

Exercise Guide for Knee Replacement Surgery



**Please bring this guide to the hospital
and to all physiotherapy appointments**

Please refer to the *Before During and After Hip and Knee Replacement Surgery – A Patient’s Guide* for further information.

The guide is available on the OASIS website: www.vch.ca/oasis

Acknowledgments

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Vancouver Coastal Health Authority



Interior Health Authority



The OsteoArthritis Services
Integration System



Northern Health Authority



Providence Health Care



Vancouver Island Health Authority

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We would also like to thank the joint replacement clients, surgeons, physicians and other health care professionals who participated in the evaluation and revision process of this guide. Your feedback and suggestions will be of great help to those preparing for joint replacement surgery.

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You are about to have knee replacement surgery. Patients who prepare for surgery and take part in their care can recover in less time and with less pain. This guide has general information along with tips and goals for exercising before and after surgery.

The goals and exercises in this guide are to help you along the path to recovery. You may get different instructions from your surgeon, doctor or physiotherapist. Always follow the directions of your care team.

Before starting any exercise program check with your physiotherapist or doctor. This guide is meant to be used under the direction of your physiotherapist.

Caution:

If you have too much pain in your knee to exercise, or if any of the exercises cause more pain or swelling in your knee, stop. Tell your physiotherapist or doctor.

If your whole leg becomes swollen or hot, tell your doctor right away!

General Guidelines: Before Surgery

If you exercise before surgery you can have a faster and easier recovery. Exercise helps to:

- Keep the movement in your knee
- Make your muscles strong
- Control your pain
- Build your knowledge of how to exercise after surgery
- Reduce your body weight
- Improve your sleep

Do activities that put less stress on your knee. Try:

- Swimming, water walking, water aerobics, water running
- Cycling (stationary or bicycle)
- Using an elliptical machine
- Walking, pole walking
- Balance exercises
- Doing specific knee movement and strengthening exercises (pages 10-11)

Always warm up before exercising. Your physiotherapist may tell you to:

- Apply moist heat to the front and back of your thigh for 5-10 minutes
- Have a warm shower or bath
- Walk forward, backwards or sideways for 5-10 minutes
- Use a stationary bike (upright or seated) for 5-10 minutes

To keep pain and swelling under control:

- Put ice on your joint
- Rest your joint
- Pace yourself
- Use a walking aid such as a cane, crutches or walker
- Talk to your doctor or pharmacist about pain medicine

General Guidelines: After Surgery

Exercise after surgery will help you recover and regain the movement and strength of your knee. Exercise also helps to:

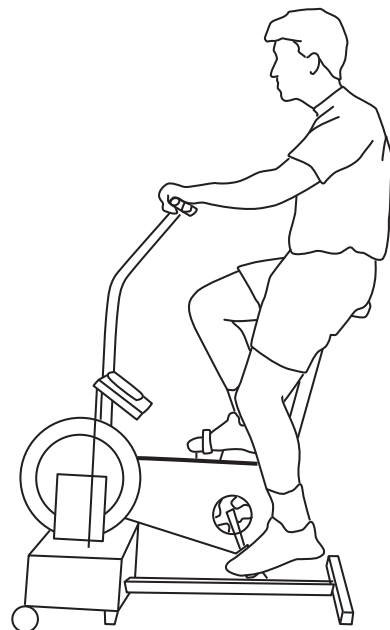
- Reduce swelling
- Prevent blood clots
- Control your pain
- Prevent constipation
- Improve your sleep

Check with your physiotherapist for guidance about the best way to **warm up** your new joint. Your physiotherapist may tell you to:

- Apply moist heat to the front and back of the thigh (NOT your knee) for 5-10 minutes to improve blood flow
- Walk forward, backwards or sideways for 5-10 minutes
- Use a stationary bike (upright or seated) for 5-10 minutes

Tips for using a bike:

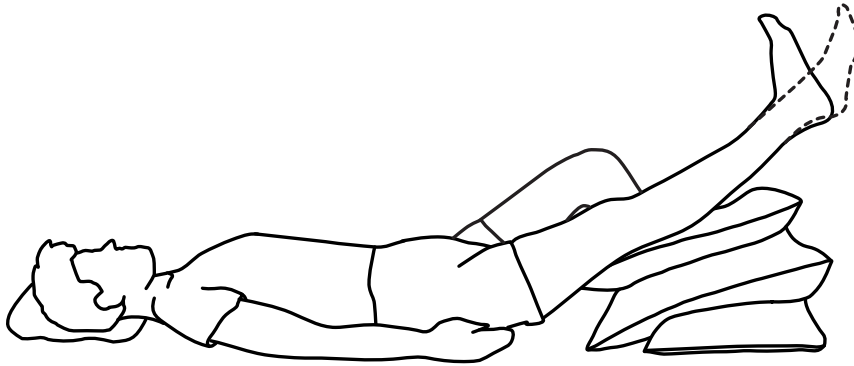
- Raise or lower the seat so your operated leg is almost straight
- Rock the pedals gently back and forth
- When you are ready, do a full circle
- Cycle forwards and backwards
- Slowly add light resistance
- Lower the seat as your knee range of motion improves



To Keep Pain and Swelling Under Control:

1. Rest Your Joint

- Change positions often (every 20 minutes) when you are awake. Try sitting, standing, and walking.
- Pace yourself. Have a rest day after a busy day.
- Lie down 3 times a day for 30 minutes on your bed or sofa. Put your leg up and support it with a wedge, arm rest of couch, or with pillows (as shown). **Keep knee straight on the pillows** with foot and ankle higher than heart



2. Pump Your Ankles

- If you are lying down, move feet up and down
- If you are sitting, place feet flat on floor, lift toes up then lift heels up

Repeat ____ times.

Repeat ____ times per day.



