HARVARD MEDICAL SCHOOL

Harvard Health Letter

VOLUME 37 • NUMBER 1 | NOVEMBER 2011

Feet and falling

Taking care of your feet could improve your chances of staying on them.

For most of our adult lives, we can take it pretty much for granted that once we're upright and on our feet, we'll stay that way. But starting in about our mid-60s, remaining perpendicular is not such a sure thing. Each year, about one in every three older Americans takes a tumble, and the chances of falling increase in our 80s and 90s.

Fortunately, most of these falls result in only minor scrapes and bruises, if that. But they can be frightening, and even if there's little physical harm, people sometimes develop a strong fear of falling. Besides, a significant minority (between 5% and 10%) of falls among older people do result in a major physical injury—broken bones, serious cuts, bad bangs to the head. Some of those injuries (hip fractures especially) lead to disability—or worse. Roughly 18,000 older Americans die each year from injuries sustained during a fall.

Everything from slippery throw rugs to poor lighting to side effects from multiple medications has been implicated as a risk factor for falling. Foot problems and pain get mentioned in the roll call of risk factors, but usually near the end and frequently as an afterthought.

Making the connection

That may be changing. Over the past several years, there's been a surge of research connecting falls to foot pain and perhaps also to common foot problems like bunions and clawed toes.

Investigators at the Institute for Aging Research, a research group based at Harvard-affiliated Hebrew SeniorLife, a long-term care facility in Boston, have found that foot pain seems to be a bigger factor in indoor falls than in outdoor falls. Other researchers have linked foot pain to a slow gait and poor balance, which is perhaps just what you'd expect.

But until recently only a handful of studies have investigated a more direct connection between foot pain and falls, according to Karen Mickle, one of a group of Australian researchers who have conducted many of the more important studies in this area. The studies that have been done have focused on high-risk groups, not the general "community-dwelling" population of older people.

Last year, Mickle and her colleagues started to fill that gap with a study published in the *Journal of the American Geriatrics Society*. They recruited about 300 adults, ages 60 and over, from Sydney and a region south of the city, identified those with foot pain and those without, and followed them for a year. By a sizable margin, the people who fell were more likely to have been bothered by foot pain than the people who didn't fall.

This year, another Australian group reported findings in the medical journal *BMJ* from the first-ever randomized clinical trial testing whether foot care would prevent falls. The study included several hundred older people (average age, 74) with foot pain. The foot-care program consisted of exercises (see page 3), inexpensive orthotics, and footwear advice. The results showed that over a year's time, the program reduced the number of falls by 36%.

Wary about what works

But there's reason to be a little cautious these days about making pronouncements about what actually works to prevent falls.

Last year, a major review of the fall prevention research surprised quite a few doctors and researchers by concluding ▸▸

INSIDE

WHAT'S NEW

Food Allergy, Intolerance, and Sensitivity

Better Bladder and Bowel Control

Special Health Reports from Harvard Medical School

To order, call 877-649-9457 (toll-free) or visit us online at www.health.harvard.edu.

The Perfectionist's Handbook: *Take Risks, Invite Criticism, and Make the Most of Your Mistakes,* a new book co-published with Harvard Health Publications. www.health.harvard.edu/PHB

Receive Harvard Health Publications' free e-mail newsletter

Go to **www.health.harvard.edu** to subscribe to *HEALTHbeat*. This free, weekly e-mail newsletter brings you health tips, advice, and information on a wide range of topics.

You can also join in discussion with experts from Harvard Health Publications and folks like you on various health topics, medical news, and views by reading the Harvard Health Blog (www.health.harvard.edu/blog).

CONTACT US

Write to us at health_letter@hms.harvard.edu

For customer service, write us at harvardHL@strategicfulfillment.com

Harvard Health Letter

Published monthly by Harvard Health Publications, a division of Harvard Medical School

Editor in Chief Anthony L. Komaroff, M.D.
Publishing Director Edward Coburn

Harvard Health Publications
10 Shattuck St., 2nd Floor, Boston, MA 02115

PUBLICATIONS MAIL AGREEMENT NO. 40906010
RETURN UNDELIVERABLE CANADIAN ADDRESSES TO:
CIRCULATION DEPT., 1415 JANETTE AVE., WINDSOR, ON N8X 1Z1
E-mail: ddewitt@staywell.com

that it was "unclear" whether the kind of fall risk assessment and management programs favored by groups like the American Geriatrics Society do, in fact, work to prevent falls. The reviewers identified vitamin D pills (another surprise) and exercise programs as the only interventions supported by results from clinical trials.

