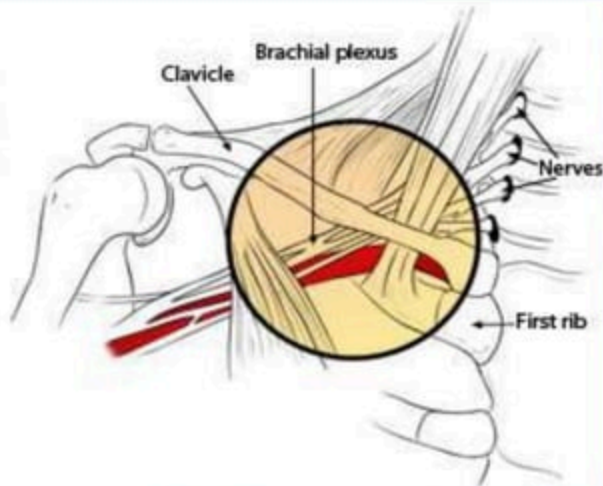
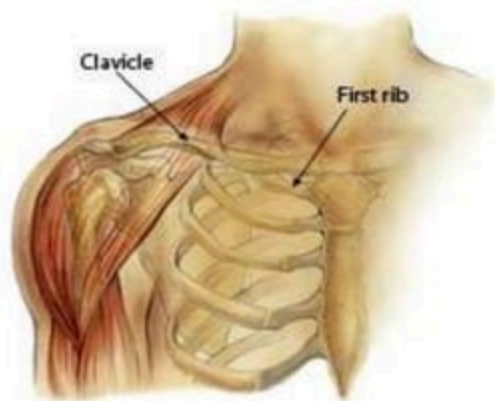


BRACHIAL PLEXUS PALSY

BY:

CARYL SUBION, PTRP, RPT



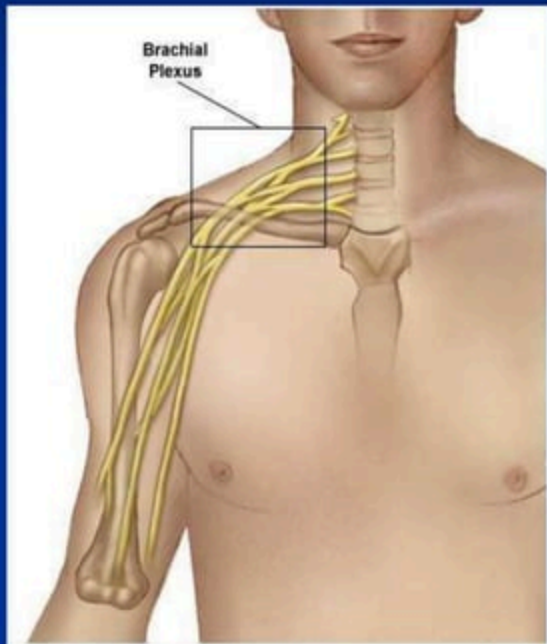
OTHER NAMES:

Erb–Duchenne palsy/Klumke

Brachial Birth Palsy

Obstetric Brachial Plexus Palsy

BRACHIAL PLEXUS



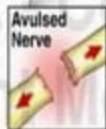
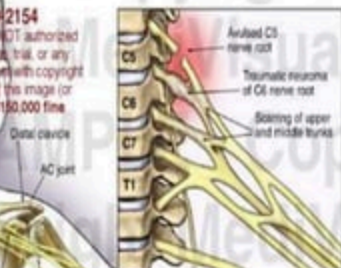
- Proximal or Duchenne-Erb's paralysis - Injury to C5 & C6, most common
- Intermediate paralysis - Injury to C7
- Distal or Klumpke's paralysis - injury to C8 & T1, extremely rare
- Total brachial plexus paralysis (more often than the Klumpke type)

CLASSIFICATION ACCORDING TO SEVERITY

Typical Brachial Plexus Injuries

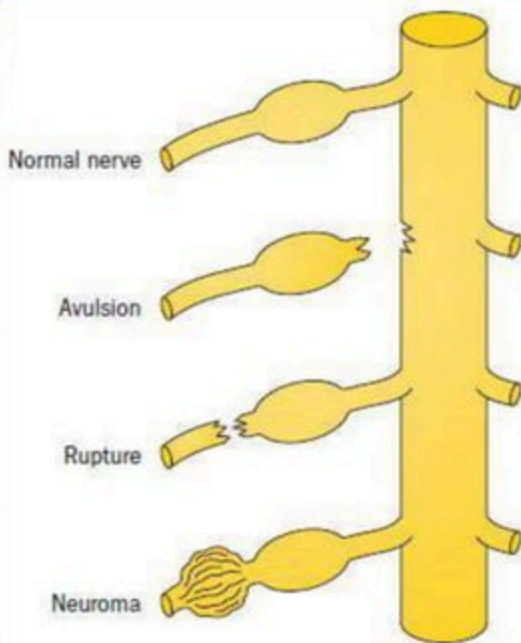
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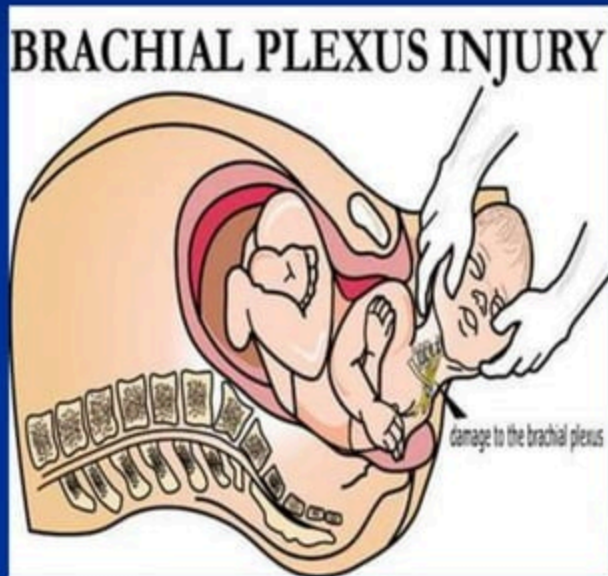
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Exhibit 205392_04X



Mechanism of injury

- Bending or stretching of the neck in a direction away from the side of injury



RISK FACTOR/CAUSES

NEONATAL

Large birthweight
(> 3500 g)

Low APGAR score
at 1 min, 5 min
& 10 min,

Breach fetal position

Congenital anomalies

MATERNAL

Age (> 35 years)

Cephalo-Pelvic
Disproportion

Gestational Diabetes
Mellitus (results in
Macrosomia)

BMI

Post date gestation

previous child with
OBPP

LABOR-RELATED FACTORS

**Shoulder Dystocia

Increased duration of 2nd
stage of labour (>60min)

