

GUIDELINES OF THE JAPANESE RESEARCH SOCIETY FOR VIBRATION SYNDROME TO DIAGNOSE HAND-ARM VIBRATION SYNDROME

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1. INTRODUCTION

The methods recommended by the Japanese Ministry of Labour are usually employed to diagnose hand-arm vibration syndrome (HAVS) in Japan, especially for recognition of it as a work-induced disease, and for medical treatment and compensation (Yamada 2002). The diagnostic methods for HAVS have not been revised in Japan for the past 35 years. In the meantime, there have been improvements in scientific and technological knowledge. Several new diagnostic modalities have been developed to diagnose HAVS. Nonetheless, the objective diagnosis is still difficult and sometimes controversial, as there is no 'gold standard' test for HAVS. In these contexts, a new set of guidelines for diagnosing HAVS appears to be desirable in Japan. The purpose of this paper is to present a draft of the diagnostic guidelines for HAVS proposed by a working group of the Japanese Research Society for Vibration Syndrome, which is currently under discussion by the Society.

2. METHODS

The working group has performed i) reviews of the current diagnostic methods for HAVS recommended by the Japanese Ministry of Labour, and those used in other countries, ii) evaluation of clinical usefulness of different diagnostic modalities available for HAVS, iii) comprehensive reviews of the relevant literature, including the most recent research works and critical evaluation of consistency of data concerning the recognized diagnostic methods, and iv) analyses of data from multicenter studies conducted in Japan among HAVS patients and control subjects, including different tests. Furthermore, the areas of consensus and dissensus were addressed. After several rounds of discussion, the working group is going to propose draft guidelines for diagnosing HAVS in Japan.

3. RESULTS

This new diagnostic guidelines will serve two purposes: first, workplace health examination for HAVS, and second, clinical diagnosis of HAVS.

The whole diagnostic process will essentially be accomplished through taking the history (family, social, medical and occupational) and reporting of subjective symptoms, physical and laboratory examinations of circulatory, nervous, musculoskeletal and other systems, and differential diagnosis.

3.1. Workplace Health Examination

The purposes of workplace health examination are to detect early any signs/symptoms of HAVS, and to prevent any progression of HAVS. It will be carried out periodically at two stages: 1) general (primary) medical examination for screening purposes, and 2) special (secondary) medical examination for evaluating the disease severity (stage) of HAVS.

General (Primary) Medical Examination

A general medical examination should be provided for workers regularly or occasionally exposed to potentially harmful levels of HAV. The examination will include: i) a brief history; ii) subjective symptoms to assess vascular (white finger, finger coldness), neurological (tingling, numbness in fingers, reduced sensitivity), and musculoskeletal (joint pain, reduced strength) systems, as well as other symptoms (insomnia, headache, hearing loss, stiff neck, backache, etc); iii) physical examination to assess neurological (including, at the discretion of the physician - sensory perception and reflexes), and musculoskeletal disorders (range of motion, exercise pain); and iv) laboratory examinations. As clinically indicated, limited laboratory examinations will be performed to evaluate vascular (measurement of finger skin temperature and nail compression test at room temperature), neurological (vibrometry with simple equipment for index and little fingers), and musculoskeletal (grip strength test) disorders.

Special (Secondary) Medical Examination

Individuals with abnormal findings or reporting any HAVS-related impairments or symptoms will undergo a special medical examination for further investigation. The procedure is basically the same as that for the basic

diagnosis (discussed later), except for the detailed worksite evaluation for preventing the progression of HAVS.

3.2. Clinical Diagnosis

The clinical diagnosis of HAVS will be established also at two stages: 1) basic diagnosis, and 2) specialized examination (laboratory-based objective diagnosis).

Basic Diagnosis

The basic diagnosis is expected to be done at the clinic level with basic equipment. The process will involve the following: i) a comprehensive history; ii) subjective symptoms for the evaluation of vascular (white finger, finger coldness), neurological (tingling, numbness in fingers, reduced sensitivity, pain), musculoskeletal (joint pain, reduced strength) systems, and other related symptoms; iii) physical examination to assess neurological (detailed examinations including sensory perception and reflexes), musculoskeletal (range of motion, exercise pain, Tinel sign, Phalen test, Froment sign) disorders; iv) laboratory examinations for the evaluation of a) vascular (cold water immersion test - 10°C 10 min of one hand with temperature measurement of five fingers, nail compression test at one finger), b) neurological (vibrometry with a simple equipment like AU02 at 125Hz for all fingers, and, at the discretion of the physician, thermal perception test using simple equipment, and nerve conduction test), and c) musculoskeletal (grip strength, and at the discretion of the physician, X-rays) systems; and v) differential diagnosis (neurological examination, and at the discretion of the physician, peripheral blood examination and X-ray).

Based on the various findings, the diagnosis of HAVS will be determined, and it will be classified according to a revised/new classification system. If HAVS is diagnosed, the individual will be advised on fitness for work with exposure to vibration, and on medical treatment.

Although the diagnosis of HAVS can be determined in most cases at this stage, where a diagnosis can not be established, these cases will be considered for the specialized examination.

Specialized Examination

Specialized examination includes laboratory-based objective diagnosis tests which will facilitate a more accurate diagnosis. Specialized examination will be performed in specialized centres under controlled conditions. This will involve FSBP (ISO 14835-2 method, four fingers) and others (angiography, thermography, etc) to evaluate vascular disorders; sense of vibration (ISO 13091-1 method, all fingers); segmental nerve conduction test; and others (hot and cold threshold tests, X-ray, Purdue pegboard test or bean transfer test).

4. DISCUSSION

In Japan, there is need for comprehensive and universally accepted diagnostic guidelines for HAVS. For this purpose, a working group was convened by the Research Society for Vibration Syndrome, Japan Society for Occupational Health that began work in 2009 to propose new guidelines for diagnosing HAVS in Japan. Each working group member has the responsibility for a selected part of the diagnostic guidelines currently under discussion by the Research Society for Vibration Syndrome.

The proposed diagnostic guidelines incorporate several functional tests considered suitable for workplace health examination and clinical examination for HAVS. The new diagnostic guidelines consider equipment availability and diagnostic value for workplace health examination or basic diagnosis. They recommend simple equipment in common use in Japan, such as the Vibrometer AU-02 (RION Co. Ltd., Tokyo, Japan), and for specialized examination, the Tactile Vibrometer (HVLab, UK) which meets the ISO standard.

Severity grading of vascular or neurological disorders of HAVS may provide important diagnostic advantages, as it may also help to assess fitness for work. The working group is now discussing the issue of grading disease severity in HAVS, and considering the use of a revised classification system or establishing a new classification method for this purpose. The working group is also discussing the optimum cut-off values for different diagnostic tests, because variations in cut-off values lead to variations in the performance of diagnostic tests (Harada and Mahbub 2008).

5. CONCLUSION

The guidelines are expected to facilitate improved and more accurate diagnosis of HAVS in Japan.

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ACKNOWLEDGEMENTS

This work is supported by the Occupational Health Promotion Foundation in Japan and Japan Society for the Promotion of Science (Grant-in-Aid for Scientific Research B).