

SAVE YOUR KNEES: The ABCs of ACLs

Sports Illustrated FOR WOMEN

Fire & Ice!

Michelle Kwan on school and skating: "I like the pressure"

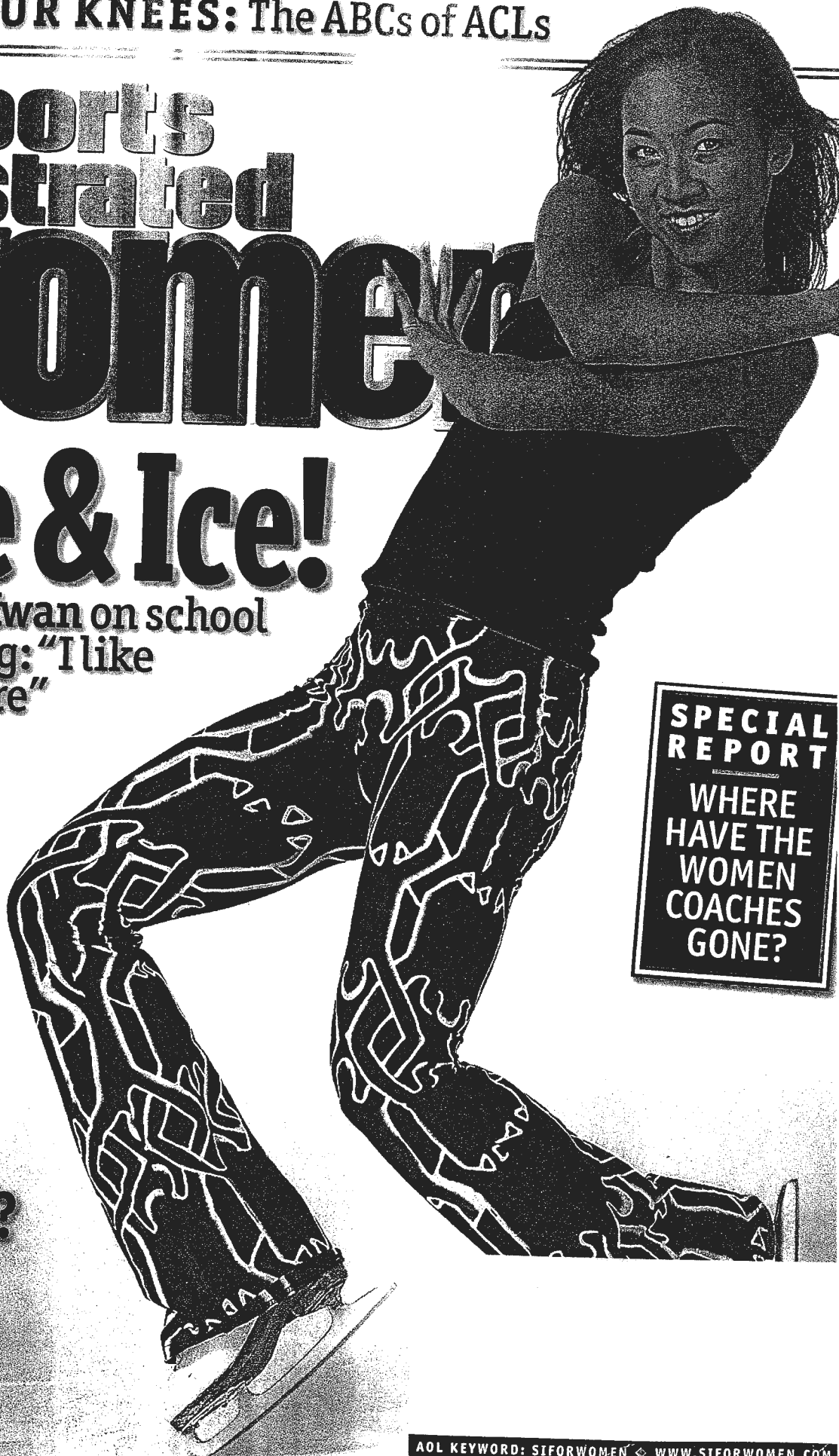
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JANUARY/FEBRUARY 2003

Don't mend knee

In the past decade 1.4 million female athletes have suffered ACL injuries—twice as many as in the previous 10 years. Are you next? Not if we can help it.

