

DRAFT

Before and After  
**Exercise Program**  
for Knee Replacement Surgery



## Before Surgery

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### Why is exercise important?

- Helps to maintain the movement and flexibility of your knee
- Improves your strength
- May speed up your recovery after surgery
- Gives you a chance to learn and become confident with the exercises
- Less postoperative pain
- Greater overall satisfaction with the surgery
- Helps to reduce or maintain body weight or body fat (extra weight puts extra strain on your knee)
- Improves your well-being and may help with sleep

**Caution: If you have too much pain in your knee to do exercises, please talk with a physiotherapist (PT) or your doctor.**

## Acknowledgments

This revised booklet is based on the original document produced in 2005 by a variety of organizations. We would like to acknowledge the contribution made by:

The Mary Pack Arthritis Program

Sunshine Coast, Powell River

Vancouver Hospital

Richmond Hospital

This edition of the booklet was developed by a sub-committee of the Provincial Rehab Advisory Group (PRAG) made up of physiotherapists in each of the following Health Authorities



Vancouver Island Health Authority



Northern Health Authority



Interior Health Authority



Vancouver Coastal Health and the Osteoarthritis Services Integration System



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

### Exercise guidelines:

- Always check with your PT or doctor before starting a new exercise program
- **Try the exercises on page 11 and 12 to prepare your knee for surgery**
- If any of the exercises increase the pain or swelling in your knee, stop and talk to your PT or doctor

## Why do my arms need to be strong before surgery?

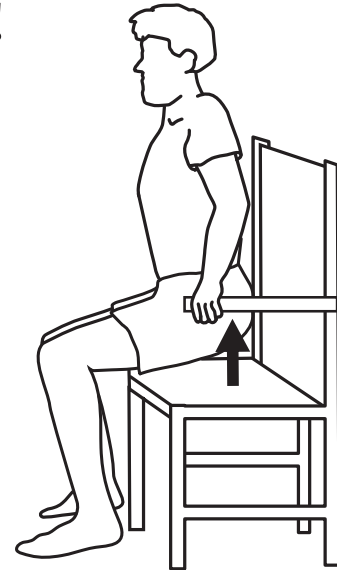
You need strong arms to use your walker (or crutches), to help you get out of bed, and stand up from chairs. The muscles on the back of your arm (called: triceps) are the ones to work on!

### Arm chair push-ups work your triceps!

- With your elbows bent, and hands on the arms of the chair
- Push down through your hands to lift your body off the chair.
- Hold 5 seconds.

Repeat \_\_\_\_\_ times.

Repeat \_\_\_\_\_ times a day.



**Follow the additional pre-operative exercises (pages 11 and 12) and warm-up guidelines on (page 14).**

### Please Note:

- If your limp concerns you when you walk or it is increasing the pain in your knee please consult with a PT.
- If you have difficulty sleeping due to knee pain, follow the guidelines on page 3 of this guide.
- If your knee becomes painful and swollen, follow the guidelines on page 4, 5 and 6 of this guide.

## After Surgery

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### Why is exercise and early knee movement important?

#### Exercise helps to:

- Regain the movement in your new knee joint
- Reduce swelling in your knee and lower leg
- Prevent blood clots
- Control your pain
- Activate the muscles which support your knee
- Improve your walking
- Prevent constipation
- Improve your sleep

### What can I do to improve my sleep?

It is normal to have some sleepless nights for 12 weeks following your knee surgery.

#### Tips for a better sleep:

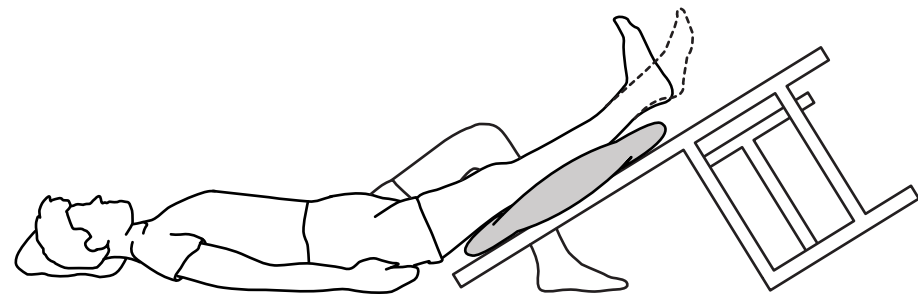
- Ice your knee before bed to help with pain (follow instructions on pages 5 and 6).
- Talk to your general practitioner (GP) about pain pills
- Do some gentle knee movements (exercise #5, page 12) and do ankle pumps (page 5) to relax the muscles
- When on your side, use a pillow between your knees
- When on your back, elevate the operated leg with pillows (see page 4).
- If you need to sleep in a reclining chair, use pillows to support and straighten your knee

## How can I help reduce pain and swelling in my knee?

- Use the good resting position described below
- Use ice packs by following instructions on pages 5 and 6
- While awake, change positions often between sitting, standing, and walking (every 20 minutes)
- Try ankle pumps on page 5 to help with blood flow
- Use your walking aid (walker/crutches/cane)
- Plan a rest day after a busy day
- Practice deep breathing exercises to help with pain and relaxation
- Use your pain pills as prescribed by your GP and tell your doctor if the pain is too much or if you are not improving
- Talk to your PT about other strategies

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

## Good resting position:



- Lie down 3x/day for 30 minutes with leg raised and supported for example on; a wedge, with pillows, arm rest of couch and upside down chair.
- **Keep knee straight on the pillows** with foot and ankle higher than heart
- Use ice if needed (follow ice guidelines on pages 5 and 6)
- Do ankle pumps (page 5)

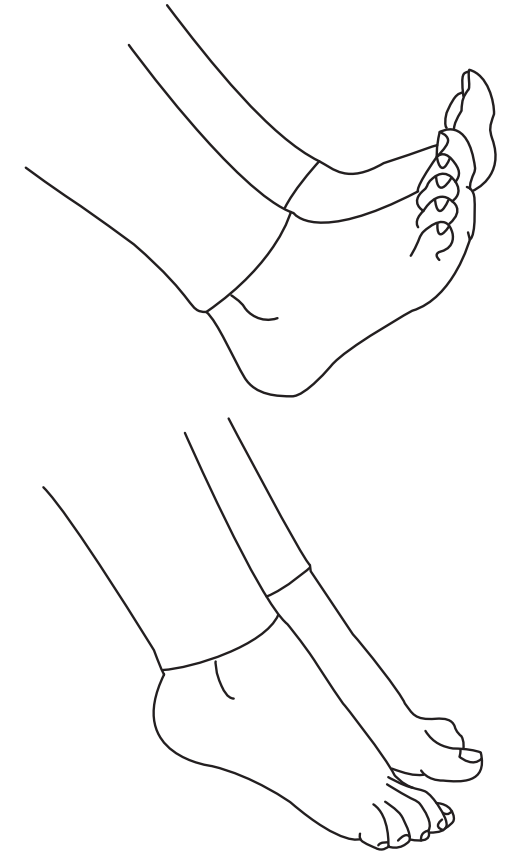
## Ankle Pumps:

**Good exercise to improve blood flow and decrease risk of blood clots!**

- Lying down, move feet up and down.
- When sitting, place feet flat on floor, lift toes up then lift heels up

Repeat \_\_\_\_\_ times.