Induction of labour
-Oxytocin augment

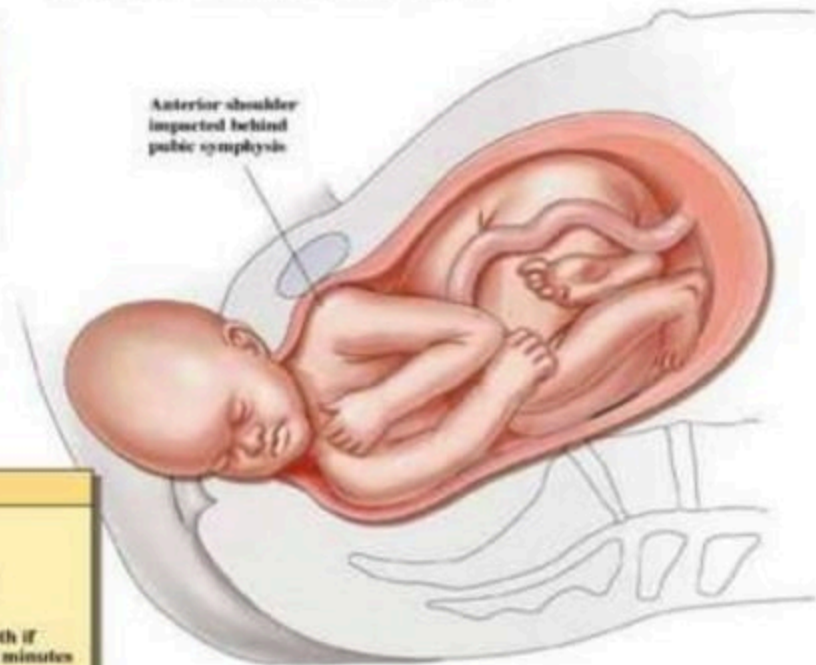
Operative vaginal deliveries
-Vacuum extraction
-Direct compression of
fetal neck during
delivery by forceps

SHOULDER DYSTOCIA

NORMAL.



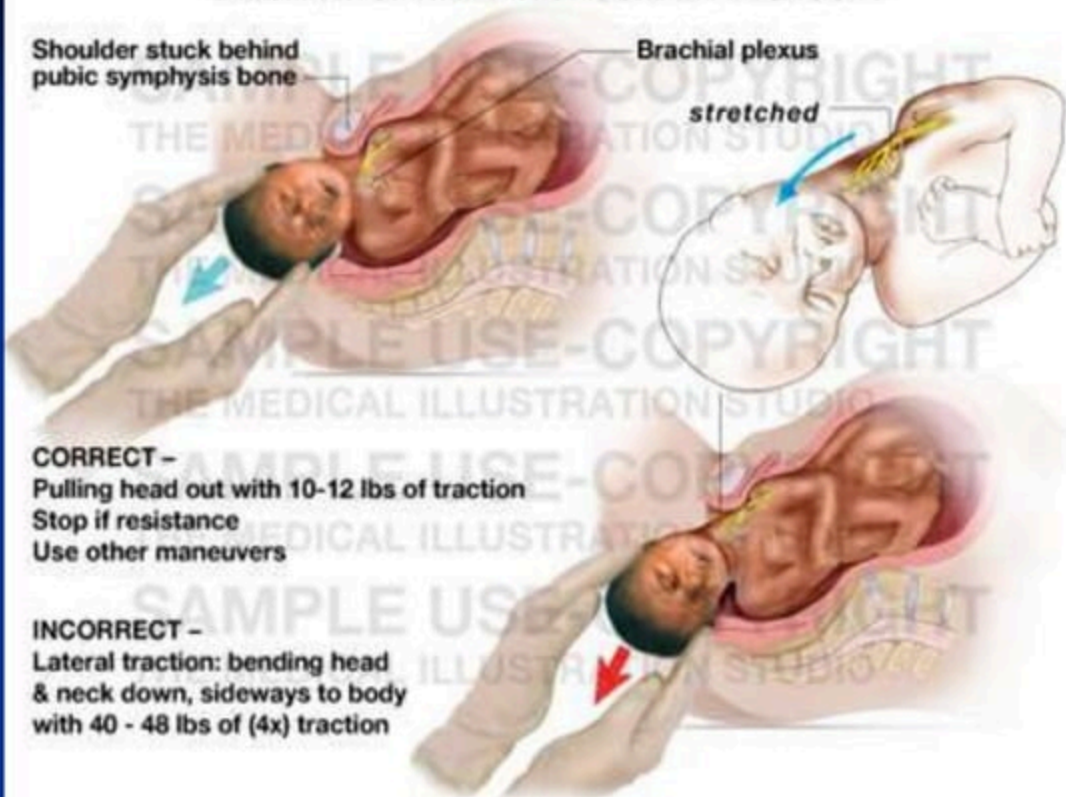
Anterior shoulder impacted behind pubic symphysis

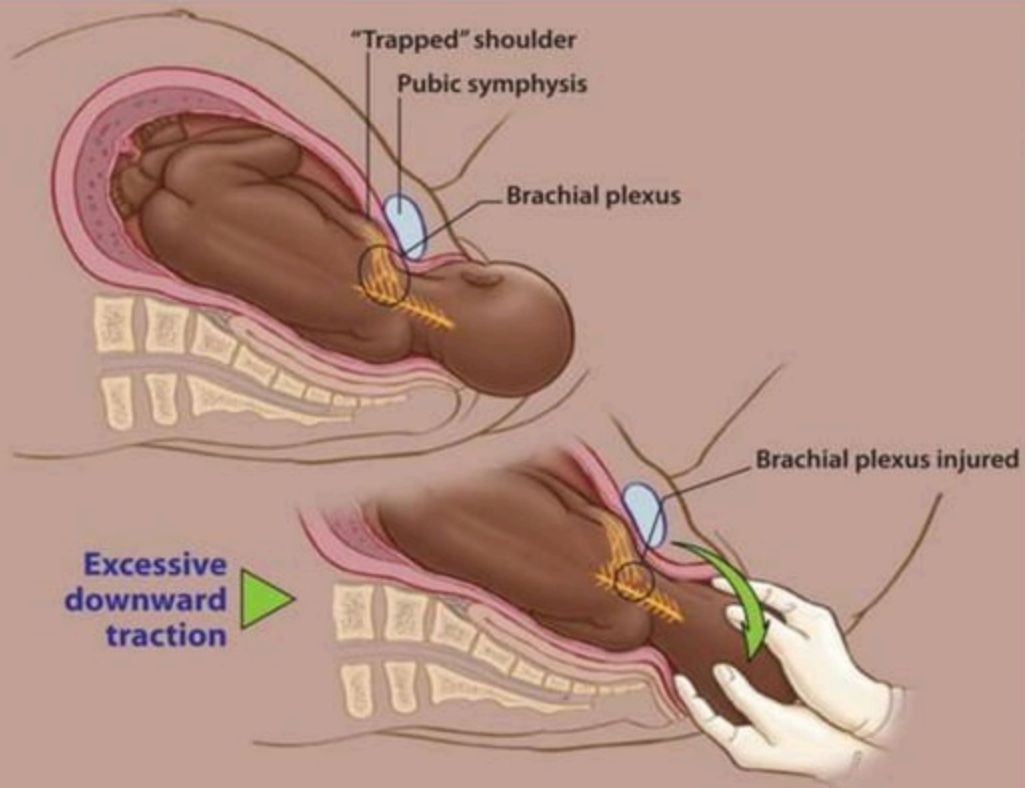


DANGERS INCLUDE:

