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Help patients prevent repeat ankle injury

Tell patients that a simple home-based exercise regimen can help them avoid recurrent ankle sprains.

PRACTICE CHANGER

Advise patients being treated for ankle sprain that reinjury—which is especially common during the first year—can result in chronic pain or disability, and that a home-based proprioceptive training program has been shown to significantly reduce the risk of recurrent sprain.¹

STRENGTH OF RECOMMENDATION

A: Based on a high-quality randomized controlled trial (RCT).

Hupperets MD, Verhagen EA, van Mechelen W. Effect of unsupervised home based proprioceptive training on recurrences of ankle sprain: randomised controlled trial. *BMJ*. 2009;339:b2684.

ILLUSTRATIVE CASE

A 35-year-old man comes to see you 1 day after injuring his left ankle, which he inverted while playing racquetball in a semicompetitive league. After a clinical exam, you diagnose an ankle sprain. You advise him to wrap the ankle for protection and recommend rest, ice, compression, and elevation. Besides treatment for the current sprain, however, he asks what he can do after recovery to prevent ankle reinjury.

What can you tell him?

An estimated 23,000 ankle sprains occur every day in the United States, which amounts to approximately 1 in every 10,000 people.² In many sports, ankle sprain is the most common injury,³ partly because an athlete who incurs a first ankle sprain is at increased risk of another.⁴⁻⁶ The risk of reinjury is highest in the year immediately following the initial sprain.⁶⁻⁸

Long-term effects of repeat sprains

About half of recurrent ankle sprains result in chronic pain or disability, so preventing repeat sprains is an important patient-oriented treatment goal. Various modalities, including bracing, taping, and warm-up and strengthening exercises, have been used to prevent recurrence of ankle sprain. Proprioceptive training has also been suggested.^{5,9} A Cochrane review in 2001 found limited evidence for reduction of ankle sprain recurrence after proprioceptive exercises.¹⁰ Until the study reviewed in this PURL, its effectiveness remained uncertain.

STUDY SUMMARY

Exercise program reduces risk

Hupperets et al¹ investigated the effectiveness of a home-based proprioceptive training program to prevent ankle sprain recurrence. Enrollees (N=522) in this well-done RCT were active sports participants ranging in age from 12 to 70 years, all of whom had incurred ankle sprains in the preceding 2 months. They were recruited throughout The Netherlands using a variety of medical channels—emergency departments, general practices, and physical therapy offices—and advertisements in newspapers and sports magazines, at sports tournaments, and on the Internet.

The athletes were randomized to the intervention or control group, with stratification for sex, type of enrollment, and type of care they initially received for the ankle sprain—which the participants in both groups received without interference from

the authors. (Among the enrollees were 181 people who did not receive any medical care for their sprains.)

Participants in the intervention group were given an instructional DVD, a balance board, and an exercise sheet, with further instructions available on a Web site. They were told to engage in 3 self-guided treatment sessions per week for 8 weeks, with a maximum duration of 30 minutes per session. The regimen included a series of exercises such as the 1-legged stance, in which the patient slightly flexes the weight-bearing leg at the knee, hip, and ankle while the foot of the other leg is off the floor, then switches legs after a minute. The exercises involved increasing levels of difficulty—performed on an even surface, on an even surface with the eyes closed, or on a balance board.

The primary outcome was a self-reported new sprain of the previously injured ankle during 1000 hours of exposure to sports in a year of follow-up. Severe sprain—defined as a sprain leading to loss of sports time or resulting in health care costs or lost productivity—was a secondary outcome. Cox regression analysis was used to compare risk of a recurrent ankle sprain between the intervention and control groups, using an intention-to-treat analysis.

At the 1-year point, 56 of the 256 participants in the intervention group (22%) and 89 of the 266 participants in the control group (33%) reported recurrent ankle sprains. The risk of recurrence per 1000 hours of exposure for the intervention group was significantly lower (relative risk [RR]=0.63; 95% confidence interval [CI], 0.45–0.88) compared with the control group. Nine people would need to be treated to prevent 1 recurrent ankle sprain.

Similarly, significantly lower risks for severe sprains were found for the intervention group, as indicated by loss of sports time (RR=0.53; 95% CI, 0.32–0.88) and health care costs (RR=0.25; 95% CI, 0.12–0.50).

WHAT'S NEW?

High-quality study supports self-guided training program

This is the first RCT to assess the effect of a nonsupervised home-based proprioceptive

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training program, in addition to usual care, on the recurrence of ankle sprain. Two earlier studies had evaluated balance board exercises to prevent initial ankle injuries in young athletes, and

both found these exercises to be effective.^{8,11} But prior studies evaluating prevention of recurrent ankle sprain have had methodology weaknesses or small sample sizes.^{12–14}

One other RCT had studied the effect of an exercise program that included balance boards on the risk of ankle sprain recurrence and found a significant difference in favor of the intervention group (absolute risk reduction=22%).¹⁵ But the exercise program in that study was supervised by professionals rather than self-guided by patients. The study was also marred by significant loss to follow-up (27%), and the information on reinjury was collected retrospectively a year after the acute ankle sprain.

By comparison, the study done by Hupperets et al had a large sample size, minimal loss to follow-up (14%), and monthly check-in with patients to assess reinjury. The results show an absolute reduction of 11% in the risk of recurrence of ankle sprain. The evidence brought forth by this high-quality RCT supports adding a home-based proprioceptive training program for every patient with an acute ankle sprain to reduce the incidence of sprain recurrence.

CAVEATS

Will patients do their exercises?

One concern highlighted by this study is compliance with the treatment regimen. Only 23% of those in the intervention group fully complied with the 8-week program, 29% were partially compliant, 35% were not compliant, and 13% were of unknown compliance.

We think these findings reflect the compliance seen in the real world, so it is encouraging to know that the intervention was nonetheless effective. Clearly, some proprioceptive training is better than none; the optimal amount is not known.

Generalizability is another concern, since this study focused on athletes. However, the investigators included a wide spectrum of patients (ages 12–70 years, male and female,

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and those engaged in all levels of sports activity). Furthermore, since the mechanism of injury for lateral ankle sprain is generally the same, we think it is reasonable to assume that ankle sprains not related to sports would benefit from a proprioceptive program, as well.

CHALLENGES TO IMPLEMENTATION

No significant barriers exist

The treatment does not have any significant adverse effects and should be easy to recommend. Balance boards can be obtained from a sporting goods supplier or online, at a cost of \$13 to \$35.

Some busy physician practices may not have the time or staff to teach patients how to carry out these exercises. In that case, a 1-time referral to a physical therapist should be sufficient. (Illustrations of proprioceptive exercises are available at www.bmj.com/cgi/data/bmj.b2684/DC1/1 and www.med.umich.edu/1libr/sma/sma_xwobble_art.htm.)

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This activity was submitted by DIME and funded through an independent educational grant from Boehringer Ingelheim Pharmaceuticals, Inc.

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