

Portage Soccer Club



Coach's Manual

"Winning through development"

Developed 2003
Revised 2004

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Introduction

This manual is intended to be a brief primer for those individuals who are or who want to be a coach for the Portage Soccer Club. The Portage Soccer Club is a non-profit organization that is a member of the West Michigan Youth Soccer Association (WMYSA) which is part of the Michigan State Youth Soccer Association (MSYSA). The PSC fields teams from U-9/10 to the U-19 level for both boys and girls. There are several levels of soccer that are currently played in Michigan and the United States and depending on the governing body under which the team is organized they are called different names. Starting with the most competitive level these are generally termed National Teams, Olympic Development Program (state and regional), premier, select and recreational (AYSO). All teams in the PSC play at the select level. TKO which is also part of WMYSA fields the only teams that are sanctioned by WMYSA to play at the premier levels in the Michigan State Premier Soccer League (MSPSL) and typically play at premier levels 1 or 2. Although the PSC does not field teams in the MSPSL, the leagues, particularly the Elite division, that PSC teams do play in have historically been comparable to the select division of MSPSL in terms of player skill and level of competition. Tryouts for the TKO teams are separate and distinct from the PSC. Players that form TKO teams may be from any geographical area while teams formed by the Portage Soccer Club are comprised of players that reside within the Portage Public School District, attend a school within the Portage district, or have been released by their home club. As the PSC is an organization that has teams playing at a competitive level the expectations for the teams, parents and coaches are different than those of the recreational leagues from which most players enter into the PSC. It is important that players, coaches and parents understand these differences and the responsibilities that they entail.

The first and foremost responsibility is that parents should decide WITH their child which level of play is best suited for their child. Not all children are suited for the club and premier levels because of the time that it involves in practices and games as well as other factors. The time commitments and expectations are such that the parent AND child should decide if this is something that if they participate in that they will still enjoy the sport. Up to 70% of children decide to leave competitive sports (including soccer) by the age of 16 for various reasons. Parents should make sure that it is not because they are being pushed into a situation that they do not enjoy what they are doing.

How is the Portage Soccer Club different than American Youth Soccer Organization?

There are several differences between soccer as it is played by the league that the Portage Soccer Club is in and the recreational league organized by the American Youth Soccer Organization (AYSO) and it is important for the coach as well as the players and parents to understand these differences. The AYSO has 5 basic tenets to its philosophy three of which are very different from the Portage Soccer Club, and other clubs in the league that the club plays in. The AYSO philosophy includes

- 1) Balanced teams. Each new year new teams are formed that are as evenly balanced as possible.
- 2) Everyone plays. It is mandated that every player on every team must play at least half of every game.
- 3) Open registration. The program is open to all children between 4 ½ and 19 years of age who want to register and play soccer. Interest and enthusiasm are the only criteria for playing.

This is in contrast to the Portage Soccer Club where

- 1) Teams are not necessarily balanced. Balanced teams are generally formed for age groups U10-U11. Teams are balanced through a draft between coaches that will be coaching the respective teams but not all players trying out may be selected. U12-U19 teams are not balanced and players will be separated based on criteria established by the club and the individual coaches. Team composition may or may not change from year to year.
- 2) Everybody plays a minimum of 1/3 of a game. Not all players will play the same amount of time. How much a player plays over the 1/3 minimum is at the discretion of the coach. Some players may play a whole game while others may be substituted in and out at the discretion of the coach.
- 3) Although anyone residing in the Portage Public School District, goes to school within the district, or obtains a release from their home club is eligible for trying out with the Portage Soccer Club, individuals that try out for a club team may not necessarily be accepted to play with the club. Players are selected to play for the club based on several factors including playing ability, coachability, and ability to interact appropriately with peers. The decision to play on the team is at the discretion of the coach for that team. It is also realized that parents can effect the chemistry on the field and between players and it should be remembered by parents that if their behavior is, or becomes, unacceptable their child may not be selected for a team.

Winning through development

It is a fact of life that the emphasis of players, parents and coaches typically lies in winning games whether or not this is directly mentioned. Winning is obviously a main point of stepping out on the field, the game is a competition to see who wins. Having stated that fact it is also true that winning should not be the main focus of the coach, the parents or the team. The main focus of all PSC teams is on development of the player which includes not only development as an individual who can play the game of soccer but also development of individuals that we are proud of in representing our club and community. It is therefore the quality of the game that is played that becomes the most important point. Wins and losses must be viewed in relation to how well individual players and the team functioned. Games (won or lost) become a mechanism for the coach to determine what priorities are set in the next practice.

Appropriate practice times.

The amount of practice that each team spends per week may vary with age. For teams that are U-9/U-10 through U-11 usually 1 1/2 hours twice a week is recommended. For older teams this can extend to 2 hours twice a week.

A general guideline for a practice would be

20 minutes - warmup, Coerver moves, review of technical aspects (e.g. trapping, passing, dribbling, shooting etc.)

50 minutes – Main concept of the practice (e.g. passing, shooting, etc..)

20 minutes- Scrimmage, with possible restrictions to emphasize main concept covered.

This structure fits loosely with the USSF guidelines. The main differences would be that the practice goes over material during the warm up that is not necessarily the main focus of the practice. The reason for this is that players will only learn techniques after many repetitions (covered in the warm up) and the USSF guidelines do not fully address this. A general rule of thumb to follow is to remember that techniques and tactics are not learned in one to a few sessions but are gained through repetition over long periods of time (weeks/months/years) and players will only be comfortable enough to use them in a game only after many repetitions. Short reviews of certain techniques each session, even if they do not represent the concentration of the season or the practice, will help players to eventually gain the skills that they need to master.

At some point during the practice players should engage in small sided play (1 v 1; 2 v 2 etc.) to help them gain more touches on a ball and confidence handling the ball.

What should be covered in practice.

Through technical excellence comes tactical ability

“The English Football Association’s research indicated that it was almost impossible for players to cure technical flaws after the age of 14. This puts the burden of knowing how to teach the techniques of soccer on the youth coach, the most important coach in the country. This is why the NSCAA has such a heavy emphasis on technical training in the National Youth Diploma and the National Diploma”.

Jeff Tipping NSCAA Director of Coaching Education (The NSCAA National Youth and National Diplomas are equivalent to the USSF E and D certificates).

The following is a short article by Lawrence Fine that sums up a philosophy identical to the PSC concerning technical and tactical coaching and set plays.

“I was asked recently why I am not spending more time on corner kicks, direct kicks, indirect kicks and so on in the training of some of the younger teams I work with. The comment was made that other teams seem to spend a great deal of time working on “plays” while I seem to spend a lot more time working on technical and tactical training but not on the dead ball situations.

When dealing with limited time in terms of training of young players, you have to make some decisions regarding priorities. The first decision should be what are the short and long term goals for the players and team. If the goals are geared more toward winning as opposed to player and team development then one way to do this would be by working on getting the biggest, fastest players, kicking the ball far, having the big fast players run the ball down and hope for either a goal scoring opportunity from this or a corner kick or free kick. Then the team would spend a lot of time on free kick and corner kick “plays” and would most likely be successful in the short term (in this case, success being determined by winning). The problem is, at some point, teams will eventually come across another team that is bigger or faster and at this point, the team starts to lose because they haven’t worked on skill development or tactical understanding of the game.

If the goals are geared more toward team and player development it sometimes results in less wins in the short term but better players and better teams in the long run. If a coach only has 3-6 hours a week for training the question that has to be asked is whether the players will get more (long term) out of learning how to play and think through technical and tactical training or will they be better off with learning how to score on dead ball situations and being told where to go and when to go there?

As players and teams get older, working on dead ball situations become more and more important but without first getting the technical and tactical foundation down, I believe it’s improper use of training time for young teams and players.”

For U9 – U14 most of the practice should concentrate on technical skills. Obviously some tactical skills will also be taught but it should not be the concentration of most practices. Skills are acquired only after many repetitions and if they are not covered at the younger ages they become more difficult to learn as the child grows older. An expectation of what children should be learning at each age group is outlined below. For children ages U9-U11 they should play all positions at least some time of every game. Children should not be “pigeon holed” at these ages as they will change dramatically in terms of their skills and physical attributes particularly as they pass through puberty. The child that is the defender today may turn out to be the forward of tomorrow and as they change from coach to coach and team to team their roles may change as well. Many players at the national levels on down have had to change what positions they play over the course of their careers. As players grow older their ability to be able to fill in as needed becomes a desired characteristic and knowledge of what is required in each position becomes critical.

It is highly recommended that the coach formulate a plan for the team for the season. This plan should have as its concentration one or two technical or tactical aspects for the team to work on and practices should revolve around this plan. It is imperative that at all age groups some part of the practice should include short sided games from 1 v 1 up to 7 v 7. On the other hand it must be remembered that these games can not substitute for players individual work with the ball. Obviously a balance must be struck. Where that balance lies differs from team to team and should be decided upon by the coach. Practices should emphasize a minimum of standing around and a maximum of touches on the ball. A general rule of thumb is that no player should be standing in line or waiting to participate in an activity more than 1 minute or more than 1/3 of the time the activity takes.

Coaches should attempt to make practices as interesting and fun as possible. Children play this game for a variety of reasons including their friends play, their parents make them, and last but not least they like it. Although the coach can not control many of these reasons the practice should not become a reason for them to not want to play. It is apparent however that no matter how hard one does try to create a good learning environment some children will still not like what they are doing. This of course relates to their coachability.

Club coaches should focus on the following with each age group:

U9/U10

Dribbling

- Emphasis on ball control with the inside and outside and inside of both left and right feet
- Feinting including dummy step, stepover, scissors, spin or Maradona move, Desteffano, Matthews etc.. Many children may not learn these moves to the extent where they feel comfortable using them in a match situation. However these moves

serve two other purposes one is that they will be dribbling and just generally handling the ball giving them a greater confidence with the ball, and the second is that the moves will give them a generally better control and feel for the ball even with out performing the move.

- Turning the ball with inside and outside of foot (hooks and flicks)

Shooting

- Emphasis on ball placement at the lower or upper corners of the goal with both left and right feet. The vast majority of goals (upwards of 90%) that will be scored as children get older will be in these areas.
- Instep drive (no toe balls). Teaching the instep drive seems to be best done in small doses over many weeks (5 – 10 minutes/practice).
- Finishing

Chipping/bent balls

- At this age group several children will be able to already chip the ball. As the children get older more will naturally gain the leg strength to reliably chip or serve air balls.
- Bent balls are relatively easily taught; they make an effective high or low ball cross to center and an effective shot.

Passing

- Inside and outside of both feet.
- Accuracy of passing and timing passes to the run (relatively difficult for children at this age due to lack of physical/psychological development necessary for this).
- Once some modicum of accuracy is obtained simple combinations should be worked on including wall passes, give and go's, overlaps etc.
- Passing after looking where to pass

Trapping/first touch

- Should be practiced so that the player's immediate reaction in encountering the ball is not necessarily to kick it wildly down the field. Players should be encouraged in the majority of situations, to maintain control of the ball and determine whether to dribble, pass or shoot based on thought.
- Thigh
- Sole of foot
- Top of foot
- Chest

Shielding

Protecting the ball when appropriate to maintain procession, to allow other options to develop if there is little opportunity to pass, shoot or dribble.