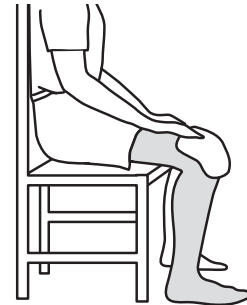
3. Use Ice

Ice your knee when it is hot and red, painful and after exercises.
(If your knee is very stiff and painful, check with your physiotherapist before icing)

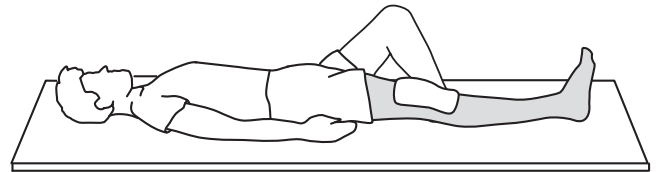
Follow these steps:

- If your scar is not healed, cover it with a clean bandage and a sheet of clean plastic wrap
- Put a damp tea towel over your knee
- Put a flexible gel pack, bag of frozen peas or plastic bag with crushed ice on your knee
- Leave the ice ON for 10 minutes
- Take it OFF for 10 minutes
- Then put it back ON for 10 minutes
- Repeat 4-6 times a day

To help with **knee bend**, place ice over your knee with your knee as bent as possible.



To help with **knee straightening**, place ice over your knee with your knee as straight as possible.



DO NOT use ice if:

- You are sensitive to cold (e.g. fingers and toes turn white or blue when you are cold)
- You can not tell if something is too hot or too cold on the skin around your knee
- Your doctor has told you that the circulation to your legs is poor and that you should avoid using ice or heat

Caution: Do NOT eat peas from a bag you have used to ice your knee. Eating peas that have been thawed and re-frozen many times can lead to serious illness. Throw the bag out once you are no longer using it for icing.

4. Use Pain Medicine

Use your pain pills as prescribed by your doctor or surgeon. Tell your doctor or surgeon if the pain is too much or not improving.

5. Use Walking Aids

Use the walking aid that your physiotherapist has measured and recommended. Do not change or stop using the walking aid until your physiotherapist or surgeon tells you to. Walkers, crutches and canes help to:

- Reduce the stress on your knee
- Reduce pain
- Improve your walking
- Improve your balance and reduce falls

Tips for walking:

- Start by walking on a flat, even surface
- Wear supportive non-slip shoes
- Bend your knee with each step

6. Sleep

Sleep helps with rest and recovery. It is normal to have some sleepless nights up to 12 weeks after your knee surgery.

Tips for a better sleep:

- Ice your knee before bed to help with pain
- Do gentle knee movements and ankle pumps to help relax the muscles around your knee
- When sleeping on your side, put a pillow between your knees
- When sleeping on your back or on a reclining chair, use pillows to support your leg and keep your knee straight

What to Expect: Weeks 1-3 After Surgery

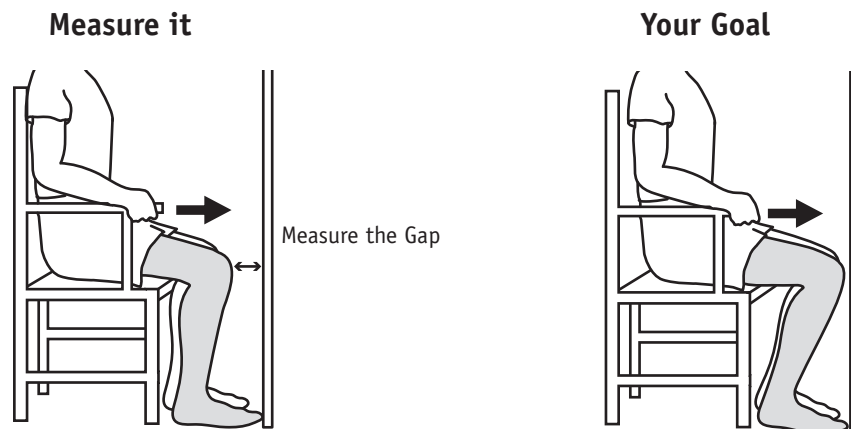
During the first 3 weeks it is important that you keep your knee pain and swelling under control. Ensure you are getting enough sleep and that you have regular bowel movements. Exercises focus on improving the range of motion of your knee.

Goals:

- Bend your knee at least 90 degrees
- Straighten your knee so that no more than three finger widths can fit behind the knee on a hard surface (5 degrees of bend)

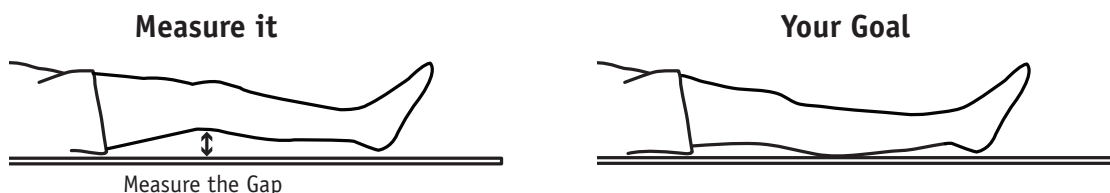
Measure Knee Bend

- Sit on chair with feet flat and toes touching a wall
- Bend your knee by easing forward on the chair
- Measure the gap between the wall and your knee (as shown below) and record it. Use the same chair each time.



Measure Knee Straight

- Lie on your back on a firm surface
- Keep your foot relaxed and press your knee down
- Have someone measure the gap under your knee (as shown below)



What to Expect: Weeks 3-12 After Surgery

3 to 6 weeks:

By 3 weeks after surgery, your knee should feel better and you should be able to make your exercises harder to reach your goals. Your physiotherapist may give you new exercises to help bend and straighten your knee and improve strength and balance.

Goals:

- Bend your knee 105-120 degrees
- Fully straighten your knee
- Walk and go up and down stairs normally
- Be able to ride a stationary bike
- Be able to sit and stand from an average chair

6 to 12 weeks:

By 6-12 weeks after surgery you will feel more confident getting back to everyday activities. Talk to your physiotherapist about making your exercises harder and read the guidelines on strength training, flexibility and balance on pages 21-22 of this guide.

