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Evaluation of pigmented skin lesions with optical computed tomography

The aim of this study was to evaluate a novel, non- contact diagnostic technique for three-dimensional imaging of melanocytic lesions, using optical computed tomography (optical-CT), in order to discriminate melanoma from nevi and determine the thickness of invasive melanoma. This method is based on non- contact measurements of biopsy samples using diffused light illumination and multiple angle detection of transmitted light. A filtered back-projection algorithm was employed to calculate 3-D maps of the optical properties of the treated tissue samples (in house developed system). Tomographic reconstructions were performed with a back propagation algorithm calculating a 3D-map of the total attenuation coefficient, by making use of Beer's law, which relates the amount of decay in intensity to the amount of absorption present per cm of tissue traveled. Seventeen melanocytic lesions, one hemangioma and normal skin were studied after excision by optical computed tomography and subsequently with conventional histopathologic examination. Statistical significance was found between melanomas, dysplastic nevi and common melanocytic nevi (Kruskal-Wallis test). No statistical significant difference was observed when thickness values obtained by optical CT were compared with histological thickness (Wilcoxon signed rank test). The results of this study suggest that optical CT may be important for the immediate prehistological evaluation of melanocytic lesions. This study offers preliminary evidence that the 3D- maps of attenuation coefficient as provided by optical-CT may be used for the classification of nevi and melanoma as well as the evaluation of the maximum thickness including Breslow thickness for melanoma.

Biography

Androniki Tosca is a Professor of Dermatology at the University of Crete Medical School. She has graduated from the Medical School of Thessaloniki, Greece. Post graduate studies in England, France and Germany and Palo Alto. Ph.D. thesis in 1978, professorship thesis in 1987. More than 152 publications in peer reviewed journals, approximately 1000 citations, a member of many national and international societies. She speaks fluently English, French and Italian. She is also an Editorial board member in National and International Journals.

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