

Advice for medical students and practitioners with colour vision deficiency: a website resource

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There is a sizeable body of evidence that colour vision deficiency (CVD) is a problem in the practice of medicine.^{1,2} Medical practitioners with CVD report difficulty seeing the redness of inflammation and fresh blood in body products. They have difficulty recognising pallor and the body colour changes indicating cyanosis and jaundice. The colour stains in histological preparations can be a problem, as can colour codes used in charts and instrument displays. Figure 1 shows the problems reported most often in a survey of CVD medical practitioners.³

Optometrists with abnormal colour vision can experience similar problems, for example, seeing redness of inflamma-

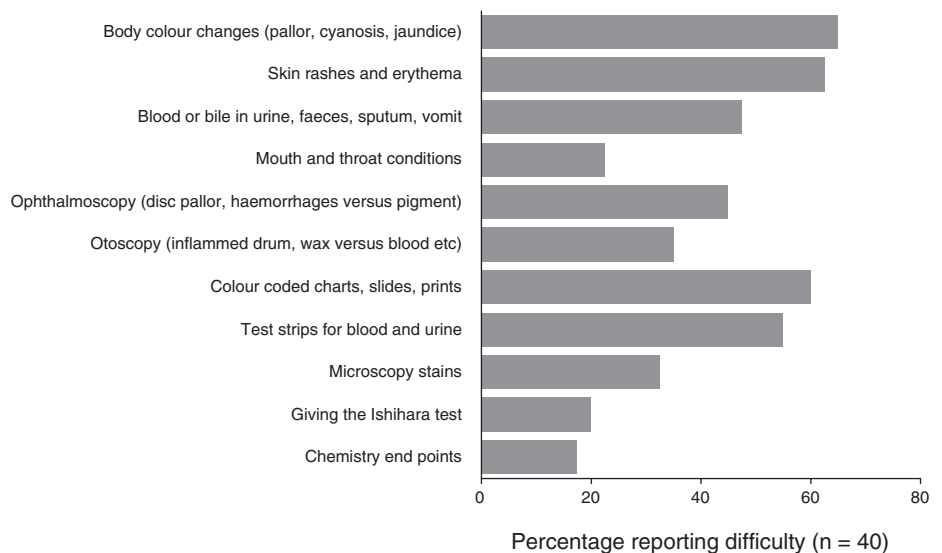


Figure 1. Percentage of medical practitioners with a CVD (n = 40) who have difficulty with particular observational medical tasks because of their abnormal colour vision. Data from Spalding.³

tion of the conjunctiva and ocular adnexa or seeing pallor or redness of the optic nerve head.⁴ They have the additional problem of distinguishing retinal haemorrhages from melanin pigment spots. Figure 2 illustrates the appearance of retinal haemorrhages as seen by a protanope.

The question we address here is the nature of the advice that should be given to young people with abnormal colour

vision contemplating a career in medicine or an allied health profession. Should they be advised against entering a career in health? There is the risk of medical error and serious adverse consequences for patients if their medical practitioner is unable to see coloured signs of illness. Moreover, medical practitioners with a CVD may frequently be anxious about the risk of error and have diminished confidence in their diagnoses. In a survey of