Repeat \_\_\_\_\_ times a day.



## Ice Guidelines:

### Use ice when:

- The skin around your knee is hot to touch
- You notice more swelling in your knee
- You have pain in your knee
- After doing your exercises

**Please Note:** You may apply ice before exercise to help with pain but it may limit the flexibility of your knee during your exercises.

## How should I ice?

**There are many ways to ice. Here are a few examples:**

- Flexible gel packs, bag of frozen peas or plastic bag with crushed ice
- When using ice, it is important to wrap it in a damp cloth prior to placing the ice on your skin.
- Make sure there is good contact between the ice and your skin.
- Avoid getting the incision wet by placing clean plastic wrap over the incision before applying the ice.
- Ice your knee in the most comfortable position
- To improve your range of motion you may ice your knee:
  - in the most bent position to help with bending or
  - in the most straight position to help with straightening
- Ice Sequence:
  - Leave “ON” for 10 minutes
  - Take it “OFF” for 10 minutes
  - Put it back “ON” for a final 10 minutes.
  - Can be repeated 4-6 times per day (place ice pack in freezer in between).
- If this is not practical check with your PT.

## Do Not Use Ice If:

- You are very sensitive to cold (e.g. fingers or toes turn white or blue)
- The skin around your knee is so numb that you can not tell whether something is too hot or too cold
- Your doctor has told you that your circulation to your legs is poor and/or you should not use ice or heat

**Caution: If using a bag of peas, make sure to mark the bag “Do Not Eat”. Eating peas that have been repeatedly thawed and frozen can lead to serious illness. Throw the bag out once you are no longer using it for icing.**

## Why do I need walking aids?

Walking aids such as walkers, crutches and canes:

- Help to decrease the stress on your new knee joint and protect healing tissues
- Help you to walk better and with less pain
- Help you to have better balance and lessen the chance of falling

## For how long do I need to use my walking aid?

Until your PT or surgeon tells you, to change or to stop using it.

## Walking Tips:

- Only change the aid when you can walk without limping
- Use the walking aid that your PT has measured and chosen for you to use
- Wear supportive non-slip shoes
- Walk with even smooth steps
- Bend your knee with each step
- Start by walking on a flat, even surface
- Slowly increase the distance you walk each week
- Record your distance in the log at the back of the book

## How can I avoid back pain after surgery?

Back pain after knee surgery is common due to changes in how you walk and move (talk to your PT). Core stability exercises help to strengthen the stomach muscles and pelvic floor muscles that support your lower back and may ease back pain.

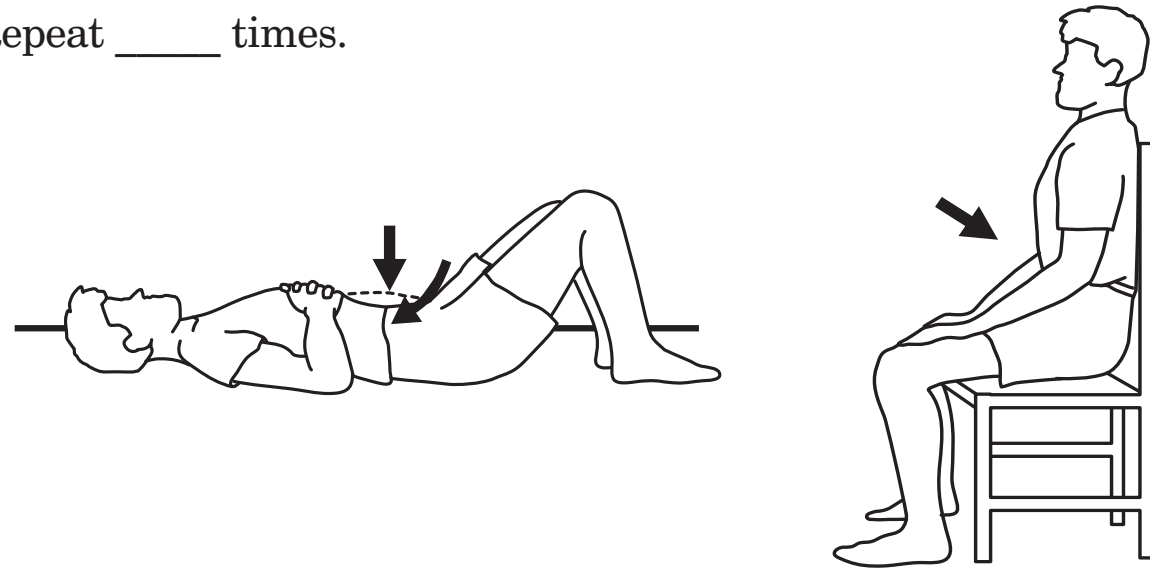
## Good exercise to help with core stability:

### Lying in bed or Sitting with back supported:

- Feet flat, knees bent
- Do relaxed breathing
- Gently pull belly button in towards spine
- Tighten muscles that stop the flow of urine (ask your PT to explain)

Hold and count \_\_\_\_ 10 seconds out loud.

Repeat \_\_\_\_ times.



## First 3 Weeks After Surgery

The goals in this guide are to help you along the path to recovery. Remember each person heals differently and the time it takes to meet the goals may differ from person to person. A positive attitude and strong determination will help your recovery process!

### Goals:

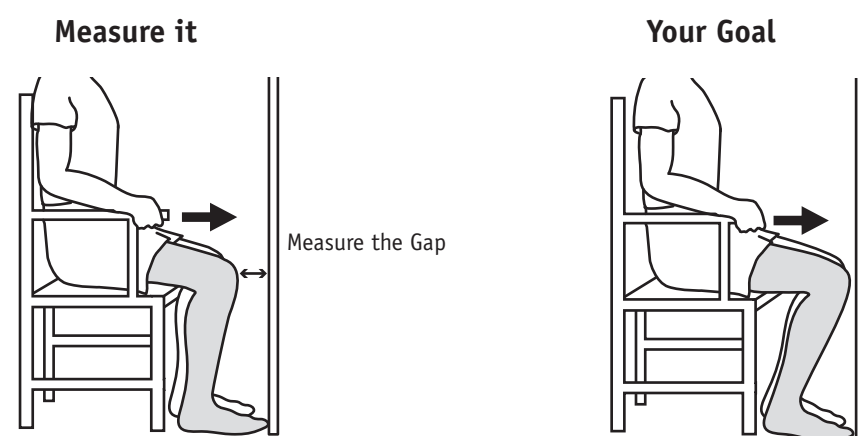
- Have knee pain and swelling under control
- Get adequate sleep
- Have regular bowel movements, drink plenty of water
- Have 90 degrees of knee bend
- Be able to straighten your knee within 5 degrees (no more than three finger widths) on a hard surface

