THE USE OF SAFETY EYE PROTECTION BY CHILDREN IN RECREATIONAL SPORTS

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ABSTRACT

Background: This research study was designed to assess the proportion of children that wear safety eyewear while playing sports. We have designed this study not only to benefit child athletes, but also to further educate parents and coaches regarding the importance of safety eye protection. According to the United States Consumer Product Safety Commission, more than 600,000 eye-related sports injuries occur each year.[1] 42,000 of these are emergency room-related and of these emergency room injuries, one third are children.[2] Research indicates that children account for 43% of sports and recreational eye injuries.[3] The American Optometric Association, American Academy of Pediatrics, and American Academy of Ophthalmology all strongly recommend eye protection in sports that pose a risk for eye injuries. *Methods:* Our plan to gather data was by utilization of a survey distributed to all parents of pediatric patients at the Michigan College of Optometry at Ferris State University. This project intends to increase the awareness of utilizing protective eyewear in sports. *Results:* Seventy-eight (78) individuals were included in the target group for the study, the majority of which (25%) played soccer. The target group for this survey was children aged between four and seventeen. It was found that only two (2) individuals (3%) of our study group wore sport-specific safety eyewear. One (1) individual (1.5%) in our target group suffered from a sports-related eye injury. *Conclusions:* It was determined that an

overwhelmingly low number of individuals in our target group wore safety eyewear while playing sports. It is important to increase the education of awareness regarding the significance of wearing safety eyewear to prevent the risk of sports-related eye injuries.

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Introduction:

Due to the large number of children involved in recreational activities, it is important for parents, coaches, and athletes to be aware of the amount, and types of sports-related eye injuries that occur every year, and the technologies available in order to prevent these types of injuries. According to the United States Consumer Product Safety Commission, more than 600,000 sports-related eye injuries occur every year.[1] One-third of these injuries occur within the pediatric population. Other studies have shown that children account for as many as 43% of sports and recreational eye injuries.[3] It has been found that the major sports that contribute to these injuries are racquetball, ice hockey, and baseball. With this information and advances in technology, there is sport-specific safety protective eyewear available to help prevent sports-related eye injuries.[4] Sports-related injuries are defined as those occurring in a place of recreation or sports or consisting of any of the following: struck in sports, fall in sports, bicycle related injury, riding an animal, water sports, overexertion, and fall from playground equipment or vehicles, primarily skates and skateboards. This is defined by the following *International Classification of Diseases, Ninth Revision (ICD-9)* E-codes.[2] In a study conducted by the University of Calgary in 2010, it was found that 30-40% of youth between the ages of 11 and 18 years seek medical attention annually for sports-related injuries.[5]

At this time, soccer has the most rapid rate of growth compared to any other sport in North America. It is currently the most common sport related to eye injuries in Europe. In the United States alone, there has been a more than 260% increase in eye-related injuries in soccer from 1973 to 1978.[1] With this information, it is easy to

speculate that soccer may soon become the most common cause of sports-related eye injuries in the United States.[4] Ocular trauma that occurs secondary to sports can vary from minor to severe. Minor injuries such as corneal abrasions and foreign bodies can be treated by physicians or optometrists. More severe ocular injuries can include injuries such as ocular hyphema, orbital bone fractures, and globe ruptures. These particular types of injuries require immediate care with the possibility of hospitalization depending upon the severity. Resulting damage can be vision-threatening and potentially permanent. The vast majority of these injuries can be easily prevented with the use of proper sport-specific protective eyewear, which is becoming more popular every day.[6] The American Optometric Association, American Academy of Pediatrics, and American Academy of Ophthalmology all strongly recommend that eye protection be worn in sports that can potentially pose a risk of eye injury.

The objective of a study conducted by the National Center for Health Statistics in 1995 was to determine the number and type of sports-related injuries in children and adolescents. The age of the subjects ranged from 5 to17 years old, which is similar to the target age group for this study. The study showed that injuries related to sports accounted for 36% of all injuries and concluded that sport activities are responsible for a large number of all injuries relative to the youth population. Of these injuries, 42,000 were emergency room-related and, of these emergency room injuries, one third were children between the age of four to seventeen.[2]

Since a large percentage of injuries in the youth population are sports-related, these injuries have the potential of creating many negative impacts on the health of

athletes and, in return, can result in an even heavier burden on the healthcare system. Due to this fact, there is increasing recognition that more research needs to be done to further develop interventions designed to decrease incidences of sports-related injuries.

Methods:

A survey was conducted regarding subjects ranging in ages from 4 to 17 years of age. Parents of these children were asked to complete a survey containing a series of questions related to the variety of sports that their children play and the type of, if any, protective eyewear that is worn by their children during these sports. The surveys were distributed to the parents of pediatric parents at the Michigan College of Optometry at Ferris State University in Big Rapids, MI. The data was collected over the course of a four month time period.

