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www.drnathbrachialplexus.com

www.drnathclinics.com

The Nath Method for Treatment of Peripheral Nerve Injuries

Family Guide

- ◆ **Modified Quad**
- ◆ **Triangle Tilt**
- ◆ **Biceps Tendon Lengthening**
- ◆ **Winged Scapula Surgery**
- ◆ **Foot Drop Surgery**
- ◆ **Traumatic Brachial Plexus Surgery**

713.592.9900

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www.drnathwingedscapula.com

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www.drnathfootdrop.com

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Before & After Pictures—Modified Quad & Triangle Tilt

before



after



Surgical Correction of the Medial Rotation Contracture in Obstetric Brachial Plexus Palsy

Quite often, individuals with obstetric brachial plexus injury (OBPI) have shoulder bones that are deformed. These deformities are caused by weakened muscles in combination with muscles that are too strong. This out-of-balance condition creates a situation where the stronger muscles get very tight and even shorter in length as time goes by. As this tightening and shortening (contracture) occurs, the humeral head is forced to unnaturally turn in the joint. This is called a "medial rotation contracture". This force may also cause the humeral head to push out of the joint and towards the back. This is called a "posterior glenohumeral subluxation" (dislocation).

The scapula is another area of possible deformity. This is called the "SHEAR Deformity". SHEAR is when your scapula is smaller in size (than the scapula on the other side) and it's elevated (so one corner actually sticks up and you can visually see it) and rotated into somewhat of a "sideways" position.

The Triangle Tilt surgery was created to address these types of out-of-balance conditions and deformities.

This particular study included 44 children who underwent the Triangle Tilt surgery between February and August, 2005. We found that after having the surgery, there was a definite improvement in the position and rotation of the scapula. We also found that the humeral head was located in a better position in the joint as well as the correction of the rotation of the humeral head. Better positioning and a correction in the rotation allowed for much improved shoulder function. We used the Mallet scale to chart the improvements.

Contact Texas Nerve & Paralysis Institute for a full copy of this article. contact@drnathmedical.com

Before & After Pictures—Triangle Tilt

BEFORE



AFTER



Triangle Tilt and Steel Osteotomy: Similar Approaches to Common Problems

Each year, thousands of children suffer brachial plexus nerve injuries at birth. These injuries affect the children on multiple levels. The primary injury is nerve damage and the secondary injuries consist of muscle and bone deformities.

The Triangle Tilt surgery was developed to address the dislocation of the shoulder joint. This dislocation occurs because of muscle imbalances and results in poor shoulder development as well as visible deformities. Early shoulder arthritis is also said to occur. The Steel Pelvic Osteotomy was developed to address hip dysplasia (from multiple causes).

We studied the two procedures and found that there are interesting similarities:

- ◆ Both surgeries involve limb girdles and ball-and-socket joints.
- ◆ Both surgeries involve three deliberate bone rotations (osteotomies). For the Triangle Tilt, the acromion, clavicle and scapula are repositioned. For the Steel Pelvic Osteotomy, the iliac spine, ischial and pubic ramus of the innominate bone are repositioned.
- ◆ Post operative CT scans for both surgeries show improvement in the positioning of the ball-and-socket joint thus bringing about greater functional abilities.

The two surgical procedures and post operative results are based on similar anatomic deformities and result in improvement of the joint.

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Before & After Pictures—Biceps Tendon Lengthening

BEFORE



AFTER



ANTERIOR RELEASE OF ELBOW FLEXION CONTRACTURES IN CHILDREN WITH OBSTETRICAL BRACHIAL PLEXUS LESIONS

For individuals with obstetrical brachial plexus injury (OBPI), it is common to have multiple types of issues pertaining to the muscles and bony structure. When a muscle is strong and its opposing muscle is weaker, an out-of-balance condition will occur. The stronger muscle gets tight and shortened and this is what we call a "contracture". Contractures can occur in any joint (scapula, shoulder, elbow, wrist, fingers) but for the purpose of this study, we studied only the elbow.

If an individual cannot fully straighten their arm at the elbow then we say that they have a "flexion contracture of the elbow". So that you understand the degree of tightening: if 360 degrees is a full circle, 180 degrees is a half circle, 90 degrees is one quarter of a circle and 45 degrees is half of that, you can now visualize what 30 degrees is. If the elbow contracture is less than 30 degrees, the usual treatment is a conservative treatment that consists of therapeutic stretching, nighttime bracing or serial casting. If the elbow contracture is greater than 30 degrees, a different approach is taken that usually involves surgery.

We use a similar approach to Garcia-Lopez who studied 10 individuals with OBPI where C5 & C6 nerves were injured and they had an elbow flexion contracture of greater than 35 degrees. Using the British Medical Research Council Scale, the flexion strength of the elbow was graded at 4 or higher. Also, each patient had no bone abnormalities in the elbow region. The surgery included "anterior releases of the elbow" (release of the muscles in the front of the elbow joint) and lengthening of the distal tendons (farthest from the shoulder joint) of the biceps and anterior brachialis muscle.

They followed the individuals for an average of 3 years after the surgery. The average gain of flexion (the ability to straighten the arm) was 28 degrees. (28 degrees BETTER than it was to start). There was some slight re-tightening that we noted at follow-up which averaged out at 2 degrees since the measurement taken at surgery. All the patients maintained good flexion strength; they were happy with the results; and there were no major complications. This has been our experience as well. Additionally, we will perform scar removal ("neurolysis") of any nerves that are trapped in the elbow contracture. This can improve function of the hand and wrist as well as the elbow. We sometimes are able to do partial elbow releases in appropriate patients, which has a shorter recovery period.

These anterior releases of the elbow are very successful for the treatment of the elbow flexion contracture greater than 30 degrees. The contracture itself was reduced without compromising elbow flexion strength.

Contact Texas Nerve & Paralysis Institute for a full copy of this article. contact@drnathmedical.com

Before & After Pictures—Winged Scapula Surgery

BEFORE

Affected Side: Right



AFTER

Affected Side: Right



MICRONEUROLYSIS AND DECOMPRESSION OF LONG THORACIC NERVE INJURY ARE EFFECTIVE IN REVERSING SCAPULAR WINGING: LONG TERM RESULTS IN 50 CASES

Scapular Winging is a condition where the shoulder blade protrudes from a person's back in an abnormal position to make it look like a "wing". This condition is commonly the result of damage to the Long Thoracic Nerve (LTN) as well as the upper brachial plexus most often by injury (stretching, traction, direct force or penetrating injury); from a tightening of the tissue that surrounds the nerve (compression); or as a result of damage to the nerve caused by positioning; from inflammation (Parsonage - Turner syndrome leading to scarring of the long thoracic nerve and the brachial plexus). Along with the bony protrusion, there may also be paralysis of varying degree, pain, and loss of function of the affected shoulder joint.

We studied a large group of patients to demonstrate the usefulness of Long Thoracic Nerve Microneurolysis and Decompression Surgery performed by Dr. Nath. Microneurolysis is micro-surgery that involves cleaning up scar tissue outside and inside the affected nerves. Decompression is the removal of any other type of tissue (connective or vascular, etc.) that forms around the nerve, constricting and impeding it from functioning correctly.

Our group of patients included 47 patients (26 male, 21 female with 3 individuals who had scapular winging on both sides). Their ages ranged from 24-57. The causes of the scapular winging was varied and is listed below:

31 patients heavy weight lifting—5 patients repetitive throwing—2 patients deep massage—1 patient repetitive overhead movement—1 patient direct trauma—1 patient motorbike accident—9 patients unknown cause
In total, 50 procedures were performed (3 patients had both sides done).

Follow-up over the next +/- 2 years consisted of physical examination and phone conversations. The degree of winging was measured by the operating surgeon (Dr. Rahul K. Nath). Patients were also asked to answer 11 questions pertaining to their quality of life from the World Health Organization's Quality of Life Questionnaire.

The results of this study showed that the Microneurolysis and Decompression of the Thoracic Nerve improved Scapular Winging in 49 of the 50 cases. 46 cases showed produced "good" or "excellent" results. At least some improvement occurred in 98% of the cases that were less than 10 years past the onset. A reduction of pain was good or excellent in 43 patients.

Shoulder instability affected 21 patients before surgery. After the surgery the instability only continued in 5 patients. However, even with the 5 patients who had instability, they still experienced some relief from the winging itself.

