

# Youth Sports Injury Prevention: Suggestions from the US for Japan

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## Table of Contents

Youth Sports Injury Prevention: Suggestions from the US for Japan.....	1
Table of Contents.....	2
A Personal and Professional Position on Sports Injuries.....	3
Understanding the Complex System of Youth Sports in the USA .....	5
Organizations Involved in the Prevention of Youth Sports Injuries in the USA ...	6
The Scope of the Youth Sports Injury Problem in the USA.....	8
A Brief Anecdote of the Challenges Faced at a California Public School.....	8
Statistics.....	9
National Center for Catastrophic Sports Injury Research (NCCSIR) Statistics on Sports Injury and Death.....	11
Recommendations to Prevent Youth Sports Injuries.....	13
National Center for Catastrophic Sports Injury Research (NCCSIR) Recommendations.....	13
National Alliance for Youth Sports Recommendations.....	16
American College of Sports Medicine Recommendations .....	17
Micheli, et al (2000) Recommendations.....	18
Powell and Barber-Foss (1999) Recommendations .....	19
Other Recommendations.....	20
Minimize risk factors.....	20
Make youth sports less serious “business” .....	20
Don’t overdo training or overuse the body .....	21
Know the specifics of who gets what injuries, and make specific plans to prevent those injuries.....	22
Train and certify coaches properly, but also ensure they know their legal duties.....	22
Use positive discipline to ensure you cause no emotional injury.....	23
Get insurance for coaches .....	23
Bibliography .....	25

## A Personal and Professional Position on Sports Injuries

When Yokota Masatoshi-sama of the Mitsubishi Research Institute asked me to lead the USA portion of this comparative study for the Ministry of Education, Culture, Sports, Science and Technology of Japan regarding youth sports injuries and accidents, I jumped at the chance because I wanted to give something back to the people and Government of Japan.

I was a JET Programme participant (2002-04) as well as a Ministry of Education, Culture, Sports, Science and Technology research student at the University of Tokyo (2007-09) before taking up my current position as Assistant Professor and Hakubi Scholar at the Graduate School of Education, Kyoto University. My experiences in Japan have all been formative in my personal as well as professional life.

I have a special interest in the general well being of young Japanese athletes, having done substantial research on the debates encircling the controversial Japanese term *taibatsu*, “corporal punishment”. *Taibatsu* is often associated with a hard-line, strict, and traditional pedagogy of sports coaching, and while there is much evidence that corporal punishment can cause physical injuries, it can also leave mental scars. For these reasons, I recommend that, if possible, the Ministry of Education, Culture, Sports, Science and Technology of Japan use a broad definition of sports injuries in future studies, one that includes mental and emotional injury as well as physical injury.

As an American, I hope that the Ministry of Education, Culture, Sports, Science and Technology of Japan will find something of value from America’s experience grappling with the difficult problem of sports injuries. I would like to be clear, however, that I do not recommend that Japan adopt our decentralized policy of letting individual states and private youth sports organizations regulate themselves. After having conducted this research, I have come to believe that such a decentralized policy, at least as it is manifest in the United States, probably facilitates more injuries than it prevents because it does not hold these states and youth sports organizations accountable to sound policies based on sports science- and sports medicine-based research.

Rather, I think there ought to be clear and concise guidelines in every sporting nation, including Japan, that follow the sports science-based and sports medicine-based recommendations stated in this report. (Japanese scientists and doctors have surely made many of these recommendations, although in this report I focus on the work of American researchers.) Basing national policy on the many years of study that doctors and scientists have already done is the best way of ensuring that the number of sports injuries – and, by extension, sports deaths – does not increase.

I hope that the Ministry of Education, Culture, Sports, Science and Technology of Japan will find in the pages that follow a clear and concise summary of the most

relevant American recommendations regarding how governments may better draft and implement policies which ensure that physical education classes and youth sports are safer and more enjoyable for all.

## Understanding the Complex System of Youth Sports in the USA

The United States is a federal democratic union of states that allows states considerable power over local policy. For example, in contrast to Japan, where educational power is centralized in the Ministry of Education, Culture, Sports, Science and Technology of Japan, the US Department of Education can only exert limited influence on state education policy. Moreover, sports policy *is* education policy in Japan, whereas in the United States this is not always the case.

As a result, sports policy of all kinds is created and disseminated on a rather ad-hoc basis. For example, the US Olympic Committee and the President's Council on Physical Fitness and Sports are two important sports organizations, but neither are mandated by federal law to ensure that Americans in all 50 states comply with some sort of national sports policy.

