Face and Neck Skin Firmness and Water Content Assessed in Young Women

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Objectives: Goals were to (1) test the hypothesis that skin hydration directly correlates with skin firmness and (2) develop skin water-firmness data to later assess age-related changes.

Background: Stratum corneum water measurements suggest linkages between skin's mechanical properties and water content but the role of dermal water is unknown.

Methods: Dermal water was assessed by tissue dielectric constant (TDC) at 300 MHz to 0.5 and 2.0 mm depths on four face sites and two forearm sites of 20 women (24.6±1.4 years). Skin firmness was determined by the FORCE (mN) needed to indent skin 1.3 mm. Skin firmness was also measured at two neck sites and total body water% (TBW) and fat% (TBF) were measured.

Results: Among face sites, FORCE varied and averaged 30.8±5.2 mN with neck and forearm values of 25.3±7.3 and 52.3±11.9 mN. TDC averages varied by face site with averages of 35.1±4.4 at 0.5 mm and 36.7±4.1 at 2.0 mm depths. Forearm TDC values were less ($p<0.001$) being 30.6±4.5 and 27.1±5.1 for 0.5 and 2.0 mm depths respectively. Regression analysis showed an inverse correlation between FORCE and TDC on forearm but not face. Forearm and face TDC values correlated with TBW and inversely with TBF.

Conclusions: Face and forearm skin water-skin-firmness relationships are different with none for face but a negative correlation for forearm. Although this is only partially consistent with the hypothesis the skin firmness data for face, neck and forearm for this young female group should provide reference data for subsequent comparisons of possible age affects.