Goals:

- Walk longer distances without a limp
- Bend your knee 105-120 degrees
- Fully straighten your knee

Remember:

You may find that pain and swelling increases as you begin new exercises, improve movement in your knee or return to work. Continue to manage your pain and swelling with the tips on pages 5-7.

Each person heals differently and the time it takes to meet goals may differ from person to person. Talk to your surgeon and your physiotherapist if you feel that you are not reaching your goals.

Exercises: Before Surgery

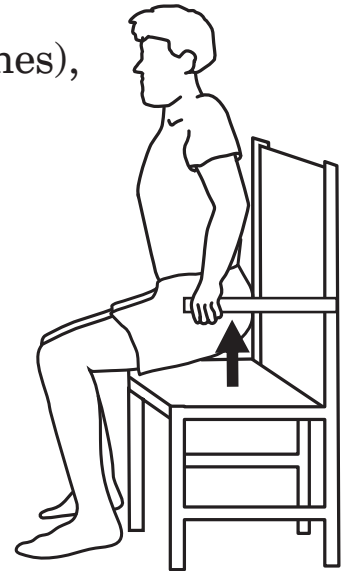
1. Arm chair push-ups

You need strong triceps to use your walker (or crutches), to help you get out of bed, and stand up from chairs. Triceps are the muscles on the back of your arm.

- Sit on chair with armrests
- Place hands on armrests with elbows bent
- Push through hands to straighten elbows and lift body up

Hold ____ seconds.

Repeat ____ times. Do __ times per day.

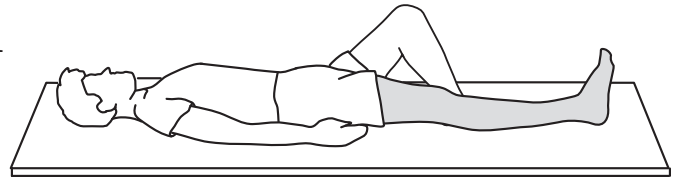


2. Thigh Squeezes (Simple)

- Keep kneecap and toes facing ceiling
- Pull toes towards you
- Tighten muscles in front of thigh and push back of knee into bed

Hold ____ seconds.

Repeat ____ times. Do __ times per day.

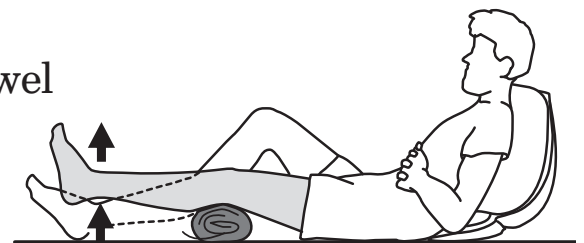


3. Thigh Squeezes (Harder)

- Place large rolled towel under knee
- Press back of knee down into rolled towel
- Straighten leg

Hold ____ seconds.

Repeat ____ times. Do __ times per day.



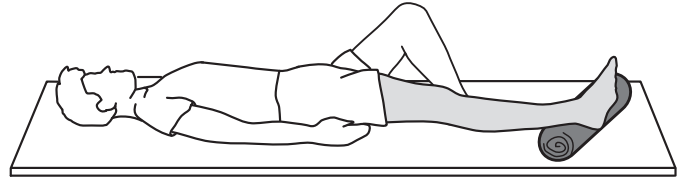
4. Knee Straightening

- Place small rolled towel under heel
- Keep kneecap and toes facing ceiling
- Gently tighten muscles in front of thigh

Hold ____ seconds.

Repeat ____ times.

Do __ times per day.



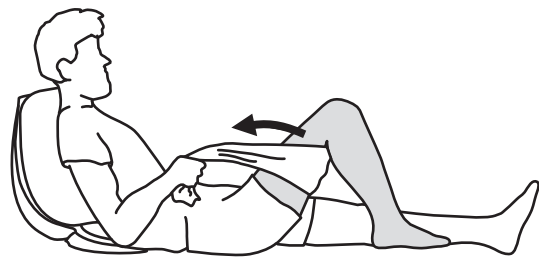
5. Knee Bend (heel slides)

- Bend knee
- Use hand or towel behind thigh to pull heel towards bottom

Hold ____ seconds.

Repeat ____ times.

Do __ times per day.



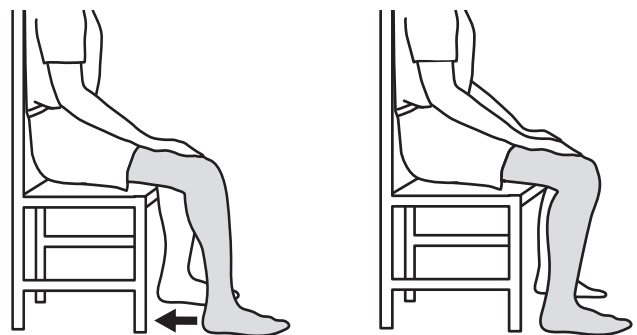
6. Sitting Knee Bend

- Sit with feet on floor
- Slide heel back to bend your knee

Hold ____ seconds.

Repeat ____ times.

Do __ times per day.



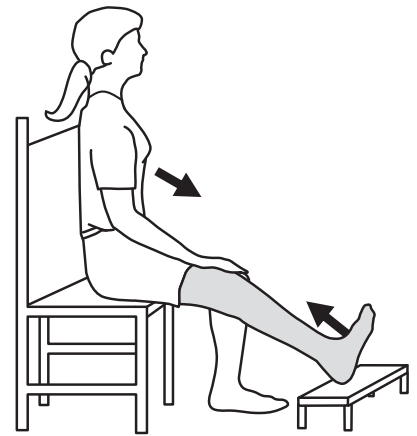
7. Back of Thigh Stretch (hamstrings)

- Sit on edge of firm seat and place heel on step
- Straighten leg and pull toes towards you
- Keep back straight and bend forward until gentle stretch is felt on back of thigh

Hold ____ seconds.

