Joint Surgery Program

Robert Wood Johnson University Hospital New Brunswick





Robert Wood Johnson University Hospital

RWJBarnabas HEALTH

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Robert Wood Johnson University Hospital



Preparing for Your Surgery

Welcome!

Thank you for choosing the Joint Surgery Program at Robert Wood Johnson University Hospital (RWJUH) in New Brunswick, a RWJBarnabas Health facility.

Electing to have joint replacement surgery is the first step toward your new, healthy lifestyle.

Each year, more than 700,000 people make the decision to have joint replacement surgery. The surgery aims to relieve pain, restore independence, and return you to a normal, active daily routine.

Great progress has been made in the healing and recovery phase following your joint surgery procedure(s), and you can expect to be up and walking the very same day, with the target goal of returning you to regular activity in six to twelve weeks.

The Joint Surgery Program at RWJUH follows a comprehensive, preplanned course of care and treatment and you will be involved in your treatment every step of the way, because you play a pivotal role in ensuring a speedy and optimal recovery.

Your care team will include physicians, nurses, physical and occupational therapists, and patient care technicians specially trained in total joint care.

You will receive thorough and continuous education to best prepare you for what to expect before, during and after treatment, of care. A preplanned course of treatment and discharge are essential for the best results in joint surgery.

Please use the following information to help guide you with your total joint experience leading up to, during and after your procedure at RWJUH. Your physicians, nurses and therapists may further tailor these guidelines to best fit the care and treatment most appropriate for you.

Keep this reference guide handy for at least the first year after your surgery. Although this guide covers many details and may look overwhelming, it will assist you with your surgery. We recommend reading the entire guide at a pace that suits you.



Program Overview

Robert Wood Johnson University Hospital and RWJBarnabas Health offers a comprehensive approach to total joint replacement and care.

Each step is designed to encourage the best results, culminating in your discharge from the hospital one or two days post surgery. (On rare occasion, discharge is on the third day after surgery).

Features of the program include:

- Dedicated nurses and therapists trained to work with joint patients.
- Family and friends participating as "coaches" in the recovery process.
- A Joint Care Coordinator who assists with coordination of all pre-operative care and discharge planning.
- A comprehensive patient guide for you to follow from before surgery until three months after surgery and beyond.

Scheduling Your Procedure

Your surgeon's office will schedule the date and time of your procedure at RWJUH. You can schedule your preoperative testing appointment and the preoperative joint replacement education class by calling 732.418.8204 between 7am – 2pm Monday – Friday

Verify that you have made an appointment with your medical doctor and have obtained the preoperative tests your doctor has ordered.

You may call the Joint Care Coordinator at any time before to ask questions or raise concerns about your pending surgery.

Preoperative Education: Joint Replacement Class

Special classes are held weekly and prior to surgery for patients scheduled to have joint replacement.

You will only need to attend one class. Members of the team are on-hand to answer any of your questions.

You are encouraged to bring a family member or friend to act as your "coach." The coach's role will be explained in class. If it is not possible for you to attend, please inform the Joint Care Coordinator.

Preoperative Education Classes include helpful information about:

- Understanding your procedure
- What to expect during your hospital stay
- Pain Management
- Prevention of infection
- Discharge planning/insurance/obtaining equipment
- Reviewing your preoperative exercises
- The role of your "coach"
- Meet some of the joint replacement team

Laboratory Testing

If you are going to a laboratory other than a RWJUH Lab for pre-admission testing, you must sign a release form allowing the release of your records to the doctor's office and hospital.



Medication Questions

You should discontinue all anti-inflammatory medications such as aspirin, Motrin®, Naproxen, Vitamin E, etc.

These medications may cause increased bleeding. If you are taking a blood thinner, you will need special instructions for stopping the medication. Your physicians will instruct you about what medications to stop before your surgery.

