POSTER 8

MEASUREMENT OF MECHANICAL PROPERTIES IN AGING SKIN

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Several molecular and structural changes, occurring as a result of intrinsic change and extrinsic damage, are seen in aging skin. The most pronounced transformations seen are vascular atrophy, decreased collagen and elastic fiber content, loss of hydration, as well as a disordered dermal matrix. Currently, it is difficult to easily quantify the physical changes of skin seen in aging. Collagen, elastic fibers, and mucopolysaccharides are the molecular components that define the biomechanical properties of skin. Elasticity, viscoelasticity and extensibility are variables used to determine the biomechanical properties of skin. Elasticity describes the stiffness of a material and is measured by calculating the Young's modulus. The research objective is to develop a medical device that uses applied vacuum and digital imaging correlation to evaluate skin elasticity seen with aging. This device has the potential for broader application as several other dermatologic conditions are associated with changes in the biomechanical properties of skin: scleroderma, nephrogenic fibrosing dermopathy, photodamage, topical steroid atrophy, epidermolysis bullosa, and wound healing. Ultimately, this method would provide a technique in which information about skin mechanical properties can be used to monitor progression of disease, evaluate treatment efficacy, and assist in the diagnosis of dermatologic conditions. Approximately 150 healthy dermatology patients, aged between 5 and 90 were tested. An image of the skin was taken before and after vacuum application. A software model measuring the change in distance between grid markings, seen in the before and after photos, was used to calculate the Young's modulus. The data was then plotted and age correlations were determined.