Repeat ____ times.

Do __ times per day.



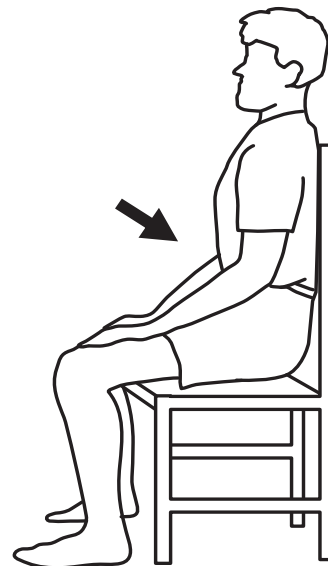
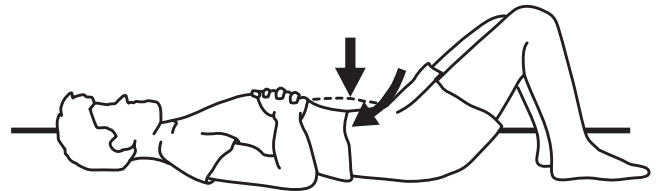
8. Core Stability

Your core muscles are the muscles in your stomach and pelvic floor. These muscles help to support your back. Many people have back pain after surgery because of the way they walk and move. Core stability exercises may reduce or prevent back pain after surgery.

- Lie or sit with back supported
- Bend knees and keep feet flat on surface
- Squeeze stomach muscles and gently pull belly button in towards spine
- Squeeze pelvic muscles that stop the flow of pee (ask your physiotherapist to explain)

Hold and count ____ 10 seconds out loud. Keep breathing.

Repeat ____ times.



Exercises: Weeks 1-3 After Surgery

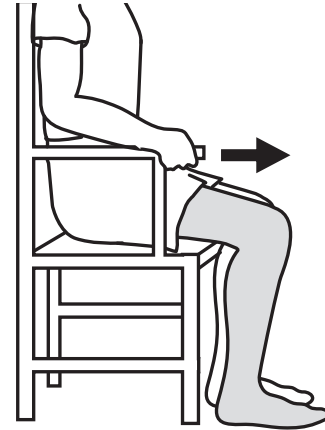
Do exercises #2-8 and the following exercises:

9. Passive Knee Bend

- Sit on chair with feet on floor
- Keep foot fixed on floor and slide bottom forwards on chair to bend knee

Hold ____ seconds.

Repeat ____ times.

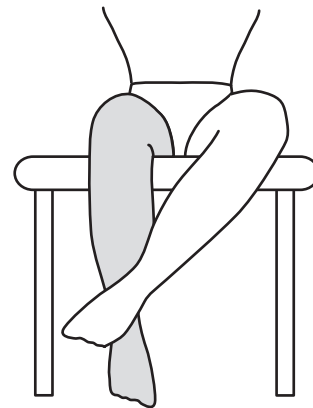


10. Assisted Knee Bend

- Sit on firm chair
- Cross non-operated leg over operated leg
- Gently push with non-operated leg until stretch is felt on front of operated knee

Hold ____ seconds.

Repeat ____ times.



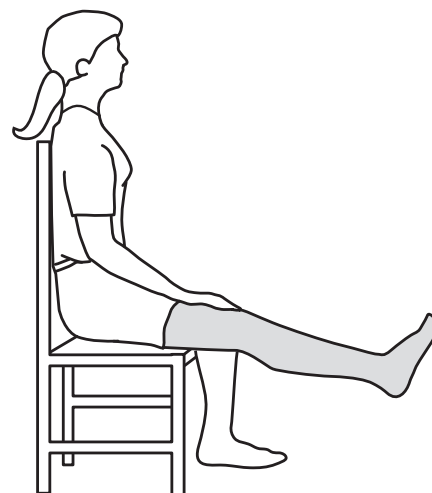
11. Sitting Knee Straightening

- Sit on firm chair
- Keep back of thigh on chair and straighten operated leg

To make harder: add ankle weights

Hold ____ seconds.

Repeat ____ times.



Exercises: Weeks 3-12 After Surgery

Exercises to Improve Bending

12. Active Knee Bend

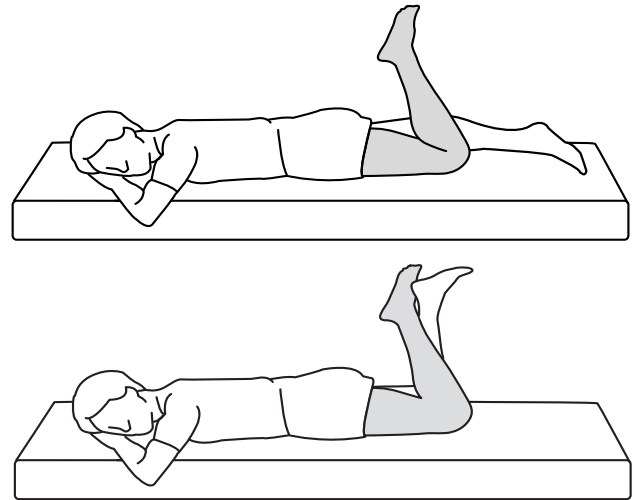
- Lie on stomach
- Bend knee, bringing heel towards bottom

Tip: Use non-operated leg to bend operated leg

Hold ____ seconds.

Repeat ____ times.

Do __ times per day.



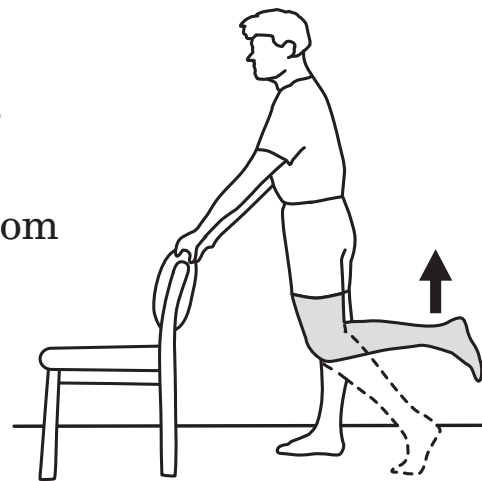
13. Standing Knee Bend

- Hold chair or firm counter for support
- Stand on non-operated leg
- Bend knee, bringing heel towards bottom

Hold ____ seconds.

