Eyeguards or Not?: The Effects of Eyewear Usage in Racquetball and How Wearing them can Help Prevent Serious Eye Injuries

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EYEGUARDS OR NOT?
THE EFFECTS OF EYEWEAR USAGE IN RACQUETBALL
AND HOW WEARING THEM CAN HELP PREVENT
SERIOUS EYE INJURIES

A RESEARCH PROJECT PRESENTED IN PARTIAL
FULFILLMENT OF THE REQUIREMENTS FOR
GRADUATION IN SPORTS ADMINISTRATION

BY RAMONA S. VONONDARZA
MARCH 2001
LYNN UNIVERSITY

APPROVED BY
Dr. Richard A. Young
# Table of Contents

## I. Introduction
1. Introduction 1
2. Statement of the Problem 1
3. Statement of the Purpose 2
4. Significance of the Study 3
5. Theoretical Framework 4
6. Definition of Terms 4
7. Limitations 5
8. Assumptions 6

## II. Background
1. Eye Injuries and Eye Protection in Sports 7
2. Sports Related Injury Statistics 9
3. Eye Protection in Racquetball 11

## III. Review of Literature
1. Sources 13
2. Work of other researchers 13
3. Summary and Analysis of Literature Review 14

## IV. Research, Design and Methodology
1. Population and Sample 19
2. Instrument and Tool used 19
3. Procedure 20
4. Method of Data Analysis 20

V. Data Interpretation 21

VI. Conclusion 25

VII. Bibliography 26

Appendix

a. Questionnaire

b. Table 1: Estimated Sports and Recreational Eye Injuries

c. Table 2: Sports With High Risk of Eye Injury
I. INTRODUCTION

1. Introduction

Racquetball is one of the fastest moving sports in the world. The ball speed can range up to 150 mph. In some rallies players run and dive after the ball, which at times is hit with pure reflex action due to the velocity of the ball. Consequently the ball direction is not always controlled. At these times the ball can hit a player in the face. The likelihood of being hit in the eye is low, but the consequences can be catastrophic (Waters, 1998).

It is probable that a ball hit by an average player at full speed into someone’s eyes can cause permanent loss of eyesight. This can be easily prevented by always using protective approved eyewear. The average of ten serious accidents a year can be significantly reduced by making the use of eyewear mandatory for all racquetball activities (Waters, 1998).

2. Statement of Problem

Every year at least ten (10) serious accidents are reported in the sport of racquetball, all of them with players not using protective eyewear (Waters, 1998). This study will focus on the actual occurrence of accidents in players not using eyewear and reveal that more than ten (10) serious accidents and countless less serious injuries to the eye occur every year with players not using eyewear. By doing so it will be demonstrated
that the common misconception that “no one ever gets hit in the eye”, is erronious, and
that the threat of an actual mishap is significant at all levels of the game. The study will
focus on experiences of “touring” and teaching professionals in the sport. This group of
people has been chosen because they are the role models in the sport and because of their
exposure time on courts around the world. The experience of professional players could
be more credible than the account of a national association because of the image the
professional players carry in the eyes of amateurs.

The goal of this study is to document the high number of accidents and therefore
achieve a resolution by governing bodies, that makes the use of eyewear mandatory,
since currently only the U.S. Racquetball Association mandates eyewear in sanctioned
events.

3. Statement of the Purpose

The reason of the study is twofold. First, to create awareness about the potential
of serious consequences of playing racquetball without protective eyewear and as a result
increase the number of eyewear users. And secondly, to distribute the results of this study
to organizational entities in the sport with the expectation of their encouraging the
requirement of eyewear usage in the sport.
I am involved in sports management and therefore in constant contact with sporting activities and events around the world. At the same time I am very involved in racquetball as I currently play on the Women’s International Racquetball Tour (WIRT) and accompany some of the men on the Men’s Tour. All of the professional events are held in conjunction with amateur tournaments. I therefore see the sport being played all around the world on a weekly basis and have witnessed countless minor and serious accidents with ball impacts in and around players’ eyes as the result of non-usage of protective eyewear. Most of these players when questioned were not aware of the potential risk that playing without eyewear involves, and would gladly purchase eyewear to avoid any accident in the future. Sport is a great field to work and to study, but I believe that the safety of athletes and recreational players should be one of the industry’s top priorities. For this reason I decided to do this research and put some light into a neglected part of player safety in the sport of racquetball. A sport that has a number of accidents, and in the worst case the result of them being the loss of eyesight will negatively influence the growing potential of the sport (Backer, 1998), and that is one of the main concerns in my field that motivated this study. In conclusion I hope that this study will help to significantly reduce the number of serious racquetball related injuries to the eye.
5. **Theoretical Framework**

