

VIBRATION-WHITE FOOT: A CASE REPORT

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Introduction

Hand-arm vibration syndrome (HAVS) refers to the neurological, vascular and musculoskeletal problems that may arise in persons with sufficient exposure to segmental upper-extremity vibration. That a condition analogous to HAVS might occur in the feet after prolonged exposure to segmental lower-extremity vibration is biologically plausible though not well studied. To our knowledge, the current evidence for this condition is limited to one case report in the literature.¹

Methods

A 54-year-old retired miner presented to our occupational disease specialty clinic with a chief complaint of pain, blanching and cold intolerance in his toes. The worker had a significant history of foot-transmitted vibration exposure over his 18-year career as a miner, most specifically from the operation of underground bolting machines in the 4 years prior to assessment. These machines expose workers to foot transmitted vibration because the control console is mounted on the machine and the platform upon which the worker stands vibrates when the machine is in operation. The worker in this case underwent a standardized assessment for HAVS consisting of a complete medical history, physical examination, blood work to rule out systemic causes of vasospastic disease and neurological disorders, nerve conduction studies in the hands, and digital plethysmography of the fingers and toes.

Results

Cold provocation plethysmography, nerve conduction studies and current perception threshold testing were all normal in the hands. Digital plethysmography for the toes showed moderate dampening of all toes waveforms post-cold stress (see Figure 1). These results indicate a vasomotor disturbance associated with cold sensitivity in the toes but not in the hands. There was no personal or family history of primary Raynaud's phenomenon and blood work to rule out systemic causes of vasospastic disease showed no significant results. The worker was diagnosed with "vibration white-foot"; a related though anatomically distinct entity to HAVS. The diagnosis was based on exposure history, compatible symptoms, a negative work-up for other secondary causes of Raynaud's phenomenon, and objective documentation of cold-induced vasospastic disease in the toes by plethysmography.

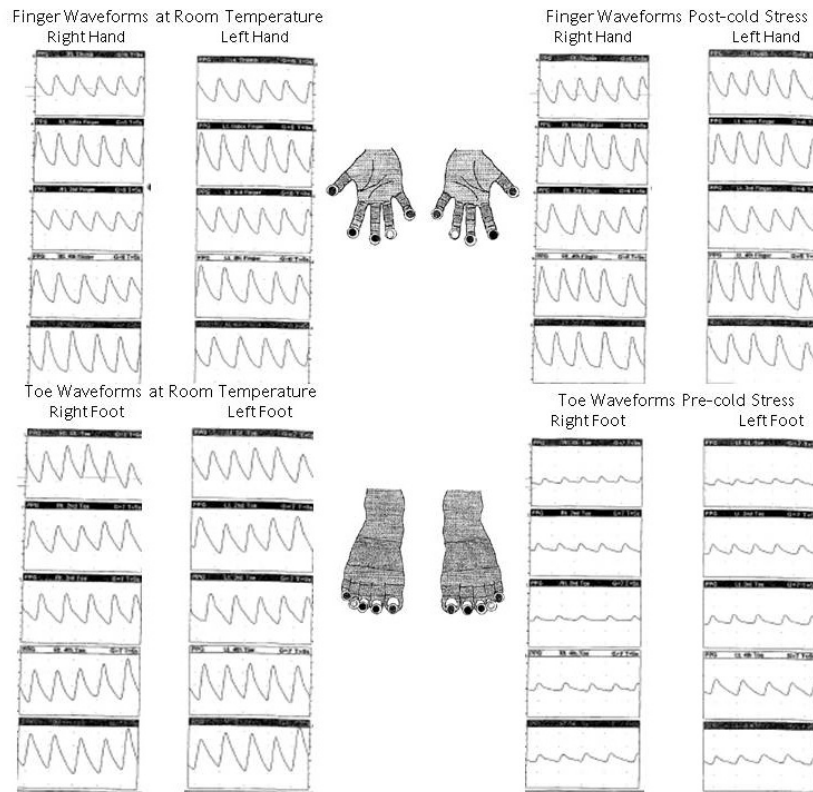


Figure 1: Plethysmography results showing finger and toe waveforms at room temperature and post-cold stress. These results indicate cold-induced vasospastic disease in the feet but not in the hands.

Discussion

This case represents the inverse presentation of most HAVS patients, who typically present with primary symptoms in the hands. There is evidence to suggest that patients with HAVS may have concurrent, albeit usually less severe, vascular and neurologic symptoms in the feet.² Most authors have related the vascular symptoms in the feet of HAVS patients to be primarily due to a centrally mediated sympathetic mechanism. This case suggests that while centrally mediated mechanisms may contribute to the vibration syndrome in the hands and feet, local pathology secondary to direct segmental vibration exposure also plays a significant, role in some cases. Recognition that foot-transmitted vibration can result in a HAVS-like syndrome in the feet should help to facilitate appropriate investigation and management of exposed workers, while also increasing awareness of this under-recognized condition.

References

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2. Schweigert, M. 2002, "The relationship between hand-arm vibration and lower extremity clinical manifestations: a review of the literature", *International archives of occupational and environmental health*, vol. 75, no. 3, pp. 179-185.