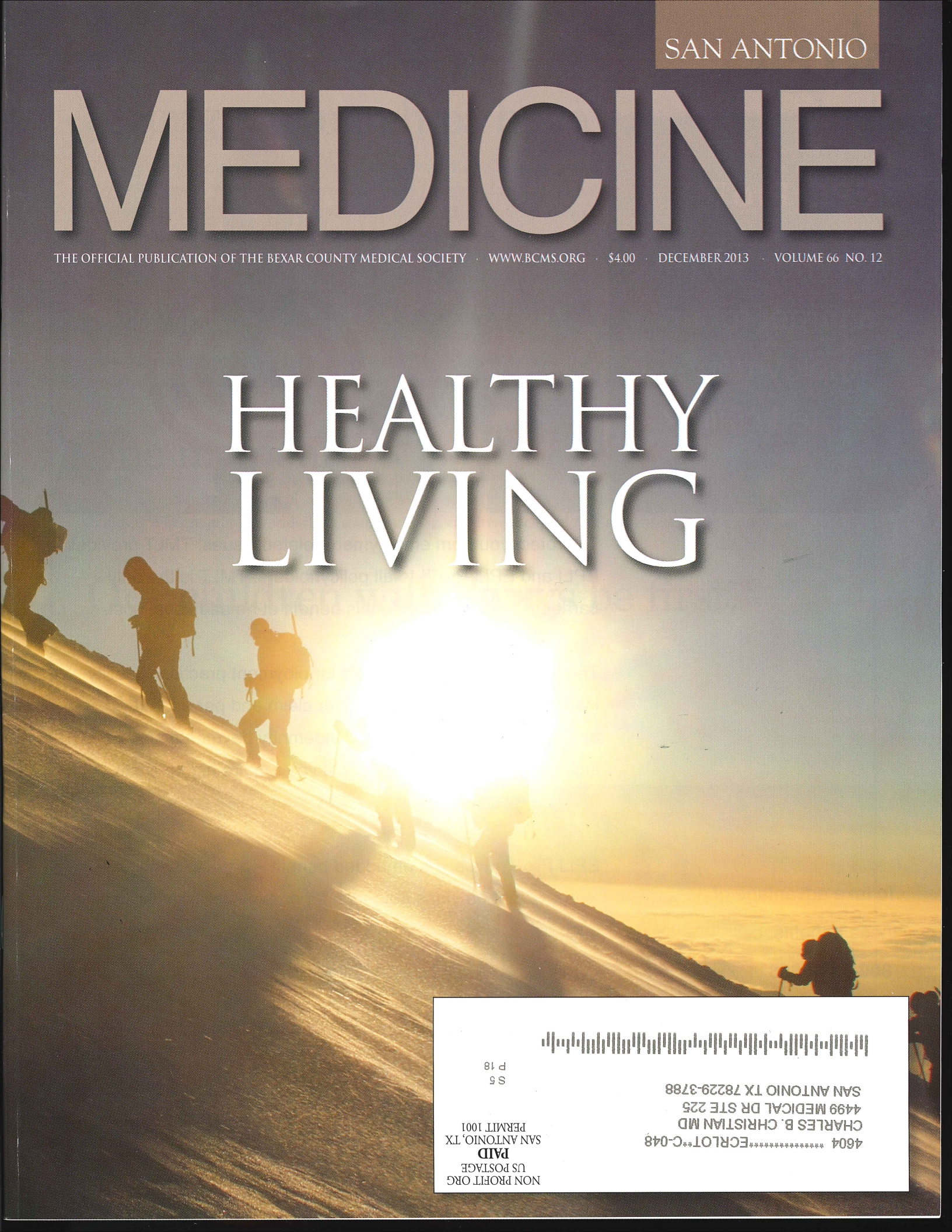
SAN ANTONIO

MEDICINE

THE OFFICIAL PUBLICATION OF THE BEXAR COUNTY MEDICAL SOCIETY · WWW.BCMS.ORG · $4.00 · DECEMBER 2013 · VOLUME 66 NO. 12

HEALTHY LIVING



> "... The sixth age shifts
> into the lean and slipper'd pantaloon,
> With spectacles on nose, and pouch on side;
> His youthful hose, well sav'd, a world too wide,
> For his shrunk shank ..."
>
> Shakespeare W., "The Seven Ages of Man" (Act 2, Scene 7). As You Like It, 1623

STRENGTH TRAINING:

A strategy to combat loss of lean mass and strength associated with the Frailty Syndrome

By Charles B. Christian Jr., MD

This oft-quoted passage of Shakespeare is an early description of what is now known as the Frailty Syndrome, something we all will face. The three main components of the Frailty Syndrome are Sarcopenia (loss of muscle mass), Dynapenia (loss of strength) and Osteoporosis. Added to these are weight loss, a feeling of exhaustion, weight loss, and mental and sensory deficits which affect our enjoyment of life and loved ones.