WHEN REBECCA LOBO blew out her left knee during the first minute of the first game of the 1999 WNBA season, the star forward for the New York Liberty thought that she'd been hit. Hard. "I came down off a rebound, just like I've done thousands of times before, but when I landed my leg buckled," she recalls. "It was like I'd sat on a collapsing chair." Lobo wasn't involved in a collision; she had just made an awkward landing. The result: She severed her anterior cruciate ligament, one of the ligaments in the knee joint that attaches the thigh (femur) and shin (tibia) bones.

Lobo sat out the rest of the '99 season. Following surgery to repair the damage and a grueling rehabilitation program, she

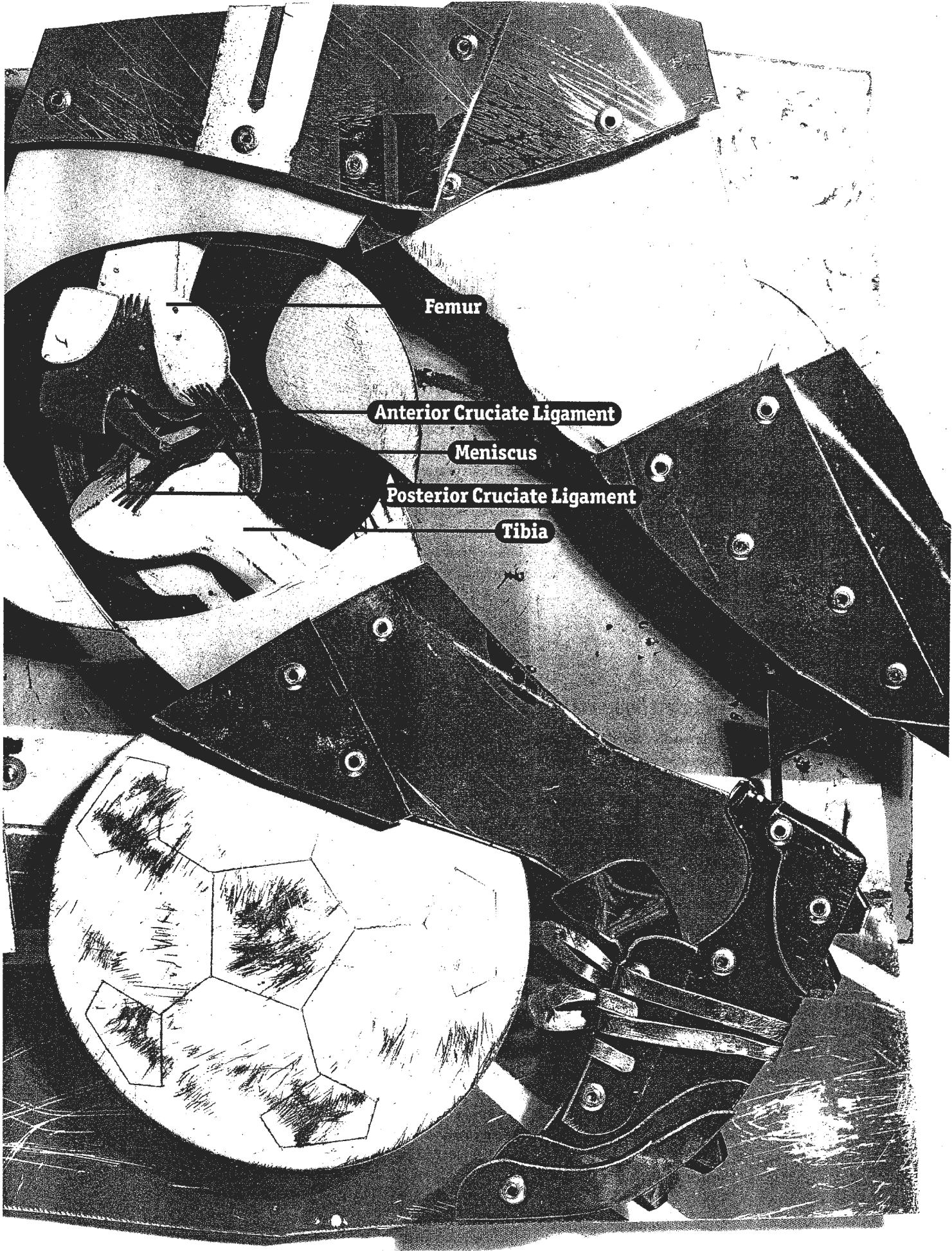
reinjured the same knee in practice less than six months later, forcing her to miss the 2000 WNBA season.

Injuries such as Lobo's are on the rise, affecting thousands of female athletes every year, from junior high school age and up. According to the NCAA, female athletes are six times more likely to suffer an ACL injury than their male peers, with almost 2,200 female collegiate athletes sidelined with the injury each year. In the past decade nearly 1.4 million women have suffered ACL injuries—twice as many as in the previous 10 years.

