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| **SPORTS VISION FEATURE** |

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| **THE STATUS OF SPORTS VISION IN SOUTH AFRICA**Prof. Jannie Ferreira Academy of Sports Vision University of JohannesburgIt is now more than 80 years since the first publication on sports I Ivision appeared in literature. The early studies all originated vIision in the disciplines of sports science and sport psychology and it was only during the 1970's that optometry and ophthalmology really became involved in sports vision. It was Garner1 who presented a study; done with some 3000 athletes that stimulated a major awareness of the role that optometry could play in sport performance and this opened the floodgates for optometric publications on sports vision. In 1980, Sherman2 published a literature overview that supports the role of vision in sports, particularly aspects such as static visual acuity, dynamic visual acuity, depth perception, stereopsis, accurate triangulation, eye movement and speed, peripheral vision and visualisation. He concluded, â€œAll these visual abilities are trainable and enhanceable by optometric visual trainingâ€. Sherman2 also referred to the unique role that optometry can play in providing sports vision. He stated that the optometrist routinely provides vision care to athletes at different levels and this care should include corrective eyewear, protective eyewear and visual training to reinforce the role of optometry in enhancing sports performance.The greater involvement of optometry and ophthalmology in sports vision research during the 1970's was also guided by two other aspects. First of all, the significant progress made in the development of soft contact lenses resulted in contact lenses becoming the primary visual correction for athletes. According to Lieblein3, a survey done by Bausch & Lomb in 1977 found that 86% of professional baseball, football, basketball and ice hockey players needing vision correction used contact lenses. More than 50% of them used soft contact lenses. During the late 1980's, a series of articles appeared, describing considerations for fitting athletes for specific sports4-7. The second aspect concerned awareness of the risk of eye injuries in sport and about the role primary care practitioners play in the prevention of such injuries through education and the provision of protective eyewear. Vinger,8 in a study on ocular injuries in ice hockey players, and Vinger & Tolpin9 in a study on racket ball players drew attention to the incidence of serious eye injuries in sport. They were amongst the first to recognise that eye injuries in sports pose a substantial but preventable risk. Estimates on the type and number of ocular injuries due to sports have largely been retrospective in nature and based on emergency room statistics or on information collected at large eye hospitals in the USA. These estimates may be as high as 100,000 eye injuries each year10-12. With the emphasis on prevention of such injuries, several studies reported on the use and development of eye protection standards13,14 and also resulted in a position statement by the International Federation of Sports Medicine15. This report provides guidelines for routine visual examinations, the identification of eye injury risk factors in sports and the factors to consider when prescribing corrective and protective eyewear for sports. Vinger31 probably has done more than anybody else to promote eye safety in sports and he was the driving force behind most of the efforts to test and develop eye protectors and produce universally acceptable safety standards. His original study published in the well-respected Duane's Clinical Ophthalmology in 1985 has recently been updated by Vinger himself16.In response to all these developments, sports vision programmes were established in several countries. In South Africa several attempts were made during the early 1990's by people such as Trevor Davies, who returned to South Africa after completing his optometry studies in the USA, to establish a sports vision organisation but all of these attempts were unsuccessful. During this time the Sports Science Institute in Cape Town even appointed a fulltime optometrist to do sports vision testing. This was done through the generous assistance of Johnson & Johnson. The sports codes themselves however, requested very limited testing and although the setup is still there today and now staffed by part-time optometrists, it is still underutilised. In 1999 Linda Moore17 did her master's degree on the effect of spectacle tints on visual performance and visual evoked responses, but is took three more years before the next research study was completed. This time by Henry Buys18 who developed norms and protocols for sports vision testing.Strangely enough, it took government intervention to really establish sports vision in South Africa. In response to the dismal performance of South Africa at the Olympic Games in Barcelona, the late Mr. Steve Tshwete who was the Minister of Sport at the time, said that never again would a South African team participate in the games if they were so poorly prepared. He commissioned the formation of a body to take care of the preparation of athletes for future competitions. The South African Sports Commission Act, No 109 of 1998 Section 15, as