## Self Checks

**Knee Bend:** To sit in a regular chair you need 90 degrees of knee bend

### Measure it!

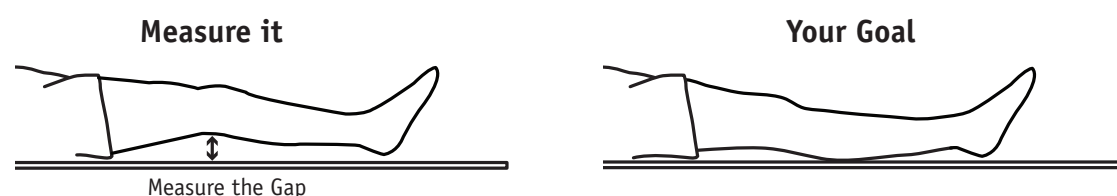
- Sit on chair with toes touching a wall
- Bend your knee by easing forward on the chair
- Measure the gap between the wall and your knee as shown below and record it (use the same chair each time)
- The goal in the first 3 weeks is to have your knees over your toes



**Knee Straight:** To walk normally (without a limp) you will need to fully straighten your knee and have 65 degrees of knee bend:

### Measure It!

- Lie on your back, press your knee down on to a firm surface and have someone measure the gap as shown below
- Goal is to have no gap between the knee and the firm surface
- Keep foot relaxed and toes forward (be consistent with foot position each time)

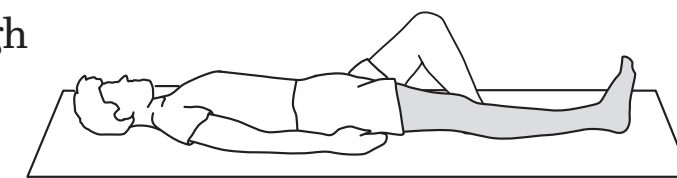


## Exercises Before & First 3 Weeks After Surgery

- Follow your PT's instructions
- Use the log on pages 32-35 to record your exercises

### 1. (a) Thigh Squeezes

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



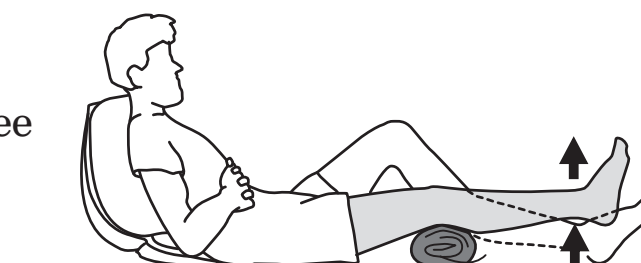
Hold \_\_\_\_ seconds

Repeat \_\_\_\_ times. Do \_\_ times per day

Pre-Op  Post-Op

### (b) To progress the exercise:

- Place large rolled towel under knee
- Press knee into rolled towel
- Straighten leg



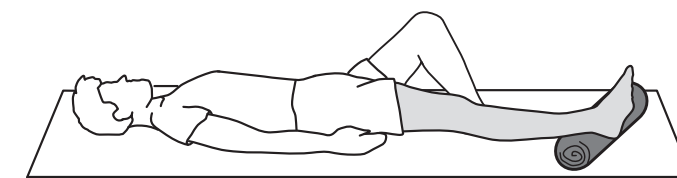
Hold \_\_\_\_ seconds

Repeat \_\_\_\_ times. Do \_\_ times per day

Pre-Op  Post-Op

### 2. Knee Straightening

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



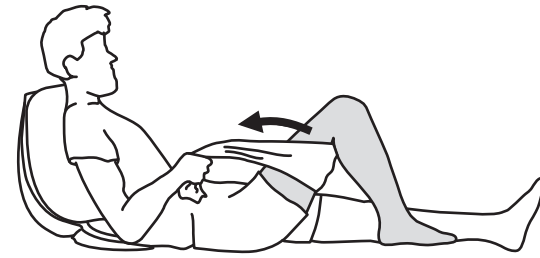
Hold \_\_\_\_ seconds

Repeat \_\_\_\_ times. Do \_\_ times per day

Pre-Op  Post-Op

### 3. Knee Bend (heel slides)

- On slippery surface (garbage bag)
- Use hand or towel behind thigh
- Bend knee
- Pull heel towards bottom
- Easier if good leg is bent
- Progress to bending without a towel



Hold \_\_\_\_ seconds

Repeat \_\_\_\_ times. Do \_\_ times per day



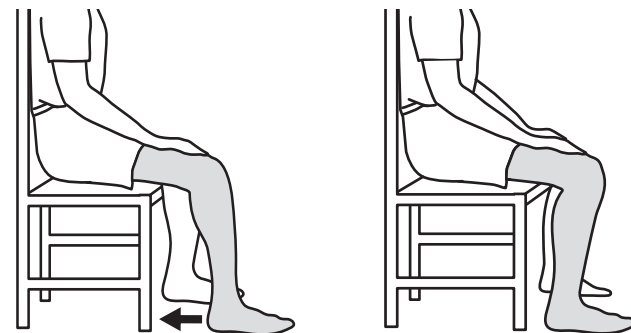
Pre-Op



Post-Op

### 4. Sitting Knee Bend

- Keep feet on floor
- Slide heel of operated leg back to bend your knee
- To progress see exercise #13



Hold \_\_\_\_ seconds

Repeat \_\_\_\_ times. Do \_\_ times per day



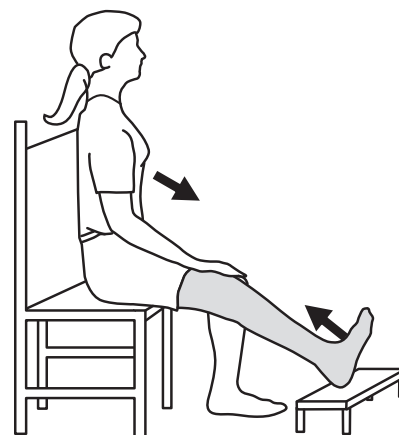
Pre-Op



Post-Op

### 5. Back of Thigh Stretch (hamstrings)

- Sit on edge of firm seat and place heel on step
- Straighten operated leg as shown
- Pull toes/foot back towards face
- Keep back straight
- Slowly bend forward from hips until gentle stretch is felt on the back of the thigh



Hold \_\_\_\_ seconds

Repeat \_\_\_\_ times. Do \_\_ times per day



Pre-Op



Post-Op

## 3 to 6 Weeks After Surgery

By 3 weeks post surgery, your knee should feel better and exercises may be able to be advanced or modified to reach your goals.

You may find that pain and swelling increases as you begin new exercises, gain mobility or return to work. Continue to follow the guidelines on pages 3, 4, 5 and 6 as needed to manage sleep, and to control pain and swelling.

At this stage you may find bending harder than straightening or vice versa. You will still need to work on both. The next set of exercises, are broken up into sections to help you work on the area you need the most.

### How much bending and straightening can I expect in my new knee?

#### How much you achieve depends on:

- How much movement you had prior to surgery
- Your willingness to do the exercises and get the knee moving
- The type of implant used in your knee - some allow for more knee bend than others

**Please Note:** Discuss with your surgeon your individual range of motion goals. Remember each person heals differently and the time it takes to meet the goals may differ from person to person.