Repeat ____ times.

Do __ times per day.



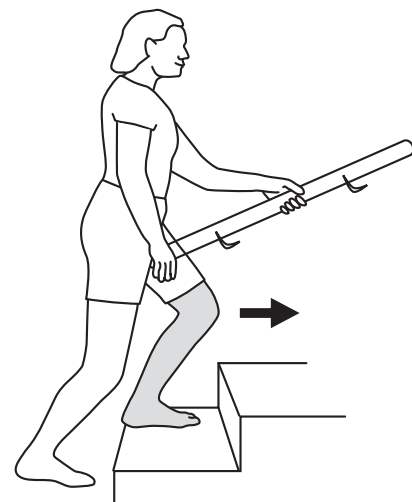
14. Step Lunge

- Place operated leg on a step
- Hold rail for balance
- Slowly bend knee forward until stretch is felt in the front of knee

Hold ____ seconds.

Repeat ____ times.

Do __ times per day.



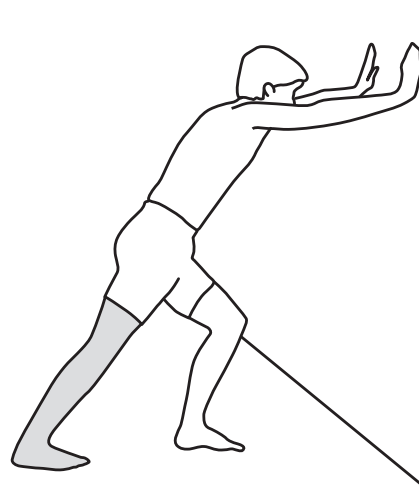
Exercises to Improve Straightening

15. Calf Stretch

- Stand at wall with one leg ahead of the other
- Keep back leg straight with heel on floor and toes pointing forward
- Lean into the wall until stretch is felt in the calf of back leg

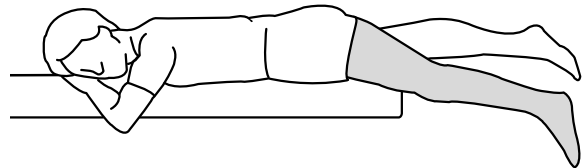
Hold ____ seconds.

Repeat ____ times. Do __ times per day.



16. Passive Knee Straightening

- Lie on stomach
- Hang foot and ankle of operated leg over edge of bed
- Let gravity pull leg straight



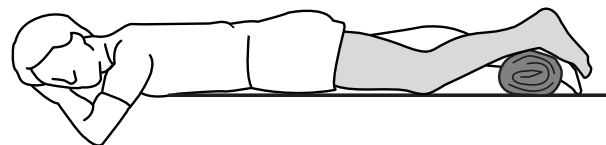
To make harder: work up to hanging kneecap over edge of bed

Hold ____ seconds.

Repeat ____ times. Do __ times per day.

17. Active Knee Straightening

- Lie on stomach
- Place large roll under ankle
- Straighten knee



Hold ____ seconds.

Repeat ____ times. Do __ times per day.

Exercises to Improve Balance & Walking

Do your core stability exercise (page 12) when you start the following exercises:

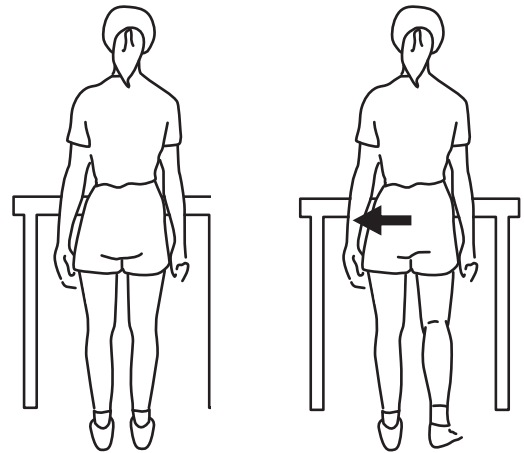
18. Side to Side Weight Transfers

- Stand facing counter or table
- Place feet hip-width apart
- Shift your weight gently side to side

To make harder: lift feet and step from side to side

Repeat ____ times.

Do __ times per day.



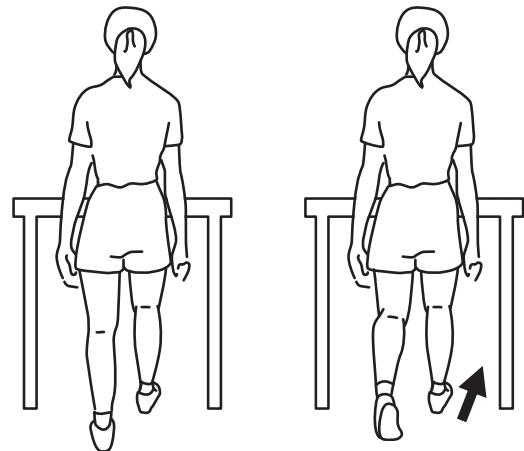
19. Forward and Back Weight Transfers

- Stand facing counter or table
- Place one foot in front of the other
- Shift your weight forward and back
- Switch foot position and repeat.

To make harder: lift feet and step forward and back

Repeat ____ times.

Do __ times per day.



20. Mini Knee Bends

- Hold counter or table for support
- Stand tall with feet flat on floor
- Bend hips and knees slightly, keeping weight on your heels and knees over second toe
- Slowly return to start position

Hold ____ seconds.

Repeat ____ times.

Do __ times per day.

