

Your Chest Wall Treatment

A Patient Guide



PRE-SURGICAL APPOINTMENTS

My Pre-Operative Visit

Date	Time
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My Pre-Operative Visit Will Be Performed

- In-Office**
23 Sunnybrook Road, Suite 200
WakeMed Medical Park, Raleigh
- Virtually via MyChart**

My Surgery

Date	Time
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Location of Surgery

WakeMed Raleigh Campus – Day Surgery

3000 New Bern Avenue – Raleigh

Please see map on page 28 for where your driver can park and how to locate the hospital entrance.

POST-SURGICAL APPOINTMENTS

Online Post-Surgical Video Visit (via MyChart)

Date	Time
------	------

Provider

In Person Post-Surgical Clinic Visit

Please arrive 30 minutes prior to your appointment time to have a chest X-ray done prior to your clinic visit. The radiology department is on the first floor of the same office building. You do not need to schedule an appointment for the chest X-ray.

Location

Date	Time
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Provider

WakeMed Pediatric Chest Wall Center

On the Road to Surgery

Welcome to the WakeMed Pediatric Chest Wall Center! We are pleased to offer a comprehensive and personalized care model designed to simplify the diagnosis, evaluation, and treatment of chest wall deformities such as pectus excavatum and pectus carinatum. We treat patients from all over the state and region, and are proud to offer the highest level of care, quality and service to every family we serve.

As you embark on your treatment journey, our team of surgeons, clinicians and support staff will be here to support you and your child every step of the way – from diagnosis through treatment, including surgery and recovery, if needed.

When it comes to caring for patients with a pectus deformity, no one has more experience than WakeMed Children's. Because we are the busiest and most experienced treatment center in North and South Carolina, our chest wall surgery patients report:

- ▶ Better patient outcomes (lower complication rates, higher success, etc.);
- ▶ Less post-operative pain;
- ▶ Shorter hospital stays than the national average.

We look forward to supporting you along your care journey.

Sincerely,

Your Pediatric Chest Wall Surgery Team

(919) 350-8797



Scan to learn more about
the Chest Wall Center.

Download the WakeMed All Access App



We encourage you and any visiting family members/friends to download the WakeMed All Access app prior to your stay. It will guide you every step of the way – from providing driving directions to WakeMed facilities, directing you on where to park, and offering turn-by-turn navigation throughout the hospital. During your stay and after discharge, you can also use it to access WakeMed MyChart for your medical record, schedule follow-up appointments, and much more.

To download, visit the AppStore or Google Play and search for WakeMed All Access.



Scan to learn more about
the WakeMed All Access App.

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YOUR HEALTH
IN YOUR HANDS.

WakeMed
MyChart



Every WakeMed patient needs a MyChart account! It's the safest, most convenient way to access your medical record and exchange information with your WakeMed providers. And, by using the **MyChart App**, you can even share information about your hospital stay, including your care team, medications, education, scheduled tests and test results, with your family and loved ones in real time through proxy access. See page X to learn more.



Your Surgery will be performed at:

WakeMed Raleigh Campus

3000 New Bern Avenue, Raleigh, NC 27610

Main Hospital Phone Number: 919-350-8000

Hospital Information

Please consult www.wakemed.org for the most up-to-date information on visiting hours, number of visitors, and more. The Patient & Family Guide in your room also provides information about the amenities available to you and your visitors while you are in the hospital.

In-Hospital Hotel – The Heart Center Inn



The Heart Center Inn operates like a hotel and is located on the third floor of WakeMed Heart Center. Pediatric Surgery patients and their loved ones who are coming from out of town may stay overnight before surgery. Your loved ones may also stay at the Heart Center Inn throughout your hospital stay so they can be close to you and still get some needed rest in order to better support you. Call Heart Center Inn Guest Services at 919-350-7777 for room availability and rates.

Pectus Excavatum

Pectus Excavatum describes an abnormal configuration of the chest, where the sternum (breast bone) pushes into the heart and lungs, giving the chest a “caved-in” or sunken appearance.

Treatment Options for Pectus Excavatum

The Vacuum Bell is a non-surgical therapy that involves placing a soft cup over the sternum, creating a vacuum seal to lift the sternum. This treatment option allows for the correction of pectus excavatum over time without interfering with school, sports and other daily activities.

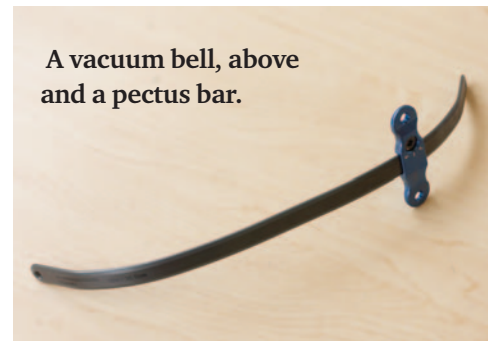
The Nuss procedure is a minimally-invasive surgical technique for patients with pectus excavatum and involves hardware that can help reshape the chest wall over time.

The Ravitch procedure is used for patients with pectus excavatum who aren't candidates for the Nuss procedure. It involves the removal of the cartilage that is causing the defect, and the placement of a small bar under the sternum to hold it in the desired position.

It's important to note that there are several experimental/novel techniques for the treatment of chest wall deformities that our clinic does not offer due to a lack of evidence-based research to support them. These include the 'Magnetic Mini-Mover,' and procedures such as Pectus Up and the Leonard technique. Please discuss any questions you have about these options with your surgeon during your visit.



A vacuum bell, above and a pectus bar.



Pectus Carinatum

Pectus carinatum is a forward protrusion of the sternum (breast bone) and/or ribs that is due to abnormal growth of the cartilage that connects the sternum to the rib cage.

Treatment Options for Pectus Carinatum

External compression bracing is a non-surgical option that is effective for most children with flexible, growing chest bones and cartilages. Our team works closely with local prosthetics professionals to provide a custom-fit brace that can be worn beneath the clothing.

For patients who don't respond to external bracing, a modified Ravitch surgical procedure is used. It involves the removal of the cartilage that is causing the defect, allowing the sternum to be pushed downward in a more normal position.



A carinatum brace.

Your Care Team

Throughout your pectus treatment, you'll have a multidisciplinary team comprised of caregivers and support staff. All procedures are performed by our highly-experienced surgeons, and your pre-operative and post-operative care will be provided by our expert nurse practitioners and/or physician assistant. Our patient insurance representative will work closely with you to coordinate with your insurance company to provide all the documentation necessary to receive authorization for treatment and/or surgery. Our patient scheduling representative will help coordinate a surgery date based on your availability and our operating room/surgeon schedules.

Communicating With Us

MyChart is Preferred!

Effective communication throughout your journey is very important to us. Our preferred method of communication is WakeMed MyChart. Our nurses check MyChart throughout the day and route all incoming messages to the appropriate party to ensure prompt response times. For messages received during normal business hours, we strive to respond within 24 hours.



Sign up for WakeMed MyChart

Once your surgery is scheduled, you will receive an email or text message that includes a MyChart activation code. If you are not a WakeMed MyChart user, please use this code to sign up. MyChart is a secure, online patient portal. You and your WakeMed providers can communicate through MyChart. Plus, you can use MyChart to request appointments and prescription refills, view information about any appointments you have before and after your procedure and see your test results. If you do not have a computer or cell phone, we will communicate with you in the way that you choose (home phone, etc.).

Getting Started with MyChart

- > Visit MyChart.WakeMed.org
- > Click on "Sign Up Now"
- > Enter your activation code, date of birth and zip code, and click "Next". You will be taken to the next sign-up page where you will be asked to create a username, password and security question.
- > Select your communication preference. Be sure to enter a valid email address so you can be notified when new information is available in your MyChart account.