Basketball, volleyball, tennis and soccer players, as well as skiers and snowboarders—athletes whose sports require lateral movements, sudden starts and stops or quick di-

By Dana Sullivan ♦ Illustrations by Andrew Kingham





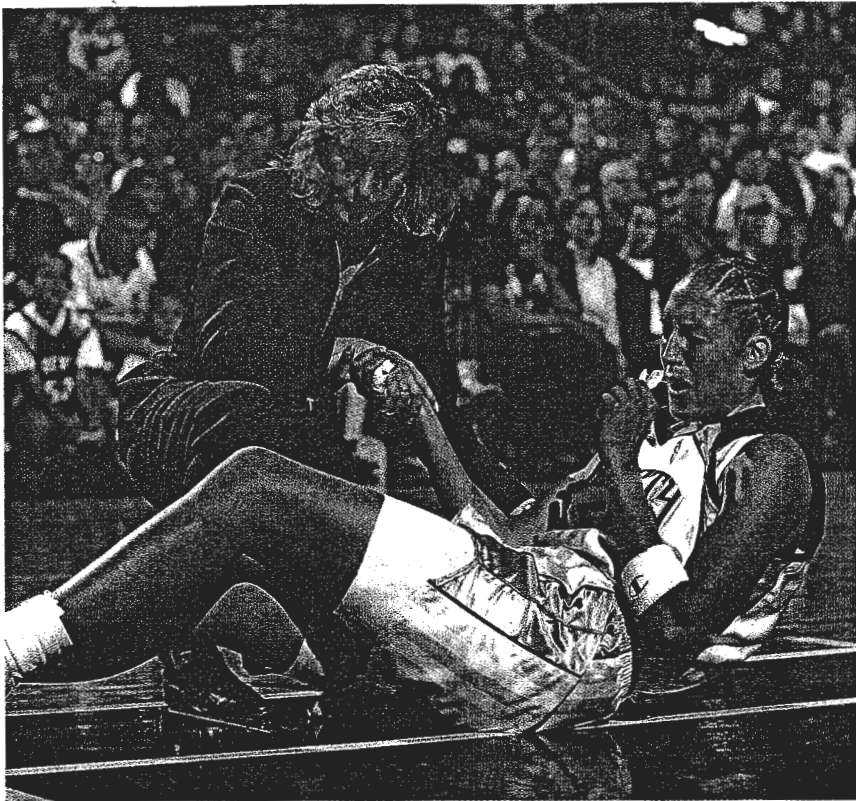
Femur

Anterior Cruciate Ligament

Meniscus

Posterior Cruciate Ligament

Tibia



knee needs

Certain activities or exercises can cause pain if you've previously injured a knee. Here are some dos and don'ts to avoid discomfort:

■ **Don't** do walking lunges. If your forward momentum carries you farther than a quarter of the way to the ground, it can strain the knee. **Do** standing lunges instead.

■ **Don't** do leg extensions with heavy weights on a quad-strengthening machine, which has a padded bar that rests just above the ankles. It puts too great a load on the knees as you lift. **Do** use the machine with lighter weights. After raising the bar, only lower your legs about halfway to the starting position; repeat the exercise from this point. This will help strengthen the inner thigh without endangering the knee.

■ **Don't** run downhill. Your center of gravity falls forward, forcing your knees to act like brakes. **Do** find a flat, even surface to run on, such as a bike trail or track.

■ **Don't** ride with your bicycle seat too low—it puts an added force on the front of the joint. **Do** adjust your seat: It should be high enough so that your knee is slightly bent when the pedal reaches its lowest point.