Racquetball is a high-speed sport, in which the ball travels at great speed. A well-hit ball can have the speed of a bullet, and the consequences when hitting a player from short distance into an eye are in worst case partial or total loss of eyesight in the affected area. Most players are not aware of this potential threat. They do not understand that the ball they use can cause such horrific damages and therefore neglect to use protective eyewear while playing the sport of racquetball, not realizing that the purchase of protective eyewear can potentially save their eyesight in the case of an accident (Waters, 1998). “Seldom do athletes realize that the use of protective gear can reduce the probability of serious injuries. Unfortunately many players only use protective gear when the rules of the sport require them to do so” (Balmon, 1996).

The use of approved protective eyewear (which retails at approximately US $ twenty (20)) can protect a player from serious consequences when being hit by a ball into an eye (Waters, 1998). Consequently the use of eyewear should be mandated at all times players enter the court, regardless of whether they are participating in a competitive event or not. I also believe that education can prevent accidents, which is something that I hope to achieve with this study.

6. **Definition of Terms**

**Approved Eyewear:** Eyewear that is approved for usage in sports, having past impact tests guaranteeing that the lens will not shatter upon ball impact.
Average Player: A player that is able to maintain a rally and does not miss the ball when attempting to hit it.

Ball speed: Speed that the ball reaches when leaving the racquets strings until hitting the front wall of the court.

Ball Impact: Place a ball hits on a player’s body or gear

Eyewear/Eyeguards: Glasses worn while playing sport that have plastic lenses and are secured with a strap to remain in place.

Impact Sports: Sporting disciplines in which frequent physical contact between players is the norm, e.g. football, hockey, rugby.

Polycarbonate lenses: Prescription or nonprescription lenses made of polycarbonate material with a center thickness of at least 2 mm that meet or exceed ANSI Standard No. Z87.1. These are designed to fit in street-wear frames as well as sports goggles.

Teaching Professional: A certified racquetball teacher who spends most of his time teaching the sport to others.

Touring Professional: A racquetball player that regularly participates in professional tournaments and accepts money rewards for participation in the sport.

7. Limitations

The limitations of this study are that the data depends on the information given by others to attain results, since it is impossible to ask every racquetball player about their personal experience. I have also found that some of the touring professionals were hesitant in giving information about their eyewear usage habits because of their sponsors.
Most of the touring professionals do not wear eyewear when practicing the sport by themselves but are hesitant to admitting to doing this out of fear that this might lead to consequences with their sponsors.

The fact that this study mainly concentrates in the United States might fail to give an accurate picture of eyewear usage at world wide level, but lack of complete professional organizations in some countries make the sampling procedure difficult.

8. Assumptions

It is assumed for the purpose of this study, that the majority of racquetball facilities in the world do not require the usage of eyewear on their courts, and that currently the only required usage is in professional or United States Racquetball Association (USRA) sanctioned tournaments. It is further assumed that the perceived pressure from sponsors to use eyewear will not bias the reported results.
II. BACKGROUND

1. Eye injuries and eye protection in sports.

The International Federation of Sports Medicine (FIMS) calls attention to the fact that, while injuries in sports can be relatively frequent, they are almost completely preventable (Balmon, 1996). Loss of sight, even in one eye, involves changes in lifestyle for the individual and serious financial and social consequences both for the individual and for society as a whole. It is imperative that sport eye injury risk be reduced to as low a level as possible by enforcement of existing safety rules or by rules changes, where applicable. To this end all athletes should wear eye protectors where appropriate to the sport.

Most sports that pose risk for unprotected eyes can be made quite safe with the use of appropriate protective devices. The athlete deserves a careful explanation of the risk of eye injury, both with and without various types of eye protectors in the proposed sport.