amended, makes provision for the establishment of a high performance committee. One of the objectives of this body is to design, implement and maintain a sports science programme to enhance performance levels, accelerate sports development and to support coaches and athletes in several different areas of which sports vision is one. The recent introduction of the South African Sport Confederation and Olympic Committee (SASCOC), which will replace the South African Sports Commission (SASC), will be responsible for the establishment of a national academy of sport as well as provincial sport academies. These academies will create exciting opportunities for sports vision specialists.Not withstanding all these positive developments, sports vision still lacks general acceptance in sport science and other related disciplines. This is the result of several critical reports and studies questioning the efficiency of visual training programmes and the transfer of these visual skills to athletic performance. In 1989 Leibowitz et al19 wrote a report to the USA Olympic Committee condemning the use of visual training to improve athletic performance. Wood and Abernethy20 and later Abernethy and Wood21 also expressed serious concerns on the usefulness of visual training. Nevertheless, one only needs to surf on the Internet to realise how many people worldwide are offering sports vision services. The problem is that most of these services are based on anecdotal reports and testimonies rather than scientific, dependable studies and procedures. Although several national optometry associations do have sports vision sections, the need is for institution based sports vision research centers.It is against this background that the Academy of Sports Vision was established at the Rand Afrikaans University (currently the University of Johannesburg) in the year 2000. This Academy has, as its main aim, the research and training of post-graduate students â€“ either through a post-graduate diploma in sports vision or research master's and doctoral degrees. Since its inauguration, 61 optometrists have obtained the post-graduate diploma, while 5 students obtained master's degrees and one student completed his Ph D. Currently 4 master's and 2 Ph D students are registered in sports vision.The Academy of Sports Vision is currently busy developing a model for vision in sports performance. With this model we intend to provide answers to the three questions that have always haunted sport science, namely: 1. That athletes have better visual abilities than non-athletes and that the better athletes have better visual abilities than poorer athletes. 2. That visual abilities are trainable. 3. That visual training of visual abilities is transferable to the performance of the athlete.The bulk of the evidence clearly indicates that superior athletes do not perform better than the normal population on these visual abilities. These conflicting reports may be the result of a one dimensional view on the functioning of the visual system. Milner and Goodale22 suggest a â€œtwo visual systemâ€ hypothesis on the basis of an anatomical distinction that divides the visual system into one system that deals with perceptual presentation of information and a second system that is responsible for visuomotor control. We would postulate that with visual training programmes, the emphasis should be to deal with those visual skills that relate to visuomotor control in order to achieve improved sports performance.Vision is often seen as the ability to perceive, select and to interpret information presented to the system. But when investigating the role of the visual system in sports performance, it is important to understand the interaction between environmental demands on the system, optical properties of the eye and the functional properties of the visual perceptual system. Our research23,24 does suggest that the visual information processing system, and more specific visuomotor control, is far more important than the visual information gathering system when considering sports performance. Thus superior athletes differ from the normal population in their ability to use visual information to control motor action rather than simply relying on visual perceptual skills. An ineffective gathering system may however limit proper visual processing and should therefore not be ignored. According to Milner and Goodale22 the traditional distinction between the 'what' and 'where' in the visual system should make way for a 'what' and 'how' approach. Thus the emphasis should be to develop the 'how' abilities of athletes by developing visual training programmes that relates to the specific visuomotor demands of a specific sport.I have no doubt that Sports Vision as a discipline is here to stay. For optometrists only interested in providing sports vision correction and or protective eyewear, the latest developments in the fields of contact lenses and impact resistant spectacle lenses as well as the wide range protective eyewear will provide more than enough exciting opportunities. As far as the testing and training of sports specific visual skills are concerned we have now turned the corner and future studies will provide scientific prove to the importance of such training in sports performance.**REFERENCES**1. Garner AI. Visual aid prescribing for the athlete. Calif Optom 1977 3(6) 18-19.