Heading

- Not recommended for this age group and the reality is that few if any opportunities exist for players to head the ball in a game at this age group. Some studies have indicated that although the ball is generally not traveling at a high enough speed at this age to cause serious short term damage it may be possible to still get some brain damage due to repeated heading. Due to the risk, however minimal, of incurring any damage at all the club does not endorse heading practices for this age.

Tactical instruction

Roles of the different players (defender, midfield, forward) should be worked on to some degree to allow children to begin to understand what is expected of them on the field. This should include the concept of circulation. Communication should be stressed between teammates to encourage them to better control the game through interaction with their teammates. Role of first and second attackers and defenders.

U11

As with the U10 group as well as an introduction to some hand tossed balls for heading (offensive, defensive and flicking).

U12 – U14

Technical instruction as with U10-U11

Tactical instruction

- should increase but the concentration should remain on the technical side. Tactical schemes can only really be implemented with technical ability.
- instruction should include introduction to roles of first second and third attackers and defenders, overlaps, runs in the box and circulation

U15 and above

Same skills as lower age groups with an increased emphasis on the tactical aspects.

A philosophy by Lawrence Fine on half time talks

“One of the things that coaches have to be aware of is when they are giving too much information to their players.

This past weekend, I was working with a team I had never worked with before and found myself making the same mistake many coaches make. Instead of picking a couple of topics to emphasize between

games (it was a series of shortened friendly matches) I found myself trying to cover too many topics. At the time my thought process was I had a receptive group who wanted to learn but the mistake was that by trying to cover too many topics, they learned a little bit about a lot instead of learning a lot about something in particular.

When talking to a team, especially between games or at half time, it's important to pick a couple of items at the most, keep the discussion brief and to the point, make sure the players understand what has been discussed, and then let it go. If you try to cover too many subjects, rather than accomplishing more than addressing only a few subjects, you will actually accomplish even less.

Pick two or three subjects, be organized in your approach and see how much more effective your team will be.

Team formation.

For all ages this will depend on the strengths and weaknesses of the team. For teams that play small sided league games many different formations have worked well for several different teams (3-2-2, 2-3-2, 4-3, 3-4 etc.). For the older groups 4-4-2 or, particularly for women, 4-3-3 is suggested but it is up to the coach to decide what is the best for the particular team.

Certification

By WMYSA policy all PSC head coaches are required to have a United States Soccer Federation (USSF) E license, its equivalent or higher. Coaches that initially do not have appropriate certification must have the appropriate license by the next year's tryouts or they may not continue coaching within the club for the next year. Education of a coach does not stop with licensure, it is only the minimal beginning. Like many careers or activities being a coach is a dynamic process that requires continuing education and it is expected that coaches participating in the PSC will find ways of furthering their knowledge and abilities by attending clinics provided by the club, attending clinics at other venues, reading, and/or watching videos.

What is expected of a coach for the club

Coaches for the club provide a window onto the club as well as the city of Portage and the state of Michigan. They are the first point of contact that many people within and without the community have with the club and coach conduct therefore is important for team dynamics and the success of the club. Coaches are expected to treat every child fairly and with respect; the role of the coach is not to humiliate, berate or otherwise abuse players, referees and parents. They should not yell in a derogatory fashion at any child or other coach whether they are on their team or another squad. Coaches are expected to treat referees with respect and not yell at a referee in a derogatory fashion. Like it or not the coach does serve as a role model not only for the children but also the parents. It is also the responsibility of the coach to be familiar with the relevant rules and regulations of the MSYSA and WMYSA.

The coach should remain as positive as possible. Obviously mistakes made on the field may need to be discussed but positive coaching entails praising players when you see them do something correctly and quite often ignoring mistakes when the player knows what they have done wrong.

As indicated above, and will be repeated here, education of a coach does not stop with licensure, it is only the minimal beginning. Like many careers or activities being a coach is a dynamic process that requires continuing education and it is expected that coaches

participating in the PSC will find ways of furthering their knowledge and abilities by attending clinics, reading and films.

According to the current regulations (2004) any individual can be a coach, there is no minimal age. However if an individual who is under 18 years of age is registered as the head coach the manager must be over 18 years of age.

What is expected of a parent with the club

As much as the coach is a point of contact for people to the club the parents are also ambassadors for the club and the community. Parent behavior has direct effects on the ability of the club to function and be regarded as a high quality organization. Parent behavior can also have direct effects on club and team dynamics, making playing on a team and being a part of the club an enjoyable experience for members of a team or creating situations that are miserable for all involved. It is important for parents to also understand that their behavior may be evaluated in terms of their child being selected for a team. Parent behavior that results in “bad chemistry” whether on or off the field can alter team dynamics and can be evaluated either consciously or subconsciously by coaches in the selection of their child for a team.

It is important for parents to also realize that coaches, the board members, team managers and others are volunteers and this is not a “service organization” where fees are simply paid for services rendered. Parents should expect to volunteer and become part of club activities such as concession stand duty, cleaning and care of the fields as well as general team activities. This is their club and they should participate in it.

One last aspect for parents to remember is that the club is interested in developing players. Because of this players that do not fully participate in practices, leave or do not show for practices, miss practices and games to participate in other sports, leave the team for other teams or practice primarily with other teams are not participating fully with the club and have taken spots on the team that would be filled by players that would have more of an interest in playing with the club. These kinds of activities may be taken into consideration when teams are formed at tryouts or playing time is allotted. It is also the club’s philosophy that those players that have initiated a commitment to other teams such as with the American Youth Soccer Association before they join the club should also continue to honor those commitments.

What is expected of a player with the club

Players for the club, like the coach and their parents, are expected to conduct themselves in a manner appropriate for an individual representing an organization and community. Players should exhibit good sportsmanship on and off the field, respect the referees opposing players, parents, coaches and each other. Players should arrive at practices and

games at the appropriate times be ready to play and practice. The player is expected to participate in all activities with a positive attitude towards themselves and to those around them.

The Coach's First Aid Kit
Author: NCSS Information Team

Every coach should be prepared to handle emergency situations during practice or at games. It is essential that coaches have at least one fully stocked first aid kit on hand whenever athletes are playing. The National Center for Sports Safety has compiled a list of items that should be included in every coach's first aid kit.

- Sport Safety Training injury prevention and care handbook
- Non-powdered Barrier Gloves
- Resuscitation mask/face shield
- Instant Ice Cold Pack
- Elastic Fabric Flexible Bandages- standard size
- Strip Bandages (Band-Aids)
- Triangular Bandage for sling
- 2"x 2" Sterile Gauze Pads
- 2" King Roller Gauze
- 3" x 3" Sterile Gauze Pads
- Telfa Non Stick Pads
- Large Patch Bandage
- Eye Patch Kit (Eye Patch and Clear Tape)
- Adhesive Tape
- Alcohol Swabs
- Disinfectant Pads
- Iodine-Povidone Prep. Pads
- Insect Sting Swabs
- Antiseptic Pads
- Hydrocortisone Cream
- Q-tip Swabs
- Sun Block (30) SPF
- Insect Repellant
- Splint
- Tape Cutter
- Scissors

Overuse Injuries: The New Scourge of Kids Sports

Author: Dr. Lyle Micheli

I am a passionate advocate of children's sports, but I'm not so gung-ho that I can't recognize the profound changes taking place in children's sports, and the problems these changes have created - in particular, the rise of "overuse" injuries.

Overuse injuries were once virtually unknown in young athletes. All that changed with the emergence of organized sports and their emphasis on repetitive coaching drills, as well as the recent trend toward sports specialization in young athletes. *Patellar pain syndrome* - an alignment problem in the knee caused by overtraining - is today the number-one diagnosis in my clinic, even though it had never been seen in kids until the growth in organized sports. Talk of stress fractures, tendinitis, and bursitis is no longer confined to pro athletes; today it can be heard in high school locker rooms.

Certain overuse sports injuries, such as Little League elbow, which refers to shear damage to the growth cartilage in the elbow joint caused by repetitive whipping motions of the arm, are seen exclusively in child athletes because of the softness of their growing bones and relative tightness of their ligaments and tendons during growth spurts.

Other overuse sports injuries seen mostly in children include *osteochondritis dissecans* of the knee and ankle (repetitive grinding together of bones in those joints causes damage to the growing surface cartilage and may result in pieces of dead bone and cartilage dropping into the joint and wreaking havoc), *Osgood Schlatter's syndrome* (inflammation at the point where the tendon connects the kneecap to the very top of the shinbone) and *os calcis apophysitis* (inflammation at the point where the Achilles tendon attaches to the heel).

Unlike acute sports injuries such as sprains, strains, bruises, and breaks, which the Consumer Products Safety Commission tells us result in four million emergency room visits every year, the exact prevalence of overuse injuries is difficult to ascertain. That's because the symptoms of overuse injuries develop over time, and do not require immediate emergency care. Suffice it to say overuse injuries in kids sports are so common that pediatric sports medicine clinics such as the one at Boston Children's Hospital have opened to respond to the problem, and, as seen above, we've had to come up with medical names for them.

One of the most disturbing aspects of overuse injuries is their insidiousness. Often kids won't admit to being sore - they just drop out of sports, often for life. When they go undetected, the damage to a growing child's hard and soft tissues can be permanent. Evidence suggests that overuse injuries sustained in childhood may continue to cause problems in later life - arthritis, for instance.

As overtraining is the most common cause of overuse injury, the most effective way to prevent overuse injuries is to ensure kids are being coached by qualified personnel. The National Center for Sports Safety has just introduced a sports safety course called **PREPARE** that I helped develop. The course is available online at www.sportssafety.org and covers important topics ranging from blisters and sprains to life-threatening head and

neck injuries. **PREPARE** gives coaches and parents the knowledge and confidence to respond to emergencies until professional help arrives. I urge you to have the coaches in your local youth sports take this course. Another important measure is to make sure kids have a proper pre-season physical every year to rule out underlying conditions that might predispose them to overuse injury - anatomical abnormalities such as knock knees, flat feet, and swayback, for instance. Finally, if kids want to participate in strenuous sports, they should be fit enough to do so - a properly-performed pre-season physical should rule out fitness deficiencies, and recommend an exercise program.

Every day I see happy, healthy, confident youngsters with a glint in their eye that tells me they're hooked on sports for life. By reducing overuse injuries we can make sports a safer and even more rewarding environment for their young participants.

Dr. Micheli co-founded and is director of the world's first sports medicine clinic for children, located at Boston Children's Hospital. He is also the chairperson of the Massachusetts Governor's Committee on Physical Fitness and Sports, and a past president of the American College of Sports Medicine.

Chronic or Overuse Injuries in Sports

Author: Joseph Iero, M.D.

The most common disorders seen by sports orthopaedists as well as the general orthopedic are the overuse injuries. All active persons, from the elite athlete to the “weekend warrior,” are subject to these injuries that typically become chronic because they do not cause enough discomfort to cause the athlete to stop participating in their sport. The athlete will usually consult a trainer or coach initially, and if symptoms continue or worsen will look for medical advice. Many of these injuries are brought on by insufficient recovery time. Some are nagging injuries following an acute event, which never is allowed to heal. There are many overuse injuries of both the upper and lower extremities that can cause an athlete to perform at a lower level.

