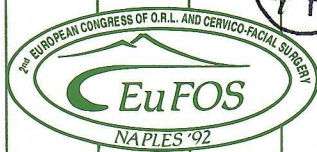




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Longitudinal epidemiologic study of a population of noise exposed railroad workers

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SUMMARY

Hearing loss due to chronic exposure to elevated noise levels is a well established pathologic entity and most nations have enacted worker protection laws requiring periodical hearing tests and ear nose and throat medical examinations. The authors have followed during the past 15 years professionally exposed workers from the Milan section of the Health Department of the Italian Railroad. All workers underwent periodical general otolaryngologic examination and pure tone audiometry. The results of these examinations have been evaluated for hearing loss incidence and progression. Our results stress the importance of periodical hearing tests and effective screening in the prevention of noise related hearing loss.

INTRODUCTION

Workplace noise is a well known offender to the inner ear hearing receptor cells and most countries have enacted laws and rules to limit noise exposure and monitor its effects on laborers. Italian law is still not exhaustive in the determination of maximum exposure levels, the major guideline calls for a maximum exposure level of 90dB in 8 Hours. To achieve worker protection, a list of specific types of work considered to be at risk has been established under chapter 44 of the law DPR 482/1975 and DPR 1124/1975. All workers which fall in the tabulated categories have to be monitored

by a clinical ENT examination and periodical hearing tests.

In order to study the effectiveness of close clinical monitoring with taking of appropriate action in persons found to be at risk and of workplace surveillance, we have studied a working population homogeneous for noise exposure levels given by the workers of the Italian State Railroad's Milan Compartment followed by us and who classified under chapter 44 of law 482/75.

MATERIALS AND METHODS

From all workers of the Italian State Railroads depending from the Milan Compartment we have considered 1052 persons who qualified at risk under chapter 44 and subchapters of law 482/75. All clinical ENT examinations and hearing tests during the last 15 years have been done by one of us. Working conditions included those as indoor mechanics as well as outdoor railroad maintenance, with noise originated from the machinery in continuous or pulsed way, with or without vibration. The overall exposure time at any workshift of not more than three hours. All workers were male and age 22 and up, in none there were evidence of disease in the ENT region. Workers who were at risk passed a clinical exam and hearing test every year, those who tested positive for hearing loss due to acoustic trauma where retested every six month and removed from the noise exposed work if found in progression of more than 5% by the AAOO hearing loss percentage scale, those with a larger acoustic trauma at the first test were removed directly. Once removed from the noise exposed work, no further testing was done since not required by the worker protection law.

RESULTS

On 1052 persons 558 (53.0%) tested normal during our hearing tests for one or more times, 110 (10.5%) resulted with a hearing loss unrelated to acoustic trauma and 384 (36.5%) had clear signs of noise exposure related hearing loss. In 280 (26.6% of total, 72.9% of the group) of these, significant hearing loss was already present at the first hearing test, and they were not allowed to continue work in a noise exposed area. Hearing tests at the start of the job have been mandatory only since 1985 and some of those who tested positive at the first test may have been exposed already also at work, besides previous or parallel exposure (like previous work, sport hunting,

TAB.1: Totale esami eseguiti su persone esposte a rumore

Number of exams:	1052
resulting in:	
Normals:	558
Other ear disease:	110
Acoustic trauma:	384
	removed from exposure after first exam: 280
	with continuing noise exposure: 104

etc.). In 104 cases (9.9% of total and 27.1% of the group) we saw a progression of noise related hearing loss over the years.

Considering these 9.9% of controlled patients, 4.6% (48 patients) remained stable during the following years (max 15), while 5.3% (56 patients) showed at some point and to some degree a progression of the hearing loss. Using the Merluzzi scale of hearing loss groups, this loss was in all cases not more than one class, except in one, who passed between two tests from class one to class four. (See Fig. 2)

TAB.2: Merluzzi classification of persons with continuing noise exposure

I. without progression of hearing loss: (tot. 48)	
Merluzzi class:	Total:
1	28
2	12
3	8
II. with progression of hearing loss: (tot. 56)	
loss of one class:	55
loss greater than one class	1

CONCLUSIONS

The results of our study show that about half of all noise exposed workers did not show any hearing loss at any time. In 10.5% of the workers unrelated hearing disease could be detected and in a total of 36.5% a noise related hearing loss was evident. Perhaps in 26.6% this loss was already present at work begin and the worker was removed to a different mansion. In the remaining 9.9% we saw the presence of a stable hearing loss in about 4.6, and in only 5.3% a further deterioration could be observed, in this patients a prompt removal from the noise exposed work and/or changes in the local noise levels and protection devices made possible to contain the loss in a minimal range. Only in one case (0.1%) a larger loss could not be prevented.

