

The benefits of balance training

Though not included in official exercise guidelines, balance training can do a lot to help keep us on our feet and active.

Last month, in our article on ankle sprains (*HWHW*, February 2007), we highlighted the importance of restoring ankle function as soon as possible after an injury. One important goal is to prevent the ankle from giving way recurrently during weight-bearing activity, such as running, walking, or even standing. This chronic ankle instability, often caused by inadequate healing or rehabilitation after a sprain, can result in increasingly injurious sprains, arthritis, or tendon problems.

Experts in sports medicine and physical therapy say that in addition to the usual range of motion, flexibility, and strengthening exercises, rehabilitation should include exercises aimed at training (or retraining) the body's sense of its position in space—in particular, its sensation of limb and joint movement. This largely unconscious capacity—the medical term for it is “proprioception”—is what allows us, for example, to walk in the dark without losing our balance or to distinguish the brake from the accelerator without looking at our feet. Aging and injury to muscles and ligaments can take a toll on proprioception.

One form of proprioceptive exercise—balance training—has been shown to prevent ankle re-injury and reduce the risk of ligament problems in athletes. It's also under study for wider use to improve mobility and prevent falls and injury.

Not just for athletes

Balance training helps reduce the risk of falls in older adults with balance problems and women with low bone mass. It also improves postural stability after a stroke. More re-

search is needed to identify which components of balance training do the most good and to test them for preventing falls and injuries in healthy adults. So far, the evidence hasn't been sufficient for an official recommendation, such as the one for physical activity that most of us know (by heart!): To reduce your risk for chronic disease and preserve function, get at least 30 minutes of moderate-intensity activity (such as brisk walking) on all or most days of the week, plus resistance and flexibility exercise a couple of times a week.

Many organizations, including the National Institute on Aging, recognize the importance of balance for preventing falls—especially among older people—and recommend certain techniques for improving it, often as part of strength training (see “Selected resources”). Besides being one of the normal challenges of aging, balance problems are also a concern for people with such conditions as Parkinson's disease, arthritis, multiple sclerosis, and osteoporosis.

Staying on our feet

Balance relies on input from several of the body's systems, including the following:

Visual system. To get an idea of how important vision can be for balance, see if you can stand on one leg with your eyes closed for 30 seconds. (If your performance is wobbly, don't worry; balance training can help stabilize it.) Our eyes also help us adjust our body's position, so we can steer around obstacles in our path.

Vestibular system. If you've ever suffered from vertigo, you know about balance problems caused by inner ear trou-

Selected resources

Exercise: A program you can live with (Harvard Health Publications, 2007)
www.health.harvard.edu/E

Exercise: A Guide from the National Institute on Aging (National Institute on Aging, 2006)
www.nia.nih.gov/HealthInformation/Publications

Ways to work balance exercise into everyday life

It may be easier than you think to fit balance training into your daily routine. Try some of the following activities:

- Stand on one leg whenever you're waiting in line at the theater, bank, or grocery store.
- Stand on one leg while brushing your teeth: one minute on one leg while brushing the upper teeth, and another minute on the other leg while brushing the lower teeth.
- Keep a wobble board (see example, page 7) in your office; stand on it during a break or whenever you're on the phone.
- Ask someone to toss you a Frisbee or beach ball while you balance on one leg and then on the other.
- Practice sitting down and getting up from a chair without using your hands.
- Practice walking heel to toe—that is, like a tightrope walker, placing the heel of one foot just in front of the toes of the opposite foot each time you take a step.
- Take a tai chi or dance class (or use DVDs at home), or take up social dancing. Although more research is needed, there's evidence that dance can improve balance and stability. Studies comparing dancers to nondancers suggest that dancers rely more on proprioception than on visual cues.
- Visit a fitness center and find out if it offers balance classes or the use of (and training on) balance or wobble boards.

ble. Nerve receptors in the semicircular canals, the utricle, and the saccule—parts of the inner ear—are sensitive to movements of the head and relay its position to the brain.

