

## **Knee Arthritis**

### **Rehabilitation Using the Resistance Chair**

#### **General Information**

Osteoarthritis affecting the knee is a common and often painful condition commonly leading to reduced mobility and deconditioning. Prevalence (ref). It is most often secondary to a gradual age-related degradation of the knee joint surface. Poor body mechanics, overuse, and obesity can contribute to degeneration of the knee joint. It can also be a result following a trauma to the knee joint.

#### **Symptoms**

People with knee osteoarthritis will typically experience knee pain, stiffness, and decreased range of motion. They may also have swelling and often have pain upon walking, kneeling, squatting, and/or climbing stairs.

#### **Management**

The treatment may include: medication (NSAID's such as Iuprofen), bracing, therapy modalities (heat, cold, electrical stimulation), and a specific rehabilitation program. Other common possible treatment options include various injections and supplements such as glucosamine and chondroitin sulfate. Surgical intervention may also be considered if rehabilitation therapy fails.

#### **The Resistance Chair Solution**

Moderate exercise is crucial in the treatment of osteoarthritis not only for general health but for maintaining function and independence (1, 4). The American College of Rheumatology has published guidelines for the treatment of people suffering with knee osteoarthritis recommending exercise as one of the mainstays of treatment (2). Simple home-based exercise therapy has been shown to produce significant reductions in knee pain from osteoarthritis (3). The Resistance Chair provides an effective program for knee stabilization including strengthening, increasing range of motion, and aerobic exercise to reduce pain and increase level of activity leading to an overall improved quality of life. The Resistance Chair also provides an excellent option for conditioning without aggravating knee osteoarthritis pain due to standing and walking.

## References:

1. Bautch, Judith C; Hirao, Yumiko. Effect of exercise on walking ability and perceived exertion in individuals with knee osteoarthritis. *Arthritis Care & Research*. 45(6) Dec 2001, p S11.
2. Hochberg MC, Altman RD, Brandt KD, et al. Guidelines for the medical management of knee osteoarthritis. *Arthritis Rheum*. 1995;38:1541-1546.
3. Thomas, K.S. et al. Home based exercise program for knee pain and knee osteoarthritis: randomized controlled trial. *BMJ: British Medical Journal*” *BMJ: British Medical Journal*; 10/5/2002, Vol. 325 Issue 7367, p752, 4p.
4. Ettinger Jr, WH Burns R, Messier SP, et al.: A randomized trial comparing aerobic exercise and resistance exercise with a health education program in older adults with knee osteoarthritis. *JAMA* 1997, 277:25–31.

## Warm-Up Exercises

**(Perform each of the following movements 10 times)**

Goal: To warm up the muscles and joints.



Figure A

### Seated March in Place

Sit upright in chair with back supported. Alternate lifting one knee at a time as if marching in place. (Figure A)



Figure B

### Seated Heel Raises

Sit safely toward front of chair with feet firmly on floor. Raise both heels off the floor as high as you can while keeping balls of feet on the floor. Slowly lower heels. (Figure B)



Figure A

### Leg Extensions

Sit upright in chair with back supported. Slowly straighten one knee at a time then lower to starting position. Repeat opposite side. (Figure C)

## Bicycle Warm-Up

Goal: To increase circulation and increase ease of motion in knee joint.

1. Sit in chair with back supported.
2. Adjust the bicycle track position for a comfortable range of motion.
3. Pedal Mini-Bike forward for up to 5 minutes. (Figure A)



Figure A

## Hamstring Stretch

Goal: To stretch the hamstring muscles.

1. Begin sitting upright in chair. Extend one leg out straight with the heel resting on the floor. Keep the other knee bent. (Fig. A)
2. While maintaining a straight back, lean forward from the hips until you feel a stretch behind your upper thigh. (Fig. B)
3. Hold position for at least 20 seconds. Recommend holding for 60-90 seconds if possible. Repeat times each side.

Technique key – If you feel pain in your lower back or foot, bend your knee until you isolate the stretch to the back of the thigh.



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.
4. Repeat 10 times and perform 2 sets.

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



Figure A

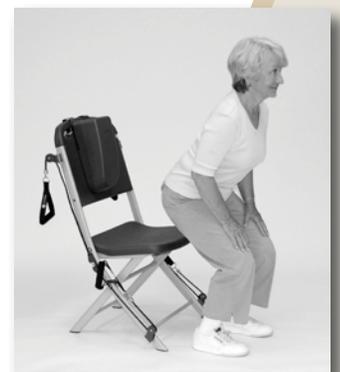


Figure B

## Hip Abduction with Lower Cable

Goal: To improve strength of hip for knee control.