- Entrapment of cord
- Inability of child's chest to expand properly
- Severe brain damage or death if child is not delivered within minutes

DELIVERY OF HEAD IN SHOULDER DYSTOCIA





Clinical presentation

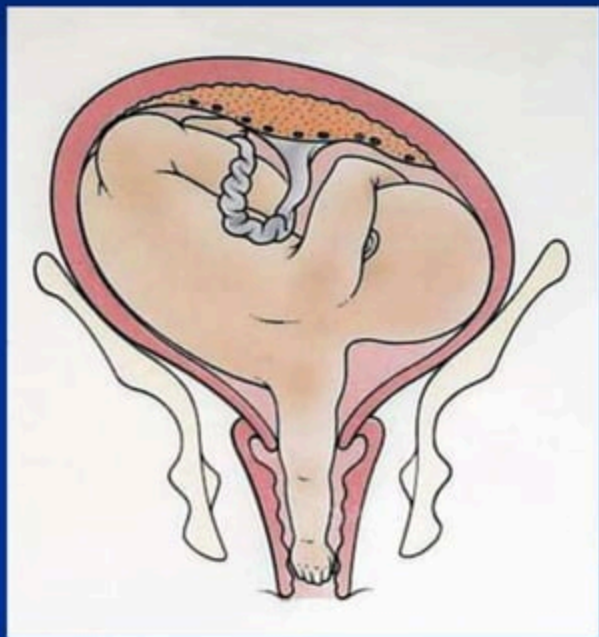


- waiter's /porter's/policeman's tip position

KLUMPKE'S PARALYSIS

- MECHANISM OF INJURY:

Pulling up of the arm above the head, so that stretch on the C8 and T1 roots



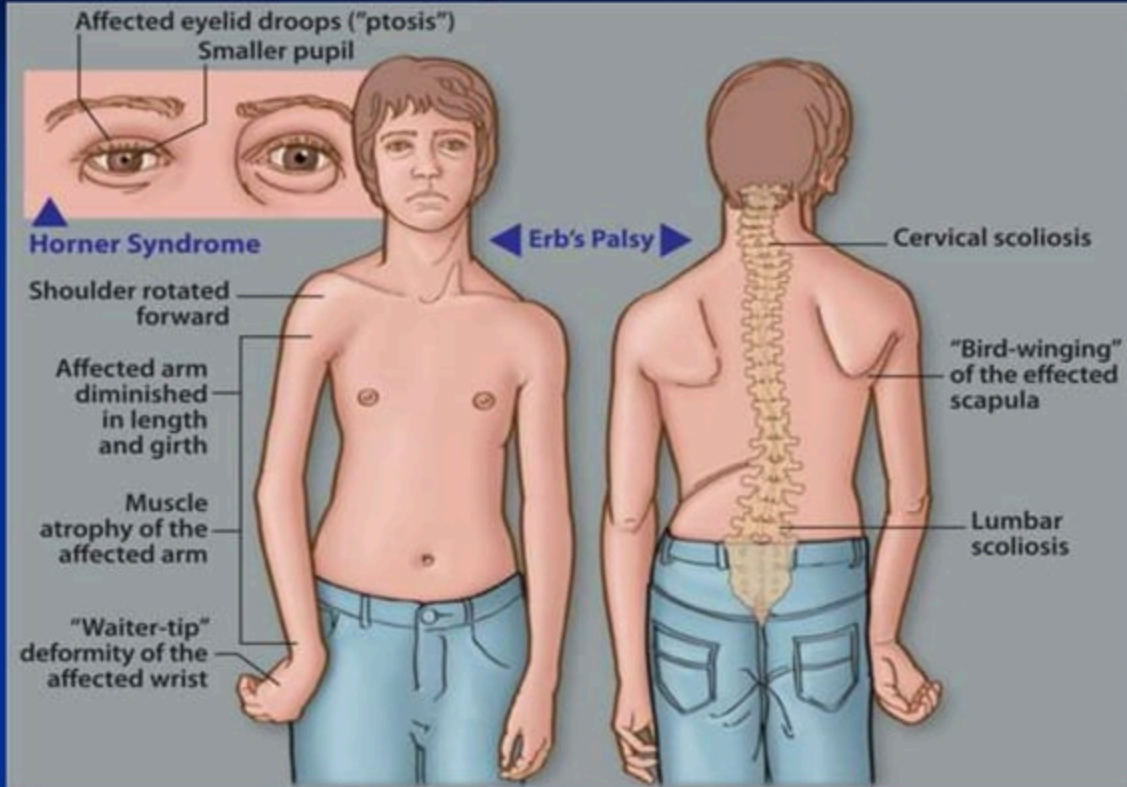
Clinical Presentation



- Pronators of the forearm
- Flexors of the wrist joint



GLOBAL/TOTAL BPI



DIAGNOSING ERB'S PALSY

- Erb's palsy is diagnosed by a thorough physical examination and medical history. An affected baby may hold its affected arm close to the body with the elbow pronated. In addition to a routine physical examination, some doctors may perform special imaging and diagnostic studies such as a nerve conduction study or magnetic resonance imaging (MRI).



CLINICAL ASSESSMENT

- U.E is flail & dangling
- Look for other extremities
- U.R: arm held in IR, add, active abd not possible, elbow extended forearm pronated, thumb flexed.
- Complete paralysis- vasomotor impairment, pale & marble like color
- Horner's sign
- Associated # [clavicle, humerus]

DIFFERENTIAL DIAGNOSIS

- Fracture Pseudoparalysis
- Congenital Varicella of the Upper Limb
- Cerebral Palsy (Monoplegia)
- Intrauterine Upper-Limb Nerve Compression by the Umbilical Cord or Amniotic Bands
- Intrauterine Maladaption Palsy

MANAGEMENT

- CONSERVATIVE MANAGEMENT
- SURGICAL MANAGEMENT

Protective phase

- **Initial rest period of 7-10 days** – to allow for reduction of hemorrhage & edema around the traumatized nerves
- **No ROM** or other interventions are initiated
- The involved UL is **positioned across the abdomen or aeroplane position.**
- **Avoid lying** on the involved limb
- Positioning, splinting, kinesiotapping, gentle massage therapy

CONSERVATIVE MANAGEMENT

PHYSIOTHERAPY – cornerstone of conservative mngt.