Chronic injuries of the upper extremity include: rotator cuff tendonitis, tennis elbow (lateral epicondylitis), golfer’s elbow (medial epicondylitis), DeQuervain’s tenosynovitis, cubital tunnel syndrome, and carpal tunnel syndrome. Although there are many more disorders, these are some of the more commonly seen problems. Rotator cuff tendonitis is associated with overhead activity- especially with throwing athletes. The rotator cuff is a broad flat tendon comprised of four muscles. Together, they keep the head of the humerus centrally located throughout the range of motion of the shoulder joint. Overlying the tendon is a bursa, or a fluid-making sac, which can become inflamed as well. Patients will commonly complain of pain with overhead activity, problems sleeping on the shoulder, and possibly weakness of the shoulder, secondary to the pain while using the shoulder. The initial treatment for this type of chronic shoulder pain is activity modification (stop performing exercises that cause the shoulder to hurt), anti-inflammatory medicines (if no contraindications), icing and other modalities, and a physical therapy program designed to first achieve painless motion, followed by strengthening of the arm. Once these have been accomplished, a gradual return to normal activity is allowed.

Tennis and golfer’s elbow are basically the same entity on opposite sides of the elbow. During a golfer’s downswing, the lag arm has stress placed on the inside, or medial aspect, of the elbow. Likewise, during a backhand, the tennis player will stress the lateral or outside of the elbow. This repetitive stress can cause multiple micro-traumatic events that can cause the origin of the forearm flexor muscles (golfer’s elbow) or wrist extensors (tennis elbow) to develop tears and degenerate. This degeneration can cause pain and loss of strength. Normally, symptoms will abate time by combining rest, stretching, anti-inflammatory medicines, and occasionally a strap used to offload the area. However, like the name implies, these can cause long-term pain and dysfunction. If all non-operative treatment fails, there are some procedures that can alleviate symptoms.

DeQuervain’s tenosynovitis is a problem in the first extensor compartment of the wrist, caused by repetitive lifting or extending the wrist. The initial treatment starts with icing; anti-inflammatories, stretching, and can include an injection and splinting. The lower extremities are also frequently involved. These injuries can range from “nagging” problems with tendonitis and bursitis to the more serious stress fracture. Most of the lower extremity problems are caused by the repetitive nature of running, jumping or

dancing. There are multiple sites in the lower extremities that can be involved with a bursitis or tendonitis. The most common sites are: the lateral aspect of the hip (greater trochanteric bursitis), the front portion of the knee (patellar tendonitis or pes anserine bursitis), and the posterior ankle (Achilles tendonitis). The treatment for all of these is activity modification, icing regimens, stretching, anti-inflammatories, and physical therapy.

While overuse injuries can cause months of distress and lost playing time, they are not as serious as a stress fracture. Stress fractures are commonly seen in the foot, lower leg and the hip. These injuries require diagnosis and treatment by an orthopaedic surgeon. Often this diagnosis can be made with a combination of a history, physical exam and x-rays. Sometimes an additional test, such as a bone scan, is needed to secure the diagnosis. Stress fractures of the metatarsals are treated with modified weightbearing, casting, and sometimes surgery. These same treatments are needed in the treatment of the lower leg stress fractures. Stress fractures of the hip are serious, and can be an emergency. Patients commonly complain of groin and knee pain. This injury is rare, but is usually seen in people who log many miles, such as long distance runners and military recruits. When suspected clinically, X-rays along with a MRI or bone scan, are used to confirm the diagnosis. These fractures commonly need to be “pinned” or secured with internal devices such as screws. If not caught early, they may go on to move apart and can have a poor outcome, with hip arthritis being the result.

Keeping all of this in mind, overuse or chronic injuries are commonly diagnosed and usually require a period of rest, combined with therapy and medications. They may need a longer time to heal than the athlete would like, but most will resolve with little or no long-term problems. Occasionally, a seemingly innocuous injury can be serious. If an athlete has tried treating the injury and the problem persists, he or she should consult a physician.

Sports Injuries and Arthritis

Author: William Cottrell, M.D.

Americans of all ages are increasingly participating in sporting activities. This is a healthy trend, as sports are well known to be helpful for cardiopulmonary fitness and weight-control. However, with the benefits does come some risk, namely sports injuries. Most sports injuries are mild and temporary, with no long-term effects. Minor sprains and bruises or overuse injuries treated properly may be nuisances but do not necessarily cause any permanent problems. Some injuries, however, may lead to arthritis later in life.

Millions of Americans are affected by arthritis, a potentially painful and debilitating condition. Arthritis is the result of disease or damage to articular cartilage, the white glistening surface of our bones found in the joints. Articular cartilage is found in all major joints of the body, including the hips, knees, and shoulders, as well as the smaller joints of the upper and lower extremities and even the spine and pelvis. When this normally smooth gliding surface is no longer intact, pain, swelling and stiffness may result. This is what is referred to as arthritis.

Arthritis is usually seen in older people, but is also seen in younger people who either have a less common form of the disease or have suffered an injury. The most common form is osteoarthritis, also referred to as degenerative arthritis. It usually occurs naturally, without any specific prior injury, in older people. However, this form of arthritis is also the type seen after injury. In this case, it may be referred to as post-traumatic osteoarthritis, or wear-and-tear arthritis. Whatever the name, the result is the same – a painful, swollen, stiff, and sometimes enlarged or deformed joint. It can be mild in some people, offering only an occasional reminder of an old sports injury, or it can be severe, causing daily suffering and degrees of disability.

It is important to understand the type of injury that can go on to cause arthritis in later life. The types of injuries that lead to arthritis include direct injury to the cartilage (as in fractured joints) or injuries that alter joint mechanics, increasing the stress on the articular surface. The first type is less common in sports, more often seen in motor vehicle accidents or falls from a great height. In these instances, severe bruising of the cartilage surface may lead to permanent injury and eventual arthritis. It may also occur from a fracture of the bone through the cartilage in the joint. In these cases the joint may heal with irregularity causing the cartilage to wear unevenly and eventually erode, resulting in arthritis. A key factor is that, while cartilage is a living tissue and does respond to injury, its reparative capacity is limited, and any significant damage usually results in a permanent alteration.

The more common way a sports injury leads to arthritis is when a ligament or supporting structure is damaged, causing abnormal mechanics in the joint. This greatly increases the stress on the articular surface, which over time, wears out and causes arthritis. One of the most known examples of this types of this injury is in the knee. With the increased attention of media to the injuries sustained by star athletes, most people have heard of an ACL injury. ACL stands for anterior cruciate ligament, one of the major stabilizers of the knee. The ACL is in the center of the joint and keeps the tibia (lower leg bone) from

moving forward on the femur (thigh bone). Commonly an athlete injures the ACL trying to pivot. The result of a torn ACL is generally an unstable knee, one that buckles occasionally, especially with strenuous activities or further participation in sports. This instability abuses the knee, and over time, the articular surfaces are damaged by the abnormal stresses. Once again, the result is eventual arthritis, although the timetable ranges from a short time to many years.

Another knee injury that results in arthritis is torn cartilage. The menisci are a different form of cartilage found in the knee. They are roughly semicircular wedges, two in each knee, that function to cushion the joint, absorbing a great deal of stress, and also more evenly distributes stress across the joint. A torn meniscus alone can be painful and cause swelling and stiffness, leading a patient to seek early surgical treatment. Historically, the entire torn meniscus was removed. We now know that, while this treatment relieves the acute pain and swelling, it eventually predisposes the patient to premature arthritis due to the absence of the protective effects of the menisci. Currently, attempts are made to repair a torn meniscus to remove only the torn part, leaving as much healthy meniscus as possible. Despite these efforts, an injured meniscus may still lead to earlier arthritis.

The next issue is treatment of arthritis due to sports injuries. As is true in most cases, the best treatment is prevention of the injuries. There are a few different methods to prevent sports injuries. The first is proper conditioning. When someone is poorly conditioned or fatigued, the muscles do not protect the joints, and an injury is more likely. It is important for athletes at any level to be properly conditioned for their sport, not only with regards to stamina but also strength and flexibility. Proper nutrition and hydration also come into play. The next aspect of prevention is proper form and technique in the specific sport, assured in part by following the rules of the game. Finally, certain sports offer protective equipment, and this may be of benefit in injury prevention.

Once an injury has been sustained, there are still measures that may prevent arthritis. Avoiding strenuous or demanding activities may decrease the chances of arthritis. In many cases, as in the torn ACL, the problem can be surgically corrected, restoring proper mechanics and thereby hopefully preventing arthritis.

If arthritis does result, there are also many ways to treat the symptoms. The first is activity modification. Occasionally, orthotics or braces may help. Medications such as acetaminophen (Tylenol) or anti-inflammatory medicines such as ibuprofen may offer relief. Physical therapy, including exercises, are sometimes helpful. New over-the-counter nutritional supplements have also shown promise. Occasional joint injections may give some relief. When all other measures have failed, surgery ranging from arthroscopy to joint replacement can be performed. Unfortunately, there is no cure for arthritis, and that is why prevention is the best treatment.

Nutritional Abuse

Author: Lyle Micheli, M.D.

The frequent over-emphasis on winning in sports may drive some young athletes to abuse their nutritional status, often with dangerous consequences. Taking steroids is the most blatant form of this abuse, but nutritional abuse is almost as serious. Some athletes starve themselves to “make weight” to qualify for a particular weight category or to make themselves look more attractive for sports where physical appearance is considered important (such as figure skating, gymnastics, or ballet), or overeat in order to "bulk up" to become a more imposing physical presence. For adults these practices are ill-advised, but for young athletes they can have disastrous consequences.

As many as a quarter million young American males starve themselves every year in order to make weight in wrestling. Undernourishment, dehydration, anorexia, and bulimia are just a few of the unnecessary occupational hazards of sports such as wrestling, gymnastics, figure skating and ballet, in which athletes try to control their weight. In the short term, these practices may interfere with normal growth and development. In the long term they may impair basic health.

Bulking up is frequently done by high school or junior high football players. They think that gorging on cola, french fries, and protein supplements will make them more effective on the field of play. Without nutritional counseling, the practice of bulking up is not only useless but dangerous. Weight that is gained without proper training is usually fat rather than muscle. Most often the dangerous practices of bulking up results in obesity and its associated problems.

Creating a Safe Playing Environment for Your Athletes

Author: NCSS Information Team

As a coach, you are ultimately responsible for the safety of your athletes. Creating a safe playing environment for your students can significantly reduce the number and severity of injuries during your practices and games. The National Center for Sports Safety has outlined a few guidelines to help you create a safe playing environment.

- Develop an emergency action plan and make sure all of your assisting coaches are familiar with the emergency procedures.
- Always have an accessible, working phone at practice and at games to ensure that emergency personnel can be contacted quickly in case of an emergency.
- Make sure that your first aid kit is with you at all practices and games.
- Always have water or sports drinks available for your athletes, giving them numerous breaks to prevent dehydration.
- Examine your playing fields, courts and other surfaces before practice and games for potentially dangerous obstacles such as holes, loose tiles, buckled wood, wet spots and sharp objects.
- Regularly check the players safety equipment before practice to make sure it is put on correctly and that nothing is cracked or missing pieces. If equipment is damaged, do not let the athlete use it.
- Make sure to store unused equipment away from the playing field so that no one trips over it while playing.
- Encourage your athletes to be aware of any unsafe playing conditions and report them to you.

