

HAND-ARM VIBRATION SYNDROME ASSESSMENT TESTS



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Hand-arm vibration is transmitted from work processes into workers' hands and arms. It can be caused by hand-held power tools such as concrete breakers, hand-guided equipment such as lawn mowers or by holding materials being processed by machines such as pedestal grinders.

Hand-arm vibration syndrome (HAVS) is a group of diseases caused by exposure of the hands to vibration. The best known of these is vibration white finger (VWF) which is caused as a result of damage to the blood vessels.

There may also be damage to the nerves and muscles of the fingers and hands, causing numbness and tingling, reduced grip strength and sensitivity. Carpal tunnel syndrome (CTS) is an example of this and is caused by compression of the nerves in the wrist. Pain and stiffness in the hands and joints of the wrist, elbows and shoulders may also occur.

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Grip Strength

Description/Purpose

This is a test for the measurement of your hand-grip strength.

Procedure

1. Sit or stand comfortably.
2. Elbow bent to 90 degrees.
3. You will be asked to squeeze the hand-grip instrument with your maximum strength, starting with the normal hand followed by the injured hand.
4. Each test will be repeated 3 times alternately (right/left hand and vice versa).

This test usually takes 7-10 minutes.

Cold Immersion Test (Cold Water Tank Test)

Description/Purpose

This test looks at the way your blood flows through the small blood vessels of your hand by measuring the temperature of the skin at your finger tips. The skin temperature of your fingers is recorded while you are relaxed at room temperature and we continue to watch the temperatures after your hand is placed in the cold water. It is normal for your fingers to cool to the same temperature as the water (15°C). When your hands are removed from the cold water, the test measures how quickly your fingers warm up again.

Procedure

(left-hand is tested first)

1. Numbered thermocouplers will be taped to the tips of your fingers (left-hand first) and the wires supported by velcro strapping around each finger.
2. A blood pressure cuff is wrapped above the wrist.
3. The temperatures of the fingers are recorded for 2 minutes, then the left-hand is immersed in the watertank to the wrist. The cold tank temperature is 15°C.

4. The blood pressure cuff is inflated to 10mm above your normal blood pressure.
5. The cuff is released after 5 minutes with the hand remaining in the water tank for 2 minutes more.
6. After 7 minutes the hand is removed from the cold water, and the fingers are lightly dried with a towel.
7. The recording chart continues to record the temperatures from the fingers for another 7 minutes.

The entire procedure is repeated with the right hand.

This test usually takes 35-45 minutes.

Current Perception Threshold (CPT)

Description/Purpose

This procedure tests how much feeling you have in your fingers to electrical currents. It is a nerve test. This is to test your ability to feel an electrical stimulus at a low-level of current.

The purpose of it is to measure the least amount of mild electrical stimulus that you are able to feel.

Procedure

1. This test is not painful.
2. A pair of small electrodes will be taped on to your finger. First we will test the index finger and then the little finger of the left hand and then the index figure and finally the little finger of the right hand.
3. The stimulus will feel like a tingling, buzzing, pinprick, pulse or dull throbbing. Some people cannot describe it, but they feel something different in their finger.
4. The Technician will give you instructions before the test.

This test usually takes 30-45 minutes

Purdue Pegboard Test

Description/Purpose

This is a hand dexterity test. This is a test to see how fast and accurately you can work with your hands, fingers and arms.

Procedure

1. You will be seated comfortably at a small table directly in front of the Purdue Pegboard.
2. The Purdue Pegboard is a flat board (approximately 12" by 18" by 1") with rows of holes in it. At the end furthest from you there are four cups containing pins, collars and washers. For the test you will be asked to pick up the pins, collars and washers and put them correctly on the pegboard as quickly as you can.
3. The scores will be recorded 3 times for each group of tests. Each test will take 30 seconds.
4. The Test Administrator/Technician will show you what to do before each test begins.
5. You will have a chance to practice before you begin the test.

This test usually takes 15-20 minutes.

Audiometry

Description/Purpose

This is a hearing test. This is a test of your hearing ability usually with the aid of an Audiometer (automated machine). The purpose of this test is to assess and identify occupational hearing loss.

Procedure

1. You will be seated comfortably in an Audiometer booth.
2. You will be given a set of headphones and a hand-switch.
3. The Technician will give you instructions before the test.

This test usually takes 20-30 minutes.

Digital Plethysmography and Arterial Peripheral Doppler Study

Description/Purpose

This test is used to assess skin/finger blood flow at room temperature and after the fingers have been put into very cold water (2 minutes at 10°C) and to record the digital (fingers) blood pressures using a Doppler ultrasound instrument. This test will check to see if there are any health problems in the large blood and small blood vessels of your arms and hands.