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EVALUATION OF THE WHITE FINGER RISK PREDICTION MODEL IN ISO 5349 SUGGESTS NEED FOR PROSPECTIVE STUDIES

G. Gemne[1], R.Lundström[2]
[1] 74 Radmansgatan, S-11360 Stockholm
[2] National Institute for Working Life, Umeå, Sweden

Summary

The risk prediction model for white fingers in Annex A of ISO 5349 is not likely to offer protection from all tools and all work processes. It is also probable that some work place changes it has initiated are either redundant or lack the intended effect. The main reasons for these shortcomings are the following.

The often demonstrated disagreement between predicted and observed white finger occurrence may be related to the fact that the model is based on latency data. This leads to an overestimation, to an unknown extent, of true group risks. A possible healthy worker effect, resulting in underestimation, has not been considered, and uncertainty because of recall bias is connected with using latency as effect variable in a slowly developing disorder like white fingers. The diagnostic criteria for white fingers have varied over the years, causing a possible inclusion of circulatory disturbances other than those induced by vibration. Among insufficiently clarified matters unrelated to vibration are variations in individual susceptibility and other host factors that modify vibration effects, uncertainty concerning daily or total effective exposure, and the fact that variation in work methods and processes as well as ergonomic factors other than vibration tend to make different groups incomparable from the viewpoint of risk for injury. Lack of sufficient data on vibration measurements and employment durations add to the uncertainty, as do variations in tool conditions (grinder wheels, etc) and inherent difficulties in measurement. Finally, the ISO 5349 frequency-weighting curve only relates to acute sensory effects rather than chronic effects on vascular functions like white fingers, and directional difference in sensitivity has not been incorporated in the curve.

Data on exposure-response relationships are needed from prospective studies that monitor the dose of exposure to special vibration types and all relevant environmental agents, employ diagnostics with good sensitivity, specificity and predictive value, and pay attention to environmental or individual confounding factors and effect modifiers. Before such data are available, the ISO 5349 model should not be used for risk prediction. It can serve, however, as an incentive for manufacturers to produce tools that vibrate less, and for employers to implement practical measures in order to reduce the total duration and dose of effective exposure.

Key words: hand-arm vibration, exposure-response relationship, frequency weighting, ISO 5349.

Address for correspondence: R. Lundström, National Institute for Working Life,
P. O. Box 7654, S-90713 Umeå, Sweden