Preventing Heat Exhaustion and Dehydration

Author: Amadeus Mason, M.D.

Heat-related illness and dehydration syndromes have always been concerns for coaches, athletes and their parents. The events of the 2001 NFL pre-season have served to heighten our concerns. Each year heat-related illness and dehydration syndromes affect thousands of athletes at all levels and continues to be among the leading causes of preventable sports injury and death.

What are we talking about?

Heat-related illness and dehydration syndromes include heat rash, heat cramps, heat exhaustion and heat stroke. These should not be seen as individual entities but as part of a continuum. The earlier the intervention, the better the odds of averting a disastrous chain reaction.

How does this work?

The skin is the key to the body's ability to regulate its temperature (thermoregulation). Once the brain senses that there is an increase in temperature, it initiates thermoregulatory mechanisms. The skin is the main cooling organ. It maximizes heat loss by using radiation, convection, conduction and evaporation. Radiation – heat is directly lost to the atmosphere. Convection – heat loss is facilitated by moving air or water vapor. Conduction – heat loss by direct contact with a cooler body. Evaporation – heat is lost by turning liquid (sweat) into vapor (the skin's major heat loss mechanism).

It's not so much the heat, it's the humidity. If the skin is so effective at cooling, why do athletes get into trouble? First, for any of the skin's cooling mechanisms to work, there needs to be adequate skin exposure. The problem is the much-needed sports safety equipment does not facilitate optimal skin exposure. Secondly, the environment needs to be conducive for heat transfer from the body. The combination of high temperatures and humidity severely impair the cooling mechanisms, especially evaporation. It is often the environment that athletes are training and competing in. For morphologic and physiologic reasons children do not adapt as effectively when exposed to heat stress, making young athletes more susceptible to heat-related illness and dehydration syndromes.

What can you do?

Stay cool:

- Work out in early morning or late evening. Avoid the hottest times of the day.
- Reduce the intensity and duration of your workout.
- Take the time to get into shape before arriving at training camp. Know the climate you are going to and try to get acclimated before getting there.
- Take frequent rests and remove your headgear. The head has an ideal body-mass to surface-area-ratio to maximize heat loss.

Stay hydrated:

- Drink often and drink regularly. Do not rely on thirst, by the time you are feeling thirsty, there is already a significant fluid deficit.

- Drink more than just water. When you exert yourself, you lose electrolytes as well as fluid. Replacing the fluid alone (with just water) can lead to electrolyte imbalances. These imbalances can be life-threatening.
- Monitor your urine, it should be the consistency of lemonade, not apple juice.

Stay healthy:

- Eat and sleep well. Maintain a well-balanced diet. Replenish salt and rehydrate. Avoid alcohol, soda, caffeine and other stimulants.
- Gain or lose weight slowly, allowing your body time to acclimate to the change.
- Sharp drops in weight after exertion can be an indicator of excessive fluid loss.
- Know the warning signs of heat-related illness and dehydration syndromes.

What to look for?

- Confusion – cannot remember simple things, complete simple/routine tasks.
- Irritability – a change in temperament.
- Belligerence – easily frustrated, compounded by the confusion and irritability.
- Lightheadedness
- Incoordination
- Fatigue – in excess of what would be anticipated.
- Paradoxical chills – goose bumps and shivering in the face of high environmental temperature (an ominous sign).

If you or some one else is exhibiting these symptoms:

- 1. Stop the activity immediately.**
- 2. Move to a cool (shaded) area.**
- 3. Get some fluid (water, sports drink, IV).**
- 4. Contact a health professional or your sport safety certified coach.**

So where do we go from here?

In hindsight, most cases of heat related-illness and dehydration syndromes could have been prevented and should have been predicted. With a working knowledge of heat-related illness and dehydration syndromes, a moderate level of suspicion and a little common sense, everyone can get through two-a-days safely (even in the dog days of August).

U.S. Soccer Federation Youth Soccer Heat Stress Guidelines

OVERVIEW

The popularity of soccer among American youth is at an all-time high. According to the latest 2000 statistics from the Sporting Goods Manufacturers Association (SGMA), nearly 14 million young athletes (13,832,000¹) under the age of 18 play soccer at elite and recreational levels in the United States.

The rapid growth of youth soccer participation in recent years, coupled with an increased need for qualified and certified coaches, has made insuring the safety of youth soccer players more important than ever before. Moreover, a rash of well-documented cases of heat illness in the past year across a variety of sports has prompted the U.S. Soccer Federation to issue the following information and guidelines to parents, young athletes and coaches for one of the most common and most preventable sports injuries – heat-related illnesses, including dehydration, heat exhaustion and heat stroke.

The following information and youth heat stress guidelines provide suggestions for preventing the potentially dangerous and sometimes deadly effects of playing in hot or humid conditions.

PHYSIOLOGICAL FACTORS THAT PUT YOUNG ATHLETES AT RISK

Heat-induced illness is one of the most preventable sports injuries. Parents, young athletes and coaches need to understand the physiological factors that put children and adolescents at risk for heat-related illness and take steps to prevent it. Exercising children do not adapt to hot weather as effectively as adults when exposed to high climatic heat stress, which makes them more susceptible to heat illness when they are active in the heat and dehydrated. The physiological reasons that place children at risk are:

- 1) Children and adolescents absorb more heat from the environment because they have a greater surface area to body-mass ratio than adults. The smaller the child the faster the heat absorption.
- 2) Children and adolescents have a reduced ability to dissipate heat through sweating².
- 3) Children and adolescents produce more metabolic heat during physical activity².
- 4) Children and adolescents frequently do not have the physiological drive to drink enough fluids to replenish sweat losses during prolonged exercise^{3,4}.

FACTORS THAT PUT YOUNG SOCCER PLAYERS AT RISK

In addition to physiological considerations, several factors specific to the sport of soccer place children at risk for heat illness. However, these risks can be reduced significantly with the close attention of parents, young athletes and their coaches. These soccer-specific factors are:

- 1) Limited stoppage time during matches, with players constantly running and moving.
- 2) Young soccer players can not take advantage of normal stoppages in play for fluid breaks because the rules do not allow, nor are they encouraged, to use this time for fluid consumption.

- 3) Games are held outdoors, often in high temperatures and humidity, on large fields that offer little shade. Heat radiated by the sun is a major component of heat stress. This issue is complicated by limited access to shaded areas for players between halves or between games.
- 4) Young players fail to drink enough fluids at tournaments and summer camps, where numerous games and practices take place each day.
- 5) Games and practice sessions are often not modified when players are confronted with extreme heat and humidity conditions.

Additional factors to consider

Communication between playing fields and medical tents at tournaments is sometimes insufficient.

Many teams fail to recognize the importance of using light-colored, loose-fitting uniforms⁵.

Referees could be unaware of the importance of fluid breaks.

Mental alertness⁶ and skill performance decline with dehydration and could be a factor in injuries occurring late in matches and training sessions.

HEAT ILLNESS PREVENTION TECHNIQUES

Acclimation to the heat is an important factor in preventing heat illness. The rate of acclimation for children is slower than that of adults⁷. A child needs as many as 8 to 10 exposures (30-35 minutes each) to the new climate to acclimate sufficiently. Such exposures can be taken at a rate of one per day or one every other day. During the acclimation process, it's important to drink adequate amounts of fluid to build blood plasma volumes. Kids who are not acclimated are at greater risk for heat illness than those who have become *heat acclimated*.

When a child becomes heat acclimated, the child's sweat rate and total sweat losses increase because they begin to sweat sooner and produce more sweat than before becoming acclimated. This allows the child to dissipate more body heat into the environment through sweat evaporation. When a child becomes acclimated and the child's sweat rate increases, it's important the child drink sufficient fluids to replace the increased sweat losses and stay hydrated. Parents, players and coaches must understand that thirst is not a good indicator of a child's fluid needs, so children need to drink on a schedule (see FLUID GUIDELINES).

Children must wear clothing that is light-colored and lightweight to facilitate body cooling. Parents and coaches should encourage breaks in a shaded area whenever possible, especially during tournaments, multi-game and multi-practice days. It's important to be aware of high temperatures and humidity and change practice and game times to cooler portions in the day, such as morning and dusk.

According to National Weather Service information on Heat index/Heat disorders, which relates ranges of heat index (temperature and humidity) with specific disorders, the temperature and humidity conditions outlined below place people at risk for the corresponding conditions:

Heat Index	Possible heat disorders for people in high risk groups
130°F or higher	Heat stroke highly likely with continued exposure.
105° - 130°F	Heat stroke, heat cramps or heat exhaustion likely with prolonged exposure and/or physical activity.
90° - 105°F	Heat stroke, heat cramps and heat exhaustion possible with prolonged exposure and/or physical activity.
80° - 90°F	Fatigue possible with prolonged exposure and/or physical activity.

FLUID GUIDELINES

The U.S. Soccer Federation provides these guidelines to help parents, players and coaches prevent dehydration and heat illness in young athletes who are active in the heat:

- 1) Weigh children before and after activity to determine how much fluid they lose during activity⁸.
- 2) The following has been adapted from the American Academy of Pediatrics policy statement⁹ on heat stress:
 - Before prolonged physical activity, the child should be well hydrated.
 - During the activity, periodic drinking should be enforced even if the child does not feel thirsty and each 20 minutes the child or adolescent should consume:
 - 5 ounces of fluid for a player weighing 90 lbs or less
 - 9 ounces of fluid for a player weighing more than 90 lbs
 - To ensure that the child is not dehydrated before the start of the practice session or game, the child should drink 12-16 ounces of fluid approximately 30 minutes before getting to the field.
 - Once the activity is over, drinking every 20 minutes should be carried on for one hour.
- 3) Kids need to drink enough of the right fluids to replenish fluid losses during activity. Flavored beverages that contain sodium (sports drinks) are preferable because the child may drink more of them. Research shows that lightly sweetened and flavored non-carbonated beverages, like sports drinks, are preferred during exercise and are consumed in greater volumes than water¹⁰, diluted fruit juice¹¹ or carbonated beverages¹². Research shows that fluids containing sodium chloride (sports drinks) increase voluntary drinking by 90% and prevent dehydration compared to drinking plain water³.
- 4) In addition to replacing fluid, children also need to replace the electrolytes, such as sodium, lost through sweat. Electrolyte replacement is important to stimulate a child's thirst mechanism¹³, help the body hold on to fluid¹⁴, help prevent muscle cramps¹⁵ and to maintain sodium levels in the blood¹⁶.
- 5) Fluids children should avoid immediately before, during and shortly after activity include fruit juices, carbonated beverages, caffeinated beverages and energy drinks. Fruit juices have a high sugar content, which can slow fluid absorption and cause upset stomach¹⁷.

Carbonated beverages, such as soft drinks, can reduce voluntary drinking due to stomach fullness and throat burn when gulping^{12, 18}.

Caffeinated beverages have a mild diuretic effect and therefore could promote dehydration by increasing urine production¹⁹.

Energy drinks should be avoided because many contain caffeine and have high carbohydrate concentrations, which slows the emptying of fluids from the stomach²⁰.

