Sir Ganga Ram Hospital

Basic Concepts of Brachial Plexus Injury Management

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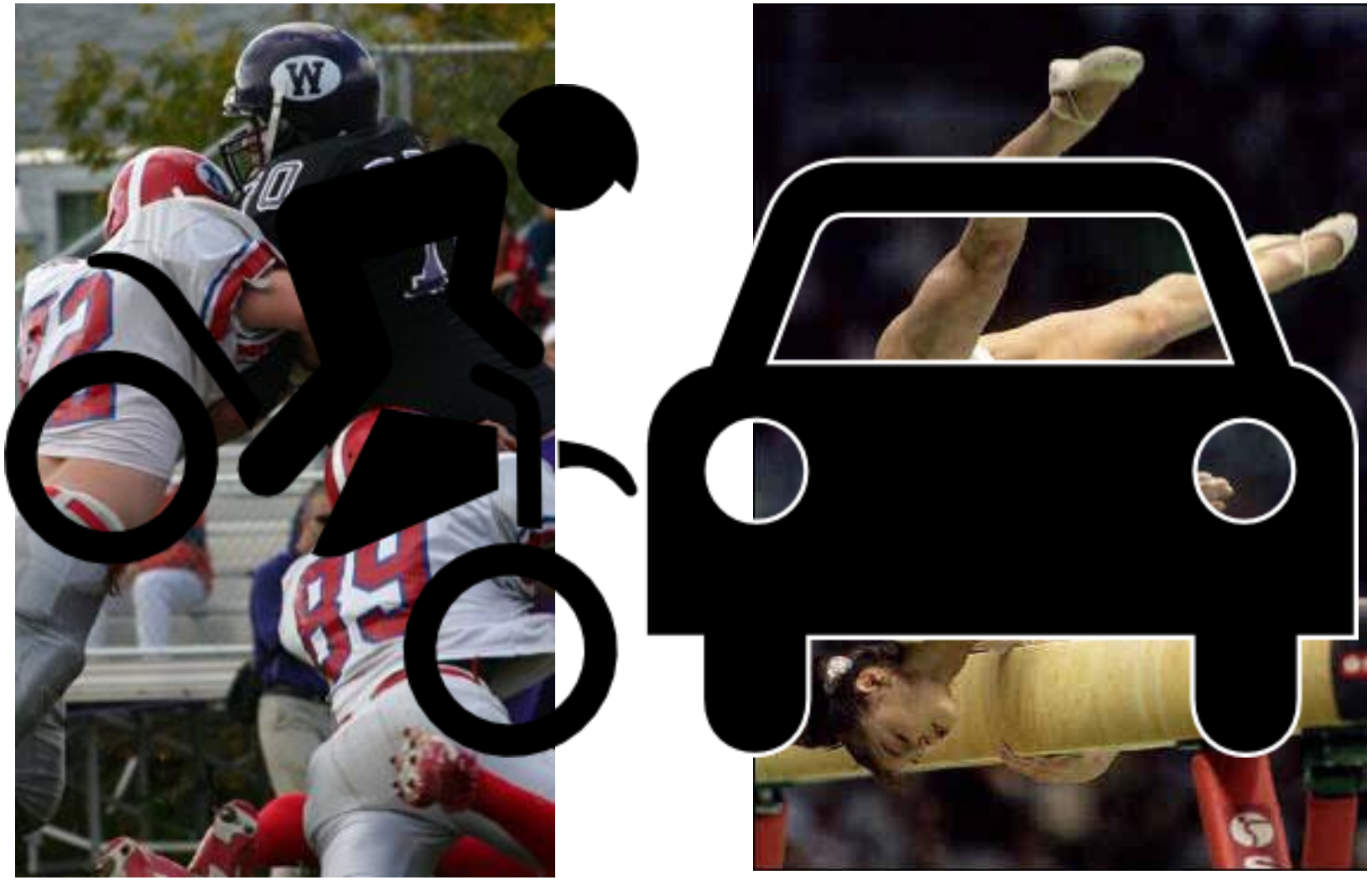
- How to Diagnose?
- What is the Prognosis?
- Do we need to operate….If yes…When to Operate?
- How is the Orthopedic Surgeon involved. ?

