

FSBP% (Finger Systolic Blood Pressure%) as an Objective System for Evaluating Peripheral Circulatory Disorders Caused by Hand-Arm Vibration Syndrome

Field name "Hand-arm vibration syndrome"

In order to establish an objective diagnostic method for vibration induced-impairment, repeated examinations^{1, 2, 3, 4} (Fig. 22) have shown that employing the Finger Systolic Blood Pressure (%) (FSBP) is useful. Furthermore, when Raynaud's phenomenon manifests itself, we found that the

FSBP% becomes zero⁵ (Fig. 21). The cut-off, sensitivity, and specificity values are given in Table 9. If the cut-off value is set to 70%, the sensitivity is 71.9%, and the specificity is 85.5%.

What is the Finger Systolic Blood Pressure%?

The Finger Systolic Blood Pressure% (FSBP%) is a method that is performed in the following manner.

The finger blood flow is constricted for 5 min., the finger to be measured is cooled to 10°C, and the FSBP value after cooling is measured. The measurement is compared to the control finger (thumb) to verify change.

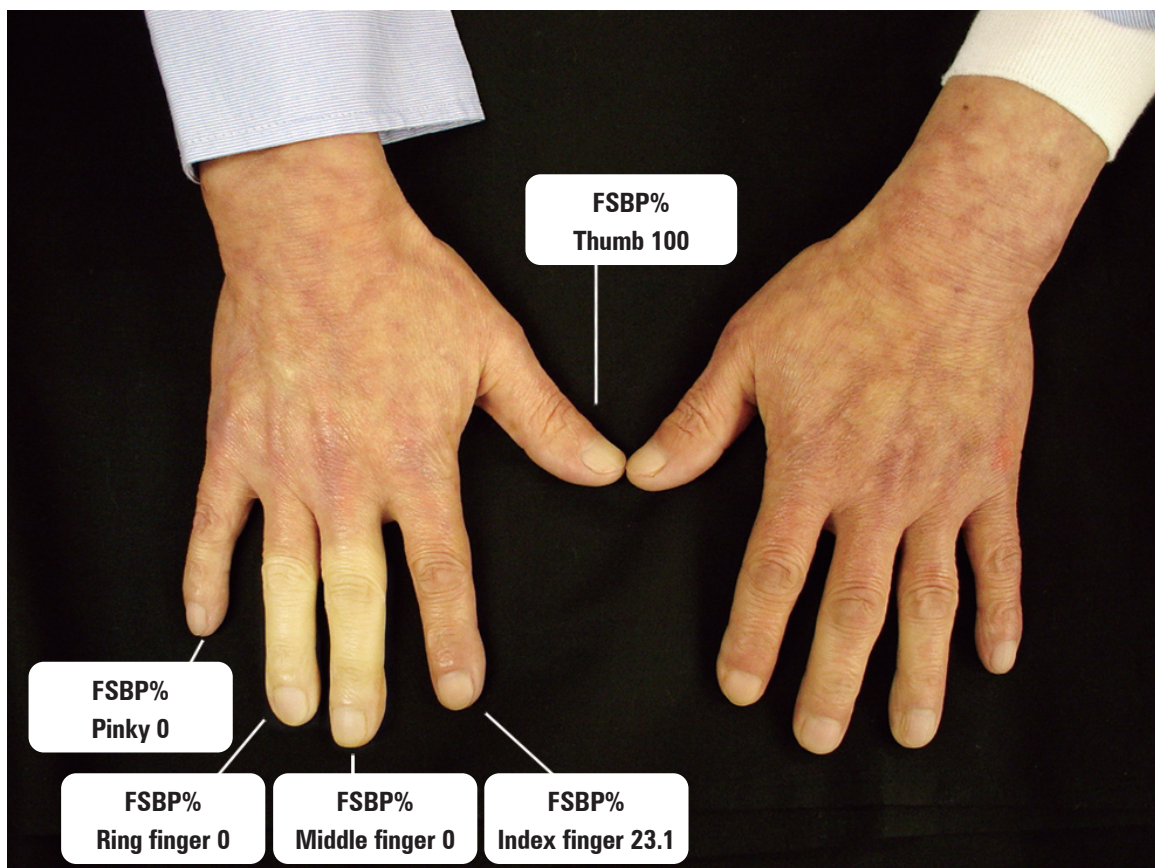


Fig. 21. Raynaud's phenomenon and the FSBP% measured at the time of the episode

The right middle and ring fingers exhibit Raynaud's phenomenon. The pinky exhibits Raynaud's phenomenon to a lesser extent. The SBP% is 0 for each of the middle finger, ring finger, and pinky exhibiting Raynaud's phenomenon.

