

A NEW EXAMINATION SYSTEM USING PHOTOPLETHYSMOGRAPHY TO EVALUATE SKIN BLOOD FLOW DURING EXPOSURE TO VIBRATION

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SUMMARY

We introduce a new examination method developed at the University Dermatology Hospital in Tübingen in cooperation with the Institute for High Frequency Techniques of Aachen Technical College and the Metabo Factory in Nürtingen, Germany.

The Tübingen workplace simulator for studying vibration white finger (VWF) syndrome generates standardized vibrations reproducing the vibration pattern of actual hand-held tools. This simulator makes it possible to evaluate on-line the effects of defined vibrations on skin blood flow in the fingers and to investigate the etio-pathogenesis of vibration white finger syndrome. The vibration simulator itself is modelled after an altered router with two side-mounted handles. The electronic speed control and exchangeable unbalance pins make it possible to adjust the frequency and amplitude of the vibrations to simulate actual conditions in the job. New developed photoplethysmographic sensors are fastened to the fingertips with double adhesive rings and measure blood flow in the skin. Measurements are recorded simultaneously with a multi-channel plotter. This method is not only useful as a diagnostic tool but has potential future applications in pre-employment screening in the affected industries and in the development of reduced-vibration tools.

Key words: vibration white finger syndrome, Raynaud's phenomenon, vibration simulator, hand-held tools, diagnosis

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