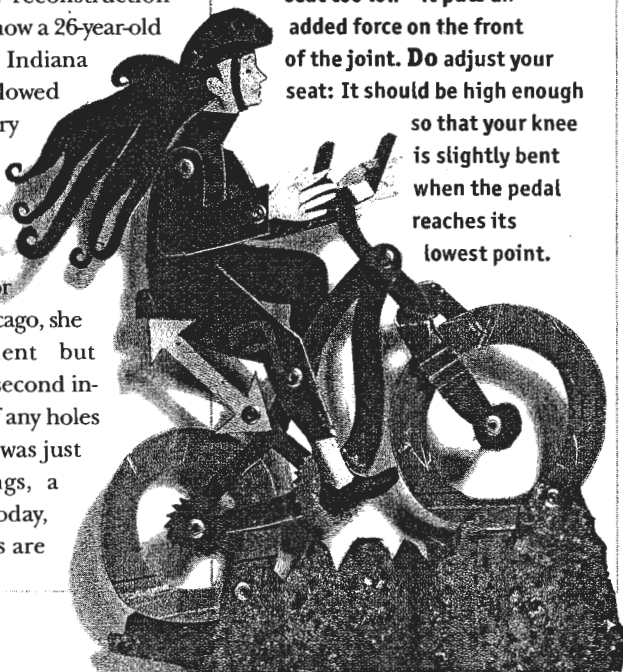
These ligaments cross one another in the center of the knee, forming the hinge of the joint. "Women tend to have stronger quadriceps than hamstring muscles, and they also rely on their quads more," says Hewett. "That disparity means that during abrupt movements, the stronger quads pull at the ACL and the weaker hamstrings can't keep the joint stabilized." The result: The ligament gives way and can be sprained, partially torn (called an avulsion) or fully severed (also known as a rupture).

Build a strong base

The first step to take in shoring up shaky knees is to strengthen the muscles surrounding the joint. Then you need to learn how to use these muscles to control the movement of your knees during play, says Mary Lloyd Ireland, an orthopaedic surgeon in Lexington, Ky., and a former physician for the U.S. women's Olympic basketball team. Exercises that require you to work one leg at a time—such as one-legged squats and presses, lunges, and hopping on alternate feet—build strength and improve balance, both of which are essential in injury prevention. (For

more strengthening, balancing and other joint-protecting exercises, see *Prevention Starts Here*, page 66.)

Lisa Vojta is one athlete who wishes she had paid more attention to weight-training exercises when she was younger. Growing up in Naperville, Ill., Vojta played soccer every day, practicing her ball handling skills and running speed drills for hours on end. But she never gave strength training a thought until she tore her ACL during a summer club team tournament at age 16. "I never lifted weights until after my first ACL reconstruction surgery," says Vojta, now a 26-year-old graduate student at Indiana University. Vojta followed an intensive recovery regimen and was back on the playing field within nine months. Four years later, while playing for the University of Chicago, she retore the ligament but doesn't believe the second injury was the result of any holes in her training. "It was just one of those things, a fluke," says Vojta. Today, Vojta insists her legs are



stronger than ever, thanks to a continued program of weight training. And if she had to do it over again, she says, she would have trained differently from the beginning. "Maybe I could have avoided the whole ordeal."

Land safely

Strong knees can help stave off ACL injuries, but learning how to land properly is just as important. "The vast majority of ACL injuries occur on landing or when an athlete decelerates on the planted leg just before a direction change," says Ireland.

A recent study presented to the American Orthopaedic Society for Sports Medicine noted that women tend to jump and land with their knees somewhat straight, which exposes the joint to forces as much as two to four times their body weight. "Women consistently jump and land in a more hazardous position than men do," says Edward M. Wojtys, M.D., a professor of orthopaedic surgery at the University of Michigan and lead author of the research. "The closer you come to landing with your knees in full extension, the more likely you are to injure an ACL because you're not using your muscles to absorb the shock."

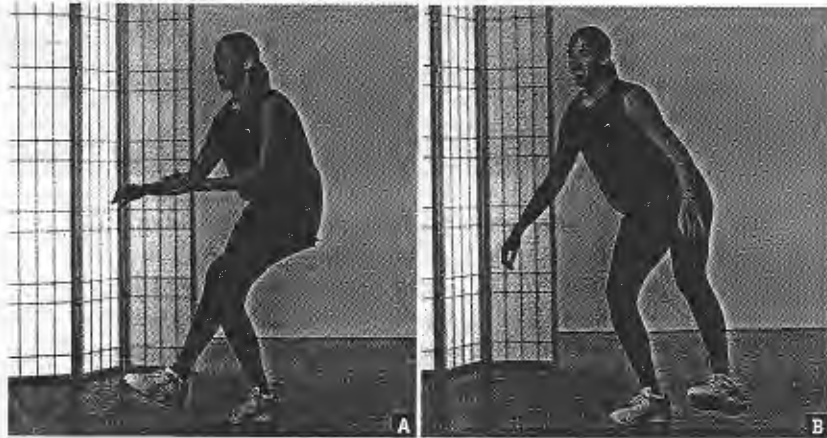
Ireland agrees. "Women need to be taught to land with their hips over their knees and to land on both feet in a coordinated fashion," she says.