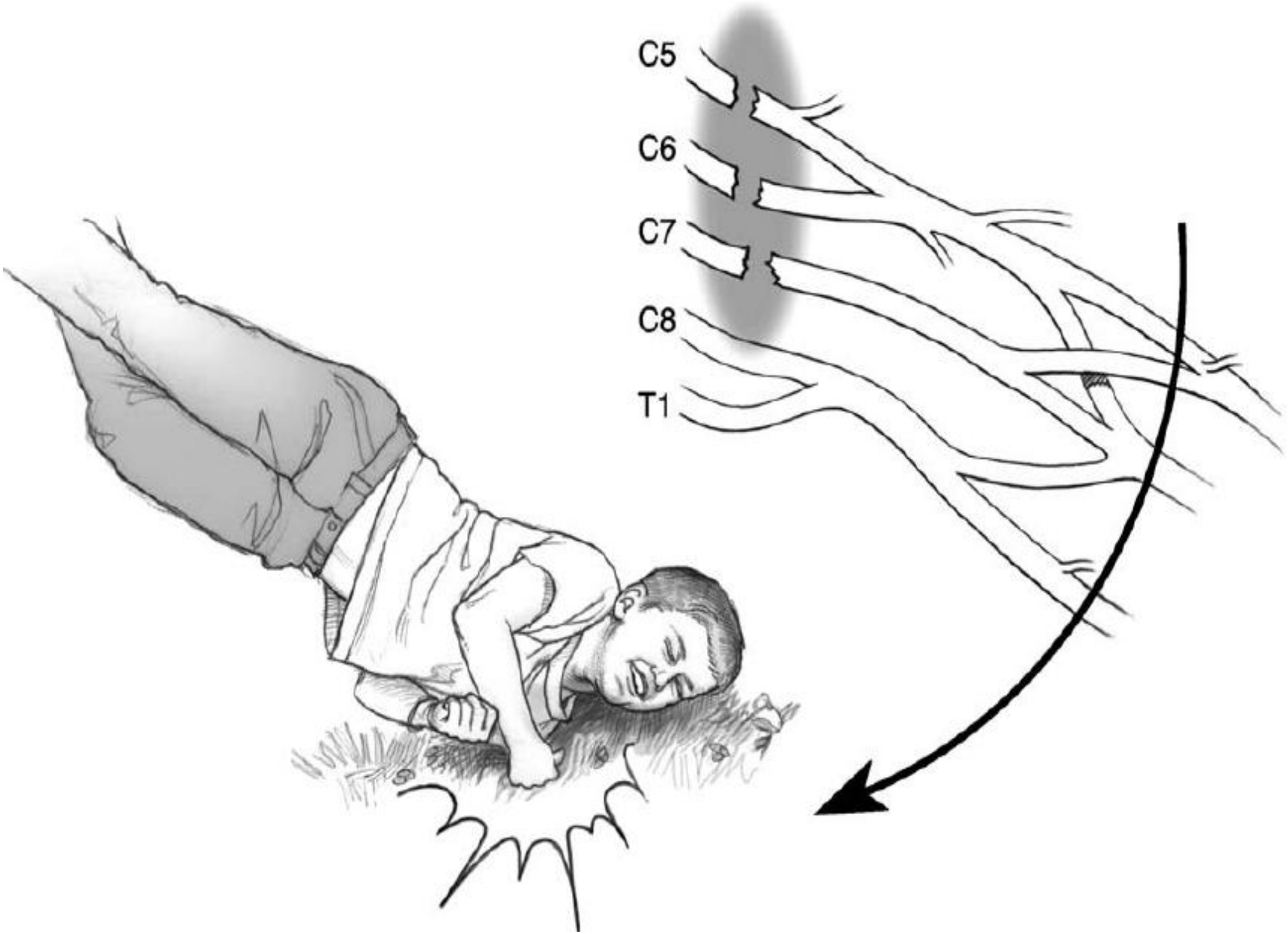
Mode of Injury

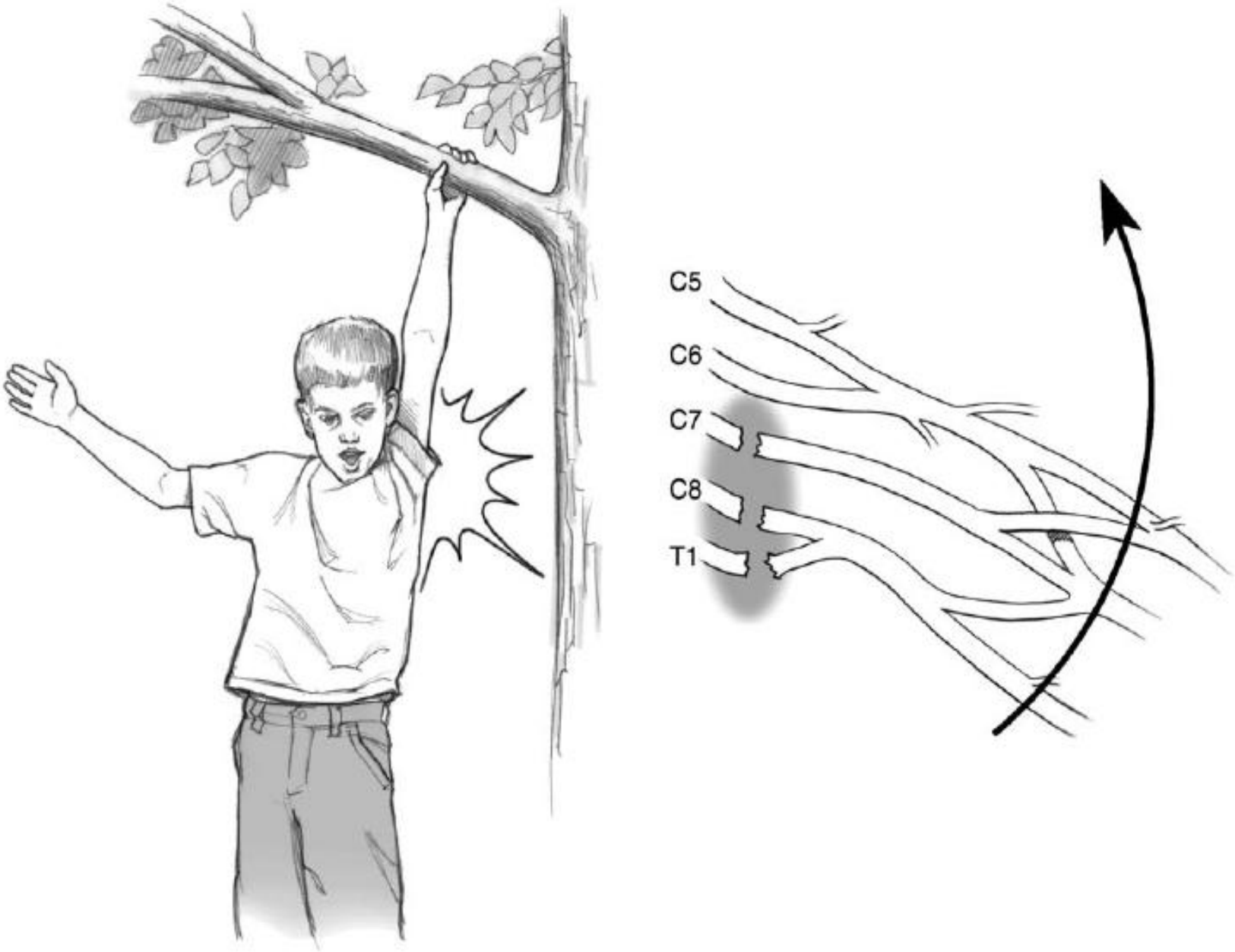


Mechanism of injury

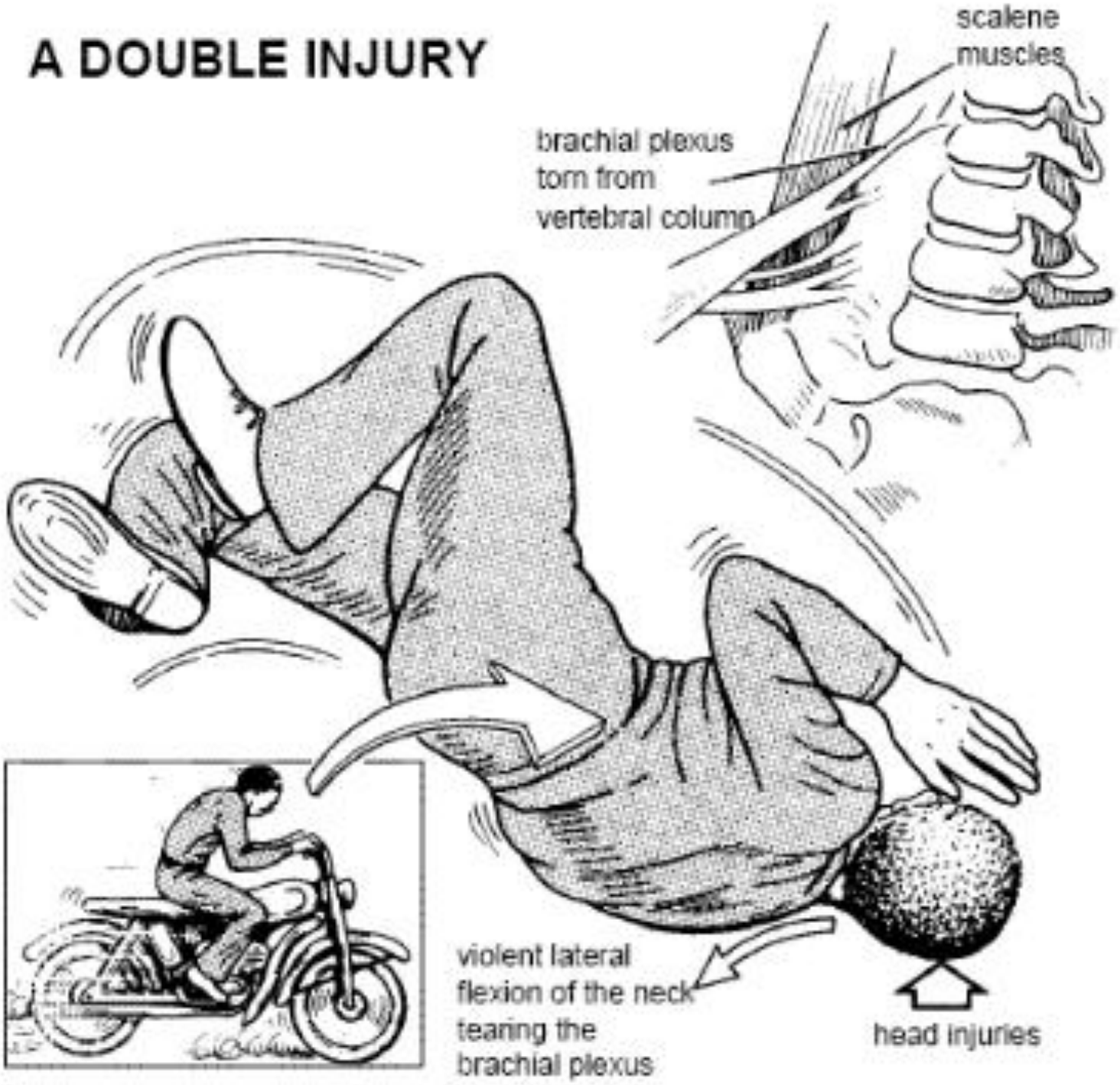