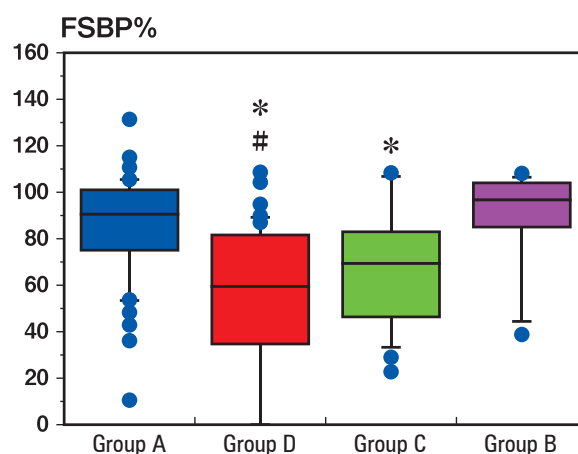


Fig. 22. FSBP% comparison (Room temperature $21 \pm 1^\circ\text{C}$)

Group A: Control group

Group B: Vibration exposed group that did not express Raynaud's phenomenon

Group C: Group in which Raynaud's phenomenon was not expressed at examination one year prior

Group D: Group currently expressing Raynaud's phenomenon

The distribution for the FSBP% value of each group is shown as a box plot.

* indicates a significant difference ($p < 0.05$) compared to Group A.

indicates a significant difference ($p > 0.05$) compared to the members of Group B that did not express Raynaud's phenomenon

Table 9. Cut-Off Value, Sensitivity, and Specificity

Cut-Off Value (%)	$21 \pm 1^\circ\text{C}$	
	Sensitivity (%) N=134	Specificity (%) N=96
60.0	59.4	95.8
65.0	67.2	94.0
70.0	71.9	85.5
75.0	71.9	80.7
80.0	78.1	75.9
85.0	89.1	60.2
90.0	95.3	54.2
95.0	95.3	47.0

References:

- 1) Nasu Y., et al.: Research, development, and dissemination of quick and accurate diagnostic method based on vibration induced impairment, Research report. The Japan Labour Health and Welfare Organization, Clinical Research Center for Hand-Arm Vibration Syndrome, 2007.
- 2) Nasu Y.: FSBP% (Finger Systolic Blood Pressure%) an objective method for evaluating peripheral circulatory disorder due to vibration induced impairment- Aiming to establish an objective diagnostic method for vibration induced impairment. The Japan Labour Health and Welfare Organization, Clinical Research Center for Hand-Arm Vibration Syndrome, 2008.
- 3) Nasu Y., Fujiwara Y., Honma H., Yanai T., Toyonaga T., Kido K., Ikeda T., Hashiguchi H., and Kurosawa Y.: Measuring change in finger arterial blood pressure after localized hypothermia as an objective method for evaluating peripheral circulatory disorder. Japanese Journal of Occupational Medicine and Traumatology, 56:13-27, 2008.
- 4) Nasu Y., Kurozawa Y., Fujiwara Y., Honma H., Yanai T., Kido K., and Ikeda T.: Multicenter study on finger systolic blood pressure test for diagnosis of vibration-induced white finger. Int Arch Occup Environ Health 81:639-644, 2008.
- 5) Fujiwara Y., Yoshino S., and Nasu Y.: Simultaneous observation of zero-value of FSBP% and Raynaud's phenomenon during cold provocation in vibration syndrome. J Occup Health 50:75-78, 2008.

* Reference 1 can be viewed at <http://www.research12.jp/h13/index2.html>, a site dedicated to the research and development, and dissemination projects related to the 13 fields of occupational injuries and illnesses.

* Reference 2 can be viewed at <http://www.research12.jp/h13/index.html>, a site dedicated to the research and development, and dissemination projects related to the 13 fields of occupational injuries and illnesses.