TEXAS NERVE & PARALYSIS INSTITUTE

A FAMILY GUIDE

for OBPI Management

Dr. Rahul K. Nath

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Getting Your Child Evaluated by Dr.Nath

How to Get Your Brachial Plexus Injury Evaluated in 3 Steps

1. Visit Dr. Nath's website and send us a contact form that briefly describes your injury.

http://www.drnathbrachialplexus.com/contact/index.php

2. Submit your video for evaluation

Dr. Nath
Texas Nerve & Paralysis Institute
6400 Fannin Street, Suite 2420, Houston, TX 77030

Videos can be uploaded online:

http://www.drnathbrachialplexus.com/evaluation/video.php

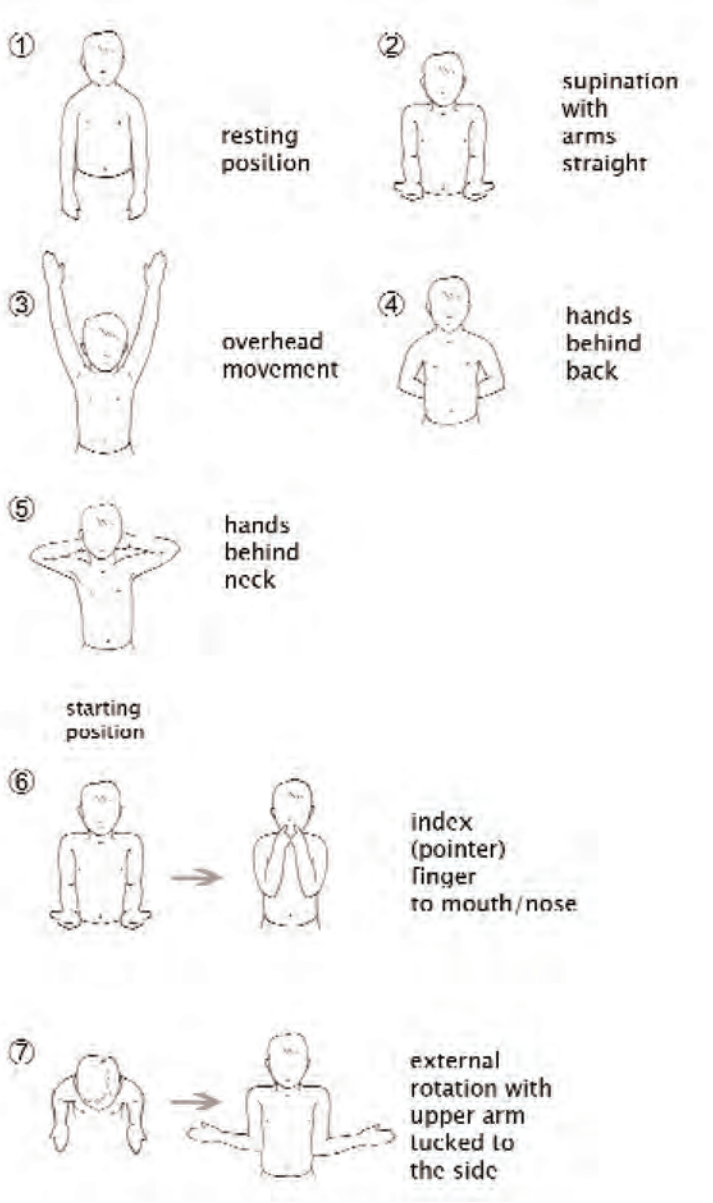
3. Send us ALL medical records, including EMGs, if performed.

Dr. Nath
Texas Nerve & Paralysis Institute
6400 Fannin Street, Suite 2420
Houston, TX 77030

Tips for taking a useful evaluation video

Please refer to the diagram on page 4 which details the movements that Dr. Nath needs to view in order to assess active range of motion.
Child should not be wearing a shirt; girls may wear a sports bra or bikini top.
The movements should be performed slowly without assistance from the other arm or hand, preferably more than once.
Be sure to film under good lighting conditions with the light source in front of the patient.
You may consider filming in portrait rather than landscape.
Please make sure the fingertips are visible in the resting position.

Active Range of Motion Movements for Evaluation



Once Dr. Nath has evaluated your video, a member of the Texas Nerve & Paralysis Institute staff will contact you to discuss his recommendations.

Outreach Days

Since traveling is difficult and expensive for most people, Dr. Nath holds free outreach days in specific cities outside of Houston to meet with patients and their families, evaluate their condition, and offer his opinion. Generally, these clinics are held in regions of the country where he has a large number of patients. He typically spends a day or two meeting with both current and new patients. Dr. Nath usually visits a region once a year but busy regions may have outreach days 2-3 times a year. If you can gather 15-20 families, Dr. Nath will be happy to come to your area. Dr. Nath is a licensed physician and surgeon in many states. If your state is not on his list, however, he will have to complete the licensing process first, which takes approximately six months.

Dr. Nath sees patients of all ages and for all types of peripheral nerve injury including: obstetrical brachial plexus injury, traumatic brachial plexus injury, winged scapula, and foot drop. When you come to meet with Dr. Nath, you should bring copies of all current x-rays, scans, tests, and studies (including the reports).We also request that you come prepared with a written list of questions. The ability to choose a specific appointment time is given to families with infants (under 12 months). You need to request an appointment time that works best with your infant's schedule. It is best if your baby is active, awake and not hungry for your visit with Dr. Nath.

To view upcoming outreach days and schedule a meeting time, visit Dr. Nath's satellite clinic website: http://www.drnathclinics.com

Scheduling and Planning for Surgery

Now that you have decided to schedule your child for surgery, our staff is ready to help you every step of the way. Your main contact person at the Texas Nerve & Paralysis Institute will be the patient liaison, (866) 675-2200; contact@drnathmedical.com. Our professional staff, which includes insurance specialists, has had experience guiding hundreds of families through this process. It is our goal to make this as easy as possible for you and your child.

Your first step should be to contact the patient liaison at our office to discuss pre-surgical testing. This is also the person you can contact at any time should you have any questions. Be prepared to provide details about your insurance information before a surgery can be scheduled. The insurance specialist will assist you in getting authorization for the surgery from your insurance company and talk to you about our experiences with your specific insurance company and what you will need to do to get the surgery approved. Our insurance specialist will also organize your pre-surgical appointments for you and will be in constant contact with you regarding your benefits and scheduling. Once all of your appointments are confirmed and your insurance has authorized the surgery, you will be provided with a final itinerary that details all of your appointments for the days leading up to surgery. This is usually available no later than two weeks prior to surgery.

General Pre-Surgical Issues

Length of Stay & Pre-Op Testing

Now that you have a surgery date, there are many preparations that have to be made. A good place to start is to determine the length of your stay in Houston. Some factors to consider when making this decision are: how much pre-operative testing is necessary, how long your child will be in the hospital, and if there are any post-operative issues that should be addressed before you leave. **Typically, you will need to stay a minimum of 3 days.** Some parents like to stay a day or two after discharge from the hospital. Do not book your airfare until your insurance company authorizes the surgery.

How many tests will be ordered for your child and how long does each test take?

Pre-operative testing may include an EMG, upright MRI, and any labwork requested by the Anesthesia Department (read about anesthesia clinic below). You must also set aside time for a custom splint to be fitted and constructed prior to the surgery. Your child will be placed in this splint while still under anesthesia in the operating room. Our insurance specialist will help you schedule all of your child's pre-operative appointments.

Upright MRI can be performed at a facility near your home, or in Houston at Natural MRI, LC. MRI is a non-invasive and painless procedure. The upright scan is done without anesthesia at the Natural MRI facility located approximately 2 1/2 miles from Dr. Nath's office (**http://www.drnathmri.com**). It is not usually performed on children under five years of age. The session will take about 45 minutes, and both shoulders will be scanned. You should plan on being there one to two hours in case your child has the wiggles and the scan has to be repeated. While the scan is being performed, your child can sit on a parent's lap and watch a DVD from our library or a child's favorite that you bring with you on the big-screen television. Please do not have any metal objects on you or your child (jewelry, belts, eyeglasses, etc.).

Can pre-operative testing be done in one day or would my child be best served if it is spread out over two days with fun trips to the zoo or museum?

It is possible for all pre-operative appointments to be done in one day. However, moms and dads know their child's tolerance level best.

Splinting Appointment

Your child will need to wear a brace to position and stabilize the shoulder and/or arm after surgery.

For Triangle Tilt patients only: The splint is constructed by an orthotist (a person that is specially trained in making splints, braces, etc.) in Houston who works closely with Dr. Nath. You will need to have your child measured by a local orthotist prior to your arrival in Houston. Our patient liaison will provide you with a form to be filled out by your orthotist and faxed directly to Dynamic Orthotics & Prosthetics (713) 747-4249. Our office can also assist you in forwarding the information to the appropriate individual. The splint will be ready for final fitting when you arrive in Houston.