#### Goals:

- Pain and swelling still under control
- Have the knee fully straight
- Be walking normally (knee fully straight needed)
- Have approximately 105-120 degrees of knee bend
- Go up and down stairs normally (95 degrees of bend needed)
- Be riding a stationary bike (105 degrees of bend needed)
- Be able to sit and stand from an average chair (105 degrees of bend needed)

## If by 6 weeks you have not been able to achieve your goals:

- Discuss your concerns with your surgeon during your scheduled follow up visit
- Continue with your exercise program
- Continue to see a PT in your community

### Warm Up Guidelines

It is important to warm up before you start your exercises to prepare the muscles and joints around your knee for movement and stretches. Suggestions for warming up include:

- Walking forward, side ways and backwards for 10 minutes
- Applying moist heat to the front and back of the thigh (not your knee) for 5-10 minutes to help improve blood flow (refer to the flexibility guidelines on page 27)
- Use a stationary bicycle for 5-10 minutes

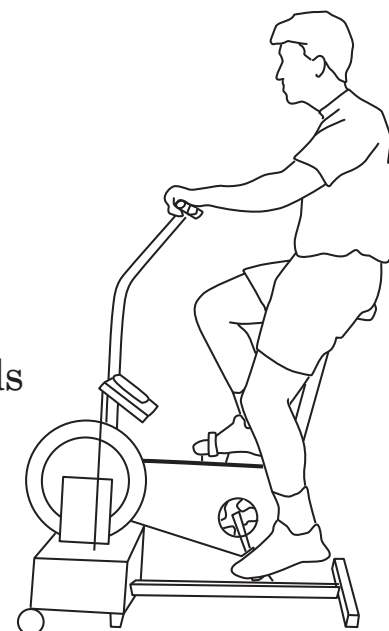
### Stationary Bicycle:

- Upright or seated bike
- Helps gain movement
- Improves your blood flow

### Technique:

- Adjust seat so your operated leg is almost straight on the pedal
- Rock pedals gently back and forth
- Progress to cycling forwards and backwards
- As you improve lower the seat
- Slowly add light resistance

Pre-Op       Post-Op       Advanced



## Exercises to Improve Your Walking

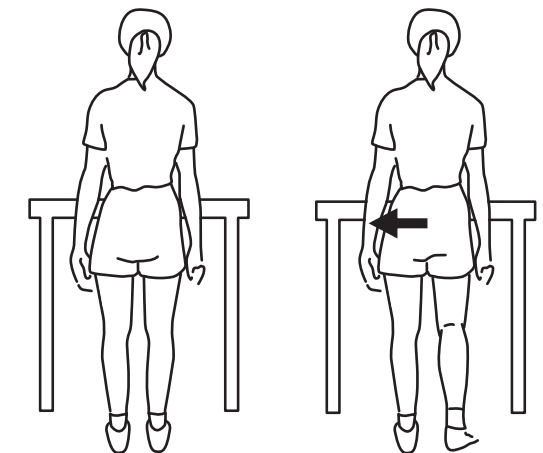
For exercises #6-10 it is important to engage your core muscles (page 8) as you start the exercise

### 6. Side to Side Weight Transfers (balance)

- Stand facing counter or table
- Feet hip width apart
- Shift your weight gently side to side
- Progress to side stepping

Repeat \_\_\_\_ times

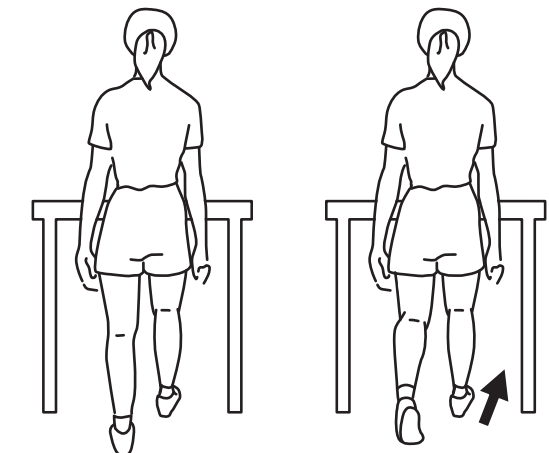
Pre-Op       Advanced



### 7. Forward and Back Weight Transfers (balance)

- Stand facing counter or table
- Place one foot in front of the other
- Shift your weight forward and back
- Repeat \_\_\_\_ times
- Switch foot position and repeat.
- Progress to stepping forwards and backwards

Pre-Op       Advanced



## 8. Mini Knee Bends

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

Hold \_\_\_\_ seconds       

Repeat \_\_\_\_ times.    Pre-Op    Advanced

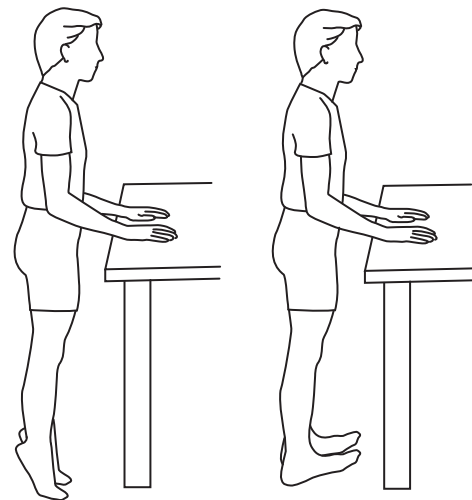


## 9. Toe-Heel Ups

- Hold firm counter or table for support
- Rise up on toes
- Hold \_\_\_\_ seconds
- Now rock back on heels, lifting toes up

Hold \_\_\_\_ seconds       

Repeat \_\_\_\_ times.    Pre-Op    Advanced

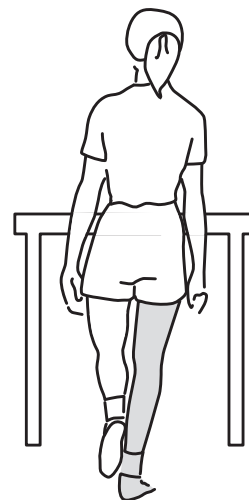


## 10. One Leg Balance

- Stand facing counter
- You can place chair behind you for safety
- Stand on operated leg
- Lift non-operated leg off floor
- Keep pelvis level and back straight

Hold \_\_\_\_ seconds       

Repeat \_\_\_\_ times.    Pre-Op    Advanced



## Exercises to Improve Bending

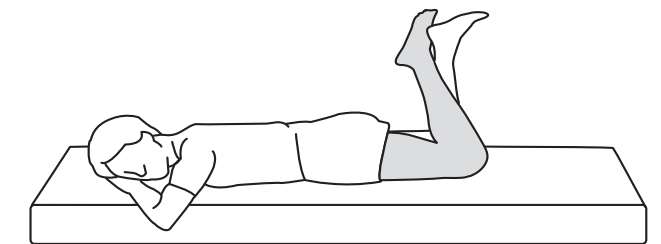
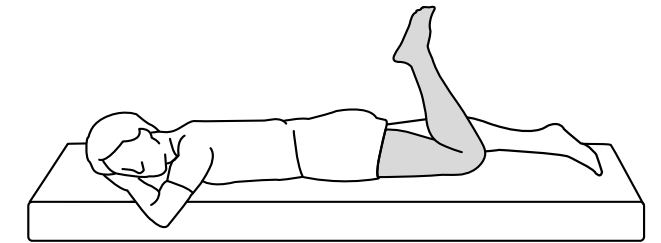
**Note:** Exercises #3 and #4 on pages 13 also help with bending.