None are immune to the effects of the aging process or the development of disabling disease as we approach the end of life. As we age, we don't so much fear death as we fear the probability of loss of mental and functional capacity. The bottom line is that you will probably die a variation of a frailty death unless you die from the ravages of cancer, a heart attack, stroke, accident or violence.

My mother died a frailty death. She was a long-term survivor of breast and lung cancer and required stenting for coronary artery disease. At 82, osteoporosis was found and because of lapses of memory, she was admitted to an assisted living facility. At 85, she developed a T-10 vertebral compression fracture which was very painful and required a two-week hospital stay at bed rest. The fracture was stabilized with vertebroplasty and ambulation was started. She was very weak after this period of bed rest and was admitted to a nursing home for physical therapy and rehab which was of little use in restoring strength. She became a permanent resident of the nursing home, lost weight and became weaker and weaker with increased postural instability. One day she slipped and fell and broke two ribs, developed pneumonia and died three days later. She got old, got weak, developed postural instability, fell, broke a bone and then died: a classic case of death from the Frailty Syndrome.

A MESSAGE OF HOPE

Carl Bard once wrote: "Although no one can go back and make a brand-new start, anyone can start now and make a brand-new ending." This, to me, is a message of hope! The medical community and especially our geriatric colleagues and the government are intensely studying the Frailty Syndrome and strategies to combat its main components, loss of muscle mass and, much more importantly, loss of strength, in the hope of providing better endings for each of us. There is a direct relationship with sarcopenia and dynapenia: loss of activities of daily living.

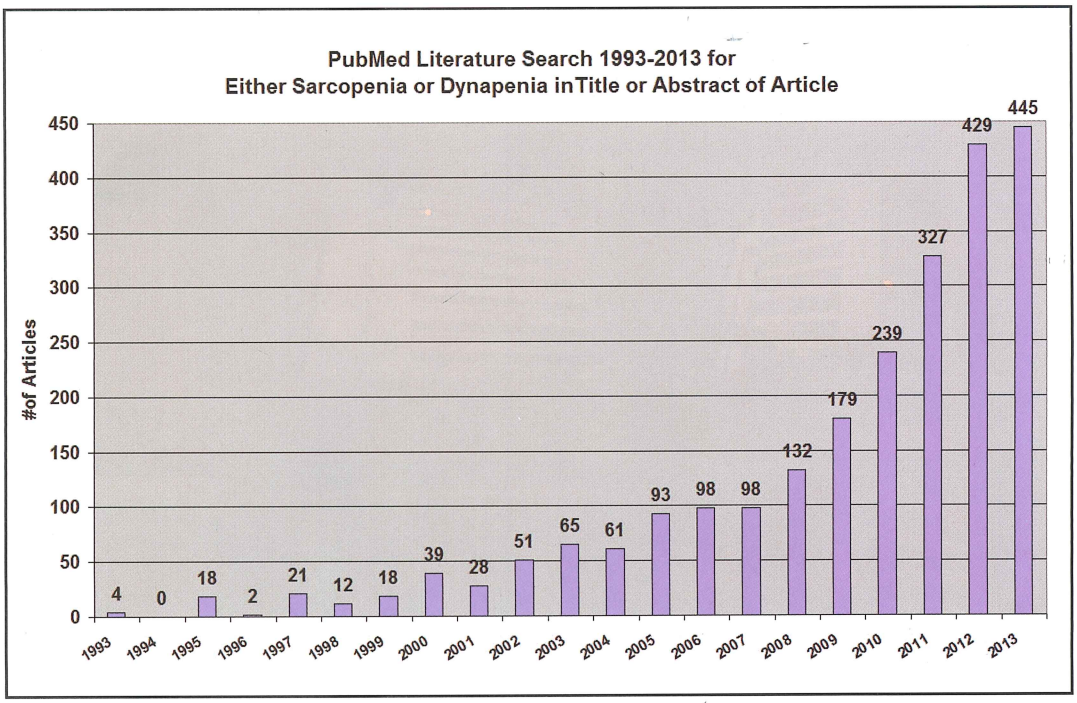
Current strategies which hold the most promise are aimed at improving or maintaining strength. It is recognized that the only strategy shown to avert the loss of strength and muscle mass as we age is strength or resistance training. Several longitudinal studies of master and recreational runners have shown that these activities, and likely other aerobic or steady-state activities, are not sufficiently intense to maintain muscle mass or strength as we age. It is difficult, if not impossible, to make these activities intense without injury because they require speed or acceleration changes which can damage ligaments, tendons or joints and are often performed in uncontrolled environments.