Mod Quad patients can be measured for their splint by a local orthotist prior to their arrival in Houston. Alternatively, they can be measured at Children's Memorial Hermann hospital prior to surgery.

For all other surgeries, splints/braces will be fitted post-operatively prior to discharge from the hospital.

Please ask the patient liaison for additional information regarding splinting/bracing.

http://www.drnathbrachialplexus.com/splint

Does Dr. Nath accept insurance?

Although Dr. Nath is not a preferred provider for any insurance company network, we have great success in working with all insurance companies to make arrangements for surgeries. Please feel free to contact our office and speak with our insurance specialist.

Will my child be able to attend school after surgery?

This is mostly up to you, your child and your school district. There will be some restrictions on your child's activities, however, including: no unsupervised physical activity, no monkey bars, no lifting greater than 5 pounds, no push-ups and no backpacks. You may want to purchase a rolling backpack for your child.

You should contact your school district to determine what services they can provide to your child. Some districts will provide home-bound education. Other services you may want to inquire about are: obtaining a second set of books for your child, extra time to complete assignments, bus service, and special desks/seating that will provide some support for your child's arm.

Two to Three Months prior to Surgery

Health Insurance Issues

•Call the patient liaison (866) 675-2200 to determine whether there are any final insurance issues that need to be addressed.

•Call your health insurance company and discuss the upcoming surgery with them. Request that you be assigned a "case manager" who will help you navigate the full potential of your benefits plan.

•You may need to get a referral from your primary physician.

•If you need information about the surgery for your insurance company, there are Ready-To-Print PDF files on the website (in the Brachial Plexus Surgery section). Our insurance specialist will help you coordinate this communication.

•A Letter of Medical Necessity from Dr. Nath may also be needed.

•Some insurance companies have special support programs for families who have to travel for surgery. For example, Aetna has the National Medical Excellence Program. Once your child's surgery is approved, these programs may cover travel, portions of your hotel stay, and airport transfers. The exact benefits you receive depend on your insurance company and coverage. You may have to talk with multiple people within your insurance company to uncover these types of benefits.

•Your pediatrician's office may also be a useful resource.

Other Medical Issues

Has your child been exposed to chicken pox or another childhood illness within the last three weeks? Are there other specialists involved in your child's care? Does your child have other medical issues that need additional pre-planning for a surgery? **Set up appointments with your pediatrician and specialists for one month prior to surgery to discuss specific pre-surgery, intra-operative and post-surgery needs.**

You will also need to see your pediatrician three to five days after surgery. You may want to schedule that appointment at this time.

For your trip to Houston, bring any test results or medical records that would help in your child's care and that have been requested by Dr. Nath and the Anesthesia Department.

Have you decided how many days you will be in Houston? What kind of medical support system do you have at home? Do you have a pediatrician who is close to home and easy to get to?

One Month prior to Surgery

Health Insurance

Call our insurance specialist at (866) 675-2200 and determine whether anything else is required for the insurance pre-certification/pre-authorization process.

Hospital Registration

Your child will need to be registered at Children's Memorial Hermann Hospital. Our staff will take care of this. However, you should call the hospital at (713) 704-5538 to confirm that your child's registration is complete. Have your insurance information available when you make that phone call.

Contact Anesthesia Department

If your child has known issues with anesthesia, if there is family history of issues with anesthesia, if there are other medical complications, or if you just want to talk with the anesthesiologist to answer your questions, you may make an appointment at the Anesthesia Clinic in the hospital. You can meet with them in person or have a phone conference. To arrange a phone conference, call the nurses' desk at the Anesthesia Clinic (713) 704-3724. **If you would like to meet with the anesthesia staff prior to surgery, please let our patient liaison know that you would like this appointment included in your pre-surgical itinerary.**

The clinic is on the 2nd floor , Jones Pavilion, Day Surgery Reception Area.

Lab Work

Lab work may be requested by either Dr. Nath or the anesthesia department. Ask Dr. Nath if lab work will be required for your child and under what circumstances an anesthesiologist might order the lab work. Any information you know in advance will help you prepare your child. Lab work is usually peformed locally,

approximately one week prior to surgery.

Some clinics have EMLA (numbing cream) available to make sure that the lab work is as pain-free as possible (request it in advance). You can ask your pediatrician or the lab for more information about this. **It takes approximately 1 hour for the full numbing to take place, so plan on this extra time.**

Travel Arrangements

If your health insurance offers no travel support, there are foundations that provide free or reduced airfare. Some airlines also offer airfare assistance; you should contact them directly. Hotel rooms can often be booked at a reduced "medical" rate. More information on these matters can be found in the Hotel, Air Travel, and Transportation sections of this booklet.

Car Seat

Mothers have reported to us that the easiest car seat to use after surgery is a 5-point harness car seat with straps that adjust in the front (see also page 29).

Emergency Splint Plan

Find a local orthotist, therapist, or hospital clinic that can repair or re-manufacture the splint in case of a splint failure (most important for Triangle Tilt surgery). Devise a plan for after-hours emergency care (see Post-Surgery Information sheets in the surgery area on the website).

Pediatrician At Home

If you have not already done so, make an appointment with your pediatrician for 3-5 days after surgery for an incision check.

Stop Taking These Products

Your child should not take any aspirin, aspirin products, Vitamin E or herbal products three weeks prior to surgery. This includes topical lotions and ointments that contain Vitamin E. If you are unsure about a product, please call Dr. Nath's office.

These ready-to-print pages are found in the Brachial Plexus Surgery section on Dr. Nath's website (**http://www.drnathbrachialplexus.com -** Look for the surgery info drop-down box). Print them up in advance and see if there are any special preparations you need to make.

One Week prior to Surgery

Visit Your Pediatrician & Have Lab Work Done

Does your child have a fever, congestion, sore throat, cough, rash, allergic reaction, exposure to chicken pox or other childhood disease, or anything else that may be brewing? A second follow-up visit to clear your child for surgery would be appropriate. It is most important to call Dr. Nath at (866) 675-2200 to discuss the current health issue or e-mail him at drnath@drnathmedical.com. **Do not schedule any immunizations for this time period. Have required lab work performed at this time.**

Preparations at home for your return from Texas

•Prepare a container for incision dressing changes: alcohol gel to disinfect your hands, sterile gauze pads, easy-to-remove medical tape, Tylenol, etc.

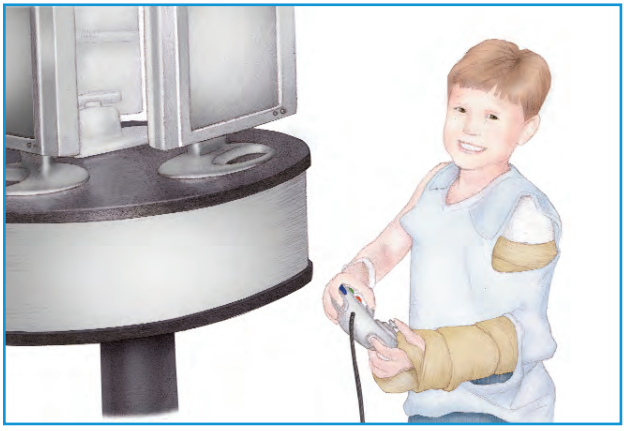
•Think about where you will be sponge-bathing your child and prepare that area with washcloths, shampoo, soap, towels, etc. Some families pre-purchase no rinse shampoo and soap (**http://norinse.com** or at your local medical supply store). It is helpful if a second person is available to help with the first few sponge baths and range-of-motion sessions.

•Prepare a few ready-to-heat meals for the first few days at home or have family or friends bring in some meals until you get some rest and things return to normal.

•Evaluate your child's sleep area. Will your child's crib or bed accommodate the splint? Do you have an alternate sleep area if the crib quarters are too tight with a large splint? One can never know how a child will react to any surgery. Some children sleep well after surgery and some children have a hard time with a change in sleep position and the splint. Have extra pillows available—this may help.

Talking with Your Child about Surgery

There are many ways to prepare a child for surgery. Having a conversation about surgery can be difficult for you and your child. The way you go about having the surgery conversation can vary depending on age and maturity level. Whether or not your child is already fearful of surgery also plays a part in how the conversation should proceed. The majority of parents that we interviewed believe that this conversation shouldn't occur too far in advance of the planned surgery date. The more time that the child has to think about it, the more time they may spend creating fears about it. Some parents choose to have the conversation just a couple of days before the trip.



A good place to start planning for this conversation is to look at Dr. Nath's website. There are three slide shows about children having surgery. It is important that you preview them before showing them to your child. From there you can go to the page on Memorial Hermann Children's Hospital (links are on page 16) where there are numerous pictures of the hospital. Look at the maps to find the locations of the playrooms, movie theater, etc. On that page you can also read about the "child life" specialists at the hospital. Plan for a children's tour the day before surgery and make arrangements for a child life specialist to be present at different times of your child's stay.