These kinds of reviews have their limitations. Some interventions, like vitamin D pills, are much easier to test in a clinical trial than others. And there's certainly enough experience, evidence, and common sense available to offer a few suggestions about feet and fall prevention.

Choose your shoes wisely—and wear them. People assume they know their correct shoe size, but a study published earlier this year by doctors at the New York University Hospital for Joint Diseases

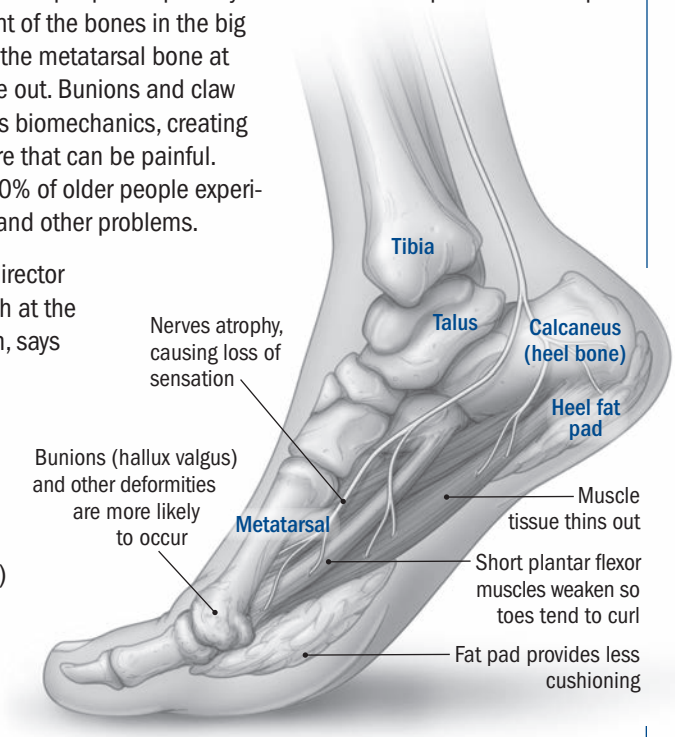
The aging foot

The lowly feet have to be capable of handling high-pressure situations. When you're standing still, the force from your body weight is spread fairly evenly. But when you walk, the force on the heel when it hits the ground is up to about 1½ times your body weight. Walk fast, and the force of that impact is even larger. As the foot rolls forward, the pressure shifts to the outside edge and then, as you start to push off, to the ball of the foot and the toes. Young, spry feet can repeat this thousands of times a day and feel no pain.

Older feet may not be so lucky. The feet, like the rest of the body, feel the effects of age. Muscle tissue thins out. The long nerves that supply them don't send electrical messages as efficiently as they once did, so there may be some loss of sensation. Blood is more likely to pool in veins, which causes feet and ankles to swell. Recent research has undercut the notion that the fat pads under the heel and the ball of the foot get thinner with age, but the tissue may change in other ways so that it provides less cushioning.

Age also tends to bring on structural changes. Arches falter, so there's a tendency for the feet to flatten out. Older toes have a propensity toward curling into "claw toes" because of muscle imbalance. And older people—especially older women—are prone to developing bunions, a misalignment of the bones in the big toe that causes the end of the metatarsal bone at the base of the toe to angle out. Bunions and claw toes can throw off the foot's biomechanics, creating "hot spots" of extra pressure that can be painful. Surveys show that about 30% of older people experience foot pain from these and other problems.