Sports can be classified on the basis of low risk, high risk, and extremely high risk for eye injury. Eye injury risk is almost totally related to the particular type of sport. Low risk sports do not involve a thrown or hit ball, a bat or a stick, or close aggressive play with body contact. Examples include track and field, swimming, gymnastics, and rowing. Sports with high risk of eye injury (when protective devices are not being worn) involve
a high speed ball (or puck), the use of a bat or stick, close aggressive play with intentional or unintentional body contact and collision, or a combination of these factors. Examples include hockey (ice, field, and street), the racket sports (racquetball, squash, tennis, badminton), lacrosse (men's and women's), handball, baseball, basketball, football (U.S., Canadian, Australian), soccer, and volleyball (Balmon, 1996). The incidence of serious eye injury in these sports is a source of great concern, but adequate eye protective devices are available. Sports involving extremely high risk for eye injury are the combative sports such as boxing and full-contact karate for which effective eye protective devices are not available. The functionally one-eyed athlete should be strongly advised against participation in such sports. It is believed that a beginner is more prone to injuries than are intermediate or advanced players because beginners have not yet learned or refined the necessary skills to master the sport (Waters, 1998). However, in such sports as hockey, squash, and racquetball, highly skilled athletes play a faster game with more aggressiveness and, thus, may be subject to higher eye injury risk than other participants.

Most eye (and face) injuries could be prevented or, at least, the effects of such injuries minimized by using protective eyewear. Molded polycarbonate frames and lenses (plain/non-prescription protective eyewear) are suggested for contact lens wearers and athletes who ordinarily do not wear glasses but participate in moderate to high-risk, non-contact sports (e.g., racquetball, baseball, basketball). When protective eyewear has been employed in racket sports eye injuries have been eliminated.
2. **Sports related eye injury statistics.**

It's a cliche we've all heard growing up: 'Be careful, you could put an eye out with that thing.' But according to the data, such motherly concern is warranted, especially in cases of sports equipment in the hands of an unprotected child (David, 1995).

Accidents resulting in eye injuries can happen to anyone. But statistics reveal that over half of the victims are under the age of 25. Many of these injuries (over 100,000 annually) occur during athletic or recreational activities.

Ranging from immediate vision loss to damage that lies undetected for years, the consequences of a sports eye injury can be devastating. Bleeding (hyphema) within the eye may cause glaucoma years later. Even a minor eye injury can eventually cause retinal detachment and legal blindness.

The high speed of objects involved in sports like hockey and racquetball are often underestimated. The use of protective sports eyewear, such as, sports goggles, can reduce the risk of significant eye injury by at least 90 per cent.

Polycarbonate is a lightweight plastic material used in riot plastic shields and canopies for jet aircraft. Polycarbonate is available in prescription and non-prescription eyewear and can withstand a squash or racquetball force of 90 mph.

During high-risk racquet sports, players should wear eye protectors and are best protected by sports frames with 3mm polycarbonate lenses.
It is important to note that contact lenses do not protect the eyes from injury. Athletes wearing contact lenses should also wear protection over their eyes. Protective sports eyewear should be fitted by an experienced eye care professional.

Over 41,000 sports-related and recreational eye injuries were treated in hospital emergency departments in 1993. Seventy-one percent of the injuries occurred in individuals under 25 years of age, 41% occurred in individuals under 15 years of age, and 6% occurred in children under 5 years of age. Children and adolescents are particularly susceptible to injuries because of their fearless manner of play and their athletic immaturity. Ten sports or sports groupings are highlighted in this statement based on their popularity and the high incidence of eye injuries (see Appendix - B). Baseball and basketball are associated with the most eye injuries in athletes 5 to 24 years old. Participation rates and information on the severity of the injuries are unavailable, however, and so the relative risk of significant injuries cannot be determined for various sports (Prevent Blindness America, 1993).

The high frequency of sports-related eye injuries in young athletes indicates the need for an awareness among athletes and their parents of the risks of participation and of the availability of a variety of approved sports eye protectors. When properly fitted, appropriate eye protectors have been found to reduce the risk of significant eye injury by at least 90% (Prevent Blindness America, 1993).