- Maintain – PROM, Supple of muscle.
- Improve Muscle strength
- Stretch muscle groups to prevent contracture.
- Facilitates normal movement patterns while inhibiting substitutions.
- Sensory Awareness
- Positioning (abd, ER, F/A flexion, wrist ex.)
- Splinting
- Kinesiotapping
- Electrical Stimulation



splinting

- **-Resting night splints** – prevent wrist & finger F contracture
- **-Wrist cock-up** – maintain neutral wrist alignment (Klumpke's Paralysis)
- **-Statue of liberty splint** – prevent Add & IR contracture



SPLINTING

- **Air splints** – restraining uninjured UE to encourage injured UE
- **Aeroplane splint** – Erb's palsy



BPI Treatment Intervention



BPI Treatment Intervention



Interventions



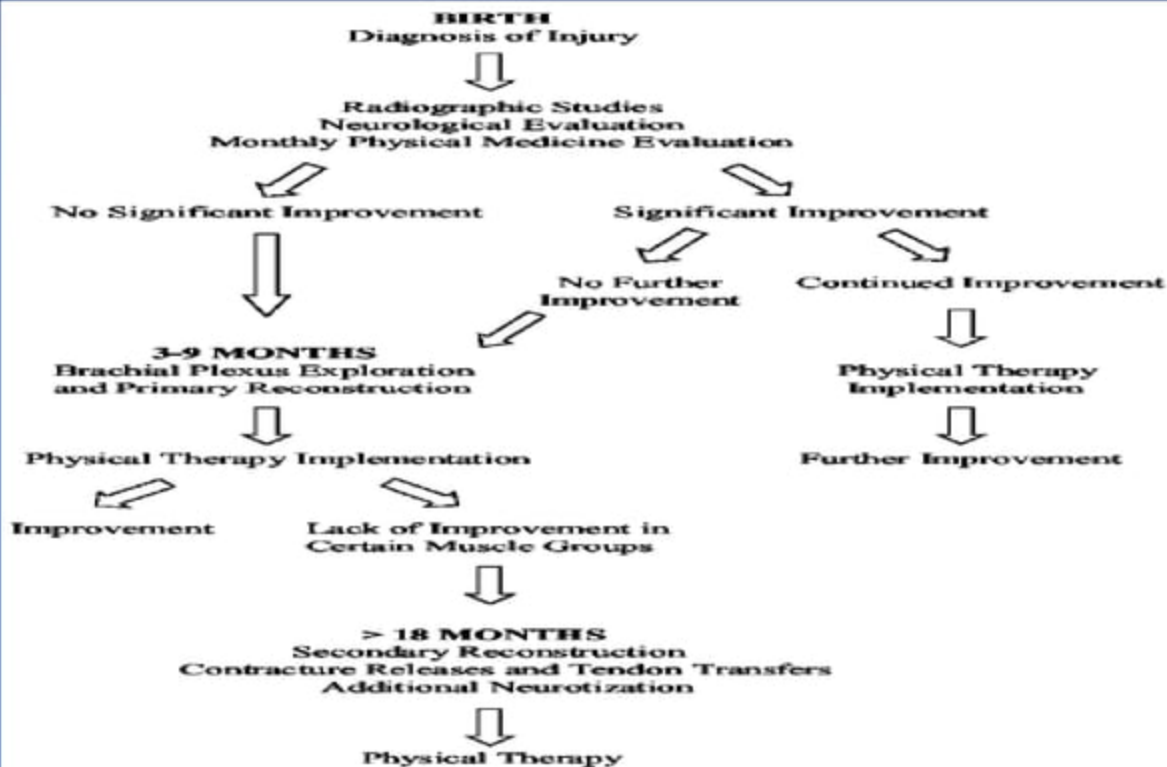
Interventions



Scapular winging, Trumpet sign



flowchart



SURGICAL MANAGEMENT

- If there is no change over the first 3 to 6 months, doctors may suggest exploratory surgery on the nerves to improve the potential outcome. Nerve surgery will not restore normal function, and is usually not helpful for older infants. Because nerves recover very slowly, it may take several months, or even years, for nerves repaired at the neck to reach the muscles of the lower arm and hand. Many children with brachial plexus injuries will continue to have some weakness in the shoulder, arm, or hand. There may be surgical procedures that can be performed at a later date that might improve function

Towel test

- Absence of biceps recovery by 3 months of age is an indication of surgery
- The infants that did not pass the towel test At 6 months also did not pass it at 9 months are the potential candidates for surgery
- Lefevre and Diament called it as *hand to face test*
- In supine, the child face is covered with towel
- Shoulder flexion, elbow flexion and extension and finger flexion and extension are needed for the test.
- He/she passes the test if he/she then removes the towel from the face.

TOWEL TEST

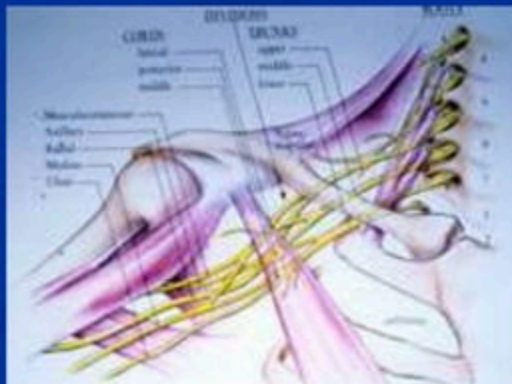
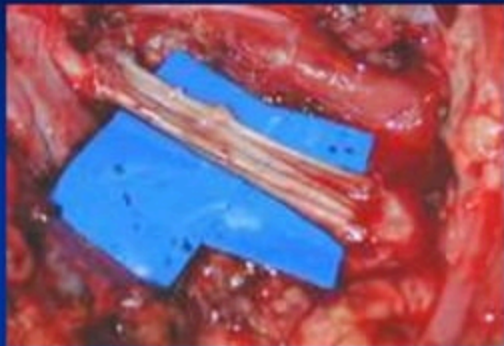


Indication for surgical correction

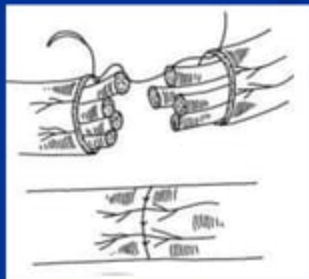
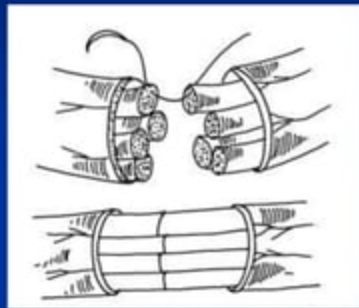
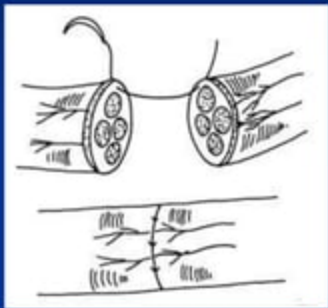
- Surgical exploration should be done within 6 months of life
- Exploration and nerve grafting or neurotization if there is a complete plexus palsy at 3 months or if there is a C5-C6 palsy with absence of biceps at 3 months
- Failure of recovery of elbow flexion and shoulder abduction from the 3rd to the 6th month of life.