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**CURRENT TRENDS IN SPORTS VISION THE USA**Paul BermanThe citizens of the United States, like many cultures of the world, are sports crazy. Not only are more and more people watching sports but they are also participating in sports. In the United States, 90% of all parents want their children involved in some type of organised sport. (Gallop Poll) U.S. citizens are involved in a number of sports:http://www.eyesite.co.za/magazine/april2005/images/sportsvisionpic1.gifhttp://www.eyesite.co.za/magazine/april2005/images/sportsvisionpic2.gifWhen we talk about sport vision in the United States, it is generally divided into areas. Those areas involve remediation of visual difficulties that could affect performance, enhancement of visual performance, sports protection and injury treatment.In addition, our country has also become aware that these sporting activities bring increased risk for eye injuries. This risk has increased the need for eye protection while playing sports.Every 10 years, the United States Government releases a document entitled â€œHealthy Peopleâ€ which states the health goals for the country. For the first time vision health goals have been listed. Of the 487 general health goals for our country, such as decrease obesity, increase cancer screening, there are nine vision objectives. Of these, one states, â€œIncrease the use of appropriate personal protective eyewear in recreational activities and hazardous situations around the home.â€ This puts an obligation on eye care practitioners in the United States to protect the eyes of their citizens.While not a formal government organisation, the ASTM; American Society for Testing of Measurements, has established criteria for sports protective eyewear. The need to use sports protective eyewear is becoming more commonplace. In the United States, it is estimated that 100,000 eye injuries occur during the participation of sports. According to Prevent Blindness America, 90% of these are preventable, many through wearing appropriate protective eyewear.With a resolution by the American Optometric Association, position papers from the American Academy of Ophthalmology, and the American Academy of Paediatrics there seems to be great synergy in decreasing these needless eye injuries. An important point is that a child who is amblyopic or has decreased vision is 150 times more likely to go blind - 50% of these being caused by trauma. Therefore, more and more eye care practitioners are beginning to protect their patients, particularly the functionally one-eyed patients.New styles are currently available that take sports protective eyewear from somewhat unsightly goggles to fashion eyewear which meets the appropriate standards. With Transitions Polycarbonate Lenses, sports can be played both inside and outside, while protecting the eyes.With this need for eye protection in mind, there is a bill before the New Jersey Legislation, the first of itâ€™s kind that would mandate protective eyewear when children, who wear glasses, participate in community or scholastic based sports. This will help us take the first step. Hopefully many other states and countries will follow to eliminate the needless loss of sight. It is estimated that in the United States alone, 1.4 million sight years are lost due to needless eye injuries. Many of the trends coming out of the United States can be debated, but I believe that this is one that all people can agree on, as it protects our citizensâ€™ precious gift of vision.Additionally, as everyone is looking for the competitive edge, more and more athletes are looking for multiple pairs of sports glasses to optomise their performance. Eight base Technology offers a promising break through in increasing peripheral vision. There is much research being done indicating that certain tints will enhance performance in certain situations.Many teams and professional athletes are also looking for the competitive edge. They seek out sports vision optometrists who evaluate their visual skills. Evaluations go beyond the standard refraction and look at conditions such as eye/hand coordination, eye movement skills, depth perception and visual processing. When a problem is found with visual acuity or binocularity, glasses and/or vision therapy is prescribed to remediate it. In many other countries, Olympic teams are working with optometrists to get similar improvements.There are also many athletes who are looking for the competitive edge to improve other vision areas that are very trainable. Hitting a baseball, a quarterback throwing a pass, a basketball guard finding the open man, all involve visual skills. Our vision tells us when and where to do something. Most athletes make the correct movement but they do it at the wrong time or the wrong place. With vision being the timing device, sports enhancement vision therapy has been very successful in giving many athletes and teams the edge.Sports vision is an area that many eye care practitioners are very interested in. It is exciting, interesting and enables us to use much of what we know, whether it is too correct refractive error with contacts, to eliminate injuries with sports protective eyewear, to treat eye injuries after they occur, to train coaches in first aid, or to do vision therapy to enhance performance or remediate visual difficulties. Furthermore, sports protective eyewear offers an additional profit center. There are many ways in which sports vision has been giving athletes a competitive edge.Paul Berman, O.D., F.A.A.O.