

Osteoporosis Protocol

Rehabilitation using the Resistance Chair www.activeaging.com.au

General Information

Osteoporosis is a condition where bones gradually decrease in mass or density making bones weaker and brittle. This process is progressive in many cases and can lead to bone breaks (fractures) and disability if not treated. Women are more commonly affected by this condition following menopause because of hormonal changes. However, anyone of advanced age likely has some degree of bone density loss and can benefit from treatment such as a structured exercise program. Osteoporosis is often caused by a combination of factors including suboptimal nutrition (especially in the 20's when bone is building), hormone production, and activity level. Bone density is maximal during the late 20's and early 30's and then gradually decreases with age. Other conditions such as hyperthyroidism, hyperparathyroidism and hypogonadism can cause hormonal abnormalities speeding up bone loss. Certain medications have also been associated with osteoporosis. Inactivity also contributes to bone loss and increases risk of fractures related to falls. Specific exercise training may actually strengthen bones reducing the risk of fractures and even falls.

Symptoms

People with osteoporosis usually do not have any symptoms until they suffer a broken bone or fracture. This often is related to a fall secondary to poor conditioning and lack of exercise activity. Compression fractures of the spinal bones (vertebrae) can occur without any associated trauma in osteoporosis. This can lead to significant pain and decreased function that may last for several months. Although not always painful, spinal compression fractures can lead to significant loss of height and poor posture. Hip fractures are also related to osteoporosis and can severely impair quality of life and function. Osteoporosis elevates risk of arm and wrist fractures with falls which can severely impact one's ability to perform daily activities. A rehabilitation program specifically aimed at osteoporosis treatment is a powerful tool in the reduction of fractures and falls.

Diagnosis

The diagnosis of osteoporosis involves a careful history, physical examination, laboratory studies, and specialized bone density testing performed by a health professional. This assessment should also include a review of one's activity level and identify ways to improve conditioning. An important part of the treatment is identifying any medical conditions or medication that may be contributing to bone loss. Other imaging techniques such as a CT scan may also be done for further evaluation.

Management

Osteoporosis management involves a combination of medications, nutritional supplementation with diet modification, smoking cessation, and exercise therapy. These treatments should also be considered in those without osteoporosis for prevention of this disease. The treatment of osteoporosis involves a focused rehabilitation therapy program to gradually restore adequate strength and improving overall function. People with osteoporosis or those who would like to prevent it should adopt a regular exercise program including strengthening, weightbearing and balance exercises.

The Resistance Chair Solution

A strengthening program as provided by the Resistance Chair and weight bearing activities such as walking are vital in treatment and prevention. Another benefit of the Resistance Chair Solution is a rehabilitation program to improve overall conditioning and lowering the risk of falls. These exercises and stretches are the optimal initial treatment approach to this disease and ensuring maximal quality of life and independence.

Scapular Adduction Exercise

Goal: To improve posture and alignment of shoulder joint.

1. Sit in chair with back up against posture support
2. Maintain upright posture with chest lifted and eyes looking straight ahead while you squeeze shoulders back and together against sides of posture support. (Figure A)
3. Hold position for 5 seconds. Repeat 12 times.

Maintain this upright posture with chest lifted and back straight throughout rest of the exercises.



Figure A

Chest Press

Goal: To improve strength of chest and shoulder muscles

1. Sit in chair.
2. Grasp upper cables at chest level. (Fig. A)
3. Push arms forward then slowly return to starting position. (Fig. B)
4. Repeat 10 times and perform 2 sets

Technique key – Keep wrists straight throughout exercise and shoulders relaxed, away from ears.



Figure A



Figure B

Forward Raises

Goal: To increase strength of front of shoulders.

1. Sit in chair.
2. Grasp lower cables in each hand as shown. (Figure A)
3. With thumbs pointing upward, palms facing inward, raise both arms in front to shoulder level, lower slowly. (Figure B)
4. Repeat 10 times and perform 2 sets.

Technique key – Exhale as you raise arms, inhale as you lower arms. Keep wrists straight.



Figure A



Figure B

Side Raises

Goal: To increase strength of sides of shoulders.

1. Sit in chair.
2. Grasp lower cables in each hand. (Fig. A)
3. Raise both arms out to side as shown. Lower slowly. (Fig. B)
4. Repeat 10 times and perform 2 sets.

*Caution: Do not raise arms higher than shoulder level.

Technique key – Exhale as you raise arms, inhale as you lower arms. Keep wrists straight.



Figure A



Figure B

Bicep Curl

Goal: To increase strength of front of arms.

1. Sit in chair.
2. Grasp lower cables in each hand, palms facing forward. (Fig. A)
3. Bend elbows and slowly straighten. (Fig. B)
4. Repeat 10 times and perform 2 sets.