Surgical Intervention

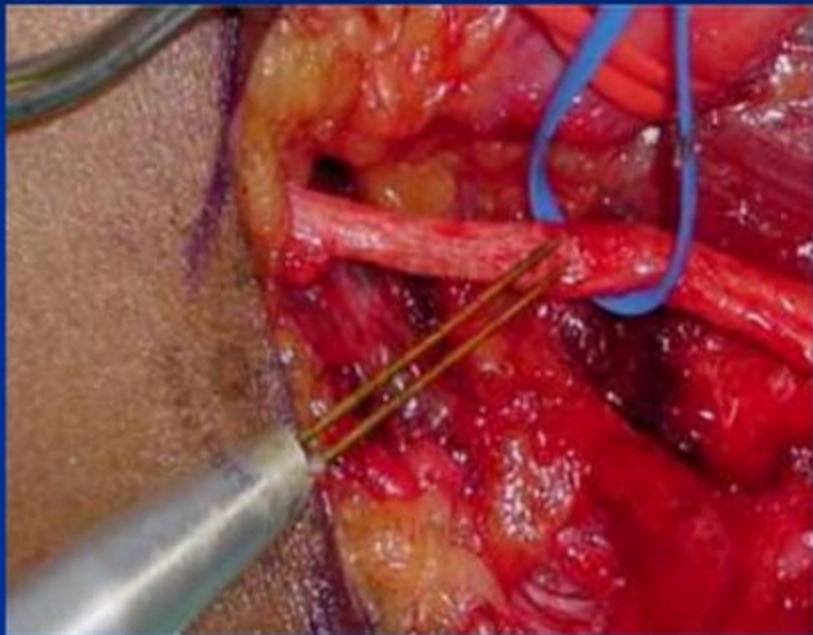
- Neurosurgery 5-10%
OBPI
 - Nerve grafting
 - Neuroma dissection and removal
 - Neurolysis
(decompression and removal of scar tissue)
 - Direct end to end anastomosis of nerve ends



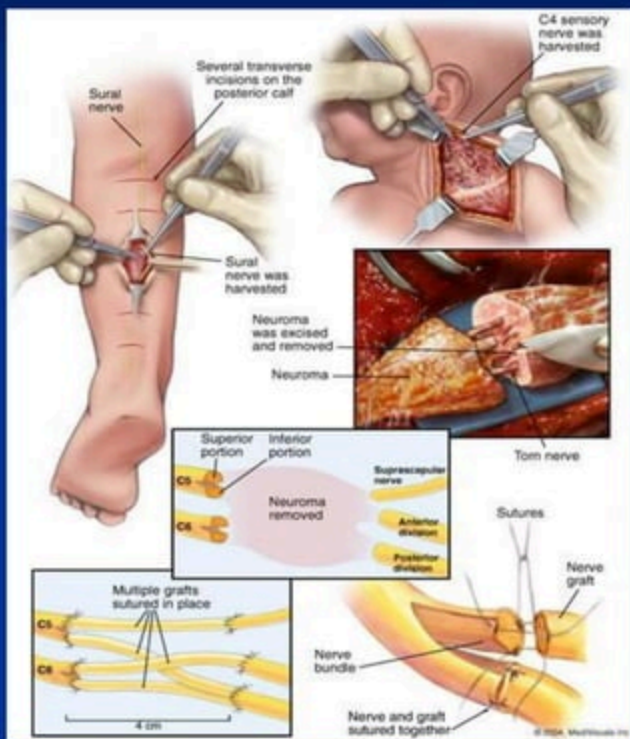
Neurorrhaphy



Neurolysis



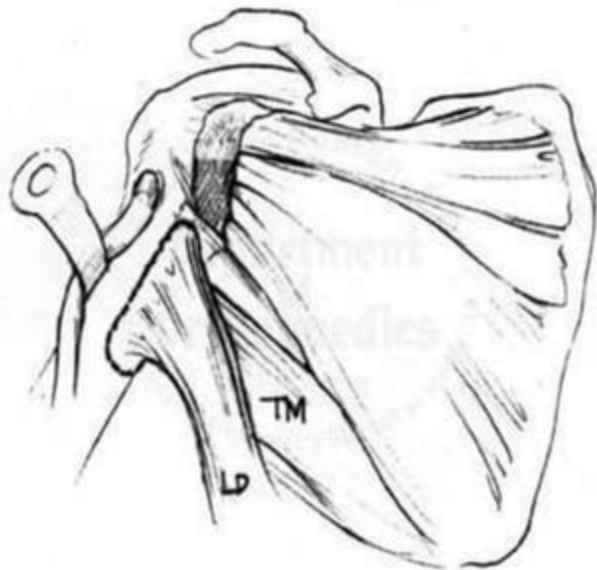
Neuroma Removal



Neurotization

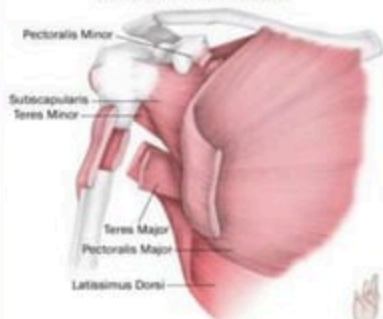


Tendon Transfer

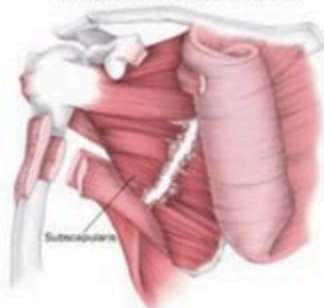


Mod Quad

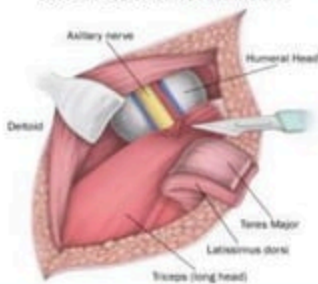
SURGICAL RELEASE OF:
Pectoralis Minor, Pectoralis Major,
Teres Major, and Latissimus Dorsi,



PARTIAL RELEASE OF SUBSCAPULARIS



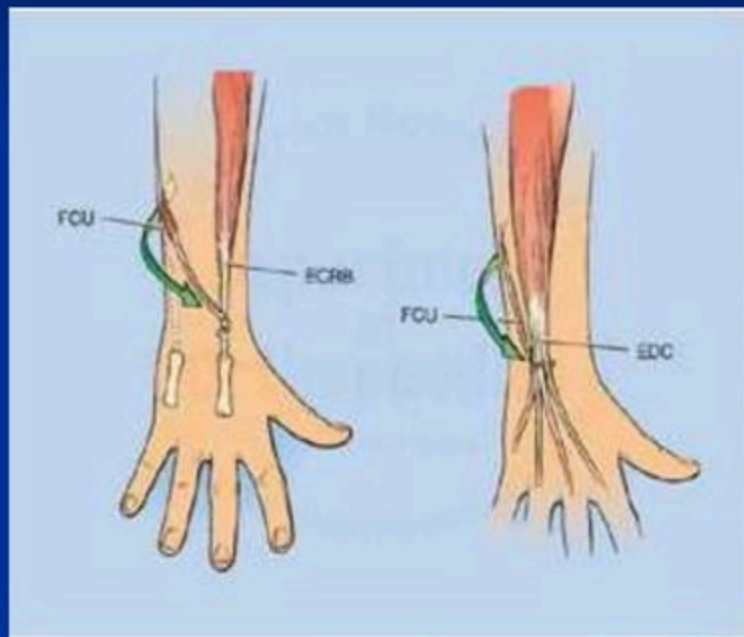
DECOMPRESSION OF AXILLARY NERVE



**REATTACHMENT OF TERES MAJOR
AND LATISSIMUS DORSI TO TERES MINOR**



Tendon Transfer



Post op management

- Immobilization
 - Cast 3-6 weeks
 - Night splint 3-6 months
 - Scar management
 - Tendon gliding
 - US massage
- Muscle reeducation
 - cues to perform previous action of transferred muscle
- -Taping / vibration over muscle belly
- -Biofeedback
- -NEMS-after 6 weeks
- *Functional performance