There are herbal medicines that can interfere with your other medicines. Check with your doctor to understand if you need to stop taking any of your herbal medicines before surgery. (Examples of herbal medicines include, but are not limited to: Echinacea, ginkgo, ginseng, ginger, licorice, garlic, valerian, St. John's wort, ephedra, goldenseal, feverfew, saw palmetto and kava-kava.)

Advance Directives

Advance Directives are a means of communicating to all caregivers the patient's wishes regarding health care. If a patient has a Living Will or has appointed a Health Care Agent and is no longer able to express his or her wishes to the physician, family, or hospital staff, the hospital is committed to honoring the wishes of the patient as they are documented at the time the patient was able to make that determination.

There are different types of Advance Directives and you may wish to consult your attorney concerning the legal implications of each.

LIVING WILLS are written instructions that explain your wishes for health care if you have a terminal condition or irreversible coma and are unable to communicate.

- APPOINTMENT OF A HEALTH CARE AGENT (sometimes called a Medical Power of Attorney) is a document that lets you name a person (your agent) to make medical decisions for you, if you become unable to do so.
- HEALTH CARE INSTRUCTIONS are your specific choices regarding use of life sustaining equipment, hydration and nutrition, and use of pain medications.

On admission to the hospital, you will be asked if you have an Advance Directive. If you do, please bring copies of the documents to the hospital with you so they can become a part of your Medical Record. Advance Directives are not a requirement for hospital admission.

Stop Smoking

It is essential to stop smoking before surgery. Smoking delays your healing process and raises your risk of infection. Smoking reduces the size of your blood vessels and decreases the amount of oxygen circulated in your blood. Smoking can also increase clotting which can cause problems with your heart. Smoking increases your blood pressure and heart rate. If you quit smoking before you have surgery you will increase your ability to heal. If you need help quitting, ask about hospital resources.

Start Preoperative Exercises

Many patients with arthritis favor the painful leg. As a result, the muscles can become weaker making recovery slower and more difficult. For this reason, it is very important to begin an exercise program before surgery as you will learn the exercises at the optimal time and initiate the work towards improving strength and flexibility. This can make recovery faster and easier. If you need professional guidance and assistance in performing these preoperative exercises, a referral to Physical Therapy may be indicated. Always consult your physician before starting a pre-operative exercise plan.

Outpatient Physical Therapy Locations Near You

RWJ Fitness and Wellness Center New Brunswick (Physical and Occupational Therapy) 100 Kirkpatrick Street, New Brunswick, NJ 08901 732.545.0494

RWJ Fitness and Wellness Center Old Bridge 1044 US Highway 9, Parlin, NJ 08859 732.727.2220

RWJ Physical Therapy, Balance and Cardiac Rehab 593 Cranbury Road, East Brunswick, NJ 08816, 732.238.3202

RWJ Physical Therapy and Cardiac Rehab Monroe 111 Union Valley Road, Suite 201-A, Monroe Township, NJ 08831 732.561.8031

RWJ Physical Therapy Marlboro 475 County Road 520, Marlboro, NJ 732.705.9666

Remember that you need to strengthen your entire body, not just your leg. It is very important that you strengthen your arms by doing armchair push-ups because after surgery you will be relying on your arms to support you when walking with the walker or crutches.

You will also rely on your arms to help you get in and out of bed and chairs as well as on and off the toilet. You should also exercise your heart and lungs by performing light endurance activities – for example, walking for 10-15 minutes each day. Do NOT do any exercise that is too painful.



Preparing Your Home for Post-Surgery Stay

It is important to have your house ready for your arrival back home. Use this checklist as you complete each task. Put things that you use often (like an iron or coffee pot) on a shelf or surface that is easy to reach.

- Check railings to make sure they are not loose.
- Clean, do the laundry, and put it away.
- Put clean linens on the bed.
- Prepare meals and freeze them in single serving containers.
- Cut the grass, tend to the garden, and finish any other yard work.
- Pick up throw rugs and tack down loose carpeting.
- Remove electrical cords and other obstructions from walkways.
- Install night-lights in bathrooms, bedrooms, and hallways.
- Install grab bars in the shower/bathtub. Put adhesive slip strips in the bottom of the tub.
- Arrange to have someone collect your mail, remove garbage, and take care of pets.