It would be ideal if all children and adolescents wore appropriate eye protection for all sports and recreational activities (see Appendix C). All youth involved in organized sports should be encouraged to wear appropriate eye protection.
3. **Eye protection in Racquetball.**

Played intelligently, racquetball is a safe sport. Unlike games such as football and hockey, racquetball does not entail physical contact between players, therefore reducing the incident of injuries to most parts of the body. However, it is a game played by two to four players in a small, enclosed space, who take turns hitting a projectile at speeds in excess of 150 miles per hour. While a badly aimed shot hit at such speed obviously can cause painful bruises on any part of the body, by far the most vulnerable part of your anatomy is your eye. In fact, studies suggest that the risk of eye injury may actually increase as a player improves, because more competitive players learn to never take their eyes off the ball. As a consequence, the unprotected player faces significant risk of eye injury, including hemorrhaging and laceration of the lid and the eye itself, which can result in partial or total vision loss.

With the upsurge of popularity of the game in the late 1970s, the number of eye injuries in Canada and the United States began to reach alarming proportions. In response, researchers in the two countries began to use high-speed film techniques to study the effectiveness of the most common eyeguards commercially available at that time. The results of these studies were eye opening: They demonstrated that then-popular open (lensless) eyeguards provided minimal protection against direct ball impact. Moreover, studies showed that many hinged eyeglass style guards actually shattered on
impact at the hinge, a finding that is not surprising since a racquetball in play typically carries more energy than a .22 caliber bullet (Waters, 1998).

Fortunately, both Canadian and American organizations have begun to set standards for appropriate eye protection, and the United States Racquetball Association has recently begun requiring lensed eyeguards for all sanctioned tournament play. Many club owners have followed this lead by making eye protection mandatory for all club members and users. Manufacturers have responded to these trends by upgrading the quality of their guards, replacing older plastics with scratch and impact-resistant polycarbonate. Guards are available in a range of styles, with reinforced hinges or sturdy one-piece construction. In addition, corrective prescription lenses and antifog coatings offer excellent visibility to any player.
III. REVIEW OF LITERATURE

1. Sources

The only sources that deal with protective equipment in sports are articles in sports media and in scholarly journals. I was unable to find books about the subject. I decided not to rely on sports media because it is difficult to pinpoint the quality of research presented in the articles. Most of the articles on protective gear in regular sports media seem to be more of a sales presentation of the gear than a research supported by data and facts. All of the sources that I have consulted for this research project support the usage of protective equipment in sports with the exception of the article by Andrade. She was unable to show clear findings that prove a diminished rate on open wound cuts in field hockey players using shinguards compared to the ones that do not.

2. Work of other researchers

Looking at my sources it will be obvious to see that there is only one dealing with indoor racquet sports directly while all the other sources are dealing with protective gear and sporting equipment in general but not specialized to racquet sports. I therefore have to use a survey in the form of a questionnaire to get the reference for the sports of
racquetball, since as mentioned above, I was unable to find specialized literature about the subject.

All other researchers that I consulted for this project have studied the use of protective equipment in traditional impact sports. None of these researchers focused their attention on indoor sports in which the small amount of room can have a significant importance on the amount of impact that occurs between the playing object (ball/racquet) and the participant of the sport.

3. **Summary and Analysis of Literature Review**

**Andrade, Maria:** This is a research study that collected data from high school field hockey players. The research did not find a significant difference between usage and non-usage of shinguard in high school matches since the amount of open wound injuries in the shin area is very limited at this level. This might be because the samples were only female high school players since there is no competitive male field hockey in high schools in the United States, and most of these girls do not hit the ball hard enough to cause a serious cut on another player. While this research concludes that there is no difference between shinguard or non-usage and makes no clear-cut recommendation, the author recommends that a similar study needs to be done for higher competitive level to show how effective protective gear could be in preventing injuries at high competitive level (Andrade, 1997).

This article was clearly written as a start of research in the field hockey area, but needs to be expanded to include an analysis on shinguard usage and accident prevention.
at high competitive level in different countries. The playing surface was not taken into consideration by the author of this study, but hinted on having an effect on ball speed.