Technique key – Keep wrists straight throughout motion.



Figure A

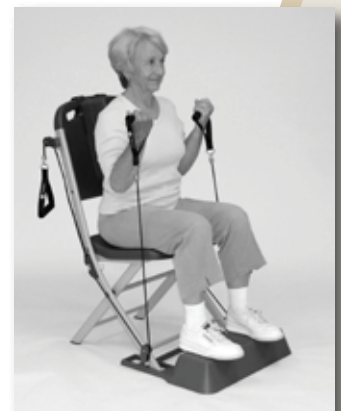


Figure B

Tricep Pulldown

Goal: To increase strength of back of arms.

1. Sit in chair.
2. Grasp overhead cables and pull down to starting position as shown; elbows at sides and bent to 90 degrees. (Fig. A)
3. Push cables down to sides to straighten arms. (Fig. B)
4. Slowly bend elbows back to 90 degrees.
5. Repeat 10 times and perform 2 sets.

Technique key: Keep elbows close to sides of body with wrists straight.



Figure A

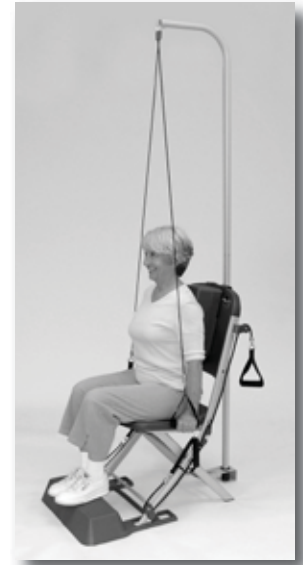


Figure B

Wrist Extension

Goal: To increase strength of forearm and wrist.

1. Sit sideways in chair with your right side towards the back of the chair. Place a firm pillow on your lap.
2. Grasp the lower cable with your left hand and position your forearm on the pillow with your palm facing DOWN, elbow bent. (Figure A)
3. Lift your wrist upwards as far as you can and then lower. (Figure B)
4. Repeat 10 times and perform 2 sets.

Technique key – Keep your arm on the pillow near your side and only move from the wrist.



Figure A



Figure B

Wrist Flexion

Goal: To increase strength of forearm and wrist.

1. Sit sideways in chair with your right side towards the back of the chair. Place a firm pillow on your lap.
2. Grasp the lower cable with your left hand and position your forearm on the pillow with your palm facing UP, elbow bent. (Figure A)
3. Lift your wrist upwards as far as you can and then lower. (Figure B)
4. Repeat 10 times and perform 2 sets.

Technique key – Keep your arm on the pillow near your side and only move from the wrist.



Figure A

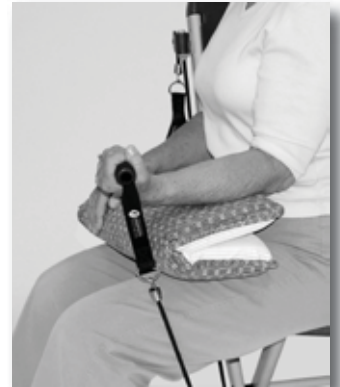


Figure B

Hip Abduction with Lower Cable

Goal: To improve strength of outer hip.

1. Sit in chair with back supported and both feet firmly planted on the floor
2. Wrap lower left cable under both thighs and hold handle against top of right thigh. Wrap lower right cable under both thighs and hold handle against top of left thigh. (Figure A)
3. Slide right leg to the side of the chair as shown. (Figure B)
4. Slowly return to starting position.
5. Repeat 10 times and perform 2 sets on each side.

Technique key – Do not lift foot more than one inch off the floor during lateral movement. Maintain trunk stability.

Option - Place pillowcase on floor and *slide* foot along the floor.



Figure A

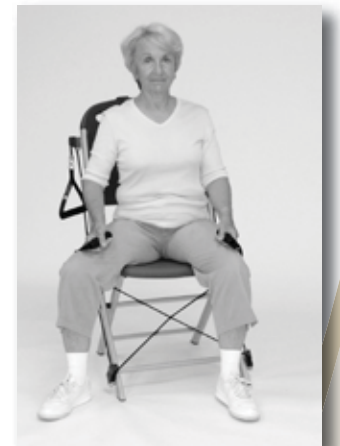


Figure B

Chair Squats

Goal: To improve leg strength and ability to get in/out of chair.

1. Sit toward front of chair with hands on thighs, feet firmly on floor. (Figure A)
2. Lean forward, transferring weight to legs as you lift your bottom off the chair. (Figure B).
3. Slowly return to seated position.

Technique key – Practice holding position at stable, comfortable heights.