SIGNS OF DEHYDRATION AND HEAT ILLNESS^{21, 22}

If dehydration progresses unchecked, the risk of heat illness increases. Heat illness is best understood in three separate degrees of severity: heat cramps, heat exhaustion, and the most serious form, heat stroke. The symptoms outlined below are not always additive and do not necessarily occur in progression. This means a young athlete could experience heat stroke in absence of other indicators.

Dehydration during exercise is a common problem. Some young athletes can suffer serious problems if they become dehydrated by just 2 percent of their body weight during exercise in the heat. That's why it's important to recognize the warning signs:

Thirst	Nausea
Dry lips and tongue	Headache
Irritability	Muscle cramping
Lack of energy	Red, flushed face
Dizziness	Dark yellow urine

Treating the symptoms of dehydration is crucial in preventing more serious conditions such as heat exhaustion.

- 1) Have the child rest in a cool place
- 2) Provide a sports drink that contains electrolytes
- 3) Prevent dehydration in the future by ensuring the child consumes fluids before, during and after exercise

Muscle cramping

Muscle cramping can be associated with exposure to excessive heat. Painful involuntary whole-body muscle cramps are often associated with loss of fluids and electrolytes. Some of the signs and symptoms of muscle cramps include:

Muscle spasms.

“Knotting” of muscles and muscle pain

Excessive sweat loss

Excessive saltiness of sweat over the skin or visible dried salt on the skin

To treat a young athlete suffering from muscle cramps:

- 1) Have them drink fluids with electrolytes, like a sports drink
- 2) Gently stretch and massage cramped muscles
- 3) Have them rest in a cool, shaded area
- 4) Apply ice to the cramped area

Heat Exhaustion

As a child becomes dehydrated, heat illness may progress to heat exhaustion if left untreated. Eventually, fatigue and exhaustion occur because the cardiovascular system can no longer support exercise and core body temperature control at the same time. Common symptoms of heat exhaustion are:

Dizziness
Cold, clammy skin
Feeling chilly
Rapid pulse
Fatigue

Treatment of heat exhaustion is similar to that of dehydration and should take place immediately. This treatment includes:

- 1) Rest the child in a cool, shaded area
- 2) Drink a sports drink that contains electrolytes
- 3) Have the child lie down with legs elevated to promote circulation

Heat stroke

Much like a spinal injury, heat stroke is an athlete's worst nightmare because it can result in death. In contrast to heat exhaustion, which indicates a cardiovascular limitation, heat stroke represents a failure of the central nervous system. At this point, the body loses its ability to dissipate heat and cool itself, causing damage to critical organs which can lead to death.

Symptoms and results of heat stroke include:

Very high core body temperature
Dry, hot skin and the inability to sweat. In some people, however, sweating may continue
Confusion or unconsciousness
Death

The important thing to remember is that heat stroke must be treated immediately by doing the following:

SEEK MEDICAL ATTENTION IMMEDIATELY

Immediately cool the victim down by whatever means possible

- An ice bath
 - Ice packs place on the groin, neck and armpits
 - A cool shower
 - Cool, wet towels
 - Water spray
- Provide cold fluids

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Developing an Emergency Action Plan

Author: NCSS Information Team

Preparation is the key to responding to unexpected emergencies. While people talk about emergency action plans, it is imperative to get it in writing. You may think you've got everything covered in your head, but the best way to cover all the bases is to put it in print.

Every program and facility should have an Emergency Action Plan. This is the only way to be ready for potential emergencies. Although emergencies can occur anywhere, certain types of emergencies, such as specific natural disasters, are more likely in some locations than others. Emergencies not only include injuries, but illnesses such as heart attack, seizure, or stroke.

An Emergency Action Plan should include all relevant categories and emergencies. This plan should outline the responsibility of everyone that may be involved, and should cover the following areas:

Layout of the facility

Plan where EMS personnel will enter and exit the field. Have a designated place for all keys that open gates or doors to the playing service so that emergency services can come in or students may be evacuated. Decide on the location of rescue and first aid equipment and always have a working phone nearby with emergency telephone numbers posted.

Equipment

Make sure that your first aid kits are fully stocked and you have access to emergency equipment such as flashlights, fire extinguisher, etc. Also, make sure to have physical forms and medical release forms for your athletes easily accessible.

Support Personnel (within the facility)

Evaluate which support personnel will be with you at the practice or game. This could include coaches, athletic trainers, athletic officials, facility administrators, management personnel, teachers, school nurse/physician, athletic director, clerical personnel and maintenance personnel.

External Support Personnel

Provide posted telephone numbers for EMS personnel, police, fire, hazardous materials (Hazmat) team, Poison Control Center, hospitals, power and gas companies and health department. Staff Responsibilities Assign each staff member a duty. There should be a person(s) to provide care, a person(s) to control bystanders and supervise other athletes, a person(s) to meet EMS personnel, and a person(s) to transport the injured athlete when appropriate.

Communication

Make sure it is clear how and when to call 911 or the local emergency number. Create a chain of command within your facility support personnel. Make sure there is a person to contact the injured student's family or guardian, and a person to deal with the media.

Follow-up

Decide who will be responsible for completing the appropriate documentation (accident and incident report, etc.) and refilling your first aid kits. Put together a team to evaluate the effectiveness of the Emergency Action Plan and conduct a staff debriefing.

It is vital to have strategies and procedures in place prior to a crisis. By developing an Emergency Action Plan, you will be prepared to handle emergency situations at your practices or games.

Some of the research in this article was presented by Dr. William E. Garrett, Jr., who has worked with the U.S. National Teams.

Training Techniques, And Their Effect on Frequency of ACL Injuries in Female Soccer Players?

By Holly J. Silvers, MPT

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Santa Monica Orthopaedic & Sports Medicine Research Foundation

Anterior Cruciate Ligament injuries are among the most common of all sports-related knee injuries, affect the lives of more than 250,000 people in the United States each year.

Studies conducted during the past three decades have indicated that female athletes sustain non-contact injuries to the ACL of the knee more frequently than their male counterparts. In a study conducted at Duke University, Drs. Bing Yu and William E. Garrett, Jr. found that female recreational athletes incur non-contact ACL injuries 7.3 times more often than that of male recreational athletes.

ACL injuries are often season-ending and require reconstructive surgery and four to six months of rehabilitation. Players who opt to delay an ACL surgery often suffer secondary injuries such as meniscal tears, articular cartilage injury, or medial and lateral collateral ligament injury.

Possible prevention strategies for ACL injuries were discussed at a panel briefing during the American Academy of Orthopaedic Surgeons Annual Meeting in San Francisco, Calif. earlier this year.

According to research presented, four risk factors have been studied in order to understand the causes of ACL injury: anatomy, hormones, environmental factors and biomechanics. The studies, including the one conducted at Duke University, indicate that by intervening just within biomechanics, there can be a decrease in the number of significant knee injuries in the female athletic population.

The Santa Monica Orthopaedic and Sports Medicine Research Foundation has collaborated with U.S. Soccer, FIFA, University of Southern California and the Centers for Disease Control to better understand the mechanism of injury of non-contact ACL injuries and has worked diligently to develop an effective prevention program.

These researchers completed a randomized controlled trial with sixty-one Division I NCAA women's soccer teams in the 2002 season. Each team was randomized to one of two groups: those performing the program (intervention group) and those who continued to do what they were doing in previous seasons (control group).

The study was conducted for 14 weeks over the course of the fall season. The athletes in the intervention group performed a twenty-minute alternative warm-up called the PEP Program (Prevent Injury and Enhance Performance). This intervention group

demonstrated a 100-percent decrease in non-contact ACL injuries during practice and an overall 45-percent decrease in non-contact ACL injury (game and practice) compared to the control group.

Additionally, the rate for ACL injury was reduced even further – a 72-percent reduction, when analyzing the last six weeks of the season. This is because muscle adaptation and neuromuscular training takes approximately four to six weeks to make an effective change in an athlete.

This research indicates that a program that addresses landing technique, core stability, balance and proprioception (joint awareness) can effectively decrease the incidence of ACL injuries in the soccer athlete.

Dr. Timothy E. Hewett of the Cincinnati Children's Hospital and the University of Cincinnati College of Medicine, noted at the conference that sports programs commonly use training programs for athletes in order to reduce significant injuries.

Hewett and his colleagues initiated a study to examine the effects of a comprehensive training program in order to analyze injury rates, performance and biomechanics in female athletes. The athletes trained three days a week for 90 minutes followed by 15 minutes of stretching exercises. The results demonstrated that females increased speed during timed sprints after training.

The study also demonstrated significant desirable biomechanical changes during a landing maneuver following the training. In contrast, the control group demonstrated no significant increase in any of the above measured parameters.

Overall, these studies and the research that was presented show that by focusing on a player's movement patterns, individual performance deficits can be determined. By giving all players a comprehensive intervention or a warm-up program, such as the PEP Program, these deficits can be addressed. As the research shows, with the use of a program, that the players are more likely to continue performing at a high level without incurring season ending injuries.

For information on the research presented in this article and the PEP Program including a downloadable .pdf describing its components, visit the Web site at www.aclprevent.com or e-mail the author of this article, Holly Silvers, at HollySilversPT@aol.com.

For more information from U.S. Soccer's Sports Medicine Department, please contact Hughie O'Malley, U.S. Soccer's Manager of Sports Medicine Administration, at homalley@ussoccer.org or 312.528.1225.

RESOURCE CENTER – Thursday, March 18, 2004

As part of our continuing effort to service and educate our membership, each Thursday U.S. Soccer will provide an informative article from one of its departments. Once a week, we will bring you an article/paper/essay that will hopefully enhance your enjoyment and knowledge of the game of soccer - on and off the field.

This month, Dr. Donald T. Kirkendall, who works with U.S. Soccer's National Teams, examines the prevention of groin injuries.

Preventing Groin Injuries

The typical groin strain is a common injury in soccer, which is why players stretch these muscles as a part of their pre-game routine. U.S. Men's National Team players Tony Sanneh and Claudio Reyna have missed playing time with this injury, and most recently Ante Razov has been sidelined as well. The injury is not unique to soccer, however, as athletes in many other sports, including ice hockey, often suffer from this injury.

In soccer players, groin strains are often a result of rapid changes of speed/direction or reaching to the side to make a tackle. In ice hockey, groin injuries are common because of the diagonal stride in skating puts the groin (or adductor) muscles under strain. Many sports require quick changes of direction and/or bursts of speed, and these are the leading causes of groin injuries.

While treating these injuries is a major focus of sports medicine, prevention of injuries is also an important goal. Before preventing injuries, it is important for doctors to know how the injury occurs. The next step is to examine the difference of the muscles and joints between the athletes who are injured and those who are not.

The doctors at the Lennox Hill Hospital in New York City have been studying adductor injuries for a number of years.

Lennox Hill's team of doctors chose to focus their study on a large group of professional hockey players. The doctors measured flexibility and strength of the hip on each player initially and then charted their groin injuries over two seasons. After this period, the researchers reviewed their data to see if there were any differences between the injured and uninjured players.

There was no difference between groups when comparing flexibility, but the injured players had remarkably lower adduction strength. Does that mean all that time spent stretching the groin is ineffective?

Not necessarily, it is probably a combination of strength and flexibility. Professional ice hockey players seemed to be very flexible, making it appear that poor groin strength was a major factor in predicting groin injuries.

The next step the Lennox Hill team took was to devise a training program to improve

groin strength. The three-step process included a warm-up, strengthening and some ice hockey specific exercises.