What to Bring to the Hospital

Bring personal hygiene items (toothbrush, powder, deodorant, electric razor, etc.); underwear, shorts, tops; well-fitted shoes with non-slip soles, such as flat shoes or tennis shoes. You may bring battery-operated items. If you have adaptive equipment such as a walker or reachers, you may have them brought to you after you surgery. Please make sure that personal equipment is labeled clearly.

You must bring the following to the hospital:

- Your Patient Guidebook
- A copy of your advance directives, if you have one
- Your insurance card, driver's license or photo I.D., and any co-payment required by your insurance company

Special Instructions

You will be given specific instructions from your surgeons regarding medications, skin care, and showering.

- DO NOT take medication for diabetes on the day of surgery.
- Please leave jewelry, valuables, and large amounts of money at home.
- Makeup must be removed before your procedure.
- Nail polish may be left on.
- ▶ All medications are to be left at home.
- In the event that your medication is not readily available in the hospital, plan for somebody to bring in your medications. Pharmacy will then verify them before your nurse can administer.

The Day Before Surgery

The hospital will contact you on the day before surgery (or on Friday if your surgery is on Monday) to find out what time your procedure is scheduled. You will be asked to come to the hospital approximately two to three hours before the scheduled surgery to give the nursing staff



sufficient time to start IV's, prepare, and answer questions. It is very important that you arrive on time to the hospital as occasionally the surgical time is moved up at the last minute and your surgery could start earlier. If you are late, it may create a significant problem with starting your surgery on time. In some cases, lateness could result in moving your surgery to a much later time. Feel free to bring items to help you pass the time such as books, newspaper, needle work, etc.

The Night Before Surgery

You will need to clean your skin with special antiseptic wash the night before surgery, and the morning of surgery. You will receive the wash and directions from pre-admission testing. Follow the directions carefully. If you have any questions, feel free to ask. For example, if surgery is on Monday, use the special wash on Sunday night and Monday morning.

Your surgeon recommends this special wash to reduce the amount of germs on your skin prior to surgery.

Anesthesia

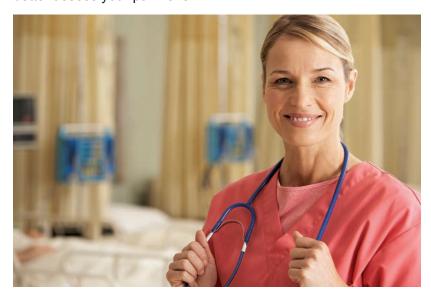
Decisions regarding your anesthesia are tailored to your personal needs. The types available for you are:

- General Anesthesia: provides loss of consciousness.
- Regional Anesthesia: involves the injection of a local anesthetic to provide numbness, loss of pain, or loss of sensation to a large region of the body. Regional anesthetic techniques include spinal blocks, epidural blocks, and arm and leg blocks.
- Medications are also given to make you drowsy and allay your anxiety.

Will I Have Any Side Effects?

Your anesthesiologist will discuss the risks and benefits associated with the different anesthetic options as well as any complications or side effects that can occur with each type of anesthetic. Nausea or vomiting may be related to anesthesia

or the type of surgical procedure. Although less of a problem today because of improved anesthetic agents and techniques, these side effects continue to occur for some patients. Medications to treat nausea and vomiting will be given if needed. The amount of discomfort you experience will depend on several factors, especially the type of surgery. Your doctors and nurses will do everything possible to relieve pain and keep you safe. Your discomfort should be minimal, but do not expect to be totally pain-free. The staff will teach you the pain scale to better assess your pain level.



What Will Happen Before My Surgery?