Scan to learn more
about MyChart.

If you have trouble signing up, please call 919-350-2288 or email us at mychart@wakemed.org. You can also access WakeMed MyChart by downloading the app from Google Play or the Apple App Store.

Reach Us By Telephone

- > **Main Office:** (919) 350-8797
- > **Scheduling:** (919) 350-6749
- > **Insurance:** (919) 350-0645
- > **WakeMed Billing:** (919) 350-8359

Pre-Surgical Journey – Steps to Surgery

Once you decide to undergo a chest wall procedure, our team will help you navigate your pre-surgical journey to ensure all imaging studies and testing are complete and that you are cleared for surgery.

Pectus Checklist Before Surgery

□ Imaging Tests

- ▶ **X-Ray:** Most insurance companies require a chest x-ray prior to obtaining a CT scan of the chest. This test is often completed at your first consultation appointment.
- ▶ **Chest CT:** The CT scan is a more detailed study required by most insurance companies prior to surgery. Please note insurance authorization for a CT scan can take up to three weeks. The CT scan results will help calculate your Haller Index, which helps the surgeon determine the severity of the chest wall deformity. Generally, measurements greater than 3.25 are considered severe enough to benefit from surgery, while patients with a Haller index of less than 3.25 generally do not meet insurance requirements for surgery.

If possible, all imaging studies (both X-ray and Chest CT) should be performed at either a WakeMed Imaging Center or Raleigh Radiology location.

If these locations aren't convenient, find the imaging provider of your choice. In this case, we will need to fax them an order for your test, so please share the fax number and location with our office staff. Upon completion of the study, please ask them to share the results with our office either by CD or electronic images.



Scan to find an imaging location.

□ Echocardiogram

This test provides a comprehensive look at the structure of the heart and how it is working. This test will show if/how the heart is affected by the pectus deformity. Referral to a pediatric cardiologist will be required for this test – our office will place the referral and the test will be performed during your cardiology visit.

□ Additional Testing

Sometimes additional testing is ordered by the surgeon to further evaluate how a patient is being affected by their pectus deformity. Insurance companies may also require additional testing before they will authorize payment for surgery.

- ▶ **Pulmonary Function Test (PFT):** This test measures how well your lungs work. Because pectus deformities can affect lung function, this test will provide important baseline information. Talk to your provider about the referral process for this test, which may vary based on insurance.
- ▶ **Exercise Stress Test:** This is a treadmill stress test that measures how a patient's heart and lungs work during physical activity. Often a patient with pectus will have diminished exercise capacity. Referral to a pediatric cardiologist will be required for this test – our office will place the referral then the cardiologist will order the cardiac exercise test.

People with pectus carinatum generally develop a normal heart and lungs. However, the deformity may prevent these from functioning as well as they could. There is some evidence that pectus carinatum may prevent complete emptying of air from the lungs in children.

Obtaining Authorization/Insurance Approval

Our team will work with you and your health insurance company to obtain prior authorization for payment for the surgical procedure. The authorization process will begin after the following has been completed:

- > A consultation with the surgeon
- > All required testing has been completed
- > All results are received, and
- > Surgery is scheduled

Please note this process can take several weeks, but our office will keep you informed of any updates. In the event that additional testing is required by your insurance company, we will contact you with further information.

You'll have a dedicated patient insurance representative working on getting authorization from your insurance company and we make every effort to provide all the required documentation to get approval on the first try. Insurance authorization is usually submitted 15-30 days prior to surgery and it can take 15-30 days to get an answer.

Obtaining authorization for surgery is not a guarantee of payment by insurance; therefore, we recommend you contact your insurance company about your specific plan coverage.

There are times when insurance companies do not authorize surgery. If this does occur, we strongly encourage you to contact your insurance company to discuss appeal options regarding the denial. Your pediatric surgery team will work with you during the appeal process. Ultimately, if the insurance company does not approve the appeal, we will cancel surgery. Should your insurance plan change, please notify our surgery scheduler immediately via MyChart or by calling 919-350-6749.

Surgery Scheduling

Once insurance authorization is obtained and a case request is received from your surgeon, we will begin the scheduling process. These surgeries are usually performed Monday-Wednesday. Your patient scheduling representative will make every effort to accommodate surgery date requests, but is not always possible. Communication via MyChart is preferred to help our scheduler manage the hundreds of incoming messages per week.

Pre-Operative Appointment

Once a surgery date is confirmed, your care team will reach out to book your final pre-operative appointment – generally 1-3 weeks prior to surgery. For your convenience, this appointment can be conducted in person (Sunnybrook Rd. office) or virtually through MyChart.

Preparing for Your Hospital Stay – What to Expect

For pediatric chest wall procedures, your total hospital stay will range from 1-4 days, depending on the procedure performed. (Average hospital stay, Nuss procedure: 1-2 days; Ravitch procedure: 2-4 days). After surgery, patients will be moved to the WakeMed Children's Hospital where you will have your own room on the pediatric floor. There is a couch that pulls into a bed for parents or caregivers to stay. You will have your own bathroom/shower, TV, free wi-fi, etc. On-campus food options include our main cafeteria and an on-site Panera Bread. Patient meals will be delivered 3x per day.

Enhanced Recovery after Surgery (ERAS)

Enhanced Recovery After Surgery (ERAS) is a care plan that helps speed up recovery after your surgery. ERAS involves teamwork between your health care providers and YOU.

Why Do We Use ERAS?

ERAS provides guidelines which allow your health care team to work together to help you recover more quickly and decreases the chance of complications. ERAS helps you prepare before, during and after surgery to:

- › Heal more quickly
- › Allow you to eat and drink as soon as it is safe for you
- › Assist in keeping your pain more controlled
- › Assist you in walking within 24 hours
- › Keep your hospital stay short

ERAS Procedures Before Surgery

A member of your health care team will talk to you about your role in the ERAS pathway. They will also give you important details about how to prepare your body for surgery, including exercise, deep breathing and tobacco cessation. You may be asked to drink a 12-ounce carbohydrate drink (ex. Gatorade, Powerade, etc.) several hours before surgery, which will help promote bowel function after surgery and decrease preoperative thirst/hunger. Gum chewing after surgery helps decrease nausea and dry mouth and assists in the return of bowel function. Bring the gum of your choice with you to have available after surgery.

On the day of surgery, you will receive medications before surgery to help with pain control.

ERAS and Pain Management

Although you will have some pain after surgery, with ERAS the goal is to adequately control your pain and minimize negative side effects from commonly used pain medications. These medications can lead to constipation, excessive drowsiness, confusion, delayed return of bowel function and longer hospital stays. Combining medications that treat post-surgery swelling with smaller amounts of pain medication (called opioids) improves pain control and helps you recover faster.

ERAS After Surgery

Your post-operative ERAS protocol will include:

- › Pain control
- › Increase movement! Out of bed, sitting in a chair and walking
- › Nutrition: eating and drinking as soon as it is safe for you
- › Gum chewing three times a day once indicated

Hospital Visitation

Generally, at our Children’s Hospital, parents or other support persons are encouraged to be with the pediatric patient 24 hours a day. Generally, children of all ages who are free of contagious illnesses are welcome in our hospitals during standard visiting hours – 8 am to 8 pm daily. They are not permitted to stay overnight. Pediatric patients are permitted up to four visitors at a time.

Important Note: Visitation policies are subject to change based on seasonal illness and other factors. We encourage you to scan the QR code to check the latest visitation guidelines under effect at WakeMed. WakeMed will only limit visitation when needed to protect the health and safety of patients, visitors or WakeMed staff members.