1. Warmup: stationary cycling, groin stretching, sumo squats, side lunges, kneeling pelvic tilts
2. Strengthening: ball squeezes with different size balls, concentric adduction against gravity, cable/elastic standing adduction, seated adduction machine, slide board forward, slide board with simultaneous adduction (spread legs and bring both together at the same time), one-legged lunges
3. Ice hockey specific: on-ice kneeling adductor pull-togethers, cable cross-over pulls, slide skating, cable resisted striding.

Over the next two years, 58 players followed the program. Based on pre-training tests, 33 players were classified as being at risk of a groin injury due to low adductor strength. The injury rate of these players fell more than 400 percent – from 3.2/1,000 game-exposures the two years before to .7/1,000 game-exposures during the prevention phase. That is a huge reduction in groin injuries.

Most coaches encourage flexibility work on the groin area, but need to add some adductor strengthening to their work. Players must take some responsibility by preparing for the season by strengthening these muscles using some of the exercises listed above, or other groin-specific exercises.

In addition to the weeks it can take for these injuries to heal, athletes often do not realize how much these muscles are used in day-to-day activities until they suffer this injury.

The research by the Lennox Hill team clearly shows that flexibility and strength reduce the risk of groin injuries, which should encourage every player to take all recommended steps toward prevention.

Questions can be directed to Hughie O'Malley, U.S. Soccer's Manager of Sports Medicine Administration. Hughie can be reached at homalley@ussoccer.org or at (312) 528-1225.

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US Women's National Teams Program

Adult Politics: The Games Parents Play

Issue

As the sport of soccer continues to gain in popularity throughout the United States it is important to monitor the effects of this growth. As we have already witnessed, growth in any sport in this country can bring about both positive and negative ripples, especially given the emphasis our society places on sports. College basketball for example has increased its fan base dramatically in the past two decades, but this exposure has also taken gambling to a new and dangerous level. For every new and exciting development in a sport there also can be a new and often disturbing challenge that must be overcome if the sport is to continue to move forward. Soccer has its share of challenges for the future. In fact, one could argue that soccer might have more challenges than any other sport at this time, since it is one of the fastest growing sports in the country. One challenge that is becoming increasingly alarming is the role of the parent toward their soccer-playing child. These are the new millennium soccer Moms and Dads. While most parents have generously given their time to become coaches, administrators, referees and supportive fans for the benefit of their children, many others have become overly involved in their children's soccer life to the detriment of his or her development and the game. These parents put too much pressure on their children in the hope that they will make a national team or earn a college scholarship. Instead of parents taking a supportive role they become agent and negotiator sheltering their children from the true lessons that the game can instill. Lessons like overcoming adversity, taking responsibility, setting goals, working together for a common cause, and respecting authority to name just a few. The results are young players who cannot think or act independently, lack creativity and ultimately who lose their love and desire to play the game.

Recommendations

Adversity = Growth

In the recently released children's movie, *The Emperors New Groove* there is a scene in which the prince and his sidekick Pacho are trying to escape their captors. At one point they find themselves bound together back to back on a log heading down a river. The prince, who is facing the opposite direction, hears the rush of a waterfall approaching and exclaims, "let me guess, we're heading for a huge waterfall," Pacho replies matter of fact, "yep." The prince says, "sharp rocks at the bottom," Pacho replies again, "yep." The prince says calmly, "Bring it on!"

"Bring it on!"

Like the prince, young players need to be able to embrace adversity whether this is a difficult loss, being cut from a team, accepting a referee's decision or even working out difficulties among themselves. At the very least they need to be able to handle it in a positive, independent way. Parents can and should be the guiding influence in teaching their children how to handle adversity, but they should not take this responsibility away from the child.

The only way young players can embrace adversity is through practice.

Nowadays, we more often see the opposite. When a team loses a game by what is perceived as a bad call by the referee, the parent goes and screams at the referee. Instead

of young players taking responsibility from the loss, they end up blaming the referee. When players are cut from a team, the parents blame the coach. Instead of the players learning what parts of their game need improving for them to reach the next level, they end up blaming the coach, or the parents switch the player to another team.

Children follow the lead of their parents!

For many of us we see adversity as something that must be avoided at all costs. It can be painful in the short term, but tremendously beneficial in the long term. It is the special person who can react to adversity and truly learn from it. Parents must help guide their children through adverse times being careful not to stifle their ability to turn a negative situation in to a positive one. The individuals who have learned this are much more likely to reach farther than anyone thought possible. Every player that has made a career of professional sport or who has made a national team has suffered through their own share of adversity. Parents must think of adversity as an opportunity for their children to grow.

Wear Their Boots

Before saying anything to your child on the field think first about how it would affect you if you were playing in the game at that time. Put yourself in your child's mind, see what he/she sees, hear what he/she hears and then ask yourself how would you respond.

Feel the Love

“To play the game is great! To win the game is greater! To love the game is the greatest of all!” This quote is on a plaque inside the lobby of the famed Philadelphia Palestra. It says what most elite athletes already know. In developing their children in the game of soccer the best parents can do is to help instill a love for the game. No athlete ever made it at the highest level without a real and undying love for the game. The love is what makes players train hard, the love is what makes players sacrifice for, the love helps players overcome adversity and the love makes them reach for their dreams. This love cannot be coerced, pressured, or forced. It must be nurtured and has to develop through both positive and negative experiences.

Pop the Questions?

Have your athlete ask themselves these three questions after each and every game:

1. Did I work hard?
2. Did I take responsibility for my actions?
3. Was I positive with myself and my team?

If they can answer yes to all three of these then they were successful that day regardless of the score or amount of playing time. Parents influence player development as much or more than coaches do. Are you stifling your player's development?

Rationale

In every sport athlete matriculation beyond the age of 16 greatly diminishes. For some, this will be their last organized health-full experience in life. Sports is and should be about participation, enjoyment, team cohesion, challenges, adversity and yes – competition! Sports mirrors life and life mirrors sport. However hard we try as coaches or parents we cannot control the outcome of a game or life's challenges. However, we have a large window of opportunity to influence how our children and athletes respond to life's ups and downs. Sport instills a sense of physical strength, self-esteem, empowerment and the mental ability to deal with disappointment. Players will make

mistakes, they will experiment, they will fail and they will succeed. Between the white lines, let the game be the teacher.

Stress Fractures Can Be a Concern for Soccer Players

1/22/04 7:11 PM

As part of our continuing effort to service and educate our membership, each Thursday U.S. Soccer will provide an informative article from one of its departments. Once a week, we will bring you an article/paper/essay that will hopefully enhance your enjoyment and knowledge of the game of soccer - on and off the field.

This month, Drs. Thomas P. Knapp and Bert R. Mandelbaum, who work with U.S. Soccer's National Teams, look at stress fractures.

Stress Fractures

by Drs. Thomas P. Knapp and Bert R. Mandelbaum

While they account for just two percent of all soccer injuries, stress fractures are an injury concern among soccer players at all levels. At the national team level, nine of the 24 members of the 1994 U.S. World Cup team had a history of stress fractures.

The injury is nothing new. Originally noticed in soldiers as early as 1855, they were originally referred to as march fractures. Stress fractures were first mentioned in sports medicine in 1958.

Stress fractures seem to be a result of training on hard ground, poor shoe design, training errors and over-training. The repetitive stress of these activities causes the outer layer of bone (periosteum) to be broken down faster than it can be rebuilt. The cortex underneath weakens, leading to a stress fracture that cannot be seen by X-ray until it starts to heal. The fracture is part of a continuum of bone injury: stress reaction to stress fracture to the underlying bone damage that is visible by X-ray.

The risk of stress fracture increases with an increase in the amount of training. Stress fractures are more common with year-round training, and is evident in the high incidence of this injury in the warm weather states of California and Florida where all-season training is possible.

In soccer, an increase in training is almost always the reason for these injuries. Symptoms start out as a dull, gnawing pain, usually toward the end of a workout, and will gradually increase over two to three weeks. Early on, pain subsides with rest, but as time progresses, pain occurs earlier in exercise and persists long into the recovery period. The intensity of the pain increases over time until a point where running cannot be tolerated. Eventually, pain will continue into the night. Rest and days off can reduce the pain, but symptoms return with a resumption of training.

The tibia is the most common location of all stress fractures, but in soccer players, the most common fractures occur in the second and fifth metatarsals, tibia, fibula, femur and hip. Fractures in the femur and tarsals are common in older athletes, while the tibia and fibula are most common in young athletes. Research has shown that the incidence is similar between boys and girls under age of 16, but they appear more often in adult

women than adult men.

In treating the injury, adequate nutrition is a vital consideration for both men and women. Additionally, female athletes may need supplemental calcium intake. Also, menstrual patterns need to be determined during treatment for possible estrogen supplementation. Among females with several recent stress fractures, the existence of an eating disorder needs to be considered.

Stress causes the injury, so stress must be removed for healing. The healing can take six-eight weeks for the bone to adequately heal, depending on the site of the injury. Crutches should be used if there is a limp. Reevaluation takes place at six week intervals for provocation of pain and imaging. Once normal and pain free, the athlete can gradually return to training. If more conservative measures fail to produce results, surgery is an option.

Overall, stress fractures may be a small percentage of the injuries suffered in soccer, but with their six-eight week healing period they can knock players out for a long period of time.

Questions can be directed to Hughie O'Malley, U.S. Soccer's Manager of Sports Medicine Administration. Hughie can be reached at homalley@ussoccer.org or at (312) 528-1225.

Why You Feel Sore... Delayed Muscle Soreness and Specificity
2/13/03 2:58 PM

As part of our continuing effort to service and educate our membership, each Thursday U.S. Soccer will provide an informative article from one of its departments. Once a week, we will bring you an article/paper/essay that will hopefully enhance your enjoyment and knowledge of the game of soccer - on and off the field.

This month, Dr. Don Kirkendall, who works with our National Teams on a regular basis, looks at Delayed Onset Muscle Soreness and specificity.

Why You Feel Sore...
Delayed Muscle Soreness and Specificity
by Dr. Don Kirkendall

Last month I spent a great weekend in Winchester, Va., where I spoke about knee injuries to physical therapy students, then later had the opportunity to watch a local girls team train indoors under the steady hand of James Wood HS coach Mark Pennypacker. After watching an hour of training, Mark asked if I wanted to join in for scrimmage. That was like offering candy to a child. Of course I was going to play. We played three games to 5, and I learned something that night that I've learned time and time again - I learned that pain can be quite instructive.

I stepped on the floor without any warm-up thinking that I would just take it easy and walk through the game with a trap here and a pass there. That plan didn't last 60 seconds. Within minutes, I was bent over, sucking wind and as fatigued as I can remember being in recent history. I know what lactic acid buildup feels like, and I was beyond buildup and approaching overflowing. I was just hoping one of the girls would score so we could take a break.

Finally, a goal is scored and I practically crawled to the water fountain. I know what I did wrong. I stepped onto the field with no warm-up. I asked my body to go from rest to very high intensity activities. The pH from lactate made my legs feel very heavy and tired.