**Backer, James:** This study has collected data from high school, college and professional football teams. Questionnaires were handed out to athletes and team physicians. The athletes were asked if they had ever experienced head trauma as a result of the nature of their sports, and asked if they were wearing a helmet when doing so. The physicians were asked to explain every head trauma they ever treated on a team while assuming the potential consequences if the athlete would not have worn a protective helmet. The answers showed that over 15 percent of head traumas could have been fatal with out the use of a helmet, and the author therefore concludes that the use of a helmet saves lives (Backer, 1998).

I think that this is a very well carried out study, in which a broad range of sampling was done taking all levels of playing into consideration. The questioning of team physicians makes this study complete since it shows an expert’s point of view.

**Balmon, Christian:** This research that started out at the Olympic Games in Barcelona during the Summer of 1992 and concluded with questionnaires over the next few years. Balmon observed athletes that participated in the 1992 Olympics both in person and on competition videos. Only accidents requiring medical attention and having a comparable incident with opposing conditions (usage or non-usage of protective gear) were included in the research. The result showed clearly that the accident rate using protective
equipment when available for the sport was 47 percent lower than those not using protection (Balmon, 1996).

Carrenero, Mariano: This study was done by the Spanish Sports Council, and is a comparison of the use of safety equipment to non-usage. The author of this study analyzed the sport of gymnastics. He looked at the accident and incident rate in all of Spain’s registered Gymnasiums, tabulating the outcome of an incident using protective equipment to the outcome of non-usage. This study differs from all the others that I will use in my project as the author refers to mats and ropes as protective equipment and not to anything actually worn by the athletes themselves. Carrenero concludes that the use of protective equipment lowers the accident rate in the sport of gymnastics. He also stresses the importance of correct use of the equipment since misuse can also cause accidents. Misplaced mats can slip out of place and cause an accident when a gymnast falls on to such equipment.

David, Helene: This study concentrates on skiing, and the type of accidents that occur in both, recreational and competitive practice of this sport. The author looks at the potential and types of accidents that occur on the skiing slopes, separating the analysis between regular skiing and snowboarding. The first conclusion reached by the author is that the potential for fatal accidents involving a snowboard is less then 1 percent, while the potential for an accident is 10.5 percent. The numbers for skiing are 2.4 percent for fatal accidents and 11.2 for other accidents. The author looked at all World Cup skiing and snowboard races in one winter and polled slope operators in the United States and
Europe. According to her the sample is therefore representative and allows her to call for safety matting around slopes claiming that skis and snowboards could otherwise be compared with a weapon (David, 1995).

I think that this is an interesting study, but the author should also look at and differentiate the speed involved in skiing and accidents and also factor the snow conditions in, since most of the fatal accidents seem to occur in unfavorable snow conditions (David, 1995).

**MacKenzie, Mark:** This study focuses on the female ice hockey players and their behavior on the ice. The author compared the playing attitude of a hundred female ice hockey players in ten practices. In half of those practices the players were given all protective equipment that is standard for the sport while the chest pad was left out in the other half. The study was motivated by a complaint of the Women's Activist Association stating that the use of a chest pad makes it sometimes hard to differentiate a female form a male player. MacKenzie was able to demonstrate that the playing level significantly decreased without the chest pad, since players were hesitant to "bodycheck". This more conservative playing style had a negative consequence in the player's health since team physicians reported a twenty-six percent increase in bruises without the chest pad. The author therefore closes her article stating that the use of chest pads outweighs the negative and makes a definite plea for use (MacKenzie, 1999).

**Waters, Thomas:** This is the only study that included the sport of racquetball. The author looks at squash and racquetball. He surveyed one thousand players in the United States
and Canada, asking them about their perception of protective eyewear. Forty percent of these players were not aware of the potential consequences of being hit in the eye. Thirty-eight percent of these forty stated their willingness to invest in protective eyewear if the effectiveness could be proved (Waters, 1998).

I think that this study is a good start, but I would have liked to see a follow-up included in the research. By that I mean a poll of the questioned players after a while to see whether they purchased eyewear and a second one about the usage.