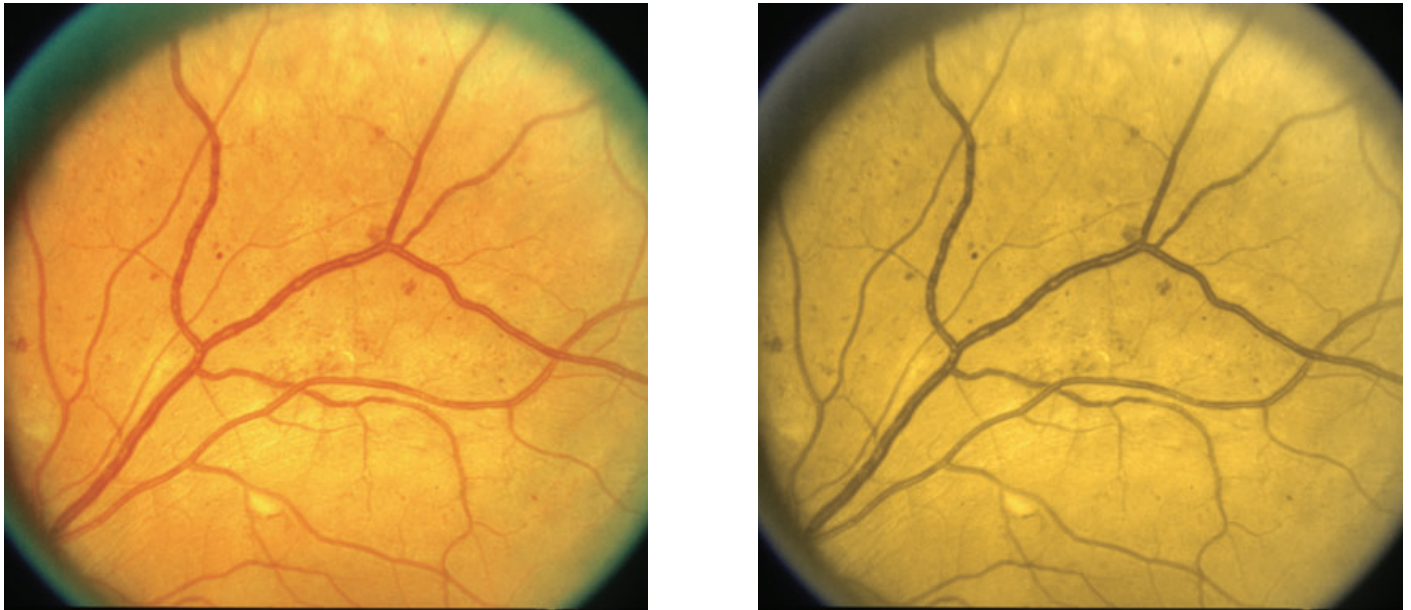


Figure 2. Retinal haemorrhages (left) are readily identified in this case of diabetic retinopathy by their red colour but in the image (right), in which the colours have been digitally transformed to the colour appearance for a protanope, they are not readily differentiated from melanin pigment spots.

medical practitioners with a CVD, some made remarks such as ‘You do not necessarily know when you have a problem—others point them out’ and ‘The problem is I do not know what I am missing’ or ‘I feel I am very vulnerable . . . there are times when patients describe red rashes and I cannot see them and nurses point out the invisible dots.’³

These remarks might be dismissed as mere anecdotal reports but because they are consistent with what is expected from the known characteristics of abnormal colour vision, they have the power to persuade. In any event, there is also experimental evidence of physicians who have abnormal colour vision being unable to identify important signs of illness. We have summarised this evidence elsewhere.⁵

To our knowledge, no medical course excludes students with abnormal colour vision, with the possible exception of a medical college in Taiwan that is known to have had a policy in 1995 of excluding students if they failed the D-15 test.⁶ There have been colour vision requirements for

medical courses in Japan but efforts to relax these began in the late 1980s⁷ and it seems they have been successful.⁸ The prevalence of abnormal colour vision among medical practitioners is probably the same as it is in the general population.¹

While medical practitioners with abnormal colour vision have reported that they sometimes made errors due to their colour vision deficiency,³ we do not know how often they occur and how serious they are. The errors that do occur need to be viewed in the context of the fact that medical error is not uncommon and has a variety of causes. The right approach to error minimisation is to recognise errors when they occur, identify their cause and find ways to avoid their recurrence. This approach should apply to errors that may arise because of abnormal colour vision. Medical practitioners with abnormal colour vision can minimise errors by their choice of speciality, by placing reliance on sources of information that do not depend on colour and making sure they have good observation conditions, especially good lighting.

We do not advocate the introduction of a colour vision requirement for entry into medical courses, although other occupations in which abnormal colour vision may put public health at risk do have colour vision requirements.⁹ We take the view that all medical students who have abnormal colour vision should be aware of their deficiency before entering a medical course, that they should know its severity and have an appreciation of the kind of problems it may cause in their chosen career. Then they will be in a much stronger position to acknowledge the problems they have, be readier to seek advice and be better equipped to find ways to overcome them. This will be appreciated by medical students. In a survey of 155 medical students with a CVD by Burke,¹⁰ a common refrain was that they did not get advice and support to help them deal with their problems. Seventy-four per cent of the sample said it would be useful in their future career to have a full colour vision assessment, so that they knew the type of defect and its severity.

We propose that medical schools should test the colour vision of their students and provide those with abnormal colour vision with well-founded advice and support, although unfortunately at present, there are few who have sufficient knowledge to provide good advice.

It is incumbent on optometrists to test the colour vision of their patients, especially those yet to choose their career, and to offer concrete and useful advice. This does not mean dogmatic advice not to enter particular careers, as it is surprising how well people with abnormal colour vision cope in their careers and everyday life. Abnormal colour vision precludes some careers because there is a statutory colour vision requirement but for other careers that involve colour, individuals with abnormal colour vision should be helped to make informed choices.

It should be borne in mind that the survey of patients with abnormal colour vision carried out by Steward and Cole¹¹ found that 46 per cent of dichromats and 15 per cent of anomalous trichromats said they had problems with colour in their present work. Intending medical students who fail the D15 test can be expected to have difficulty recognising surface colours¹² and therefore are likely to have trouble recognising coloured signs of illness, the colours of histological stains, and colours used to code information in medical instruments and medical images.

We have developed a web site 'Colour Blindness and Medicine'⁵ to help students who are considering the study of medicine make an informed choice. We think it might also be helpful to medical practitioners with a CVD and it should be useful for prospective students of optometry. The main pages of the web site are:

1. Tests for colour vision deficiency
2. About colour vision deficiency
3. Common problems in medical practice
4. A picture gallery of common problems
5. Should I study medicine?
6. Is there a treatment?
7. Tips and advice for the colour blind doctor.

There is also a detailed overview of the evidence for believing that abnormal colour vision can affect the practice of

medicine, and a comprehensive bibliography of some 62 publications.

We hope that optometrists and medical practitioners might direct their patients with abnormal colour vision to this web site, especially those who are contemplating a career in medicine or one of the allied health professions. We hope that those who provide support and counseling to medical students might also make use of this web site.

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