The next morning - Saturday - brings about more pain. It is called Delayed Onset Muscle Soreness. I don't run much anymore due to residual heel pain from a past injury, but I do regularly ride the stationary cycle, so my endurance is not bad. But my legs are really sore -- groan-with-every-movement sore. The front of my lower legs are sore because I haven't recently had to move my foot into all the positions demanded of you on the soccer field. My calf muscles are sore because I haven't sprinted in some time, and they are tired from continued use. My quads and hams are sore from running, from stopping, from kicking and from changing directions. But the most soreness is located in my adductor muscles -- the groin muscles. You never know how much you use those muscles until they remind you with soreness the next day.

The reason for the pain is pretty well understood. When muscles develop force while lengthening, a great deal of force is generated and that leads to damage to some muscle cell membranes. Not much has been shown to prevent this soreness (other than regular training), although vitamins C and E seem to help speed up the repair; a welcome addition to some sports drinks.

This pain is evidence of damage and repair of this damage is one of the body's quickest adaptations. An old coaching adage says to get rid of soreness, do what ever it was that made you sore and that is correct. Had I gone out and played Sunday instead of watching the Super Bowl, I wouldn't feel nearly as bad on Monday as I did on Saturday.

You are probably saying that the moaning of an ex-player has little value to you as a current player or coach, but really it does. How many times have you seen teams going through a fairly passive pre-game warm-up? A little ball work, some stretching, maybe a little 5v2 and now it is time for kickoff. You wonder why the first 10-15 minutes of the game just don't seem to be clicking, but after a while things start to look better. The same thing can happen at the start of the second half. Why? The warm-up for the first half wasn't specific to the game – too passive, not enough higher intensity work prior to kickoff. Warm-up is supposed to bring you up to the demands of the game, not just break a sweat. And the second half? The players have just spent the last 15 minutes sitting and listening to first half review and second half plans, then are expected to step right out and play. Not good. The first 15 minutes will be tentative and less cohesive than envisioned, but the next 15 minutes are pretty good.

And the soreness? In order to be prepared to for play, all players need to have gone through lots of changes of direction. Playing 11v11 in practice just is not intense enough. Smaller sided games require more of everything so emphasis should be placed on these games. Straight ahead running trains a player to run straight ahead. Activities suggested by coaches for players should require many changes of direction and agility work, especially as training camp approaches. A player who has run distances pre-season will have good endurance, but may well be so sore from soccer training at the start of camp that they have problems processing the coach's lessons and insights. The more agility work that is done, the more prepared for the quick changes of direction required in the game.

From a training theory standpoint, this is called specificity. The more specific the training (and warm-up) is to the activity, the more the adaptations are specific to the demands of competition will be.

These lessons can and should be applied to practices, games and off-season workouts. If you don't properly prepare yourself for the activity, you are not only hurting yourself in the immediate moment, but you're also preparing to put yourself in uncomfortable pain the following day.

Coaches and players spend all week preparing for games, and it is important that proper preparation continues up until the whistle blows.

Questions can be directed to Hughie O'Malley, U.S. Soccer's Manager of Sports Medicine Administration. Hughie can be reached at homalley@ussoccer.org or at (312) 528-1225.

Shin Splints

1/30/03 10:03 AM

As part of our continuing effort to service and educate our membership, each Thursday U.S. Soccer will provide an informative article from one of its departments. Once a week, we will bring you an article/paper/essay that will hopefully enhance your enjoyment and knowledge of the game of soccer - on and off the field.

Today we examine an injury that effects many different athletes, but can be very difficult to diagnose. We hope you find the following information educational, but please use it only as a guideline and be sure to consult a professional if you continue to experience pain in your lower leg.

Shin Splints

As is the case with most contact sports, injuries in soccer can take its toll on a player and a team. Following the 1999 Women's World Cup, the team was beset with a variety of injuries. One of those was a very common injury that hit WWC hero Briana Scurry.

After the Women's World Cup, Scurry began suffering from shin splints. Shin splints are an injury that many youth and amateur athletes know about, and an injury that is not exclusive to soccer. While this injury is fairly common, identifying shin splints is a diagnostic dilemma. Most any athlete who has pain in their lower leg may call the pain "shin splints," but, unfortunately, it's not quite that easy.

Aching pain in the lower leg can happen to beginner athletes who are unaccustomed to exercise on a new surface, as well as to experienced athletes who increase their exercise intensity, change shoes or move to harder surfaces. The pain comes with exercise, especially when running on roads or tracks with tight turns and is usually felt on the medial (middle) aspect of the lower leg and may even linger even after exercise itself.

Shin splints are a common problem in figure skaters and gymnasts, as they don't use training shoes with lots of support and cushioning. If runners are accustomed to training on one training surface and then switch to a new surface, shin pains usually follow.

The actual medical term for shin splints can be 'medial tibial stress syndrome' or 'posterior tibial syndrome.' All of the muscles of your lower leg are attached to the tibia or fibula. The common perception is that the change in exercise habits leads to a tearing of the muscles as they attach to the tibia, however, some tendon involvement may be present as well.

The typical treatment for shin splints is:

- Rest (do something other than running)
- Non-steroidal, anti-inflammatory medications (e.g. ibuprofen)

- Stretching and thorough warm-up before activity
- Ice massage for 15 minutes after exercise
- Stretching exercises to improve flexibility of the calf and heel cord
- Work on strengthening ankle dorsiflexors
- Slow, gradual return to running (progress from water running to Stairmaster to treadmill to over the ground running).
- Also, make sure running shoes are of good quality. If there is access to an athletic trainer, there are some taping techniques that help.
- Over the longer-term, Orthotics may be prescribed

What is presented above is strictly a general guide - don't take these comments and self-treat any pain in the shins. See a sports medicine physician. Why? Unfortunately, there are more serious problems that also cause lower leg pain and are mistakenly called shin splints; specifically stress fractures and compartment syndromes (which require surgery). This is why it can be very dangerous to simply shrugging off lower leg pain as 'shin splints'. So, use this information as a guideline, but also be sure to see a professional if you are experiencing prolonged or consistent pain in your lower leg.

For more information on injuries and soccer, please contact Hughie O'Malley, U.S. Soccer's Manager of Sports Medicine Administration. Hughie can be reached at homalley@ussoccer.org or at (312) 528-1225.

Sun Safety Tips & Skin Cancer Prevention
12/5/02 5:08 PM

As part of our continuing effort to service and educate our membership, each Thursday U.S. Soccer will provide an informative article from one of its departments. Once a week, we will bring you an article/paper/essay that will hopefully enhance your enjoyment and knowledge of the game of soccer - on and off the field.

This past fall the U.S. Under-19 Women's National Team made history as they won the first-ever FIFA women's youth world championship. In addition to focusing on their on-field role, the team also took the opportunity to use the world stage as a platform for educating teens on the dangers of skin cancer amongst teenagers by creating a unique partnership with the Skin Cancer Society. With the "U.S. U-19s Starting XI Sun Safety Tips," the team handed out specially created literature to people they encountered on their road to the championship, helping to try and create media awareness about the importance of sun safety. As a young team, playing outdoors every day, the team spread the word through clinics, appearances at schools and interaction with the media.

SUN SAFETY TIPS

from The Skin Cancer Foundation and the U.S. U-19 Women's National Team

By the age of 18, most people have received 50%-80% of their lifetime sun exposure.

Sun Safety's Starting XI -

- Avoid the sun from 10 a.m. to 4 p.m. (when the rays are most harmful)
- Seek the shade
- Wear protective clothing
- Wear sunglasses that block at least 99% of UV rays.
- Wear broad-brimmed hats
- Wear lots of sunscreen, with an SPF of 15 or greater
- Apply sunscreen at least a half an hour before going outdoors
- Reapply sunscreen every two hours
- Stay out of tanning salons
- Tell your friends about the importance of Sun Safety
- Remember! Almost all skin cancers are preventable, and skin cancer is curable when detected and treated early.

Skin Cancer Facts -

- All skin cancers are preventable and curable when detected and treated early.
- Skin cancer is the most common form of cancer in women age 25-29.
- More than 90 percent of all skin cancers are caused by sun exposure.
- Melanoma is the deadliest form of skin cancer and has more than tripled among Caucasians between 1980 and 2002.
- One person dies of melanoma every hour.
- Almost one in four people who develop melanoma in the United States are under 40 years of age.

The following is an article on skin cancer prevention from one of the team's doctors, Dr. Chris Amann.

Skin Cancer Prevention

by Dr. Chris Amann

Team Physician, U.S. Under-19 Women's National Team

As a sports medicine physician, environmental exposure to heat and cold is a commonly encountered problem. Not only do the issues of metabolism, electrolyte balance, and thermoregulation come into play, but also the issues of protection from the elements. This summer, the Under-19 Women's National Team participated in many matches on their way to winning the first-ever FIFA Under-19 Women's World Championship in which sun exposure was an important issue.

It has been well documented that the risk of developing skin cancer is directly proportional to sun exposure, and the effects of sun exposure are cumulative. Armed with this knowledge, we set out to minimize the risk of long-term complications of sun exposure in our athletes.

When feasible, practices were held either earlier in the morning or later in the afternoon, avoiding the peak hours of 10 a.m. to 2 p.m. to minimize sun exposure. Athletes were also given practice gear consisting of tightly woven fabric to protect against the sun. Sunscreen with an SPF of at least 15 as used liberally, and we made sure that it contained agents that protected against both UVA and UVB rays.

Due to the intense workouts that the players endured, the athletes were encouraged to reapply sunscreen often, to minimize the protective loss of the sunscreen through sweating. Athletes were reminded during intense workouts after one hour that they should reapply sunscreen, especially in the hotter climates. Water breaks were encouraged, and often there were places available in the shade for the athletes to take a break. The injured players were encouraged to view practices from a shaded area to minimize sun exposure.

Many of the girls enjoy the fact that they spend so much time in the sun, because it

allows them to “work on their tan.” Fair-skinned individuals, such as Megan Kakadelas and Lindsay Tarpley, were reminded more frequently that they should use sunscreen and protective clothing due to the increased incidence of skin cancer in fair-skinned individuals. Even the coaches and training staff heeded their own advice by wearing hats, sunglasses, and sunscreens. Even during overcast or cloudy days, the athletes were reminded that UV rays still penetrate the cloud layer and that it is still possible to get sunburned in cloudy weather.

Our medical staff worked hard to keep the players healthy and on the field and on the trail to the World Championship, and at the same time we were also protecting the players from potentially harmful rays. With the amount of hours that players spend outdoors training, it is important to drill these self-protecting habits into the athletes at a young age. Remember, nearly all skin cancers are preventable and curable when detected and treated early.

Questions can be directed to Hughie O'Malley, U.S. Soccer's Manager of Sports Medicine

Administration. Hughie can be reached at homalley@ussoccer.org or at (312) 528-1225.

Muscle Strains

10/17/02 12:34 PM

As part of our continuing effort to service and educate our membership, each Thursday U.S. Soccer will provide an informative article from one of its departments. Once a week, we will bring you an article/paper/essay that will hopefully enhance your enjoyment and knowledge of the game of soccer - on and off the field.

This week we examine one of the most common injuries in sports - especially soccer - the muscle strain in an article by Dr. William E. Garrett.

Muscle Strains by Dr. William E. Garrett, Jr. MD, PhD

Muscle strains - pulled muscles - are among the most common injuries in sports - as many as 30% of the injuries seen in sports medicine are strain injuries.