You will most likely speak to an anesthesiologist during your pre-operative testing appointment. Your anesthesiologist will review all information needed to evaluate your general health. This will include your medical history, laboratory test results, allergies, and current medications. With this information, the anesthesiologist will determine the type of anesthesia best suited for you. He or she will also answer any further questions you may have.

After Your Surgery

The Day of Surgery

Once you arrive on the Orthopedic Unit*, the physical therapist may assess your progress and get you walking with a walker.

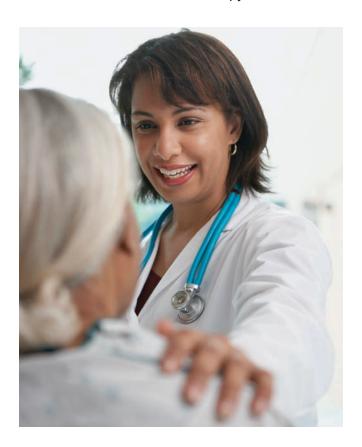
Day One After Surgery

Daily Schedule:

Your surgeon or residents will visit you in the morning. You will have therapy twice a day and your coach is encouraged to be present as much as possible, and it would be helpful if your coach participates in therapy. Visitors are welcome, preferably late afternoons or evenings, not during therapy sessions. If you are physically and medically stable, the option of going home may be offered to you the day after surgery. Many patients feel comfortable and ready to go home.

Day Two After Surgery

Most patients go home the second day after surgery. You could leave after the first therapy session, or after the second therapy session.



Understanding Pain

All patients have a right to have their pain managed. Pain can be chronic (lasting a long time) or intense (breakthrough). Pain can change through the recovery process.

If you need more help with your pain management, talk to your nurse, the Joint Care Coordinator, or your doctor.

Pain Scale

Using a number to rate your pain can help the Joint Team understand the severity of your pain and help them make the best decision to help manage it.

Your Role in Pain Management

Using a pain scale to describe your pain will help the team understand your pain level. If "0" means you have no pain and "10" means you are in the worst pain imaginable, how would you rate your pain? With good communication about your pain, the team can make adjustments to make you more comfortable. Try to relax, when you are relaxed medication works better.



Deep Breathing and Coughing

To prevent potential problems such as pneumonia, it is important to understand and practice breathing exercises. Techniques such as deep breathing, coughing, and using an Incentive Spirometer may also help you recover more quickly. Directions on using the Incentive Spirometer will be discussed in your pre-operative education class.

Breathing Exercises

- Perform in an upright, sitting/leaning forward/ standing position, shoulders relaxed
- Breathe in deep and slow as much as possible through nose or mouth
- Hold breath for 2-5 seconds
- Then breathe air out slowly through pursed lips (like you are blowing out birthday candles) as a normal relaxed expiration
- ▶ 10-15 consecutive breathes repeated for 3 sets-60 sec pause between each set
- Cough during pause to mobilize secretions if necessary
 - **Perform hourly after surgery**

To Help You Cough:

- ▶ Take a slow deep breath. Breathe in through your nose and concentrate on filling your lungs completely.
- Breathe out through your mouth and concentrate on your chest emptying completely.
- Repeat with another breath in the same way.
- Take another breath, but hold your breath and then cough hard. When you cough, focus on emptying your lungs.
- Repeat all steps twice.

Discharge

Understanding your plan for discharge is an important task in the recovery process. You can expect help from your Joint Care Coordinator to develop a plan that meets your particular needs. Many patients should expect to be able to go directly home, as is usually best to recover in the privacy and comfort of your own surroundings.



Please remember that sub acute stays must be approved by your insurance company prior to payment. A patient's stay in a sub acute rehabilitation facility must be done in accordance with the guidelines established by Medicare or other insurers. Although you may desire to go to sub acute rehabilitation when you are discharged, your medical progress will be monitored by your insurance company while you are in the hospital. Upon evaluation of your progress, you will either meet the criteria to benefit from sub acute rehabilitation or your insurance company may recommend that you return home with other care arrangements. It is important for you to make plans preoperatively for care at home.

