lations where such unnatural deaths are rare, or absent, there will be no handedness effect. This seems to be borne out by the preliminary findings of current longitudinal surveys.^{10 22 23}

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Colour blind cricketers and snowballs

Nicholas Goddard, Dominic Coull

Abstract

Objective—To determine whether colour blindness affects batting in professional cricketers.

Design—Comparison of batting averages of colour blind cricketers and those with normal vision.

Setting—Players on 18 first class county cricket teams.

Subjects—280 of 306 players were tested.

Main outcome measures—Results of Ishihara colour blindness tests.

Results—Batting average for the colour blind group (12 players) was slightly lower than for players with normal vision (20.88 v 26.31). There was no difference in the number of batsmen and bowlers affected. Batting averages before and after the introduction of the white ball into Sunday League cricket did not differ significantly.

Conclusions—That batting performance is not significantly impaired by colour blindness suggests that to some extent these players are self selected. Routine testing of cricketers for colour blindness is not recommended.

Introduction

This study was motivated by the senior author's red-green colour blindness, coupled with his singular lack of ability to hit a (red) cricket ball moving at speed. As

he is able to hit a white rounders ball or baseball or a black squash ball with some degree of accuracy and reliability, it must be assumed that colour blindness has some role. If red-green colour blindness alone caused this inability a similar visual handicap in professional cricketers could adversely affect batting performances, especially with a red cricket ball—travelling at 80 mph (130 km/hour) or more—rising off a lush green wicket.

The study aimed to determine the prevalence of red-green colour blindness in a group of professional cricketers. Four questions were to be answered:

- (1) Are cricketers less likely to be colour blind than men in the general population?
- (2) Are batsmen less likely to be colour blind than bowlers?
- (3) Does colour blindness affect batting ability?
- (4) Would introducing a white ball into Sunday League cricket make any difference to colour blind players?

Methods

During the course of the 1993 cricket season the playing staff of every first class county side (18 teams) were tested for red-green colour blindness by using standard Ishihara test charts. No additional tests of visual acuity or depth of vision were carried out. When appropriate, players wore their normal contact lenses or spectacles. We were able to test 280 cricketers of the 306 listed, which represents 92% of the playing population.

To assess the influence of the white ball we compared the batting averages of colour blind players in the AXA Equity and Law Sunday League in the two seasons before and after its introduction.

Results

Eight per cent of men in the general population are red-green colour blind.¹ Of the 280 players we tested, 12 (4%) had red-green colour blindness. This difference is statistically significant ($z=3.053$; $P=0.0023$).

The players affected reflected the composition of normal cricket team (and 12th man)—five were predominantly batsmen, two were all-rounders, one was a wicket keeper, and four were predominantly bowlers.

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Test your cricket prowess

Information obtained from *Playfair*² allowed the batting performances of affected players to be compared with those of the entire cricketing cohort (306 players). The average batting performance for all cricketers was 25.631 (SD=14.35) for the season. The batting average for the colour blind group was slightly below this at 25.51 (11.43). This difference was not statistically significant.

The mean batting averages of the colour blind players over the two seasons since the introduction of the white ball into Sunday League cricket (21.64, SD=14.8) and the previous two seasons (18.94, SD=11.82) seems to show a slight improvement in the batting figures, but this difference is not statistically significant. It is not appropriate to compare differences in batting averages between the one day and the four day games.

Discussion

Our figures show that the incidence of red-green colour blindness in professional cricketers is approxi-

mately half of that in the normal male population. There seems to be no difference between the numbers of batsmen and bowlers affected. Batting performance is not significantly impaired, suggesting that to some extent these players are self selected and cope with their colour blindness. Indeed, one former international opening batsman is sufficiently colour blind so as to have extreme difficulty distinguishing the colour of snooker balls (G G Arnold, personal communication).

We do not recommend routinely assessing players for colour blindness. The white ball in the one day game seems to make little difference to batting performance.

We thank all the county coaches, captains, and players who cooperated so kindly and patiently during the course of our research, and Mr Richard Lockwood for providing the statistics for the AXA Equity and Law Sunday League.

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How sensitive are cardiac surgeons' fingers?

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During open heart surgery for many years surgeons have used estimates of arterial and pulmonary artery pressure from direct digital palpation despite the array of monitoring equipment that is in evidence at the time of the operation. The reasons for this range from disbelief in the accuracy of often ancient monitoring equipment to the not uncommonly seen difference between central aortic pressure and peripheral radial artery pressure after cardiopulmonary bypass.^{1,2} Claims by cardiac surgeons that their digital estimates of pressure may be accurate are often greeted with derision by their anaesthetic and junior surgical colleagues. The purpose of this study was to investigate the accuracy of blood pressure estimation by digital palpation of major vessels during heart surgery by different grades of surgical staff.

Methods and results

Subjects were the cardiac surgical staff of one consultant firm. The study was carried out during 18 consecutive open heart operations. After cardiopulmonary bypass was discontinued the monitoring equipment was arranged so that none of the operating surgeons could see it. A needle on the transducer was used to measure direct systolic pressure in the ascending aorta and the main pulmonary artery. The exact technique of digital palpation varied slightly between subjects but usually consisted of gentle palpation of the blood vessel with the pulp of the index finger of the right hand. At the time of the estimate the directly measured aortic pressure was recorded, as was the radial artery pressure. The order in which the staff made their estimates was varied to reduce the influence of copying. This was repeated for each grade of surgical staff. The same procedure was used for the pulmonary artery pressure. Estimates by each grade of surgical staff were plotted against directly measured aortic pressures (the "standard"), and best fit lines were drawn. Agreements between surgeons' estimates, direct measurements, and radial artery pressure monitor measurements were compared by the method of Bland and Altman.³

The figure compares consultants' estimates of systolic blood pressure and directly measured aortic pressure. Mean differences between the estimated and measured systolic aortic pressure were 1.1 (95% confidence interval -1.9 to 4.1) mm Hg for consultants, 2.2 (-1.8 to 6.4) mm Hg for registrars, and 0.4 (-5.5 to 6.4) for senior house officers. Estimates by consultant, registrar, and senior house officer were all highly correlated with central aortic pressure.

Difference between consultants' estimates of systolic aortic blood pressure and direct measurements, plotted against the average of these values

Differences between digital estimates and radial artery measurements (mean -4.2 (-8.7 to 0.3)) were modest, bearing in mind accuracy, reproducibility, and digital preference in blood pressure measurement,⁴ and also when compared with the differences found between radial artery measurements and the standard. Estimates of pulmonary artery pressure showed a less impressive correlation with direct measurements, and surgeons' estimates tended to be lower than the pulmonary artery catheter measurements (mean difference -2.8 (-6.2 to 0.6) for consultant). The underestimate was modest, however, and 95% confidence intervals were within 10 mm Hg for all grades of surgical staff.

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