We concluded that for appropriate patients, surgical Microneurolysis and Decompression of the Long Thoracic Nerve, significantly improved Scapular Winging. This surgery should be considered the primary method for restoring functional health.

Contact Texas Nerve & Paralysis Institute for a full copy of this article. contact@drnathmedical.com

Before & After Pictures—Foot Drop Surgery

BEFORE

Affected Side: Right Foot



AFTER

Affected Side: Right Foot



The most successful outcomes occur if the surgery is done within 4-6 months after the injury.

SUCCESSFUL MANAGEMENT OF FOOT DROP BY NERVE TRANSFERS TO THE DEEP PERONEAL NERVE

One of the causes of the condition called "Foot Drop" is traumatic damage to the peroneal nerve. This can happen as a result of a sharp injury, a gunshot wound, a sciatic nerve tumor, radiculopathy or hip replacement surgery.

The strategy we used to try to reanimate the foot drop (for the type of foot drop caused by peroneal nerve palsy) involved a nerve transfer of functional fascicles of either the **superficial peroneal nerve** or of the **tibial nerve** as the donor for the deep peroneal-innervated muscle groups.

This study included 14 consecutive patients. Eleven cases had successful restoration of British motor grade 3+ to 4+/5 ankle dorsiflexion. One patient had restoration of grade 3 ankle dorsiflexion. Two patients had no restoration of dorsiflexion.

The author concludes that nerve transfer to the deep peroneal nerve is a feasible and effective method of treating deep peroneal nerve injuries of less than one-year duration.

Contact Texas Nerve & Paralysis Institute for a full copy of this article. contact@drnathmedical.com

Before & After Pictures—Traumatic Brachial Plexus Surgery

BEFORE



AFTER



The most successful outcomes occur if the surgery is done within 4-6 months after the injury.

PHYSIOLOGICAL AND CLINICAL ADVANTAGES OF MEDIAN NERVE FASCICLE TRANSFER TO THE MUSCULOTANEOUS NERVE FOLLOWING BRACHIAL PLEXUS ROOT AVULSION INJURY

Loss of biceps muscle function is a significant disability after brachial plexus root avulsion injuries.

Nerve grafting techniques between the spinal cord and the avulsed root have not proven successful to reestablish function. However, using nerve transfers appears to be effective and has advantages for reducing the distance that the nerve has to regenerate.

Since the early 1990s, the Oberlin technique of transferring ulnar nerve fascicles to the motor branch of the musculocutaneous nerve has been the preferred technique to reinnervate and restore biceps muscle function. In this study presented here, the authors examine the efficacy of an alternative technique using median nerve fascicles transferred to the musculocutaneous nerve to reinnervate the biceps muscle.

Forty consecutive patients with combined C5–6 brachial plexus root avulsions were evaluated pre- and postoperatively according to the British Medical Research Council Motor Grading Scale. Personal interviews concerning quality of life (QOL) after surgery were conducted and scored based on standards set by the World Health Organization.

All patients showed some degree of improvement in biceps muscle function. Thirty-six (90%) of the 40 patients regained movement against gravity. The patients had a 77% improvement in overall QOL after the surgery; most notably, 92% of the patients reported their lack of need for medication and 75% a significant lessening of postoperative pain.

Redirection of part of the healthy median nerve resulted in no measurable functional deficits, and only 28 patients reported minor sensory disturbances in the first web space for an average of 3 months after surgery.

The authors conclude that the median nerve fascicle transfer resulted in a significant improvement in biceps muscle function with an acceptable level of morbidity and should be considered an effective, and in many cases preferable, alternative to ulnar nerve fascicle transfer.

Contact Texas Nerve & Paralysis Institute for a full copy of this article. contact@drnathmedical.com

Brachial Plexus Injury

Brachial plexus injury involves damage to the nerves which transmit signals from the spinal column to the shoulder, arm and hand. Patients may experience symptoms including paralysis of the arm, lack of muscle control in the arm or hand, and a lack of sensation in the arm or hand.

Obstetric brachial plexus injuries (OBPI) occur at birth, often due to a difficult delivery. When pulling or twisting mechanisms are used during delivery it causes the nerves of the brachial plexus in the neck to be stretched and injured. Some injuries can be corrected with early physical/occupational therapy, in other cases, surgical intervention is needed.

Dr. Nath's method of treatment address the soft tissue and bony abnormalities that result from OBPI. Surgeries which may be recommended for OBPI patients that Dr. Nath performs include the **Modified Quad** and **Triangle Tilt and Bicep Tendon Lengthening** surgeries.

Although most follow-up care regarding movement and therapy should be done through Dr. Nath, utilizing video and therapy reports; it is important to keep both the primary care physician (pediatrician if minor) as well as your therapist involved with the process.

HOW TO BE EVALUATED:

Contact the office at 866-675-2200 to evaluated by Dr. Nath in the Houston office.

Satellite: To limit costs for our patients Dr. Nath also visits several locations around the country year round. Please visit our website www.drnathtclinics.com to meet with Dr. Nath at a location near you.

Video Evaluation: If you do not locate a satellite clinic near your town you visit Dr. Nath's website and send us a contact form that describes your injury briefly. In order for Dr. Nath to evaluate your child, we kindly ask that you please send us a video or photos showing your child's current range of motion. Attached you will find an illustration of the movements to be included.

Visit our website video upload: <http://www.drnathtbrachialplexus.com/en/files/add.php>

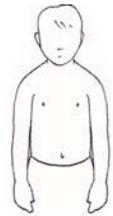
We also need to see any medical records pertaining to the injury.

For more information about treatment options for obstetric brachial plexus injury, you may download a free copy of Dr. Nath's e-book here: <http://www.drnathtbrachialplexus.com/book-download/index.php>

Movements for assessment of active range of motion



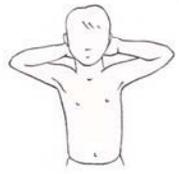
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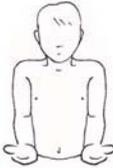
resting position



overhead movement

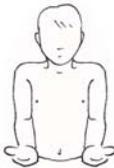


hands behind neck

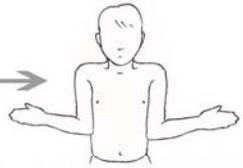


supination with arms straight

starting position



index (pointer) finger to mouth/nose

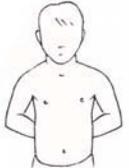


external rotation with upper arm tucked to the side

please send video or photographs to:

Texas Nerve and Paralysis Institute
 6400 Fannin Street, Suite 2420
 Houston, TX 77030

email: contact@drnathmedical.com



hands behind back

MODIFIED QUAD:

The Modified Quad (Mod Quad) is performed on patients from 6 months of age well into adulthood. Persistent contractures of the shoulder and chest impair growth and development often leading to further pain and movement limitations; so the Mod Quad is recommended early in life.

Tightness in shoulder joint and inability to raise the effected arm over head are both commonly present in patients with obstetric brachial plexus injuries (OBPI). The Modified Quad procedure is recommended to decompress the axillary nerve and release the contractures in the latissimus dorsi, teres major, subscapularis and pectoralis muscles. 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 of this is dramatic improvement in abduction.



BEFORE

AFTER



Modified Quad "statue of liberty" splint

The Mod Quad surgery is about 1 hour procedure. Patients stay for one night in the hospital to ensure proper splinting and positioning of the arm. You will be given detailed instructions on postoperative care upon discharge.

Children under 6 years of age will be splinted in a "statue of liberty" position for 2-4 weeks. It is a half torso, rigid body splint that maintains the position of the shoulder at 120 degrees oriented laterally (to the side as shown above). 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. Later, it may be worn for an additional four weeks at nighttime only. During the postoperative phase there should be no internal rotation movements until clearance is given by Dr. Nath. When splint is no longer worn at night, regular physical therapy and occupational therapy should be resumed, gradually and as tolerated.

Children 6 and older as well as adult patients will not be placed in a splint. They will be instructed on how to keep the arm immobile. In some cases a pillow may be provided to help with this.

Parent/Caretaker Post-Op Instructions

Nerve

Is there numbness, tingling or pain in the elbow, hand, wrist and /or fingers?
Call Dr. Nath (866) 675-2200 ASAP.

Circulation

Check nail beds for two days post surgery (should be pink). Press nail bed until turns white and release, should return normal pink color within 2 seconds. If not, call Dr. Nath (866) 675-2200.

