

Daily habits influencing skin barrier function measurements: a prospective study

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Background

Biophysical properties like transepidermal water loss (TEWL) can be measured to evaluate skin barrier function. Different factors, such as age, anatomical location, water exposure, perspiration, smoking and skin hydration, have been found to influence these biophysical measurements. The effect of the influencing factors were mostly examined in highly controlled settings. Measurement of electrical skin impedance (EI) is a new non-invasive method based on the skin's impedance to low electrical currents through the skin. Factors that affect skin barrier function using EI have never been investigated. Therefore, this study focusses on the effect of daily habits on TEWL and EI measurements in healthy adults.

Objectives

The aim of this study was to evaluate the effect of daily habits on measurements of skin barrier function. Additionally, the influence of different anatomical locations on these measurements were investigated.

Methods

Healthy adults (n = 31) were divided into 3 age groups (18 – 29, 30 – 49 and ≥ 50). The effect of body cream application, skin washing with soap, walking, stairclimbing and drinking a cup of coffee on TEWL and EI measurements were evaluated. All measurements were performed on volar forearm and abdomen.

Results

Measurements of TEWL decreased at 15 and 90 minutes after body cream application and skin washing on both volar forearm and abdomen. Stair climbing increased the TEWL values on both anatomical locations after 5, 30 and 90 minutes. Coffee intake increased the TEWL values on the abdomen after 5 and 90 minutes.