Your child may have a number of questions which may include "Will it hurt me? Will I be awake? Where will you be? What will the doctor do to me? Why do I need surgery?" There are a number of books that may help you address these issues with your child. Examples of these books are as follows:

Going to the Hospital - Anne Civardi and Stephen Cartwright, 1993, EDC Publishing. (ages 3 to 6)

Going to the Hospital - Fred Rogers, 1997, The Putnam Publishing Group. (ages 5 to 6)

A Visit to the Sesame Street Hospital - Deborah Hautzig and Joe Mathieu, 1985, Random House/Children's Television Workshop. (ages 4 to 7)

Big Operation: The Busy World of Richard Scarry - Richard Scarry, 1995, Aladdin

Paperback. (ages 4 to 8)

When Molly Was In The Hospital: A Book for Brothers and Sisters of Hospitalized Children - Debbie Duncan, Nina Ollikainen (Illustrator), 1995, Rayve Productions, Incorporated. (ages 4 to 7)

Franklin Goes to the Hospital - Paulette Bourgeois and Brenda Clark, 2000, (volume 25), Scholastic, Inc. (ages 5 to 7)

Clifford Visits the Hospital - Norman Bridwell, 2000, (Clifford the Big Red Dog), Scholastic Inc. (ages 4 to 8)

Curious George Goes to the Hospital - H.A. Rey,1999, Rebound my Sagebrush. (ages 4 to 8)

Katie Goes to the Hospital - Barbara Taylor Cork, 2002, Peter Bedrick, School Specialty Publishing. (ages 4 to 8)

The Magic School Bus: Inside the Human Body - Joanna Cole and Bruce Degar, 1989, Scholastic, Incorporated. (ages 6 to 9)

It may also help to have a children's doctor's kit on hand so you can role play surgery with dolls or stuffed buddies. Talk to your child's closest friends and ask them to make something special for your child to bring along to the hospital. It might be nice to create a book with one page per friend that includes pictures, designs and get well wishes. Other ideas include painting a large t-shirt that your child can wear after surgery or decorating a pillowcase to use at the hospital.

Have your child help you pack their suitcase. If your child has a special blankie or stuffed buddy, it can and should come along. The more familiar items that you have around the hospital room, the more comfortable your child will feel. Bring an MP3 player filled with some nice, relaxing music. Your child can even have the music on during the surgery.

With good planning and age-appropriate, loving conversation, you can reduce the level of anxiety that seems to come along with a child who's having surgery.

Links:

http://www.drnathbrachialplexus.com/allslideshows/index.php
Three slide shows of children having surgery.

http://www.drnathbrachialplexus.com/hospitalaffiliations/hermannhospital.php
Memorial Hermann Children's Hospital - pictures of the hospital, information about Child Life Associates

Packing for the Hospital

For Your Child

•Bring insurance cards, X-rays, MRI and CT-scans, test results and/or any medical documentation that Dr. Nath has requested.

•Pack all **medications** that your child is currently taking and any equipment that might be necessary (nebulizer machine, blood-sugar testing kits, etc.).

•Bring a **favorite buddy or blankie, toy or game** to help pass time, comfort and distract.

•Soothing **music** can help an anxious child before, during and after surgery. Bring a CD/tape/MP3 player with some sweet, relaxing music. Don't own any? Do a search for "massage supplies" and you will find lots of beautiful music options.

•**Clothing** should include two or three t-shirts that are two sizes larger than normal and some comfortable pants. A fleece/stretchy jacket, two sizes larger than normal, is helpful in cold weather (Triangle Tilt patients might have to slit the sides and use velcro to close it up.)

•For the hospital itself, children have their hospital pajamas but will need some slippers or slipper socks so they can walk around the hospital.

•If your child is still in diapers, the hospital is able to provide you with diapers and wipes but sometimes they run out of a particular size, so bring your own just to make sure.

•Pack a **small bag for the airplane ride home** that includes: pediatric Tylenol, wipes, extra change of clothes for child, extra fluids to drink (subject to airport security clearance), and a bag that can be used if vomiting occurs.

•**Pack all medications** you are currently taking and any equipment that might be necessary.

•**Clothing** should be comfortable clothes in which you can sleep. Each patient floor has laundry facilities. Each room has a bath/shower and the nurses can give you towels but **bring your own shampoo, toothpaste, razor, etc**

•Bring your **camera** to take pictures, a **calling card** so you can call family and friends and a **list of important phone numbers**. Remember, cell phone use is not permitted in the hospital. Pack things that will occupy your time while you are waiting and while your child is sleeping.

•Remember to bring **cash** for meals and vending machines.

The Day before Surgery

Pre-Surgical Guidelines

It is very important that you follow the guidelines below. Failure to follow these guidelines may result in the cancellation of your child's surgery.

- After midnight before surgery:
  NO food of any kind
  NO orange juice
  NO milk
  NO infant formula
  NO juice drinks or sodas or any kind of drink that has any color to it whatsoever*
  *might be mistaken by a surgeon to be blood if the child vomits

- Up To 4 hours before arrival time you may breastfeed your child.

- Up To 1 hour before arrival time, your child can have unlimited amounts *of the following liquids only*:
  water
  plain apple juice (not mixed with any other juice)
  white grape juice
  Sprite or 7-Up soda

- Memorial Hermann Children's Hospital suggests that if your child is 2 years old or younger, you wake him/her up 2 hours before the arrival time to feed him/her an unlimited amount of clear liquids such as water, white grape juice, apple juice and Sprite or 7-Up.

- If you have additional questions about food, drink or times, please speak with a surgical nurse at Memorial Hermann Children's Hospital – Pediatric Surgery Area (713) 704-1383.

You will be given additional detailed pre-operative instructions prior to surgery. This will include information about where to park at Hermann, parking ticket validation, and what to do upon your arrival at the hospital.

Houston Area

Although the city of Houston's population puts it squarely at number four in the nation, it feels more like a series of overlapping small towns. Each neighborhood boasts its own character and flavor. Most of the communities share the beauty of Houston, made possible by its proximity to several waterways. Called the Bayou City, Houston is home to more than 10 of these winding waterways that serve as green spaces for fitness and nature enthusiasts. It is easy to forget that Houston is famous for being a sprawling metropolitan area with serious traffic problems. A light rail system links downtown theaters and venues where the Astros, Aeros, and Rockets play with the museum district, medical center, and Reliant Park where the Texans and Comets play and the annual Houston Rodeo is held. Houston also boasts the two time league champion Dynamo soccer team. Whether it's the arts or sports that tickle your fancy, it's likely to be happening while you're here. Many attractions are kid-friendly, ranging from the NASA space center to a zoo and aquariums (**http://www.houstonkids.net**)

Home to one of the country's busiest sea ports, Houston has welcomed immigrants from many countries, and this can be seen in the wide variety of ethnic restaurants available. Cuisines from Tex-Mex, Cajun and barbecue to Indian, Vietnamese, Thai, and Cuban can be found throughout the city. Because Houston is on the gulf, fresh seafood is also a good bet. When you tire of eating, Houston is also known for its shopping. The Bayou city has a something to offer everyone.

Are there fun things to do in Houston if we come a day or two earlier?

Yes! Houston is a great town for fun! See this page for a small listing of fun things to do. The Zoo (great for all ages) and the Children's Museum (good for children in the 5+ range) are very close to the hospitals and make for a good half-day outing. If the weather is nice, swimming at the hotel pool can make even the most nervous parent and child relax. (By the way, the Marriott and Best Western have indoor pools but please check in advance to see if they are operational and warm.) For adults, Houston is a hub of cultural, culinary and theatrical delight. A web search for "Houston Area Attractions" should yield a nice listing of places to go around the town. Your hotel will also have pamphlets and brochures in their lobby. The hotel shuttle for most hotels should be able to bring you to and from if within the two-mile radius of the hotel.

The Children's Museum of Houston, **http://www.cmhouston.org**
Downtown Aquarium,
http://www.aquariumrestaurants.com/downtownaquariumhouston
Hermann Park, **http://www.houstontx.gov/parks/hermannpark.html**
Houston Zoo, **http://www.houstonzoo.org**
Houston Museum of Natural Science (including the Cockrell Butterfly Garden and Wortham IMAX Theatre), **http://www.hmns.org**
Houston Arboretum & Nature Center, **http://www.houstonarboretum.org/**
Johnson Space Center, **http://www.nasa.gov/centers/johnson/home/index.html**
Katy Mills Outlet Mall, **http://www.katymills.com**
Rainforest Café, **http://www.rainforestcafe.com**
Kemah Boardwalk, **http://www.kemahboardwalk.com**
Galveston, **http://www.galveston.com**
Schlitterbahn Galveston Island Water Park,**http://www.schlitterbahn.com**
Moody Gardens, **http://www.moodygardens.com**
Aquarium, IMAX, Rainforest Pyramid,
Palm Beach Waterpark (seasonal)

Texas Medical Center

"The Mission of the Texas Medical Center is to promote the highest quality health status for all people by assisting institutions of the Texas Medical Center to achieve individual and collective goals of the highest possible standards of patient and preventive care, of research and education, and of local, national and international community well-being."