Two Basic Mechanisms

- Traction
- Compression

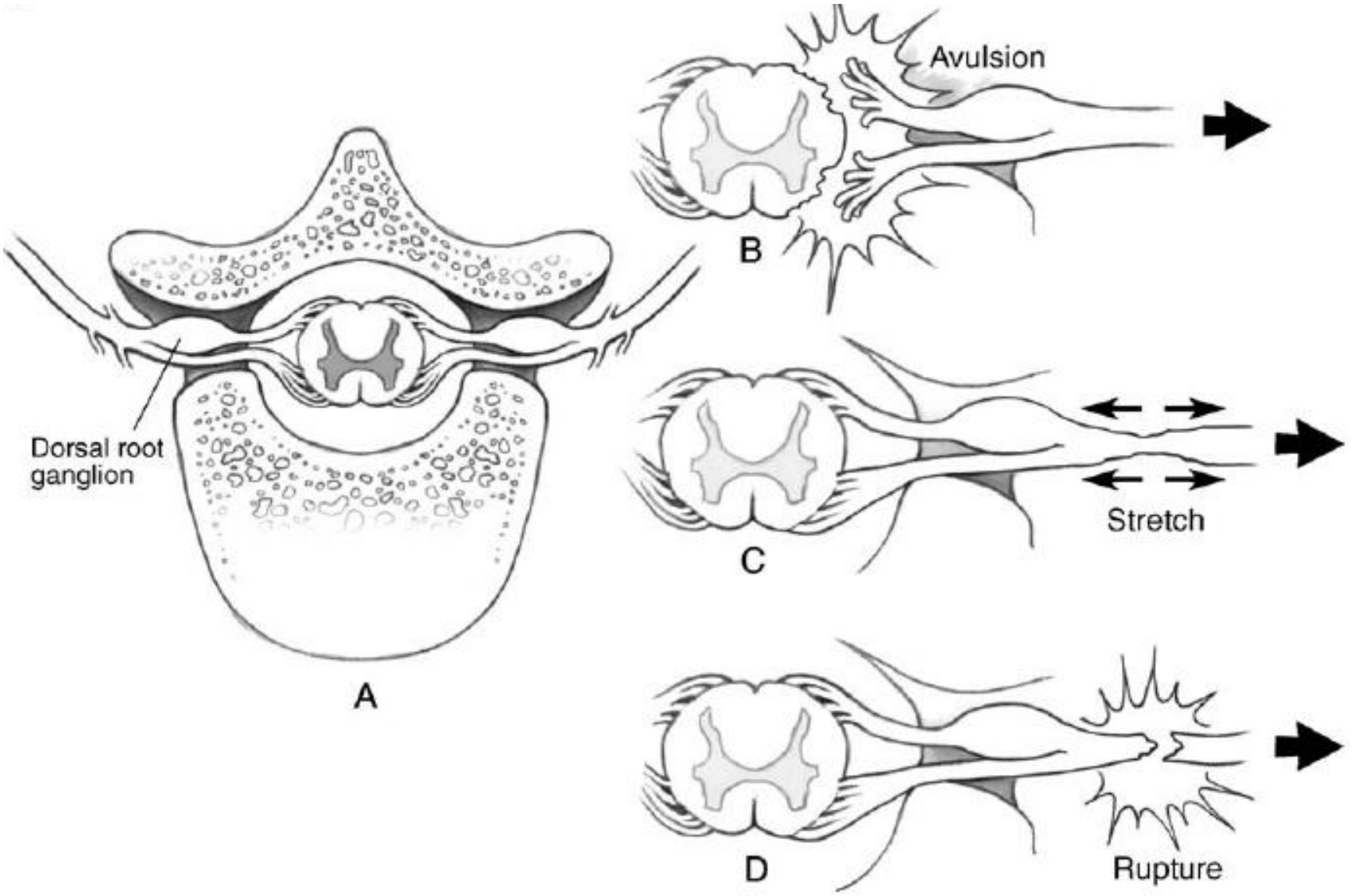

C5
C6
C7
C8
T1


C5
C6
C7
C8
T1

A DOUBLE INJURY



Types of Plexus Injury



Clinical Presentation

- Road Traffic Accident most common. Sports Injuries, Falls also seen
- Usually associated with other injuries
- Often the diagnosis is missed because of associated Head Injuries
- Mostly Closed injuries(~90%)
- Associated Clavicular Fracture(~20%)
- Vascular Injuries(~10%)