**Uniheidelberg:** This website shows tables comparing accidents in all Olympic sports differentiating between male and female athletes and indoor and outdoor sports. I believe that the data is very useful but would have liked to see some conclusions and more information about the data, since the validity is not very clear due to the lack of background information.
IV. RESEARCH DESIGN AND METHODOLOGY

1. Population and Sample.

The population selected in this research was all of the ranked male racquetball touring professionals, the first fifty ranked female players and teaching professionals in all clubs that host professional events. Touring professionals were chosen because of their contact with the sport of racquetball and the clubs hosting professional events because of their exposure to the game. All ranked professionals were included because of the diversity of countries that they represent, giving a better perception of eyewear usage out of the United States.

2. Instrument or Tool used

Each player was given a questionnaire asking him or her about their eyewear usage habits, both while being on the court by themselves or while sharing a court with others. The confidentiality issue was included because most of the players have sponsors and might be reluctant to admit to non-eyewear usage. Players were handed a questionnaire and the tour also included them in regular player updates. Because of the nature of this research the International Racquetball Tour offered one bonus point in the world rankings for every completed questionnaire therefore, helping to complete data collection that will be useful in making a recommendation regarding eyewear usage.
3. Procedure

The questionnaires were handed to all players between November 1 and 8, 1999. In order for them to get the one bonus point the completed form had to be returned by January 31, 2000. Until then the questionnaires were included in all player mailings. The facilities included in this research will receive the questionnaires with the new tour programs for the 2000/2001 season to be mailed out by May 1, 2000 and will be given one month to complete the questions. The reward will be a special mention of cooperation on the tour’s website. The answers of all players were then listed in a database and compared to other players’ answers. Once the initial conclusions were drawn, I created tables and graphs to better understand the impact of usage versus non-usage.

4. Method of Data Analysis

Compilation of all data in a spreadsheet, and calculate the percentages of eyewear and non-eyewear usage and the consequences.
V. DATA INTERPRETATION

One hundred and seventy two questionnaires were collected in total. There were 45 female players, 88 male racquetball touring professionals, and 39 teaching professionals. The results were astonishing.

Combining the three populations the results showed that 73% of all the players surveyed believe that racquetball eyeguards should not be worn at all times while on the racquetball court. In Figure 1, we can see how most of the females believe eyeguards should be always in use. Taking into consideration that these results come from touring and teaching professionals, it is not difficult to understand why there are so many people in athletic clubs that do not wear eyeguards. Beginners, juniors, and intermediate players try to imitate the best player in the club, and if they see the club professional not wearing protective lenses while practicing, then probably they are going to do the same. These actions increase the probabilities of an eye injury in the racquetball court to those people who are not as experienced in the skills of the game as the club professional.
All the players surveyed agreed that junior players should wear eyeguards at all times. However, this answer contradicts the previous one, since 73% believed that eyeguards should not always be used while being on the court. Probably the reason for this inequality comes from the fact that most players do not wear eyeguards when they are practicing in the court by themselves. Of course, the chances of being hit are minimal under this condition, but the problem begins when other players see the top professional players not wearing the proper eyeguards on the court. Therefore, they believe they can do the same under the impression that there is no chance the ball could hit them in the eye. As we already know this assumption is incorrect due to the number of racquetball eye injury related accidents that have been reported throughout the years.

All players also agreed that no one should ever play against an opponent without using eyeguards. In this case, the chances of being hit by the ball increase, especially
when playing doubles instead of singles. However, 63 percent of all athletes surveyed admitted that they do practice drills by themselves without eyeguards. Again the chances of being hit in the eye decrease but there is always the probability that it could happen.

A small 7 percent of the players has witnessed an eye injury on the racquetball court, but when we translate this statistic to the number of players today in the sport, the calculation could be frightening. Only one player out of 172 surveyed has been hit in the eye with the ball without using eyeguards. However, 29 percent has been hit in the face and frames, while using the protective lenses (Figure 2). Fortunately for this percentage of athletes the eyeguards kept them from ending their competitive career in sports.

![Pie chart showing the percentage of athletes hit in the face with ball while using eyewear.](image1.png)

Out of all athletes surveyed 5 percent played matches without using lenses in the eyeguards. This can occur when the weather inside the court is so hot and humid that certain glasses get fogged. The players prefer to take the lenses off instead of cleaning them constantly. However, they do not think of the risk they are taking by not using the required eye equipment.
Probably the most dramatic result out of the surveyed is the fact that 100 percent of the athletes have seen other players not wearing eyeguards (Figure 3).