In soccer, as one would expect, most of the strain injuries occur in the leg muscles. The injured muscles are predictable: the hamstrings are the most common, and the thigh (rectus femoris) and the groin are also highly susceptible to such injuries.

In soccer, these strains usually occur during sprinting, rapid deceleration, kicking or stretching to reach the ball. In order to strain a muscle, a powerful contraction must be combined with some lengthening of the muscle like dragging the foot on the ground while contracting the quadriceps for kicking.

When such a strain occurs, pain can be felt anywhere along the length of the muscle, but the actual damage is very near where the tendon and muscle join each other. Bruising sometimes occurs, especially when the hamstring is injured, and any attempt to increase the length (that is, move the limb through its range of motion) is painful.

There are many various ways to go about the treatment of such a strain. The RICE (rest, ice, compression, elevation) principle is a very effective initial treatment for strain injuries. A short course of immobilization followed by early mobilization has also been suggested. Non-steroidal anti-inflammatory drugs are not advised in the treatment of strain injuries. The muscle is quite weak after the injury and gets weaker over the next day, maybe two. Afterwards, repair of the muscle slowly brings the strength back towards normal. This of course depends on the severity of the strain. A slight strain may return to strength in a week while a more severe strain might take well over a week for its strength to return.

Physical therapy usually involves rest of the muscle followed by range of motion exercises and then stretching. This is important to minimize the scar tissue than can form.

Much of the rehab is based on the comfort of the athlete. As the athletes are unlikely to push themselves past their pain tolerance, the injured tissues are not very likely to be

further injured. For example, if the athlete is doing the stretching on their own, it is unlikely they will cause further injury.

Low-intensity isometric, concentric or isokinetic strength training is helpful, again as tolerated. The athlete can start light jogging when he/she is comfortable. Higher-speed running, cutting, or ball drills can be added when tolerable. It is important not to return to play too soon. One reason is to keep from re-injuring the strained muscle, and another reason is that an athlete playing with an injury that hasn't completely healed is at a high risk of a major injury, and it doesn't have to be to the previously injured body part. Playing with a partially healed strained muscle reduces one's speed, strength and agility. The most dangerous part of the game is tackling, so going into a tackle with an injured leg could lead to that (or the other) leg suffering a more major injury like a ligament tear or a fracture.

In a game that involves as much physical exertion as soccer does, minor injuries such as muscle strains will occur. In such an instance, the first thought must be to properly rest and then rehab the muscle. With proper care a player can be back on the field in a short amount of time. But by rushing back from the injury, a player puts himself/herself at a much greater risk for a more threatening injury.

Questions can be directed to Hughie O'Malley, U.S. Soccer's Manager of Sports Medicine Administration. Hughie can be reached at <homalley@ussoccer.org> or at (312) 528-1225.

Coaching sports can be rewarding and stressful as it is without having to worry about injuries to your players. However, there may be situations when appropriate medical personnel are not available and the care of the athlete is in your hands. Here are some general guidelines regarding injuries that often occur on the soccer field.

1. **Coaches should at the very minimum be certified in CPR and First Aid.** Knowing these basics will allow you to think clearly should an emergency arise.
2. **Remember R.I.C.E.: Rest, Ice, Compression, Elevation.** Most common injuries encountered in soccer will follow this general principle. **DO NOT** use heat while swelling is present to the extremity. Apply ice to the injured area for 15-20 minutes. Adding heat will increase the swelling, while ice will help decrease it.
3. **Let common sense prevail.** If there is a deformity, **DO NOT** move the athlete. Call 911 (or the local equivalent) and let trained personnel handle the situation.
4. **Communicate with parents** and inform them of the situation if they are not on-site at the time of the injury.
5. **Be conservative.** If you have doubts as to an athletes' ability to play, do not let them play.

Ankle Injuries

1. Most ankle injuries involve ligaments and tendons (i.e. sprains). In instances like this, follow the R.I.C.E. principle. These injuries often turn into recurring injuries if the athlete returns to activity too soon. If the athlete experiences pain during activity, he/she should be removed from competition. If the pain level increases in the following days, the athlete should see a physician.
2. If a deformity is present, do not attempt to put the limb in place or move the limb. Immediately call 911 or EMS personnel.

Deep Thigh Bruise

Usually caused by direct contact to the thigh, a deep thigh bruise is very painful and can lead to potential problems.

1. Ice immediately with the knee in a bent position. This will help maintain flexibility to the thigh muscle.
2. Instruct the athlete to keep stretching the thigh. This will prevent swelling/blood from "settling" in the muscle and limit movement.

Knee Injuries

The knee is the most vulnerable joint in the body and should be dealt with using caution. Injuries can occur to the ligaments, tendons, kneecap, cartilage (meniscus) and bones (growth plates). Here are some indications of significant injury to the knee:

- Hearing or feeling a "pop" or a "snap" in the knee.
 - Feeling that the knee "gave out"
 - Sharp pain
 - Obvious deformity
 - Limited movement
 - Swelling
1. Apply ice immediately and immobilize the knee. When immobilizing the knee, be sure to splint the ankle. As a general rule to follow, the joint above and below the injured joint should be splinted.
 2. In all instances involving a knee injury, the athlete must follow-up with a physician.

Head Injuries

There are currently many different theories regarding head injuries and concussions and how to treat them. The following guidelines are essential to insuring safe return to play for your athlete:

1. When in doubt, keep the athlete out. Any player who appears to have suffered a concussion should be removed from participation and evaluated by a physician as soon as is practical. Players exhibiting prolonged loss of consciousness or marked amnesia should be evaluated immediately in an emergency room. Players should not be allowed to return to play if they exhibit the symptoms (headache, nausea, blurred vision, dizziness, ringing in the ears, unsteadiness, confusion) of concussions.
2. If an athlete loses consciousness, call 911 and activate EMS. Before this athlete can return to competition or practice, he must be cleared by a physician.
3. Athletes, in the eagerness to play, may fudge the truth when telling the coach how they feel. As part of the overall evaluation, have the athlete perform sport-specific movements on the sideline and watch for unsteadiness, lethargy, uncoordinated movements. They may lie, but their bodies won't.

Neck Injuries

Any athlete that sustained a hit and complains of neck pain, or numbness and tingling to extremities **MUST NOT BE MOVED**. Immediately call 911. If the athlete is not breathing, your priority is to get the athlete breathing, which means you – or another trained person on-site must begin CPR. However, neck injuries pose a unique problem when CPR is initiated. We encourage all coaches and staff to contact their local EMS

provider and learn how and when to use 'log rolling' when in this situation.

Soccer, like most sports, contains the risk of injury, but the use of shin guards and on-field awareness can lessen that risk. In the case of an injury, stay calm and seek medical help. The general guidelines listed above should not be used as a substitute for seeking trained personnel. Remember that a player's health is the first priority in situations where an injury appears to have occurred, and trained medical personnel are best able to deal with such situations.

Information compiled by U.S. Soccer's Manager of Sports Medicine Administration Hughie O'Malley and Athletico trainers Lynn Grosman and Rich Monis. For more information, please contact O'Malley at homalley@ussoccer.org or (312) 528-1225.

As part of our continuing effort to service our membership, U.S. Soccer Communications Center sends out an informative email from one of its departments each week as part of our "Resource Center." This week's "Resource Center" email is a look at muscle cramps and what can be done to prevent them.

DEALING WITH MUSCLE CRAMPS

Potential Causes and Prevention Methods For Dealing with Cramping Muscles

Muscle cramping is not an uncommon problem among athletes. Although it is not entirely clear what causes muscle cramps, they are often instigated by loss of fluids and minerals during a hard workout or game. Sometimes muscle cramps can be serious enough to take a player out of a competition. According to U.S. Men's National Team Strength and Conditioning coach Pierre Barrieu, even though the causes of muscle cramps are not entirely known, that does not mean measures cannot be taken to prevent them.

Potential Causes of Muscle Cramps

“Actually, science hasn't figured it out completely,” Barrieu said about the causes of muscle cramps. “Probably one of the reasons is dehydration, another one is lack of minerals that is affecting the regular muscle contracting mechanism. It also has something to do with the central nervous system.”

Dehydration is certainly one of the most common factors that contribute to muscle cramps, which are often coupled with large losses of minerals such as sodium, calcium and potassium through sweat. Fluid, mostly water, makes up more than 70 percent of the human body. Along with the loss of sodium—a mineral that initiates signals from nerves, which in turn leads to muscle movement—and other minerals, the loss of fluid in the human body may cause muscles to become irritable. When the muscles are irritated in such a way, any slight stress, such as movement, may cause the muscles to contract and twitch uncontrollably.

Another factor in muscle cramping may be flexibility. Most people tend to relate lack of flexibility and stretching to pulled muscles, however, according to Barrieu, if the muscle is tight, it tends to cramp a lot easier than other muscles.

Preventing Muscle Cramps

Since the majority of muscle cramps are associated with loss of fluids and minerals as well as tight muscles, the most obvious preventative measures are to keep well hydrated, replace the sodium and other minerals lost through excessive sweating and stretch adequately.

“You definitely want to make sure that your players don't get dehydrated,” said Barrieu.

“Same thing with minerals.”

When it comes to the Men’s National Team, Barrieu makes sure players are hydrated and get plenty of salt. Salt not only replenishes sodium lost through sweat, it also retains water, which helps players stay better hydrated.

Barrieu also makes sure that players get enough minerals such as potassium and calcium and works on flexibility daily, making sure that players’ muscles are not overly tight, especially since some players are more prone to cramps than others. Stretching properly on game day is particularly important because of the intensity of the workout.

Another way to prevent muscle cramps is not only to pay attention to hydration, but also to make sure to avoid dehydration by staying away from alcohol, said Barrieu.

“When you drink alcohol you definitely expose yourself to cramps,” Barrieu said. “The reason is that alcohol is sucking a lot of water out of your cells. You definitely have to stay away from alcohol if you’re an athlete and you don’t want to cramp.”

Relieving Muscle Cramps

Sometimes muscle cramps occur despite an athlete’s efforts to prevent them. When muscles cramp during a workout, they can be relieved by:

1. Stretching. A muscle cramp is the contraction of a muscle, so what the athlete needs to do is try to relax that particular muscle, which often brings to mind the typical image of a person stretching, Barrieu said.
2. Drinking fluid. If the muscle cramping is extreme (whole body cramping), fluid should be given through an IV, said Barrieu. However, players should try to rehydrate with a fluid containing electrolytes, such as Gatorade, so that the muscle may receive the minerals it requires to function properly. According to research from U. Connecticut, oral rehydration (drinking) offers psychological and physiological recovery benefits not obtained from IV treatments.
3. Adequate recovery. This actually means resting and trying to make sure that the muscle is not active until the central nervous system recovers and no longer sends signals to that muscle to contract.

So while the exact causes of muscle cramps may be unknown, cramping can often affect a player’s productivity on the field, which makes preventing muscle cramps very important. Adequate hydration, stretching and staying flexible and making sure that the proper mineral levels are maintained are all key factors in avoiding muscle cramps. Also important is avoiding alcohol and other such drinks that dehydrate the body, and making sure that if a player’s muscles do cramp, that player allows the affected muscles to relax and recover completely.

Information obtained from Men’s National Team Strength and Conditioning coach Pierre Barrieu and the Gatorade Sports Science Institute, www.gssiweb.com.