The survey (see Appendix A) consisted of five questions. The questions were asked in a simple yes/no format with two questions requiring a written response. The first survey question identified the age of the child. As stated previously, the target group was between the ages of 4 to 17. The next survey question examined whether the child wore any type of eye correction and if yes, what type of correction (either spectacles or contact lenses). The third question inquired as to whether the child participated in any sports, and if so, which sports. If a survey participant played multiple sports, each sport was taken into consideration. Lastly, it was asked whether the child had suffered any type of eye injury while playing sports. If an injury did in fact occur, we further asked in which sport the injury was acquired.

Results:

There were a total of 83 participants in the survey; however, five of these participants were outside of the desired age range of 4 to 17 years of age. Therefore, there were a total of 78 participants included in the summarized data. The majority of our subjects (38%) were between the ages of 4 to 7 years of age. The remaining ages were divided into the following ranges: 8-10 years, 11-13 years, and 14-17 years. Each of these remaining age groups were equal in number, comprising 20.5 % of the remaining survey participants. The data collected during the course of the study is summarized in Table 1.

Age	# of participants
<4	4
4-7	30
8-10	16
11-13	16
14-17	16
>17	1
Total	83

Sport	# of participants
Soccer	15
Hockey	7
Football	7
Basketball	6
Dance	2
Racquetball	2
Baseball	8
Cross country/track	3
Cheerleading	6
Wrestling	1
Golf	1
Bowling	1
Swimming	1

Wears safety eye protection	2
Does not wear safety eye protection	76

Has not suffered an ocular injury	77
Has suffered an ocular injury	1

Table 1. Summary of collected survey data

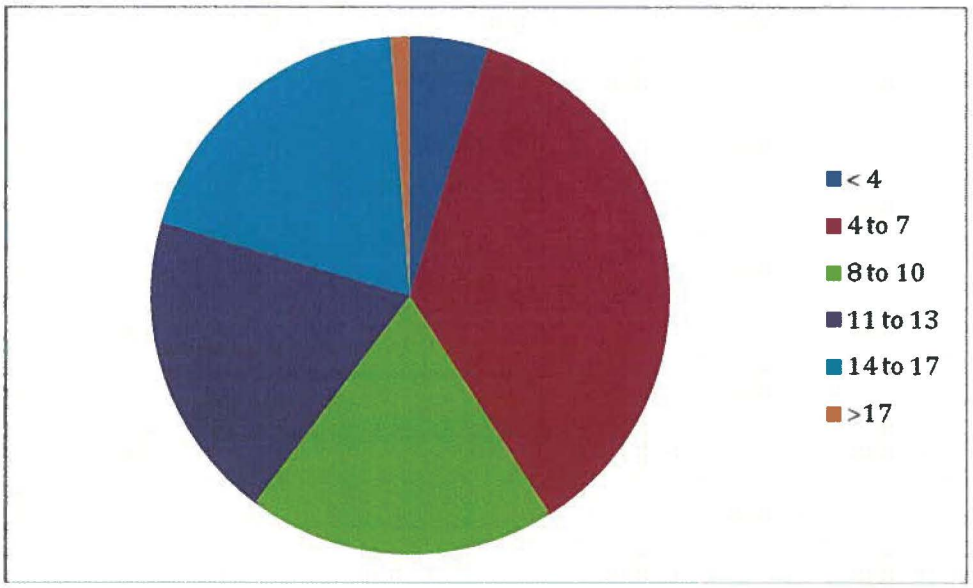

Table 2. Age range of study participants

The summarized data of each of the age groups is outlined in Table 2. The study determined that of the total number of subjects, a large majority (77%) participated in at least one sport. It was found that the most popular sport that children in this study between the ages of 4 to 17 participated in was soccer (25%). The second most popular sport was baseball (13%). The next two most popular sports were football and hockey (12% each). These were followed by basketball and cheerleading (10% each). Cross country and track both included 5% of the participants. Table 3 summarizes this information.