Incision

Check for signs of infection—discharge of any kind, redness, warmth, smell. Keep clean and dry. See your family physician for an incision check one week following surgery. Steri-strips usually fall off by themselves in 2-4 weeks when the incision has closed. If they haven't fallen off by themselves (and you know that the incision is closed), you can just wash them off gently with soapy water.

Bathing

The incision cannot get wet until it is fully closed. Once the incision is fully closed, and if the patient is using a splint (as per Dr. Nath's instruction), the splint can be removed for bathing but the arm must be held in the upright position.

Splint

If the splint loses integrity, if it weakens or breaks and the position of the arm changes, bring to therapist, orthotist or hospital clinic to repair. If the patient has to wear the splint during the day, de-splint at the prescribed number of days or weeks, slowly and carefully. The least painful method is to remove the splint, get into a warm bath, and lower the arm in the bath water or have the patient lay flat, remove the splint and apply some warm compresses. You may want to administer some Tylenol an hour before de-splinting the first time. Let the patient determine the length of time with the splint off for the first couple of days. Gradually increase time out of the splint as tolerance increases.

Follow-Up

- (a) video three months post-op followed by a video at one-year post op
- (b) evaluation by therapist every three months for two years post-op (using our PDF evaluation form)

GENERAL GUIDELINES—ACTIVE MOVEMENT AS TOLERATED

Passive range of motion (PROM) begins when the patient no longer has to wear the splint during the day. All PROM is done slowly until resistance is felt. When resistance is felt, decrease range slightly and hold for 30 seconds. Repeat with each stretch 3x. Entire sequence should be done a minimum of 2x per day.

Elbow flexion/extension
Wrist flexion/extension
Finger flexion/extension

Forearm pronation/supination
Wrist abduction/adduction
Finger abduction/adduction

SHOULDER ABDUCTION

Position of Child: seated on lap facing out or in comfortable chair.

Stability: Adult places one hand over the lateral border of the scapula. Hold firmly to prevent the scapula from sliding laterally.

Motion: With one hand on elbow, bring arm out to side as far as possible and then up above the head.

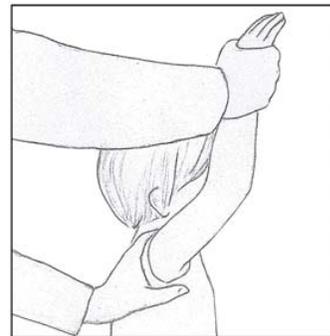


SHOULDER FLEXION

Position of Child: seated on lap facing out or in comfortable chair.

Stability: Adult places one hand over the lateral border of the scapula. Hold firmly to prevent scapula from sliding laterally.

Motion: With other hand down by the forearm/wrist, lift arm up above head.

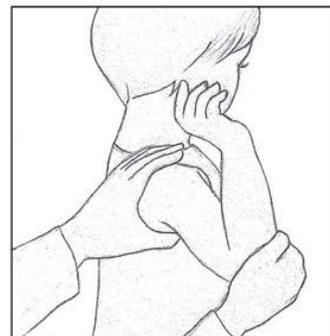


SHOULDER EXTERNAL ROTATION

Position of Child: seated on lap facing out or in comfortable chair with arm abducted to 90 degrees with elbow flexed to 90 degrees.

Stability: Adult places one hand over the lateral border of the scapula. Hold firmly to prevent scapula from sliding laterally.

Motion: With other hand supporting arm at elbow, rotate arm posteriorly (into external rotation).



For therapy questions contact Cindy Servello, OT at cindy1otr@aol.com

Illustrations by Marjon Fatemizadeh Aucoin
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Post Mod Quad Therapy Instructions

As the child becomes more tolerant of handling, begin facilitation of active movement. All resistance needs to be eliminated with the exception of gravity. Do not encourage any internal rotation or adduction of the shoulder. If child spontaneously attempts to complete activity using shoulder adductors or internal rotators such as crossing the midline, please adapt activity.

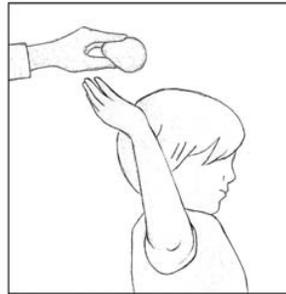
All activities are to be done with therapist/parent stabilizing the trunk and scapula. All compensatory movements to be discouraged such as hiking the hip, rotating or bending the body backwards or sideways, or hiking the shoulder. Only encourage correct movement patterns even if the child is able to get better range/function using compensatory patterns.

GOOD



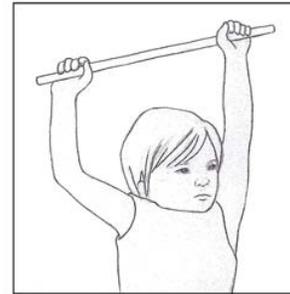
Shoulder Forward Flexion

reaching overhead
in a forward position



External Rotation

reaching backward behind
ear, reaching for objects to
the side and behind



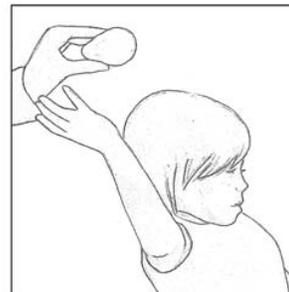
Shoulder Abduction

reaching up and out
to the side

BAD



using the trunk to lift the arm



body bent backwards

Weeks 8+

It is imperative that a **full assessment of the scapular stabilizers on both sides as well as upper extremity function** be done before an active program is initiated.

Assessment of scapular stability should consist of muscle grading of all upper trunk and shoulder musculature both in terms of range of motion as well as strength.

Assessment of sensibility of upper trunk, shoulder, and extremity should also be done.

Please be extremely careful when assessing shoulder internal rotators and adductors as they have been surgically released.

Treatment must focus initially on **strengthening of the scapular stabilizers** prior to upper extremity training, in order to allow for adequate scapulohumeral rhythm.

Please consider the use of taping, and/or TheraTogs (www.theratogs.com) to maintain scapular stability as new movement of the extremity is achieved.

TES (nighttime electrical stimulation) as well as sEMG with Stimulation are modalities which have been shown to be effective when used in coordination with traditional treatment techniques. Contact Pia Stampe, PT at Advanced Muscle Stimulators. (www.advancedmusclestimulators.com)

Follow-Up

- (a) video three months post-op followed by a video at one-year post op
- (b) evaluation by therapist every three months for two years post-op (use our evaluation form)

Evaluation Form

Please use our evaluation form found on Dr. Nath's website www.drnathbrachialplexus.com in the Mod Quad surgery section. Return the form to contact@drnathmedical.com.

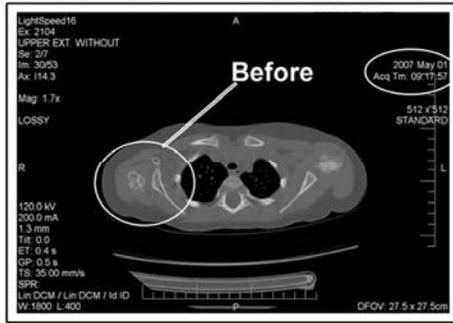
Therapy Questions

For therapy questions contact Cindy Servello, OT at cindy1otr@aol.com.

TRIANGLE TILT:

The **Triangle Tilt** is recommended for patients diagnosed by 3D CT scan with a scapular hypoplasia, elevation and rotation, or SHEAR, deformity and for those with persistent internal rotation contractures. The average candidate for the triangle tilt has internal rotation of the arm at the shoulder and poor supination. A characteristic elbow flaring is seen along with sloping of the shoulder. As a result, the arm can appear shorter in length. Scapular elevation is visible in images from a CT scan of the upper body.