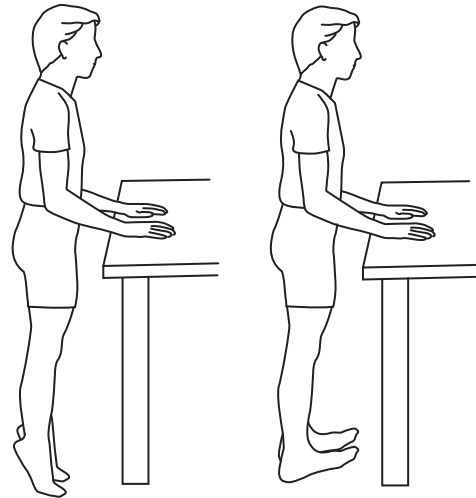


21. Toe-Heel Ups

- Hold counter or table for support
- Rise up on toes
- Hold ____ seconds
- Rock back on heels, lifting toes up

Repeat ____ times.

Do __ times per day.



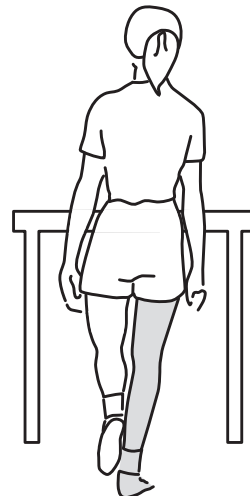
22. One Leg Balance

- Stand facing counter or table with a chair behind you for safety
- Stand on operated leg
- Lift non-operated leg off floor, keeping pelvis level and back straight

Hold ____ seconds.

Repeat ____ times.

Do __ times per day.



Exercises to Improve Strength

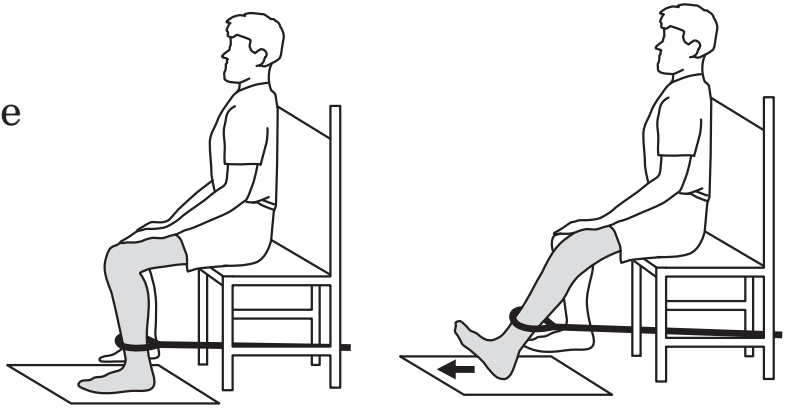
23. Resisted Knee Straightening

- Attach elastic to secure object and to ankle of operated leg as shown
- Sit forward on chair and place operated leg on towel
- Slide foot forward along the floor to straighten knee

Hold ____ seconds.

Repeat ____ times.

Do __ times per day.



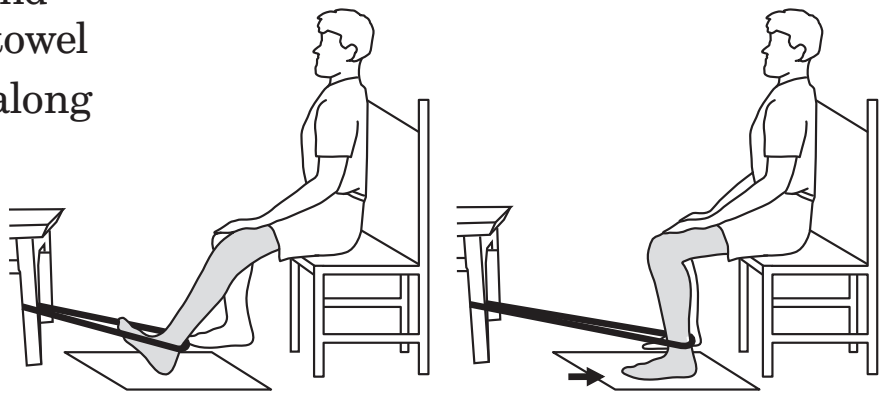
24. Resisted Knee Bend

- Attach elastic to secure object and to ankle of operated leg as shown
- Sit forward on chair and place operated leg on towel
- Slide foot backwards along the floor to bend knee

Hold ____ seconds.

Repeat ____ times.

Do __ times per day.

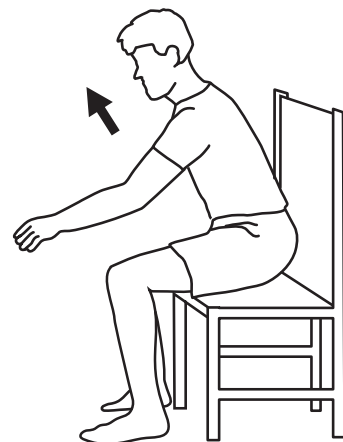


25. Sit to Stand

- Sit on edge of firm chair
- Lean forward until nose is over toes
- Press feet into the floor and stand up using legs, not arms
- Slowly sit back down on chair

Repeat ____ times.

Do __ times per day.

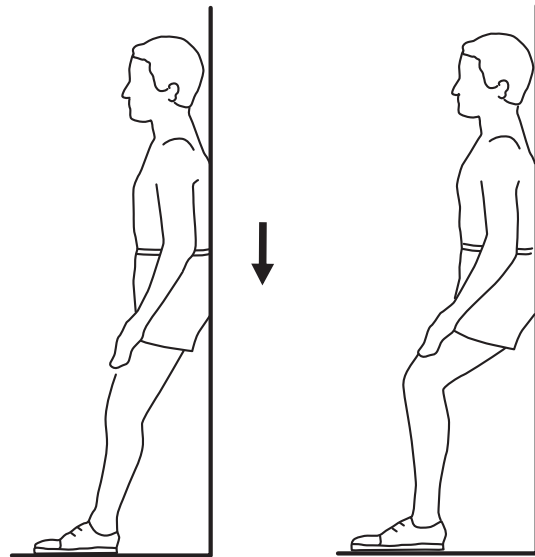


26. Wall Slides

- Stand with back against wall
- Place feet shoulder-width apart and about 2 feet from the wall
- Bend your knees and slowly slide down wall, keeping knees over second toes
- Stop when you feel thigh muscle working
- Slowly slide back up the wall

Repeat ____ times.

