

Vibration related white finger disease: a case report

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ABSTRACT

Vibration related white finger disease is frequently observed in workers exposed to hand-arm vibration. The main occupational exposure sources for hand-arm vibration are grinding, road and concrete breaking, using of grinding wheel, rotary saw, high pressure water hose, pneumatic hammer, drill, hammer, hand crusher, lawn mower, road roller. A 38-year-old male patient was admitted to our occupational disease clinic with complaints of pain on both fingertips, swelling on the fingers and occasional whitening of the fingers on both hands. There was a story of pneumatic hammer use in a private firm that produced heat resistant plate for 12 years and also work story in the same company for 2 years in the grinding department. The case was considered to be a white finger disease due to vibration with current findings and work history, and medical treatment for white finger disease was regulated. It has been suggested that the patient should do job change, work in a non-cold environment, and also avoid work that can cause vibration. This case who exposed hand-arm vibrations shows the importance of taking a detailed work history while taking an anamnesis. In screening the health effects of the hand-arm vibration, the complaints of white finger disease should be carefully questioned and examined. Vibration-related white finger disease, as in other occupational diseases, can be protected by taking effective measures at the workplace.

Keywords: vibration, occupation, occupational disease, white finger

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Vibration; is usually the result of the swinging movements that the tools, equipments and machines in the workplace generate during work and is a physical risk factor that can cause occupational disease. Nowadays, vibration is one of the most studied ergonomic factors affecting human health and job success [1].

The damage of vibration on worker depends on various factor such as individual sensitivity, severity of vibration, exposure frequency, duration (years), level of insulation, grip strength, body part affected by source, maintenance repair of used instruments [2]. It is divided into two parts as whole-body vibration and

hand-arm vibration according to the contact of the body to the vibration source. The main occupational exposure sources for hand-arm vibration are grinding, road and concrete breaking, using of grinding wheel, rotary saw, high pressure water hose, pneumatic hammer, drill, hammer, hand crusher, lawn mower, road roller. Vibration related white finger disease is due to hand-arm vibration; It is a painful disorder in the veins, nerves, muscles and joints that lead to disability [3]. In this article we will present a case of white finger disease due to hand-arm vibration after use of vibrating tools for 12 years.



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CASE PRESENTATION

A 38-year-old male patient was admitted to our occupational disease clinic with complaints of pain on both fingertips, swelling on the fingers and occasional whitening of the fingers on both hands (Figure 1). There was a story of pneumatic hammer use in a private firm that produced heat resistant plate for 12 years and also work story in the same company for 2 years in the grinding department. The case was taken from the forging department due to complaints and he was given to the sanding section, but in this section also stated that the complaints continue. there were 20 years-packed cigarette (active) history in his medical history and hypertension in his mother in his family history.

Occupational History

August 2002- currently; In a company that manufactures heat-resistant plaques, he is pouring the mixture of chemicals into big boilers and preparing mud. He is pouring out the prepared mud with a shovel, then stepping up on mud and grinding it with a pneumatic hammer. On average, he is grinding with a pneumatic hammer eight plates per day. For the last 2 years, he has been sanding the burrs of the produced plates.

On physical examination, general condition was good, vital findings were stable, system examinations were usual. Hemogram, routine biochemistry, sedimentation, ANA profiles were within normal limits. The case was consulted in the rheumatology department. Both upper extremity arterial and venous

system doppler USG were observed as usual. The case was considered to be a white finger disease due to vibration with current findings and work history, and medical treatment for white finger disease was regulated. It has been suggested that the patient should do job change, work in a non-cold environment, and also avoid work that can cause vibration.

DISCUSSION

Vibration is an important risk factor that causes workers to be adversely affected by the working environment and the inadequacy of controlled epidemiological studies on dose-effect relationship makes it difficult to establish this relationship [4]. It has been reported that more than 150 thousands in the Netherlands, more than 0.5 million in the England and more than 0.5 million in the United States are exposed to hand-arm vibrations [5]. Occupational diseases arising from vibration are encountered in SGK statistics. The reason for this is that in our country, the issue of vibration is not well known, employees are not complaining about vibrations in their workplaces [2]. The Raynaud phenomenon associated with hand-arm vibrations is described in 1862. In 1911 Professor Giovanni Loriga described a disease that first appeared on the fingers of workers working with hammer drills in the mines in Italy, with attacks of pallor, cyanosis and chills. This disease started to be called white finger syndrome in the 1970s [6,7]. It is characterized by attacks of vasoconstriction of the finger arteries. Attacks last for minutes, hours and increases with cold



Figure 1. Photos taken during attack.

exposure or emotional stress [2].

Nyantumbu *et al.* [8] conducted a cross-sectional study in a gold mine in the Republic of South Africa in order to determine the extent and weight of the hand-arm vibration-induced influence of miners, as well as the tools that caused these impacts. They stated hand-arm vibration is linked to the use of hand-held vibrating tools, and this exposure has indicated that workers may experience pinning, numbness, loss of grip strength, pain, loss of hand skills, and potentially increased risk of occupational accidents. In gold miners exposed to vibration, the prevalence of hand-arm vibrations was found to be 15% and the latent period of 5-6 years was determined for the formation of the disease [8]. In our case, after 12 years using of pneumatic hammer, complaints started in both hands. In a cross-sectional study by Barregard *et al.* [9] in Sweden on car repairers, vibration-associated white fingers were observed in 15% of individual workers exposed to vibration on the average of 3.5 m/s² per day for 12 years and this rate increases to 25% in who exposed for 20 years. According to the regulations for protection of employees working in our country against risks related to vibration; for hand-arm vibration [2]. The daily exposure effective value for an 8-hour working period is 2.5 m/s². Vibration-related effects occur for many years, so no significant problem is observed in vibration exposure at high levels.

If the vibrational exposure is lifted in the early stages of the vascular-associated white finger, the development of permanent damage can be avoided and existing findings can be regressed.

Individual vibration measurements must be performed regularly to avoid hand-arm vibrations and necessary technical and engineering precautions should be taken to avoid exceeding the upper limits allowed. Vibrating instrument users should be informed and trained on correct and reliable instrument handling and as it is known that continuous vibration exposure increases the damage, the divided working range should be applied at rest intervals. Necessary medical examination must be carried out before recruitment and clinical examinations should be carried out at regular intervals in workers with vibration exposure. As contact with cold air or cold objects triggers attacks of white finger disease, it can benefit to use gloves to keep fingers and hands warm

and to protect them from injuries. Anti-vibration gloves are also proposed which partially isolate the high frequency components of vibration.

CONCLUSION

As a result, this case who exposed hand-arm vibrations shows the importance of taking a detailed work history while taking an anamnesis. In screening the health effects of the hand-arm vibration, the complaints of white finger disease should be carefully questioned and examined and more training should be given in order to recognize and evaluate the health effects of hand-arm vibration. Vibration-related white finger disease, as in other occupational diseases, can be protected by taking effective measures at the workplace.

Authorship declaration

All authors listed meet the authorship criteria according to the latest guidelines of the International Committee of Medical Journal Editors, and all authors are in agreement with the manuscript.

Informed consent

Written informed consent was obtained from the patients for publication of this case report and any accompanying images.

Conflict of interest

The authors declared that there are no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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