The Texas Medical Center has grown up around Hermann Hospital to include 46 not-for-profit institutions. The goal of philanthropist, M D Anderson, whose efforts led to its founding, was to create a medical center where people from all walks of life could have access to the best health care. The center continues to meet the medical needs of people from all parts of the country and all walks of life.

To learn more about the Texas Medical Center, and see maps of the area, visit their website at http://www.texmedctr.tmc.edu.

Children's Memorial Hermann Hospital

Dr. Nath is affiliated with several hospitals located in the Texas Medical Center, across the United States and internationally.

Dr. Nath is now performing pediatric surgeries at **Children's Memorial Hermann Hospital**. Located on Fannin Street in the Texas Medical Center, it is in the same area that parents are already familiar with.

Over 37,000 children annually receive treatment at the children's hospital, which is located within the Memorial Hermann Hospital complex. Your child is ensured access to advanced medical equipment and expert care by a full-service, university-affiliated hospital.

More information can be found on Dr. Nath's website:
http://www.drnathbrachialplexus.com/hospitalaffiliations/hermannhospital.php


Memorial Hermann Heart & Vascular Institute
North MacGregor Dr.
Memorial Hermann Medical Plaza
Memorial Hermann Hospital
UT Professional Building
TMC Parking Garage 4
UT Medical School at Houston
Ross Sterling Ave.
Main St.
Fannin St.
Cullen St.
John Freeman Blvd.
Rice University
Southwest Fwy
59
Kirby Dr
N Boulevard
Milford St
Graustark St
Bissonnet St
Bayard Ln
Yoakum Blvd
Main St
Caroline St
Austin St
Palm St
Southmore Blvd
Wichita St
Almeda Rd
Rice Blvd
Sunset Blvd
Fannin St
Ewing St
Binz St
Zoo Circle Dr
Hermann Park
N Macgregor Dr
Carson Ct
288
South Fwy
University Blvd
School Pl
Stockton Dr
Sheridan Rd
E Cullen St
Moursund St
Charleston St
Dixie
Southgate Blvd
Wordsworth St
W Holcombe Blvd
Holcombe Blvd
Brays Bayou
Hermann Pressler Dr
Dudley St
Allisimpson St
Lockett St
Payson St
Michael E Debakey Va Medical Center
Braeswood Blvd
Lehall St
St Agnes St
Selma St
Staffordshire St
Carroll St
Underwood St
S Braeswood Blvd
Old Spanish Trl
Charline Fall St
Grand Blvd
Ardmore St
Dupree St
Corder St
Cayuga St
Greenbriar Dr
Knight Rd
Reliant Park
El Camino St
El Rio St
Holly Hall St
Naomi St
El Mundo St
Fannin St
Almeda Rd
Holt St
S Loop Fwy W
1B
610
38A
38C
S Loop Fwy E
Dr. Nath's Office
Suite 2420
6400 Fannin Street
Memorial Hermann Hospital
Natural MRI
Suite L
8307 Knight Road
Dynamic Orthotics
11155 S Main Street
MetroRail Stop
Houston Zoo
Museum District
N
W
E
S
(Map data from MapQuest.com)

Hotel Arrangements

How many days should we stay in Houston?

This answer will vary from person to person and family to family. How many days you arrive before surgery depends on how many pre-operative tests are ordered. You may need one day to do testing and splinting or you may need two or more. Your child may or may not need additional post-operative care. Dr. Nath may ask that you stay an additional 24 hours. We do suggest, however, that you go home as soon as possible so that your child can get back to familiar surroundings, routines and his/her own comfy bed.

My child is having surgery, should we keep our hotel room while our child is in the hospital?

This is a personal preference. Some families keep a hotel room and the parents take turns going to the hotel to rest and shower. Some families completely pack up and move into the hospital for the entire time their child is there. Many of the surgeries are now on an outpatient basis or only necessitate an overnight stay, so keep that in mind. Both parents are permitted to sleep at Children's Memorial Hermann Hospital. They have a bench bed near the window for one parent and a recliner chair for the other parent. Every room has a full bathroom with bathing facilities. If an infant is most comforted in a "family bed," you may request a regular hospital bed instead of a crib.

Are there hotels nearby?

There are many hotels within a two-mile radius of the Texas Medical Center. When searching for a hotel online, the key words for the area will be the "Texas Medical Center." Texas Nerve & Paralysis Institute has a contract with Residence Inn. Some families receive discounts by using the Entertainment card, AAA card and military or government I.D.'s. Many hotels give you better discounts if you book online. Rates and discounts change by season.

Holiday Inn Hotel & Suites - Houston Medical Center

6800 South Main Street- (713) 528-7744
http://www.hi-medcenter.com/
Enter promotional code: **"IL140"** to receive special rates for Dr. Nath's patients.

Amenities include: •**Complimentary** shuttle service to the Texas Medical Center and other Houston destinations. •High-speed internet access. •Suites with kitchenettes available. •Pool and fitness center.

Houston Marriott Medical Center Hotel

6580 Fannin Street- (713) 796-0080
http://marriott.com/property/propertypage/HOUMC

Residence Inn by Marriott

7710 Main Street - (713)
660-7993
http://www.marriott.com/HOUAS
Enter promotional code: **"N8B"** to receive special rates for Dr. Nath's patients.

Following amenities are also included:

- **Free** shuttle service.to your appointments in the Texas Medical Center area, area restaurants and shops
- **Free** social hours (Monday to Thursday 5:30 pm to 7:30 pm includes **light snacks, beer, wine** and **soft drinks**)
- **Free** breakfast buffet
- Residence Inn will do grocery shopping for you and deliver your items directly to your hotel room.
- **Free** fitness center access
- **Free** parking
- **Free** high-speed internet access
- Coin Laundry

Crowne Plaza Houston Medical Center

6701 South Main Street - (713) 797-1110
http://www.crowneplaza.com

Air Travel

What airports are nearby?

There are two airports in the Houston area: Hobby (HOU) and George H. Bush Intercontinental (IAH). The airport you use will mostly likely be determined by the airline you travel with. Hobby is approximately thirteen miles from the Texas Nerve & Paralysis Institute, while Intercontinental is approximately 25 miles away. (**http://www.fly2houston.com**)

How can we get free or discounted airfare?

Listed below are the airlines/organizations that provide families with free or reduced medical airfare. Each program has its own criteria for gifting or discounting flights. Some organizations require that you have a letter from a non-profit organization. This can be obtained from local community or religious organizations and should state that there is financial need for assistance. If your child is a brachial plexus patient you can ask UBPN, Inc. for this letter. Contact UBPN at (866) 877-7004 or e-mail info@ubpn.org. Some organizations will request a confirmation letter from the doctor or the hospital. Note that the cheapest flights usually include a Saturday night stay.

Airline carriers use unused frequent flyer miles for these flights. Occasionally, they will tell you that they have "run out" of these miles and may temporarily shut down their medical flight program. This is why it's important to start seeking these options as soon as you have a clinic or surgery appointment. Some airline carriers or organizations may only allow you one or two flights per lifetime. Some offer tickets for the child and one parent or just the individual adult traveling, but ask for a second adult/parent ticket. Availability and rules change often. Don't forget to ask what the options or penalties are for flight changes.

If you must fly with one adult, upon making your reservations, you may ask the airline for a representative to "meet and assist" you when you check in and when you arrive at your destination. Some airports will allow a family member or friend to accompany you right to the gate. You must request this when you check in at the airport. To have a family member or friend meet you at the gate when you arrive home, they must go to the check-in counter prior to your flight's arrival and request a pass. Whether passes are granted or not depends on airport policy and current security conditions.

If your airline is not listed, call them directly and ask if they have a special program for medical airfare. It is common for airlines to donate unused mileage to children and families in need.

- **Miracle Flights For Kids**
  http://www.miracleflights.org, (800) FLY-1711.
- **Northwest Airlines Kid's CareProgram**
  Applications can be downloaded at:
  http://www.nwa.com/corpinfo/aircares/about/kidcares.shtml
  or call **(**612) 726-4206 to request an application for KidCares travel.
- **Southwest Airlines Civic and Charitable Contributions**
  Contact Debbie Wafford at (214) 792-7943 for application.
- **American Airlines Miles For Kids**
  (817) 963-8118, Fax (817) 931-6890
- **Continental Airlines - Meeting Works Department**:
  (800) 468-7022 - Agreement #DK56VM
- **National Patient Travel Center**
  http://www.patienttravel.org, (800) 296-1217
- **Mercy Medical Airlift**
  (800) 296-1217
- **Angel Flight, Inc.**
  Jerry Dorré**,** Executive Director
  4310 Amelia Earhart Dr.
  Addison, Texas 75001
  office: 972 458 0700
  fax: 972 858 5492
  general questions: jerry@angelflightsc.org
  http://www.angelflightsc.org

If you call any of the organizations above and find that the information or telephone number has changed, please let us know so that we can make the correction.