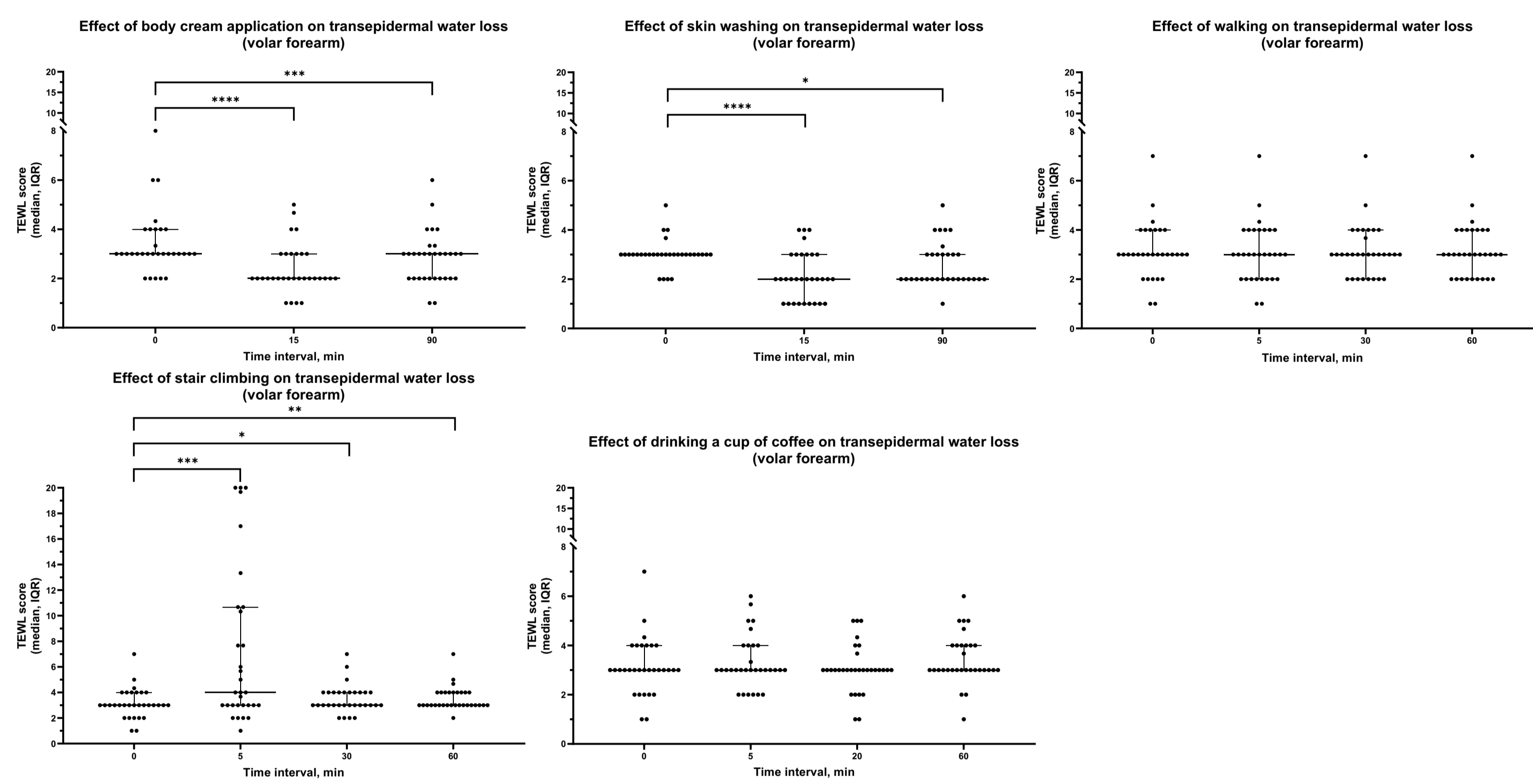


Figure 1. Effect of daily habits on TEWL measurements on volar forearm

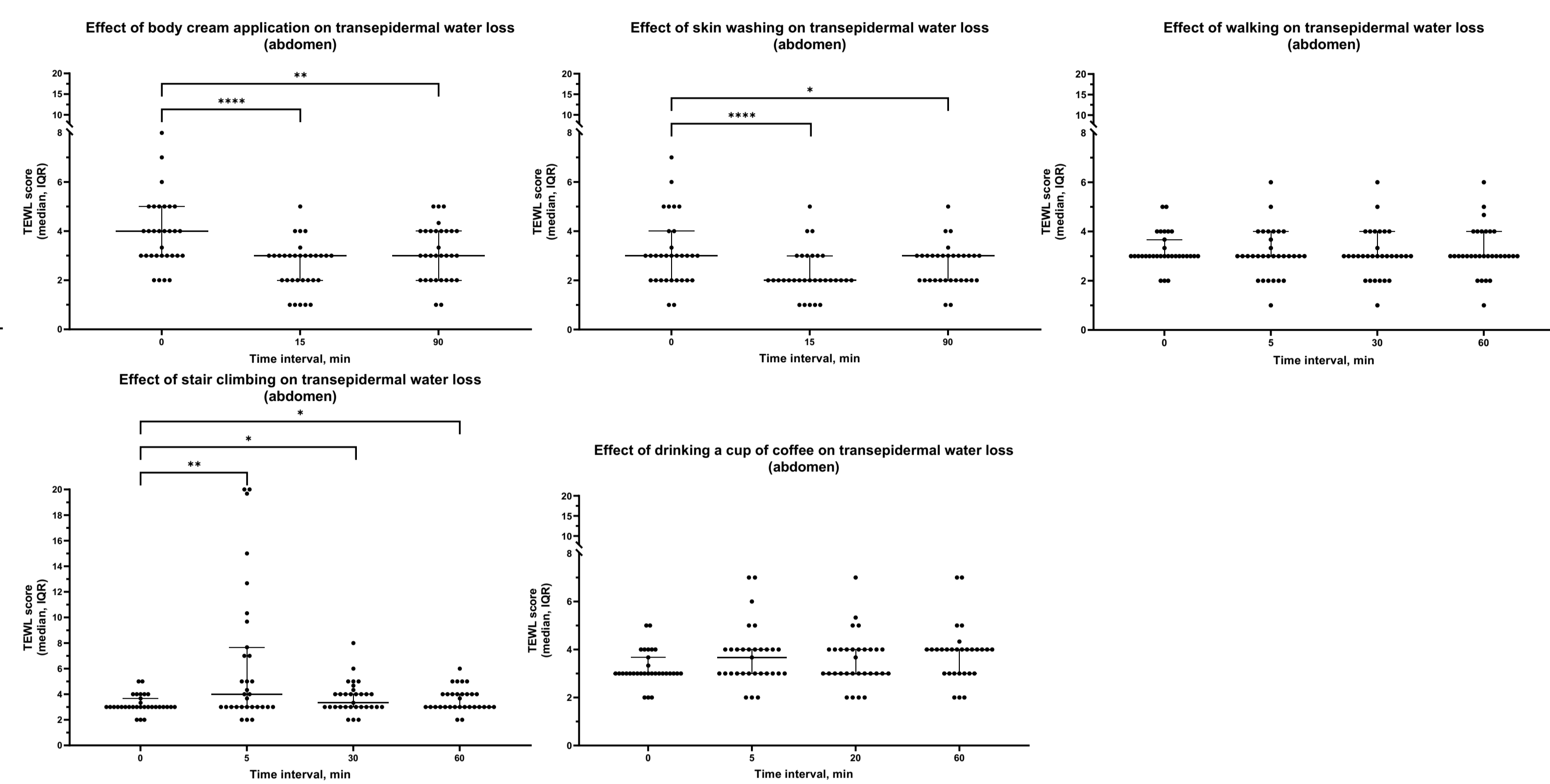


Figure 2. Effect of daily habits on TEWL measurements on abdomen

EI value lowered 15 and 90 minutes after body cream application and skin washing at both anatomical locations. Daily habits, such as stair climbing, walking and drinking a cup of coffee, had no effect on measurements of EI.