**About The Author****CURRENT STATUS**Paul Berman has been in private practice for 30 years at 5 Summit Avenue, Hackensack, New Jersey. He practices full scope optometry with an emphasis in orthoptics, sports vision, contact lenses, vision and learning and special needs. He is also a Therapeutic Optometrist. Paul Berman serves as Senior Global Clinical Advisor and is Founder of Special Olympics Lions Clubs International Opening Eyes. He is the Director of Professional Relations and Education, as well as a Consultant and Chair of the Advisory Board of Liberty Optical. He is President of the Correctional Eye & Vision Care Inc. He is a Director of the New Jersey Institute of Sports Vision and the I Care Vision Screening. He has been the team Optometrist for the New Jersey Devils, NHL since 1997 as well as acting as the Vision Care Consultant for the NY Football Giants. He is a Consultant to the National Health Services, Inc. Finally he is an Honoured Member of the National Directory of WHOâ€™s WHO in Executives and Professionals.Here are some recent Professional Affiliations, Activities & Awards:]1. International Optometrist of the Year, World Council of Optometry â€“ 2005
2. World Sight Day Optometric Consultant, Sarajevo, Bosnia- Herzegovina, Oct.13, 2004
3. Committee Member, Opening Eyes to Intellectual Disability, EVALUATING THE VISION OF PEOPLE WITH INTELLECTUAL DISABILITIES Global Curriculum, 2004
4. Outstanding Alumni â€“ Pacific University â€“ School of Health, 2004 Finalist, Humanitarian of the Year, Review of Optometry, 2004
5. Testified before the NJ Senate regarding Assembly Bill No. 2038, Mandating Protective Eyewear, March 2003
6. Person of the Year, Bergen County YMCA, November 2001
7. Optometrist of the Year, AOA Sports Vision Section 2001

**CURRENT TRENDS IN THE UK**Geriant GriffithsRecent research1 in the UK has begun to justify the role of vision in sport more directly and this work is now beginning to unify the different strands of Sport Vision, for instance:* Correction of sight
* Orthoptics / therapy
* Sporting performance / physiology
* Nutrition
* Psychology
* Sport vision appliances

This research came out of accumulated data from the Sports Vision Association, which showed that hand and eye dominance is sport specific and varies considerably from one sport to another. This also varies from the accepted norm of about 68%, right eye right hand2. See table 1 - Eye dominance in sport.Table 1 Incidence of eye dominance in elite sport %http://www.eyesite.co.za/magazine/april2005/images/sportsvisionpic3.gif**SPORTING TASK**Two groups of International and National athletes from tennis and clay shooting were given specific sporting tasks wearing goggles which successively blurred their dominant and non dominant eyes. The blur, to about the UK driving standard, was achieved with graded Bangiter foil1.From the results it was possible to conclude that clay pigeon shooting is an aiming sport and relies on good vision in the dominant eye. What was less predictable was that it also requires good depth perception to judge the speed of the bird, which apparently slows as distance increases. What was unexpected is that cross dominance may be an advantage in this sport (much higher incidence than in rifle shooting).More surprisingly, it was found that the process of aiming in tennis in the traditional shooting sense, is subsumed by the need to anticipate or judge distance and that it was the non dominant eye which was critical to this skill, especially in very strongly right eyed right handed players.A poignant aside, was that cross dominant athletes who have had to cope with binocular deficiencies, learn to judge depth using monocular clues much better and are therefore less affected by binocular imbalance; a less sensitive but more robust visual system. Indeed it could be argued that in some sports less that total reliance on sensory information directly from the eyes frees the memory and improves reaction time. Preliminary findings in Formula 1 racing support this theory.The overriding conclusion was that whatever the configuration of the athletes visual system, optimal correction was the single most important consideration in competitive sport. It may follow from this that the best form of eye exercise (impossible to duplicate in the laboratory) is playing the game in the real competitive situation with optimally corrected vision.Significantly, the proposed laws of sports vision may demonstrate a direct link between vision, occupation and behaviour for the first time and begin to bridge the gap between Sports Science and Optometry.Based on the evidence of this research the following laws of Sports Vision are proposed:* The primary visual skills in sport are aiming and anticipation, upon which all other skills are based.
