

IN VIVO EVALUATION OF MELANOMA THICKNESS BY MULTISPECTRAL IMAGING AND AN ARTIFICIAL NEURAL NETWORK. A RETROSPECTIVE STUDY ON 250 CASES OF CUTANEOUS MELANOMA

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Aims and background: Noninvasive diagnostic methods such as dermoscopy, sonography, palpation or combined approaches have been developed in an attempt to preoperatively estimate melanoma thickness. However, the clinical presentation is often complex and the evaluation subjective. Multispectral image analysis of melanomas allows selection of features related to the content and distribution of absorbers, mainly melanin and hemoglobin, present within the lesion. Hence, it is reasonable to assume that the same features might be useful to predict melanoma thickness.

Methods: A multispectral image system was used to analyze *in vivo* 1939 pigmented skin lesions. The lesion selection was based on clinical and/or dermoscopic features that supported a suspicion for melanoma. All the lesions were then subjected to surgery for the histopathological diagnosis, and 250 were

melanomas. From the multispectral images of the melanomas, we selected 12 features, seven of which were used to train and test an artificial neural network on 155 and 95 melanomas, respectively.

Results: Sensitivity (i.e., melanoma ≥ 0.75 mm thick correctly classified) and specificity (i.e., melanoma < 0.75 mm thick correctly classified) evaluated from the receiving operating characteristic curves ranged from 76 to 90% and from 91 to 74%, respectively.

Conclusions: Our approach provides results similar to those obtained with other methods and has the advantage that it is not related to the expertise of the clinician. In addition, the physical interpretation of the selected features suggests a possible role of spectrophotometry as an objective method to study the natural history of the early phases of the disease.

Key words: artificial neural network, Breslow thickness, image analysis, melanoma, spectrophotometry.

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