

RESEARCH ABSTRACT 10-YEAR TREND IN USA CUP SOCCER INJURIES: 1988-1997

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INTRODUCTION

Soccer has become increasingly popular around the world. Since its inception in 1985, the USA Cup has become the fourth-largest international youth tournament in the world.

More than 800 teams from 23 countries participate. The purpose of this study was to examine a 10-year trend in the incidence of injury during these games.

METHODS

The study took place between 1988 and 1997. The participants were 89,500 male and female soccer players between the ages of 9 and 19. Injuries were monitored and treated at a central medical facility staffed by physicians, athletic trainers, physical therapists, podiatrists and nurses. Injuries were categorized by anatomic location, whether they were old or new injuries, and whether they were play-related. Injury rates were calculated with a denominator of 1,000



The majority of injuries occurred in the lower extremity, with ankle sprains most frequent.


player hours. Heat and humidity were monitored closely.

RESULTS

A total of 3,840 new play-related injuries were sustained during the study period. The majority of injuries (65.5 percent) occurred in the lower extremity, with ankle sprains most frequent. This was followed by injuries to head and neck (13.6 percent), upper extremity (12.3 percent), and trunk (8.6 percent). Males and females had similar injury rates. Females had higher rates of ankle sprains (2.49 vs. 1.69) and knee injuries (2.55 vs. 1.89) and were more vulnerable to heat illness when compared with

males. In contrast, males sustained higher rates of concussions and fractures. The highest aggregate rates occurred in the under-16 and under-14 age brackets for females. In years of extreme heat and humidity, the overall rate of heat injuries quadrupled. Overall, injury rates declined from 19.87 to 9.89 injuries/1,000 player hours over the 10-year period. This decrease was similar for both genders.

DISCUSSION

The analysis of the USA Cup between 1988 and 1997 reveals a downward trend in youth soccer injuries. This may be a result of a number of changes over the years, including rule changes, improved training and conditioning, and improved field conditions. Results suggest that gender differences in injuries continue to exist and need to be considered when treating these athletes. In addition, extra precautions need to be taken during periods of extreme heat and humidity. Overall, soccer remains a relatively safe sport as catastrophic injuries were rare and most injuries were minor. 

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COVER STORY

'BRACE' YOURSELF: ANKLE SPRAIN MANAGEMENT UPDATE

In the United States, 850,000 lateral ankle sprains occur annually, making this one of the most common injuries in both the general and athletic populations. Despite the millions of dollars spent on ankle braces and the prevention and management of ankle sprains, health care providers remain uncertain about whether braces prevent injury or are superior to tape. It is not conclusive whether sports performance is affected by ankle bracing or whether long-term use affects the ankle in a negative way. A review of medical literature was undertaken to help answer these frequently asked questions:

WHAT IS THE PURPOSE OF AN ANKLE BRACE?

Ankle braces are designed to limit subtalar joint mobility in order to reduce the loads on the supporting ligaments. Limiting mobility is accomplished through the use of flexible, semi-rigid or rigid braces. Improving proprioception, or position sense, is believed to be another benefit. This is accomplished by providing a glove-like support to the ankle that creates a greater perception of control by the wearer. Studies have shown an improved response of the peroneal muscles during inversion stresses when braces are worn. Quicker activation of



When combined with rehabilitation, ankle bracing improves performance and reduces re-injury for athletes with a history of ankle sprains.

these muscles may help prevent ankle injury.

DO BRACES PREVENT INJURY/RE-INJURY?

There are multiple studies with conflicting results as to whether bracing actually prevents or reduces the severity of injury in wearers with no previous history of injury. However, the literature supports the role of ankle bracing in helping to prevent re-injury in those individuals with a previous history. It is important to note that bracing alone is not considered the best approach to prevent re-injury. A rehabilitative program to restore mobility,

after tape application. With ankle braces, ultimate support is significantly reduced with increased wear. Bracing is believed to be a better alternative because of the convenience of application and relatively low cost. However, it is important to match the appropriate brace with the wearer to maximize fit and support. A thorough education on donning, properly using and caring for a brace is needed.