Proprioception. Receptors called proprioceptors in the skin, joints, ligaments, tendons, and muscles receive stimuli (for example, pressure on the bottoms of the feet) indicating the position, orientation, and movement of the body, and convey information to the brain, which uses it to create a constantly changing map of your position. When you lift your right leg, for example, the map is revised, and you maintain your balance by unconsciously shifting your weight to your left leg.

You need sensory input, central processing (motor control), and muscle power to maintain stability during both purposeful movements, such as lifting the foot off the ground during an exercise routine, and reflexive ones, such as recovery from a sudden stumble. Injury, illness, neurological disorders, medications, and advancing age can affect all the systems involved in balance.

Better balance

Balance tends to erode with time, especially if you're not active—neural connections, for example, may be lost if they're not used. So whether you want to recover from an ankle sprain or maintain your long-term health, balance exercise should probably be on your “to do” list.

Fortunately, you don't need a lot of equipment and training to perform the basics. In fact, good balance starts with good posture—something you can practice almost anytime, anywhere (for more on posture, see *HWHW*, August 2005). Some strength is also important for balance. Strong hip, knee, and ankle muscles will give you a solid foundation and help you stay upright (for more on strength and other types of exercise, see “Selected resources”).

Much of what we know about balance and proprioception comes from research on ankle sprain and instability in athletes. For example, athletic trainers and rehabilitation experts at the University of Kentucky recommend exercises



Photo provided by Carl G. Mattacola, Ph.D., University of Kentucky

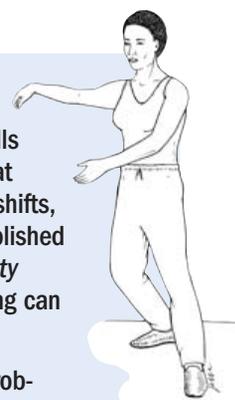
to improve proprioception at the intermediate stage of rehabilitation following injury—that is, once the ankle is able to bear full weight without pain (*Journal of Athletic Training*, December 2002). This training also helps cut down on ankle injuries, says Timothy L. Uhl, Ph.D., a faculty member in the university's athletic training program in the Department of Rehabilitation Sciences.

Balance training and tai chi

Healthy older people can reduce the risk of falls with tai chi, an ancient Chinese martial art that incorporates slow turning movements, weight shifts, and deep breathing. But research recently published in the *Journal of the American Geriatric Society* (December 2006) showed that balance training can outperform tai chi.

The study involved older adults with balance problems. The researchers found that participants who practiced combined balance and step training (CBST)—exercises designed to improve balance and speed while stepping in different directions—made greater gains in balance and mobility than participants who practiced tai chi. The CBST routine included walking backward and sideways, walking on a plank, stepping on and off curbs, practicing heel and toe rises, and catching a ball while standing on an unstable surface.

This study shouldn't be taken as an unequivocal endorsement of balance training over tai chi. The advantage of CBST was modest, and variants of both methods have been shown to reduce falls when tested individually. In other studies, tai chi has also been shown to improve cardiovascular fitness, strength, and flexibility.



The basic idea is to stabilize the body under increasingly difficult circumstances—for example, balancing on one leg first on a flat surface, then on a wobble board (see photograph), and eventually on a wobble board while catching a ball or receiving a push to the shoulder.

Athletic training and ankle rehabilitation programs often involve various pieces of equipment, but you can start your own training much more simply with a routine that Dr. Uhl recommends to people with some ankle or hip weakness:

1. Stand on one leg on a wood floor or other hard surface for 30 seconds. (You may want to stand in a doorway or near a table, in case you need to stabilize yourself at any point.) Repeat using the other leg. When you can do this without touching the door frame or table, go to step 2.
2. Stand on one leg for 30 seconds, then on the other, with your eyes closed—again, don't hold onto anything. After you've accomplished that, go to step 3.
3. Place an old foam pillow on the floor. (Foam is better than feathers because feathers pack down. Foam has some spring to it.) Stand on the pillow on one leg for 30 seconds; switch legs and repeat. Then do the same exercises with your eyes closed.
4. Do the above pillow exercise on tiptoe. Stand on one leg, then on the other, for 30 seconds—first with your eyes open, then with them closed.

According to Uhl, standing on one leg not only helps rehabilitate the ankle, it also appears to reduce knee and hip pain. ♥

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