Scan to learn more about hospital visitation

Ronald McDonald Family Room



Located within the WakeMed Children’s Hospital, the Ronald McDonald Family Room offers families a place to rest and regroup while remaining close to their child. Services include a stocked kitchenette including free snacks, drinks and coffee, laundry facilities, television, computers and internet access, and comfortable seating.

The Family Room is staffed by volunteers and is open from 9 am to 9 pm daily.



Pectus Surgery Pre-Op Instructions

Things to Consider/Purchase Ahead of Surgery

- Polyethylene glycol (MiraLAX) -available over the counter at most pharmacies, grocery stores
- Chlorhexidine soap (also called Hibiclens soap)-available over the counter
- Gatorade/Powerade 32 oz and 12 oz
- Pick up gabapentin (Neurontin) from home pharmacy
- Find a good spot for sleeping postoperatively. We recommend sleeping in either a hospital bed or recliner for 2-4 weeks due to restricted movement. Your care team can coordinate delivery of a hospital bed for use at home during your stay, so we encourage moving furniture to accommodate before you leave for the hospital.

3 Days Prior to Surgery

- Begin taking gabapentin (Neurontin) – 1 pill (300 mg) each evening
- Begin taking 1 capful of Miralax mixed into 8 oz of juice/water daily for 3 days before surgery

Night before Surgery

- Shower using Chlorhexidine soap -scrub on your chest area x 5 minutes
- Dry off with clean towel
- Put on clean pajamas
- Sleep on clean sheets
- Nothing to eat or drink after midnight

Morning of Surgery

- Drink 12oz of Gatorade/Powerade. Finish drinking this 3 hours prior to your surgery time.
- Shower again using chlorhexidine soap
- Dry off with clean towel
- Wipe with chlorhexidine wipes
- Brush teeth, spitting out toothpaste and water
- Wear clean clothes to the hospital
- Arrive to the hospital two hours prior to your scheduled surgery time. You should receive a call one business day prior to surgery to confirm your arrival time. Park in the P1 parking deck and proceed to Patient Registration upon arrival. See Raleigh Campus map on page 25.

What to Expect When You Arrive at the Hospital

Patient Registration staff will check you in and escort you to our pre-operative area. Here, you'll need to remove all clothing/jewelry and change into a hospital gown. You'll have an IV started, have any necessary labs drawn, and will receive medications needed in preparation for surgery. Your surgeon will meet with you to address any last-minute questions before your procedure.

Once the Operating Room is available, you'll go back for surgery and your family will be directed to the waiting room. Most procedures take 1.5 to 2 hours.

When the surgery is complete, the surgeon will meet with parents/caregivers to provide an update. After surgery, the patient will go to the recovery area (PACU) and family will be invited to the bedside.

Managing Your Pain in the Hospital

Managing your pain is very important – both during and after your procedure. Here are a few ways we'll aim to keep your pain under control throughout your surgery and recovery. We use a multimodal approach to minimize the need for narcotic pain medication, although most patients will need these medications in the hospital and for 1-2 weeks after surgery.

In Pre-Op

- > **Tylenol:** This will be given in Preop to help with pain control after surgery. It will continue after surgery as a non-narcotic pain medication.
- > **Gabapentin:** This medication is non-narcotic and used to help control nerve pain. Patients can get nerve pain after the cryoanalgesia as the nerves are shutting down. You will start this at home 3 days prior to surgery. It will also be given in pre-op and continued after surgery.

In the Operating Room

- > **Cryoanalgesia:** This procedure 'freezes' the nerves in the chest to help with pain control. It takes about 48-72 hours to take effect and will last for 1-2 months.
- > **Lidocaine (Exparel):** This long-acting lidocaine will help with pain control until the cryoanalgesia takes effect.

In Recovery (PACU)

- > **IV Toradol:** This medication is similar to ibuprofen and will be administered every 6 hours throughout hospitalization.
- > **Oxycontin:** This is an extended release oxycodone, narcotic pain medication. It will be given every 12 hours on a schedule for the first 24 hours after surgery. We will then switch you to oxycodone every 6 hours as needed.
- > **Flexeril:** Also known as cyclobenzaprine, this muscle relaxer will be given every 12 hours on a schedule.

Your care team will assess your pain regularly throughout your stay using a 10-point 'Pain Scale' as pictured here. It's important to communicate with your care team if you are experiencing pain, as pain medicine is more effective if it's taken before pain becomes severe.

Your comfort is our priority



0

No Pain



1 – 2

Hurts a Little



3 – 4

Hurts a Little More



5 – 6

Hurts Even More



7 – 8

Hurts A Lot



9 – 10

Hurts Very Much

Your Post-Operative Journey – In the Hospital

After a few hours in the Recovery area, patients will be moved to our WakeMed Children's Hospital (4E Pediatrics). Patients will be encouraged to begin eating and using the bathroom as quickly as possible. These activities will help prevent urinary retention and decrease the side effects of the narcotic medication.

Child Life Specialists

At some point during your stay, you'll likely be visited by our Child Life Specialists, a team of experts who help children and families cope with the stress and anxiety that often accompany a hospital experience. They are trained in teaching children and adolescents about medical procedures in a developmentally appropriate manner to support your child's specific needs and facilitate effective coping methods. A family-centered resource, they cater to patients 0-17 and their families.

Physical Therapy

You will receive a visit from a physical therapist (PT) as shortly as possible after surgery. Getting out of bed early and often with the support of your PT or nurse is highly recommended to promote faster recovery. Throughout your stay, your PT will work with you through many exercises, including those included in this booklet. They will make sure you know how to safely move around and ensure you are capable of going up and down stairs.



Scan to learn more about how to support your adolescent during their hospital stay.



Cough Pillow

After surgery you will receive a pillow to assist with coughing. You should hold the pillow across your chest with both arms when coughing to decrease pain. It is also helpful to hold the pillow when getting out of bed as a reminder to not use your arms.

Incentive Spirometer

Breathing exercises will help you take long, deep breaths to improve your lungs after surgery. By using the incentive spirometer (above), you can increase the flow of oxygen to your lungs and improve your ability to cough up mucous, so pneumonia does not develop.

To use the incentive spirometer:

- > Breathe out normally and then place your lips around the mouthpiece to form a tight seal.
- > Take a long slow deep breath in through your mouth, keeping your lips sealed on the mouthpiece.
- > Hold your breath for about 3 seconds.
- > Breathe out normally.

Repeat as instructed. Try to do the exercises 10 times each hour you are awake. Take normal breaths in between deep breaths. You will continue using your lung exerciser for two weeks after discharge.

Preparing for Discharge

Prior to discharge, you will go down to the Radiology department to have another chest x-ray performed. This will provide a baseline of how your chest looks just after surgery in case there are any concerns after discharge.

Requirements for leaving the hospital include:

- > Eating and drinking well without nausea/vomiting
- > No fever for 24 hours
- > Passing gas and no distention in the abdomen
- > Cleared for discharge by Physical Therapy
- > Incisions healing well
- > Voiding well
- > Pain control with oral medications
- > Able to take deep breaths and move around with help of family members

Prior to discharge, your provider will review all instructions including incision care, activity restrictions, and medications. You will receive a chart with a schedule of medications to help with pain control and weaning off narcotics. For your convenience, all medications will be delivered to your hospital room from the WakeMed Outpatient Pharmacy.

Pectus Post-Operative Medication Management

Managing your medications after surgery is extremely important for your recovery and pain management. During your hospital stay, your care team will talk to you about the medications you'll need to take after discharge. You should also receive a 'Medication Record' document to help you keep track and document the medications you're on each day. Be sure to ask any questions you may have before you leave the hospital - and if you have questions once you're home, reach out to your doctor/care team via MyChart.

