

Occurrence of white finger in the gas industry

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WALKER DD, JONES B, OGSTON S. Occurrence of white finger in the gas industry. *Scand J Work Environ Health* 12 (1986) 301–303. A survey was undertaken to study the prevalence of symptoms of white finger in a group of workers who use vibrating tools in the gas industry to break and reinstate road surfaces; the study also compared the level with that found in a reference population having no exposure to vibration. The difference in the prevalence of white finger between the two groups did not reach statistical significance. The prevalence increased with age, and this relationship was statistically significant in each group, but the differences in the prevalences between the survey and reference populations did not reach statistical significance in any of the age groups. White finger symptoms increased in association with increasing years of usage of vibrating tools, but this phenomenon was shown to be related to age rather than to exposure to vibration. The authors conclude that it would appear that vibration-induced white finger is not currently a particular problem among men who use vibrating tools to break or reinstate road surfaces. That this is the case, however, is possibly more a reflection of the way such tools are used in the gas industry than of the inherent safety of the tools themselves.

Key terms: age effect, prevention, questionnaire survey, symptoms, vibration exposure, VWF unlikely.

Pneumatic drills and hammers have been used in the gas industry to break and reinstate road surfaces for many years although, in more recent years, they have been almost totally replaced by hydraulic versions. Road breaking is carried out by a member of the distribution team, which comprises two or three men, depending on the nature of the job in hand and the experience of the individuals in the team. The task of road breaking generally rotates within the team, and an accurate assessment of the frequency and duration of this job is very difficult. It is estimated, however, that a distribution worker generally operates such tools up to 2 h daily. Hempstock & O'Connor (2) measured the vibration produced by a pneumatic road breaker and showed that it exceeds the recommended maximum exposure level for regular users over a range of frequencies below 100 Hz. Tasker & Robinson, at the British Gas Engineering Research Station at Newcastle, have confirmed these findings in respect to both pneumatic and hydraulic road breakers as used in the gas industry (to be published). While there have been isolated reports of vibration-induced white finger (VWF) in users of road breakers (Taylor, personal communication, 1980), there is no epidemiologic information regarding the prevalence of VWF in such a population. Nevertheless, it was considered impor-

tant to investigate the matter in view of the known association between the use of vibrating tools and VWF. This paper describes a pilot survey to examine the prevalence of symptoms of white finger from all causes in a group using vibrating tools and in a reference population of men who were not exposed to such tools. Any significant excess of symptoms found in the former group would be considered to be possibly induced by vibration and would indicate a need to carry out a wider and more-detailed survey.

Subjects and methods

A questionnaire survey was carried out. Clinical examination and tests were not included. Nine hundred and five distribution workers (a response rate of 96.6 %) were interviewed and, complete data were obtained for 895 men. It was not without difficulty that a reference population was chosen, as it was not possible to include sufficient distribution workers who had no experience with vibrating tools. It was, therefore, decided to include a group of meter reader/collectors as the reference group, as they had no occupational exposure to vibration and, as in the distribution group, their work took place predominantly out of doors. Of the 553 men interviewed (a response rate of 91.9 %), complete data were obtained for 546. In this paper white finger status was broadly classified by the answers to the questions "Have you ever suffered from occasional whitening of the fingers?" and "Do you still suffer from this?" No attempt was made to proceed to a more-detailed classification according to seasonal variations or work or social interference as in

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Taylor and Pelmeur's classification of VWF (3) because the purpose of the paper was to compare the prevalences of white finger symptoms among the vibration-exposed and reference populations rather than to quantify the severity of any white finger symptoms found. In any event it was not thought to be appropriate to use a VWF classification for white finger of different etiologies.

Results

In comparing prevalence rates between the distribution workers and the reference group, we calculated

Table 1. Prevalence of white finger (WF) among the distribution workers and meter readers.

	Total number	Number with WF	Crude prevalence	Age standardized prevalence
Distribution workers ^a	851	82	9.6	12.4
Meter readers	546	52	9.5	9.5
Statistical significance				Chi square (Mantel-Haenszel test) = 2.9 : p > 0.05

^a Excluded are 44 distribution workers under 20 years of age.

Table 2. Prevalence of white finger (WF) by age group.

	Age group (years)														Chi-square test (linear trend)	
	20—29			30—39			40—49			50—59			≥ 60			
	Total number	With WF		Total number	With WF		Total number	With WF		Total number	With WF		Total number	With WF		
		N	%		N	%		N	%		N	%		N		%
Distribution workers ^a	292	17	5.8	239	19	7.9	138	11	7.9	136	24	17.6	46	11	23.9	22.2 p < 0.01
Meter readers	29	2	6.8	123	6	4.8	169	14	8.3	171	23	13.5	54	7	13.0	5.5 p < 0.05

^a Excluded are 44 distribution workers under 20 years of age.

both the crude and age standardized rates, the latter by using the meter readers' group as the standard population. The significance of any difference between the groups was evaluated with the Mantel-Haenszel test. The prevalence of white finger in the two groups is shown in table 1. The differences in both the crude and age standardized prevalences did not reach statistical significance. The prevalence increased with age in both groups (table 2). The chi-square test for linear trend confirmed that this relationship was significant for both the distribution workers and the meter readers ($p < 0.01$ and $p < 0.05$, respectively). The differences between the prevalences did not reach statistical significance in any of the age groups. The prevalence of white finger in the distribution group was examined in relation to years of use of vibrating tools (table 3). In 509 current users with no previous experience with such tools in other industries, the prevalence of white finger showed an association with increasing years of usage of vibrating tools. That this effect was related to age rather than to exposure to vibration was seen when the observed cases in each exposure group were compared with the number of cases expected (calculated with the use of age-specific prevalences). The very small differences between the observed and expected cases were not statistically significant. Thus there did not appear to be a relationship between prevalence of white finger symptoms and use of vibrating tools among distribution workers in the gas industry.

Table 3. Prevalence of white finger (WF) among 509 distribution workers^a using vibrating tools within the gas industry only.

Use of vibrating tools (years)	Number at risk	Observed (N)	Expected ^b (N)	Prevalence (%)
1-5	182	17	15.0	9.3
6-10	143	13	13.5	9.1
11-15	70	9	8.8	12.9
16-20	41	6	5.6	14.6
≥ 21	73	13	15.0	17.8

^a Excluded are workers who had used vibrating tools in other industries, those with less than one year's use within the gas industry, and workers under 20 years of age.

^b The differences between the observed and expected cases are not significant.

Discussion and conclusions

The crude prevalence of white finger was almost identical in the two groups and was of the same order as that due to nonvibrational causes of white finger in reference populations of other surveys (1). Even when the prevalence in the distribution group was standardized for age, the difference between the distribution group and the reference group did not reach statistical significance, and the prevalence was still very much lower than that for VWF found in other surveys of users of vibrating tools. The lack of a statistically sig-

nificant excess of white finger symptoms among the distribution group and the absence of an association between white finger symptoms and years of vibratory tool use provides evidence to suggest that the use of such tools has not materially contributed to the number of white finger cases found in that group. The results of the survey suggest therefore that VWF is not a particular problem among men who use vibrating tools to break or reinstate road surfaces in the gas industry. The possibility of VWF developing in workers using vibrating tools for longer periods than are typically used cannot, however, be excluded, and steps have been taken to prevent any such isolated cases of VWF from occurring and to monitor employees who

develop white finger symptoms irrespective of their etiology.

References

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