Do __ times per day.



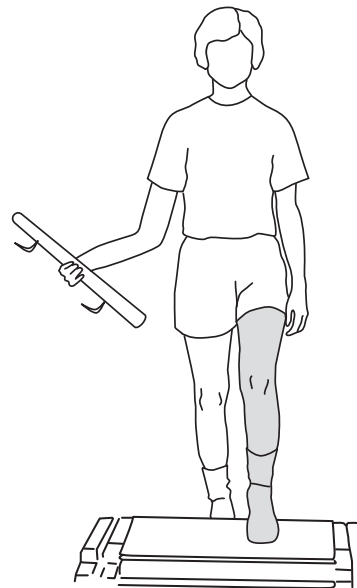
27. Stepping Up/Down

- Stand facing low step
- Hold counter or railing for balance
- Slowly step up, leading with operated leg
- Slowly step down, leading with non-operated leg

Tip: keep pelvis level at all times

Repeat ____ times.

Do __ times per day.

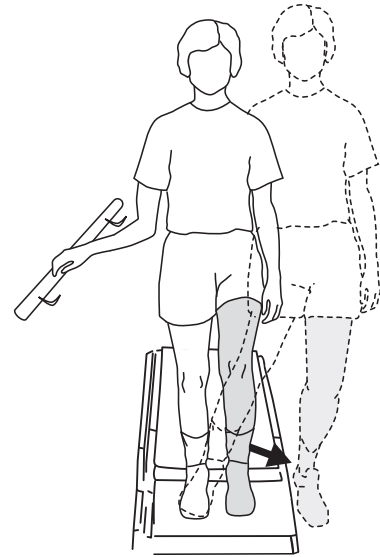


28. Side Steps

- Stand next to low step
- Hold counter or railing for balance
- Slowly step up, leading with operated leg
- Slowly step down, leading with non-operated leg

Tip: keep knees over second toe at all times

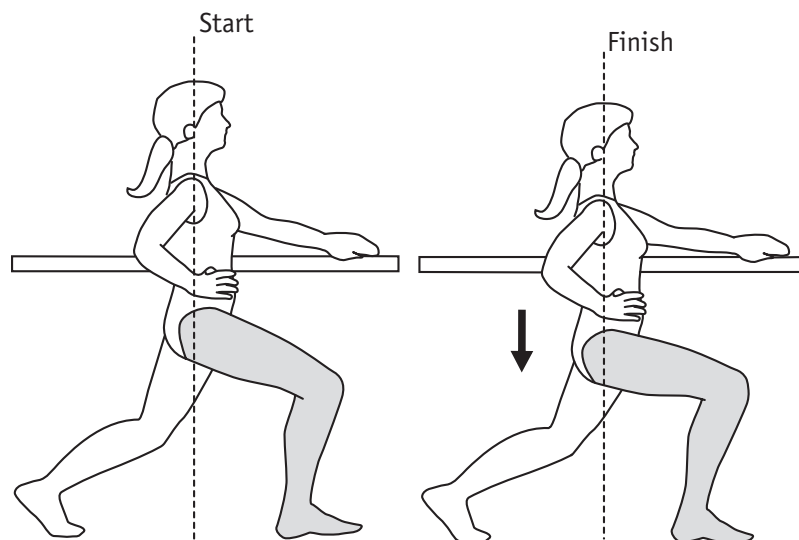
Repeat ____ times. Do __ times per day.



29. Split Squat (lunge)

- Hold counter for support
- Step forward with operated leg
- Slowly bend knee, keeping knee behind toes and over ankle
- Return to starting position
- Switch sides

Repeat ____ times. Do __ times per day.



Exercise Guidelines :

3 Months-1 Year After Surgery

A good level of activity will increase the life of your joint replacement.

Exercise helps to:

- increase your fitness level and endurance
- reduce your risk of falling
- increase your muscle strength
- improve your bone quality (helps to fix your artificial joint to the bone)
- keep your weight under control (extra weight on your body also places extra stress on your joint)

Following joint replacement, try to do activities that are low impact (see activity recommendations on page 24). Activities that require a new skill set are not recommended as they increase the stress on the joint and have a greater risk of injury.

Flexibility

If you had tight muscles before surgery it may take longer after joint replacement to get the movement back in your joint. Stretches can be done in many different ways. Ask your physiotherapist how to change a stretch to make it work for you.

Guidelines:

- Stretch when you are done your exercises, after a walk or when your muscles are warm. Warm muscles are easier to stretch.
- Hold the end of the stretch for 30 seconds. Relax and breathe slowly.
- Ensure that you feel a stretch in the muscle or tissue being stretched. If you don't feel a stretch you won't improve your flexibility.
- Stretch at least 3 days a week
- Heat can help with stretching. Put your leg in the stretched position and put heat on the tight muscles (where the stretch is felt) for 1-10 minutes.

Strength Training

Committing to a long term strengthening program will help you regain strength and protect your new joint. Your operated leg will take up to a year or more to regain normal strength.

Guidelines:

- Do 8 -15 repetitions of an exercise. To build strength, your muscle should feel tired by the last repetition.
- If you can't do 8 repetitions of an exercise, you need to make the exercise easier.
- If you can complete 1 set of 15 repetitions over 3 strengthening sessions you can make the exercise harder. You can make the exercise harder by:
 - Adding more weight (2-3 lbs)
 - Doing a bigger movement (open or close your joint more)
- If you want to maintain your current strength, train 2 days a week
- If you want to increase your strength, train 3 days per week
- Always rest the day after doing strengthening exercises to let your muscles recover. Do not do strengthening exercises more than 4 days a week.

