

**Materials for preparation of the students majoring in "Medicine"
Course 3, Faculty of Medicine
for exercising of the topic: Vibration disease
Academic Discipline of "Occupational Diseases and Toxicology"**

Vibration disease

Vibration is the mechanical oscillation of an object about an equilibrium point.

Hand-Arm Vibration Disease

Definition. A specific occupational disease characterized by primarily distal peripheral vascular, nervous and musculoskeletal disorders of the upper limbs with latent period of a few months to several years and gradual development in three stages.

Etiology. It is caused by local vibration transmitted by the hands along the arms with frequencies ranging from 10 to 1500 Hz. Daily vibration exposure, the subject's total operating time, frequency weighted vibration amplitude and acceleration of the hand-held tools, low temperature exposures and drinking and smoking habits are all risk factors of recognized value in vibration-induced Raynaud's phenomenon.

Occupations at risk. These are miners, stonecutters, drillers, woodcutters, jack hammers, chipping tools etc.

Pathogenesis. Vibration is a stressor causing autonomic disbalance with increased sympathetic nervous activity and/or parasympathetic depression, activation of the hypothalamic-hypophyseal-adrenal axis, and the limbic and sympathetic-adrenal systems.

Clinical picture. The vibration disease includes some syndromes.

1. Musculoskeletal syndrome: The manifestation is with pain and stiffness in the joints and muscles, and diminution of hand-grip force. Occurs as tendinitis, myotendinous and myositis, chronic arthritis located in the shoulders elbow, and little joints in the hands.

2. Raynaud's phenomenon: Occurs with blanching in the fingers. With the increasing severity the disease blanching doesn't correlate with the temperature.

3. Neurological syndrome: the peripheral nerve system is affected. The sensory and motoric function of the peripheral nerve is damaged. The patient complains of hypoesthesia, tingling and decreased of vibration perception and motor dysfunction.

Investigation panel:

1 For the musculoskeletal syndrome: X-ray or CT scan for bone and joints, EMG and ultrasonography of hands.

2. For the Raynaud's phenomenon and another vascular and microcirculatory problems: capillaroscopy, arteriography, Doppler sonography

Neurological syndrome: palesthesiometry, ENMG

Remember: Very important for the vibration disease is to prove that there is decreased or lost vibration perception. We can use two devices: Tuning fork with amplitude 128 Hz or palesthesiometry.

Treatment: Analgesics, NSAIDS, drugs that protect the central and peripheral nervous system and vasodilators, physical therapy

Medical assessment of the work capacity: Vibration disease grade I- need of temporary medical treatment and dynamic medical check-ups

Vibration disease grade I-II and II grade- need of medical treatment and hospitalization. The patient need temporary labor adjustment to appropriate work without vibration.

Vibration disease II-III or III requires permanent partial disability and adequate treatment.