

Sports eyewear and eyecare

A survey of UK and US practitioners

In our health conscious society, sports participation is seen as a popular and effective means of enhanced fitness. In the UK alone, some 60 million people participate in sport and leisure¹, many in more than one activity and often well into middle age and beyond. Indeed, sport is now established as the second largest industry worldwide² and many sportspeople spend considerable amounts of money on activities such as skiing, cycling, golf and leisure clubs.

Survey questionnaire

A questionnaire was prepared and distributed to 5,000 practitioners in the UK and, for comparative purposes, also in the USA. The average age of respondents was 45 with a range from 21 to 74, equally distributed between males and females and with a ratio of optometrists to dispensing opticians of 4:3.

The sample questionnaire is shown in Table 1, which illustrates the questions,

For optimum eye protection and peak performance, many sporting activities require a high level of visual skills which, in turn, transmit and process items of information at high speeds through a process known as parallel pathways³. This suggests that sports performance may be greatly enhanced by the application of sports vision.

People will be more comfortable and see more when glare is eliminated, will be better shielded from eye injuries with suitable standards approved protective eyewear and perform better when acuity is optimised. These essential requirements may be obtained by sports eyewear, expertly prescribed and dispensed by eyecare practitioners.

Market for sports vision

There are approximately 59 million residents in the UK⁴ and also some 60 million participate in sport and leisure activities¹. This does not mean that almost all UK residents are necessarily sportspeople, as most participate in more than one activity. However, most people do take part in some sporting activity, even if merely spectating.

The market for sports vision is potentially served by approximately 12,500 optical practitioners, of whom 60% are optometrists and 40% dispensing opticians⁵. Optometrists perform some 13m NHS sight tests per year⁶. Let us assume then that the ratio of NHS to private sight tests is three to two⁷, and the ratio of presbyopes to pre-presbyopes is 3:2⁷. If each sportsperson undertakes between two to three activities, then we may estimate that there are 24m UK sportspeople of whom 14.4m are likely to be sedentary and 9.6m active participants. Forty percent of the population are sports or leisure orientated and say 5.2m have a sight test each year. If these estimates are truly representative, then it follows that each practitioner will see an average 416 sportspeople per year each with specific sports vision requirements.

A survey was undertaken in 2000-2001 to determine the interest and participation of eyecare practitioners in sports eyewear and also their role in catering for the need of sportspeople. Published figures have been modified to allow for regional variations.

Table 1

The questionnaire which was distributed to 5,000 eyecare practitioners

| a) Sports eyewear dispensing | % |
|--|-----|
| i) Do you have a designated sports vision appliances display in your dispensary? | 30* |
| ii) Which of the following do you stock and display routinely? | |
| Wraparound sports spectacles (e.g. cricket/cycling) | 56 |
| Squash goggles with lenses (housing & ocular) | 60 |
| Lensless eye guards (housing only) | 28 |
| A range of paired demonstration tints to demonstrate contrast enhancement or reduce glare | 56 |
| Shooting spectacles | 23 |
| Billiard spectacles | 56 |
| Ski goggles | 70 |
| Surface swimming spectacles | 76 |
| Underwater swimming face mask | 43 |
| Basketball goggles incorporating flexible frame housing | 10 |
| Aviation spectacles | 26 |
| Others (Please specify) | 20 |
| b) Sports eyewear prescribing | |
| i) Do you ask all patients about their hobbies/sports/recreation? | 60* |
| ii) What % of your patients do you estimate participates in a sport or recreation on a regular basis? Please circle 50% CORRECT | |
| 0-25% 26-50% 51-70% 75%+ | |
| iii) Are you aware that sports participation is the main cause of eye injury resulting in hospital admission? | 76* |
| iv) Are you aware there is a published British Standard (BS) for the Eye Protection in Squash Racket Sports? | 83* |
| v) Are you aware that the term 'safety spectacles' is obsolete and should be replaced by 'eye protectors'? | 63* |
| vi) What % of you prescribed lenses are: | |
| Material % | |
| Glass 4 | |
| CR39 or similar 91 | |
| Polycarbonate 5 NB USA 49% | |
| (Please estimate and insert) | |
| vii) Compared to CR39 lenses of equal thickness, do you estimate that the impact resistance of uncoated polycarbonate is: (Please circle) | |
| Equal | |
| X (2-4) | |
| X (4-9) X (4-9) CORRECT ANSWER | |
| X (10-20) | |
| viii) Do you appreciate that the impact resistance of polycarbonate is reduced by: | |
| a) Hard coating | 53* |
| b) Reduced temperature | 16* |
| ix) Do you prescribe as required: | |
| a) Prescription polarising lenses | 40* |
| b) UV inhibitors | 93* |
| c) Prescription tinted lenses | 80* |
| d) Others | 20* |
| Please specify | |
| * Percentage of 'yes' replies | |