![Figure 3](image)

What is this telling us? There are many people that do not understand the implications of being hit in the eye with a ball traveling between 80 and 150 miles per hour. Probably, some of these players are just trying the game for the first time and do not see the need of purchasing eyeguards. Maybe they want to find out if they like the game before they invest into some protective eyewear equipment. Maybe, they strongly believe the ball will never hit them. Or maybe they consider themselves to good of a player to be in the direct line of the ball. But I have seen players of great talent and experience being hit regularly by the opponent with the ball. It is a risk that could have major repercussions, but most of people tend to ignore it.

The results from most of the foreign athletes surveyed demonstrated that in other countries outside the US the protective eyewear is not a requirement for the game of...
racquetball. Probably, the accidents reported are greater, while the awareness of the risk of playing without eyeguards is lower.

VI. Conclusion

The results from the research have shown that most racquetball players do not recognize the risks of not wearing protective eyewear. The accidents are being reported, the governing bodies are ignoring the facts, and the sport will eventually suffer from it, unless new regulations for the use of eyewear improve. There are many possibilities for improved use of eyewear, such as: education of the players at all levels and requiring mandatory use of eyewear on any court, anywhere, regardless of competition. Another possibility is that racquet companies could start selling an all-together package for beginners that could include an inexpensive racquet, eyewear, a glove and balls. In this way, the new and inexperienced player could purchase at once all the necessary equipment to start playing the game. Racquetball is an exciting and fast growing sport that people of all ages can learn to play. The only things they need to start are a racquet, a ball, and protective eyewear!!
VII. Bibliography


## QUESTIONNAIRE

### PROTECTIVE EYEGUARDS USE

<table>
<thead>
<tr>
<th>Question</th>
<th>YES</th>
<th>NO</th>
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</thead>
<tbody>
<tr>
<td>1.- Do you ever play non-competitive racquetball Games without wearing eyeguards?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.- Do you ever practice drills on the court without Wearing eyeguards?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.- Do you ever play matches without the lenses in the eyeguards?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.- Have you ever been hit in the face with the ball While using eyeguards?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.- Have you ever been hit in the face with the ball Without using eyeguards?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.- Have you seen players on the court not wearing Eyeguards?</td>
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<td></td>
</tr>
<tr>
<td>7.- Have you seen an eye injury on the racquetball Court?</td>
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<td></td>
</tr>
<tr>
<td>8.- Do you believe eyeguards should be worn at all times while on the racquetball court?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.- Do you believe Junior players should wear Eyeguards at all times while on the racquetball court?</td>
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</tr>
</tbody>
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Please circle one:  

- US  
- Other country

- Male  
- Female
Table 1: Estimated Sports and Recreational Eye Injuries: 1993

<table>
<thead>
<tr>
<th>Sport Recreation Activity</th>
<th>Estimated Injuries</th>
<th>Less than 5y</th>
<th>Age Groups 5-14 y</th>
<th>15-24 y</th>
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<tr>
<td>Baseball</td>
<td>6136</td>
<td>363</td>
<td>3150</td>
<td>1407</td>
</tr>
<tr>
<td>Swimming and pool sports</td>
<td>3439</td>
<td>43</td>
<td>1608</td>
<td>729</td>
</tr>
<tr>
<td>Racquet and court sports</td>
<td>3183</td>
<td>34</td>
<td>668</td>
<td>1064</td>
</tr>
<tr>
<td>Football</td>
<td>2197</td>
<td>0</td>
<td>1097</td>
<td>998</td>
</tr>
<tr>
<td>Ball sports (unspecified)</td>
<td>1749</td>
<td>194</td>
<td>743</td>
<td>320</td>
</tr>
<tr>
<td>Soccer</td>
<td>1319</td>
<td>0</td>
<td>731</td>
<td>365</td>
</tr>
<tr>
<td>Golf</td>
<td>969</td>
<td>43</td>
<td>486</td>
<td>112</td>
</tr>
<tr>
<td>Hockey (all types)</td>
<td>946</td>
<td>19</td>
<td>342</td>
<td>515</td>
</tr>
<tr>
<td>Volleyball</td>
<td>821</td>
<td>0</td>
<td>180</td>
<td>263</td>
</tr>
<tr>
<td><strong>Total Selected Sports</strong></td>
<td><strong>29,280</strong></td>
<td><strong>808</strong></td>
<td><strong>11,246</strong></td>
<td><strong>9,186</strong></td>
</tr>
<tr>
<td><strong>Other Sports &amp; Recreational Activities</strong></td>
<td><strong>11,751</strong></td>
<td><strong>1,457</strong></td>
<td><strong>3,483</strong></td>
<td><strong>2,977</strong></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>41,031</strong></td>
<td><strong>2,265</strong></td>
<td><strong>14,729</strong></td>
<td><strong>12,163</strong></td>
</tr>
</tbody>
</table>