There is no dedicated national "Sports Ministry" in the United States, and as a result what follows in this report are mostly *recommendations* regarding best practices to avoid injuries in youth sport and physical education classes. These recommendations come from a variety of sources, including journalists, doctors' groups, scientists, and statisticians.

The following is a list of relevant organizations specifically involved in making some these recommendations.

## Organizations Involved in the Prevention of Youth Sports Injuries in the USA

### RELEVANT INTERNATIONAL ORGANIZATIONS

Federation of Internationale Medicine du Sport  
<http://www.fims.org/>

World Health Organization (WHO)  
<http://www.who.int/en/>

### RELEVANT DOMESTIC (USA) ORGANIZATIONS

Amateur Athletic Union  
<http://www.aausports.org/>

American Alliance for Health, Physical Education, Recreation and Dance  
<http://www.aahperd.org/>

American College of Sports Medicine  
<http://www.acsm.org/>

American Orthopedic Society for Sports Medicine  
<http://www.sportsmed.org/>

American Osteopathic Academy of Sports Medicine  
<http://www.aoasm.org/>

American Physical Therapy Association  
<http://www.apta.org/>

Center for Disease Control  
<http://www.cdc.gov/>

Consumer Product Safety Commission (CPSC) (*National Electronic Injury Surveillance System*, only covers product-related injuries)  
<http://www.cpsc.gov/about/clrnghse.html>

National Athletic Trainers Association  
<http://www.nata.org/>

National Center for Catastrophic Sports Injury Research (NCCSIR)  
<http://www.unc.edu/depts/nccsi/>

National Federation of State High School Associations  
<http://www.nfhs.org/>

National Institutes of Health (see especially *Sports Injuries in Youth: Surveillance Strategies*)

<http://www.nih.gov/>

National Operating Committee for Safety in Athletic Equipment

<http://www.nocsae.org/>

National Safety Council

<http://www.nsc.org/Pages/Home.aspx>

National Youth Sports Safety Foundation

<http://www.health.gov/NHIC/NHICScripts/Entry.cfm?HRCODE=HR2693>

The President's Council on Physical Fitness and Sports

[http://www.fitness.gov/resources\\_factsheet.htm](http://www.fitness.gov/resources_factsheet.htm)

United States Olympic Committee

<http://www.teamusa.org/>

## **POPULAR YOUTH SPORTS LEAGUES**

Little League Baseball

[http://www.littleleague.org/Little\\_League\\_Online.htm](http://www.littleleague.org/Little_League_Online.htm)

Pop Warner Youth Football

<http://www.popwarner.com/aboutus/benefits.asp>

American Youth Soccer Organization (AYSO)

<http://www.ayso.org/home.aspx>

## **RELEVANT COACHING ORGANIZATIONS**

Positive Coaching Alliance

<http://www.positivecoach.org/>

American Sport Education Program

<http://www.asep.com/>

## The Scope of the Youth Sports Injury Problem in the USA

### A Brief Anecdote of the Challenges Faced at a California Public School

Before considering the scope of the youth sports injury problem in the US, let me please share a brief anecdote about a middle school in my hometown in the state of California and the challenges its teachers face when a child injures himself during a physical education class or after school sports activity.

I played high school basketball with a friend who eventually became a physical education teacher and then later a vice principal at this middle school. He kindly provided me with the following information regarding the potential causes of youth injuries in his school physical education classes as well as the potential prevention measures he and his fellow teachers used to minimize the risk that such injuries might occur.

#### **Violence, Accidents and Limited Health Care Provision Allowed by Teachers**

Violence by teachers or coaches against students is rarely the cause of youth sports injuries because the California education code specifies zero tolerance for coaches or teachers who hit players or students. Child protective laws also forbid such violence, and 'corporal punishment' has been illegal in California since 1986. (This is not the case in other US states, however, where corporal punishment is still legal.)

In order to prevent accidents, when students at this school do wrestling in their physical education classes, children are forbidden from beginning to wrestle from one's feet. Wrestlers must start on their knees, from a low position, and each wrestler can also only wrestle against opponents of a similar weight.

All teachers at this school must fill out incident reports for "anything more bump or bruise" in order to protect themselves and their school in the event there is a lawsuit against the school brought by the parents.

If an injury does occur, the most this school's teachers can administer is a band-aid or ice; anything more and they have to call a parent or health care professional to administer it. This is also to limit the school's legal liability.