Of course even the most comprehensive ACL-protection program is no guarantee that your knees will be safe. But it will reduce your overall risks. Lobo, for one, wishes she had done more early on to prevent her knee troubles. "When you're forced to be away from your sport, it's all you can think about," says Lobo, who intends to be back on the court with the Liberty for the 2001 season.

"My goals have gone from being an all-star to just being able to play basketball," she says. "I always took for granted that I could play. Now I know what a gift it is." ♦

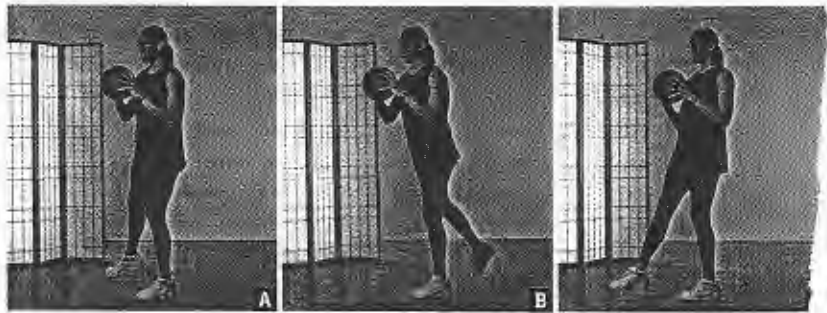
prevention

The key to a stable knee is strengthening the surrounding muscles. "The knee is just a link in a chain, you need to focus on the rest of the leg," says Vern Gambetta, president of Gambetta Sports Training Systems in Sarasota, Fla., and conditioning consultant to the University of North Carolina and University of Virginia women's soccer teams. "If everything else works, and the muscles around the knees are strong, then there's not as much force on the joint." He suggests doing at least two of the moves every day, with the aim of doing each exercise twice a week. "Ten or 15 minutes a day is all it takes, and your knees will thank you," he says. Here, Rebecca Lobo demonstrates some of Gambetta's favorite exercises.



1 Single leg squat (strengthens legs, improves balance)

(A) Standing on right foot, bend left leg slightly and lift it forward about six inches off the ground, holding both hands in front of you. Squat until right knee is just over toes. Hold about 10 seconds; repeat on opposite side. (B) From starting position, raise left foot out to side; squat and hold. Repeat on opposite side. Lift left foot and rotate leg out (as if getting onto a horse); squat again and hold (not pictured). Complete entire sequence two times.



2 Balance shift (improves balance skills)

(A) Stand with feet slightly wider than shoulder-width apart, knees slightly bent. Shift weight onto left leg and lift right foot off floor; hold five to 10 seconds. Focus on keeping upper body perfectly still; repeat on opposite leg. (B) Step forward onto left foot and hold as before; repeat on opposite leg. (C) Step backward onto left foot and hold as before; repeat on opposite leg. For an added challenge, have a partner toss you a ball while you're balancing in each position (pictured).

starts here



3 Multidirectional jump (improves jumping and landing skills)
 (A) Stand with feet together, hands at sides. (B) Jump forward about two feet and simultaneously turn 180 degrees. Upon landing, jump left and turn 180 degrees. Upon landing, jump right and turn 180 degrees. Upon landing, jump backward and turn 180 degrees. Repeat cycle two times. As you become more advanced, try jumping farther in each direction.



4 Lunge (strengthens legs, hips and buttocks)
 Stand with feet about hip-width apart, weight on heels and hands at sides. Contract abs and step forward with left foot, leading with heel. As foot touches floor, bend both knees until left thigh is parallel with floor. Press off ball of left foot and push back to starting position. Repeat eight to 10 times on each leg, two sets on each side; work your way up to five sets total. Return to starting position and repeat the exercise, this time stepping backward with left foot. Repeat the same number of reps and sets. To make the exercise more challenging, try doing it barefoot.



5 Miniband series (strengthens buttocks and hips to help absorb impact from landing)
 Tie an elastic resistance band or rubber tubing and place it just above the ankles. Stand with your legs far enough apart to maintain some tension on the band. (A) Sidesteps: Step out three feet to the left; repeat 20 times. Switch sides and repeat. Big steps (not pictured): Take 20 strides forward, then 20 strides backward. (B) Cariocas: Cross your right leg in front of your left and step to the left; repeat 20 times. Repeat cross-steps, leading with left leg and stepping to the right. (C) Monster walks: Bend at both knees and waist and step three feet to the left, repeat 20 times; step 20 times to the right. Instep-sidesteps (not pictured): Adjust the band so it's down over the insteps (around the ball of the foot). Step three feet to the left, repeat 20 times; step to the right 20 times.