### 11. Active Knee Bend

- Bend knee
- Bring heel towards bottom
- Hold \_\_\_\_ seconds
- Then straighten
- Can use non-operated leg to bend operated leg

Repeat \_\_\_\_ times

     
Pre-Op    Advanced

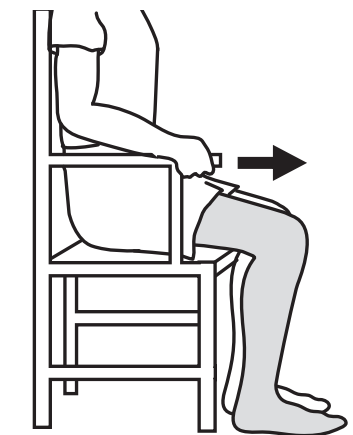


### 12. Passive Knee Bend

- Keep feet on floor and bend knees
- Keep foot of operated leg fixed on floor
- Slide bottom forwards on chair

Hold \_\_\_\_ seconds    Repeat \_\_\_\_ times.

     
Pre-Op    Advanced

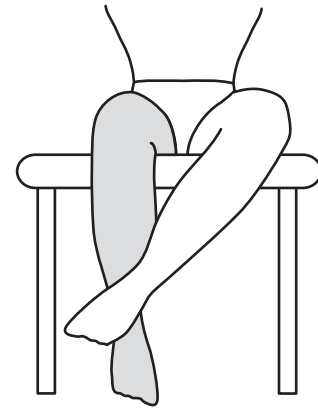


### 13. Assisted Knee Bend

- Sit on chair, knees bent
- Cross non-operated leg over operated leg
- Gently push with good leg until stretch is felt on front of operated knee

Hold \_\_\_ seconds Repeat \_\_\_ times.

Pre-Op  Advanced

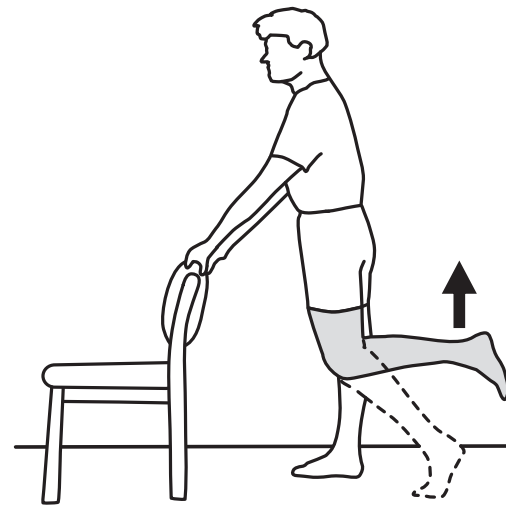


### 14. Standing Knee Bend

- Stand on non-operated leg
- Hold chair or firm counter for support
- Bend operated knee
- Keep thighs in line and knees together

Hold \_\_\_ seconds Repeat \_\_\_ times.

Pre-Op  Advanced

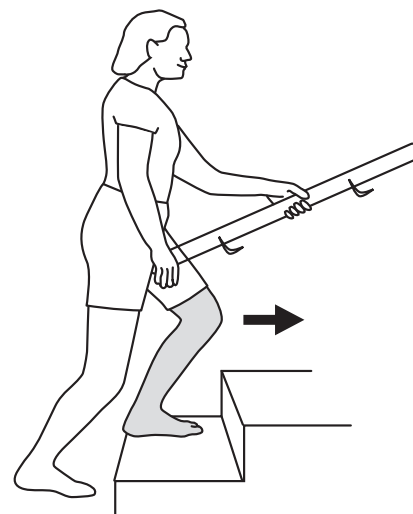


### 15. Step Lunge

- 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.

Pre-Op  Advanced



## Exercises to Improve Straightening

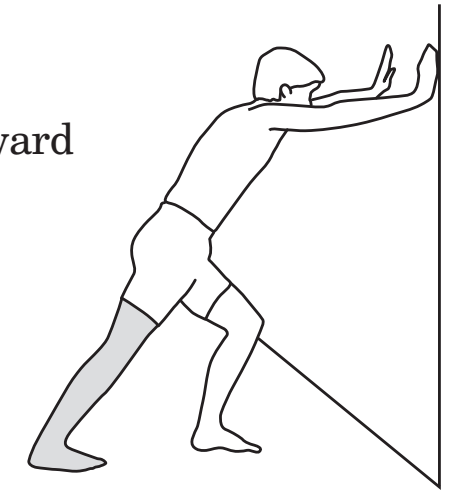
**Note:** Exercises #1, #2, and #4 on pages 11 and 12 also help with straightening.

### 16. Calf Stretch

- Keep back leg straight
- Keep heel on floor and toes pointing forward
- Lean into the wall until stretch is felt on the calf of your back leg

Hold \_\_\_ seconds Repeat \_\_\_ times.

Pre-Op  Advanced

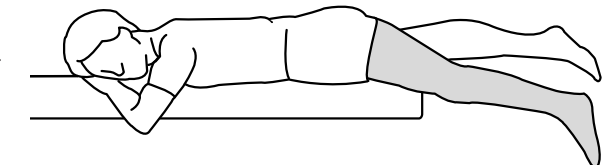


### 17. Passive Knee Straightening

- Lie on stomach
- Hang operated leg over edge of bed
- Start with foot and ankle off the bed
- Progress to kneecap off the bed
- Let gravity pull leg straight

Hold \_\_\_ seconds

Repeat \_\_\_ times. Pre-Op Advanced

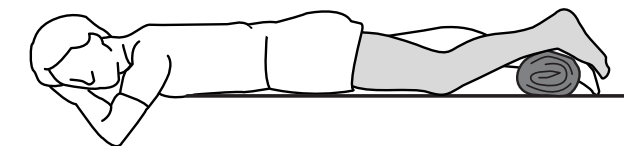


### 18. Active Knee Straightening

- Lie on stomach
- Tuck toes up
- Straighten knee

Hold \_\_\_ seconds

Repeat \_\_\_ times. Pre-Op Advanced



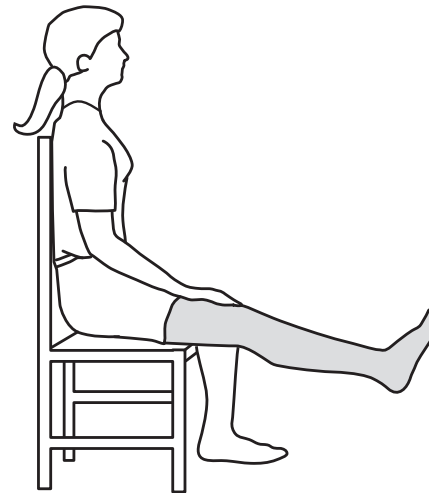
# Exercises to Improve Strength and Balance

## 19. Sitting Knee Straightening

- Sit on firm chair
- Keep back of thigh on chair
- Straighten operated leg
- Progress to adding ankle weights