This brief anecdote illustrates that at least some US schoolteachers face a significant challenge to helping children when they are injured or fall ill because they must be more concerned about protecting themselves in case a child's parents decide to bring a lawsuit against the school for supervisory negligence. Sports injuries are a problem in the US, but we Americans do not do a good enough job of empowering the people who are closest to our children – the teachers – with the respect and trust they deserve and need to help our children when they need help most.



## Statistics

### **HOW MANY SPORTS INJURIES AMONG AMERICAN YOUTH?**

Statistically, youth sports injuries are a significant problem in the US. According to Hyman (2009), in 2003 3.5 million American children under fifteen suffered a sports injury that required medical treatment. This figure does not include children who chose to ignore their pain and failed to tell their teacher/coach/parent. Given that the *National Council on Youth Sports* estimates that 41 million American youth play organized sports, this 3.5 million represents an injury rate of almost one in every ten athletes (Hyman 2009: 65). According to the Lucille Packard Children's Hospital at Stanford University (n.d.), almost 1/3 of all injuries, and 21% of all traumatic brain injuries, incurred in childhood are sports-related injuries, and the most common injuries are strains and sprains. The leading cause of death from sports injury, which is rare, is from trauma to the brain.

### **WHERE?**

According to the Lucille Packard Children's Hospital, the most severe youth sports injuries occur in individual sports and recreational activities. Contact sports like football and basketball also have statistically higher rates of injury than non-contact sports like swimming or golf.

The Lucille Packard Children's Hospital reports that more than 775,000 children aged 14 and under are treated in hospital emergency rooms (ER) each year, often from falls, collision, or overexertion during unorganized or informal sports activities. Most organized sports injuries (62%) occur during practices, not games. According to Micheli, et al (2000), "Twenty-five percent to 30% of youth sports injuries occur in organized sports, and another 40% occur in unorganized sports."

### **WHICH SPORTS?**

Almost half of all head injuries sustained in sports or recreational activities occur during bicycling, skateboarding, or skating incidents. The following numbers of children aged 5-14 are treated for injuries in US hospital emergency rooms each year:

<b>Sport</b>	<b>Number of children seen in hospital emergency rooms per year</b>
Bicycling	Nearly 275,000
Basketball	More than 200,000
Football	Nearly 194,000
Baseball and Softball	Nearly 117,000 <sup>1</sup>
Trampolines	Nearly 80,000
Soccer	About 75,000
Skateboarding	More than 61,000
In-line and roller skating	More than 38,000
Snow skiing/Snowboarding	More than 29,000
Gymnastics	Nearly 23,500
Ice Skating	Nearly 10,600
Ice Hockey	Over 18,000
Sledding	More than 15,000

\*Source: Lucille Packard Children's Hospital at Stanford University (n.d.)

## **SERIOUS BRAIN INJURIES**

If brain injuries are the leading cause of death in sports, where do they occur most often? According to Powell and Barber-Foss (1999), 5.5% (1219) of all sports injuries (23,566) counted in a three-year period were mild traumatic brain injuries (MTBIs):

Of the MTBIs, football accounted for 773 (63.4%) of cases; wrestling, 128 (10.5%); girls' soccer, 76 (6.2%); boys' soccer, 69 (5.7%); girls' basketball, 63 (5.2%); boys' basketball, 51 (4.2%); softball, 25 (2.1%); baseball, 15 (1.2%); field hockey, 13 (1.1%); and volleyball, 6 (0.5%). The injury rates per 100 player seasons were 3.66 for football, 1.58 for wrestling, 1.14 for girls' soccer, 1.04 for girls' basketball, 0.92 for boys' soccer, 0.75 for boys' basketball, 0.46 for softball, 0.46 for field hockey, 0.23 for baseball, and 0.14 for volleyball...Based on these data, an estimated 62 816 cases of MTBI occur annually among high school varsity athletes participating in these sports, with football accounting for about 63% of cases.

## **HOW MUCH DOES IT COST?**

The cost of youth sports injuries in the US is probably in the hundreds of billions of dollars, though we are unable to fully account for the large number of so-called "overuse injuries" (see below for details). According to Micheli, et al (2000):

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<sup>1</sup> Baseball also has the highest fatality rate for this age group, with 3 to 4 children dying from baseball injuries each year.