BONY IMPROVEMENTS AFTER MOD QUAD AND TRIANGLE

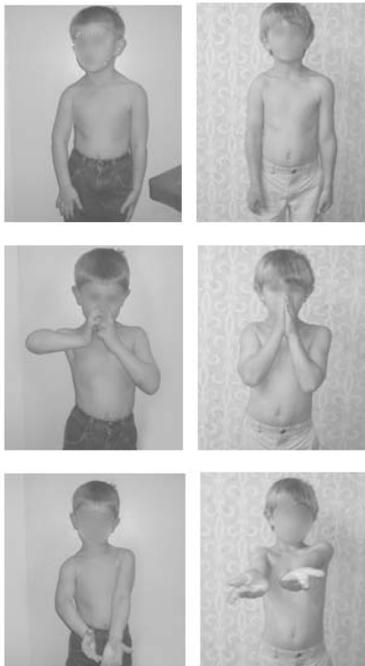


DISLOCATED SHOULDER WITH JOINT DESTRUCTION



RELOCATED SHOULDER WITH JOINT REGENERATION

The Triangle Tilt procedure focuses on restoring the arm to a more natural position by addressing the primary issue of scapular rotation. The clavicle and acromion are repositioned in a controlled fashion and allowed to re-align, effectively restoring the spatial relationship of the clavicle and scapula (tilting the triangle). The Triangle Tilt surgery consists of: Dr. Nath performing an osteotomy of the clavicle, osteotomy of the acromion process at its junction with the spine of the scapula, osteotomy of the superomedial angle of the scapula as well as anterior capsule release in cases of shoulder instability.



BEFORE

AFTER



SARO Brace

The Triangle Tilt is a two-hour procedure. The patient stays for one night in the hospital to ensure proper splinting and positioning of the arm. Post-operatively, 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 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 3-6 weeks typically. The splint may be worn only at night for an additional 12-18 weeks if recommended by Dr. Nath. 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 and rough sports should be avoided for one-year post-operatively

As shown in the before and after pictures, the Triangle Tilt often improves the length, movement and position of the arm by improving exaggerated internal rotation. Thus, secondary effects of internal rotation such as elbow flaring and sloping of the shoulder are improved. Concomitant winging of the scapula is also improved by the Triangle Tilt.

Most importantly, the Triangle Tilt usually allows the arm to fit better into the shoulder joint, leading to improved anatomy of the joint. After the procedure, the patient's shoulder joint will remodel close to normal anatomy after Triangle Tilt.

Following the procedure Dr. Nath places the patient in the SARO brace that maintains the arm in partial adduction with the elbow in extension and the forearm in supination.

This brace is custom-made the day before surgery by an orthotics facility designated by Dr. Nath, as the brace was developed for this specific surgery.

The patient wears this brace 24/7 for up to 6 weeks following surgery. Dr. Nath will inform the patient's parents how long the patient needs to wear the brace when he discharges them from the hospital. The length of time in the brace may be different for each patient.

Parent/Caretaker Post-Op Instructions

Nerve

Is there numbness, tingling or pain in the elbow, hand, wrist and / or fingers?
Call Dr. Nath (713) 592-9900 ASAP.

Circulation

Check nail beds for two days post surgery (should be pink). Press nail bed until turns white and release, should return normal pink color within 2 seconds. If not, call Dr. Nath (713) 592-9900.

Incision

Check for signs of infection-discharge of any kind, redness, warmth, smell. Keep clean and dry. See your family physician for an incision check one week following surgery. Steri-strips usually fall off by themselves in 2-4 weeks when the incision has closed. If they haven't fallen off by themselves (and you know that the incision is closed), you can just wash them off gently with soapy water.

Bathing

The incision cannot get wet until it is fully closed. The brace **cannot** be removed for bathing.

SARO Brace Summary

1. Should be worn 24/7 for 3 – 6 weeks as directed by Dr. Nath during discharge from the hospital.
2. Once brace is removed, please send a video to Dr. Nath's office so he may determine the brace wearing schedule.
3. Videos must be sent every 3 months as it may be necessary for brace to be worn at night for a long of period of time. **Proper wearing of the SARO brace is crucial to the outcome of your child's surgery.**

SARO Brace:

Worn 24/7 without removal for 3 to 6 weeks. Brace final wearing time will be determined by Dr. Nath pending results of Triangle Tilt surgery prior to discharge from the hospital. Please do a brace assessment each morning after the child wakes up to make sure that the brace is still functioning correctly and that the arm placement is correct. Please ensure that plastic body part of the SARO brace is not touching the armpit and adjacent inner arm, leaving at least a one inch space between the plastic of the splint and the arm. Remember that the splint should be positioned over hip joint and not over waist area. This position is to prevent redness over the inner arm with potential of skin breakdown.

Contact Dr. Nath's office at (713) 592-9900, if you feel that the SARO brace has shifted in position. If the brace looks like it is losing its integrity or if it weakens or breaks, and the position of the arm changes, immediately bring your child to an orthotist to repair. If the original brace was made in Houston by Dynamic Orthotics & Prosthetics, L.P. and your local orthotist has questions or problems—have him/her call them directly at toll-free **(888) 814-0711**.

Post Triangle Tilt Instructions

At 3 – 6 weeks please remove SARO brace (as directed by Dr. Nath at discharge from the hospital), and then send a video to Dr. Nath. Dr. Nath will decide the brace wearing schedule based upon the video.

Limited Passive Range of Motion (PROM)

48 hours after surgery: Begin to work on PROM to the elbow on the operated extremity. Remove the lower strap (only) and work on these exercises 2-3 times a day for 20 minutes, using the stretch and hold technique. **“Stretch and Hold” PROM Method:** All PROM is done slowly until resistance is felt. When resistance is felt, decrease range slightly and hold for 30 seconds. Repeat each stretch 3 times. Entire sequence should be done minimum of 2 times per day. Warm the elbow and the forearm first with a compress and proceed slowly as the child may be very stiff. The goal of this exercise should be to reach 90 degrees of elbow flexion (please refer to picture)

Weeks 2 to 3: Continue to work on passive range of motion (PROM) to the elbow, wrist and the fingers, 2-3 times a day.

Weeks 3 to 6: Continue to work on passive range of motion (PROM) to the elbow, wrist and the fingers, 2-3 times a day until the brace is scheduled for removal according to Dr. Nath’s instructions.

Removing the Brace (3 to 6 weeks since surgery): When it is time to remove the brace, please do it slowly and carefully. You may want to administer some Tylenol an hour before. The least painful method is to remove the brace and get the child into a warm bath or shower so that the entire side of the body gets warmed and relaxed. Let the child determine the length of time with the brace off for the first couple of days. Gradually increase time out of the brace as tolerance increases. Some children may want the brace off right away and not have any discomfort. Some children may need to take it a little slower. Let your child lead the way. It is expected for the child to loose ROM in these areas due to being immobilized on the SARO brace. The goal of therapies at this time will be to restore function and mobility to the operated shoulder, elbow and hand. Precautions: Do not work on resistive exercises at this time.

Schedule appointment with Physical or Occupational Therapy (PT/OT): At this time your child will be re-evaluated by Dr. Nath via a video or in person. Once Dr. Nath recommends therapy please call the office to obtain new orders to resume therapies. Therapy should focus on Active ROM exercises to the operated shoulder and elbow.

Follow-Up

- (a) Video at three months post-op followed by a video at six months post-op, one year post-op and again at two years post-op.
- (b) A 3D CT scan one year post-op.
- (c) An evaluation by a therapist every three months for two years post-op (use our PDF input form).

BICEP TENDON LENGTHENING:

The bicep tendon lengthening is a surgical procedure to alleviate elbow flexion contractures, about an average of 25° and improved length, sometimes almost to normal, and improve the upper extremity functions.

Biceps tendon lengthening (BTL) is performed using a Z plasty technique on OBPI patients, who have had diagnosed biceps tendon fixed flexion contractures. Ulnar, radial and median nerve decompression was also performed at the same sitting. The surgery is performed under general anesthesia. An incision is created over the volar elbow crease to expose the underlying biceps tendon, the brachialis muscle fascia and the median and radial nerves. The lacertus fibrosus released sharply. The biceps tendon is dissected proximally and distally, then sharply released in a z-fashion, allowing improved passive extension of the elbow joint.

The radial, median and ulnar nerve contractures are released using internal and external neurolysis to improve finger and wrist flexion and extension. The brachialis fascia is exposed and a series of step-lengthening fascial releases are performed to lengthen the brachialis muscle (included in Z-Plasty). Partial release of the collateral ligament are also performed.



