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## Bone Health and Fracture Prevention for Older Adults

**“A healthy skeletal system with strong bones is essential to overall health and quality of life”**

*Report of the Surgeon General, 2004.*

Bones give support and protection, allow movement, and resist fracture. You can maximize bone health if you maintain a physically active lifestyle, engage in bone building exercise, and eat a calcium-rich diet from an early age. Exercise can make a difference in keeping you fit and active and reduce your chance of a fracture.



### Fight Fracture with Fitness!

**Adults who are physically active and do regular exercise have less likelihood of experiencing a fracture. The right exercises and good habits can maximize peak bone mass achieved in youth, maintain bone in adulthood, and reduce bone loss related to aging.** Both muscle strengthening and weight-bearing exercise can build and maintain a healthy skeleton. Exercise can also preserve strength and stability to reduce falls and spinal stress that result in fractures. Exercise with hand or cuff weights, gym equipment, or elastic tubing stimulates bone and improves muscle strength. The effect on bone is local or specific to the site of the muscles doing the work. Weight bearing exercise is another way to improve bone density and stay fit. Brisk walking, step aerobics, stair climbing, and jumping are examples. Resistance exercise and weight bearing should be done regularly to provide lasting benefits. Exercises that improve muscle strength, core stability, balance and coordination will help prevent falls.

Exercises to improve posture or strengthen the “core” protect against spine fractures resulting from stress on weakened bone. Proper posture and safe body mechanics during all activities will protect the spine against the compressive effects of bending and **kyphosis**, a rounded spine. Kyphosis is associated with a stooped appearance and loss of height. Fractures of the spine are greater in those with kyphosis regardless of whether there is a history of osteoporosis or fracture. The kyphosis can be reduced with exercises that strengthen and lengthen the spine. Postural supports and bracing are helpful for some individuals.



**If you have osteoporosis, are at high risk for a fall or fracture, or have a medical condition affecting your ability to exercise, do not start an exercise program without first consulting your physician and a physical therapist.**

A **physical therapist** can evaluate for needs and design exercises to improve posture, balance and coordination. In addition, he or she can help identify safety hazards in your home.



If you have had a recent fracture to the back, hip or wrist, your physical therapist can provide instructions on how to perform basic everyday activities such as getting out of bed, loading the dishwasher, and vacuuming. A physical therapist may fit you with a support or brace to ease pain and maintain better posture, suggest hip padding for protection should you fall, and provide you with aids for walking and daily activities. For pain, a physical therapist may also use manual (hands-on) techniques and therapeutic modalities.



While regular exercise is essential in the prevention and treatment of weak bones, or osteoporosis, caution must be used to avoid injury or a fracture. **Avoid exercises performed with a flexed or rounded spine**, such as sit-ups, crunches, and toe touches; exercise machines that involve forward bending of the trunk; and movements and sports that bend and twist the spine. Use caution if you enjoy sports such as tennis, golf, and bowling.



**So get started! It is never too early or too late!**

## **Posture and Body Mechanics Come First**

### **Neutral Spine with Lower Belly Hollowing**

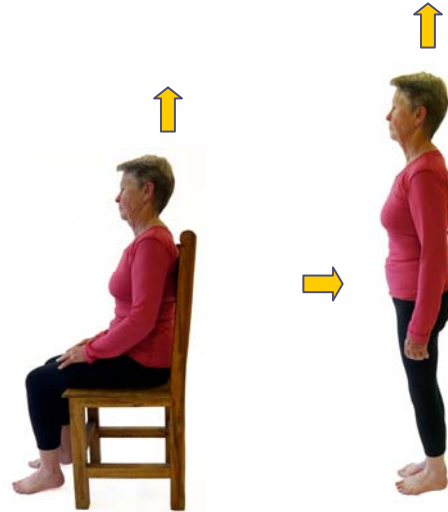
Place your low back in a comfortable position, with your back muscles relaxed somewhere between flat and arched. Draw the belly button in toward the spine, as if to “hollow” the belly, while keeping the neutral position. Breathe as you maintain the muscle contraction. Try to keep this “neutral” position in all daily activity and exercise.



## Stand and Sit Tall

Good posture when you are standing is straight vertical alignment of your body from the top of your head, through your body's center, to the bottom of your feet. Lift the rib cage off the pelvis and stand tall. Use your lower belly muscles to maintain a "neutral" spinal position with a hollow space in the low back: draw your belly button in toward your spine, knees soft. Pull the chin in and lengthen the back of your neck. If standing for awhile, put one foot on a stool

When sitting, good posture means keeping the spine and head straight while maintaining the three natural curves of the spine. The pelvis should be placed against the back of the chair and both feet should touch the floor or a footrest. There should be adequate spine support from the chair or a backrest.



## Hip Hinging

When bending, use your lower belly muscles to maintain a "neutral" spinal position with a hollow space in the low back. Stand with your feet shoulder width apart, and hinge at the hip joint, not the back or waist, during daily activities and any bending or lifting. Keep your head and trunk aligned in a straight line. Do not twist while bending forward. Use this technique during all forward bending activities to minimize compression on the spine.