Injuries from sports participation are a significant cause of hospitalization and health care costs in children and adolescents. Injuries are the second leading cause of emergency room visits for youth and the second leading cause of injury in schools...In 1997, the medical cost of sports injuries for youth age 0 to 14 in the United States for product-related injuries was \$365,470,091,189 for 28 sports: archery, baseball, basketball, bicycling, boxing, diving, field hockey, football, golf, gymnastics, horseback riding, ice hockey, ice skating, inline skating, martial arts, mountain bikes, roller skating, skiing, soccer, softball, swimming, tennis, track and field, trampolines, volleyball, weightlifting and wrestling (Micheli, et al 2000).

*National Center for Catastrophic Sports Injury Research (NCCSIR) Statistics on Sports Injury and Death*

**BACKGROUND OF THE STUDY**

Since American football has historically been perceived as America's most violent and dangerous sport, the Annual Survey of Football Injury Research has been conducted since 1931, first by the American Football Coaches Association and since 1965, the University of North Carolina, Chapel Hill.<sup>2</sup> Its goal has been to make football safer. It claims to have achieved this goal by providing the research necessary to convince football rule makers to improve coaching techniques and helmet standards as well as disallow, in 1976, 'spearing'<sup>3</sup> tackles. 'Spearing' tackles are tackles in which the defender attempts to bring the offensive player to the ground by leading with his head. Although such tackles still occur, they are illegal and severely penalized, and coaches are encouraged to teach their players how to tackle without 'spearing' as well as support officials when they penalize players for spearing.

The National Center for Catastrophic Sports Injury Research (NCCSIR) was established in 1982 to expand the tabulation and analysis of sports injuries in all sports, not just football. From 1982 on more than just fatalities have been recorded; non-fatal severe disabilities as well as serious but not disabling injuries have also been recorded.

These all-sports NCCSIR studies have produced some surprising findings. In particular, in contrast to the aforementioned perception that football is America's most violent sport, the NCCSIR has found that the injury rate per 100,000 athletes is actually higher in ice hockey and gymnastics than in football.

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<sup>2</sup> The National Collegiate Athletic Association (NCAA) also started its own injury research, also supervised by the University of North Carolina, Chapel Hill, in 1977.

<sup>3</sup> The report reads: "The original 1976 rule defined spearing as "the intentional use of the helmet (including the face mask) in an attempt to punish an opponent". In the new 2005 definition of spearing the word "intentional" was removed from the rule in order to make it easier for the referees to call."

## **STATISTICS REGARDING DIRECT AND INDIRECT FATALITIES IN FOOTBALL**

Approximately 1.8 million Americans play football each year. Most (1.5 million) are high school, junior high school, and non-federation school football participants. There are also 75,000 college players and 250,000 sandlot and professional players.

Since 1978, the number of **direct fatalities**<sup>4</sup> in football has consistently been under 10. The number of **indirect injuries** has been in double figures since 1999 with the exception of 2003 and 2007, when it was in single digits.

Since 1968, when there were 68 direct fatalities in football, there has been a dramatic decline in the number of these fatalities. There were no direct fatalities in football in the year 1990, the first time that ever happened since 1931.

Following is an example from a recent year's NCCSIR study:

In 2008, there were **7 direct fatalities** in football (5 in games, 1 in practice and 1 in scrimmage). This equates to a 0.39 direct fatality/100,000 player exposure ratio. 5 of these 7 deaths were due to brain injuries. The others were chest and abdomen injuries. In 2008, there were **13 indirect fatalities** in football, most caused by heatstroke or heart problems. These include 7 in high school, 3 in college football, and 3 in sandlot football.

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<sup>4</sup> Direct Injury: "Those injuries which resulted directly from participation in the skills of the sport."  
Indirect Injury: "Those injuries which were caused by systemic failure as a result of exertion while participating in a sport activity or by a complication which was secondary to a non-fatal injury."

## Recommendations to Prevent Youth Sports Injuries

### National Center for Catastrophic Sports Injury Research (NCCSIR) Recommendations

The NCCSIR makes 9 recommendations for avoiding **head and neck injuries and deaths** in football:

- 1) Strengthen the neck through proper conditioning exercises.
- 2) Coaches should teach proper tackling and blocking technique and never allow players to lead with top of the head or helmet (“spearing”).
- 3) Rules prohibiting spearing should be enforced in practice and in games
- 4) All adults should check that players’ equipment is properly fitted.
- 5) When a player has shown signs of head trauma he should receive immediate medical attention.
- 6) If players have headaches they should seek medical attention immediately. They should also be encouraged to share such information with adults.
- 7) Coaches should not make the decision of whether players return to the game or not; that decision should be made by trained medical professionals.
- 8) Two organizations – the National Federation of State High school Associations and the NCAA Committee on Competitive Safeguards and Medical Aspects of Sports – have in the last three years (2008-2011) recommended that no athlete should return to a game after suffering a concussion, losing consciousness, or showing other “worrisome symptoms”. Athletes with so-called “second impact syndrome” – when an athlete who has not recovered from a concussion returns to play and suffers another severe hit – results in death more often than athletes with one concussion.
- 9) Game officials (referees) should call all illegal helmet contact during games. If referees consistently make these calls, coaches will eventually stop teaching players how to tackle and block by leading with their helmet.