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 a pillowcase on the floor and slide foot on the floor.



Figure A



Figure B

## Isometric Hip Adduction (with Ball)

Goal: To strengthen inner thigh muscles.

1. Sit tall in chair with feet flat on floor, positioned approximately 6 inches apart
2. Place a soft ball or pillow between inner thighs, just above the knees. (Figure A)
3. Squeeze thighs together as strong as you comfortably can. Keep feet on the floor.
4. Hold 5 seconds. Repeat 10 times.

Technique key – Do not have feet too wide apart.

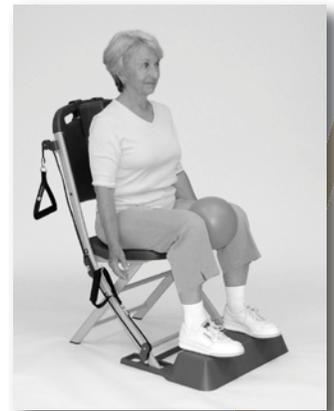


Figure A

## Quadricep Stretch

Goal: To stretch the front of thigh.

1. Stand at right side of chair. Face away from chair and hold Balance Bar for support.
2. Place right foot on chair seat as shown (Figure A).
3. Squeeze buttocks and abdominals to tuck pelvis under. Keep thighs together. Feel stretch in front of thigh.
4. Repeat 2 times each side.
5. Hold stretch for at least 20 seconds. Recommend holding for 60-90 seconds, if possible.

Technique key – Keep thighs together. If your balance is stable, you can increase the stretch by bending your supporting leg.



Figure A

## 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.

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, lifting left foot off the floor. Hold 5 seconds (Figure B).
4. Repeat 10 times and perform 2 sets on each side.

Technique key – Maintain knee aligned directly above your foot throughout the motion and keep you pelvis level.



Figure A

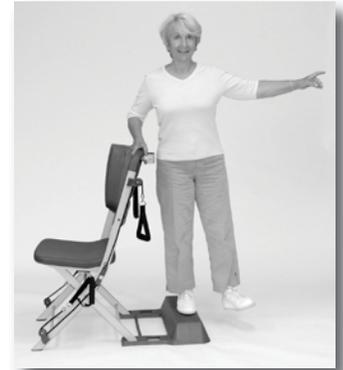


Figure B

## 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

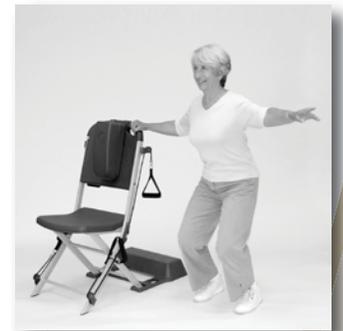


Figure B

## Calf Stretch

Goal: To stretch the back of the lower leg.

1. With the Health Step locked onto the back of the chair, face the back of the chair and place both feet on the Health Step. Hold the Balance Bar with both hands for support.
2. Drop the left heel off the back of the step so that it stretches down towards the floor (Figure A). Your right knee should bend slightly.
3. Hold stretch for at least 20 seconds. Recommend holding for 60-90 seconds if possible.
4. Repeat 2 times each side.

Technique key – Make sure that your feet face straight ahead.



Figure A



Close-Up View

## Alternate Calf Stretch

1. Stand facing back of chair with hands on Balance Bar for support.
2. Step one foot backwards approximately 12 inches.
3. Make sure that your back foot is facing straight ahead.
4. With the back knee straight, gently lunge weight forward onto front leg until you feel a stretch in the back of the calf of your back leg. (Figure A)
5. Hold stretch for at least 20 seconds each side. Recommend holding for 60 to 90 seconds if possible.
6. Repeat 2 times each side.

Technique key – Keep the heel of the back foot on the floor with the foot pointing straight ahead.



Figure A

## GENERAL NOTES

- Engage abdominals with all exercises.
- Remember to breathe with each repetition.
- Start rehabilitation program slowly, only working through minimal discomfort levels. If pain increases, decrease resistance level and/or repetitions.
- Consult your physician if you experience increased pain, weakness or swelling.

## POST EXERCISE

- Rest with ice pack on knee for 10-15 minutes.

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

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