My child is having surgery, will we have a problem seating our child in the airplane after surgery?

Try to get "bulkhead" seating (these go fast so request this early on) if you can. The bulkhead is the first row in the regular cabin. It has a little extra legroom because there are no seats in front of it. Which arm will be splinted? Get seating on the

opposite side of the airplane. If the left arm is splinted, get a seat on the right side of the airplane. Have water/drinks available as well as a bag for stomach sickness, a box of wipes and change of clothing. Also make sure that the patient is adequately medicated (if necessary) for pain during the travel time. Adults in splints may be able to get an open seat in first class without additional cost. It never hurts to ask.

My child is having surgery; do we need a stroller or a car seat when coming to Houston?

You will need an "airplane compatible" car seat for the airplane (**http://www.faa.gov/passengers/fly-children/crs**) and for any car travel while in Houston. Moms have informed us that the best car seat to use is a five-point harness car seat where the straps are adjustable in the front. Infant seats with adjustable strapping works fine for infants with a primary surgery immobilizer. Strollers are very helpful when traveling. You can actually wheel your stroller directly to the door of the airplane and leave it in the jetway, where it will be tagged and stored. When you arrive at your destination, it will be waiting for you in that same area. Older children (ages 3-5) might still need the assistance of a stroller to help them navigate the long walks through the airport while still tired from their surgery.

Transportation

When we get to Houston, should we rent a car?

Many people do well without renting a car. The medical center area is well serviced by the Houston public transportation system and many of the hotels offer free shuttle service to and from the hospitals and other places within a 2-mile radius of the medical center. Check with your hotel for information on their shuttle services. Transferring from and to the airports can be done easily by taxi or private driver (limousine/town car). Note that hotel shuttles will not transfer you to and from the airport.

There are standard posted rates by zone on the taxi booths at each airport and in each taxi. Please verbally confirm this rate with your taxi driver **before** you enter the taxi. If you need to pay by credit card, tell the person in the taxi booth when you request your taxi. Taxi and Town Cars will cost somewhere in the range of $50-100 round-trip depending on the airport to which you are traveling.

Cab Services

Fiesta Cab Company (713-225-2666)
http://www.taxisfiesta.com

Pickup and delivery service to all points of the Texas Medical Center and both airports. Fiesta accepts reservations up to 30 days in advance. They also operate a town car service with scheduling.

Liberty Cab Company (713-695-6700)
http://www.libertycab.net

Liberty provides pickup and delivery to all points in the Texas Medical Center and both airports and accepts reservations up to 30 days in advance.

Square Deal Cab Company (713-659-7236)

Square Deal provides pickup and delivery to all points of the Texas Medical Center and both airports. This company accepts reservations in advance and is able to accommodate wheelchair needs.

United Cab Company (713-699-0000)
http://www.unitedcab.com

United provides pickup and delivery, accepts reservations in advance, and accepts all major credit cards. They will schedule vans with 24-hour notice.

Yellow Cab Company (713-236-1111)
http://www.yellowcabhouston.com

Yellow cab provides pickup and delivery and accepts reservations in advance. They will make pick ups within five minutes at any point in the Texas Medical Center. Area cab stops are located conveniently.

Private Town Cars

Town Cars cost around the same price (or slightly more) as taxis and offer you some additional comfort. Check websites like **http://www.limos.com** for listings in the Houston area. Once you have booked a driver, ask him for the exact location where he will be waiting for you, whether or not he will have a sign with your name on it, and if there is enough room in his car for a car seat (requiring a middle seat belt). Also, get his cell phone number in case you cannot find him at the airport.

Houston Public Transportation

http://www.ridemetro.org

METRO Rail
This new light rail line runs 7.5 miles from downtown to south of Reliant Park. It's a fast, convenient and safe way to travel between Downtown, Midtown, the Museum District, the Texas Medical Center and Reliant Park. The Metro comes every six to twenty minutes (normal business hours to weekend evenings respectively).

Texas Medical Center Campus Trolley
Texas Medical Center Circulator
Provide transportation within the Texas Medical Center

METRO TMC Shuttle Service

Metro Shuttle bus routes (red, white and blue) provide free transportation between most buildings in the Texas Medical Center. Bus stops are conveniently located throughout the campus.

METROLift Information

METROLift, a service of the Metropolitan Transit Authority, offers curb-to-curb transportation for persons with disabilities who are unable to ride regular METRO bus service. For information, call (713) 225-0119.

Metro Bus

http://tripplanner.ridemetro.org

METRO offers comfortable, reliable bus service to the Texas Medical Center on 13 routes. Routes and schedules are available in the Texas Medical Center Parking Services Offices (in Garage 2) and on the METRO Web site. Reduced fares are available to children, students, senior citizens and persons with disabilities. For more information, call (713) 635-4000.

1 — Hospital Route
2 — Bellaire Route
4 — Beechnut Route
8 — South Main Route
14 — Hiram Clarke/Fulton Limited Route
26/27 — Outer/Inner Loop Crosstown Route
34 — Montrose Crosstown Route
68 — Brays Bayou Crosstown Route
73 — Bellfort Crosstown Route
87 — Sunnyside/Plaza del Oro/TMC Route

Frequently Asked Questions: Early Management of OBPI

What is primary surgery?

There are three primary surgical solutions: neurolysis, neurotization (nerve transfer) and nerve grafting. These may be performed alone or in combination with each other. The choice of which peripheral nerve surgery technique is appropriate is based on which method will maximize and encourage the natural regenerative process of the nerve. This involves balancing two main factors: scar tissue removal and reduction of the gap over which nerves must regenerate.

When the nerve remains in-continuity, surgery cannot help during the initial stages of healing. In the majority of cases, natural healing processes result in outcomes similar to or better than nerve reconstruction and biceps function is recovered in the first three months. For the remaining cases, paralyses and secondary developmental issues persist and surgical reconstruction of the nerves should be considered and performed as indicated by electrical and clinical evidence.

In my experience, nerve transfers are preferable to nerve grafting although both have a good record of success in this population when performed appropriately

In most cases the plexus will repair itself more efficiently without surgical help. Within the first three months, range of motion (ROM) exercises performed at each diaper change will encourage motion and maintain flexibility as muscles start regaining power. Physical therapy is important in allowing new movement patterns to be learned, and to maintain range of motion to delay the development of contractures. An initial EMG study is recommended to establish a baseline.

What is The Nath Protocol for Early Management of Nerve Injury?

The protocols at The Texas Nerve and Paralysis Institute are based on my experience with thousands of children with brachial plexus injuries seen in the last 8 years.

Generally, if there is continued significant shoulder and/or elbow weakness by the age of 4 to 6 months of age, and certainly, if there is significant weakness in the biceps muscle by 6 months of age, I believe that surgical exploration is indicated.

Intraoperative nerve testing then defines the specific procedure used to improve arm function. It is very important to note that in 12 to 18 months following injury,

denervated muscles will not accept a new nerve supply, and remain paralyzed or weak permanently. Because nerves only grow back at one inch per month, time is of the essence in managing these and any other nerve injuries. Bone deformity can accompany longstanding paralysis

If your child has weakness of shoulder, elbow, and/ or hand by the age of 3 to 4 months, we strongly recommend consultation with a surgical specialist with extensive experience in obstetric brachial plexus injuries.

If your child has no movement in any part of the arm by 3 months, we strongly recommend surgery at or before 3 months.

We have found this series of steps to offer optimal results**.** The specifics of application to each child are highly individual, however, and of course other centers may have different management protocols.

EMG's are ideally done at 4 to 6 weeks of age to set a baseline for further evaluation in the future. Similarly, an MRI around that time can be done to determine whether root avulsion (tearing of the roots from the spinal cord) is present, although this test overall is less important than a good EMG examination. The EMG should then be repeated around 3 to 4 months of age to see if improvement has occurred electrically, and to correlate with the physical examination. Generally speaking, if there is not full movement of all elements of the arm (shoulder, elbow, hand) by 3 to 4 months, serious consideration for operative exploration should be initiated. If there is no elbow flexion by 6 months of age, surgery is definitely recommended.
Some modifications to these general rules are:

- continuing improvement in arm function by 4 to 6 months will delay or contraindicate surgery at that time, but if improvement stops later, surgery might be indicated, as in the next item below;

- patients who arrive at our clinic well after 9 to 12 months of age with continuing elbow weakness and other deficits will require 2-level reconstruction, at the level of the nerve roots and in the axilla with appropriate nerve transfers and releases;

- patients who are seen after 2 years of age for the first time are best managed with nerve releases and muscle/tendon transfers.