But Marian T. Hannan, co-director of musculoskeletal research at the Institute for Aging Research, says it's a little misleading to blame aging for foot woes. You could be a hundred years old and have nary a problem. Rather, it's the injuries and chronic diseases (diabetes especially) that accumulate in old age that can make it a rough time for feet (and other body parts, too).



showed that 35% of people are off by at least half a size. The percentage was even higher among people with diabetes. More people are buying shoes online, so going to a shoe store and getting your feet measured is becoming a thing of the past. But there are standard conversion charts available on the Web that convert your foot's length and width in inches (or centimeters) into shoe size. Just type "shoe size conversion" into a search engine, and you'll find them.

Older people may want to be especially careful about width. Even if you don't have a full-fledged bunion, the base of the big toe may bulge out somewhat with age, so the front of your foot needs more room than it used to. If you have clawed toes, or the beginning of them, you also need to make sure that the front of the shoe (the toe box) is deep enough; otherwise, you'll run the risk of developing calluses on the knuckles of your toes from friction against your shoes.

But the comfortable shoe is enjoying a heyday. Any number of running and walking shoes are wide, roomy, and stretchy enough to keep older feet comfortable, stable, and supported. Even people with serious foot problems may be able to wear an attractive pair of running or walking shoes instead of bulky orthopedic shoes.

But here's a twist: Harvard researchers conducted a study that showed that choice of footwear really didn't have much of an effect on falls—that is, there was no difference between athletic shoes and other types. They did find, though, that people who wore shoes indoors were less likely to suffer a serious injury from a fall than those who padded around in slippers or socks or went barefoot. So shoes do seem to help with balance and support, and you're more likely to wear them if they're comfortable.

Lose weight. Larger people tend to have larger feet, so the additional force from the extra size is distributed over a larger area. But if weight gain pushes your BMI into the high 20s or 30s, that puts more force on the feet. Studies have linked being overweight or obese to foot pain and other foot problems.

No question, losing weight is difficult, and keeping it off even more so. But if you're heavy, dropping a few pounds could literally take a load off your feet, spare you some pain, and possibly (this hasn't been proven) reduce your chances of falling.

Try prefabricated orthotics first. Hylton Menz, the lead author on many of the Australian foot and fall studies and a podiatrist, says orthotics do seem to prevent some falls by stabilizing the feet, redistributing pressure, and providing additional tactile input "so there is a little bit of extra information about where the feet are."

But there's a lot of debate about which kind of orthotic is best—and not just for fall prevention but for a whole variety of foot and leg problems. Custom-made orthotics, made from an impression of the foot, cost at least several hundred dollars. The prefabricated kind cost about $50.

The orthotics used in the study that showed that a foot-care program could prevent falls were prefabricated, not custom made. And prefabricated and custom-made orthotics have produced similar results when they've been tested in several clinical trials as a treatment for plantar fasciitis and foot pain from rheumatoid arthritis.

So, based on these data and on the cost difference, Menz, a Fulbright Visiting Scholar this fall at the Institute for Aging Research, says it makes sense to try prefabricated orthotics first before investing in the expensive custom-made ones unless you have a major foot deformity that clearly needs custom treatment.

Give your feet a little bit of a workout. Exercises for the feet and ankles can help offset the muscle loss and stiffness that naturally set in with age. Menz and his colleagues say the home exercises were probably the main reason the multifaceted foot-care program they tested was successful in preventing falls. Three of the exercises used in the study are illustrated above.

Some of the exercises may seem a little goofy, but they serve a purpose. For example, picking up marbles or small stones with your toes helps strengthen muscles that may counteract the tendency of toes to curl. But foot exercises aren't the only kind of activity that benefits the feet. Menz gave yoga as an example of exercise that may prevent foot problems.

Three exercises to shape up your feet

1 Place a large rubber or elastic band around the end of your big toes and gently rotate your feet away from each other with your heels on the ground. This exercise is for people with mild bunions (hallux valgus). The goal is to increase the range of motion in the metatarsophalangeal joint affected by the bunion rather than actually correcting the bunion.

2 Place a resistance band—a large stretchy band used for exercises—around the leg of a table. Rotate your ankle so you stretch the band out, away from the table leg. This exercise strengthens the ankle muscles, particularly the tibialis posterior muscle.

3 Pick up small stones or marbles with your toes. This exercise strengthens the muscles that contribute to the tendency for toes to curl in old age.