

## Vibration White Finger

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### **Reduced Epidermal Nerve Density Among Hand-Transmitted Vibration-Exposed Workers**

This very small study found evidence that could one day be used as part of an objective evaluation of hand-arm vibration syndrome. Nerve damage of this sort is not reversible but could have many alternate causes. Loss of sensory nerves in the skin, to this degree, on its own, would usually lead to mild impairment.

This was a study of 10 male construction workers who were diagnosed with vibration white finger to at least 2 SN in the Stockholm classification system. Their average age was 42.3 years and all had experienced gradual deterioration in the hands for at least two years. They had presented for examination in order to access compensation for lost work (an average of 5 years before examination).

10 Control subjects were recruited from a list of people who had been thoroughly examined in previous work and had been found to have normal nerve conduction in the lower arm region and no occupational exposure to vibration. They were matched for age (average 43.1 years) and were non smokers.

Forearm skin biopsies (3mm diameter) were taken from the skin of both cases and controls. Samples were sectioned and stained for examination and the numbers of epidermal nerves per mm were counted by standardised procedures. Epidermal nerve density (END) as a function of skin depth was compared between cases and controls.

The epidermal nerve density values of vibration exposed subjects were significantly lower than those of age matched control subjects ( $4.1 \pm 2.8$  vs  $9.0 \pm 4.3$  fibres/mm,  $P = 0.005$ ). Eight of the ten cases had density values below 5 fibres/mm.

#### Comment

This report suggests the possible development of an objective test for nerve damage associated with excessive hand-arm vibration. A great deal more work would be needed to ensure that changes in epidermal nerve densities was not due to other conditions (e.g. diabetes, alcoholism or smoking). There is clear overlap between END values in exposed and non exposed people.

The END values were not correlated with sensory tests and so, if this is confirmed, would not be useful in compensation systems that rely on the Stockholm classification for sensory neural deficit. In our view, END deficit would indicate permanent damage but without further work it's correlation with the potential magnitude of compensation cannot be stated with confidence.

It would be of more assistance in assessing causation if END values were assessed against known exposures to hand-arm vibration. If a causal link is established it would seem likely that END measurement would be used to further understand the mechanisms of this disease and could be used in health screening as an early indicator of excessive exposure.