

# **CLINICAL ASSESSMENT AND CHARACTERISTICS OF MEN AND WOMEN EXPOSED TO HIGH LEVEL OF HAND-ARM VIBRATION**

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## **Introduction**

While the neurological and vascular aspects of Hand-Arm Vibration Syndrome (HAVS) has been generally accepted as a medical condition, the medical criteria and the clinical findings used to establish the diagnosis has been more difficult to bring to consensus. The criteria was first quantified by the Taylor-Palmear scale.<sup>1</sup> This criteria was subsequently modified in 1986 at the 1<sup>st</sup> Stockholm Workshop<sup>2,3</sup> to include more acceptance for the neurological effects that characterized the predominate findings in some workers. The relationship between hand-arm vibration and Carpal Tunnel Syndrome was defined in NIOSH 97-141<sup>4</sup>.

While the aforementioned documents have defined the clinical entities associated with hand-arm vibration exposure, agreement on the clinical findings and test to confirm the diagnosis has been more difficult to bring to consensus. Clinicians assessing HAVS has relied on a number of varied neurological and vascular tests. The neurological testing has focused on assessing damage to the sensory capability of the fingers for the neurological component including tests to measuring ability to sense vibration, cold or other end point finger sensor functions. However, the vascular testing has been traditionally focused on the ability to either measure vascular function or to reproduce the vascular blanching that occurs in HAVS with cold water provocation. Recent assessment of this testing in the United Kingdom Coal Miner's study has questioned the value of this testing especially in reviews by McGeoch.<sup>5</sup> In an attempt to provide some type of definitive testing to substantiate vascular damage from hand-arm vibration exposure, angiography is an alternative or adjunct to cold water provocation testing.

The standards that have been established to predict the level, type and incidence of HAVS have been based on clinical studies and reports that have essentially been all male populations. However, the recent entry of women into more vibration intensive jobs has brought about the exposure of some women to high levels of vibration previously only previously experienced by men. However, there have been only few studies that look at HAVS in women<sup>6</sup>. Although exposed the same vibration levels, it has not been clear that the latency and type of pathology of HAVS in women will be the same as for men.

The purpose of this study is to look at recent case studies of men and women exposed to jobs with high levels of hand-arm vibration with extensive clinical testing for both the neurological and vascular components of HAVS as well as other associated upper extremity conditions such as Carpal Tunnel Syndrome.

## Methods

Clinical cases referred for evaluation with neurological testing including, vibrometry, Simmes-Weinstein mono filaments, 2 point discrimination, Purdue peg board testing and nerve conduction testing. Vascular testing included Allen's testing, Doppler studies of both upper extremities, cold water provocation testing and angiograph. Additional laboratory blood work and clinical examination was done to rule out alternative disease conditions that could confound results such as diabetes, collagen-vascular disease, etc.<sup>6</sup>

## Results

Although the study was too small for statistical significance, review of the cases show that when exposed to the same high levels of hand arm vibration, women develop HAVS symptoms sooner than might be expected and early onset of Carpal Tunnel Syndrome.. In contrast men take longer to develop the same symptoms and are more likely to develop other finding such as tendonitis before they develop the constellation of symptoms and findings found in women.

Comparison of the vascular testing techniques indicates that the angiography can be helpful in confirming the vascular damage from hand-arm vibration exposure in both men and women. Furthermore, angiography may help localize areas of damage from specific exposure. The study proved to be too small to compare the effectiveness the various vascular testing techniques but suggest that further study is warranted.

## Discussion

The study shows that there is a suggestion that present standards for the latency of HAVS and other vibration related disorders may be different for women then for men. Also review of clinical cases shows that angiography is useful tool in confirming and defining the level of vascular pathology in case of significant HAVS. Further enlarged studies to confirm both of these findings are recommended.

## Bibliography

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