Right Brachial Plexus

Name | Chart # | Birth date | Date exam | PAIN

Address:

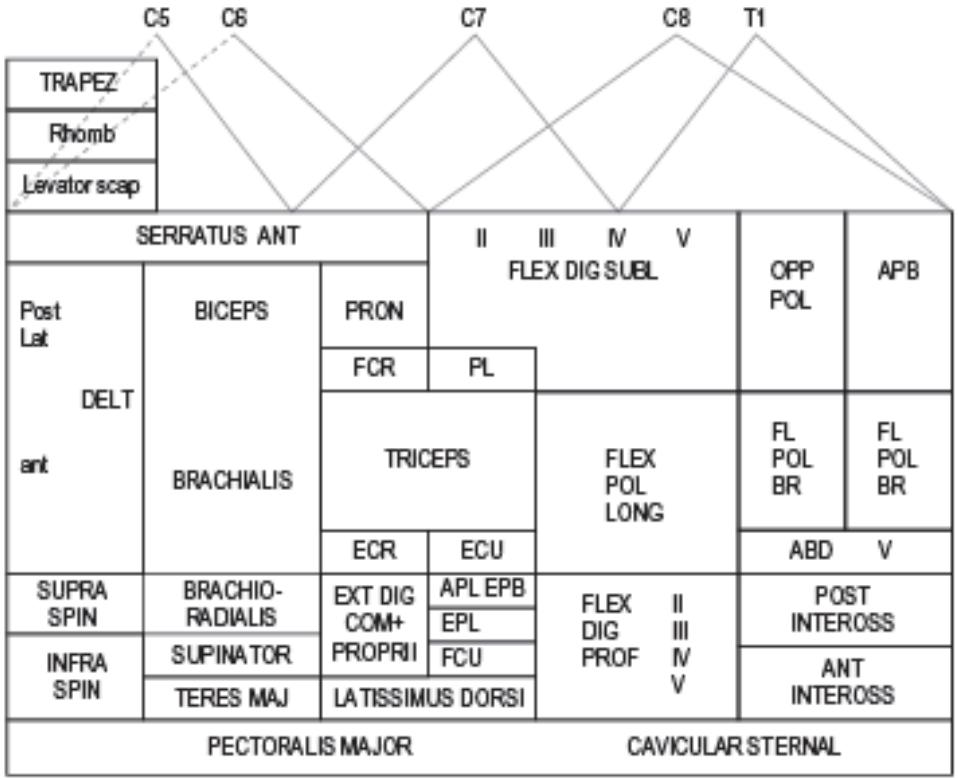
Present illness | Date of injury

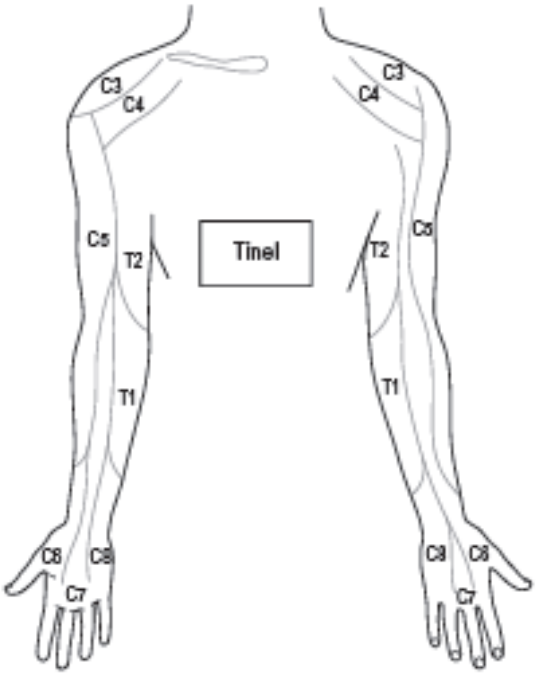
Past history | X-Ray and | Horner's syndrome