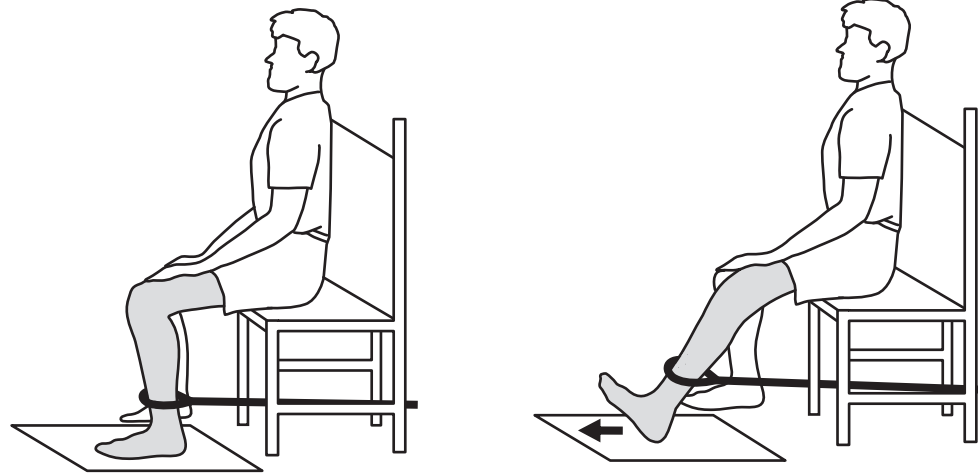
Hold \_\_\_\_ seconds Repeat \_\_\_\_ times.

Pre-Op       Advanced



## 20. Resisted Knee Straightening

- Attach elastic to secure object
- Sit forward on chair and place operated leg on towel
- Attach elastic to ankle of operated leg as shown
- Tighten the muscles at the top of the thigh
- Slide leg forward **along the floor** to straighten



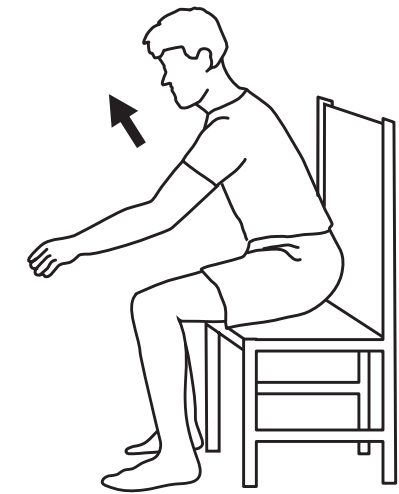
Hold \_\_\_\_ seconds              
 Repeat \_\_\_\_ times.      Pre-Op      Advanced

## 21. Sit to Stand

- Sit on edge of firm high chair
- Lean forward nose over toes
- Press feet into the floor
- Without using hands
- Stand up using your legs
- Slowly sit back on chair

Repeat \_\_\_\_ times

Pre-Op       Advanced

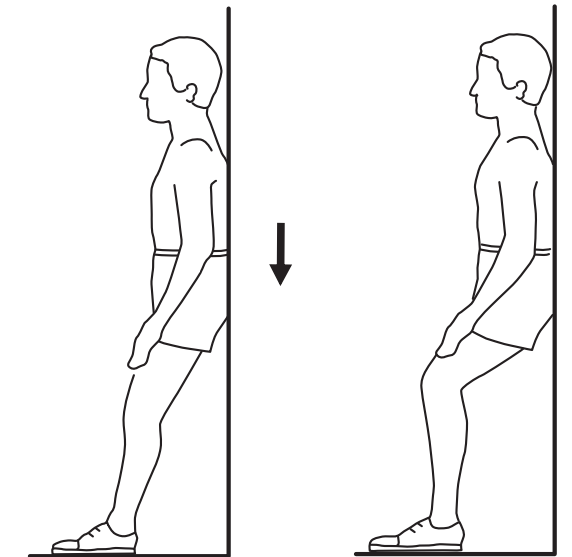


## 22. Wall Slides

- Stand with back against wall
- Place feet shoulder width apart and out from the wall
- Place hands on thigh
- Slowly slide down wall a short distance
- Keep knees over second toes
- Slowly slide back up the wall

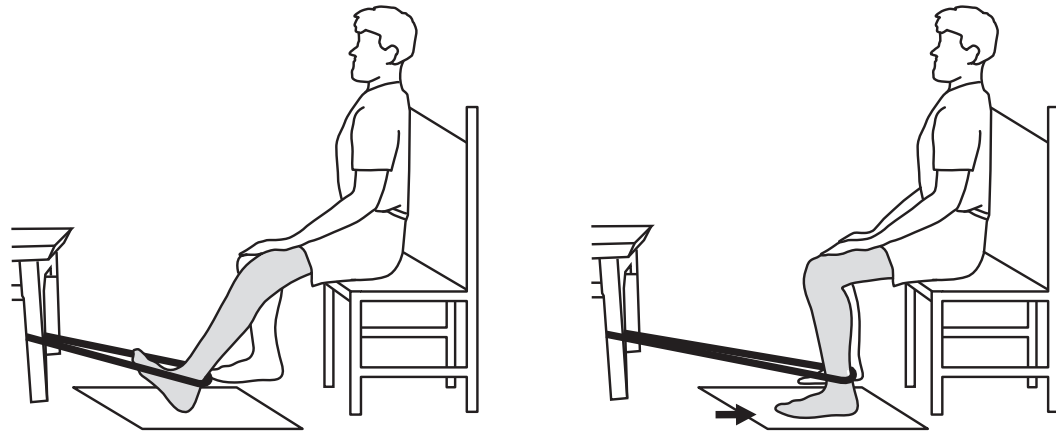
Repeat \_\_\_\_ times

Pre-Op       Advanced



## 23. Resisted Knee Bend

- Attach elastic to secure object
- Sit forward on chair and place operated leg on towel
- Attach elastic to ankle of operated leg as shown
- Hold \_\_\_ seconds
- Tighten the muscles at the back of the thigh
- Slide leg backwards along the floor



Repeat \_\_\_ times

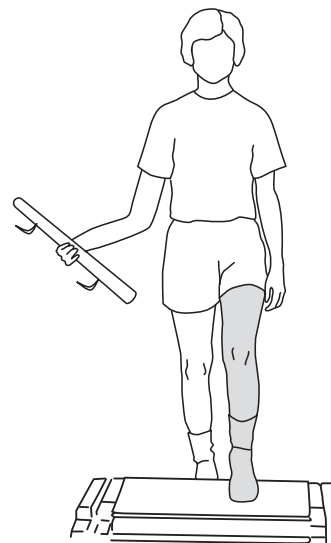
Pre-Op  Advanced

## 24. Step Ups

- Stand facing low step
- Hold firm counter or rail for balance
- Place foot of operated leg on step
- Slowly step up
- Slowly return to starting position
- Keep pelvis level at all times