BEFORE

AFTER



BEFORE

AFTER

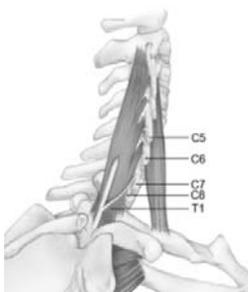
POST- SURGERY INSTRUCTIONS FOR BICEPS TENDON LENGTHENING

		Problems:
Cast	<p>The arm is placed in an elbow extension cast for up to 1-3 months 24/7. The cast is placed in surgery.</p> <p>Dr. Nath will give specific cast instructions at time of discharge. Including when it is to be removed.</p> <p>Please speak with your local physician or occupational therapist prior to coming in for surgery to notify them to make sure they are willing to remove the cast when notified by Dr. Nath.</p>	<p>It is important for the elbow to be fully extended for the time limit set by Dr. Nath at discharge. If the cast weakens or breaks and the position of the arm begins to change, immediately take the patient to a facility that can repair the cast (orthotist, therapist or hospital clinic). If the cast was removed, wrap the elbow in an ace bandage to give it some protections and support. The elbow should be in an extended position while traveling to the facility where the repair will occur.</p> <p>Call Dr. Nath (1-866-675-2200)</p>
Nerve	Is there numbness, tingling or pain in the elbow, hand, wrist or fingers?	Call Dr. Nath (1-866-675-2200)
Incision	Check for signs of infection— discharge of any kind, redness, warmth, or smell. Keep the incision clean and dry. The Steri-Strips will fall off in 10 – 14 days.	Consult the local physician or pediatrician for a wound check and cast check at 1 week post-op.
Circulatory	Check fingernail beds two days post surgery. (They should be pink.) Press nail beds until they turn white and release; they should return to a normal pink color within approximately 2 seconds.	If a problem arises, call Dr. Nath immediately at 1-866-675-2200 or consult your local physician.
Bathing	Cast cannot be removed while bathing. Cover the casted arm before bathing.	
Passive Range of Motion	Gentle PROM for shoulder, wrist and fingers as tolerated. The cast may NOT be removed while performing the PROM exercises.	

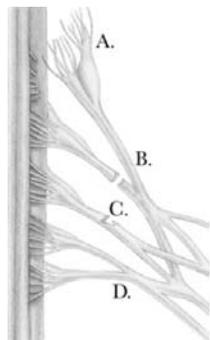
6400 Fannin Suite 2420, Houston, Texas 77030
Toll Free 866.675.2200 Houston area 713.592.9900 Fax 713.592.9921
Email: drnath@drnathmedical.com

TRAUMATIC BRACHIAL PLEXUS INJURY:

The brachial plexus is a complex set of nerves originating in the spinal cord at the neck and supplying the muscles of the arm, elbow, wrist and hand. The brachial plexus is derived from 5 roots; 2 upper, 1 middle and 2 lower roots. Injury to the upper roots paralyzes the shoulder and elbow, and a lower root injury predominantly affects the hand.



The five nerve roots of the brachial plexus are named for the vertebrae from which they emerge (C5-T1).



Common Types of Nerve Injury

- a) Avulsion
- b) Rupture
- c) Partial Rupture
- d) Stretch Injury
- e) Nerve remains in-continuity



BEFORE



AFTER

Most adult injuries to the brachial plexus occur as a result of significant trauma such as during a motor vehicle accident. Motorcycle and all-terrain vehicles are most commonly involved although automobile accidents can also cause the injury. The head and neck are forced away from the shoulder and arm, stretching the nerves of the brachial plexus and resulting in tear, rupture, or avulsion if the force is great enough. Injury can also occur in adults as the result of causes such as inflammation, tumor, or radiation.

Nerve surgery is recommended as early as possible because of the large distance between the neck and hand of an adult and the 1 inch per month rate of regrowth. Muscles begin to atrophy at the time of injury and can lose the ability to respond to regrown nerves. Atrophy of denervated muscles can be delayed using an implantable muscle stimulator or similar technique. The stimulator delivers electrical pulses directly to the paralyzed muscle every minute around the clock to give surgical repairs time to work, and improve the quality of the final muscle function. Surgical strategy depends on the severity of injury to each root.

Nerve Grafting

Nerves that are ruptured can be repaired by bridging the gap with healthy nerve from another part of the body. The Sural nerve in the leg is commonly used with no loss of function and only minor changes in sensation.

Nerve Transfer

Nerve transfers take power from uninjured adjacent nerves, bypass the area of injury and provide healthy nerve to the paralyzed muscle. The advantage to transfers is the shorter distance over which the repaired nerve has to renew before function returns to the muscle.

Nerve Decompression

When the nerve is stretched but not torn, scar tissue can form and a simple nerve decompression surgery that releases the scarring can restore function. Pinching of the nerve is released surgically, and like a garden hose that has been unkinked, the flow improves and results in return of function.

Other Surgical Options

In some cases tendon transfers are required to transfer functional movement from an injured muscle group to a less injured one. Free muscle transfer is the transfer of a muscle freed from elsewhere in the body, such as transfer of the gracilis muscle from the leg, to the arm. Generally, a combination of all of these options will be recommended. These and other approaches are being developed all the time, giving reason to hope for restoration of function and appearance of the injured arm.

The number of surgeries and their duration will depend on the injury and the individual patient's goals. Dr. Nath will discuss options with you after reviewing your medical records and examining your functional abilities. The sooner you contact our office the more favorable the final result of reconstruction.



POST- SURGERY INSTRUCTIONS FOR NERVE TRANSFER PATIENTS

Immobilizer	A sling should be worn for the first 3 weeks after surgery.	If the sling malfunctions, a new one can be rented or purchased at a nearby medical supply store.
Incision	Check for signs of infection—discharge of any kind, redness, warmth, or smell. Keep clean and dry. The Steri-Strips do not need to be removed and should be allowed to fall off on their own.	Consult the local physician for a wound check and dressing change 1 week post-op.
Circulatory	Check fingernail beds two days post surgery. (They should be pink.) Press nail beds until they turn white and release; they should return to a normal pink color within approximately 2 seconds.	If a problem arises, call Dr. Nath ASAP- 866-675-2200 or consult your local physician.
Bathing	Take only sponge baths until the incision dressing is changed 1 week post-op (Don't get the incision wet for 1 week.) Try not to get the incision very wet until it completely closes.	
Therapy	At 3 weeks post-op/ once the incision closes, regular therapy may begin. Electrical stimulation therapy may also begin at this time.	You may order the galvanic ESTIM-2C from Med Labc Inc. http://www.medlabsinc.com/Med_Labs/E-STIM.html . Toll free: 1-800-968-2486.

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WINGING SCAPULA:

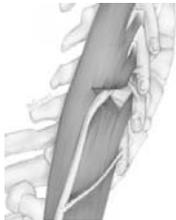
Winging of the scapula due to long thoracic nerve injury is a common diagnosis and can become a significant functional problem. The compensatory muscle activity required to maintain shoulder stability in the absence of serratus anterior function is associated with pain, spasm, and tendonitis around the shoulder joint. The long thoracic nerve itself is small in diameter and fragile-appearing, making it susceptible to injury. Perhaps the most important anatomic feature associated with injury is its course through the fibers of the middle scalene muscle. Several patients sustain an insult to the nerve through direct compression by the middle scalene muscle while weight lifting or exercising. Other patients sustain a direct extrinsic crush to the nerve.

Long Thoracic Nerve Decompression

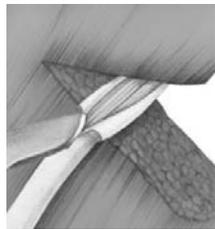
- Compression of the nerve is released by a partial resection of the middle scalene muscle.
- Scar tissue that may have built up around the nerve itself is surgically removed to further relieve pressure on the nerve.
- The forces pinching the nerve are surgically removed, and like a garden hose that has been unknicked, the flow of power to the serratus anterior improves and results in return of function and shoulder stability.



Thoracic nerve compressed through middle scalene muscles



Partial resection of middle scalene muscle



Scar tissue incised

LONG THORACIC NERVE DECOMPRESSION



BEFORE



AFTER

Recovery and Results

- Stay in Houston is 3-4 days.
- Return to work in 1-2 weeks (although heavy lifting and weight bearing activities are off-limits for several months).
- Function returns immediately in some cases and over a few months in others.
- Aqua therapy will be prescribed to help rebuild the serratus anterior and rebalance the shoulder muscles.
- 98% of patients have decreased winging after surgery.

HOW TO BE EVALUATED :

Contact the office at 866-675-2200 to be evaluated by Dr. Nath in the Houston office.

Satellite: To limit costs for our patients Dr. Nath also visits several locations around the country year round. Please visit our website drnathclinics.com to meet with Dr. Nath at a location near you.

