Dermoscopy compared with naked eye examination for the diagnosis of primary melanoma: a meta-analysis of studies performed in a clinical setting  
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CRD summary
The authors assessed the value of adding dermoscopy to clinical examination for the diagnosis of melanoma. Despite some limitations in the review process, their conclusion, that the addition of dermoscopy increased the accuracy of naked eye examination, is likely to be reliable.

Authors’ objectives
To assess the gain in diagnostic accuracy provided by using dermoscopy, in addition to examination with the naked eye, in the diagnosis of melanoma.

Searching
MEDLINE, EMBASE, CINAHL, Clinical Evidence, the Cochrane Library and AustLit were searched (1987 to November 2006). Update searches were conducted via PubMed (January 2008). Search terms were reported.

Study selection
Studies that compared the diagnostic performance or clinical examination with and without the use of dermoscopy, for the diagnosis of melanoma, in prospectively recruited, consecutive series of patients with a defined clinical presentation, were eligible for inclusion. Studies were required to report sensitivity and specificity for both index test protocols, compared independently with a reference standard (histopathological diagnosis, or diagnosis by an expert in the filed); index tests had to be interpreted blinded to the results of the reference standard. Studies conducted on images of melanoma, and studies without an English language abstract, were excluded.

The majority of included studies (eight out of nine) used a histopathological reference standard. Six out of nine studies used the ABCD(E) rule for clinical diagnosis of melanoma. A variety of criteria (reported in the review), were used for dermaascopic diagnosis. Where reported, the median Breslow thickness of melanoma ranged from 0.35 to 0.95 mm.

Titles and abstracts were screened by one reviewer, with uncertainties discussed with an expert in the field and disagreements resolved by consensus. Retrieved articles were assessed for inclusion by two reviewers.

Assessment of study quality
The authors did not state that they assessed study validity. Included studies were restricted to those that made direct, independent, blinded comparisons between tests.

Data extraction
Data were extracted on melanoma thickness, the criteria for clinical and dermoscopic diagnoses of melanoma and on the numbers of true positives, false negatives, true negatives, and false positives. Full definitions were provided in the review.

The authors did not state how data were extracted for the review, or how many reviewers performed the data extraction.

Methods of synthesis
Sensitivity and specificity, with 95% confidence intervals, by lesion, were calculated for clinical examination, with and without dermoscopy, for each study. These values were plotted in receiver operating characteristic space and as forest plots. Positive predictive values were also reported.

The hierarchical summary receiver operating characteristic method was used to estimate a summary receiver operating characteristic curve and the relative accuracy of the two test protocols. The relative diagnostic odds ratio was used as
the measure of relative accuracy. A covariate for test type (clinical examination versus clinical examination plus dermoscopy) was included in the hierarchical summary receiver operating characteristic model to test for differences in shape of the summary receiver operating characteristic, accuracy and positivity rates between the two test protocols.

Results of the review
Nine studies, two randomised trials and seven cross-sectional studies, were included in the review. Included studies assessed a total of 8,487 suspicious skin lesions (study size ranged from 43 to 3372) and identified 375 melanomas or 'lesions suspicious for malignancy' (melanoma prevalence ranged from 0.5% to 21.1%). Five studies included only suspicious lesions selected for excision and were thus subject to verification bias. All but one of the included studies were conducted in specialist pigmented lesion clinics; the study conducted in primary care had referral of suspicious lesions to a specialist clinic as its endpoint.

The summary estimate of sensitivity was higher for clinical examination plus dermoscopy (0.90, 95% CI: 0.80 to 0.95) than for clinical examination alone (0.71, 95% CI: 0.59 to 0.82). The summary estimates of specificity were similar for clinical examination plus dermoscopy (0.90, 95% CI: 0.57 to 0.98) and clinical examination alone (0.81, 95% CI: 0.48 to 0.95).

The diagnostic odds ratio was estimated to be 15.6 times higher for clinical examination plus dermoscopy than for clinical examination alone; relative diagnostic odds ratio 15.6 (95% CI: 2.9 to 83.7). When two studies with sensitivities of 1.0 (based on very small numbers of melanomas) were removed from the analysis, the relative diagnostic odds ratio was reduced, but remained statistically significant.

Positive predictive values were also reported.

Authors' conclusions
For clinicians with at least minimal training in dermoscopy, the addition of dermoscopy increased the accuracy of naked eye examination for the diagnosis of cutaneous melanoma in suspicious skin lesions.

CRD commentary
The review addressed a clearly stated research question, which was defined by appropriate inclusion criteria. The search strategy included a number of potential sources, but restriction to studies with an English language abstract may have resulted in a loss of relevant data and leaves open the possibility of language bias. Measures were taken to minimise error/bias in the inclusion screening process, but it was unclear whether similar measures were applied during data extraction. The authors did not formally assess study validity. However, some important aspects of methodological quality formed part of the inclusion criteria of the review and issues of study quality were addressed by the authors in their reporting of results. Rigorous meta-analytic methods were applied and these were clearly explained. Overall, the authors' conclusion is likely to be reliable.

Implications of the review for practice and research
Practice: The authors stated that some training in dermoscopy is needed to achieve the improvements in diagnostic accuracy reported.

Research: The authors stated that future research assess the numbers of unknown false negative lesions using follow-up, or non-invasive reference tests.

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