Repeat \_\_\_ times

Pre-Op  Advanced

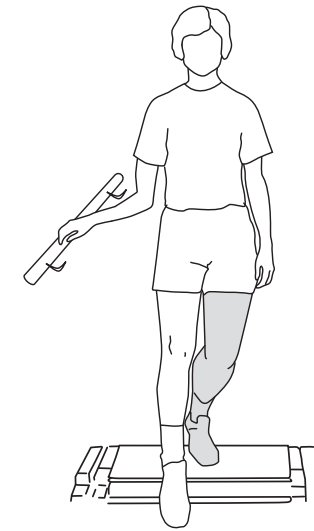


## 25. Step Downs

- Stand on low step
- Hold firm counter or rail for balance
- Slowly step down with non-operated leg
- Slowly return to starting position
- Keep pelvis level at all times

Repeat \_\_\_ times

Pre-Op  Advanced

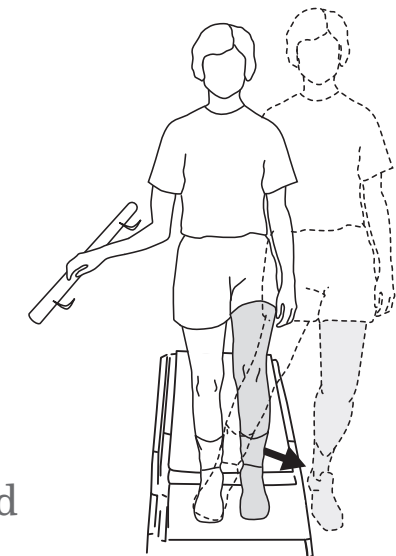


## 26. Side Steps

- Stand next to low step
- Hold firm counter or rail for balance
- Slowly step up with operated leg
- Slowly step down with non-operated leg
- Keep knee over second toe

Repeat \_\_\_ times

Pre-Op  Advanced

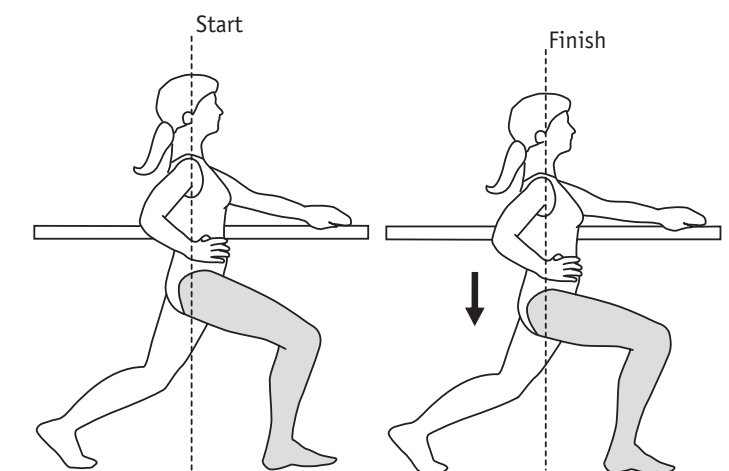


## 27. Split Squat (lunge)

- Hold firm counter for support
- Step forward with operated leg
- Keep knee behind toes and over ankle
- Slowly bend knee (maximum 60 degrees)
- Return to starting position
- Switch sides

Repeat \_\_\_ times

Advanced



## 6-12 Weeks After Surgery

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By 6-12 weeks after surgery you will feel more confident to resume day-to-day activities and you will be up on your feet for longer periods of time. During this time, continue to use the guidelines for pain and swelling on pages 4, 5, 6 and 7.

**Note:** Before progressing your exercises, please read the guidelines on strength training, flexibility and balance on pages 25-27. Please talk to your PT if you need further help.

### Goals:

- Be walking longer distances without a limp
- Have about 105-120 degrees of knee bend
- Have the knee fully straight

### 6-12 weeks exercise program should include:

- Bending and straightening exercises
  - as needed to reach your goal
- Progression of strengthening exercises (page 25-26)
- Progression of balance and stability exercises (page 28)

## 3 Months to 1 Year After Surgery

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### General Activity Guidelines After Total Knee Replacement

The main goal after joint replacement surgery is to enjoy your life again. Here are a few things to keep in mind:

- Fewer people require revision surgery early on if they keep active after knee replacement
  - Being active will increase your:
    - aerobic fitness and exercise tolerance
    - coordination and postural reflexes (decrease risk of falling)
    - muscle strength
    - bone quality (better fixation of the prosthesis)
    - metabolism (keeping your weight under control)
- More people require revision surgery later on if they do too much activity
- A good level of activity will increase the life of the joint replacement

### How long will it take to strengthen the muscles around my knee joint?

- Most of the strength was lost during the years prior to surgery
- It is important to commit to a long term strengthening program to both regain strength and protect your new joint replacement
- **The operated leg will take up to a year or more to regain its normal strength**

## Strength Training Guidelines

- There should be a sense of momentary muscle fatigue on completing 8-15 repetitions. You may notice your muscle feels a little shaky or you may find you can't complete the full movement
- No muscle fatigue during or after doing strengthening exercises means the muscle is not being challenged enough and will not increase its strength.
- Resistance should be light enough to allow you to complete at least 8 repetitions.
- When you can complete 1 set of 15 repetitions over 3 strengthening sessions you may increase the resistance
- To make the exercise more difficult:
  - Add resistance (add weights) increasing by 2-3 lbs
  - Or increase the number of repetitions
  - Or do the movement through greater range
- To maintain your current strength:
  - Strength train 2 days per week
- To increase your current strength:
  - Strength train 3 days per week
- Strengthening exercise sessions should be separated by at least 1 day of rest and not done more than 4 days a week to allow the muscles to recover.

## Strength Training Precautions

- Too much muscle fatigue will temporarily decrease your balance and joint position sense, so walk carefully after strengthening exercises
- Pain and inflammation may limit exercise choices
- If joint is painful or inflamed, do not exercise the muscle to fatigue:
  - Use lower resistance (sub-maximal), or no resistance
  - Do fewer repetitions
  - Do isometric exercises (example exercise #1 thigh squeezes page 11). If doing isometric exercises, hold for 6 seconds and at 50-60% of your maximal effort.

## Flexibility Guidelines

- If you had tight muscles or contractures before surgery it may take longer after joint replacement to regain movement
- It is important to feel a stretch in the muscle or tissue being stretched. If no stretch is felt, no change in flexibility will likely occur.
- Stretch at the time of day when pain and stiffness are least.
- Hold the end of the stretch for 30 seconds (longer if no change is occurring).
- Stretch at the end of your exercise session, after a walk or when your muscles are warm. Warm muscles are easier to stretch.
- Relax and breathe slowly during the stretch.
- Fewer stretches held for a longer period may be more effective for some muscles and shortened tissues.
- Stretch at least 3 days per week, preferably daily for the first few weeks following surgery.
- These are ways to use heat to help with stretching:
  - Place your leg in the stretched position.
  - Apply heat on the tight muscles (where the stretch or tightness is felt) for 1-10 minutes.
  - Add a light weight (if tolerated) to help increase the stretch while the heat is still on for a further 5 minutes. Remove the heat and move the joint.
  - Repeat 2 times.
- Stretches may be done in many different ways. Ask your PT how to change a stretch to:
  - avoid pain
  - if your joint is inflamed
  - if you cannot feel a stretch

## Balance Exercise Guidelines

It is important to re-train and challenge your balance after total joint replacement to decrease the risk of falling. When practicing these activities have a firm counter or railing within reach.