DO BRACES AFFECT ATHLETIC PERFORMANCE?

It appears that bracing improves performance in athletes with a prior ankle injury. By

MILLIONS OF DOLLARS ARE SPENT ON ANKLE BRACES AND THE PREVENTION AND MANAGEMENT OF ANKLE SPRAINS.

strength, proprioception and balance, in conjunction with the use of a brace, is considered the soundest approach to preventing re-injury.

IS BRACING A BETTER ALTERNATIVE TO TAPING?

Again, there are conflicting views as to which is most effective in providing stability. However, researchers agree that both interventions are successful at preventing re-injury. Both have limitations. Rarick et al. demonstrated a 40 percent loss of support in as few as 10 minutes

limiting functional range of motion, performance may be affected when bracing is applied to athletes with normal ankles without prior injury. This is attributable primarily to the hindrance of the brace to normal mobility.

DOES LONG-TERM USE AFFECT THE ANKLE IN A NEGATIVE WAY?

Prolonged use might weaken ankle musculature because of the external support it provides. However, Cordova et al. reported that peroneus longus stretch reflex activation

Continued on Page 2

Continued from cover story

was unaffected by eight weeks of bracing. Karlsson and Andreasson demonstrated that bracing actually improved peroneal muscle reaction time in chronically unstable ankles. Jerosch et al. studying a four-month trial of brace use on handball players, demonstrated no significant negative effect in a measured jump test compared to controls. Though more rigorous testing is needed, these studies suggest that long-term bracing is not detrimental to the ankle.

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CASE STUDY

A FEMALE SOCCER PLAYER WITH LATERAL ANKLE INSTABILITY

HISTORY OF PRESENT ILLNESS

This case involves a 14-year old female referred to physical therapy with lateral ankle instability bilaterally. In 2004, an inversion mechanism to the left ankle led to a distal fibula fracture. She wore a boot for a few months and then underwent physical therapy for three months. Upon discharge, she was issued a functional ankle brace. In April 2005, she presented to our facility reporting weakness and instability of both ankles while participating in lacrosse, tennis and running.

ASSESSMENT

The patient was issued the sports portion of the Foot and Ankle Ability Measure (FAAM) survey. This is a valid and reliable outcome tool used to help assess foot function with daily activities as well as sports activities. Initially, the patient presented with a score of 9/32 (32 meaning no disability) with sports-related activities. She reported no pain until an episode of instability occurred.

She reported no pain prior to an episode of instability. She rated this pain from 6-8 on a pain scale of 0-10 (0 = no pain and 10 = severe pain).

OBJECTIVE EXAM

While sitting, the patient appeared to have a relatively normal arch. However, upon standing, her right foot was noted to pronate more than her left. With palpation, the patient exhibited no tenderness on any soft tissue or bony structures.



Perturbation training was used to teach the patient to react quickly and appropriately to a destabilizing force.

However, she did report having pain in the area of the anterior talofibular ligament when an episode of instability occurred. Range of motion of the talocrural joint and strength were assessed (Tables 1 and 2, respectively). She denied any numbness, tingling or loss of

sensation at any time. She had increased laxity bilaterally with an anterior drawer test but reported no pain.

A lateral step-down test also was performed. This test challenged the patient's ability to maintain her balance at her hip and ankle bilaterally.

TABLE 1.

Range of Motion	Right Passive	Left Passive
Dorsiflexion	5	0
Dorsiflexion with knee bent	10	7

TABLE 2.