Post op.

Saro Brace



PROGNOSIS for Erb's Palsy

- Generally good for spontaneous recovery, although may be incomplete
- Depends on degree of involvement
- Majority of spontaneous recovery by 9 months



BPI Neuronal Recovery

- Axon regeneration 1 mm per day
 - 4-6 months for upper arm
 - 7-9 months for lower arm
- Recovery is varied according to damage
 - 2 years upper arm
 - 4 years lower arm

Denervated muscle fibers survive for approximately 18 to 24 months.

PREVENTION

- Birthing facility has a duty to be sure that their obstetric teams have continuing education and skill training, so that they have current knowledge and skills to deal with these challenges when they occur.
- Mother/patients proper education.
- Good advance planning by the obstetrician.
- Good judgment .
- Proper history taking

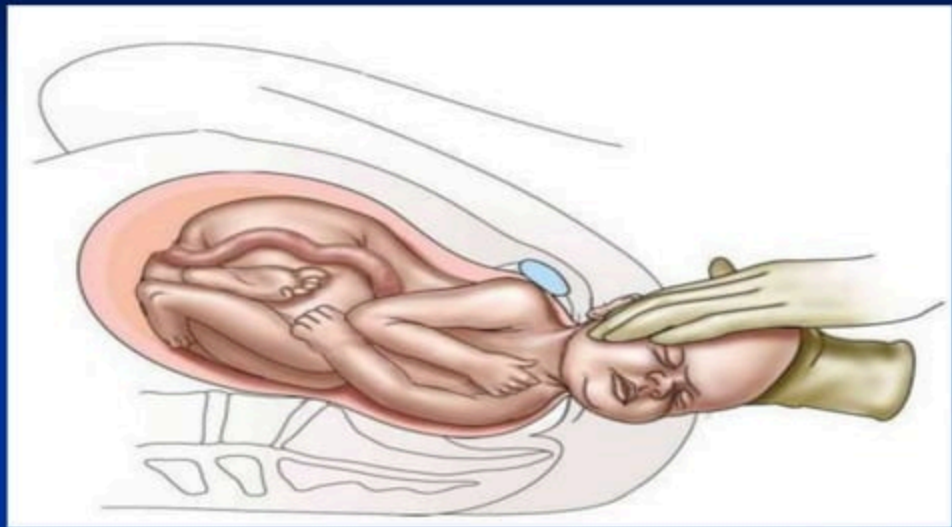
DELIVERY MANUEVER

- EPISIOTOMY
- McROBERT'S POSITION
- SUPRAPUBIC PRESSURE
- WOODS MANUEVER (woodscrew maneuver)
- COMBINATION MANUEVER
- GASKIN MANUEVER
- RUBIN MANUEVER
- MANUAL DELIVERY OF POSTERIOR ARM

Alarmer method

- **A**sk for help. This involves requesting the help of an obstetrician, anesthesia and pediatrics for subsequent resuscitation of the infant.
- **L**eg hyperflexion (McRoberts' maneuver)
- **A**nterior shoulder disimpaction (pressure)
- **R**ubin maneuver/woodscrew
- **M**anual delivery of posterior arm
- **E**pisiotomy
- **R**oll over on all fours (GASKIN)

TRACTION



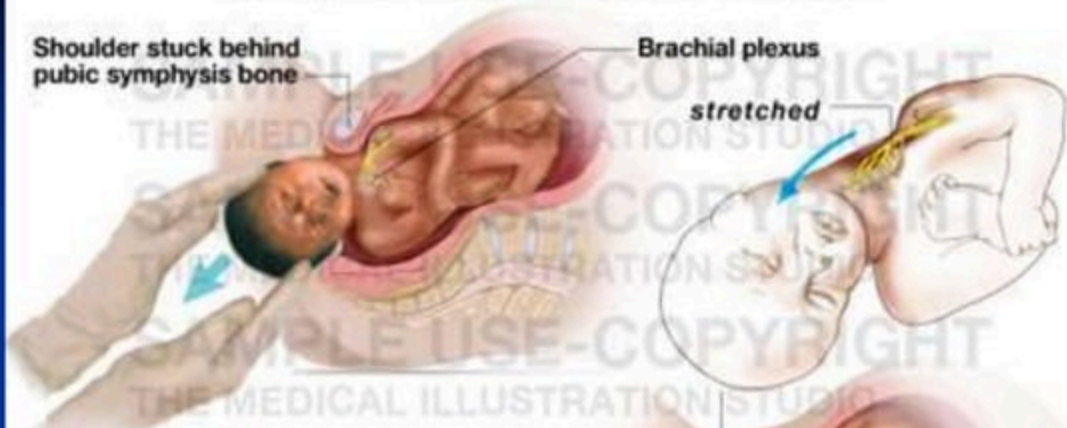
- Many doctors use traction (pulling on baby's head) or fundal pressure (where the nurse climbs on the bed and jumps down onto your stomach) before anything else and these are not only the least effective techniques, but dangerous to mother and baby.

DELIVERY OF HEAD IN SHOULDER DYSTOCIA

Shoulder stuck behind
pubic symphysis bone

Brachial plexus

stretched



CORRECT -

Pulling head out with 10-12 lbs of traction

Stop if resistance

Use other maneuvers

INCORRECT -

Lateral traction: bending head
& neck down, sideways to body
with 40 - 48 lbs of (4x) traction



Episiotomy

Episiotomy with Release of Shoulder Dystocia

1. Initial Presentation



2. Episiotomy

The baby's head is slightly elevated and scissors are used to create a standard midline episiotomy.