Medication	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14
Oxycodone 5mg (only as needed) every 6 hours for 1-2 days, then taper off by day 5 (see below)														
Noretrtin 300mg once daily x 7 days														
Cyclobenzaprine (Flexeril) 15mg every 12 hours x 10 days														
Ibuprofen (Motrin) 600mg every 6 hours x 3 weeks														
Acetaminophen (Tylenol) 650mg every 6 hours x 2 weeks														
Soma 1 tablet nightly until off narcotics														
Oxalce 1 tablet daily in the AM until off narcotics														
Miralax 1 capful twice per day until off narcotics														

Notes

- Oxycodone: The patient must take 5mg every 6 hours for 1-2 days, then tapering off by day 5 at home per example instructions below. It can be given less frequently if the patient is doing well. May taper off earlier if pain is <4/10. Ideally, the patient should be off oxycodone within 5 days from discharge.
- Home day 1-2: Every 6 hours as needed
- Home day 3: Every 6 hours as needed
- Home day 4: Every 12 hours as needed
- Home day 5: Off
- Bowel regimen should be continued until having a daily soft stool then you can start decreasing these medications.
- If the patient does not have a bowel movement in 2-3 days you can try Dulcolax suppository, Enema, or Oral Magnesium Citrate per patient preference.
- All medications except Motrin and Tylenol can be given less often as patient's pain improves.

What to do With Unused Medications?

In order to keep your family, friends and the community safe, it is essential to properly dispose of unused or expired drugs so that they don't become a safety hazard. Medication take-back bins are the safest, most effective way to dispose of most types of prescription or over-the-counter medications. WakeMed offers several drop-off locations in Raleigh and Cary.



Scan to learn more about our Drug Take Back program.

When You Get Home

Your WakeMed Pediatric Surgery team wants you to have a successful recovery. Here are some things you can expect when you return home.

Your child is in the recovery stage after the surgical repair of their chest wall deformity (pectus excavatum or pectus carinatum). Because the surgery typically involves the placement of one of more

metal bars under the child's sternum (bone in the middle of the chest), there are some important things to know and instructions to follow to ensure a successful recovery.

- > Your child can return to school/work 2 weeks after hospital discharge.
- > No carrying book bags, backpacks or anything greater than 10 lbs. for 2 weeks after hospital discharge.
- > If applicable, two sets of schoolbooks should be provided – 1 set for home and 1 set for school.
- > No contact sports or strenuous activity for 2 weeks. This includes contact sports in gym/PE class. Your child's surgeon will tell you when they can return to sports/strenuous activities.
- > Slouching or slumping should be avoided – good posture is very important.
- > Your child should avoid sleeping on their side for 2 weeks.
- > If your child needs an MRI or CT scan, tell the technologist that your child has a metal bar under their sternum. MRI testing and CT scans of the abdomen can be safely performed, but the metal bar may impact test results.
- > CPR can be performed, but may require more force than usual.
- > Defibrillation for cardiac arrhythmia can be performed using the anterior/posterior placement.
- > The metal bar may set off metal alarm systems (airport, etc.). The bar is not visible from the outside.

Incision Care

- > Your child can shower 2 days after surgery.
- > Steri-Strips (small pieces of white tape used to close the incision) should remain in place for at least one week after surgery. If they have not fallen off after 14 days, remove them.
- > Gently wash the area once the Steri-Strips fall off or are removed.

When to Call your Child's Doctor

- > Fever greater than 101.5
- > Continual cough
- > Severe chest pain, especially with deep breaths
- > Redness, drainage, or swelling at the incision sites
- > Breathing difficulties
- > Any injury to the chest that may cause the bar to move

If you have questions, please send us a message via MyChart (preferred for non-urgent messages) or call our office at (919) 350-8797. If calling after hours, the WakeMed Call Center will answer and route your call appropriately.

Follow-up Appointments

Every pediatric surgery patient will have a telemedicine visit with a provider one week after discharge. After two weeks, there will be an in-office visit with the surgeon. This visit requires a chest x-ray, which will be performed on-site. Please arrive at least 30 minutes before your scheduled appointment for the chest x-ray. Please call (919) 350-8797 if you have any questions prior to these appointments.

Activity Restrictions

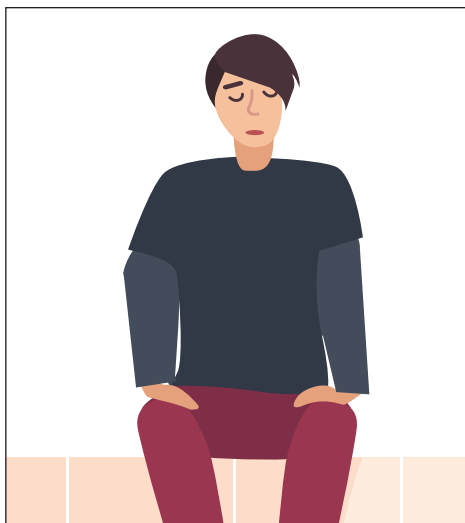
First 14 Days (2 Weeks) After Surgery

For proper healing and recovery, it's important to carefully adhere to your surgeon's activity restriction recommendations as follows:

- > No lifting over 10 lbs.
- > No sleeping on your side
- > No twisting (keep shoulders in line with hips)
- > No weight/pressure through arms
- > No backpacks
- > No opening heavy doors
- > No climbing ladders (ex. getting out of the pool)
- > Put milk/liquids in small containers
- > Limit household tasks that require pushing and pulling such as vacuuming and laundry
- > **Dressing:** Put arms in shirts then lift shirt overhead. Can move arms backward to fit into sleeve and bend over to pull up pants. You may cross your legs to put on shoes.
- > **School books:** Try to have a second set of books at home to avoid carrying to /from school.
- > **Sleeping:** Put head of bed all the way up before sitting upright to get in/out of bed. Support can be given at the back of the head and the pelvis. You may sleep in a recliner if you prefer. There are no restrictions against lying flat to sleep.
- > Be alert when moving around environment to avoid colliding with people/objects

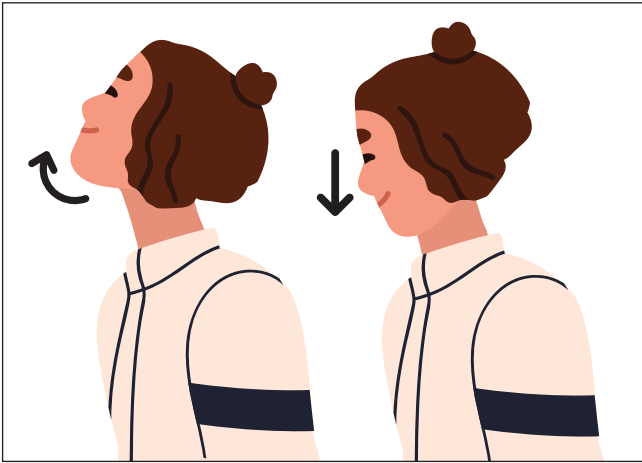
Daily Exercises

- > Walk 3-4 times each day, minimum, increasing by 5-10 minutes per day.
- > Move or reposition every 2 hours including sitting up in chair 3 times each day.
- > Perform incentive spirometry (breathing device) 10 times each hour while awake.
- > Do the following 8 exercises as shown, using the illustrations and instructions for guidance.