Video Evaluation: If you do not locate a satellite clinic near your town you visit Dr. Nath's website and send us a contact form that describes your injury briefly. In order for Dr. Nath to evaluate please send a video to our office showing the following motions. Please have someone film you from behind without a shirt, so that the shoulder blade is visible.

Movement 1: Raise your arms straight in front of you at a right angle to your body and then as high as possible. Return them to resting position in the same way.

Movement 2: Raise your arms to the side through a "T position" and then as high as possible. Return them to the resting position through the same "T" position.

Movement series 3: Facing a wall, raise your arms to the front at a right angle to your body. Continue to as high as possible above your head (as in movement 1). Take them down to the side through a "T" position (as in movement 2). Without bringing your arms completely down, return them to the front. Then, perform a press-up against a wall.

Visit our website for video upload: <http://www.drnathbrachialplexus.com/en/files/add.php>

We also need to see a recent EMG report (nerve conduction study). This testing may be done by a neurologist in your area. If you have not had an EMG performed, please refer to your primary care physician or general practitioner for a reputable Neurologist in your area. The EMG should include testing for the serratus anterior, biceps, supraspinatus, infraspinatus, and the deltoid muscles. Please send all medical records with the EMG Report.



POST- SURGERY INSTRUCTIONS FOR WINGING SCAPULA PATIENTS

Immobilizer	A sling can be worn for 48 hours after surgery, if needed.	If the sling malfunctions, a new one can be rented or purchased at a nearby medical supply store.
Incision	Check for signs of infection— discharge of any kind, redness, warmth, or smell. Keep clean and dry. The Steri-Strips do not need to be removed and should be allowed to fall off on their own.	Consult a local physician for a wound check and dressing change 5-6 days post-op.
Circulatory	Check fingernail beds two days post surgery. (They should be pink.) Press nail beds until they turn white and release; they should return to a normal pink color within approximately 2 seconds.	If a problem arises, call Dr. Nath ASAP- 866-675-2200 or consult your local physician.
Bathing	Patient may shower over dressing immediately.	
Therapy	Swimming may begin immediately post-op. Women may not lift more than 2-3 pounds overhead for 3 months post-op. Men may not lift more than 5-10 pounds overhead for 3 months post-op.	Send pictures or a video at 3 months post-op for review. After Dr. Nath's review of the photos/ video, he will decide when to release to begin strength training gradually as tolerated.

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 Email: drnath@drnathmedical.com

FOOT DROP:

Foot drop refers to the loss of the ability to dorsiflex, or raise the foot at the ankle, causing a floppy foot that hampers walking. Foot drop can be caused by many factors, but most often it is due to an injured peroneal nerve. When the peroneal nerve is damaged, it cannot stimulate the tibialis anterior muscle which is responsible for lifting the foot up at the ankle. Trauma or a tumor anywhere along the nerve can cause foot drop.

There are two methods for surgically repairing the nerve available within six months of the injury. These surgeries offer recovery of voluntary movement so that the patient does not have to use an orthotic device or walk with an awkward gait. After this time frame, tendon transfers or other ankle stabilizing approaches that do not restore movement, but improve mobility, are available.

Nerve Transfer Surgery

Healthy nerves adjacent to the injured nerve can be bridged to the injured nerve, bypassing the area of injury. Nerves responsible for the ability to push down the foot, for example, can be branched to also supply power to the ankle for lifting up.

Nerve Decompression Surgery

When the peroneal nerve was stretched but not torn a simple nerve decompression surgery can restore function. Decompression refers to surgically relieving pinching of the nerve, and like a garden hose that has been unkinked, the flow of power to the muscle improves and results in return of function.

Foot Drop Nerve Surgery

- Surgery takes 1-2 hours, and requires 1 overnight stay in the hospital.
- The incision is 1-3 inches long behind the knee.

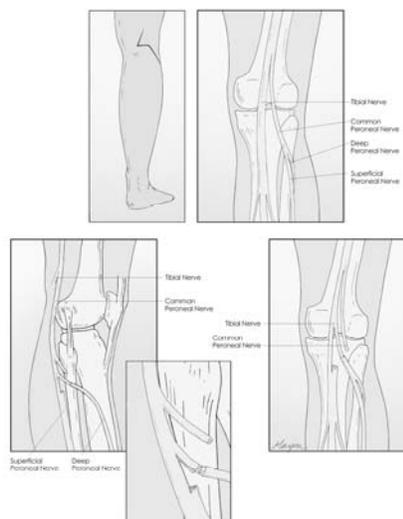
Top left panel –
Surgical incision is made at the popliteal fossa.

Top right panel –
Preoperative anatomy of the tibial and peroneal nerves (common and the branches to superficial and deep peroneal nerves).

Lower left panels –
Partial transfer of superficial peroneal nerve to deep peroneal nerve. Two fascicle groups of the superficial nerve suffice to neurotize the deep peroneal distal stump.

Lower right panel –
Partial transfer of tibial nerve to common peroneal nerve.

NERVE TRANSFERS FOR FOOT DROP



HOW TO BE EVALUATED:

Time is of the essence with this type of injury, as we only have a six month window from the date of injury or onset of symptoms to optimally respond to this type of nerve damage with Dr. Nath's specific surgeries

Contact the office at 866-675-2200 to be evaluated by Dr. Nath in the Houston office.

Satellite: To limit costs for our patients Dr. Nath also visits several locations around the country year round. Please visit our website drnathclinics.com to meet with Dr. Nath at a location near you.

Video Evaluation: If you do not locate a satellite clinic near your town you visit Dr. Nath's website and send us a contact form that describes your injury briefly. In order for Dr. Nath to evaluate please send a video to our office showing the following motions. Please send a video to our office showing your current range of motion. Please have someone film you as you are sitting on a high chair, where your feet may hang down. Perform the following movements:

Lift both feet up 3 times

Push both feet down 3 times

Turn both feet inward 3 times

Turn both feet outward 3 times

Stand up, take 3 steps forward, and 3 steps backward.

Visit our website for video upload: <http://www.drnathbrachialplexus.com/en/files/add.php>

We also need to see a recent EMG report (nerve conduction study). This testing may be done by a neurologist in your area. If you have not had an EMG performed, please refer to your primary care physician or general practitioner for a reputable Neurologist in your area. The testing should include the sciatic nerve and its muscle distribution. Please send all medical records with the EMG report.



POST- SURGERY INSTRUCTIONS FOR FOOT DROP PATIENTS

Immobilizer	Crutches may be used for ambulation for 5 days after surgery. If ambulation is still difficult at this time, crutches may be used for up to 3 weeks post-op.	If the crutches provided by the hospital malfunction, crutches can be rented or purchased at a nearby medical supply store.
Incision	Check for signs of infection—discharge of any kind, redness, warmth, or smell. Keep clean and dry. The Steri-Strips do not need to be removed and should be allowed to fall off on their own.	Consult the local physician for a wound check and dressing change 1 week post-op.
Circulatory	Check toenail beds two days post surgery. (They should be pink.) Press nail beds until they turn white and release; they should return to a normal pink color within approximately 2 seconds.	If a problem arises, call Dr. Nath ASAP- 866-675-2200 or consult your local physician.
Bathing	Take only sponge baths until the incision dressing is changed 1 week post-op (Don't get the incision wet for 1 week.) Try not to get the incision very wet until it completely closes.	
Therapy	Do passive range of motion exercises at the knee and ankle for 14 days. At 2 weeks post-op, regular physical therapy may begin. Electrical stimulation therapy may also begin at 2 weeks post-op. You should send in a follow-up range of motion video and therapist evaluation at 6 months post-op.	You may order the galvanic ESTIM-2C from Med Labc Inc. http://www.medlabsinc.com/Med_Labs/E-STIM.html . Toll free: 1-800-968-2486. For therapy questions, you may email Cindy Servello, OT, at Cindy1OTR@aol.com .