In conclusion we think that a close monitoring as done by us at present with the railroad workers has a valid effect on the prevention for noise related hearing loss, if integrated with workplace surveillance, worker assignments and follow ups. Introducing mandatory hearing tests before starting a noise exposed work can point to patients already with a hearing loss and probably at greater risk, this especially since we up to date do not have any generally valid and accepted tool to monitor individual noise susceptibility. We think furthermore that testing should be continued also on those workers who being removed from a noise exposed workplace, are not considered any more at risk by the law, for at least two years, to detect long term effects.

BIBLIOGRAPHY

Broich G.; La prevenzione secondaria nell'adulto; Simposio su "Pre-

- venzione e Recupero della Sordita'", Universita' degli Studi di Pavia, 22 Novembre 1980, Ed. CRS Amplifon, Milano
- Broich G., Gobba F., Prestinoni A., Prececurutti G., Sarti R., Tartoni G., Tarantini A.R., Tampieri A.; Computerized Evaluation of Audiometric Screening Results in Industry; 1ST International Workshop on Data Banks in Occupational Health, organizzato dalla International Commission on Occupational Health e dalla Commission of the European Communities, Varese, Ott. 1986; Pubblicato dal Office for Official Publications of the European Communities, Bruxelles, 1987
- Broich G., Bazzana O.; L'Uomo, il suono, il rumore: fenomeni di una convivenza coatta; 5a Giornata di studio del Centro Studi Regionale Salute - Ambiente, su "Pubblica amministrazione, Ordine giudiziario, mondo produttivo del lavoro di fronte a: i problemi dell'inquinamento da rumore", 26-5-1988, Cremona
- De Cristofaro R., Garozzo A., Farruggia E., Sicari G.; Studio retrospettivo sulla incidenza delle ipoacusie da rumore nella popolazione ferroviaria della Sicilia orientale professionalmente esposta. Indagine conoscitiva sulla incidenza delle ipoacusie nei lavoratori professionalmente esposti dell'officina G.R. di Catania e di Messina; Bollettino del Collegio Medici Italiani dei Trasporti 1:47-52, 1987
- Gobba F., Tartoni G., Di Rico R., Prestinoni A., Sarti R., Cavalleri A., Broich G.; A Computerized Program for the Estimate of Occupational Hearing Loss in Industry According to the International Standard ISO/DIS 1999; 1ST International Workshop on Data Banks in Occupational Health, organizzato dalla International Commission on Occupational Health e dalla Commission of the European Communities, Varese, Ott.; Pubblicato dal Office for Official Publications of the European Communities, Bruxelles, 1987
- Mauceri P., Becca A., Borri G., Tugnoli G.; Indagine sul danno uditivo da rumore in un gruppo omogeneo di volontari allievi ferroviari; Bollettino del Collegio Medici Italiani dei Trasporti, 1:25-28, 1987
- Prestinoni A., Catenacci C., Spada O., Terzi R., Grampella D., Broich G.; Vocal Audiometry in the Evaluation of Industrial Hearing Loss"; , XXIST Congress in Occupational Health, Dublin, Eire, Ott. 1984

LONGITUDINAL EPIDEMIOLOGIC STUDY OF A POPULATION OF NOISE EXPOSED RAILROAD WORKERS

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Hearing loss due to chronic exposure to elevated noise levels is a well established pathologic entity and about all nations have enacted workers protection laws requiring periodical hearing tests and ear nose and throat medical examinations.

The authors have followed during the past 15 years a large population of workers professionally exposed to elevated noise levels, through the Milan section of the Health Department of the Italian State Railroads. All workers underwent periodical general otolaryngological examination and pure tone audiometry. The results of the examinations and test have now been evaluated for hearing loss incidence and progression, related to age, sex, concomitant ear diseases and time as well as the overall level of noise exposure. The statistical evaluation of the results and its meaning in terms of workers protection will be presented and discussed.