

Review Article on Isometric Exercise

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Abstract

The isometric exercises for the osteoarthritis of knee have been designed to strengthen the thigh muscles without much movement around the knee joint. Strength of the quadriceps muscles affects the knee joint functions. It is evident that lower extremity strength has a major role in knee joint shock attenuation during weight bearing activities. There is increased risk of development or progression of osteoarthritis due to greater or uncontrolled loading on the knee joint. Reduction of pain and disability is the main aim of treatment approach in the management of knee osteoarthritis. Isometrics are a type of strength training in which the joint angle and muscle length do not change during contraction (compared to concentric or eccentric contractions, called dynamic/isotonic movements).

Keywords: isometric exercise, osteoarthritis, rehabilitation

Introduction

Isometric exercise is a way of training the muscles to develop strength and increase muscle mass. In isometric contractions, tension is created in the muscles but because the resistance is equal to or greater than the force of the muscle, there is no movement produced. Thus, these kinds of exercises are normally done in static positions where there is no obvious change in movement or in the distance of the angle of the joint. Because strength is only developed when a joint is at a specific angle, isometric contractions often make use of muscle fibers that are often neglected in dynamic strength training programs such as weight lifting. It is believed that when circulation within the muscle is impeded, lack of oxygen results in the formation of muscle filaments within the muscle body itself. This results in increased mass and consequently, strength. Doing isometric exercises for 10 minutes a day is enough to strengthen your muscles significantly.

Definition for isometric exercise

“An **isometric exercise** is a form of exercise involving the static contraction of a muscle without any visible movement in the angle of the joint”.

Purpose

Isometric exercise is intense and contributes to burning fat and building muscle, increase strength.

Benefits of isometric exercise

- Fighting age related muscle loss, muscle activation, muscle rehabilitation, muscle strengthening.
- Not much time required, getting past sticking points, don't require equipment, can be done anywhere.
- Targets all of your muscle groups, increased flexibility, increased mental health.

Isometric quadriceps strengthening technique:

I. Straight leg raising (slr) exercise:

A) in supine position:

- Advise the patient to lie flat or sit with leg straight.
- Instruct them to tighten the muscles in front of thigh as much as she / he can, pushing the back of the knee flat against the floor/bed.



Straight Leg Raise

- Lift the leg/heel 4 to 6 inches off the floor/bed. after 5 seconds.
- Bring leg/heel back to the floor. keep the muscle in front of the thigh as tight as possible as lower the leg, and then relax.
- Repeat the exercise 10 times for 2 times per day.

B) High sitting position:

- Advise the patients to sit at the edge of bed with the hanging of legs.
- Instruct them to pull the toes up, tighten the thigh muscles and straighten the knee of the legs.



- Lift the straighten leg individually to be equal to hip level for a second and bring back to same position.

- Repeat the exercise 5 times for each legs and follow for two times aday.

II.Step-up and step downexercise:

- Stand on the edge ofstep.
- Place the foot on the step approximately 7 inches in height. hold on to a hand walls, chair or other objects for balance ifneeded.



- Slowly step-up and down. make sure that kneecap is always in line with the second toe and hips arelevel.
- Lightly touch the heel of the opposite legs to the floor and return to the starting position.
- Repeat exercise ten times,2 times perday.

III.wall slideexercise:

- Stand with back against the wall. The feet should be shoulder with apart and approximately 18 to 24 inches away from the wall. Kneecap should be line with the tip of secondtoe.
- Slowly slide down the wall so that 75to90 degree bends theknees.



- Hold this position for 5 seconds. Stand up and rest for 5second.
- Repeat exercise 10 times, 2 time/day.

IV.Hip adductionexercise:

- Advise the patient to lie flat or sit with legstraight.
- Placea inch roll under knee, allowing it to bebend.
- Tighten the muscle in front of knee as much as can, and lift the heel off the floor.



- Hold this position for 10seconds.
- Repeat exercise for 10 times, 2times/day.

Conclusion

The objective of this review was to evaluate whether isometric quadriceps exercise has beneficial effect in patients with knee osteoarthritis. The results of this review demonstrated that isometric quadriceps exercise brought significant improvements in all the parameters after the 5-week training program.

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