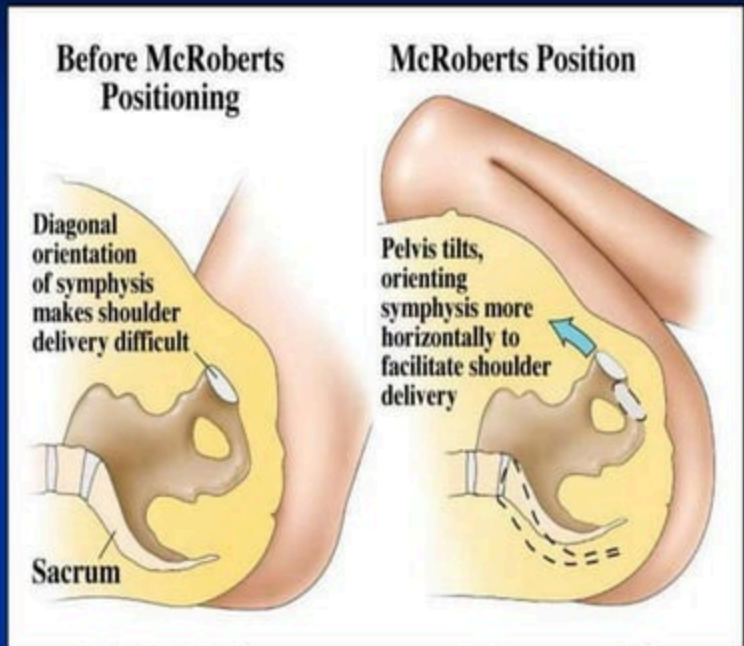


3. Eventual Delivery



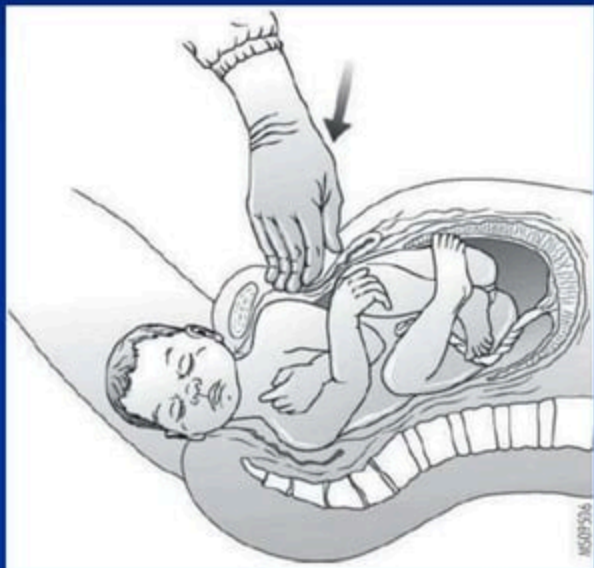
Sample Use on Copyrighted

McRobert's Manuever



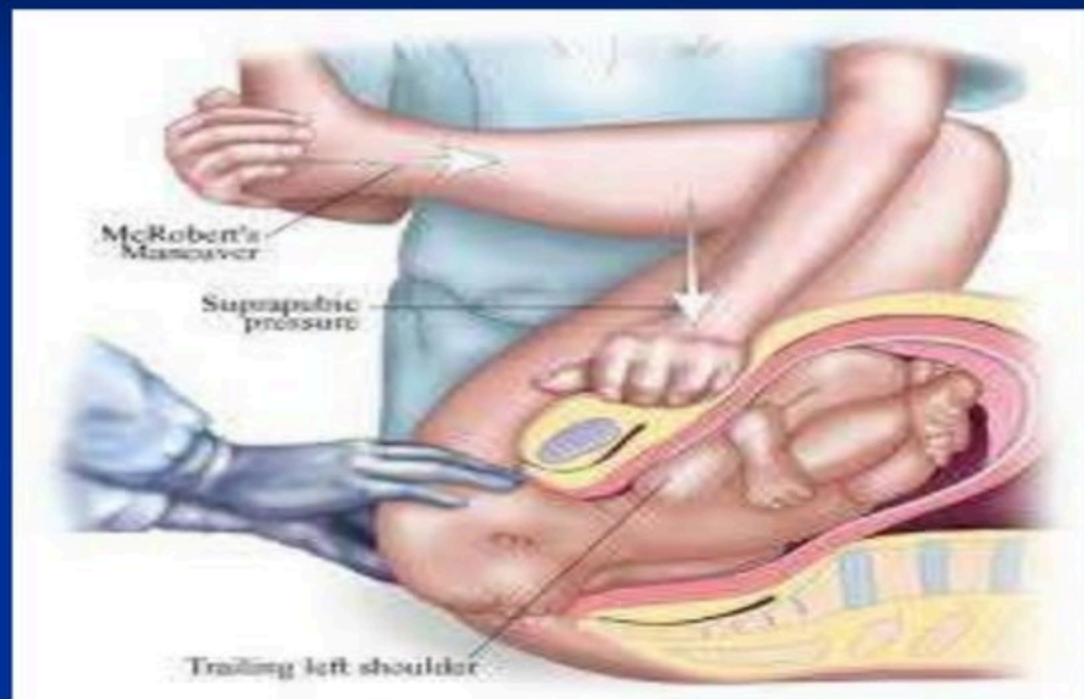
- The McRoberts maneuver (where mom's legs are brought up as far back toward her stomach as possible, which realigns the pubic bone and can slip baby's shoulder out) should be tried first and if failing

Suprapubic Pressure



- Suprapubic pressure (where the doctor or nurse makes a fist and pushes hard on the baby's shoulder just above the pubic bone) can be applied.

Combination



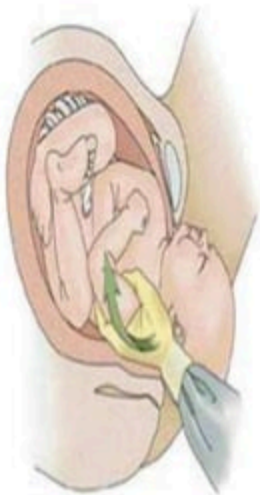
Gaskin Manuever



- The Gaskin Maneuver consists of having mom roll onto all fours (or assisting if necessary). During the process, many babies become dislodged and pop right out. If this doesn't happen, then the doctor actually has better access to help wiggle the baby around until the shoulder releases and the rest of baby is born (Woods or Rubin maneuver).

Woodscrew Manuever

ROTATE
POSTERIOR
SHOULDER



Woods Screw Maneuver

1. Doctor locates
impacted shoulder
with fingers



2. Doctor rotates
shoulder away from
pubic symphysis



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3. If successful, baby
rotates, is dislodged,
and is delivered.

