Systematic review of the diagnostic accuracy of dermatoscopy in detecting malignant melanoma

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Authors' objectives
To assess the evidence that dermatoscopy improves the accuracy of diagnosis of melanomas in clinical practice.

Searching
MEDLINE Express was searched from January 1983 to January 1997 using the MeSH terms 'melanoma' or 'skin neoplasms', combined with 'sensitivity and specificity' and the textwords 'dermascop*', 'dermatoscop*', 'skin surface microscop*', 'epiluminesc*' or 'incident light microscop*'. EMBASE was searched from 1980 to 1966 using similar strategies. The bibliographies of retrieved articles were also reviewed.

Study selection
Study designs of evaluations included in the review
Studies fulfilling the following criteria were included in the review: an original study with a formal 'Methods and Results' section, which compared the diagnostic accuracy of dermatoscopy for malignant melanoma with another method of clinical diagnosis. Studies with no comparison group were excluded. Articles on the terminology of dermatoscopic techniques, the development of criteria for diagnosing pigmented skin lesions, and observer error of diagnosis, were also excluded.

Specific interventions included in the review
The included studies were required to compare the diagnostic accuracy of dermatoscopy for malignant melanoma with another method of clinical diagnosis. Articles on the accuracy of digital imaging computer programs were excluded. The dermatoscopy methods studied included dermatoscopy using hand-held monocular dermatoscopes with x10 magnification and binocular stereo microscopes with magnification up to x40.

Reference standard test against which the new test was compared
The included studies were required to use excision biopsy with histopathological examination as the reference standard.

Participants included in the review
The included studies were required to assess the diagnostic accuracy of dermatoscopy over a large range of pigmented lesions, including a spectrum of stages of melanoma and lesions commonly confused with melanoma. The included studies were of patients with pigmented lesions who were attending specialist dermatology clinics.

Outcomes assessed in the review
No inclusion criteria relating to the outcome measures were specified. The outcomes assessed in the review were the sensitivity, specificity, positive and negative likelihood ratios, and positive and negative predictive values.

How were decisions on the relevance of primary studies made?
The author reviewed abstracts of articles to identify studies meeting the inclusion criteria.

Assessment of study quality
Validity was assessed using the following criteria: explicit criterion standard of histopathological examination; blinding of observers; spectrum of pigmented skin lesions; study setting; patient demographics; prevalence of melanoma; sample size; intra- and inter-observer error; and the proportion of pigmented skin lesions in which no dermatoscopic diagnosis could be made. The author did not state how the papers were assessed for validity, or how many reviewers performed the validity assessment.
**Data extraction**
A single observer extracted the data.

**Methods of synthesis**
How were the studies combined?
A meta-analysis, and the estimation of a single summary statistic for the diagnostic benefit of dermatoscopy, were considered inappropriate. This was due to the variability in the sensitivity and specificity in clinical diagnosis between the studies, and the potential variability in the observers’ ability to make a diagnosis. The results were described in a narrative review.

How were differences between studies investigated?
Differences with respect to various factors were discussed.

**Results of the review**
Six studies (n=1,382) were included: 3 used hand-held monocular dermatoscopes, 2 used binocular stereo microscopes, and 1 study used both.

The likelihood ratios for a positive diagnosis of melanoma by dermatoscopy ranged from 2.9 to 10.3. Conflicting results were found among the studies comparing the sensitivity and specificity of dermatoscopy to non-dermatoscopic diagnosis. An assessment of the studies’ internal and external validity was hampered by the lack of information. The following information was lacking in the primary studies: explicit statements on how lesions were chosen for entry into the study; comment on the suitability of the sample to detect clinically important differences in the diagnostic methods being evaluated; complete data on all presenting lesions; follow-up to calculate the true false negative rate; information on how the histological diagnosis was reached; objective data on melanoma diameter or Breslow depth; criteria for clinical diagnosis; and details of the methods of non-dermatoscopic examination.

**Authors’ conclusions**
Variability between the studies in methods, observers and types of pigmented lesions, and the lack of studies in primary care, made it difficult to generalise the results. Dermatoscopy did not appear to improve the accuracy of diagnosis sufficiently to alter the clinical management of most pigmented skin lesions. Further research with more explicit methods is needed.

**CRD commentary**
This clearly written and presented review provided a description of the methodological problems encountered among primary studies on the accuracy of dermatoscopic diagnosis of melanomas in clinical practice. Details of the inclusion criteria, literature search, methods of selecting the primary studies, criteria used to assess validity, and the included studies, were given. The author acknowledged that publication bias is possible. As the author stated, the methodological problems encountered in the primary studies prevented the calculation of any summary statistic for the diagnostic accuracy of dermatoscopy.

**Implications of the review for practice and research**
Practice: The author did not state any implications for practice.

Research: The author suggested that future research should be more explicit in the methods used, and should select lesions representative of those seen in primary and secondary care in Australia. He further suggested that a comparison of the diagnostic accuracy of dermatoscopy and standard magnified images used by dermatologists and by general practitioners would be desirable.

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