The NCCSIR makes 12 recommendations for avoiding **heatstroke**:

- 1) Each athlete should have a complete physical examination and annual health history update. Previous heat illness should be included in this report, as well as the activity that led to it.
- 2) Acclimatize athletes to heat gradually by providing graduated practice sessions for the first seven to ten days on abnormally hot or humid days.
- 3) Know both the temperature and the humidity because it is the latter not the former that is harder for the human body to cool itself in. Measure the relative humidity with a sling psychrometer and anytime the “wet-bulb temperature” is over 78 degrees.
- 4) Adjust activity level and provide frequent rest. Rest in cool shaded areas and remove helmets and jerseys. For every hour of workout, 15 to 30 minutes should be provided for rest.

- 5) Give water regularly and freely. Make water available in unlimited quantities.
- 6) Salt should be replaced daily. Salt food liberally during training. Don't give players salt tablets.
- 7) Athletes should weigh themselves each day before and after practice. Check to see which players' weights' change most frequently. 3% weight loss through sweating is safe; 5% is not.
- 8) Clothing is important. Don't wear long sleeves, long stockings, or excess clothing. Never wear rubber or sweat suits.
- 9) Some athletes are more prone to heatstroke than others: e.g. those not accustomed to heat, the overweight, the eager athlete who pushes himself too much, those with previous heat problems.
- 10) Look for signs of heat illness: nausea, incoherence, fatigue, weakness, vomiting, cramps, weak rapid pulse, flushed appearance, visual disturbances, and unsteadiness. Have a plan for recommended emergency procedures always on hand. All personnel should have access to this plan.
- 11) More and more medical personnel are using ice water baths to treat heat illness. Some schools use outdoor swim pools filled with ice water.
- 12) Consult the National Athletic Trainers Association "heat illness position statement".

The NCCSIR makes 14 recommendations for avoiding **all injuries**:

- 1) Mandatory medical examinations should be taken before participating in football. If a physician has any questions about an athletes' readiness to participate, the athlete should not be allowed to play. Coaches in college should follow NCAA recommendations, coaches in high school should follow their State High School Athletic Association's guidelines.
- 2) All personnel involved in football should emphasize proper, gradual and complete physical conditioning, particularly in terms of neck strengthening and acclimatization to hot weather.
- 3) Physicians should be present at all games and practice sessions. Where a physician is unable to attend, emergency measures must be planned and accessible.
- 4) All personnel should know about the problems and safety measures related to physical activity in hot weather.
- 5) Each institution should strive to have a certified athletic trainer who is a regular member of the faculty and is adequately prepared and qualified.
- 6) All groups involved in Sports Medicine should liaise with other interest groups – e.g. physicians, trainers, coaches, manufacturers, administrators, etc.
- 7) Game rules should be strictly enforced, and coaches should support game officials in this endeavor.
- 8) Employ well-trained athletic personnel and secure excellent facilities and equipment.
- 9) Research should continue to investigate safety in football.

10) Keep the head out of football; coaches should teach and emphasize the proper fundamentals of blocking and tackling to help reduce head and neck injuries.

11) Strict enforcement of the rules by coaches and officials will reduce serious injury

12) When a player has shown signs of head trauma (loss of consciousness, visual disturbances, headache, inability to walk correctly, disorientation, memory loss), he should receive immediate medical attention.

13) Schools should have Automated External Defibrillators (AED) available since the number of indirect heart related deaths has increased over the years.

14) Be aware that football players with “sickle cell trait” might have an increased risk of indirect death. Consult the National Athletic Trainers’ Association “Consensus Statement” on their website entitled, “Sickle Cell Trait and the Athlete”.