In the event sub acute rehabilitation is NOT approved by your insurance company, you can pay privately. Please keep in mind that the majority of our patients do so well that they do not meet the guidelines to qualify for sub acute rehabilitation. Also keep in mind that insurance companies do not

become involved in social issues, such as lack of caregiver, animals, etc. These are issues you will have to address before admission.

The Social Worker and Case Manager will work with you, and your family, to set up the visiting nurse to come to the house within the first 24 hours after you get home. They will also set up a therapist to come to the house and do therapy with you in your home. The Case Manager or Social Worker will also ensure that you have a rolling walker and 3-in-1 commode at home.

The Case Manager or Social Worker will also ensure that you have all the equipment needed.

Patient Experience Survey

To assure continued excellence in providing your care from the time of discharge to perhaps a year later, you may be asked to participate in patient satisfaction surveys. These surveys, both from the hospital and from the Joint Surgery Program, is your opportunity to tell us what you feel went well and what can be improved.

Caring for Yourself at Home

- ► Take your pain medicine at least 30 minutes before physical therapy.
- Gradually wean yourself from prescription medication to a non-prescription pain reliever. Ask your physician for narcotic alternatives.
- Change your position every 45 minutes.
- Use ice for pain control. Applying ice to your affected joint will decrease discomfort, but do not use for more than 15 minutes each hour. You can use it before and after your exercise program. A bag of frozen peas wrapped in a kitchen towel works well because the bag will easily match the shape of your knee. Mark the bag of peas and return them to the freezer so they can be used again later.

Try not to nap too much: While you are recovering, try not to nap too much during the day so that you will sleep better at night.

- Body Changes: Your appetite may be poor. Drink plenty of fluids to keep from getting dehydrated. Your desire for solid food will return.
- You may have difficulty sleeping, which is normal. Do not sleep or nap too much during the day.
- Your energy level will be decreased for at least the first month.

Pain medication that contains narcotics promotes constipation. Use stool softeners or laxatives, if necessary.

What If I Live Alone?

You may return home and receive help from a relative or friend, or plan to stay at their home for the first few days. You will have a home health nurse and physical therapist visit you at home for a short while after discharge.



Dressing Change Procedure:

Caring for your wound after surgery: Because each patient is different, and each surgeon has his own preferences, please follow the instructions of your discharge nurse in the hospital. Don't forget to wash your hands before caring for your wound.

Signs of Infection

- Increased swelling and redness at incision site
- Change in color, amount, odor of drainage
- Increased pain in knee
- ▶ Fever greater than 101.5 degrees

Signs of Blood Clots in Legs

- Swelling in thigh, calf, or ankle that does not go down with elevation.
- Pain, heat, and tenderness in calf, back of knee or groin area.
 - NOTE: blood clots can form in either leg.

To Help Prevent Blood Clots

- Perform ankle pumps
- Walk several times a day
- Take your blood thinners as directed

Pulmonary Embolus

An unrecognized blood clot could break away from the vein and travel to the lungs. This is an emergency and you should **CALL 911** if suspected.

Signs of a Pulmonary Embolus:

- Sudden Chest Pain
- Difficult and/or rapid breathing
- Shortness of breath
- Sweating
- Confusion

Prevention of Pulmonary Embolus

- Prevent blood clot in legs
- Recognize if a blood clot forms in your leg and call your physician promptly

Postoperative Safety and Avoiding Falls

Kitchen

- Do NOT get down on your knees to scrub floors.
- Use a mop and long-handled brushes.
- Plan ahead! Gather all your cooking supplies at one time. Then, sit to prepare your meal.
- Place frequently used cooking supplies and utensils where they can be reached without too much bending or stretching.

To provide a better working height, use a high stool, or put cushions on your chair when preparing meals.