Table 2
Sports eyewear routinely displayed

| Sport | Ranking | % | Participants (millions) |
|-------------------------------------|---------|----|-------------------------|
| Swimming | 1 | 78 | 10.0 |
| Skiing | 2 | 70 | 1.20 |
| Squash | 3 | 60 | 2.10 |
| Wraparound (e.g. cricket & cycling) | =4 | 56 | 4.50(1) |
| Demonstration tints | =4 | 56 | 3.0(2) |
| Billiard spectacles | 6 | 50 | 3.9(1) |
| Face mask | 7 | 43 | <0.3 |
| Lessless eye guards | 8 | 26 | 2.1(3) |
| Others | 9 | 20 | - |
| Flexible housings | 10 | 10 | <0.3(4) |

- (1) Possibly under-displayed
- (2) To increase contrast or reduce glare
- (3) Dangerous
- (4) Possible baseball & soccer

correct answers and the 'yes' or 'no' replies. In order to analyse the data quantitatively, the answers were marked numerically – with two marks if the answer was either correct or 'yes', zero if unanswered and minus one if either incorrect or 'no'. However, in the case of 'Lessless eye guards' in question a (ii), which are potentially dangerous, the marking was reversed so that 'no' was given two marks and 'yes' minus one.

The completed questionnaires were then analysed in order to determine the publicity, awareness and knowledge of optometrists and dispensing opticians about sports eyewear. Table 2 shows the

ranked order by which optical sports appliances were routinely displayed, and considers the potential market shown in millions of participants for each sport¹. Additionally, in deciding which eyewear to display, stockists should also be mindful of the spending power of specific sportspeople.

Swimming is the nation's favourite recreation with 10 million participants (Figure 1). It is therefore reassuring to note that swimming goggles, which are available to prescription, were the most frequently dispensed appliance and were stocked by 76% of those practitioners who replied. These were followed in descending

order by skiing (Figure 2), squash (Figure 3), wraparound spectacles, demonstration tints, billiard spectacles, face masks, lensless eye guards and flexible housings.

Cricket and cycling are undertaken by 4.5 million people who may benefit from wraparound spectacles but these sportspeople were arguably under-displayed in the survey. Cricket is also likely to be played by people in socio-economic Class B (middle class/professionals), who presumably have higher than average spending power, whilst cyclists also traditionally spend large amounts on sports gear.

The potential display by lensless eye guards by approximately one in four respondents is of great concern if the question was correctly understood. This type of appliance refers to a housing, or a frame without protective lenses or oculars so that the rim supposedly protects the eye from a projectile such as a squash or tennis ball. Apparently such 'protectors' are readily available at leisure centres and sports clubs and may appeal to players in the mistaken belief that they protect the eye from injury.

Lessless eye guards and goggles are favoured by players because they are lighter, do not steam up, splash or scratch. Unfortunately, however, they cannot be recommended under any circumstances or for any sport, as they instil a false sense of

Figure 1

With 10 million participants, swimming is the most popular recreation in the UK. Seventy six percent of practitioners surveyed stocked swimming goggles which are available in plano or prescription lenses, clear tinted or mirrored and with adjustable bridges¹⁵



Figure 2

Sport is now regarded as the second largest industry worldwide² and many sportspeople, such as cyclists and skiers, spend considerable amounts on kit. Seventy percent of study participants stocked ski goggles



Figure 3

Because racket sports are arguably the primary source of preventable eye injuries, a British Standard (BS 7930-1) has been published¹¹. Wearing approved eye protectors is now mandatory in doubles squash, all junior sanctioned events and in under-19 county competitions¹³

