

EXPOSURE-RESPONSE RELATIONSHIP FOR VIBRATION-INDUCED WHITE FINGER AMONG FORESTRY WORKERS

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SUMMARY

The relation between the occurrence of white finger and vibration exposure was investigated in a group of 222 forestry workers using chain saws. The forestry workers and 195 controls never exposed to hand-transmitted vibration were interviewed by occupational health physicians. The diagnosis of vibration-induced white finger (VWF) was made on the basis of subjective symptoms of finger blanching and the results of a cold test with plethysmographic measurement of finger systolic blood pressure. Vibration was measured on a representative sample of AV and non-AV chain saws. Daily vibration exposure was assessed in terms of 8 h energy-equivalent frequency-weighted acceleration [A(8)]. A lifetime vibration dose was estimated for each of the forestry workers. The overall prevalence of VWF among the forestry workers was 23.4 %. Raynaud's phenomenon was discovered in 2.6 % of the controls. In the forestry workers, the risk of VWF showed positive increments with each increment of vibration dose, suggesting a monotonic dose-response relationship. The responsiveness to cold in the digital arteries of the forestry workers was also found to increase with increasing vibration dose. The estimated relation between VWF and vibration exposure showed that the expected occurrence of VWF increased in approximately linear proportion to either A(8) (with exposure duration unchanged) or the number of years of exposure (with equivalent acceleration unchanged). In this study of VWF among forestry workers the estimated exposure-response relation showed that if the magnitude of vibration acceleration is doubled, the total duration of exposure should be halved to produce an equivalent effect. On the basis of the assessment of vibration exposure, the estimated risk for VWF in the study population was found to be lower than that predicted by the International Standard ISO 5349. The results of this study tend to support the vibration exposure levels currently under discussion within the European Union.

Key words: cold test, dose response, hand-transmitted vibration, white finger

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