HELD Dataset RD-1014-2020-0

Name of the Dataset: A model for detecting the effects of vibration on peripheral blood flow

Dataset Number: RD-1014-2020-0, https://www.cdc.gov/niosh/data/datasets/RD-1014-2020-0/

A brief description of the data written in plain language for a general audience: Exposure to hand-transmitted vibration (HTV) has been shown to result in cold-induced vasoconstriction and a reduction in blood flow to the hands and fingers of workers. Occupational exposure to HTV can also induce a hypersensitivity of the sympathetic nervous system to various stimuli, which in turn can result in vasoconstriction of the peripheral blood vessels and blanching of the skin because of reductions in peripheral blood flow. The data presented were collected using an established animal model of vibration-induced white finger (Welcome et al. 2008) to determine if changes in blood flow induced by vibration exposure could be used as a biomarker for the development of vibration-induced peripheral vascular disease. Two separate experiments were done. In Experiment 1, changes in blood flow were measured in the ventral tail artery of the rat tail before and after a 4 h exposure to tail vibration (frequency 125 Hz, amplitude 5 g). These data were compared with those of animals that were restrained and had their tail secured to a stationary platform (controls). A single exposure to vibration resulted in a reduction in blood flow in the ventral tail artery. These data are consistent with data collected in humans. In Experiment 2, animals were exposed to vibration or control conditions 5 days a week for 4 weeks (125 Hz, 5 g) and blood flow was measured by laser doppler before each exposure to determine if there were any lasting effects of vibration on blood flow that could be detected over time. Although there were no changes in average blood flow with repeated exposure to vibration, time series analyses demonstrated that the low frequency peak in blood flow (0.4 Hz) was reduced after 10 days of vibration exposure and after 15 days of restraint control. The 0.4 Hz signal in the laser doppler measurement is an indicator of arterial pulse."

A brief description of the data collection methods: In Experiment 1, changes in blood flow were measured in the ventral tail artery of the rat tail before and after a 4 h exposure to tail vibration (frequency 125 Hz, amplitude 5 g). These data were compared with those of animals that were restrained and had their tail secured to a stationary platform (controls). In Experiment 2, animals were exposed to vibration or control conditions 5 days a week for 4 weeks (125 Hz, 5 g) and blood flow was measured by laser doppler before each exposure to determine if there were any lasting effects of vibration on blood flow that could be detected over time. Although there were no changes in average blood flow with repeated exposure to vibration, time series analyses demonstrated that the low frequency peak in blood flow (0.4 Hz) was reduced after 10 days of vibration exposure and after 15 days of restraint control. The 0.4 Hz signal in the laser doppler measurement is an indicator of arterial pulse. Reductions in arterial pulse are indicative of an increase in vascular stiffness.

Formatted citations of the publications that have used these data.

Morgantown, WV: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, Research Dataset RD-1014-2020-0, 2020 Jul; :dataset

Acknowledgments (e.g., original source of dataset).

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General information on who to contact for more information (usually not individuals):
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