### Table 2: Sports with High Risk of Eye Injury with Appropriate Eye Protectors

<table>
<thead>
<tr>
<th>Sport</th>
<th>Eye Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Badminton</td>
<td>Sports goggles with polycarbonate lenses</td>
</tr>
<tr>
<td>Baseball</td>
<td>Polycarbonate face guard or other certified safe protection attached to helmet for batting and base running; sports goggles with polycarbonate lenses for fielding</td>
</tr>
<tr>
<td>Basketball</td>
<td>Sports goggles with polycarbonate lenses</td>
</tr>
<tr>
<td>Bicycling (LER)*</td>
<td>Sturdy street-wear frames with polycarbonate or CR-39 lenses</td>
</tr>
<tr>
<td>Boxing</td>
<td>None is available.</td>
</tr>
<tr>
<td>Fencing</td>
<td>Full face cage</td>
</tr>
<tr>
<td>Field Hockey (both sexes)</td>
<td>Goalie: full face mask; all others: sports goggles with polycarbonate lenses</td>
</tr>
<tr>
<td>Football</td>
<td>Polycarbonate shield on helmet</td>
</tr>
<tr>
<td>Full-contact martial arts</td>
<td>Not allowed</td>
</tr>
<tr>
<td>Handball**</td>
<td>Sports goggles with polycarbonate lenses</td>
</tr>
<tr>
<td>Ice Hockey</td>
<td>Helmet and full face protection</td>
</tr>
<tr>
<td>Lacrosse (male)</td>
<td>Helmet and full face protection required.</td>
</tr>
<tr>
<td>Lacrosse (female)</td>
<td>Should at least wear sports goggles with polycarbonate lenses and have option to wear helmet and full face protection.</td>
</tr>
<tr>
<td>Racquetball**</td>
<td>Sports goggles with polycarbonate lenses</td>
</tr>
<tr>
<td>Soccer</td>
<td>Sports goggles with polycarbonate lenses</td>
</tr>
<tr>
<td>Softball</td>
<td>Polycarbonate face guard on helmet for batting and base running; sports goggles with polycarbonate lenses for fielding</td>
</tr>
<tr>
<td>Squash**</td>
<td>Sports goggles with polycarbonate lenses</td>
</tr>
<tr>
<td>Street hockey</td>
<td>Sports goggles with polycarbonate lenses; goalie: full face cage++</td>
</tr>
<tr>
<td>Swimming and pool sports</td>
<td>Swim goggles recommended</td>
</tr>
<tr>
<td>Tennis: doubles</td>
<td>Sports goggles with polycarbonate lenses</td>
</tr>
<tr>
<td>Tennis: singles</td>
<td>Sturdy street-wear frames with polycarbonate lenses</td>
</tr>
<tr>
<td>Track and field (LER)*</td>
<td>Sturdy street-wear frames with polycarbonate or CR-39 lenses</td>
</tr>
<tr>
<td>Water polo</td>
<td>Swim goggles with polycarbonate lenses</td>
</tr>
<tr>
<td>Wrestling</td>
<td>None is available.</td>
</tr>
</tbody>
</table>

* LER = Low Eye Risk  
** Goggles without lenses are not effective.  
+ For sports in which a face mask or helmet with eye protector is worn, functionally one-eyed athletes, and those with previous eye trauma or surgery for whom their ophthalmologists recommend eye protection, must also wear sports goggles with polycarbonate lenses to ensure protection.  
++ A street hockey ball can penetrate a molded goalie mask and injure an eye.