PAEDIATRIC DERMATOLOGY

AGE-DEPENDENT TRANSFORMATION OF SKIN BIOMECHANICAL PROPERTIES AND MICROMORPHOLOGY DURING INFANCY AND CHILDHOOD

Gaelle Bellemere [1] - J.w. Fluhr [2] - Clarence De Belilovsky [3] - Gaetan Boyer [3] - C.p. Mcguckin [4] - N. Forraz [4] - G. Pellacani [5] - Caroline Baudouin [1]

Laboratoires Expanscience, Innovation R&d Direction, Epernon, France [1] - Charité Universitätsmedizin, Charité Universitätsmedizin, Berlin, Germany [2] - Laboratoires Expasncience, Innovation R&d Direction, Epernon, France [3] - Ctibiotech, Ctibiotech, Lyon, France [4] - Department Of Dermatology, University Of Modena And Reggio Emilia, Modena, Italy [5]

Introduction: Infant skin is different from children and adults'one from anatomical and functional points of view. However, the correlation between the maturation of its biomechanical properties and the evolution of skin topography and micromorphology from infancy to early adulthood has never been studied.

Objective: In this work we investigated the maturation of biomechanical function of skin postnatally and throughout childhood. We used noninvasive methods to evaluate infant skin from birth.

Materials and Methods: 70 subjects divided in 7 age groups were included: 1-15 days, 5 weeks, 5-7 months, 2 years, 4-5 years, 7-8 years, and 20-35 years old. Skin properties were examined by cutometry and reflectance confocal microscopy (RCM) in vivo, and by immunohistochemistry (IHC) in a limited number of foreskin biopsy samples.

Results: Cutometry showed that skin elasticity increased from infancy to 2 years. The viscoelastic component decreased from infancy to adulthood. Total recovery was slightly higher at older ages and total deformation did not vary between age groups. None of the parameters were correlated with stratum corneum (SC) hydration.
RCM showed that thickness of the SC and supra papillary epidermis increased with age. The homogeneity and furrow architecture of SC changed dramatically between infants and older children. Dermal papillae increased in number with age, whereas rete ridge thickness remained stable. Circular "cuffing" of the follicle by collagen fibers was observed only in newborns, age at which collagen fibers were fibrillar and showed a parallel orientation.
IHC showed that both fibrillin and elastin fibers increased in length and intensity with age, especially at the dermal-epidermal junction

Conclusions: These data demonstrate the biochemical and structural evolution of the dermis during postnatal development. These changes in these skin biomechanical properties are related to structural maturation rather than hydration. Our data support a contribution of mechanical forces to dermal maturation postnatally.