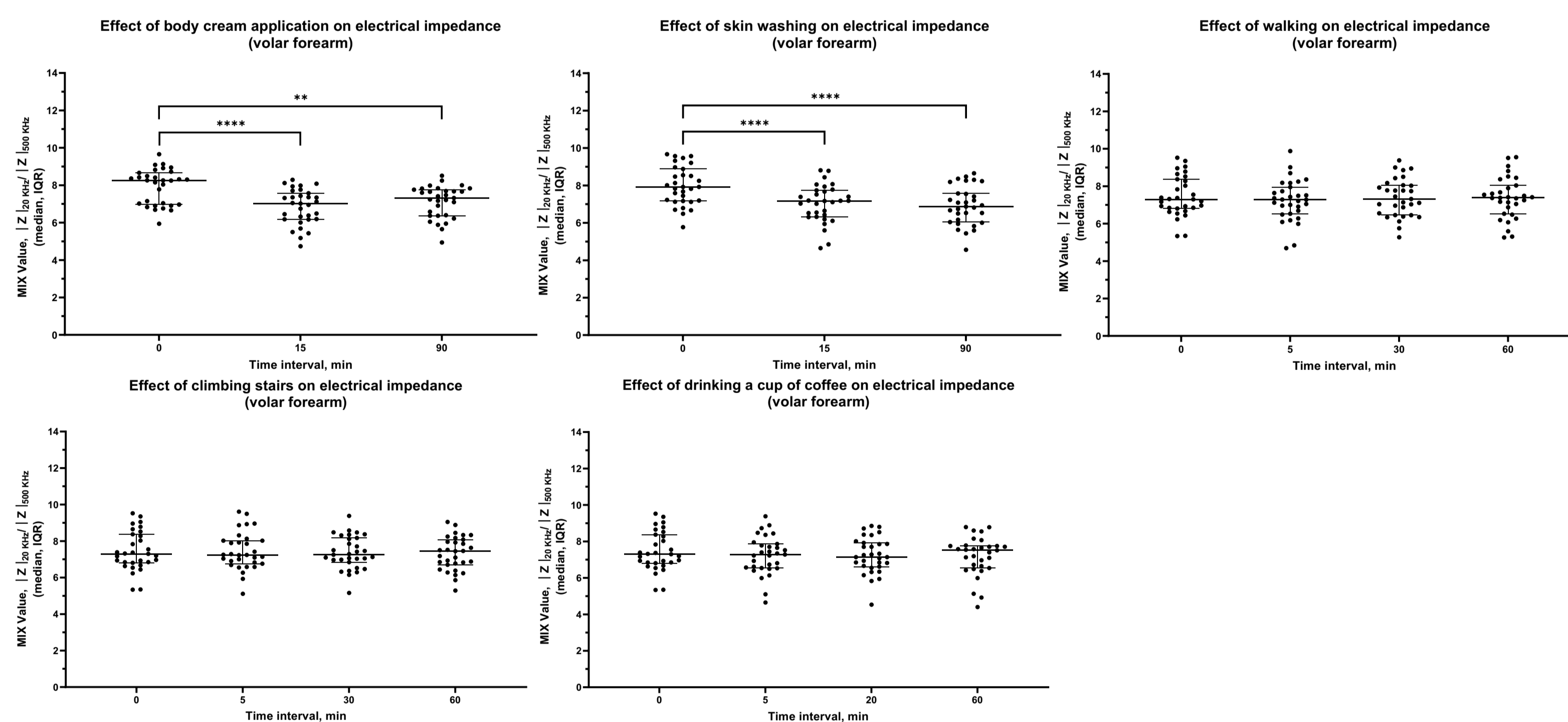


Figure 3. Effect of daily habits on EI measurements on volar forearm

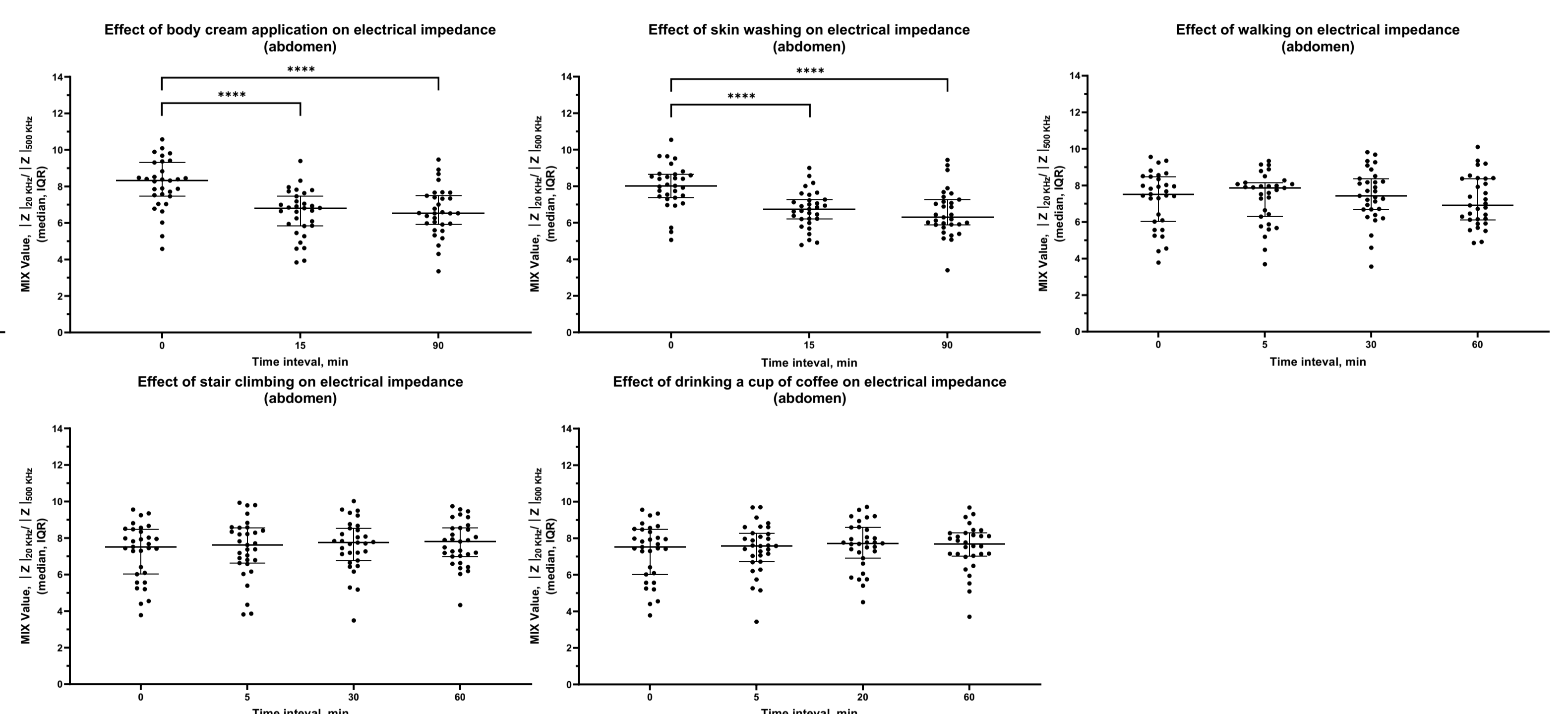


Figure 4. Effect of daily habits on EI measurements on abdomen

A difference was seen in TEWL measurements between the right and left side of the abdomen. Anatomical location had no influence on measurements of EI.