## Lifting and Carrying

Face the object. Gently draw the belly in, bend your knees and hinge at the hip crease. Breathe out as you lift and straighten. Using proper posture and safe body mechanics during all activities will protect the spine against the harmful effects of bending and twisting. Keep the object close, holding it with both arms. When carrying groceries and other loads, lighten up, then divide the weight between both sides.



**Using proper posture and safe body mechanics during all activities will protect the spine.**

# Choose the Right Exercises For You

**Exercise regularly to stimulate bone, improve your posture and enhance core stability and balance. Consider your age, fitness level, and risk for fracture in choosing what kinds of exercises to do:**

- **For children and teens** – High impact and high intensity exercise are recommended.
- **For young healthy adults** – High impact weight bearing exercise, resistance training, core stabilization, and postural strengthening.
- **For healthy adults over age 50** – Moderate intensity exercise (strength training and weight bearing), core strengthening, and balance and coordination activities.
- **For those with osteoporosis or a history of falls** – Balance and coordination training, core and postural strengthening.

**The following exercises are simple and most can be done at home with no special equipment.**

## Chair Rise

Scoot your hips forward to the middle of the chair. With your spine in “neutral”, reach back with your arms or lightly touch the armrests. Place feet apart with toes pointing straight ahead and one foot slightly forward. Hinge forward at the hip crease, not the waist, aiming your nose toward your toes and keeping your chest lifted. Push through your feet, keeping your back in good alignment.

Repeat 5 times. Use this technique when getting out of a chair or sitting down.



## Upper Back Extension

To decrease the rounded curvature or kyphosis of the spine, stand tall, lift your breast bone, and pull your chin back as you look straight ahead. Draw the belly button in toward the lower spine, arms relaxed by your side, palms forward. Gently draw the shoulder blades down and back. Hold for a count of 2 seconds. Slowly release.

Now place your arms in a “W” position. Draw the elbows down and back. Hold 2 seconds then slowly release.

Next place your arms in a “T” position. Draw the arms back. Hold 2 seconds then slowly release. Now place your arms up in a “V” position. Draw the shoulder blades down and back. Hold 2 seconds then slowly release.

Repeat the T then the W again. Lower the arms.





## Upper Back Lengthening

Sitting in a chair with a backrest, place your hands behind your head and press your back against the backrest for 5 seconds. Press against the top of the backrest and lift your breastbone toward the ceiling. Try putting a towel roll or soft ball between your shoulder blades to straighten your back even more. *Place the chair close to a wall so that you don't tip backwards or break the chair.*



## Single Leg Stand

Stand with hands lightly placed on a chair back or counter. Lift one leg, supporting your weight on the other leg. Try to hold for 15-30 seconds. Now try it on the other leg.

As this task becomes easier, use less support from your hands.

### To make it more challenging:

- Increase the time you spend on one foot to 1 minute.
- Next, try it with eyes closed. Use a counter or stand near a wall to be safe with the eyes closed.



## Side Stepping with Diagonal Reach

Knees bent, step sideways to the right as you reach to the right.

Repeat to the left: sidestepping left and reaching to the left.

To make it more challenging, try stepping and reaching in opposite directions: stepping left while reaching to the right; then stepping right and reaching to the left.



## Half Lunge with Forward Reach

Standing, reach forward with one arm as you step forward and shift your weight to the front leg. Repeat to the other side.

To make this more challenging, continue stepping and reaching forward by bringing the back (stationary leg) forward, then together with the step leg. Alternate legs with each step.



## Face Lying Trunk Raise

Lying on your stomach, place a folded towel under your forehead and a pillow under the ribs and pelvis to protect the lowest ribs. With arms by your side or in a “W” position, slowly lift up your upper back and arms. Do not “hinge” from the low back. Hold for 3 to 5 seconds. Repeat 5 times.

To make it more challenging, add small hand weights.



## All Fours Stability

In hands-and-knees position, place hands under shoulders, knees under hips, spine in neutral, back of head lifted, eyes looking down. Lift your lower belly muscles and keep the spine stable. Draw your shoulder blade down and back to begin. Slowly raise one hand off the floor and reach forward. Hold 5 seconds. Return the hand to the floor. Repeat with the other hand.

Now do this with each leg, holding for 5 seconds.

Finally, raise an arm and leg on opposite sides and hold 5 seconds. Repeat with other limbs, keeping the back in neutral.



## Stay on Your Feet and Take a Brisk Walk!

Moderate intensity exercise that includes regular walking and climbing is good for the bone and general fitness. Wear supportive shoes.

Stand tall and walk continuously for a minimum of 10 minutes. Increase your distances and grades over time.

Try to spend **at least 4 hours a day up and about on your feet.** The benefits of walking increase with distances walked.

Stairs, Tai Chi, and dancing are good ways to add some variety and challenge.

