Rewarming curves and derived parameters in the diagnosis of hand-arm vibration syndrome

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References:
MEDICINA DEL LAVORO, Vol. 102, No. 5, pp. 445-454, Sep, 2011

Abstract:
Exposure to hand-arm vibrations is a known cause of the Hand-arm vibration syndrome (HAVS), a progressive syndrome beginning with sensory loss and leading to gangrene, making timely diagnosis essential. Assessment of the usefulness of 9 diagnostic parameters claimed as being of greatest value in the diagnosis of HAVS, and examination of the complementary diagnostic value of the curve shapes. Three groups of subjects (HAVS cases, exposed workers without irreversible changes, and controls) were examined by cold provocation followed by thermographic imaging, obtainment of rewarming curves for four preselected regions and calculation of parameters. The discriminative value of individual parameters and the discriminative power of a combination of all the parameters were assessed. Qualitative curve shape analysis was included. The greatest individual discriminative ability is associated with RT (rewarming time to pre-cooling value, p < 0.001), Tmax (maximum temperature during the 10-minute recovery, p < 0.001), k (rewarming rate, p < 0.012) and RD (rewarming delay, p < 0.031). The discriminant analysis yielded one significant discriminant function (Wilks' lambda = 0.278, chi2 (18) = 48.67, p < 0.001, canonical R2 = 0.63). Four types of rewarming curves were identified. RT, Tmax, k and RD appear to be the most suitable individual parameters for group discrimination. When linearly combined, the parameters can be useful for discriminating HAVS cases from both Controls and Claimants, which constitutes the main task of an occupational health physician. Additional information is available from the qualitative assessment of the rewarming curve shape.

Keywords:
Hand-arm vibration syndrome; diagnosis; thermography; rewarming