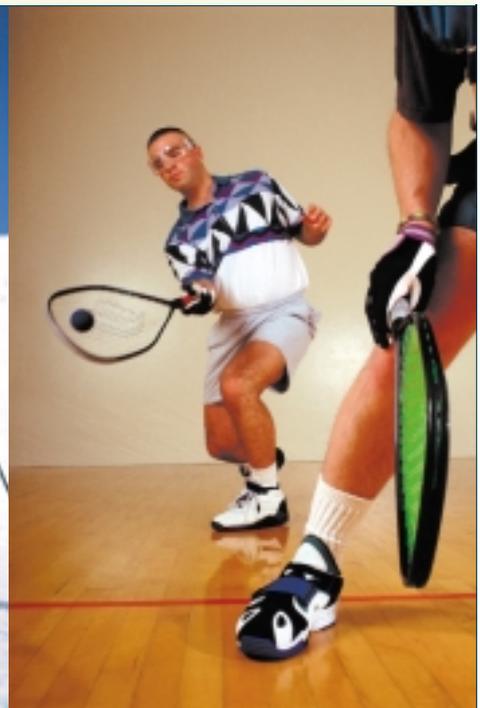


Figure 4

Shuttlecocks and squash balls are likely to attain velocities up to 135mph⁸ and penetrate the orbital cavity, causing serious compression eye trauma. Lensless eyeguards are positively dangerous, may admit and even direct projectiles into the orbital cavity



Figure 5

Although the market for sports eyewear is both lucrative and available, it is relatively unexploited by UK eyecare practitioners. Surprisingly, only one in three practitioners surveyed actively promoted sports eyewear through a designated sports vision appliance display



security to the player and if a sport induced eye injury ensued, could lead to litigation against the supplier. The danger is that they admit and even direct projectiles into the orbital cavity onto the eye thus facilitating injury^{8,9} (Figure 4). A more likely explanation of this apparent anomaly is that the question was either unclear or misunderstood. It may well have been that empty sports frames were displayed by respondents on a display or frame bar with a view to subsequent glazing.

The market for sports eyewear is considerable, still expanding and could be exploited by a designated sports eyewear display (Figure 5). Surprisingly, however, this opportunity was only capitalised by one in three respondents.

Prescribing and dispensing

As mentioned previously, the survey questions were marked from +2 to -1 so that the questions relating to awareness/publicity and knowledge could be ranked. Comparisons were made between:

- Age groups – 20-29, 30-39, 40-49, 50-59 and 60+ with the average age 44.5+ ranging from 21 to 74 years
- Dispensing opticians and optometrists in approximately similar numbers (3:4)
- UK and USA sports vision practitioners from members of the Sports Vision Association (UK SVA) and the International Academy of Sports Vision (USA IASV)
- Independent and multiple practitioners, both optometrists and dispensing opticians

As a general guide, the questions on dispensing mainly related to awareness and publicity, whilst prescribing was considered to be knowledge. However, only 30% of respondents actively

promoted sports eyewear through a designated 'sports vision appliance' display. It therefore follows that some, approximately 3.6 million sportspeople, may visit eyecare practitioners who do not actively promote sports eyewear, thus suggesting a significant lost opportunity. Additionally, and perhaps surprisingly, approximately two million patients were apparently not asked routinely about their hobbies, sports or recreation as part of the history and symptoms.

Sport has been identified as the most common cause of severe eye injury¹⁰, a British Standard is now available¹¹ and, furthermore, the public is now becoming increasingly litigation minded. An important aspect of recreational and occupational eyecare should be directed at eye injury prevention and it is confidently anticipated that practitioners are mindful of the superior impact resistance afforded by polycarbonate. In light of this, it was considered relevant to include a question on the relative strengths of polycarbonate and CR39.

It is widely agreed that the impact resistance of polycarbonate is significantly greater than other ophthalmic materials and has been estimated to be between 10 to 20 times more than CR39⁸. This figure is an educated guess and had not previously been verified scientifically but experimental evidence now available shows this to be a considerable overestimate and the true multiple is between five and six times greater¹². It is hardly surprising that half of the respondents over-estimated the answer to this question. However, given that each optical practitioner sees approximately 400 sportspeople per year⁷, it is noteworthy that only 5% of UK prescribed lenses were polycarbonate, compared to 49% by the US respondents.