* Visual performance is the controlling external factor\* in the development and maintenance of sporting performance throughout life. (\*Other external factors that can be influenced by coaching procedures include physiology, nutrition and psychology).
* Sporting performance is more or less dependant (according to the visual requirements of the sport) on the maintenance of the normal, established relationship between the two eyes.
* A deficiency in visual performance will inhibit the development of sporting potential through poor eye / hand / body co-ordination, but perfect eyes do not make a perfect athlete. This depends on innate physiology (-nature) and psychology (the grit in the oyster, the will to win - nurture).

These laws apply where vision is the primary sense and would have special applications in monocular athletes.**SPORTS VISION SCREENING**On route to these results, a battery of 6 diagnostic screening tests has been developed. These are designed to measure any deficiencies in the key elements of visual performance and at the same time demonstrate to the player why each is individually important to their game. A key element in the athletesâ€™ acceptance of optometric advice is a full understanding of its purpose and benefits. They can be done individually for one player in the clinic, or given to a whole squad as part of a formal team screening.Analytical tests measure a complex visual function, which represents a laboratory simulation of an aspect of the sport, which is visually important, like anticipation or hand eye coordination. If a team is being screened to find out who needs a full eye examination, performance on the analytical tests will be compared to the whole group and problems related to the diagnostic tests.**DIAGNOSTIC TESTS****Retinoscopy**Objective measure of refractive error; long sight short sight and astigmatism.**High and Low Contrast LogMAR Vision**Low contrast vision is a better predictor of visual performance in real conditions of poor light, mist, dirty balls and confusing background.**Eye Dominance**This gives the characteristic for each player and the importance of ocular correction may vary according to the individualsâ€™ eye dominance. A consideration of eye dominance has a great bearing on the fundamental visual skills of aiming and anticipation (depth perception).**Muscle balance**The Howell phoria chart measures the underlying tendency for the eyes to diverge or converge. Excessive divergence or convergence can be related to prescription and has a profound effect on anticipation.**EYEWEAR AND OCULAR PROTECTION PATTERNS AGAINST SOLAR FACTORS IN CRICKET PLAYERS**Linda Moore, School of Physics Dublin Institute of Technology. IrelandProf. Jannie Ferreira, Academy of Sports Vision. University of Johannesburg**INTRODUCTION.**Cricket is a sport played under conditions of high solar illumination for prolonged periods of time. Participants are therefore exposed to high levels of ultra-violet radiation (UVR), which has the potential to cause ocular damage. Associated exposure to visible light leads to glare being experienced and the potential development of visual fatigue and discomfort. These factors may then adversely affect sporting performance. Several studies indicated that athletes in general are not aware of these ocular hazards. In the game of cricket it should be common practice for players to wear ophthalmic forms of ocular protection in the form of sunglasses or non-ophthalmic devices in the form of caps or hats.**METHODS.**We decided to do a study to identify the frequency of use of ocular protective devices and to establish the motivation behind the selection of the devices. We were only interested in the effects of long-term exposure to sunlight and did not include protective eyewear worn for protection against traumatic eye injuries. A questionnaire-based study was conducted during routine visual assessment of cricket players at the Academy of Sports Vision at the Rand Afrikaans University (now the University of Johannesburg).**RESULTS AND DISCUSSION.