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Literature List
Nail StrainStress Meter

G. Musitelli, S. Sacchi, M. Bleve, P. Capra, P. Perugini, **A new approach to evaluate in vivo biomechanical properties of nails,** ISBS Copenhagen 2012

Objective: Recently, a lot of new products claiming hardener, moisturizing or whitening effects about nails are developed. In according to requirements introduced by the 1223/2009 Regulation, it is mandatory to find and validate instrumental methods able to verify product effects. The aim of this work is to present a versatile quantitative approach in which measurements of thickness and water content are associated to a compression test for in vivo evaluation of flexibility and elasticity of the nails.

G. Musitelli, S. Sacchi, E. Raffaldi, P. Capra, P. Perugini, **Evaluation of safety and effectiveness of nail products by a versatile quantitative approach,** IFSCC 2014 Paris

Introduction: The nail plate, whose thickness is roughly in the range of 300–800 mm, is composed of three histological layers: the dorsal, intermediate and ventral plates. The nail plate is composed mainly of hard keratin and lipids, like hair. It was reported that the total lipid content in the nail plate was 1.4%, and that its fatty acid content was higher and ceramide content was lower than the stratum corneum.

P. Perugini, G. Musitelli, M. Bleve, G. Khazaka, **Noninvasive measuring apparatus for the investigation of nail mechanical properties,** ISBS Lisbon 2016

The Nail StrainStress Meter NM100 is a new apparatus based on a recently patented technology (PCT/IB2014/067260), easy to use and developed for a quick and accurate evaluation of distal portion of nails in terms of thickness, compressive strength and deformation lengthwise and crosswise. Transversal deformation: The nail is deflected compressing the convex distal part. The slope of the curve indicates the elastic property of the distal nail plate. Longitudinal deformation: The nail distal edge is deflected leaving the end free to flex. The slope of the curve indicates the elasticity of the distal edge (border) of the nail. Resistance to compression force: The nail is compressed punctually. The slope of the curve indicates the structural strength of the nail. The distance before the nail is met and the curve starts indicates the thickness of the nail.

P. Perugini, G. Musitelli, M. Bracchi, P. Capra, M. Bleve, **Nail StrainStress Meter NM 100: a novel, unique in-vivo method to characterize the biomechanical properties of the nail**, Poster at the 4th International *Summit on* Nail Diseases, June 2017, Athens

Aim of the work: Definition of the procedures to use the Nail StrainStress Meter NM100, a new apparatus based on a recently patented technology, for the “in vivo” evaluation of nails in terms of thickness, structural firmness, flattening and bending properties.

M. Bracchi, G. Musitelli, P. Capra, M. Bleve, P. Perugini, **Gold standard "in vitro" procedure to evaluate safety and efficacy of nail care products**, Poster at the 4th International *Summit on* Nail Diseases, June 2017, Athens

The access to intact human nails is often limited, so animal material has been used as substitute to study nail permeability and the effect of substances in contact with nails. Furthermore, using bovine hooves, the evaluation of safety and efficacy of ingredients and cosmetic products can be achieved. However, differences between animal hooves and human nails are reported in the literature and so caution is required in extrapolating such data to predict ungual effect on humans. Aim of this work is to define a methodological approach to standardize samples obtained from animals to improve reliability and reproducibility of the data in order to predict human nail responses.

D. Khazaka, C. Uhl, **Nails: more than just skin extensions,** PERSONAL CARE ASIA, May 2018, p. 33-35

The horn-like envelopes covering the tips of our fingers and toes are called nails. They are highly specialised epidermal appendages. Finger- and toenails are made out of a tough fibrous protein, the alphakeratine. The nail consists of the nail plate, the nail matrix and the nail bed below it, and the grooves surrounding it.[1] Apart from the aesthetical aspect, a healthy fingernail has the function of protecting the fingertip and the surrounding skin from injuries and preventing the skin at the end of fingers and toes from rolling backwards over the distal phalanx. The nail helps to improve sensitivity and the grip of the fingers and also enables the precise manipulation of small objects through counter-pressure exerted on the pulp of the distal digits (e.g. pulling out a splinter in one's finger), as well as certain cutting or scraping actions.[1'3]