The latter figure may not be truly representative of US practitioners as they were mainly sports vision specialists. Additionally, US practitioners are likely to be more safety and litigation conscious compared to their UK counterparts. It is almost astounding the low incidence of UK polycarbonate lens dispensing, given the greater strength and eye protection of this material.

Table 3 shows the results of the survey, which are compared with respect to awareness/publicity, knowledge and overall sports vision rankings. In total, there are 11 groups sub-divided into three for comparison – first to fourth (top), fifth to seventh (middle) and eighth to eleventh

Table 3

Ranking of survey participants

| Awareness/publicity | % | Ranking |
|---------------------|------|---------|
| UK SVA | 44 | 1st |
| 31-40 | 34 | 2nd |
| US IASV | 33 | 3rd |
| < 30 | 30 | = 4th |
| 41-50 | 30 | = 4th |
| 51-60 | 30 | = 4th |
| Independent | 28 | =7th |
| DO | 28 | = 7th |
| Optometrist | 26 | 9th |
| > 60 | 20 | = 10th |
| Multiple | 20 | = 10th |
| Knowledge | | |
| Optometrist | 60 | = 1st |
| UK SVA | 60 | = 1st |
| < 30 | 56 | 3rd |
| DO | 54 | 4th |
| US IASV | 50 | = 5th |
| 51-60 | 50 | = 5th |
| Multiple | 47 | 7th |
| 41-50 | 46 | 8th |
| Independent | 45.5 | 9th |
| 31-40 | 36 | 10th |
| > 60 | 22 | 11th |

Table 4

Overall sports vision rankings

| Awareness/publicity | % | Ranking |
|---------------------|------|---------|
| UK SVA | 52 | 1st |
| < 30 | 45 | 2nd |
| Optometrist | 43 | 3rd |
| US IASV | 41.5 | 4th |
| DO | 40 | = 5th |
| 51-60 | 40 | = 5th |
| 41-50 | 38 | 7th |
| Independent | 36.5 | 8th |
| 31-40 | 35 | 9th |
| Multiple | 33.5 | 10th |
| > 60 | 21 | 11th |

(bottom). Both the awareness/publicity and knowledge sections indicate that younger respondents were likely to be ranked higher. Overall, practitioners under 30 who had joined a specialist sports vision association were more aware of the value of publicising sports eyewear and were also in the top one third for knowledge. Whilst the 31 to 40 age group were also aware of the advantages of awareness and publicity, they were ranked in the lower one third for knowledge.

Table 4 summarises the final results and comparisons of the survey as sports vision rankings and, as expected, indicate that younger optometrists in the UK and US who have specialised interest in sports vision were top, followed closely by dispensing opticians. Older practitioners

were in the lower third, with no appreciable difference between multiple and independent practitioners. Those in the middle third were in the 41 to 60 age group and there was very little difference between optometrists and dispensing opticians in terms of publicity, knowledge or overall ranking classifications.

Conclusion

Whilst the eyecare profession has traditionally been considered satisfying, secure and relatively well paid, these advantages, over recent years have been questioned. Potential adversaries might include consumerism, reduced NHS subsidies, deregulation of dispensing, across the counter ready readers and a dramatic increase in student numbers. Furthermore, the introduction of alternative techniques, such as autorefractometry and refractive surgery, could also challenge traditional optometry practice.

Despite these potential problems, practitioners have faced the challenges by diversifying into new areas of eyecare. To stand still is to go backwards and new horizons might include extended wear contact lenses, diagnosing, monitoring and treating eye disease, learning disabilities and vision, behavioural optometry, active involvement in refractive surgery and sports vision.

The role for eyecare practitioners is constantly changing and as one door closes another opens. The market for sports eyewear is expanding, lucrative and available. However, if optometrists and dispensing opticians do not become more aware, sports vision educated and involved then others will. For example, sports hypermarkets could well exploit the opportunity by offering a superior eyewear service. Larger organisations may be better placed to advertise and display large quantities of quality appliances, supplemented by on-site glazing of impact resistant prescription lenses in polycarbonate or the new material Trivex™.

It is the author's hope that optometry and dispensing optics will become more proactive in sports vision and sports eyewear, thus facilitating safe and efficient vision in sporting activities.

About the author

Don Loran is immediate Past Chairman and Academic Adviser to the Sports Vision Association (UK).

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