded from analysis on account of pathological conditions and the remaining 35 ears were found to have average hearing levels

within 3dB of the average normal. The mean age was 25.6 years and they had been subjected to loud music in their workplace ranging from several weeks to 10 years; in addition several had been exposed to more than 1000 rounds fired from Service rifles or shotguns without wearing ear defenders.

The author also tested a group of 10 young staff from the hospital for permanent and temporary hearing loss when they attended loud discos in the West End of London during 1974. Slight temporary hearing loss was detected within 2 minutes of leaving the music and all recovered normal hearing overnight. Tests were performed on the pop musicians who performed live at this venue with similar results to those cited in World Medicine. Measurement of music levels and hearing thresholds before and after attendance at discotheques has proved to be a popular topic for IOA Diploma projects. The findings have generally supported those given above.

The National Deaf Children's Society recently campaigned over the potentially damaging levels of sound from personal cassette players. Although little firm evidence exists of hearing damage from this source, the campaign helped to create an awareness of the dangers of loud sound. It should be noted that, before personal cassette players became popular, Coles and Knight [7] and Fisch [8] showed a proportion of young people had significant high-tone hearing losses which had been undetected and were attributed to a variety of noise exposures and to genetic causes affecting other members of the family.

In recent months Korpert [9] has reported a disturbing trend after examining 2472 young workers in Austria. A progressively increased degree of high-tone loss was found in a non-noise exposed, otologically normal group over the past 15 years. It amounts to an average deterioration of 5, 7 and 10dB at 3, 4 and 6kHz. Amplified rock music at live concerts and discotheques, personal cassette players and the riding of motor cycles (approx 100dB(A) under the helmet at 1000km/h) were considered to be responsible. Thus a daily 15 minute ride exceeds the L_{Aeq} of 85dB.

5 CONCLUSION

While no firm figure of prevalence is available, it is apparent from the review of the literature and from the preceding account that people with serious damage to hearing from loud music rarely come to hospitals. They are not seen for advice or seeking compensation as is common with NIHL from other occupations. In fact, the author's experience over more than 30 years of investigating several thousands of people with NIHL is limited to two cases who came in the belief that their hearing was damaged while working with pop groups. One was a young vocalist with a moderately severe loss at all test frequencies on an audiogram by a commercial organisation. She was proved to have normal hearing by our tests and was very happy to accept this

fact. The other case was a middle-aged road manager to a pop group. He had high-tone losses but it was found that he previously had worked many years in a noisy footwear factory which was at least equally likely to have damaged his hearing.

Grover [10] has reported on a recent government-sponsored pilot scheme in schools to create a greater awareness of the dangers of excessive noise. Such schemes, the Noise at Work Regulations, and the HSE Guidance on Noise Limitation at Pop Concerts are welcome as means of safeguarding the hearing of future generations.

6 REFERENCES

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