Figure A



Figure B

Partial Squats

Goal: To increase strength of legs.

1. Stand at one side of the chair while holding the Balance Bar with one hand (Figure A).
2. Bend your knees and squat down while keeping your body upright and perpendicular to the ground. Make sure that your knees point directly over the middle of your foot as you bend your knees (Figure B). Only squat as far as you can comfortably go without an increase in pain.
3. Slowly raise your body back into the fully upright position.
4. Repeat 10 times and perform 2 sets.

Technique key - Practice holding squat position for longer periods of time to increase strength.



Figure A



Figure B

Step Ups

Goal: To increase strength of legs and ability to climb stairs and curbs.

1. With the Health Step locked onto the back of the chair, stand behind the chair with both hands on the Balance Bar and face forward.
2. Step up with your right foot (Figure A), then step up with your left foot. (Figure B)
3. Once both feet are on top of the Health Step, step down with your right foot, then your left.
4. Repeat 10 times with each leg, alternating sides.

Technique key – Contract your buttock and thigh muscles as you step up.



Figure A



Figure B

Side Step Up

Goal: To improve strength of legs and hip and improve balance.

1. With the Health Step locked onto the back of the chair, stand sideways at the back of the chair with your right side toward the back of the chair. Hold the Balance Bar for support.
2. Place your right foot on the Health Step, with the knee bent (Figure A).
3. Slowly straighten right knee until the left foot lifts off the floor. Hold 5 seconds (Figure B).
4. Repeat 10 times and perform 2 sets on each side.

Technique key – Maintain knee alignment directly over your foot throughout the motion and keep your pelvis level. Hold the Balance Bar for support.



Figure A



Figure B

Chair Push-up

Goal: To increase strength and stability of chest, shoulders and back.

1. Stand 2-3 feet behind chair.
2. Place hands on back of chair as shown. (Figure A)
3. Bend elbows to slowly lower chest towards chair. (Figure B)
4. Straighten elbows to push back to starting position.
5. Repeat 10 times and perform 2 sets.

Technique key: Keep abdominals contracted and back straight throughout exercise.



Figure A



Figure B

CAUTION: Before beginning any exercise program please consult a healthcare provider for appropriate exercise instructions and safety precautions.

OSTEOPOROSIS PROFESSIONAL NOTES

1. Scapular Adduction Exercise: Excessive thoracic kyphosis is common in patients with osteoporosis. Strengthening the upper back muscles to support the spine is important. Pay particular attention to the cervico-thoracic alignment. The Posture Support is an excellent cue for the patient to work on maintaining upright posture during the exercises. Make sure they don't push hard against the support but rather use the support as a gentle cue for alignment.
2. Row: Cue the patient to maintain the trunk upright and steady. Perform the exercise by adducting the scapulas first (precontraction of the scapular adductors) and then pulling the cables with their arms. The trunk should remain steady during this exercise.
3. Forward and Side Raises: Make sure the patient is sitting upright with the scapulas neutral and the arms in external rotation to minimize impingement of the greater tuberosity against the acromion. Cue the patient to maintain the wrists neutral throughout the exercise.
4. Biceps and Triceps: Cue the patient to maintain the wrists neutral throughout the movement.

5. Wrist Flexion and Extension: Position the patient with the elbow flexed to approximately 90 degrees with the arm close to the side of the body. The wrist movement should be through the full range of motion.
6. Hip Abduction with Lower Pulley: Use resistance that is sufficient for the patient to feel a contraction in the gluteus medius, however still allowing full range of motion into hip abduction. If the patient is very weak, start with small movements toward the end range of hip abduction.
7. Chair Squats: Instruct patient to sit toward the front of the chair with both feet firmly planted on the floor. Have patients practice shifting their weight forward onto their feet while lifting their buttocks off of the seat. Make sure the patient maintains neutral lower extremity alignment with the knees pointing directly over the feet. For safety, cue the patient to feel the back of the chair behind their legs prior to returning to the seated position.
8. Partial Squats: Make sure the patient maintains neutral lower extremity alignment with the knees pointing directly over the feet. Cue the patient to contract their quadriceps and gluteal muscles throughout the exercise. Challenge the patient to hold the position longer as long as it is not straining their knees.
9. Step-Ups: Cue the patient to contract the muscles of the leg on the step to “lift up” rather than “pushing off” from the lower leg. This is a great exercise to work on balance and functional step-ups for community ambulation.
10. Chair Push Up: Make sure patients contract their abdominals to maintain the body in straight alignment. If the patient keeps their elbows close to their body they will bias the tricep muscles and if the elbows point outward they will bias the pectoral muscles. Perform the movement slowly with resistance both on the lowering and lifting phases.