

PREVENTION OF SPORTS INJURIES

Michael J. Pagnani, MD

I'm not often asked to discuss injury prevention and I appreciate the opportunity to help the athlete before an injury occurs. There are few good studies regarding injury prevention in the Sports Medicine literature. Several reasons exist for this lack of information: (1) It is difficult to assess the effect of preventive measures on small numbers of athletes. (2) It requires a lot of leg work to follow these athletes over time to determine injury rates. (3) As Sports Medicine specialists, we have a tendency to emphasize treatment after injury.

GENERAL:

There are several general, common-sense guidelines that we should all be familiar with: **Pre-Activity Conditioning:** No one should just jump into a sport after a long period of inactivity. Some type of aerobic conditioning is generally felt to reduce injury. The activity may be as straight-forward as walking.

Sport Specific Training: In addition to aerobic conditioning, the large muscle group involved in a particular sport should be activated before participating in that sport. For instance, a tennis athlete should focus on the shoulder musculature during the preparticipation phase of conditioning.

Gradual Increase in Activity: The athlete should slowly increase the amount and intensity of exercise. With jogging for example, I generally recommend starting with a 5 minute run, assessing soreness the next morning, and running 6 minutes when soreness is tolerable. Running time is then increased in one-minute additions.

Periods of Rest-these are needed to counter normal tissue injury which occurs with exercise.

Proper Mechanics-By this, I mean specialized coaching or instruction to ensure proper mechanics in specialized activities like throwing and overhead racquet sports.

IMPACT LOADING: EFFECT ON JOINTS

There is no real evidence to support the contention that distance running or other impact exercise damages normal joints. With this in mind, it is probably best to avoid impact exercises in joints with known arthritis or a history of knee cartilage injury. There are alternatives to impact loading aerobic exercises which should be encouraged in patients with known arthropathy and these include cycling, stationary skiing, swimming, and newer "reciprocal devices.

STRETCHING AND "WARM UP"

Most trainers, coaches, and athletes recommend a pre-activity period of stretching and warm-up before maximal effort. While there is some evidence that stretching may increase the size and strength of the muscle-tendon junction where most muscle strains

occur, there has never been a conclusive study proving that stretching or warming up results in a reduction in injury. Despite this lack of clear scientific evidence, most of us involved in the care of elite athletes have seen abundant support for these activities. Many “tightly muscled” athletes seem to have a predisposition to muscle pulls. Stretching and warming up may also optimize performance. Finally, these activities are part of the ritual of sport. There is little downside to them and they may have significant benefit.

ICE/HEAT

Warming and cooling devices have been shown to penetrate only a few millimeters into the body when applied to the skin. Ice causes blood vessels below the skin’s surface to shrink in size. This shrinkage may reduce pain. Neither heat nor cold is likely to penetrate deeply enough to affect a deep injury to a muscle or tendon. Ice is probably better than heat in the first few days after a specific traumatic injury. There is a trend away from the use of ice and heat in the training of elite athletes.

KNEE BRACING

There is little evidence to support the use of knee bracing to prevent knee ligament injuries in athletes with normal knees. In this case, there are several well-controlled studies on this subject: Some show a slight increase in injury with braces, others reveal a slight decrease in injury rates. The consensus is that they cannot prevent abnormal knee motion at the forces which cause knee ligament injury.

There may be some role for knee brace in selected patients although this too is controversial. Potential indications would include kneecap problems, known ligament deficiency, and patient preference. Even with a known ligament deficiency, however, these braces are able to decrease abnormal motions only at the loads associated with slow walking.

KNEE LIGAMENT INJURIES

There is an epidemic of ACL injuries in adolescent female athletes. With the increased participation of female athletes in sports requiring quick starting and stopping and rapid lateral movement, we should all encourage early participation of girls in preschool musculoskeletal training. As of yet, there is no method of predicting the specific “at risk” athlete for a knee ligament injury. My best advice to actively prevent injury is to encourage quadriceps and hamstring strengthening. These exercises increase the stability of the knee joint and should increase resistance to the abnormal forces which can tear a ligament. Again, exercise should be encouraged in girls at an early age.

KNEECAP PAIN

Kneecap irritation is generally a pain syndrome rather than a specific anatomic abnormality. Kneecap pain can generally be improved with a number of measures: (1) strengthening of the muscle on the inner thigh, (2) avoidance of high load activities such as stairclimbing, squatting, and knee extension exercise against resistance. (3) bracing, (4) oral anti-inflammatory medications such as Alleve and Ibuprofen. The results of surgery for this problem are unpredictable and surgery should be considered only as a last resort when all other treatment methods have failed.

ANKLE SPRAINS

Finally, we come to an area where studies have shown a positive effect of preventive measures. Ankle sprains can be prevented by several measures including: (1) strengthening of the foot and ankle musculature, (2) appropriate footwear to complement the athlete's anatomy, (3) taping (which is superior to bracing until perspiration causes it to loosen after 10 minutes or so.) and (4) braces (which are often better than tape in the long run).

SHOULDER INSTABILITY (Dislocation, Subluxation)

Preventive measures may prevent injury in healthy individuals and restore function in those with known instability (particularly in overhead and throwing sports). A preventive exercise program can be used to strengthen the large muscle groups about the shoulder:

- Rotator Cuff
- Scapular muscles

If the patient has known shoulder instability, a harness can be prescribed which limits shoulder motion and prevents it from being placed in a position of danger.

ROTATOR CUFF DISEASE/"BURSITIS"

The symptoms of rotator cuff disease can often be prevented with strengthening of the internal and external rotators of the shoulder. In theory, strengthening of the cuff can compress the humeral head into the socket. Most patients with cuff disease have a bone spur that irritates the rotator cuff. Strengthening can help prevent the ball of the shoulder from rising up when the arm is elevated. Keeping the rotator cuff from "impinging" on the bone spur.

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