Avoiding Falls

- Pick up throw rugs and tack down loose carpeting. Cover slippery surfaces with carpets that are firmly anchored to the floor or that have non-skid backs.
- ▶ Be aware of all floor hazards such as pets, small objects, or uneven surfaces.
- Provide good lighting throughout your home. Install nightlights in the bathrooms, bedrooms, and hallways.
- Keep extension cords and telephone cords out of pathways. Do NOT run wires under rugs, this is a fire hazard.
- Do NOT wear open-toe slippers or shoes without backs. They do not provide adequate support and can lead to slips and falls.
- Sit in chairs with arms. It makes it easier to get up.
- Rise slowly from either a sitting or lying position to avoid getting light-headed.
- Do not lift heavy objects for the first three months and then only with your surgeon's permission.

Postoperative Recovery and Rehabilitation

Some activities may include the following. Please consult your surgeon before beginning these activities

What to Do for Exercise

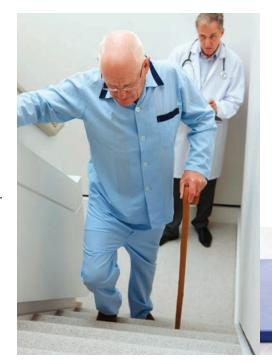
- Choose a Low Impact Activity
- Recommended exercise classes
- Home program as outlined in your Patient Guidebook
- Regular one to three mile walks
- Home treadmill (for walking)
- Stationary bike
- Regular exercise at a fitness center
- Low-impact sports such as golf, bowling, walking, gardening, dancing, swimming etc.



Outpatient Physical Therapy

Physical Therapy is a type of rehabilitation that helps preserve, develop and restore physical function that may be lost due to injury, disease or other causes. It uses numerous therapeutic procedures and exercises to expedite healing. The treatment plan focuses on preventing disability and pain, restoring function, promoting healing, relieving pain and helping patients adapt to any functional limitations. Patients recovering from surgery need to strengthen and restore movement

to repair muscles and tissues. As different as the needs of each patient may be, the ultimate goal of physical therapy is always the same: to restore each patient's productivity and independence to the fullest extent possible.



Outpatient Occupational Therapy

Occupational therapy is a type of rehabilitation that helps those limited by a physical or emotional illness, impairment or injury regain and build skills necessary for them to lead independent, productive and satisfying lives. It focuses on maximizing patients' ability to perform activities of daily living, such as functional mobility, eating, bathing, dressing and time management. Occupational therapy also helps patients prepare to return to work and to life within the community. Generally, early intervention leads to the most effective restoration of function.



Following Up With Your Surgeon

Over the past several years, orthopedic surgeons have discovered that many people are not following up with their surgeons on a regular basis. The reason for this may be that they do not realize they are supposed to, or they do not understand why it is important.

So, when should you follow up with your surgeon?

These are some general rules:

- Every year, unless instructed differently by your physician.
- Anytime you have mild pain for more than



Exercise Appendix

Hip Replacement Exercises

Seated Arm Push-Ups

Goal: To strengthen your arms to help assist you getting out of a chair

- Begin seated on a chair with arms, both feet touching the floor
- Place hands on chair arms, straighten your elbows and lift bottom off of the chair
- Hold for 1 second
- Slowly lower your bottom back onto the chair
- Repeat for 2 sets of 10 repetitions

NOTE: Use your arms, not your legs, to push your bottom off of the chair







Heel Slides

Goal: To increase flexibility of the hip and strengthen the hamstrings, the muscle behind your thigh

- Begin laying on your back
- Bend one knee while keeping your heel on the bed
- Hold for 3 seconds
- Slowly straighten your knee back to starting position
- Repeat for 2 sets of 10 repetitions

NOTE: To allow the heel to slide easier, wear a sock or place a towel under your heel





Hip Abduction/Adduction

Goal: To strengthen the muscles on the inner and outer part of your thigh and hip