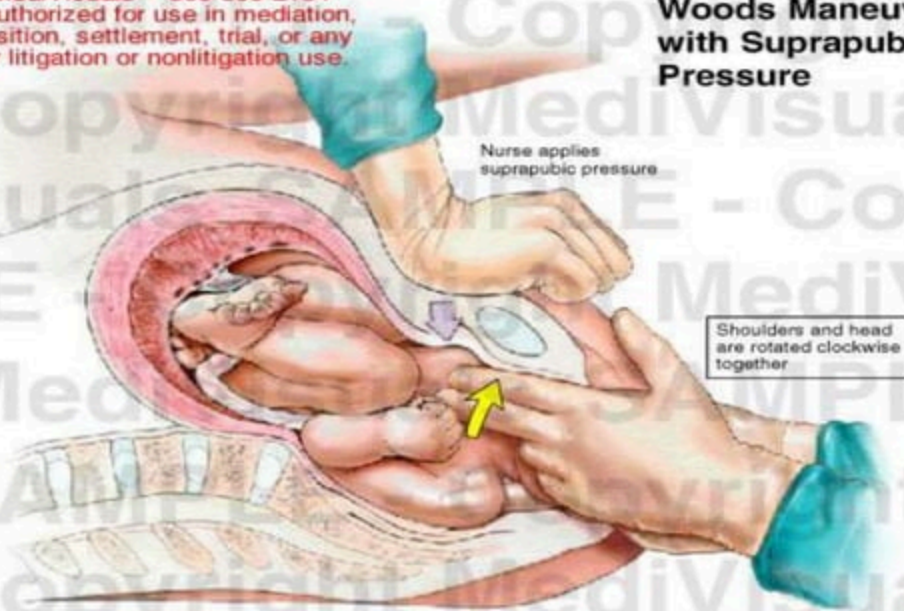


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COMBINATION

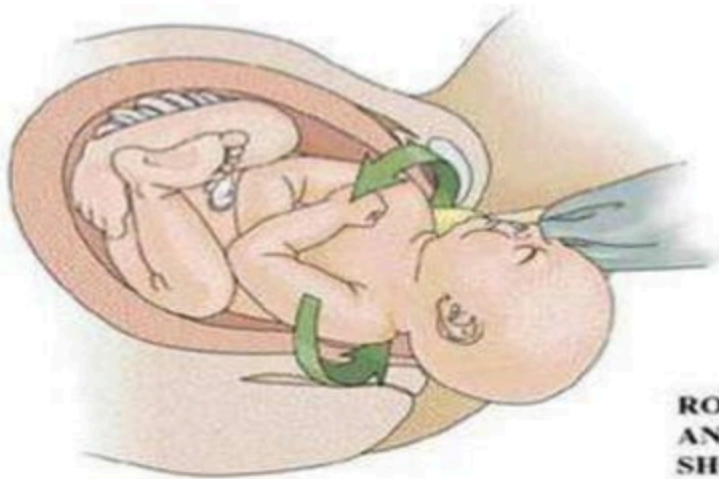
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Woods Maneuver with Suprapubic Pressure

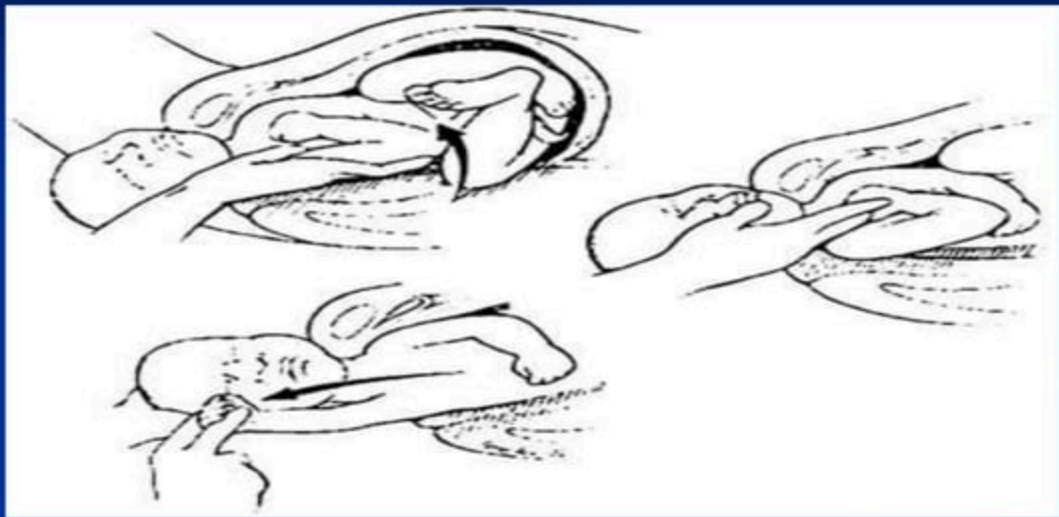


Exhibit# 400081-03X

Rubin manuever



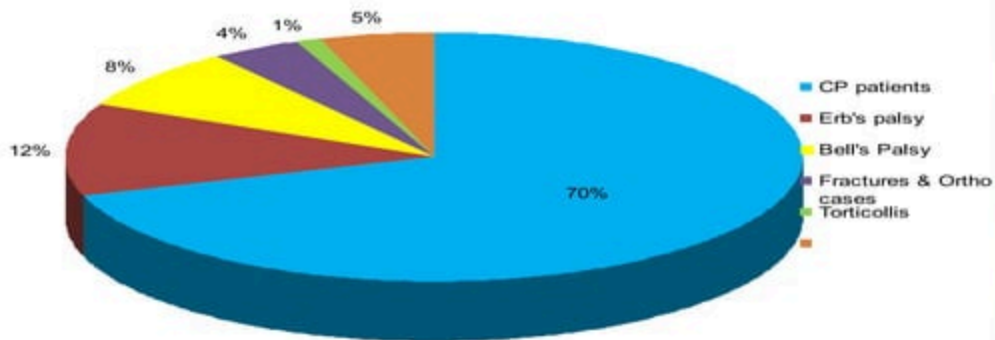
Manual Delivery of Post arm



- **Manual delivery of posterior arm:** Insert hand into the vagina and flex the posterior arm of the fetus, bringing it across the chest. The posterior arm is then delivered over the perineum which allows the provider to rotate the fetus to allow delivery of the anterior shoulder once the rotation has disimpacted it from the pubic symphysis.

INCIDENCE OF ERBS PALSY IN REHAB DEPT. @MCH

Graph percentage of cases in the Department



CURRENT TOTAL CASE IN DEPT.

■ NEW CASES 1435

■ PREVIOUS CASES –	5
■ NEW CASES –	6
<hr/>	
TOTAL -	11

MONTH	NO.OF CASEREFERRED
1	2
2	1
3	0
4	0
5	0
6	2*
7	1

YEAR 1434

MONTH	NO.OF CASEREFERRED
1	1
2	3
3	2
4	1
5	1
6	0
7	2
8	0
9	2
10	0
11	1
12	1
TOTAL	14

- TOTAL CASES OF ERB'S PALSY REFERRED IN 1434 = 14 PATIENTS
- 9 = DISCHARGED & FULLY RECOVER
- 5 = STILL UNDER THE PROGRAM
2 = UNDERGONE NERVE GRAFT PROCEDURE

REFERRED ERB'S PALSY IN THE MRH DEPT FOR THE YEAR 1434 & 1435



- **Bottom Line:**

Erb's palsy is almost always a preventable birth defect.

Conclusions

- Beware of macrosomic infants
- Avoid midpelvic deliveries in macrosomics & GDMs
- Manage Shoulder Dystocia
 - Don't rush
 - Avoid excessive traction
 - Continuing education and skill training for obstetric team.

Thank you