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Nerve Injuries lead to Muscle Imbalances

Secondary Surgery in Children with Brachial Plexus Injury (Mod Quad Operation): This does not mean that the primary surgery did not work. It describes another type of surgery later in time used to correct muscle imbalances.

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 to 4 months of age will end up with a specific series of arm restrictions caused by a muscle imbalance between injured and uninjured muscles.

Among the muscles injured in Erb's are the abductors of the shoulder (that lift the arm over the head), as well as the external rotators (that help to turn the upper arm outward and to open the palm of the hand).

At the same time, the internal rotators (muscles that turn the arm and palm inward) and adductors (muscles that pull the arm to the side) of the arm are not involved in the injury because they are supplied by the lower roots of the plexus.

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.

In order to use the hand effectively, the elbow becomes bent, and this eventually becomes fixed because of weakness of the triceps (the elbow straightening muscle).

The elbow-bent posture (also known as the Erb's Engram) contributes to the appearance of the arm being shorter, although it probably is in reality not much shorter when measured.

For this muscle imbalance, there is a very effective group of muscle releases and transfers which can put the arm in a more natural position and help to lift the arm over the head.

We refer to this operation as the "quad" procedure because it has four components:

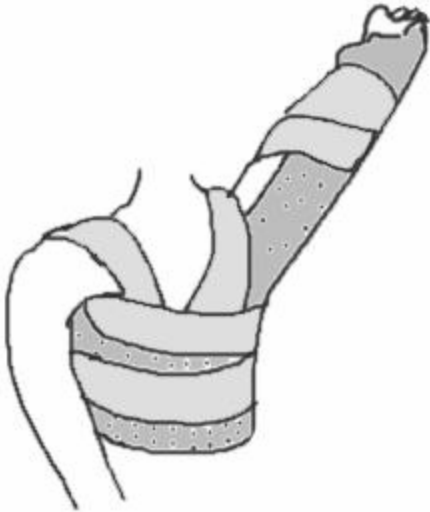
- ? latissimus dorsi muscle transfer for external rotation and abduction
- ? teres major muscle transfer for scapular stabilization
- ? subscapularis muscle release
- ? axillary nerve decompression and neurolysis). Depending on the individual child, other nerve decompressions or muscle/ tendon transfers (such as pectoralis muscle releases) might be performed at the same time (the modified quad or "Mod Quad" procedure).

We have performed the quad procedure on thousands of children and adults with Erb's palsy and have been very excited about the degree of movement that is gained. On the average, we find a 70 degree improvement in abduction and 60 degree improvement in external rotation at 6 months after surgery; these results should also improve with time.

We find that the best time to do this procedure is 1 to 2 years of age, but we have been very successful with older children and adults as well.

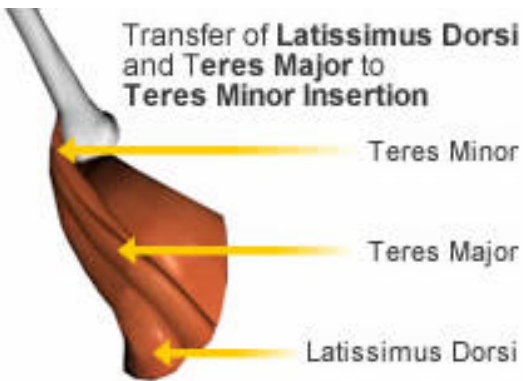
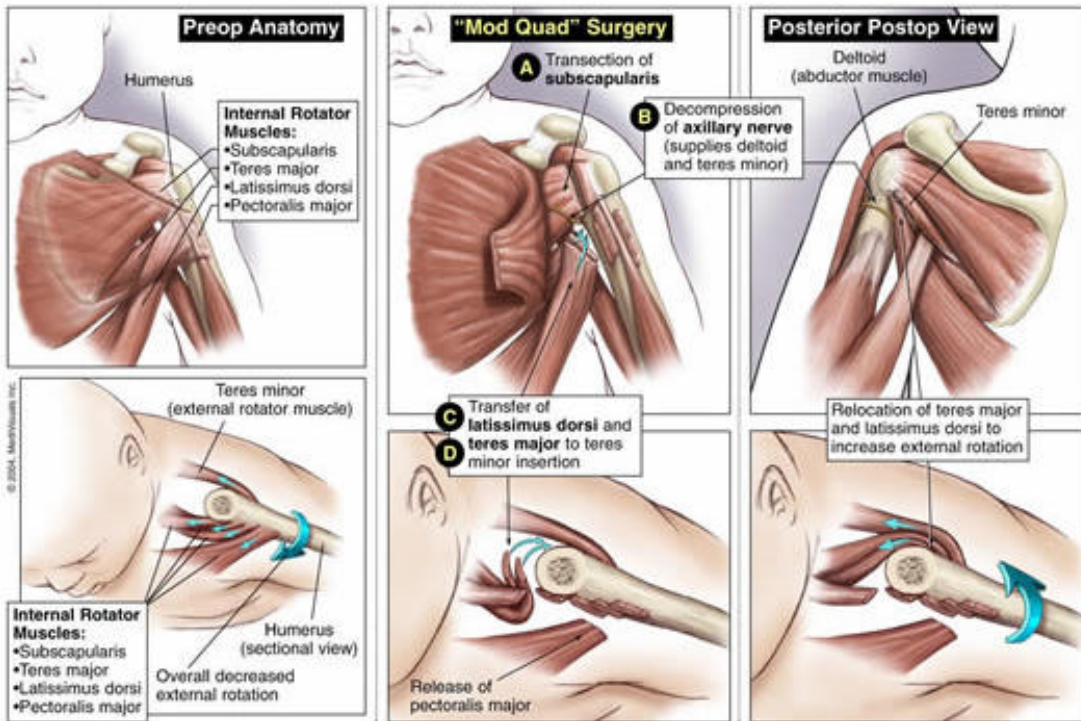
To date, Dr. Nath has performed secondary surgeries on over 3,000 children and adults.

Post-Surgical Immobilization



The statue of liberty splint is removable and very comfortable. It is made out of a moldable plastic that has holes for airflow and is lined with comfort padding that can be removed and washed or replaced if soiled. Your child will spend a number of weeks in the splint 24/7 and then a number of weeks in the splint at nighttime only. The amount of weeks splinted varies by child and the procedures performed.

Mod Quad Illustrations



These illustrations can be found in full color on the website www.drnatnathmedical.com.