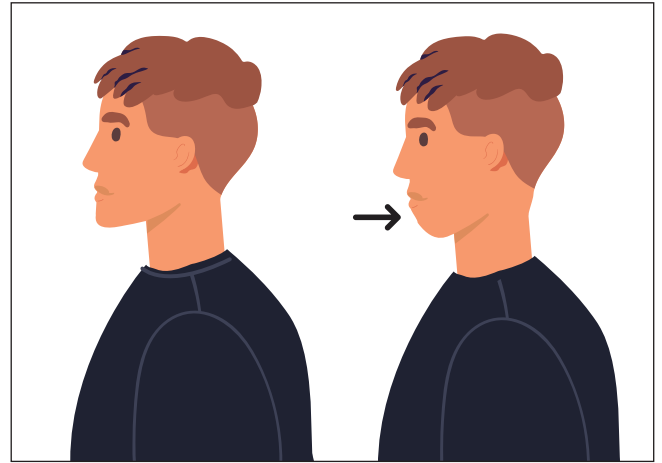
1. Chest expansion / deep breathing with breath holding

- > Sit or stand up straight with your shoulders relaxed and pulled back. Breathe in as deeply as possible and hold your breath for 10 seconds. Release.
- > Perform 10 repetitions, 3 times daily.



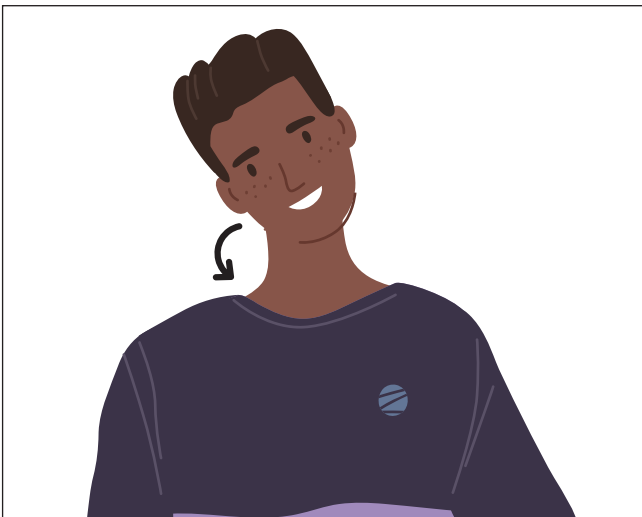
2. Neck flexion

- > Sit or stand up straight with your shoulders relaxed.
- > Slowly lower your chin toward your chest, feeling a stretch along the back of your neck.
- > Perform 10 repetitions, 3 times daily.



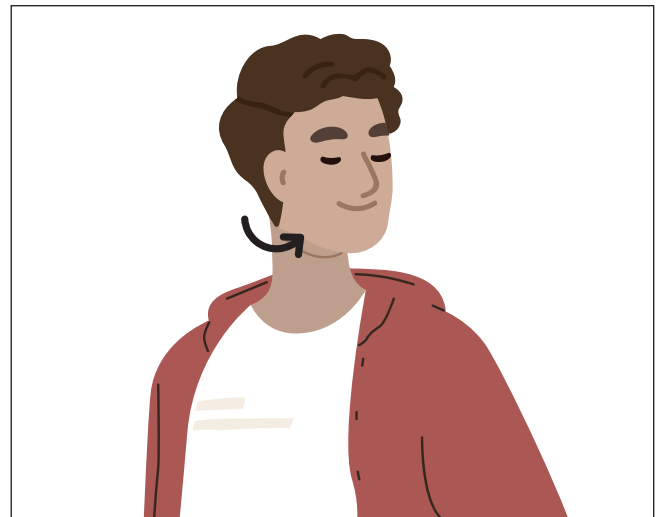
3. Neck retraction

- > Sit or stand up straight with your shoulders relaxed.
- > Gently pull your head straight back, as if you're trying to create a double chin. Keep your eyes level and avoid tilting your head up or down.
- > Perform 10 repetitions, 3 times daily.



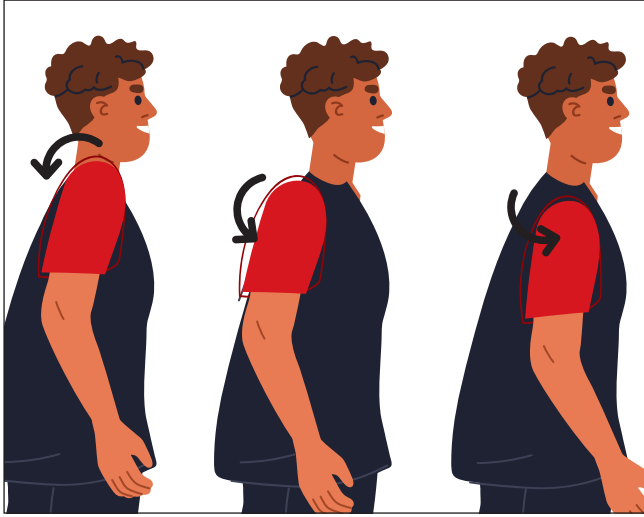
4. Neck side bend

- > Sit or stand up straight with your shoulders relaxed.
- > Slowly tilt your head to one side, bringing your ear toward your shoulder. Keep your shoulders relaxed and avoid lifting them.
- > Perform 10 repetitions, 3 times daily.



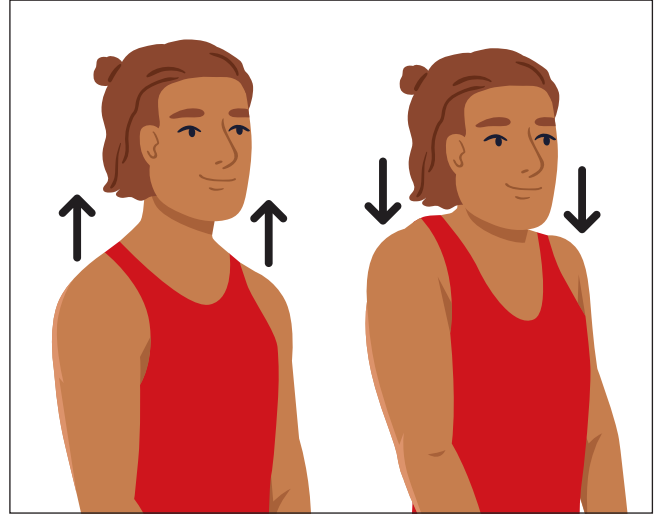
5. Neck rotation

- > Sit or stand up straight with your shoulders relaxed.
- > Slowly turn your head to one side, bringing your chin toward your shoulder. Keep your shoulders relaxed and avoid twisting your torso.
- > Slowly bring your head back to the neutral position and repeat on the opposite side.
- > Perform 10 repetitions, 3 times daily.



6. Backward shoulder rolls

- > Sit or stand upright with your arms at your sides.
- > Slowly lift your shoulders upward toward your ears.
- > Gently roll your shoulders backward in a circular motion, squeezing your shoulder blades together as they move down and back.
- > Complete the circular motion by bringing your shoulders back to the starting position.
- > Perform 10 repetitions, 3 times daily.



7. Scapular elevation

- > Sit or stand upright with your arms relaxed at your sides. Slowly shrug your shoulders upward toward your ears, holding the position for 2–3 seconds.
- > Lower your shoulders back down to the starting position. Keep your movements slow and controlled, avoiding any rotation or hunching forward.
- > Perform 10 repetitions, 3 times daily.



8. Forward shoulder flexion

- > Stand up straight and keep your arms at your sides.
- > Slowly raise one arm forward and upward in front of you, keeping a slight bend in your elbows.
- > Hold the position for a moment, ensuring your shoulders are relaxed and not shrugging.
- > Slowly lower your arms back down to the starting position and repeat on the other side.
- > Perform 10 repetitions, 3 times daily.