## National Alliance for Youth Sports Recommendations

The National Alliance for Youth Sports, in its “how-to” book for beginner football coaches (2006), recommends that:

- 1) Coaches should help players stay healthy by encouraging a proper diet and staying hydrated (National Alliance for Youth Sports 2006: 300-1).
- 2) Coaches should always require athletes to do proper warm-ups, including a sound stretching regimen both before and after games. This will enhance flexibility and protect against unwanted aches and pains (National Alliance for Youth Sports 2006: 303-304).
- 3) Coaches should always ensure equipment is tightly secure and fits properly (National Alliance for Youth Sports 2006: 311-12).
- 4) Coaches should make sure players know how to tackle properly; coaches should ensure there is no “spearing” (National Alliance for Youth Sports 2006: 311-12).
- 5) Coaches should make sure they don’t practice or play in severe weather (e.g. thunderstorms or heat waves) (National Alliance for Youth Sports 2006: 311-12).



## American College of Sports Medicine Recommendations

In order to prevent injury in sport, the American College of Sports Medicine recommends:

- 1) Coaches and teachers should emphasize that general fitness is the basis for all sports participation. Fitness exercises should be included in the training routine rather than devoting all of each training session to the development of specific skills required for a certain sport.
- 2) Children may be encouraged to participate in several different sports, rather than specializing in a single sport at an early age.
- 3) Instructors of sport should adhere to appropriate training principles and encourage athletes to begin training one or two months before the actual season begins.
- 4) In the prevention of overuse injuries, it is important for adults to allow the children to play. When young children control the intensity of an activity themselves, they seem likely to stay within safe ranges of activity level. Parents or coaches, however, often control the intensity of the game or training, and this may lead to overuse injuries.
- 5) Rules for adult games should be modified as appropriate for young people. For example, softball bases may need to be closer, playing periods shorter, and playing fields proportionately smaller.
- 6) Coaches or parents of young athletes who place too much emphasis on winning may well contribute to the risk for an athlete sustaining an injury.
- 7) Opponents in a sports event should ideally be matched by age, height, weight, maturity, and skill in order to decrease the incidence of injury.
- 8) Competitive sports among children and adolescents should be carefully supervised and rules strictly enforced.
- 9) There should be no more than a 10% increase each week in the amount of training time, amount of distance covered, or number of repetitions performed in an activity.
- 10) Training sessions should include warm-up and cool-down periods and flexibility exercises.
- 11) Comprehensive pre-participation physical examinations are recommended for all young athletes.
- 12) Resistance training for children and adolescents should exclude lifting of the maximal weight that an individual can accomplish. The amount of weight lifted or resistance used should be no larger than the amount with which the participant can complete at least ten repetitions in good form.

### Micheli, et al (2000) Recommendations

In a well-researched and concise article on the prevention of youth sports injuries, Micheli, et al (2000) recommend the following:

- 1) Mandate single national coach certification<sup>5</sup>
- 2) Learn from and study previous injuries and accidents
- 3) Develop surveillance system to monitor changes in rates and causes of sports injuries
- 4) Hold conferences and forums and write consensus papers to bring together all concerned organizations to create a critical mass
- 5) Don't overuse the body during training
- 6) Make sure you have best equipment at all times
- 7) Teach proper technique to avoid preventable injuries, such as ACL injuries in female athletes
- 8) Disseminate health information in a timely manner; don't rely on academic journals, which take years to be published.
- 9) Adopt consensus statement drafted by FIMS/WHO which addresses all relevant actors in the world of youth sport: coaches, health professionals, parents, researchers
- 10) Adopt guidelines for "pre-participation physical evaluation" recommended by five US medical societies (AAFP, AAP, AMSSM, AOSS, AOASM)

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<sup>5</sup> The US is still in progress setting this up.

## Powell and Barber-Foss (1999) Recommendations

In terms of ways to prevent traumatic brain injuries, which as we saw above is the leading cause of death among sports-related injuries, Powell and Barber-Foss (1999) conclude that:

Given the close association of MTBI (Mild Traumatic Brain Injuries) with a variety of different types of collisions, prevention strategies may be most successful when interventions are aimed at controlling the participation environment. Modifications in player skills, teaching techniques, and playing rules may be required to reduce the potential risk from different types of collisions in sports. In addition, sports medicine professionals should focus on accurate identification of MTBIs and consistent management throughout the recovery period. Players and coaches must be encouraged to report all suspected head injuries to athletic trainers and team physicians.<sup>6</sup>

Clearly identifying the MTBI, carefully documenting the signs and symptoms at the time of injury, reevaluation of the signs and symptoms until they disappear, and monitoring of brain function through neuropsychological profiles may lead to greater success in prevention of re-injury. While not all MTBIs can be prevented, accurate and consistent medical management of those that occur will minimize the potential for re-injury and subsequently reduce the potential for the long-term effects that have been associated with MTBI.