Since we all have limited amounts of time, money and energy to devote to our exercise strategy, we should therefore prioritize and consider strength training as the primary wellness strategy to prevent frailty. Increased strength will make recreational activities (often done for social reasons, competition, stress relief) such as running, cycling, swimming, golf, tennis and skiing much more enjoyable; you will be much more resistant to injury, and performance improves. These activities should be done, however, with caution to avoid injuries which might interfere with your primary strategy to avoid the Frailty Syndrome: strength training.

Fortunately, nature has provided our bodies with several mechanisms by which we can get stronger without actually needing to gain muscle mass. These mechanisms, stimulated by strength training, involve neuromuscular coordination and metabolic adaptations within muscles which produce increased strength and endurance. In addition, it is amazing how little strength training is needed if one trains to muscular failure or near failure (fatigue) on the last repetition of an exercise. Recent studies have focused on the importance of the intensity level of exercise rather than on quantity. One or two whole-body workouts lasting 15 to 20 minutes each week appears all that is necessary to improve strength. To be performed safely, these workouts should be performed using machines rather than free weights. The repetitions require slow, controlled (no jerking or heaving), continuous movements with 8 to 10 seconds for the positive and also 8 to 10 seconds for the negative phase and avoiding breath holding. This produces constant tension on the muscles, and if a challenging weight is used, muscular failure or near failure occurs easily on the seventh or eighth repetition. A small increase in weight is appropriate when one can do eight repetitions easily. One set to failure, lasting 2 to 3 minutes, has been shown to produce results just as good as multiple sets, so don't feel compelled to do more than one set to failure or near failure.

WHOLE-BODY WORKOUT

A good routine would be to pick five machines such as a leg press, chest press, pull-down, rowing and overhead press. These are great compound movements and provide a very safe whole-body workout. If performed with minimal rest between the machines, this becomes what is termed high-intensity, low-velocity circuit strength training. Circuit training creates more metabolic conditioning in the peripheral muscles and improves endurance as well as strength. Add to this a simple walking program of 30 minutes daily and you have a great exercise prescription to avoid the Frailty Syndrome and Shakespeare's "sixth age."



continued on page 22

continued from page 21

The purpose is to treat strength training as though it were a drug — not too much, not too little. Doing more than is necessary wastes time and risks injury. We should strive to maximize the results of our strength training with strategies to remain as anabolic as possible during the recovery period between the workouts. This includes attention to nutrition (adequate high-quality protein and a low glycemic index diet), a reasonable micronutrition (Omega 3 and Vitamin D3, especially) program and adequate sleep. Exercise, nutrition and sleep: the health triad!

Finally, it is recognized that part of our obesity epidemic is related to the gradual lowering of metabolic rate as we age, and this is primarily due to loss of lean mass and its metabolically functioning components. Sarcopenic obesity can be ameliorated to some extent by strength training and with proper nutritional support aid in regaining lost muscle mass, losing fat and increasing metabolic rates. Testosterone replacement in the aging male has been shown to help with retention of muscle mass, but this does not reliably translate into increased strength; only strength training will improve strength.

The most convenient method for measuring sarcopenia is DXA Body Composition Scanning. Serial scanning can demonstrate improvement in lean mass and reduction in fat mass. Dynapenia is usually self-evident or can be measured with gait speed, hand grip or leg extension testing.

Most of us have resources to pursue these principles, which will avoid entrance into the disability zone and the Frailty Syndrome. The challenge is to find ways to help the majority of people less fortunate than us.

REFERENCES

Wolfe RR. The underappreciated role of muscle in health and disease. AmJClinNutr. 2006 Sep;84(3):475-82.

Mitchell WK et al: Sarcopenia, Dynapenia, and the impact of advancing age on human skeletal muscle size and strength; a quantitative review. Front Physiol. 2012;3:260

Charles B. Christian Jr., MD, is medical director of the Inside Outside Wellness Center and Medical Spa in San Antonio. He is a BCMS member.