When and how do you make the final determination that a child needs primary/nerve surgery?

In general, if there is *no* anti-gravity function of the shoulder and biceps (with the child sitting up), I recommend considering exploratory surgery by age 4-6 months of age. If the hand is also paralyzed, then surgery should be performed earlier, 3-4 months if possible. Bending the arm and moving the shoulder while lying down is

not a good indicator of function as gravity is eliminated in this position.

What type of therapy is appropriate while we wait and to see if surgery is needed? Should we pin the child's sleeve to their chest?

No immobilization! Range of motion (ROM) therapy is important to keep joints supple as well as to improve sensory integration.

What type of range of motion exercises - how often?

Very gentle ROM of the shoulder and hand should be performed three to four times a day. Aggressive abduction of the arm and shoulder may cause inferior dislocations of the shoulder, so this should be avoided. Also, aggressive stretching of the elbow can dislocate the radial head, again causing problems. Gentle ROM is best, and certainly nothing that causes crying or pain for the child. **Stretching?** Very careful stretching is OK, avoid stretching the shoulder and elbow if possible. Detailed instructions on performing infant range of motion exercises can be found on Dr. Nath's website.

Are there any tests we should have done locally before we go for a surgical consultation?

An EMG (electromyogram) test can be useful in determining the site and severity of injury. However, a clinical examination by a specialist who frequently treats brachial plexus injuries is overall more important. MRI scans of the brachial plexus are sometimes ordered by local physicians, but are not necessary in the majority of cases.

When is the best age to do primary surgery if the child has no hand, wrist or finger movement and why?

The best age to do primary surgery in this case is probably 2-3 months of age because it will take longer for the nerves to regenerate all the way from the neck area (where the injury is) down to the hand. Also, these tend to be much more severe injuries, so there is less chance of spontaneous recovery.

When is the best age to do primary surgery if the child has no shoulder or elbow movement and why?

Around 4-6 months, because this will allow recovery if nerve grafting is needed, yet still give the longest time for spontaneous recovery to occur.

What risks are associated with this surgery?

There are general risks present for any surgery such as infection, scarring, bleeding, allergic reactions, blood clots and even organ injury or death from anesthetic. The specific risks of nerve surgery are failure to work, possible worsening of function, numbness, weakness, and loss of function. In my practice, these have been very rare.

Is there a chance my child can become worse after surgery?

There is always the possibility that this can happen, but I cannot think of a single case made worse by primary surgery in my series of over 1,200 cases.

What will you do if you find an avulsion?

Avulsion injuries cannot be repaired directly to the spinal cord. However, nerve transfer procedures can be used to shunt healthy nearby nerves to the injured nerve and give function in this way.

What will you do if you find a neuroma?

A neuroma is a mixture of regenerating nerves and scar tissue being formed at the site of injury to a nerve. The neuroma is tested in the operating room to see if there is some intact nerve passing through it. If there is some intact nerve, then based on the testing, the scar tissue is removed and the intact parts are preserved. If there is little or no nerve transmission through the neuroma, the entire neuroma is removed. In both situations, the removed areas are replaced with healthy donor nerve taken from elsewhere in the body.

What determines whether a nerve graft should be done?

I rely on clinical and intraoperative testing. I like to see actual movement of the muscle being tested rather than just a signal on a machine. If there is enough function to move the muscle against gravity when its nerve is stimulated, then I will generally not do a nerve graft.

Are there better places than others to take donor nerve from and why?

The donor nerve is virtually always taken from the sural nerve in the calf. This is a sensory nerve that can safely be removed without causing any movement deficits in the leg and leaves sensory feeling on the sole of the foot intact. If less nerve is needed, then it can be taken from the sensory nerves of the neck, again, with no deficit of function.

How long does primary surgery take?

It usually takes me about 3-5 hours, depending on what procedures are specifically required (this is often determined during the course of surgery) and the severity of the injury.

How will the child be immobilized after surgery, what type of immobilization and for how long?

The child is usually placed in a soft brace that holds the arm to the side for two weeks. Range of motion is performed every day on the elbow and hand.

How do we follow-up with you after surgery if we are not from Houston?

Your baby will stay in the hospital for two nights following surgery. This is to ensure proper administration of pain medication and antibiotics and allows therapists time to make a custom splint and to teach wound care. Note that pain medication is not usually needed after the first 24 hours. Your child will discharged after two nights in the hospital, and should be seen by your local pediatrician for a wound check 3-4 days later. Follow-up with Dr. Nath is done through therapist's reports, regular videotape mailings, and through satellite clinics that are run in many states (see section on Satellite Clinics). Locally, a pediatrician may be impor-

tant for prescriptions and other referrals, but generally can be organized through Dr. Nath's office. This system has worked very well with several thousand patients over the past eight years.

When do we begin therapy again after primary surgery?

Within two to three weeks.

Do you have therapy protocols I can give our PT/OT?

Pre-printed sheets will be sent home after surgery. These should be online on my website in the near future.

When will we see results and how will we know if the primary surgery worked? Will we have to have another EMG done and if so when?

Usually results of the surgery are seen within six to eight months and strength continues to improve over the next two to three years. Another EMG is sometimes required if the recovery is slower than expected to confirm that the nerves are growing in the right direction and restoring function.

Does primary surgery ever need to be repeated?

Sometimes, in less than 10% of cases, additional nerve surgery may be needed if the initial nerve grafts did not work or only partially worked. This would be in the form of a nerve transfer, not repeated nerve grafts.

We have been told by another clinic that nerve grafting surgery doesn't help the child gain any function. What is your opinion about this?

My particular views on nerve grafting are based on experience with several thousand children, and I believe that in appropriate cases, nerve grafting is essential. Recovery of functional movements has been very reliable. I expect that other surgeons with different experiences might have different opinions, but overall the validity of nerve grafting has stood the test of time and most surgeons would agree that they are useful.

Frequently Asked Questions: Mod Quad Surgery

Why has the Quad/Mod Quad Procedure been recommended for my child?

The situation of muscle imbalance is very common among patients with Erb's palsy and with other brachial plexus injuries. In our experience the majority of children whose injury does not resolve completely by 3-4 months of age will end up with a specific series of arm restrictions caused by a muscle imbalance between injured and uninjured muscles. One type of secondary muscle deformity that is commonly seen is muscle co-contraction.

In Erb's palsy patients, the major muscle groups that develop co-contractions are: (1) the shoulder abductors and external rotators (weakened by the C5 injury) versus the adductors and internal rotators of the arm and shoulder (relatively spared in C5 and C6 injuries) and (2) the biceps (weakened by the C6 injury) versus the triceps (relatively spared in C5 and C6 injuries). In both situations, unopposed contraction of the unaffected muscle group(s) creates a tethering effect that limits passive range of motion of the unbalanced muscles. Therefore, these strong muscles overpower the weak muscles and over time the child cannot lift the arm over the head or turn the palm out, because of the muscle imbalance.

What is the Quad/Mod Quad Procedure?

My procedure is referred to as the "Quad" surgery because it is based on the following four steps:

(1) Latissimus dorsi muscle release and transfer for external rotation and abduction.
(2) Teres major muscle release and transfer for scapular stabilization.
(3) Subscapularis release without transfer.
(4) Axillary nerve decompression and neurolysis.

Depending on the individual child, other nerve decompressions or muscle/tendon transfers (such as pectoralis muscle releases) might be performed at the same time (the modified Quad or "Mod Quad" procedure). In the Mod Quad procedure, the latissimus dorsi, teres major, subscapularis and pectoralis muscle contractures are released. The latissimus dorsi and teres major muscles are sutured to a low position in the teres minor muscle. This enhances the stabilizing effect of the rotator cuff, enabling the deltoid to act more effectively while not tethering shoulder abduction and flexion ability. The result is dramatic improvement in abudction and reduction of contractures that lead to teriary bone deformity.

What is a full Mod Quad as compared to a partial Mod Quad? What is a full pectoralis release as compared to a partial pectoralis release?

A partial Mod Quad surgery is a patient specific procedure that is used for more mild cases of contracture. The specific procedures of the Mod Quad that these patients require are determined during evaluation and can vary based upon range of motion, strength, etc.

Is this the same surgery called the L'Episcopo procedure and/or the Hoffer procedure and if not how do they differ?

No. Both the L'Episcopo procedure and the Hoffer procedure may result in excessive external rotation and loss of internal rotation. The Mod Quad is designed to minimize changes in external rotation while freeing the weakened deltoid from the tethering effect of the contracted opposing muscles.