### How can I challenge my balance?

- Walk in water (forwards, backwards, sideways)
- Stand with feet close together
- Stand on one foot and close your eyes
- Stand on an uneven surface for example:
  - Couch cushion
- Stand on a Bosu ball, wobble, rocker board, or sit fit (advanced exercises)
- Walking drills on a 2"x4" board
- Tai chi
- Ask your PT for other ways to challenge your balance and wake up your knee joint proprioception (your ability to sense the position and movement of your knee joint)

**Tip:** Stand in front of a mirror when doing your balance exercises and engage your core muscles for better control (page 8)

## What should I consider when starting an activity or exercise?

- Is it going to be done for:
  - Exercise? (regularly 3 times or more per week and higher intensity)
  - Recreation? (less frequency, less intensity)
- What is my risk of falling with this activity?
- How much force am I putting on the joint?
  - Activities with high joint forces should not be performed on a regular basis.
- Does the activity involve twisting, or quick stops?
- Do I have the skills to do the activity?
  - New technically demanding activities after total joint replacement are not recommended
  - If you don't have the skills needed for the activity, there will be more joint loading and greater risk of injury
- Do I have a healthy weight?
  - If you are carrying extra weight on your body, you are also placing extra stress on your new joint
  - Maintain a healthy weight to increase the life of your joint replacement

## Typical Knee Joint Loads During Exercise

The joint loads below are based on:  
Westby MD. Arthritis Care & Research  
2001: 45: 501.

Activity	Knee Joint Force (times body weight)	Knee Joint Force 150 pounds person	Knee Joint Force 200 pounds person
Walking – regular pace	2.8	420 pounds	560 pounds
Walking – fast pace	4.3	645 pounds	860 pounds
Fast downhill walking	8	1200 pounds	1600 pounds
Fast downhill walking using ski poles	6.4	960 pounds	1280 pounds
Cycling *	1.2	180 pounds	240 pounds
Running (7 mph)	6	900 pounds	1200 pounds
Downhill skiing medium slopes	10 beginners 3.5 skilled skier	1500 pounds 525 pounds	2000 pounds 700 pounds

### Cycling\*

\* Increasing the resistance, increases the knee joint force

\* Increasing the speed, results in little to no change in knee joint force

\* Raising the seat height will decrease the joint force

## Activity Recommendations After Joint Replacement

The activity recommendations below are based on  
Healey et al 2001, and The Knee Society at [www.kneesociety.org](http://www.kneesociety.org).

Recommended/ Allowed	Allowed with Experience	Not Recommended	No Conclusion
Walking	Speed walking	Running/Jogging	Inline Skating
Gentle hiking	Hiking and Backpacking	Rock Climbing	Weight Lifting
Swimming, water aerobics	Aerobics Sailing	Waterskiing	
Cycling • Stationary • Recumbent • Outdoor	Skiing • Alpine (easy groomed runs) • Cross country skiing	Hockey Football Basketball Baseball Soccer	
Shuffleboard	Ice Skating	Snow Boarding	
Horseshoes Scuba diving	Snowshoeing with poles on easy trails	Handball Racquetball Squash	
Ballroom dancing	Ballet	Badminton	
Bowling	Doubles Tennis	Singles Tennis	
Golfing with cart	Horseback riding	Karate	
	Softball Volleyball		

**Please consult with your surgeon on other activities you may want to do.**

<b>EXERCISE LOG</b>														
(please record total number of repetitions per day)														
Exercises Before Surgery & First 3 Weeks After Surgery		Week Of						Week Of						
		S	M	T	W	T	F	S	S	M	T	W	T	F
1	(a) Thigh squeezes													
	(b) Thigh squeezes													
2	Knee straightening													
3	Knee bend													
4	Sitting knee bend													
5	Back of thigh stretch													
3 - 6 Weeks After Surgery Exercises To Improve Walking														
6	Side to side weight transfers													
7	Fwd & back weight transfers													
8	Mini knee bends													
9	Toe & heel ups													
10	One leg balance													
Exercises To Improve Bending														
11	Active knee bend													
12	Passive knee bend													
13	Assisted knee bend													
14	Standing knee bend													
15	Step lunge													
Exercises To Improve Straightening														
16	Calf stretch													
17	Passive knee straightening													
18	Active knee straightening													
Exercises To Improve Strength and Balance														
19	Sitting knee straightening													
20	Resisted knee straightening													
21	Sit to stand													
22	Wall slides													
23	Resisted knee bend													
24	Step ups													
25	Step downs													
26	Side steps													
27	Split squat (lunge)													
	Walking (minutes)													
	Cycling (minutes)													
Measure It!	Week Of						Week Of							
<b>Range of Motion</b>	= Bend = Straight						= Bend = Straight							
<b>Strength</b>	= Front of Thigh = Back of Thigh						= Front of Thigh = Back of Thigh							

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Measure It!	Week Of							Week Of						
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Strength	= Front of Thigh = Back of Thigh							= Front of Thigh = Back of Thigh						

## Other Exercises Recommended by your Therapist

## Helpful Resources

**Please Note:** The resources below are recommended by the team of physiotherapists that developed this booklet. When looking at other sites on the computer, search for government, university and professional association web sites. Not all information found on the internet is credible, reliable or correct.

### **Internet Resources:**

The Arthritis Society: [www.arthritis.ca](http://www.arthritis.ca)

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

Physiotherapy Association of British Columbia (PABC):  
[www.bcphysio.org](http://www.bcphysio.org) To find a physiotherapist in your community.

Canadian Orthopedic Foundation: [www.canorth.org](http://www.canorth.org)

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

Other Orthopedic Sites: [www.myjointreplacement.ca](http://www.myjointreplacement.ca)  
[www.eOrthopod.com](http://www.eOrthopod.com)  
[www.mayoclinic.com](http://www.mayoclinic.com)

### **Books:**

#### **Total Knee Replacement & Rehabilitation, The Knee**

**Owner's Manual:** Authors: Daniel J. Brugioni, Jeff Falkel, Hunter House Publishers 2004. To order this book: Special Sales Department, Hunter House Inc. PO Box 2914, Alameda CA 94501-0914, Phone: (510) 865-5282, Fax: (510) 865-4295

E-mail: [sales@hunterhouse.com](mailto:sales@hunterhouse.com).

Website: [www.hunterhouse.com](http://www.hunterhouse.com) or through Chapters Indigo

#### **Before During & After Joint Replacement Surgery Book:**

(Physical Therapy Department of The Mary Pack Arthritis Program and The Reconstructive Orthopaedic Health Care Team at Vancouver General Hospital January 2005) **Ask your surgeon for a copy.**

**DVD: Patient's Guide to Joint Replacement:** (Provincial Hip and Knee Arthroplasty Collaborative 2007)

**Notes**

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**Notes**

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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](http://www.vch.ca/oasis) or <http://vch.eduhealth.ca>.  
To order more copies email [phem@vch.ca](mailto:phem@vch.ca) and quote Catalogue No. **FB.873.EX.372**  
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