Date operation | MRI | Vascular lesion

EMG | Mobility of diaphragm

- Intolerable
- Disturbance
- Acceptable
- None





M0 M1 M2 M3 M4 M5

S0 S1 S2 S2+ S3 S3+ S4

Examination

Shoulder (C5,6): Deltoid, Supraspinatus

Elbow(C5,6&7): Biceps, Brachialis

Hand(C8, T1….all roots)

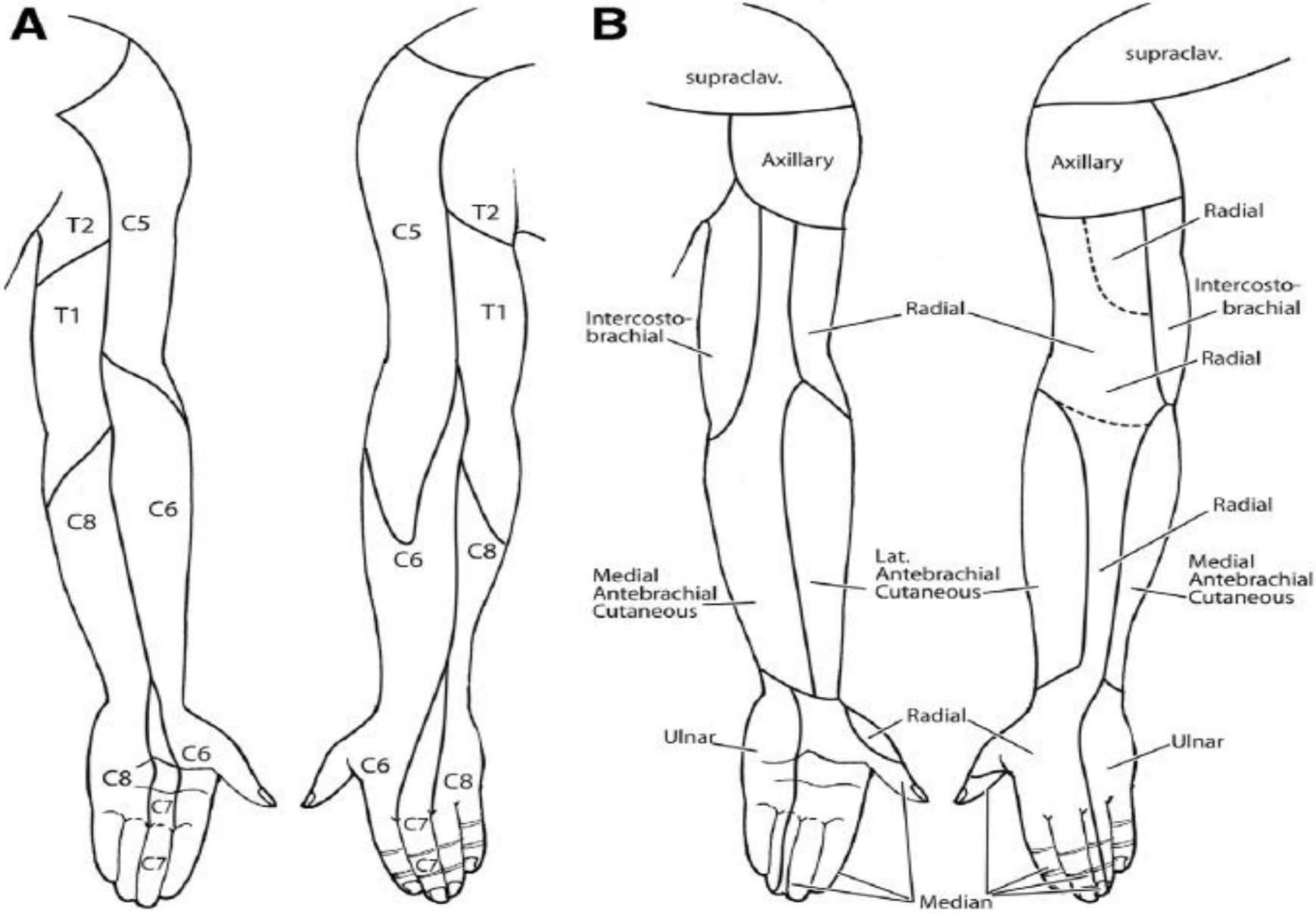
If Pectoralis, Serratus paralysed: Proximal Injury