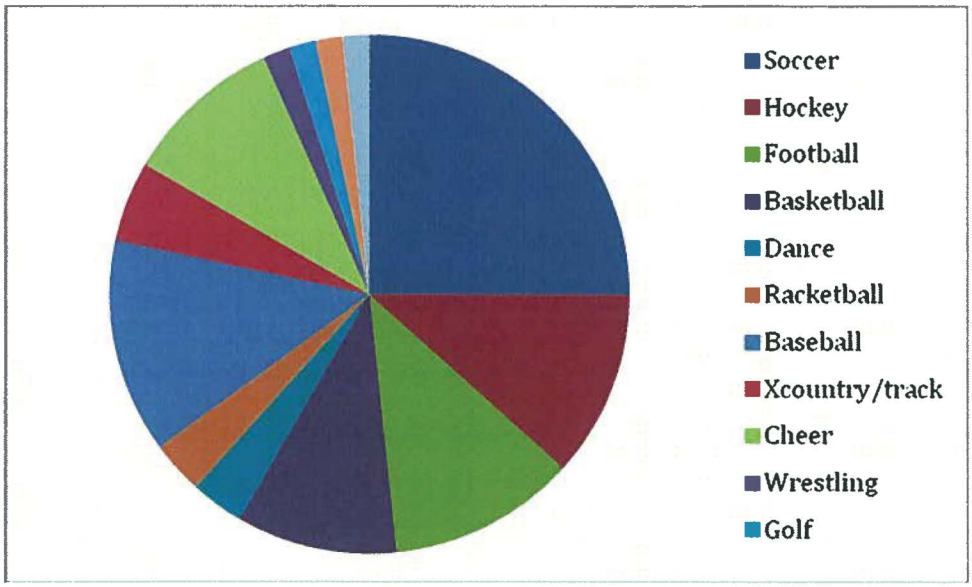

Table 3. Distribution of sports played by study participants

From the data collected, it was determined that the percentage of children that wear safety eyewear during sports is extremely low. According to this small sample of the study population, a total of 60 children between the ages of 4 to 17 participate in a sport in Big Rapids, MI. Of the 60 subjects, only 2 wear safety eye protection while playing sports, which represents only 3% of our sample population. Table 4 illustrates this distribution in graphical format.

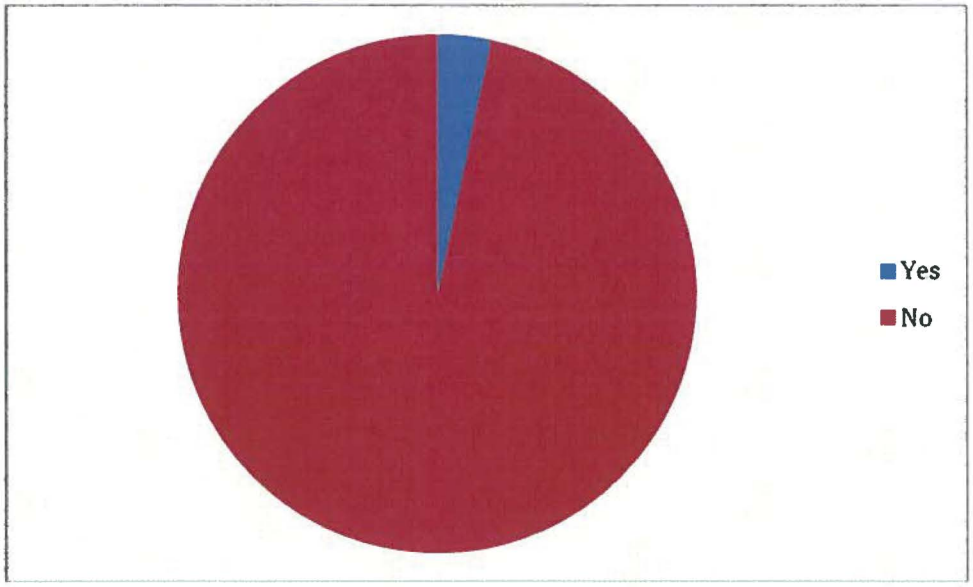

Table 4. Distribution of study participants who wear safety eyewear

From the data collected it was determined that of the total number of participants who played a sport, only one participant (1.5% of the sample) suffered an eye injury while playing a sport and this was while on a trampoline, which is an activity that was not included as a recreational sport in our survey. This information is summarized in Table 5.

