Prevent Common Injuries in Soccer: Ankle Sprains

The top four time-loss injuries in soccer are ligament injuries (to the ankle and knee) and muscle strains (to the hamstrings and groin). Depending on the level of play being studied, the number one common injury changes from the level of player. In elite, highly competitive players, the hamstring strain frequently is reported to be the number one time loss injury. In lower levels of play where the pace of play is slower, the lateral ankle sprain is the most common injury.

In a previous post, the research process for injury prevention was presented. First, establish the incidence of injury. Second, determine how the injury happens. Third, devise a prevention protocol and finally, determine if the post intervention incidence is indeed lower. Let's follow this protocol as it has been applied to ankle sprains in a project jointly conducted by the EMGO-Institute in Amsterdam and the Oslo Sport Trauma Research Centre, a FIFA Medical Centre of Excellence (Verhagen, 2004).

Step 1: Just what is the rate of ankle sprains in soccer?

As stated, ankle sprains are the most common injury in lower levels of soccer. In a large study of youth and young adult males in Europe, ankle injuries constituted 20% of all injuries (Peterson, 2000). Sixteen percent of all injuries at the 2006 FIFA World Cup in Germany were to the ankle (Dvorak, 2007). The rate of ankle injury in Germany was 11.6 injuries per 1000 match hours, which works out to about one ankle injury about every 2.5 matches.

Step 2: How do injuries occur?

There are two mechanisms of ankle sprains in team sports. The first is a contact injury where a player running with the ball (in this example, the ball is on the player's right) is challenged by a defender sliding in from the left. The lead foot of the sliding player contacts the inside of the dribbler's right ankle at or near the time of ground contact. This impact causes the sole of the plant foot to roll inside, damaging the ligaments on the outside of the right ankle.

The other mechanism occurs while landing from a jump. A player jumps, probably to head a ball, and lands on the foot of another player. The unstable landing causes the sole of the foot to roll inwards, damaging the ligaments on the outside of the ankle. This is also how a basketball player sprains an ankle when coming down from a rebound or shot; they land on another player's foot. A similar occurrence might be when a player steps into a divot in the grass or other such imperfection in the ground.

Injuries to the medial ankle ligaments are rare, but have been reported during hard face-to-face tackling.

Step 3: Devise prevention programs

Programs to prevent ankle sprains have been reported in a number of studies. Verhagen and colleagues (2004) devised a comprehensive program for Dutch volleyball players. The program involved four categories of training exercises: those requiring no equipment, those using a ball, exercises using a balance board, and exercises using the ball on a balance board.

This group studied over 1000 players participating on over 100 teams for an entire competitive season. Teams were randomized into a control group or an intervention group. There were basic exercises for each category as well as variations on each. I highly recommend taking a look at page

1388 of the article for a full description and depiction of the exercises. Most all exercises are performed ten times on each leg (where appropriate). A brief description follows:

Exercises requiring no equipment

Balance on one leg with the other knee flexed. Balance on one leg with the hip and knee flexed. Hold each for five seconds, repeat 10 times on each leg.

Exercises using a ball

In pairs facing each other, balance on one leg with the other knee flexed and toss the ball back and forth (overhand or underhand). Repeat with the hip and knee flexed. Be sure to balance on each leg.

Exercises using a balance board (most commercial balance boards are a round platform attached to the top of what looks like half a croquet ball. Some products have interchangeable bases) Do the first two exercises (above) on the platform. Try to perform 10 two-legged squats, then try one-legged squats. Walk towards the platform, step on and off while maintaining balance.

Exercises with the board and the ball

Repeat the exercises with the ball, only now on the platform. Repeat while standing on only one leg.

Variations
For variety, the above can be done with the support leg straight or flexed, with the eyes open or closed, tossing the ball over or underhand, or tossing as before with a straight or flexed support leg.

At each training session, the coach would choose one exercise from each of the four categories. No exercise was repeated until all exercises in the category had been used. The total duration needed to complete the four exercises each day was about five minutes.

For example, break the four categories into A, B, C, D. Let's say there are three exercises per category. The coach might chose exercise one from each category (A1, B1, C1, D1). The next session, they might chose exercise two from each category (A2, B2, C2, D2). The third session, the coach would have to chose exercise three (A3, B3, C3, D3) because the coach can't go back to exercises one and two (in each category) until exercise three was done. The idea is to force rotation through the exercises and not get stuck on just a set of four and neglect all the rest.

Step 4: Re-assess injury rate to determine the program's effectiveness.

The overall injury rate did not differ between the control and intervention group. But our interest is in ankle injuries, not all injuries.

There were 41 ankle injuries in the control group and 29 in the intervention group. Based on injury rate, this is a 40% reduction in injury risk in the intervention group. Of specific interest were the injuries in players with a history of ankle sprain vs. those with no history of an ankle sprain. The intervention program had no effect on players without a history of ankle sprain, a finding similar to nearly every previous study on ankle sprain prevention. However, the program was very effective at preventing ankle sprains in those players with a history of sprains.

Paradoxically, the program resulted in an increase in knee injuries, mostly in players with a history of prior knee injury suggesting that as the ankle got stronger, the weak link in the chain shifted from the ankle to the previously injured knee.

Another method of preventing recurrent ankle sprains involves the use of ankle support (Surve, 1994). Those players with a history of a prior ankle sprain who wore the ankle brace had over 80%

fewer sprains. In players with no history of an ankle sprain, those who wore the brace had half has many sprains as those who did not wear the brace.

Verhagen's project presents a comprehensive training program to prevent ankle sprains and it was very effective in preventing the next ankle sprain. No study that examines an exercise program has been effective at preventing the first sprain (the study by Surve just mentioned above used a mechanical brace, not exercises). So, should the coach single out those with an ankle sprain history or just have all players perform the exercise program? It's probably not a bad idea to incorporate these exercises into a regular warm-up. They are good motor control exercises and all players can use this kind of training. A close look at the FMARC 11 and the 11+ shows that both contain exercises found in this program.

For more information:

To see videos of the balance and motor control exercises at FIFA.com, scroll down and click on 'players health'. Click on the picture that links to The 11, then click on Launch The 11. A list of exercises is displayed on the left. Each exercise has a description and a link to see a video of the exercise.

For further exercise options, also on FIFA.com, consult the poster for a new version of The 11 that is called The 11+ that can be found here.

References

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Future postings on how to apply programs to prevent knee and hamstring injuries will be available soon.

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