Facial Skin Tissue Water Assessed by Tissue Dielectric Constant: Dependence on Nerve Territory and Posture
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Objective: To quantitatively characterize facial skin tissue water (STW) within three differently innervated regions and determine the effect of posture. Background: Knowledge of normal facial tissue water distribution could provide baseline information impacting on several clinical conditions.

Methods: STW was assessed from measuring the epidermal-dermal tissue dielectric constant (TDC). Its value depends on tissue water content (pure water = 78). Measurements were done by touching skin with a probe for about 10 seconds and recording TDC values. Triplicate measurements were done bilaterally on forehead, cheek and chin that are sites within the territories of ophthalmic, maxillary and mandibular nerves respectively. For comparison, measurements were also done on a standardized site on the anterior surface of both forearms. Measurements were done with subjects supine and then in seated.

Results: Results to date (based on 10 male subjects) indicate bilateral symmetry of TDC values at each site with left vs. right values (mean±sd) for forehead, cheek and chin being respectively (42.0±2.7 vs. 43.1±2.1, 37.0±6.2 vs. 36.3±4.2 and 43.1±5.2 vs. 43.2±3.1). Forehead and chin site values decreased from the supine-to-seated position (p<0.05) but a statistically significance decrease for cheek sites has not been confirmed. Although side-to-side symmetry is present, combined cheek TDC values (34.5 ± 5.7) are significantly (p<0.01) less than values at either the forehead (42.6±2.3) or chin (42.9±5.1). All TDC face values were significantly greater (p<0.01) than those on the forearm (32.5±1.8).

Conclusions: These seminal findings can form the basis for studying pathological departures from normal in a variety of conditions.