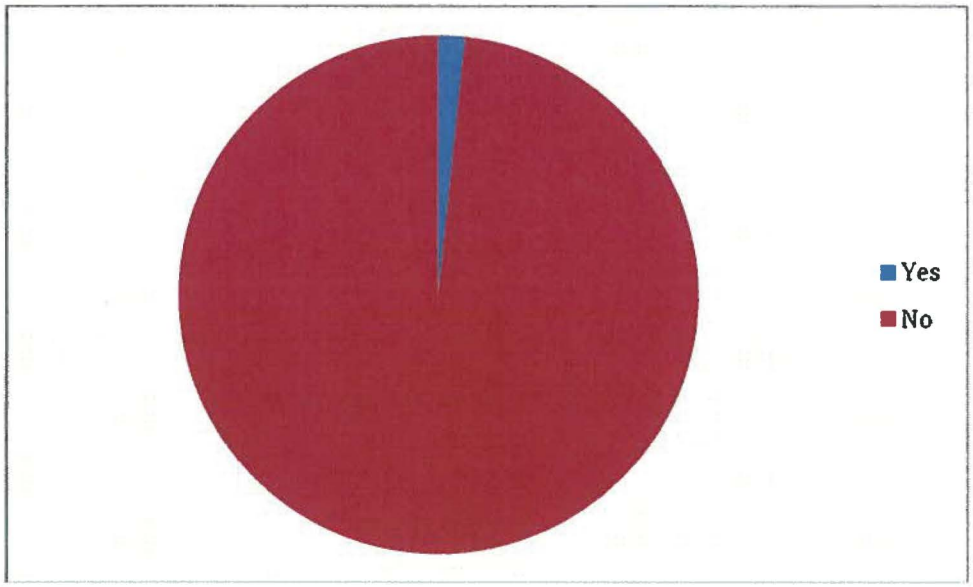

Table 5. Distrubution of participants suffering a sports eye injury

Conclusion:

Based on the results of the study, it was determined that the proportion of the sample population that wears protective eyewear during recreational sports is overwhelmingly low. Although the study only included one eye injury (which was from a trampoline incident), it showed that the population is likely very unaware and would benefit greatly from education regarding the importance of sport-specific safety eyewear and its significance in preventing ocular injuries. As stated earlier, the most common sport-related eye injury in Europe is due to soccer. Through prior research, it was discovered that soccer is the fastest growing sport in popularity in the United States and in relation to the study, soccer was the most common sport played by the target group. Therefore, it may be concluded that we may expect an increase in sports-related eye injuries in the United States as a result of more exposure secondary to an increase in the playing of soccer.

The most common safety eyewear material is polycarbonate plastic. Polycarbonate is a durable, lightweight material with dimensional stability, optical clarity, and heat and electrical resistance.[8] The recommendation for protective eyewear is 2mm polycarbonate lenses in normal street wear frames for athletes in low risk sports, and 3mm polycarbonate lenses in an appropriate sports frame for those athletes participating in moderate to high risk sports. It is recommended that athletes who play basketball should wear polycarbonate lenses and frames. Those who play hockey should wear a helmet with a full face cage that is made from either wire or polycarbonate. Sports goggles can also be beneficial as well for an extra level of protection. Baseball athletes should wear sports goggles when fielding. When batting or running bases, baseball players should wear the appropriate helmet with a polycarbonate face guard. In-general, face masks should be attached to a helmet in sports such as hockey, football, baseball, and lacrosse.[9] Contact lenses offer no protection so it strongly recommended that contact lens wearers should wear the appropriate eye protection relative to the sport being played.[10]

Monocular individuals can be generally defined as having best corrected visual acuity of 20/40 or worse vision in the poorer seeing eye. If the better eye were to sustain an injury, the individual may become visually handicapped. Therefore, it is crucial that these athletes wear some form of eye protection at all times, particularly while participating in sports. Functionally monocular athletes with history of ocular trauma or surgery should not participate in boxing, wrestling, or full contact martial arts since eye protection is not allowed in these sports.[10]

Due to the large amount of children involved in recreational sports and the increased risk of injury, it is extremely important for parents and coaches, as well as athletes, to be properly informed and educated about the risks associated with playing certain sports and the relevance of using safety eyewear. This could be accomplished in many ways. Distributing information packets during registration events for various sports can be an excellent way to educate the public on the importance of sports protective eyewear. This can be in the form of brochures or informational discs. It would also be beneficial to set up a display of various sports eyewear frame styles at the registration events to inform people of both the modern frames and the safety technology available. Another way in which sports safety eyewear awareness can be promoted is via a newspaper article. This article could state the lack of use of safety eyewear and the correlation with certain sports that are at an increased risk for injury. Also, having a display of safety eyewear in various optometrists' offices would be another way to promote awareness.

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APPENDIX A

SURVEY INSTRUMENT

Survey Instrument

	Child #1 Age _____	Child #2 Age _____	Child #3 Age _____	Child #4 Age _____
Does your child require an eye correction	YES NO	YES NO	YES NO	YES NO
If **YES,** for the above question - what type of correction?	Glasses Contact Lenses Both	Glasses Contact Lenses Both	Glasses Contact Lenses Both	Glasses Contact Lenses Both
Does your child participate in any sport(s)?	YES NO	YES NO	YES NO	YES NO
If **YES,** please specify which sport(s)				
Does your child wear safety eye wear when playing sport(s)?	YES NO	YES NO	YES NO	YES NO
If **YES,** please specify for which sport(s)				
Has your child ever suffered from an eye injury while playing a sport(s)?	YES NO	YES NO	YES NO	YES NO
If **YES,** please specify which sport				