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Area of Interest: Understanding Movement and Injuries

Topic: Increased Occurrences of ACL Injuries in High School Female Soccer Players

OVERVIEW

The objective of this article is twofold: 1) To raise the awareness in the coaching community that ACL tears have doubled in female high school soccer players over the last two years, and 2) To spur a more in-depth research study of the extrinsic factors possibly related to the increased number of ACL tears in high school soccer players.

Centers for Athletic Performance (CAP) recently performed a survey on the female soccer teams of 29 high schools and 33 club teams (U15 to U19) in the greater Kansas City area including the majority of the major high schools and club competitive teams. The survey specifically looked at the frequency of ACL tears among these teams.

FINDINGS

The following chart relates the assumptions and findings in this study of ACL injuries in female soccer athletes:

Season Type	Teams Surveyed	Aprox. Number of Participants	Aprox. Number of Practice / Games	2003 ACL Injuries	2004 ACL Injuries	Increase	2004 ACL Injuries Increased to:
High School	29	20 / team = 580	55 per season (3 months)	13	22	41%	1 in every 26 girls
Club	33	18 / team = 594	108 per season (9 months)	2	6	67%	1 in every 110 girls

Upon taking a closer look inside the numbers, you can see two different trends emerge. The first trend is the significant rise of ACL injuries in high school age soccer girls (basically 2-3 times as many injuries in 2004 as 2003).

The second trend is maybe more staggering. According to this survey the likelihood of tearing an ACL during the high school season is over FOUR times greater than injuring an ACL during the club season, which has almost twice as many opportunities (i.e. number of practices/games) as high school soccer – 108 compared to 55 opportunities.

DISCUSSION

There are a number of reasons why this is happening. The first is obvious…FATIGUE! The girls are tired during the high school season. High school practices are typically two hours long with some running as long as three hours, opposed to the typical 90 minute practices conducted by club teams. Another fatigue problem is that high schools typically practice or play games for 5 or 6 days a week as opposed to taking days off in between practices. This scenario sees the risk of fatigue (both mental and physical) start to rise. In a recent study researchers found a “remarkable alteration in the subject's ability to reposition their knees in a fatigue state” (2). This ‘alteration’ leads to the athlete getting out of position and not having the awareness (proprioception) to be able to readjust to avoid injury.

In dealing with 250 female athletes per week at Centers for Athletic Performance, Inc., we have found that there are proprioceptive deficiencies with a great number of high school age female athletes even when they are not in a state of fatigue! We time every sprint, measure every jump, and record every lift on a daily basis. When the athletes come in after a weekend tournament, there are noticeable reductions in speed, strength, and attention span. This fatigue of the body and mind, coupled with a loss of proprioception, leads to improper movement mechanics and flawed technique, which puts them at risk.

Another scenario that comes to mind is when a higher level club athlete is asked to lead her high school team. The dynamics of “normal” playing conditions change; double teams, less rest time, more time with the ball, etc. can lead to fatigue based injuries. “Fatigue is influenced by various factors such as tactics (playing position and opposing teams), fitness levels and the physiological demands of the first half, especially if players tax their maximal working capacity” (1) . So, not only does rest time between games seem to play a part, but also rest time during a game.

As for the second reason high school athletes are at a greater risk of tearing an ACL, you must dig down deeper. During club season, many of them are involved in some type of SSA program (Speed, Strength, and Agility). We have many competitive girls soccer teams (and individual players) attend our workouts and programs during the months of June - February. These programs are typically geared towards improving speed and reducing the risk of injury by stabilizing, strengthening, and increasing an athlete’s proprioception. This is done by focusing on proper movement mechanics. Unfortunately, because of the time consuming high school season (March – May), many girls find it difficult to have time to attend SSA workouts and the number of girls participating in our programs drops off significantly. It seems that during the high school season, this type of focus work (along with the strength training) diminishes. The focus turns more towards tactical work and conditioning. The girls start to lose power as well as proprioception due to fatigue. During the club season the girls are spending 2-3 days practicing or playing their sport, and 1-2 days sharpening their athleticism (speed, proprioception, strength, etc.).

CONCLUSIONS

The findings suggest that not only are the number of ACL injuries in female soccer athletes rising, but that the occurrences of these injuries is significantly larger for high school female soccer athletes.

There are many possible solutions to combat the rise of female soccer athlete ACL injuries during the high school season. Based upon the study’s findings, current supplementary research, and our experience training female soccer players, we propose the following:

- Incorporate a more periodized approach to practice during the high school season
- Increase the emphasis on functional strength maintenance and proprioception drills, while decreasing the length of the session

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- Increase the rest and recovery periods with light days of technical work, mixed with recovery based conditioning, or even days off when possible
- Allow for proper nutrition and hydration before, during and after games to keep energy levels up and recovery process at optimum levels

Although this seems to be a daunting task that will challenge coaches to step outside of the standard high school practice schedule, the impact could be tremendous! The fact of the matter is that the girls are getting faster, stronger, and much more explosive than ever. They come into the high school season playing at a high level. An SSA program designed to maintain this athleticism while keeping them fresh should lead to physical peaks at the end of the season and is critical in helping reduce the instances of ACL injuries during the high school season.

Some schools are doing something right. Several schools we surveyed reported no ACL tears over the last 2 years, and not surprisingly, they were teams that battled for state championships at the end of the year. Centers for Athletic Performance, Inc. is looking into these programs to see if possible, a solution could be found. Obviously more research needs to be done, but hopefully CAP is on the right path!

RESOURCES

1) VARIABLES INFLUENCING FATIGUE IN SOCCER PERFORMANCE
Rampinini E, Sassi A, Sassi R, Impellizzeri FM
Human Performance Lab, S.S.MAPEI, Castellanza, Italy; *Soccer professional fitness coach, London, England
From: The Rehabilitation of Sports Muscle and Tendon Injuries
2) MUSCULAR FATIGUE REPERCUSSION ON PROPRIOCEPTIVE SYSTEM IN SOCCER PLAYERS.
Nerín MA, Montaño JA, Carrasco L.
Department of Health, Physical Activity and Sports Sciences. San Antonio Catholic University of Murcia, Spain
From: The Rehabilitation of Sports Muscle and Tendon Injuries