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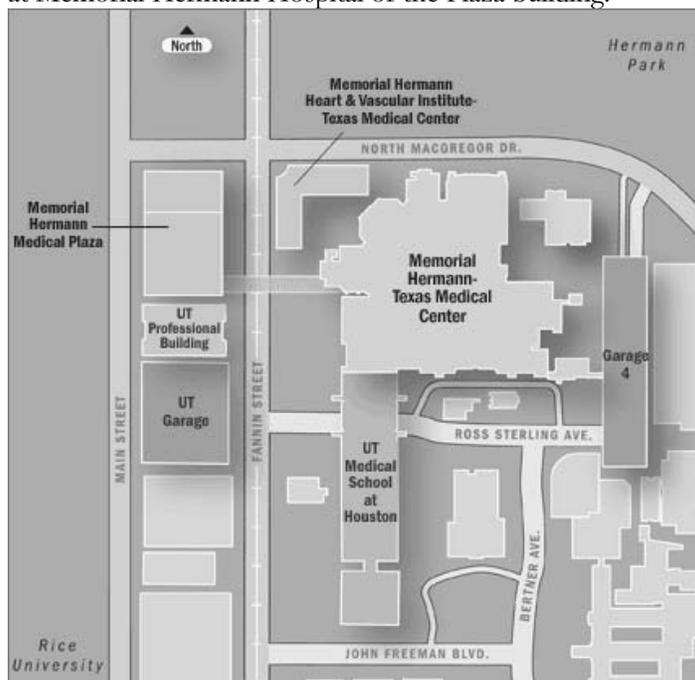
CHOOSING A LOCATION FOR SURGERY

Dr. Nath performs surgeries in two locations Memorial Hermann Hospital in Houston, Texas and St. Mary's Medical Center in West Palm Beach, Florida. Once you have decided to proceed with surgery, the next step will be to choose where you would like to have the surgery performed.

Houston, Texas

Hospital Information

Dr. Nath performs surgery at Memorial Hermann Hospital or Children's Memorial Hermann Hospital in the Texas Medical Center, at 6411 Fannin Street. Dr. Nath's office is located in the Memorial Hermann Medical Plaza at 6400 Fannin Street, Suite 2420, on the 24th floor. As seen below, Memorial Hermann Hospital is connected to Dr. Nath's office in the Plaza building by a sky bridge over Fannin Street. The plaza building contains a parking garage where patients may park. Patients may also utilize the valet service at Memorial Hermann Hospital or the Plaza building.



Transportation Information

There are two airports in the Houston area, William Hobby (HOU) and George Bush Intercontinental (IAH). The airport you should use will likely be determined by the airline you will use for travel. William Hobby is approximately 13 miles from the Texas Medical Center, while George Bush Intercontinental is approximately 25 miles from the Texas Medical Center.

If you are in need of financial assistance for your flight to Houston for surgery, you may contact one of the below organizations to determine qualifications. The organizations may require a letter of medical necessity for travel. Please contact Dr. Nath's patient coordinator at 713-592-9900 or email contact@drnathmedical.com to request any needed letters for surgery or travel.

Angel Flight, Inc.
1515 East 71st St. Ste 312
Tulsa, OK 74136
Phone: 918-749-8992
Fax: 915-745-0879

Miracle Flights for Kids
2764 N. Green Valley Pkwy #115
Green Valley, NV 89014-2120
Phone: 702-261-0494 or 800-FLY-1711
Fax: 702-261-0497

You may choose to rent a car at the airport. If you choose to take a cab to your hotel, many hotels offer shuttles to the hospital. Please check with each hotel for their accommodations. If your hotel is located downtown or directly in the Medical Center, you may also want to consider using the METRO Rail. Go to www.ridemetro.org for more information on the METRO Rail, as well as other local services that METRO offers.

Below are a few local cab companies in Houston:

Yellow Cab Company
www.yelowcabhouston.com
Phone: 713-236-1111

United Cab Company
www.unitedcab.com
Phone: 713-699-0000

Liberty Cab Company
www.libertycab.net
Phone: 713-695-6700

Hotel Information

There are several nearby hotels that can accommodate patients during their stay for surgery in Houston. Below, you will find the hotel information. Please note that only Holiday Inn & Suites provides a discounted rate to Dr. Nath's patients. Please check with each hotel for any special offers.

Wyndham Hotel
6800 Main Street
Houston, TX 77030
Phone: 713-528-7744

Hampton Inn & Suites
1715 Old Spanish Trail
Houston, TX 77030
Phone: 713-797-0040

Residence Inn
7710 South Main St
Houston, TX 77030
Phone: 713-351-1399

Hilton
6633 Travis St
Houston, TX 77030
Phone: 713-313-4000

Splint for Modified Quad Surgery

Patients undergoing the Modified Quad surgery will attend a pre-operative appointment the day before surgery to be fitted for a post-surgical splint. This appointment will take place at the Memorial Hermann Hospital Rehabilitation Department. Patients should then report to Dr. Nath's office in the Plaza building (across Fannin Street) for the second pre-operative appointment with Dr. Nath. The hospital and plaza building are connected by a sky bridge. Patients will be notified of exact pre-operative appointment times several weeks prior to surgery.

Memorial Hermann Hospital Rehabilitation
6411 Fannin Street
Jones Ground Floor
Houston, TX 77030
Rehabilitation Phone: 713-704-1545
Main Hospital Phone: 713-704-4000

Brace for Triangle Tilt Surgery

Patients undergoing the Triangle Tilt surgery will attend a pre-operative appointment the day before surgery to be fitted for a post-surgical brace. This appointment will take place at Dynamic Orthotics and Prosthetics. Patients should then report to Dr. Nath's office in the Memorial Hermann Medical Plaza for the second pre-operative appointment with Dr. Nath. Patients should travel to Dr. Nath's office using Main Street, approximately a 4 mile drive. The distance from Dynamic Orthotics and Prosthetics to Dr. Nath's office may be seen on the map below. Patients will be notified of exact pre-operative appointment times several weeks prior to surgery.

Dynamic Orthotics and Prosthetics
11155 S. Main St.
Houston, TX 77025
Phone: 713-747-4171

West Palm Beach, Florida

Hospital Information

Dr. Nath also performs surgery at St. Mary's Medical Center in West Palm Beach, Florida, at 901 45th Street. The main hospital phone number is 561-844-6300.

Transportation Information

Patients undergoing surgery in Florida should fly into Palm Beach International Airport, www.pbia.org. The airport is approximately 8 miles from St. Mary's Medical Center.

If you are in need of financial assistance for your flight to Palm Beach for surgery, you may contact one of the below organizations to determine qualifications. The organizations may require a letter of medical necessity for travel. Please contact Dr. Nath's patient coordinator at 713-592-9900 or email contact@drnathmedical.com to request any needed letters for surgery or travel.

Angel Flight, Inc.
1515 East 71st St. Ste 312
Tulsa, OK 74136
Phone: 918-749-8992
Fax: 915-745-0879
Website: www.angelflight.com

Miracle Flights for Kids
2764 N. Green Valley Pkwy #115
Green Valley, NV 89014-2120
Phone: 702-261-0494 or 800-FLY-1711
Fax: 702-261-0497
Website: www.miracleflights.org

You may choose to rent a car at the airport, or take a cab to your hotel. Below are a few local cab companies in West Palm Beach:

Yellow Cab Company
www.yelowcabflorida.com
Phone: 561-777-7777

Imperial Transportation PBC, Inc
www.imperialtaxi.com
Phone: 561-689-3663

Choice Cab Services
www.choicecabwpb.com
Phone: 888-564-1471

Palm Beach County's public bus transportation also offers regular services throughout Palm Beach County. For more information visit www.pbcgov.com/palmtranb or call 561-841-4200.

Hotel Information

There are several nearby hotels that can accommodate patients during their stay for surgery in West Palm Beach. Below, you will find the hotel information. Please check with each hotel for any special offers.

Residence Inn
2461 Metrocentre Blvd,
West Palm Beach, FL 33407
Phone: 561-687-4747

Homewood Suites
2455 Metrocentre Blvd
West Palm Beach, FL 33407
Phone: 561-682-9188

Holiday Inn Express & Suites
2485 Metrocentre Blvd
West Palm Beach, FL 33407
Phone: 561-472-7020

Courtyard by Marriott
600 Northpoint Parkway
West Palm Beach, FL 33407
Phone: 561-640-9000

Springhill Suites
2437 Metrocentre Blvd
West Palm Beach, FL 33407
Phone: 561-689-6814

Patients in need of financial assistance with their hotel accommodations may contact the Quantum House. The Quantum House is a supportive home that lessens the burden for families receiving treatment for medical conditions. Please go to www.quantumhouse.org contact (561) 494-0515 to complete registration.

