

## Effect of a Lipid Mixture on Glucocorticoid-induced Barrier Impairment and Epidermal Atrophy in Canine Skin

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**Purpose:** Intercellular lipids play an essential role in maintaining the integrity of skin barrier. Skin barrier impairment and epidermal atrophy are the most common adverse effects of topical glucocorticoids therapy. The aim of this study was to evaluate the potential repair capacity of a lipid mixture on barrier impairment and skin atrophy induced by long-term topical steroid application in dogs.

**Materials and Methods:** For 28 days healthy dorsal skin was applied with glucocorticoids, and then a topical lipid mixture containing cholesterol, ceramide, and free fatty acid twice daily over a period of 14 days. Skin surface environment were assessed for 28 days after beginning the steroids application using non-invasive biophysical measurements and were evaluated for 14 days during lipid mixture application period. Immunohistochemistry was performed to determine cellular and molecular phase of skin.

**Results:** Long-term steroid application induced skin barrier impairment and epidermal atrophy. TEWL significantly increased in a time-dependent manner with maximum increase on 28 days ( $p < 0.05$ ). Skin hydration was not significantly changed according to the application time. Skin surface pH and thickness were significantly decreased with a maximum decrease on 28 days, respectively ( $p < 0.01$ ). Histological observation showed that glucocorticoids significantly reduced the thickness of epidermis and stratum corneum ( $p < 0.01$ ) and also decreased the numbers of hair follicles ( $p < 0.01$ ). Moreover we observed that caspase-3 and PARP immunoreactive cells in epidermis and hair follicles were significantly increased in immunohistochemistry ( $p < 0.01$ ). A lipid mixture application significantly recovered the glucocorticoids-induced dermal physiological changes ( $p < 0.05$ ). Also, we confirmed that a lipid mixture significantly inhibited skin atrophy and apoptosis based on histologic and immunohistochemistry observation ( $p < 0.05$ ).

**Conclusion:** It would be concluded that a lipid mixture remarkably improved skin barrier impairment and inhibited skin atrophy and apoptosis induced by topical glucocorticoids in dogs.

**Key words:** lipid, ceramide, glucocorticoid, epidermal atrophy, dog

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