Strength	Right	Left
Tibialis Anterior	4+/5	4+/5
Tibialis Posterior	4/5	4/5
Peroneals	4/5	4/5
Hip Abductors	4-/5	4-/5
Hip External Rotators	4/5	4/5

TREATMENT

The patient's physical therapy treatment consisted of conditioning, stretches, manual resistance strengthening at her ankle, proximal stabilization exercises, agility drills, perturbation training and controlled plyometric activities.

Perturbation training was used to teach the patient to react quickly and appropriately to a destabilizing force. It was intended to help establish feed-forward mechanisms to help prevent further injury. This training involved applying a destabilizing load to the patient

her. A combination of this type of practice (altering conditions, forces and feedback) is best suited for long-term motor learning.

SUMMARY

The patient was re-evaluated on her 14th visit. Her flexibility and strength had improved. Her sports FAAM had improved to 32/32, indicating no disability. She completed a functional test that included hopping, acceleration, deceleration, cutting and twisting; she completed each of these tasks without pain or instability.

SHE PRESENTED TO OUR FACILITY REPORTING WEAKNESS AND INSTABILITY IN BOTH ANKLES WHILE PARTICIPATING IN LACROSSE, TENNIS AND RUNNING.

at the shoulders, torso or hips while she remained in an athletic ready position (center of gravity forward; hip and knee flexed) in single limb support. She faced away from the therapist so that she could not anticipate the perturbation. Following the perturbation, she was instructed to react and reassume the starting position. The next perturbation was not applied until she was in the athletic-ready position. This training was performed on various surfaces (bare floor, foam, rolls, trampoline, etc.) and at various times in her program (beginning, middle, end). Feedback was provided intermittently to allow her to process what was asked of

She was discharged and cleared to return to sports activities. She had been playing without her brace for approximately one week prior to discharge without difficulty. She continued with this practice upon her discharge. She was encouraged to continue with her home exercises and perturbation training with a teammate during the year. A follow-up phone call a few weeks later revealed that she continued to do well with all of her activities – without any episodes of instability. ■

Q&A

LATERAL ANKLE SPRAINS

WHAT MAY PRE-DISPOSE ME TO HAVING A LATERAL ANKLE SPRAIN?

Lateral ankle sprains are one of the most common injuries that we see in sports medicine. It is still unclear why some people sprain their ankles and others do not. Ankle weakness does not appear to be a predisposing risk factor. Established factors, noted in the medical literature, include an individual's height, weight, limb dominance, anatomical alignment, gender, reaction time, postural sway, shoe wear, playing surface, environmental conditions and history of ankle sprains.

IF I'VE SPRAINED MY ANKLE, AM I SUSCEPTIBLE TO DEVELOPING CHRONIC (LONG-TERM) LATERAL ANKLE INSTABILITY?

If an acute ankle sprain is not managed effectively, it is very likely – as high as 80 percent in the active population – that another ankle sprain will occur. Multiple ankle sprains can result in mechanical and/or functional instability in the ankle complex.

ARE THERE DIFFERENT TYPES OF INSTABILITY?

Mechanical and functional instability have been described in the literature. Mechanical instability can develop as a result of pathologic joint laxity, joint restrictions, synovial irritation and/or degenerative changes within the joint. Functional instability is characterized by a lack of proprioception, neuromuscular control, postural control and strength. It is possible to

have a functional instability in the absence of a mechanical instability. However, in most cases, both are present to some degree. When developing a treatment regimen specific to each ankle sprain, it is critical to identify the type of instability present.

CAN CHRONIC LATERAL ANKLE INSTABILITY BE PREVENTED?

Rehabilitating chronic ankle instability presents challenges. Therefore, the best treatment is prevention. The initial acute ankle sprain must be managed effectively. This involves protecting the healing tissues (ligamentous and capsular) from improper stress, which allows the tissues to heal and avoid any long-term altered joint mechanics. Improper healing could create altered afferent feedback to the neuromuscular control system, resulting in possible instability. Appropriate post-injury care and rehabilitation of initial ankle sprains should result in successful long-term outcomes.

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