Splint for Modified Quad Surgery

Patients undergoing the Modified Quad surgery will attend a pre-operative appointment the day before surgery to be fitted for a post-surgical splint. This appointment will take place at the following address:

St. Mary's Medical Center
Ranes Pavilion
5325 Greenwood Ave., Suite 102
West Palm Beach, FL 33407
Phone: 561-882-4928 x 22828

Patients should then report to a pre-operative appointment with Dr. Nath at the following address:

St. Mary's Medical Center
Kimmel Building
901 45th Street
West Palm Beach, FL 33407
Please contact Dr. Nath's Houston office with any issues regarding your pre-operative appointment with Dr. Nath in West Palm Beach. Phone: 713-592-9900.

Patients will be notified of exact pre-operative appointment times several weeks prior to surgery.

Brace for Triangle Tilt Surgery

Patients undergoing the Triangle Tilt surgery will attend a pre-operative appointment the day before surgery to be fitted for a post-surgical brace. This appointment will take place at Falk Orthotics and Prosthetics.

Falk Prosthetics & Orthotics
140 Jupiter Lakes Blvd.
Jupiter, FL 33458
Phone: 561-741-0488

Patients should then report to a pre-operative appointment with Dr. Nath at the following address:

St. Mary's Medical Center
Kimmel Building
901 45th Street
West Palm Beach, FL 33407
Please contact Dr. Nath's Houston office with any issues regarding your pre-operative appointment with Dr. Nath in West Palm Beach. Phone: 713-592-9900.

Patients will be notified of exact pre-operative appointment times several weeks prior to surgery.

The distance from Falk Orthotics and Prosthetics (A) to St. Mary's Medical Center (B) is approximately 14 miles.

What to Expect During the Billing Process at Texas Nerve & Paralysis Institute

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 scan reports, Physical Therapy reports, and any video or pictures requested)
We attempt to negotiate with the insurance companies to decrease the amount you would be responsible for.	We may request help from you/your human resource 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 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/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 after receiving this letter. Office phone 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.

After you or your child receives care at Texas Nerve & Paralysis Institute, we will send a claim to your insurance company. 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
- Intra-operative monitoring
- Memorial Hermann Hospital/The Methodist Hospital/St. Mary's Medical Center– facility fees
- Any other ancillary service needed during your/your child's stay

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



Rahul K. Nath, M.D.
Institute Director
Texas Nerve & Paralysis Institute

The Institute Director and Founder, Dr. Rahul K. Nath, specializes in reconstructive microsurgery. He earned his medical degree from Northwestern University Medical School in Chicago, Illinois and is board certified by the American Board of Plastic and Reconstructive Surgery. He has extensive experience with nerve reconstruction surgery techniques. During his 18 years of practice he has treated several thousand children and adults with problems due to nerve injury.

The Institutes' main office is located in the Texas Medical Center in Houston, and Dr. Nath has several satellite clinic locations across the country. Surgeries are performed at Memorial Hermann Hospital in Houston, Texas and Tenet St. Mary's Medical Center in West Palm Beach, Florida.

The Texas Nerve & Paralysis Institute specializes in surgical treatment of peripheral nerve injuries including foot drop, winging scapula, nerve tumor removal, and brachial plexus injuries.

Treatment of patients with peripheral nerve injuries are complex and case specific. Before considering surgical intervention, a treatment program should be designed and implemented to ensure the best possible long term results

Peer-Reviewed Publications

- Nath RK**, Mullen M, Somasundaram C. Correlation between physical functions, self-esteem and pain in brachial plexus birth palsy adolescents versus normal peers, *Journal Of Social Science Research*, 3:286-295, 2014.
- Nath RK**, Pretto JC, Somasundaram C. Comparing the surgical outcomes of Modified Quad and Triangle Tilt surgeries to other procedures performed in obstetric brachial plexus injury, *Surgical Science*, 4:15-21, 2013.
- Nath RK**, Kumar N, Somasundaram C. Modified Quad surgery significantly improves the median nerve conduction and functional outcomes in obstetric brachial plexus nerve injury, *Annals of Surgical Innovation and Research*, 7:5, 2013.
- Nath RK**, Somasundaram C. Extended long-term (5 years) outcomes of triangle tilt surgery in obstetric brachial plexus injury, *The Open Orthopaedics Journal*, 7:94-98, 2013.
- Nath RK**, Benyahia M, Somasundaram C. Finger Movement at Birth in Obstetric Brachial Plexus Injury, *World Journal of Orthopedics*, 18:24-28, 2013.
- Nath RK**, Somasundaram C. Successful Outcome of Modified Quad Surgical Procedure in Preteen and Teen Patients with Brachial Plexus Birth Palsy, *ePlasty*, 12: 456-461, 2012.
- Nath RK et al.** Assessment of Triangle Tilt Surgery in Children with Obstetric Brachial Plexus Injury Using the Pediatric Outcomes Data Collection Instrument (PODCI), *The Open Orthopaedics Journal* 5:385-388, 2011.
- Nath RK**, Somasundaram C, Mahmooduddin F. Triangle Tilt and Steel Osteotomy: Similar Approaches to Common Problems. *The Open Orthopaedics Journal*, 5:134-143, 2011.
- Nath RK**, Somasundaram C, Mahmooduddin F. Comparing Outcomes for Triangle Tilt Surgery Performed Before Versus After Two Years of Age, *The Open Orthopaedics Journal* 5:66-69, 2011.
- Nath RK**, Mahmooduddin F. Triangle Tilt Surgery: Effect on Coracohumeral Distance and External Rotation of the Glenohumeral Joint, *ePlasty* 10:560-567, 2010.
- Nath RK**, Mahmooduddin F, Xiaomei L, Wentz MJ, Humphries AD. Coracoid Abnormalities and Their Relationship with Glenohumeral Deformities in Children with Obstetric Brachial Plexus Injury. *BMC Musculoskelet Disord* 11:237, 2010.
- Nath RK**, Avila, MB, Karicherla P. Triangle tilt surgery as salvage procedure for failed shoulder surgery in obstetric brachial plexus injury, *Pediatr Surg Int* 26:913-8, 2010.
- Nath RK**, Karicherla P, Mahmooduddin F. Shoulder Function and Anatomy in Complete Obstetric Brachial Plexus Palsy: Long-term Improvement after Triangle Tilt Surgery, *Childs Nervous System* 26:1009-19, 2010
- Nath, RK**, Amrani A, Melcher SE, Wentz MJ, Paizi M. Surgical normalization of the shoulder joint in obstetric brachial plexus injury. *Annals of Plastic Surgery* 65:411-7, 2010.
- Nath RK**, Bowen ME, Eichhorn MG. Pressure-Specified Sensory Device versus Electrodiagnostic Testing in Brachial Plexus Upper Trunk Injury. *J Reconstr Microsurg* 26:235-42, 2010
- Nath RK**, Liu X, Melcher SE, Fan J. Long-term outcomes of triangle tilt surgery for obstetric brachial plexus injury. *Pediatr Surg Int* 26:393-9, 2010.
- Nath R**, Matyja M, Naziemiec L, Gogola A. Results of an operative treatment of the child with Duchenne- Erb's type obstetric brachial plexus injury-case report. *Polish Child Neurology* 18:79- 84, 2009.
- Nath RK**, Amrani A, Melcher SE, Eichhorn MG: Triangle tilt surgery in an older pediatric patient with obstetric brachial plexus injury. *ePlasty* 9:e26, 2009.
- Nath RK**, Somasundaram C, Melcher SE, Bala M, Wentz MJ: Arm rotated medially with supination - the ARMS variant: description of its surgical correction. *BMC Musculoskelet Disord* 10:32, 2009.
- Nath RK**, Lyons AB, Paizi M: Successful management of foot drop by nerve transfers to the deep peroneal nerve. *J Reconstr Microsurg* 24:419-427, 2008.
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- Nath RK**, Melcher SE: Rapid recovery of serratus anterior muscle function after microneurolysis of long thoracic nerve injury. *J Brachial Plex Peripher Nerve Inj* 2:4, 2007.
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- Nath RK**, Lyons AB, Bietz G: Physiological and clinical advantages of median nerve fascicle transfer to the musculocutaneous nerve following brachial plexus root avulsion injury. *J Neurosurg* 105:830-834, 2006.

For a full listing of articles or a copy of the paper send an email to contact@drnathmedical.com or visit PubMed online and search Nath RK.