- Begin laying on your back
- Keeping your heel on the table and knee straight, slide your leg out to the side
- Slowly slide leg back to starting position
- Repeat for 2 sets of 10 repetitions

NOTE: Be sure to keep heel and knees pointing toward the ceiling throughout the exercise





Quad Sets

Goal: To strengthen the muscle on top of your thigh

- Begin laying on your back or sitting on the floor with your pre-operative knee straight
- Tighten the muscle on top of your leg while simultaneously pressing the back of your knee towards the floor
- ▶ Hold contraction for 5 seconds then rest
- Repeat for 2 sets of 10 repetitions

NOTE: You can place a small towel roll under your knee to add cushion





Glutes

Goal: To strengthen the buttocks muscles

- Squeeze butt cheeks together
- ▶ Hold for 5 seconds
- Repeat for 2 sets of 10 repetitions

NOTE: Do not hold your breath when performing this exercise

Standing Knee Bends

Goal: To strengthen the hamstrings, or the muscles behind your thigh

- Begin holding onto a sturdy chair or counter for support
- Slowly bend your knee by lifting your heel towards your buttocks.
- Slowly lower your heel back to the ground while straightening at your knee.
- Repeat for 2 sets of 10 repetitions

NOTE: Keep an upright posture and avoid any forward or backward leaning throughout exercise





Standing Marching

Goal: To strengthen the hip and improve balance

- Begin holding onto a sturdy chair or counter for support
- Slowly lift your knee up towards the ceiling as if you were marching in place.
- Alternate lifting legs towards ceiling
- Repeat for 2 sets of 10 repetitions

NOTE: Keep an upright posture and avoid any forward or backward leaning throughout exercise

Ankle Pumps

Goal: To strengthen and improve flexibility of the calf muscles while promoting blood flow to prevent blood clots

- Point toes up towards ceiling
- Point toes down to floor
- Repeat for 3 sets of 10 repetitions

NOTE: Be sure to bend the whole ankle, not just the toes, while performing this exercise





Seated Long Arc Quads

Goal: To strengthen the quadriceps muscle, or the muscle that "extends" your knee

- Begin sitting in a chair with both of your feet touching the floor
- While keeping your thigh on the chair, straighten your knee by slowly kicking towards the ceiling
- Hold this position for 5 seconds
- Slowly bend your knee back to the starting position
- Repeat for 2 sets of 10 repetitions

NOTE: Sit upright in the chair without bending your hip beyond 90 degrees. You may feel a stretch or slight discomfort in the back of your knee





Knee Only

Hamstring Stretch

Goal: To increase the flexibility of your hamstring, the muscle behind your thigh

- Begin seated on a chair with your postoperative leg propped up on a chair or firm surface
- Keep your knee as straight as possible
- ▶ Hold for 30 seconds
- Repeat 3 times

NOTE: The stretch in the back of your knee should not be painful. Do not place weight on the top of your knee



Straight Leg Raise

Goal: To strengthen the muscle around your thigh and hip

- Begin laying on your back with your non-operative leg bent to 90 degrees
- Keeping your pre-operative leg straight, lift your entire leg a few inches off of the floor
- Hold for 3 seconds
- Slowly lower your leg back onto the floor
- Repeat for 2 sets of 10 repetitions

NOTE: The leg you are lifting should never go beyond the level of the bent knee





References

Westerdahl, E. (2015). Optimal technique for deep breathing exercises after cardiac surgery. Minerva anestesiologica, 81(6), 678-683.

Westerdahl, E., Lindmark, B., Eriksson, T., Friberg, O., Hedenstierna, G., & Tenling, A. (2005). Deepbreathing exercises reduce atelectasis and improve pulmonary function after coronary artery bypass surgery. CHEST Journal, 128(5), 3482-3488.

Phone number page

Doctor's office number
Joint Coordinator
Hospital
Primary Doctor

Notes

Notes





Robert Wood Johnson University Hospital