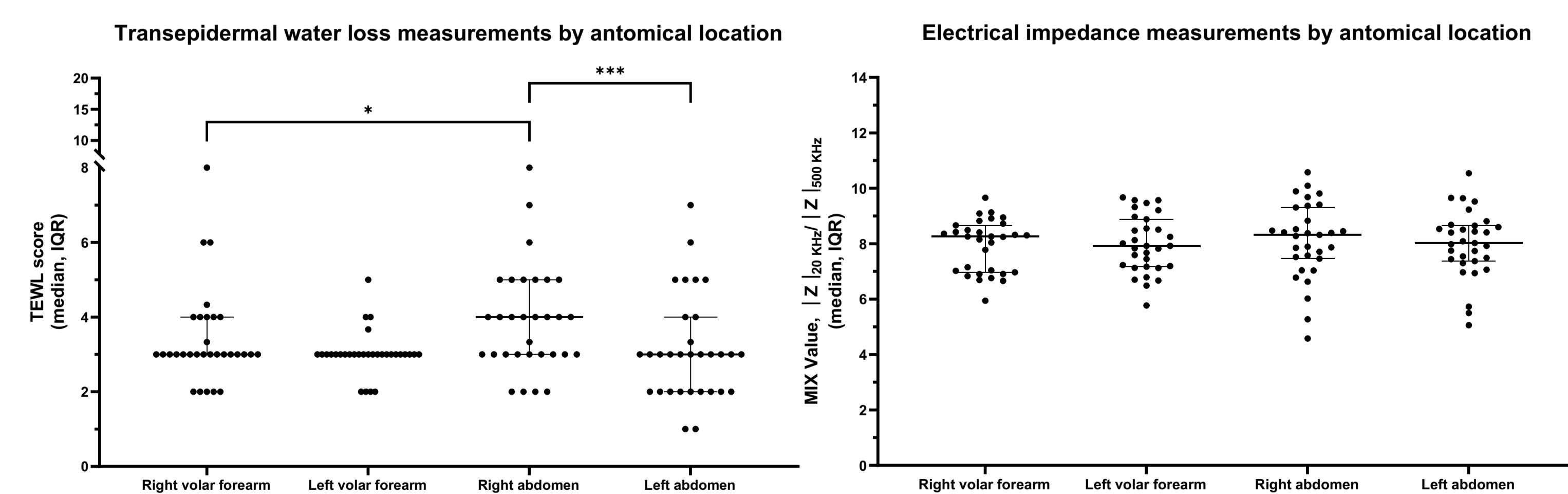


Figure 5. TEWL measurements by anatomical location

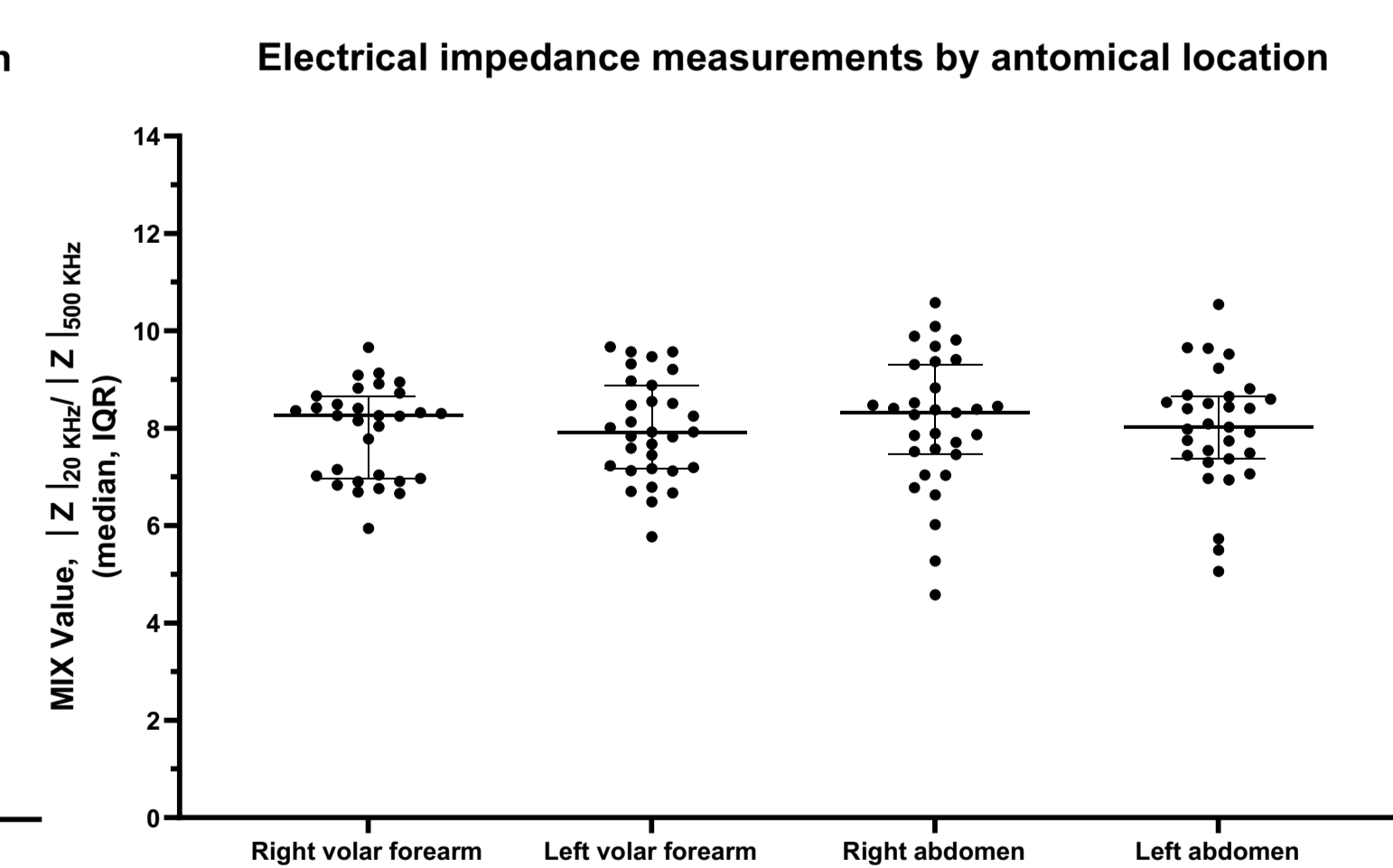


Figure 6. EI measurements by anatomical location

Set-up



Figure 7. Left: Multi Skin Test Center MC 1000 (Courage + Khazaka); Right: Nevisense (Scibase)

Conclusion

- Avoid skin washing and hydration with body cream prior to measurements of TEWL and EI
- TEWL measurements are sensitive to physical activity and coffee intake
- EI may be a reliable tool for evaluation of the skin barrier function