Will my child lose any function by having this surgery? Movement to the middle of the body (zippering)? Movement to the back of the body (reaching to the back pocket)?

There is the specific risk of weakness in strength associated with adduction (a gravity-assisted motion) and internal rotation (pledge of allegiance).

Will my child lose any function by NOT having this surgery?

Persistent contractures of the shoulder and chest result in progressive loss of abduction and concomitant bony deformity of the shoulder. Growth and development are therefore impaired by long-term contractures.

What is the best age to have this surgery done for the most benefit and why? Is a child ever too young or an adult ever too old to have this surgery and why?

The Mod Quad is performed commonly on patients from 6 months of age well into adulthood. It is a surgery of necessity. In other words, the deciding factor for treatment is the severity and extent of muscle contractures, not the age of the patient. Adults are never too old for Mod Quad surgery. However, adults often do not show the same degree of improvement as children.

This is due to the following reasons:

1. tightening of the adult shoulder capsule, surrounding ligaments and vessels associated with age;

2. established bony deformity associated with long-term contractures of the shoulder that alter the physiology of the adult shoulder.

What kind of problems would occur over time if we decided not to have this recommended surgery done?

Problems commonly associated with long term muscle contractures in the arm include:

1. long term growth abnormalities of the affected arm;
2. angulation and shortening of the arm;
3. progressive loss of arm function.

These are the result of the tethering effects of the unopposed strong muscles that progressively result in bony derangements.

Would more frequent and active therapy resolve the issues that necessitate this surgery?

Myofascial Release? Bracing or splinting? Electrical stimulation?

No.

Exactly what are you looking for when you evaluate a child for this? How does it present itself on a video?

Tightness in shoulder joint and characteristic reduction in global abduction (arm above the head) are both commonly present in children who need the Mod Quad surgery.

How long does the Mod Quad surgery take?

This surgery is a 1.5 hour procedure. Patients stay for one night in the hospital to ensure proper splinting and positioning of the arm.

How is the child immobilized after the surgery and for how long?

The arm may be splinted in a "statue of liberty" position, depending on the child's needs. It is a half-torso, rigid body splint that maintains the position of the shoulder at 120 degrees oriented laterally (to the side). The elbow and wrist are well padded to protect the ulnar nerve. The arm is splinted in such a way to encourage motion at this height. The splint is worn 24/7 for two to four weeks based on the individual patient's needs. After that, it is worn an additional four weeks at nighttime only.

Are there any restrictions in the post-op phase?

No wetting of the incision area until it is completely closed. Passive range of shoulder motion should only include the upward movement. You will be given detailed instructions.

What are the restrictions for the year following the Mod Quad?

No internal rotation movements during this time until clearance is given by Dr. Nath.

What kind of therapy will we need to do following this surgery?

When splint is no longer worn at night, regular physical therapy and occupational therapy should be resumed, gradually and as tolerated.

Restriction: No internal rotation at this time until re-evaluation by Dr. Nath.

When I ask other parents about the results of the Mod Quad, most reply with very positive results and some respond with little or no result. Why would some children receive great gains and some children receive little or no result?

Many children present with initial muscle contracture and concomitant advanced bony deformity. In these cases, the Mod Quad is often the preliminary step in total joint reconstruction and further surgical care is required.

Is there a chance my child can become worse after surgery?

It is possible, but I have never had this problem in the treatment of over 3500 cases.

Does a Mod Quad ever have to repeated and if so, why?

In less than 5% of cases, Mod Quad surgery must be repeated due to growth spurts that result in rapid elongation of the bone which cannot be accommodated by tendon lengthening.

What risks are associated with this surgery?

There is always the potential for general and specific complications associated with any surgery. The general risks of surgery should always be considered seriously.

According to my experience, there is the specific risk of weakness in strength associated with adduction (a gravity-assisted motion) and internal rotation.

Will a pectoralis release (full or partial) affect the shape and size of my daughter's breast or son's chest as he/she reaches puberty and matures?

Yes. However, contracture release resolves noticeable constriction of the breast and upper chest.

What does Secondary Surgery mean (Mod Quad Operation)?

This does not mean that the primary surgery did not work. It describes a separate type of surgery performed later in time to correct muscle imbalances.

Frequently Asked Questions: Biceps Tendon Lengthening Surgery

What are the causes of a biceps contracture?

Like all muscle contractures, biceps contracture is a result of a muscular imbalance. As in other cases of asymmetric nerve injury, muscle imbalances can occur in a C5-C7 injury where the biceps recovers faster, thereby overpowering the triceps. The resulting biceps contracture causes a characteristic bending and rigidity of the elbow joint. Typically, serial casting and splinting will not achieve long-term benefits; surgical lengthening of the biceps tendon is an option in these cases.

What is biceps tendon lengthening surgery?

The technique is a Z-lengthening of the tendon from the region of the musculotendinous junction distally. The added length that is achieved allows straightening of the elbow and provides additional length to the arm.

Can a biceps contracture be permanently corrected non-surgically? Therapy, Myofascial Release, Electrical Stimulation, Serial Casting, Botox, Dynamic Splinting?

Biceps contracture cannot be permanently corrected non-surgically. However, milder cases of biceps contracture can benefit from the above treatments.

Under what specific circumstances and at what age do you recommend a biceps tendon lengthening procedure?

Biceps lengthening is performed from 4 years of age into adulthood and is recom-

mended as treatment for muscular imbalance about the arm resulting in angulation of the elbow joint.

What are the short-term and long term benefits of having biceps tendon lengthening?

Improved length, function and growth are associated with biceps lengthening.

What are the short-term and long-term risks of having this procedure? Has a child ever lost biceps function due to this procedure?

Weakness of the biceps is both a short-term and long-term risk associated with biceps lengthening. None of the children on whom Dr. Nath has performed biceps lengthening have lost biceps function.

What kind of problems would occur over time if we decided not to have this recommended surgery done?

Progressive loss of extension and concomitant bony deformity of the elbow are results of persistent biceps contracture. Growth and development are impaired by long-term contractures.

Under what circumstances would the contracture return? If it did return, what would you recommend?

Biceps contracture can recur after a growth spurt and requires initial splinting and possible surgery depending on the degree of contracture.

Exactly what are you looking for when you evaluate a child for this? How does it present itself on a video?

Biceps contracture presents with characteristic inability to straighten the elbow (joint rigidity).

How long does biceps tendon lengthening surgery take?

This surgery is a one hour procedure. Patients stay for one night in the hospital to ensure proper splinting and positioning of the arm.

How is the child immobilized after the surgery and for how long?

The child is immobilized in an elbow extension splint full-time for three months.

Are there any restrictions in the post-op phase?

Following the initial three month full-time immobilization period, the splint should be worn only at night for an additional three months. Heavy weight-bearing exercises should be avoided for the first six months following the procedure.

What are the restrictions for the year following the surgery?

After six months, normal weight-bearing exercises and activity can resume.

What kind of therapy will we need to do following this surgery? Will we have to do a dynamic brace or electrical stimulation or any other modality and if so, for how long?

Range of motion exercises must be performed to relieve stiffness of the shoulder, elbow and wrist. Electrical stimulation every other day is recommended for strengthening.

How long will it take for the biceps to regain its original strength after the surgery? Will all of the original strength return or will there be a temporary or permanent decrease in strength because of the surgery?

Biceps strength should be regained within six months following surgery. Initial temporary weakness is common following this procedure.

How many biceps tendon lengthening procedures have you done?

More than 50.

Frequently Asked Questions: Triangle Tilt Surgery

Why was the Triangle Tilt Surgery recommended for my child?

The Triangle Tilt was recommended because your child has been diagnosed with a Scapular Hypoplasia, Elevation and Rotation or SHEAR deformity. This surgical procedure combined with posterior glenohumeral (GH) capsulorrhaphy and/or anterior capsule release (ACR) restores the arm to a more natural position by addressing the primary issue of scapular elevation. The clavicle and acromion are repositioned in a controlled fashion and allowed to re-align and interlock naturally, effectively restoring the spatial relationship of the clavicle and scapula (tilting the triangle).

In my hands, successful restoration of position and function in failed humeral osteotomy patients has followed from surgically addressing the SHEAR deformity. It may be inferred that the the Triangle Tilt surgery is a superior operation because it addresses the cause of the medial rotation. Further, this result indicates that the SHEAR deformity is indeed the underlying reason for the fixed medial rotation deformity.

What is the Triangle Tilt Surgery?

The Triangle Tilt surgery consists of:

(1) osteotomy of the clavicle
(2) osteotomy of the acromion process at its junction with the spine of the scapula
(3) ostectomy of the superomedial angle of the scapula to reduce scapular protrusion
(4) splinting of the extremity in adduction, external rotation and forearm supination

Minor elements of the procedure include bone grafting of the acromion process and clavicular osteotomy sites and semi-rigid fixation of the clavicular osteotomy segments to prevent nonunion. Posterior capsulorrhaphy and/or anterior capsule release is performed in cases of shoulder instability diagnosed by preoperative, positional MRI imaging in conjunction with the physical examination. Postoperatively, a 'saro brace' splint is worn for a period of six weeks following surgery to allow for the newly tilted triangle to heal and strengthen. The splint is worn only at night for an additional six to twelve months.