Activity Restrictions

15 Days After Surgery

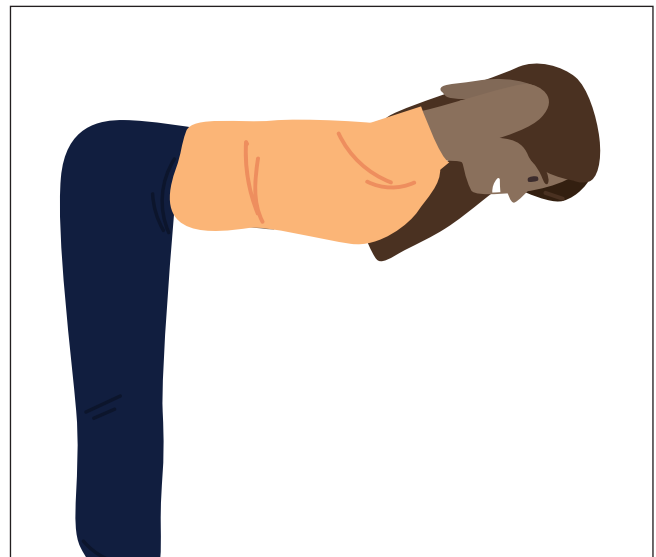
For proper healing and recovery, it's important to carefully adhere to your surgeon's activity restriction recommendations as follows:

- > Walk 3-4 times each day, minimum, increasing by 5-10 minutes per day.
- > No lifting restrictions
- > OK to stretch
- > Contact sports ok
- > Gradual return to normal activity

** Please note, this information is a guideline and therefore you should follow your doctor's instructions should that be different from what is stated here.*

Daily Exercise

- > Walk 3-4 times each day, minimum, increasing by 5-10 minutes per day.
- > Move or reposition every 2 hours including sitting up in chair 3 times each day.
- > Perform incentive spirometry (breathing device) 10 times each hour while awake.
- > Discontinue previous exercises and begin the following exercise, using the illustrations and instructions for guidance.



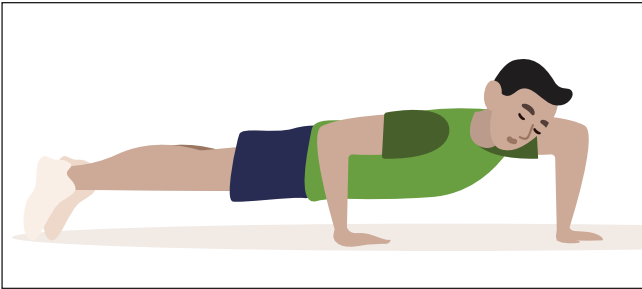
1. Back straightening

- > Place hands behind head with fingers interlocked.
- > Pull elbows back as much as possible and the head and neck needs to remain straight. This posture causes the chest to fill in the front.
- > Bend from the hips, forward and down to a horizontal position.
- > This position is held for 2-3 seconds. It is very important that the elbows, head, and neck remain straight during the exercise.
- > Perform 25 times, both in the morning and evening.

After 3 Months or Cleared by Doctor

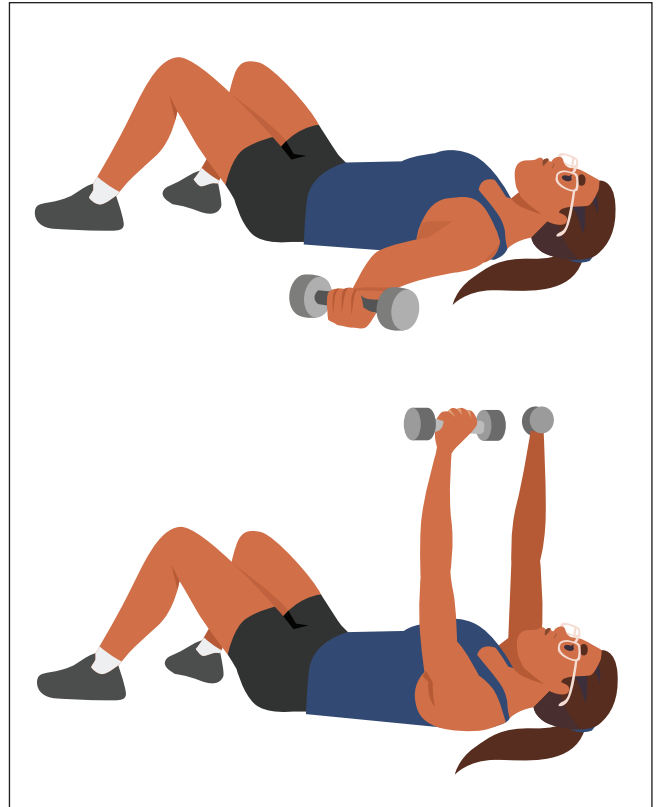
Daily Exercises

- > Discontinue previous exercises and begin the following 2 exercises, using the illustrations and instructions for guidance.



1. Push up

- > Place your hands on the floor slightly wider than shoulder-width apart, with your fingers pointing forward.
- > Position your feet together or slightly apart, with your body forming a straight line from your head to your heels.
- > Your arms should be fully extended, and your elbows should be locked out.
- > Slowly bend your elbows to lower your chest toward the ground.
- > Try to keep your body in a straight line.
- > Lower yourself until your chest almost touches the floor or until you feel a stretch in your chest.
- > Push through your palms and extend your elbows to return to the starting position.
- > Perform 25 push ups per day.



2. Chest fly

- > Place a small weight in each hand.
- > Lie on the floor with your arms stretched out on each side.
- > Keeping arms straight, bring weights together over your chest. Slowly lower to the starting position.
- > Repeat 25 times.

Activity Restrictions

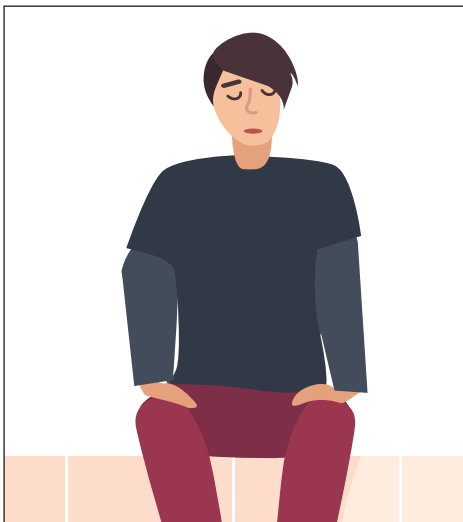
First 90 Days (3 Months) After Surgery

For proper healing and recovery, it's important to carefully adhere to your surgeon's activity restriction recommendations as follows:

- > No lifting over 10 lbs.
- > No sleeping on your side
- > No twisting (keep shoulders in line with hips)
- > No weight/pressure through arms
- > Put milk/liquids in small containers
- > Limit household tasks that require pushing and pulling such as vacuuming and laundry
- > **Dressing:** Put arms in shirts then lift shirt overhead. Can move arms backward to fit into sleeve and bend over to pull up pants. You may cross your legs to put on shoes.
- > **School books:** Try to have a second set of books at home to avoid carrying to /from school.
- > **Sleeping:** Put head of bed all the way up before sitting upright to get in/out of bed. Support can be given at the back of the head and the pelvis. You may also sleep in a recliner if you prefer. There are no restrictions against lying flat to sleep.
- > Be alert when moving around environment to avoid colliding with people/objects