Modifications of player skills, rule changes, and protective equipment can only go so far in the prevention of MTBI. Only through the continued cooperation of sports sponsors, researchers, medical professionals, coaches, and sports participants can the goal of minimizing the risk of MTBI and its long-term disability be achieved.

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<sup>6</sup> Hyman also argues that players need to be educated about the devastating long term effects of concussions and parents and coaches need to take players out of games immediately after they show any signs of concussions (Hyman 2009: 111).

## Other Recommendations

### *Minimize risk factors*

Meeuwisse and Bahr (2009) argue that there are two types of risk factors and an “inciting event” that cause sports injuries:

- 1) Certain “intrinsic factors” – such as age, gender, anatomy and body weight composition, history of a prior injury, current physical fitness condition – *predispose* athletes to a higher risk of injury.
- 2) Certain “extrinsic factors” then make athlete more *susceptible* to injury. These extrinsic factors can be “human factors” such as teammates, opponents, referees, parents, or “environmental factors”, such as bad weather or the quality of sports equipment.
- 3) Finally, the occurrence of a sports injury is dependent upon an “inciting event”: e.g. the playing situation, a player/opponent’s behavior, and the biomechanical characteristics of the body at the time of injury.

Some of these risk factors are modifiable, while some are not. The key is to modify the ones you can. For example, make sure all equipment is secure, that you don’t play in thunderstorms, and that you use proper cleat length in inclement weather.

### *Make youth sports less serious “business”*

Hyman (2009) argues that while youth sports participation in the US is generally increasing, “the fun is slipping away” for children because parents are increasingly treating youth sports as professional sports. In other words, they are taking the ‘game’ too seriously, as if it were a business.

Hyman notes that parents are increasingly getting angry when they watch their children play sports. Parents are overly invested in the game, coaching from the sidelines, causing kids to lose the ability to concentrate on just having fun.

Hyman offers a few examples of what is wrong with overly serious youth sport:

- 1) Doing only one sport all year round can lead to “overuse injuries” and burnout.
- 2) Focusing on trying to earn your child an athletic scholarship for college (Hyman 2009: 1-14).
- 3) “Helicopter parenting” akin to how Earl Woods raised Tiger Woods to be a professional golfer beginning at age 2. Hyman argues that such “helicopter parenting” is bad for the child both physically and emotionally.

Some parents are so serious about their child's sport that they have used violence against sports officials. There are hundreds of such incidents listed on the National Association of Sports Officials (NASO) website.<sup>7</sup> To protect its members, NASO offers assault protection insurance for sports officials.

As a result, in California there is a \$2,000 fine and potential yearlong sentence in prison if anyone strikes an official. 23 other US states have, like California, legislated special penalties/fines for assaulting an official.

### *Don't overdo training or overuse the body*

While injuries are to some extent an unavoidable part of any sport, overuse injuries can be avoided if the adults supervising youth sports can achieve some perspective on what these youth sports should and should not mean (Hyman 2009: 15-30). Hyman suggests that half of all youth sports injuries are not accidents but rather the result of overuse, and Dr. Lyle Micheli of Children's Hospital Boston, suggests that as many as 75% of the children he sees in his medical office are injured because of overuse (Hyman 2009: 65-66). Micheli and Hyman are infuriated by this high rate of overuse injuries because they believe that these injuries could have been prevented had the supervising adults introduced variety, moderation, and rest into children's' every day routine.

Dr John DiFiori, Chief of Sports Medicine at UCLA's Comprehensive Sports Medicine Center and physician for UCLA's intercollegiate sports teams, believes the increase in these preventable overuse injuries in sport did not exist until the "adult-dominated era of youth sports". A generation ago, when children "played" sports, they didn't have these injuries, but now they have increasingly developed "Little League shoulder and tennis elbow", suggesting that they are now "working" rather than "playing" these sports (quoted in Hyman 2009: 66).

Overuse injuries like "Little League shoulder", which refers to an injury to the shoulder that is the result of throwing a baseball too much, can be prevented with proper rest, but because Little League is a for-profit organization, it has little incentive to encourage its coaches to ensure that their pitchers do not overuse their arms. In fact, it wasn't until 2004, Little League's 66th year in business, that it finally began listening to renowned sports surgeons like Dr. James Andrews and Dr. Joe Chandler, who had long been encouraging Little League to add a maximum pitch count rule to its rule books and to discourage young pitchers from throwing curveballs, pitches which are also thought to cause arm and shoulder problems (Hyman 2009: 73-78).