Why is the surgery called the "Triangle Tilt"?

The Triangle Tilt is a surgery that addresses the elevation of the scapula in children with OBPI through the bony realignment of the clavicle and scapula. This realignment, or tilting of the triangle formed by clavicle and scapula, can be best visualized from a bird-eye-view (above the patient's head). An imaginary line forms the base of this triangle whose sides are the clavicle and the scapular spine (the upper lip of the scapula). As the scapula elevates, the plane of the triangle is steepened. The purpose of the triangle tilt, therefore, is to normalize the plane of this triangle or, in other words, to reduce the elevation of the scapula and normalize the spatial relationship between the sides of the triangle.

What functions will my child gain by having this surgery?

- Improved supination
- Resolution of elbow flaring with restoration of arm length
- Improved biceps function (hand-to-mouth motions)
- Overall appearance of the limb is normalized
- Shoulder anatomy is normalized (reduction in subluxation, etc.) with greater potential for normal growth/development

What function will my child lose by having this surgery?

Internal rotation movements can be weakened (pledge of allegiance). There is also the potential for some weakness in overhead motion.

What function will my child lose over time by NOT having this surgery?

Most notably, normal growth and development of the arm will be hindered. In addition, all of the benefits described in the answer to, "What function will my child gain by having this surgery?" will never be achieved.

BEFORE



AFTER



BEFORE



AFTER



What is the best age to have this surgery done for the most benefit and why? Is a child ever too young or an adult ever too old to have this surgery and why?

The surgery is typically recommended for children ages two through twelve with exceptions made according to the patient's development (weight, size, bone density, etc). Generally, after the age of 12 the scapula and clavicle are no longer soft and are, therefore, difficult to realign (bony edges are more problematic in older patients; high density bone does not fuse as congruously as its softer, younger precursor). Additionally, the increased weight of the limb after this age could hinder the healing process that is critical to the success of the surgery. In the case of a heavy limb, a screw or some other form of internal stabilization is required to ensure effective stabilization of the triangle. This, unfortunately, introduces another possible edge problem that might compromise range of motion and the integrity of the rotator cuff.

Would more frequent and active therapy resolve the issues that necessitate this surgery? Myofascial release? Bracing or splinting? Electrical stimulation?

I have had many patients whose parents are therapists. Despite continuous therapy, scapular elevation is not resolved in these patients. Active therapy and electrical stimulation may be beneficial to the patient, but it is limited in scope for cases with exaggerated scapular elevation.

Exactly what are you looking for when you evaluate a child for this? How does it present itself on a video? What tests does my child need to have done for the evaluation?

The average candidate for the triangle tilt presents with marked internal rotation of the arm and poor supination. A characteristic elbow flaring is seen along with sloping of the shoulder. As a result, the arm commonly appears to be shorter in length. Scapular elevation can be visualized using the images from a CT scan of the upper body.

How long does TT surgery take? How long is the hospital stay?

This surgery is a two-hour procedure. Patients stay for one night in the hospital to ensure proper splinting and positioning of the arm.

Will my child be immobilized after the surgery and for how long?

Post operatively, patients are placed into either a "gunslinger" splint or a modified SARO brace (Becker Orthopedic; pictured, right) This device consists of three plastic shells (trunk, humeral and forearm) suspended by a specially designed aircraft aluminum frame that permits angle adjustments in two planes at the shoulder and one to three planes at the elbow (depending on the size of the arm). Both the humeral and forearm sections rotate to optimize arm placement.

The SARO brace maintains the arm in partial adduction, the elbow in extension and the forearm in supination. To minimize loss of medial rotation, the arm is not splinted in full external (lateral) rotation. The type of splint used depends on the individual patient's problem. The splint must be worn at all times and is not to be removed (even for bathing) for six weeks. Subsequently, the splint is worn only at night for an additional 12-24 months.

Are there any restrictions in the post-op phase?

The splint is worn 24/7 for six weeks and **should not be removed for any reason.**

What are the restrictions for the year following the triangle tilt?

Heavy weight-bearing exercises should be avoided; especially exercises that require shoulder stability (monkey bars, etc.). No rough sports like tackle football, wrestling or lacrosse should be played.

What kind of therapy will we need to do following TT surgery?

During the six-week post-operative phase, only passive range of motion for the wrist and fingers is done. During weeks 8-10, passive range of motion (PROM) and assisted active range of motion (AAROM) is done. Therapy is resumed at week 11+. Light weight-bearing exercise resumes slowly and gradually increases over time, as tolerated. Heavy weight-bearing exercises should be avoided for one-year post-operatively.

Is there a chance my child can become worse after surgery?

There is always the potential for general and specific complications that are associated with surgery. The general risks of surgery should always be considered seriously. According to my experience, there are no specific risks of this surgery that could cause the presenting symptoms to worsen.

Will the triangle tilt affect the way my child's shoulder/arm looks?

As shown in the before and after figure, the Triangle Tilt will normalize the length and position of the arm by resolving exaggerated internal rotation. Thus, secondary effects of internal rotation such as elbow flaring and sloping of the shoulder are normalized. Concomitant winging of the scapula is also improved by the triangle tilt.

Will this surgery allow the scapula to move more freely?

The motion of the scapula can be reduced as a result of the Triangle Tilt. However, this reduction in motion does not manifest itself physiologically and does not account for any functional deficits.

How do the bones heal together? Are there bony edges that may do harm to the rotator cuff with movement?

The bones fuse together in a process in which bony tunnels connect and stabilize the newly fractured fragments. Splinting of the arm allows this fusion to occur without interruption and is, therefore, critical to the success of the surgery.

Bony edges are not of concern in children because 1) the sharp edges of the bone are surgically trimmed and 2) the soft character of the clavicle and scapula in children allows for a more rounded and successful fusion of the fragments. For this reason, adults are not suitable candidates for the Triangle Tilt procedure.

What to Expect during the Billing Process

After you or your child receives care at Texas Nerve & Paralysis Institute, we will send a claim to your insurance company to pay your bill. We will do everything we can do to minimize your financial burden by maximizing your insurance benefits.

You may receive separate billing statements from different entities which took part in your/your child's care:

- Surgeons fees from - Texas Nerve & Paralysis Institute
- Anesthesiology fees – UT Physicians
- Intra-operative monitoring – Dr. Wegren's Office
- Memorial Hermann Hospital/The Methodist Hospital – facility fees

The Billing Process	**How You Can Help**
We obtain pre-certification/authorization for the procedure prior to surgery.	Provide any pertinent medical record information as soon as it is available. (eg. EMG, CT reports, Physical Therapy reports, and any video or pictures requested)
We also attempt to negotiate with the insurance companies.	We may request help from you/your human resources department.
We wait for payment from your insurance company. If payment is not received in a reasonable amount of time, we will contact your insurance company again.	Your insurance company may ask you to provide more information. If so, please respond quickly, and let us know the information you've provided to the insurance company so we can update our records.
This process of appealing can take several months. Usually, our office is allowed a total of 3 appeals with to the insurance company.	If additional payment is not received, we will contact you requesting additional information in regards to the progress after surgery.
*Some insurance companies do allow a committee or peer review on claims. Our office will contact the insurance company to schedule this conference call.	It is important that we have the latest information in regards to the progress from the surgery. Please make sure to keep up to date with the information requested.
If our office is not allowed to set up a peer to peer review with your insurance company, you will receive a letter from our office requesting your assistance. In the letter we will explain the steps you will need to take to assist us in receiving a fair payment for surgery.	Contact our office if you should have further questions. Office number **(713) 592-9900** or **toll free (866) 675-2200**.
After your insurance company has made the final payment, we may send you a billing statement for the remaining balance, if any.	When you receive a billing statement, please pay the balance or contact our office to make payment arrangements.

**There is no positive result guarantee with any surgery. You will still be responsible for any remaining balance regardless of surgical result.

Important Addresses & Phone Numbers

Dr. Nath's Office	**(866) 675-2200**	6400 Fannin Street, Suite 2420 Houston, TX 77030
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Hermann Pediatric Surgery Area	**(713) 704-1383**	
Children's Memorial Hermann Hospital Main Number	**(713) 704-5437**	6411 Fannin Steet Houston, TX 77030
Hermann Child Life Associates	**(713) 704-1459**	
Hermann Patient Advocate	**(713) 704-4540**	
Dynamic Orthotics & Prosthetics (Triangle Tilt only)	**(713) 747-4171**	11155 South Main Street Houston TX, 77025
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