**The following aspects were investigated: 1. The frequency of use of non-prescription sunglasses and reasons for wearing it. The use of sunglasses is still not favoured by most of the players. Only 2% of the players would use it frequently while 57% claim not to wear sunglasses at all. Those who wear sunglasses would do so to reduce glare and UVR exposure but 14% of the players admitted that they wear sunglasses because they get sponsored or that they do so for fashion reasons. It is therefore obvious that the majority of cricket players are still unaware of the importance of ocular protection. Although the players were not asked to provide reasons for not wearing protection other studies we conducted indicated that the players were concerned about the sunglasses shifting or falling off when they run. This concern, again, confirms the importance of highlighting to the players the difference between performance wear and ordinary sunglasses as well as all the devices available to prevent the sunglasses from falling off.2. Favoured colour of sunglass lens tints and reasons for choice of specific colour. Grey seems to be the tint of choice and is preferred by 55% of the players while green, blue, red and yellow tints seem to be less popular. Personal preference is stated by 45% of the players as the reason for selecting a specific tint while 30% of the players will focus on a specific brand of sunglasses and allow the brand â€œto dictate the colourâ€. A further 28% of the players admitted that the sponsor determines the colour of the tint. It is therefore obvious that the choice of a specific tint is not based on any professional advice. It is also amazing to note that some of the players preferred a red tint, not withstanding the fact that cricket is played with a red ball, which means they may lose sight of the ball. Contrary to sports such as golf, where several companies will market a product to be specific for golf, there is currently no such thing as cricket glasses. Many players however are under the impression that sponsors are providing them glasses specially designed for cricket. This was even confirmed in a personal interview with Brain Lara who believed just that. Another factor which may be more important than the colour, is the density of a specific colour, since we have found that with high densities visual abilities such as contrast sensitivity and depth perception are affected negatively.3. Frequency of use of hats. Even the use of hats or caps is not generally preferred by the players, although the use of peak caps is almost as old as the game itself. One out of every four players is not wearing anything while only one out of five players would wear hats or caps frequently. Peak caps are still preferred to broad rim hats, despite the fact that the broad rim hats provide better protection. The preference for peak caps stems from the tradition of wearing peak caps in cricket and players report that wide rim hats are more uncomfortable and are even regarded as a hindrance.4. Their perception of the importance of good vision in sport. All players agreed that good vision is important for sports participants. In probing the issue further, it became apparent that to them good vision is equal to good visual acuity and that they are unaware of all the visual skills required in the game of cricket. Recent studies have shown that visuo-motor skills are far more important and that a visual acuity of 6/9 would not even be detrimental.5. Their perception of the importance of protection against UVR. Although one might expected all players to agree on this issue it was interesting to note that only 67% of players were convinced that protection against prolonged exposure to UVR is needed. The rest were uncertain or even disagreed. Thus although the dangers of UVR exposure continue to receive considerable media exposure it would be unwise to believe that there is no need to remind players about these dangers.6. Whether the wearing of sunglasses ensure more comfortable vision. This question provided a 50-50 response. There are several reasons for this uncertainty. First of all it is most probably due to their limited view that vision equates to visual acuity. It may also be the result of wearing sunglasses that is not suitable for playing cricket and when one considers their reasons for selecting their sunglasses, it can almost be expected.**CONCLUSION.**The most striking finding is that none of the players surveyed stated that their choice of sunglasses and tint selection was based on professional optometric recommendation. This may have resulted in wrong choices or even their resistance in wearing anything, hats or caps included. The promotion of photo-protective eyewear as a mechanism of preventing the adverse effects associated with exposure to solar UVR, as well as reduction of glare should be encouraged by sports vision practitioners. Furthermore sports vision specialists should take the responsibility to continuously educate athletes on the dangers of prolonged exposure to solar radiation.**REFERENCES:*** Bergmanson, JPG, Soderberg, PG. The significance of ultraviolet radiation for eye diseases. Ophthalmic and Physiological Optics, 1995 15 (2) 83-91.
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