Balance Exercise

Re-training your balance after total joint replacement will decrease the risk of falling. Always have a firm counter or railing within reach when doing balance exercises. For better control, stand in front of a mirror and tighten your core when doing balance exercises.

Challenge your balance by:

- Walking in water (forwards, backwards, sideways)
- Standing with feet close together
- Standing on one foot and closing your eyes
- Standing on an uneven surface like a couch cushion
- Standing on a Bosu ball, wobble, rocker board, or sit fit (advanced exercises)
- Doing Tai chi

Typical Knee Joint Loads During Exercise

The joint loads below are based on:

Westby MD. Arthritis Care & Research 2001: 45: 501.

Activity	Force on your knee joint	Force on your knee joint if you weigh 150 pounds	Force on your knee joint if you weigh 200 pounds
Walking – regular pace	2.8 times your body weight	420 pounds	560 pounds
Walking – fast pace	4.3 times your body weight	645 pounds	860 pounds
Fast downhill walking	8 times your body weight	1200 pounds	1600 pounds
Fast downhill walking using ski poles	6.4 times your body weight	960 pounds	1280 pounds
Cycling*	1.2 times your body weight	180 pounds	240 pounds
Running (7 mph)	6 times your body weight	900 pounds	1200 pounds
Downhill skiing medium slopes	10 times your body weight if you are a beginner	1500 pounds	2000 pounds
	3.5 times your body weight if you are a skilled skier	525 pounds	700 pounds

Cycling*

- Increasing the resistance increases the force on your knee joint
- Increasing the speed results in little to no change in the force on your knee joint
- Raising the seat height on your bike will decrease the force on your knee

Activity Recommendations After Joint Replacement

The activity recommendations below are based on the results of a survey done by with members of the Knee Society in 2005. It was reported by Drs. Healy, Sharma, Schwartz & Iorio in 2008.¹

Allowed	Allowed with Experience	No Consensus	Not Recommended
Stationary cycling	Aerobics	Squash/ racquetball	Jogging
Road cycling	Yoga	Singles tennis	Basketball
Golf	Ice skating	Weight machine	Football
Swimming	Cross-country skiing	Roller skating	Soccer
Normal walking	Downhill skiing	Weight lifting	Volleyball
Speed walking	Stationary skiing	Baseball	
Hiking	Doubles tennis	Gymnastics	
Canoeing	Horseback riding	Handball	
Square dancing	Rowing	Hockey	
Ballroom dancing		Rock climbing	
Bowling		Fencing	
Shuffleboard			

¹ Healy WL, Sharma S, Benjamin S, Ioria R. Athletic Activity After Total Joint Arthroplasty. J Bone Joint Surg Am. 2008;90:2245-2252.

EXERCISES RECORD

(please record exercises and review it with your physiotherapist)

	Week Of							Week Of							Week Of						
	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
Before Surgery: Exercises																					
1																					
2																					
3																					
4																					
5																					
6																					
7																					
8																					
After Surgery: Week 1-3																					
9																					
10																					
11																					
After Surgery: Weeks 3-12																					
Exercises to Improve Bending																					
12																					
13																					
14																					
Exercises to Improve Straightening																					
15																					
16																					
17																					

	Week Of							Week Of							Week Of							
	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	
Exercises to Improve Balance & Walking																						
18	Side to side weight transfers																					
19	Fwd & back weight transfers																					
20	Mini Knee Bends																					
21	Toe-Heel Ups																					
22	One Leg Balance																					
Exercises to Improve Strength																						
23	Resisted Knee Straightening																					
24	Resisted Knee Bend																					
25	Sit to Stand																					
26	Wall Slides																					
27	Stepping Up/Down																					
28	Side Steps																					
29	Split Squat (lunge)																					
Measure It!																						
Week Of																						
Range of Motion							= Bend	Week Of							= Bend	Week Of						
							= Straight								= Straight							
Strength							= Front of Thigh								= Front of Thigh							
							= Back of Thigh								= Back of Thigh							

Helpful Resources

Internet Resources:

The Arthritis Society: www.arthritis.ca

Osteoarthritis Service Integration System (OASIS): www.vch.ca/oasis

Physiotherapy Association of British Columbia (PABC):

www.bcphysio.org To find a physiotherapist in your community.

Canadian Orthopedic Foundation: www.canorth.org

American Academy of Orthopaedic Surgeons: <http://orthoinfo.aaos.org>

Other Orthopedic Sites: www.myjointreplacement.ca

www.eOrthopod.com

www.mayoclinic.com

Please note: When looking for information on the internet, visit government, university and professional association web sites. Not all information found on the internet is credible, reliable or correct.

Books:

Before During & After Hip and Knee Replacement Surgery:

2008, developed by OASIS at Vancouver Coastal Health in partnership with staff from all BC Health Authorities. Ask your surgeon for a copy or go online at <http://vch.eduhealth.ca> or email: pthem@vch.ca and quote Catalogue No. FB.130.B393

Total Knee Replacement & Rehabilitation, The Knee

Owner's Manual: 2004, Daniel J. Brugioni, Jeff Falkel.

To order email: sales@hunterhouse.com or website: www.hunterhouse.com

DVD:

A Patient's Guide to Joint Replacement Surgery (DVD): 2007,

Provincial Hip and Knee Arthroplasty Collaborative. For copies contact:

Valerie MacDonald RN MSN, Fraser Health CNS Orthopaedics/Surgery

C/O Burnaby Hospital ISD area, 3935 Kincaid Street, Burnaby BC, V5G 2X6

Graphic images adapted from: Visual Health Information, Therapy Skill Builders, Physio Tools

A copy of this guide can be downloaded from the
OASIS website: www.vch.ca/oasis or <http://vch.eduhealth.ca>.
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