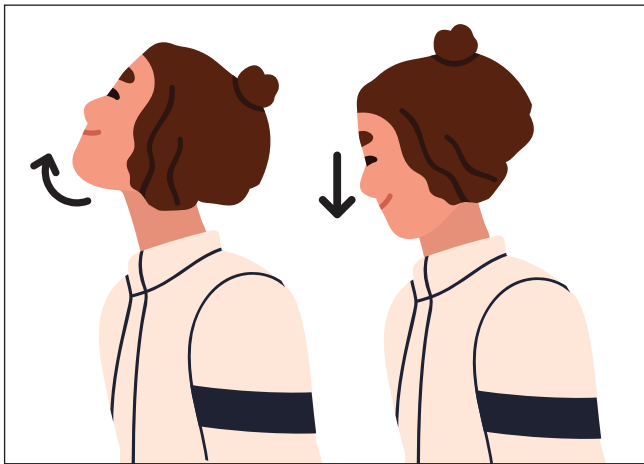
Daily Exercises

- > Walk 3-4 times each day, minimum, increasing by 5-10 minutes per day.
- > Move or reposition every 2 hours including sitting up in chair 3 times each day.
- > Perform incentive spirometry (breathing device) 10 times each hour while awake.
- > Do the following 8 exercises as shown, using the illustrations and instructions for guidance.



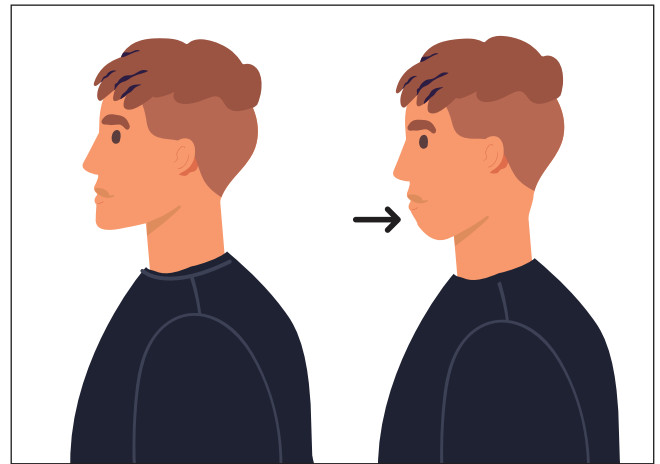
1. Chest expansion / deep breathing with breath holding

- > Sit or stand up straight with your shoulders relaxed and pulled back. Breathe in as deeply as possible and hold your breath for 10 seconds. Release.
- > Perform 10 repetitions, 3 times daily.



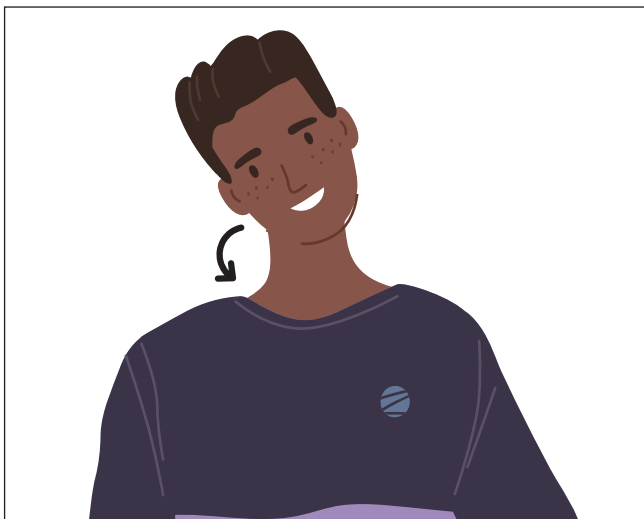
2. Neck flexion

- > Sit or stand up straight with your shoulders relaxed.
- > Slowly lower your chin toward your chest, feeling a stretch along the back of your neck.
- > Perform 10 repetitions, 3 times daily.



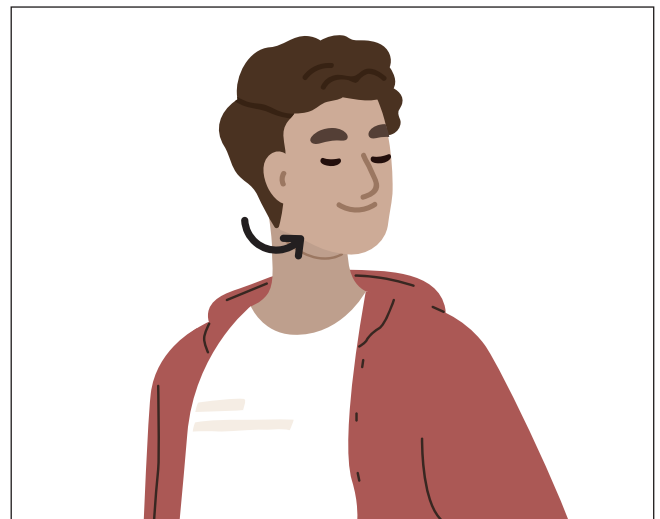
3. Neck retraction

- > Sit or stand up straight with your shoulders relaxed.
- > Gently pull your head straight back, as if you're trying to create a double chin. Keep your eyes level and avoid tilting your head up or down.
- > Perform 10 repetitions, 3 times daily.



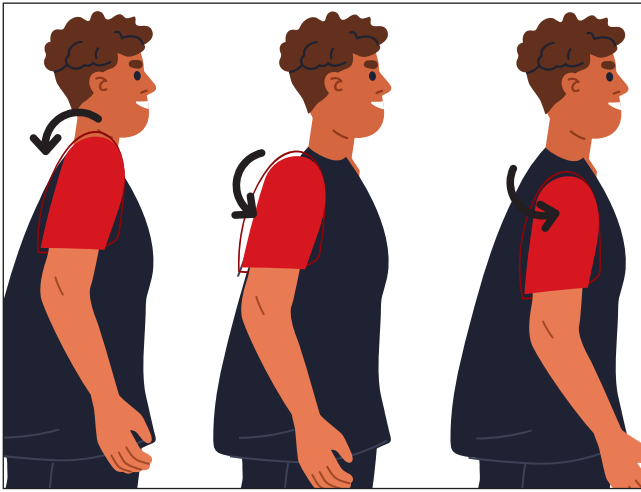
4. Neck side bend

- > Sit or stand up straight with your shoulders relaxed.
- > Slowly tilt your head to one side, bringing your ear toward your shoulder. Keep your shoulders relaxed and avoid lifting them.
- > Perform 10 repetitions, 3 times daily.



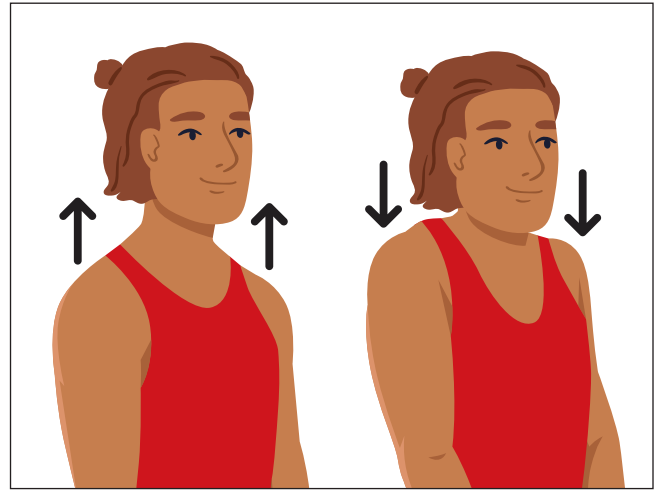
5. Neck rotation

- > Sit or stand up straight with your shoulders relaxed.
- > Slowly turn your head to one side, bringing your chin toward your shoulder. Keep your shoulders relaxed and avoid twisting your torso.
- > Slowly bring your head back to the neutral position and repeat on the opposite side.
- > Perform 10 repetitions, 3 times daily.



