

## Water Immersion Skin Wrinkling: The Influence of Age, Sex, and Adiposity

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### ABSTRACT

From the evolutionary perspective, water immersion skin wrinkling (WISW) is the perceived water drainage to enhance grip in wet conditions. In the modern medicine, it is a noninvasive test of limb sympathetic function and can be used to assess peripheral neuropathy. WISW occurs as sympathetically-mediated contraction of subcutaneous glomus bodies after perturbation of ion concentration in palmar sweat glands. This phenomenon has not been studied well. Currently, it is not clear if common demographic variations (e.g., age, sex, and adiposity) that impact overall cardio-autonomic health status also affect WISW. **PURPOSE:** The purpose of the present study is to determine if peak WISW is modulated by age, sex, and body adiposity. Additionally, we addressed if such phenomenon is associated with osmotic reactions or edema. **METHODS:** So far 23 apparently healthy adults (11 females) aged  $36.5 \pm 18.4$  years were studied. Participants' hands were submersed in  $40^{\circ}\text{C}$  water for 30 minutes with degree of wrinkling being assessed via 5-point scale (0 to 4) at 10-minute intervals. Final ratings for digits 2-5 were summed and used to determine peak WISW with a score of 16 being the highest and 0 being the lowest possible scores. Additionally, hand and forearm volume were measured via water displacement before and after submersion to quantify hand volume expansion. **RESULTS:** Peak WISW ranged from 2 to 16 with the mean ( $\pm$ SEM) score of  $13.2 \pm 0.9$ . Peak WISW was moderately correlated with age ( $r = -0.37$ ) but was not correlated with BMI ( $r = -0.16$ ) or body fat percentage ( $r = -0.09$ ). Males demonstrated a greater degree of WISW with a mean rating of 15 compared with females with a mean rating of 11 ( $p < 0.05$ ). Hand and forearm volume did not change significantly with water immersion ( $505 \pm 98$  vs.  $515 \pm 99$  ml). Changes in hand and forearm volume were not associated with peak WISW ( $r = -0.03$ ). **CONCLUSION:** The present findings indicate that water immersion skin wrinkling varies widely with age and sex, and is not associated with body adiposity, edema or osmotic reactions.