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### In vivo characterization of structural changes after topical application of glucocorticoids in healthy human skin.

Jung S, Lademann J, Darvin ME, Richter C, Pedersen CB, Richter H, Schanzer S1, Kottner J, Blume-Peytavi U, Röpke MA. *J Biomed Opt.* 2017 Jul 1;22(7):76018. doi: 10.1117/1.JBO.22.7.076018.

#### ABSTRACT

Topical glucocorticoids (GC) are known to induce changes in human skin with the potential to develop skin atrophy. Here, atrophogenic effects and subsequent structural changes in the skin after topical application of GC were investigated in vivo. Sixteen healthy volunteers were topically treated daily on the forearms with clobetasol propionate, betamethasone dipropionate, and the petrolatum vehicle for 4 weeks. All treated skin areas and a nontreated control area were examined by ultrasound, optical coherence tomography, confocal laser scanning microscopy, multiphoton tomography (MPT), and resonance Raman spectroscopy at baseline 1 day after last application and 1 week after last application. Investigated parameters included stratum corneum thickness, epidermal, and full skin thickness, keratinocyte size and density, keratinocyte nucleus-to-cytoplasm ratio, skin surface classification, relative collagen and elastin signal intensity, second-harmonic generation-to-autofluorescence aging index of dermis (SAAID), and the antioxidant status of the skin. A reduction in epidermal and dermal skin thickness was observed in GC treated as well as in vehicle-treated and untreated skin areas on the volar forearm. MPT analysis showed an increased epidermal cell density and reduced cell size and nucleus-to-cytoplasm ratio and a significant increase of SAAID after GC treatment indicating a restructuring or compression of collagen fibers clinically being observed as atrophic changes. PMID: 28753693 DOI: 10.1117/1.JBO.22.7.076018