6. Backward shoulder rolls

- > Sit or stand upright with your arms at your sides.
- > Slowly lift your shoulders upward toward your ears.
- > Gently roll your shoulders backward in a circular motion, squeezing your shoulder blades together as they move down and back.
- > Complete the circular motion by bringing your shoulders back to the starting position.
- > Perform 10 repetitions, 3 times daily.



7. Scapular elevation

- > Sit or stand upright with your arms relaxed at your sides. Slowly shrug your shoulders upward toward your ears, holding the position for 2–3 seconds.
- > Lower your shoulders back down to the starting position. Keep your movements slow and controlled, avoiding any rotation or hunching forward.
- > Perform 10 repetitions, 3 times daily.



8. Forward shoulder flexion

- > Stand up straight and keep your arms at your sides.
- > Slowly raise one arm forward and upward in front of you, keeping a slight bend in your elbows.
- > Hold the position for a moment, ensuring your shoulders are relaxed and not shrugging.
- > Slowly lower your arms back down to the starting position and repeat on the other side.
- > Perform 10 repetitions, 3 times daily.

Activity Restrictions

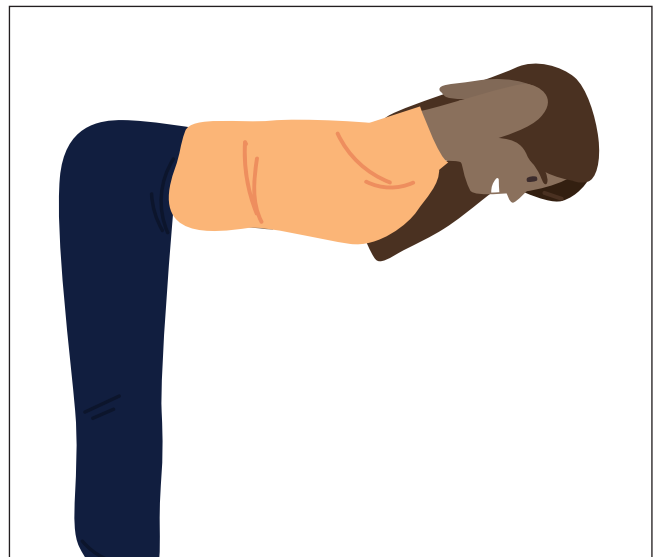
Day 91 to 120 After Surgery

For proper healing and recovery, it's important to carefully adhere to your surgeon's activity restriction recommendations as follows:

- > Slight increase in weight allowed to lift per MD recommendations.
- > Gradual return to normal activity
- > OK to stretch

Daily Exercise

- > Walk 3-4 times each day, minimum, increasing by 5-10 minutes per day.
- > Discontinue previous exercises and begin the following exercise, using the illustrations and instructions for guidance.



1. Back straightening

- > Place hands behind head with fingers interlocked.
- > Pull elbows back as much as possible and the head and neck needs to remain straight. This posture causes the chest to fill in the front.
- > Bend from the hips, forward and down to a horizontal position.
- > This position is held for 2-3 seconds. It is very important that the elbows, head, and neck remain straight during the exercise.
- > Perform 25 times, both in the morning and evening.

Activity Restrictions

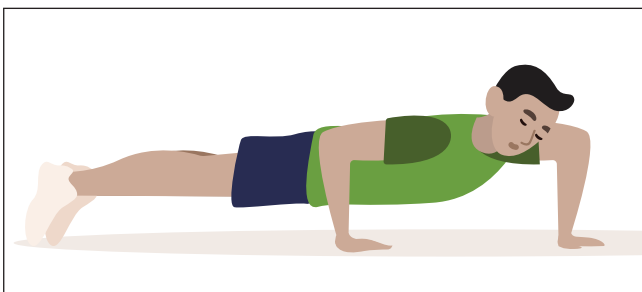
Day 121 After Surgery and Beyond

- > No lifting restrictions
- > Contact sports ok

* Please note, this information is a guideline and therefore you should follow your doctor's instructions should that be different from what is stated here.

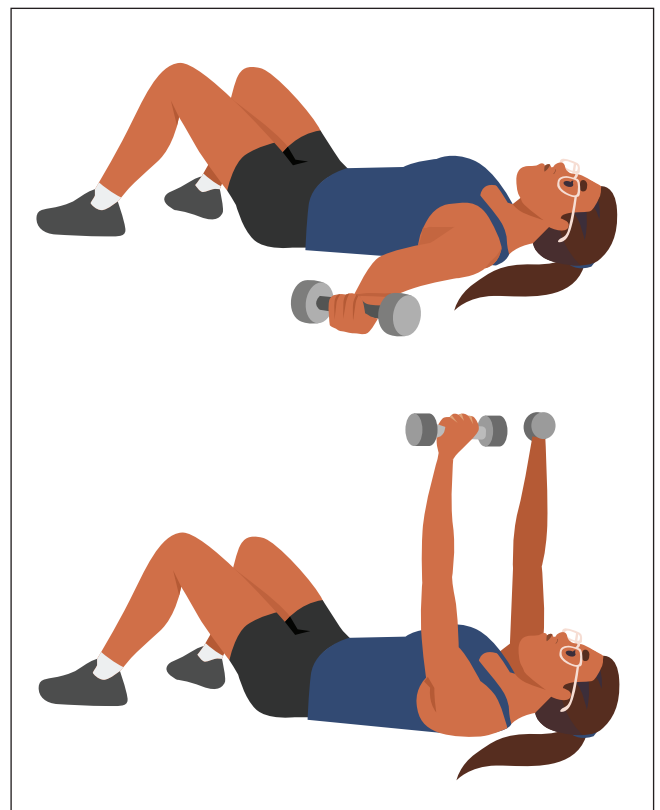
Daily Exercises

- > Discontinue previous exercises and begin the following 2 exercises, using the illustrations and instructions for guidance.



1. Push up

- > Place your hands on the floor slightly wider than shoulder-width apart, with your fingers pointing forward.
- > Position your feet together or slightly apart, with your body forming a straight line from your head to your heels.
- > Your arms should be fully extended, and your elbows should be locked out.
- > Slowly bend your elbows to lower your chest toward the ground.
- > Try to keep your body in a straight line.
- > Lower yourself until your chest almost touches the floor or until you feel a stretch in your chest.
- > Push through your palms and extend your elbows to return to the starting position.
- > Perform 25 push ups per day.



2. Chest fly

- > Place a small weight in each hand.
- > Lie on the floor with your arms stretched out on each side.
- > Keeping arms straight, bring weights together over your chest. Slowly lower to the starting position.
- > Repeat 25 times.

Hospital Map & Directions

WakeMed Raleigh Campus

3000 New Bern Avenue – Raleigh

From New Bern Avenue, use the Emergency Department and Patient Registration entrance (see map). Your driver can drop you off at Patient Registration and park in the P3 (Orange) parking lot. Additional parking is available in the P1 (Green) parking deck for visitors during and after your surgery.



KEY

- P1** Green Parking Deck for Patients & Visitors
- P2** Purple Parking for the Heart Center
- P3** Orange Parking for Day Surgery
- P5** Blue Parking Deck for Employees
- P4** Yellow Parking for:
 - The Andrews Center
 - WakeMed Physician Practices & Clinics
 - Conference Center
 - Medical Simulation Center
- GoRaleigh Bus Stops

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