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<sup>7</sup> <http://www.naso.org/>

***Know the specifics of who gets what injuries, and make specific plans to prevent those injuries***

1 in every 100 high school female athletes tears the ACL (anterior cruciate ligament) of her knee, while a remarkable one in ten female college athletes tears hers. These are expensive injuries, too: reconstructive knee surgeries for ACLs cost \$25,000 in the US. Female athletes are four to eight times more likely to tear their ACL than their male counterparts, a tragedy that might have various causes:

- 1) Girls have wider pelvises than boys, making their thighbones angle down more sharply. The greater that angle, the more pressure is exerted on the knee during sports participation.
- 2) Poor conditioning, especially in girls with strong quadriceps but weak hamstrings.
- 3) Exhaustion, especially as running, jumping and pivoting on tired knees is not good for the ACL (Hyman 2009: 73).

Knowing this higher rate of injury as well as the potential causes can help coaches plan less risky practices.

***Train and certify coaches properly, but also ensure they know their legal duties***

According to coaching expert Rainer Martens<sup>8</sup>, sports coaches in the United States have nine legal duties:

- 1) Properly plan the activity
- 2) Provide proper instruction
- 3) Warn of inherent risks
- 4) Provide a safe physical environment
- 5) Provide adequate and proper equipment
- 6) Match your athletes appropriately (e.g. in terms of size, age)
- 7) Evaluate athletes for injury and incapacity
- 8) Supervise the activity closely
- 9) Provide appropriate emergency assistance (Martens 2004: 470).

Martens provides examples of US court cases involving incidents in which athletes who were severely injured successfully sued sports coaches and school districts because a coach had failed to meet one of these nine legal requirements.<sup>9</sup>

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<sup>8</sup> Martens is widely regarded as one of the US's leading coaching experts. He is the founder of American Sport Education Program (ASEP), the largest coach education program in the US, as well as founder and president of Human Kinetics, publisher of various sport and exercise related materials. His book, *Successful Coaching*, also published by Human Kinetics, has sold over half a million copies.

<sup>9</sup> While there is no federal law in the US mandating that coaches abide by these obligations, because the US is a federal system in which states often draft their own laws regarding local issues, "case law"

### *Use positive discipline to ensure you cause no emotional injury*

If we consider the term “sports injury” to include emotional as well as physical injuries, then we ought to encourage coaches to use “positive discipline” instead of “negative discipline”, which often causes players to resent their coaches.

“Positive discipline” means using non-verbal communication effectively; reminding athletes of appropriate behavior without embarrassing them; giving misbehaving athletes attention when they don’t expect it; addressing the behavior of a misbehaving player, not his character; ensuring that consequences are never harmful physically or psychologically; making sure players understand that they “chose” the consequences because they misbehaved; avoiding public confrontations so you don’t embarrass the misbehaving player nor give him a chance to show off to his peers by showing you up; effectively using privileges as a carrot so that misbehaving players lose them when they act up; and rewarding players for their positive behavior (Martens 2004: 162).

### *Get insurance for coaches*

All coaches in all sports at all levels should carry liability insurance, and that sponsoring agencies should not allow coaches to coach without it (Martens 2004: 474). Coaches must also know specifically what sort of coverage they have, so that if the sponsoring agency (e.g. a youth sport league like Little League) does not have a certain type of necessary coverage a coach can supplement it with his/her own personal coverage. Insurance policies should provide at least \$1 million in coverage and pay the costs associated with the investigation of incidents and lawsuits. Coaches can sometimes add coaching-related insurance coverage to their homeowners’ insurance policy at a relatively small charge. Coaches can also get coverage at low rates from professional organizations like the National Recreation and Park Association (Martens 2004: 474).

Following are links to specific insurance policy information listed on the websites of some of the US’s most popular private sports leagues:

AYSO Soccer

<http://www.ayso.org/resources/insurance.aspx>

Little League Baseball

<http://www.littleleague.org/media/newsarchive/2008stories/HitsRunsBumpsandBruises-whitepaper.htm>

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is enough to set these aforementioned precedents. Marten’s nine legal coaching obligations are based on this record of case law.

Pop Warner Football

<http://www.popwarner.com/football/footballsafety.asp>

Finally, the National Council of Youth Sports also offers insurance to sports coaches in various sports, specifically focusing on limiting the number of head injuries such as concussions.

National Council of Youth Sports

<http://www.ncys.org/safety/ahead-of-the-game.php>



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