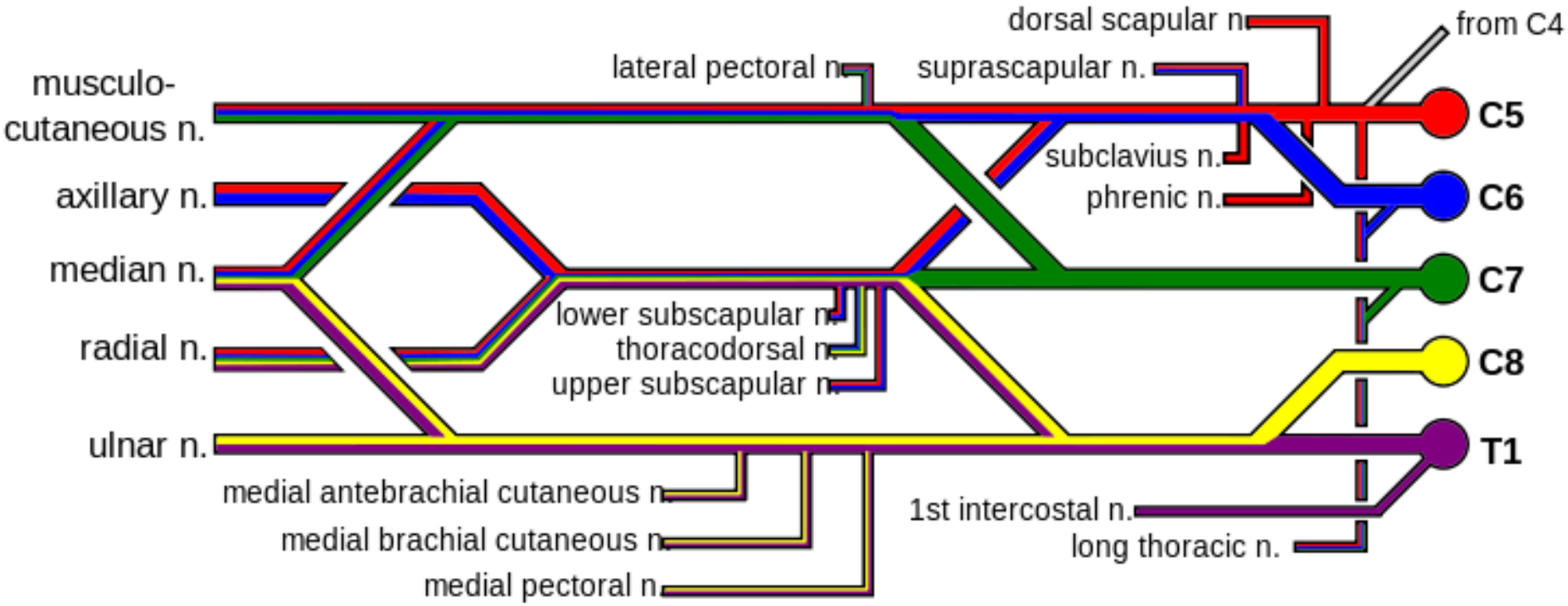
If Horner's Syndrome: than Lower roots involved

The Tinel's sign - Tapping firmly along the course of a nerve, moving from distal to proximal.

Signs indicating root avulsions (A) phrenic nerve palsy (B) Skin alterations associated with deaferentation pain. (C) winging scapula (D) external pseudomeningocele. (E) Horner's sign.

Dermatomes and Myotomes




dorsal scapular n.
from C4
lateral pectoral n.
suprascapular n.
musculo-
cutaneous n.
C5
subclavius n.
axillary n.
phrenic n.
C6
median n.
C7
lower subscapular n.
radial n.
thoracodorsal n.
C8
upper subscapular n.
ulnar n.
T1
medial antebrachial cutaneous n.
1st intercostal n.
medial brachial cutaneous n.
long thoracic n.
medial pectoral n.

Investigations

- EMG/ NCV
- MRI

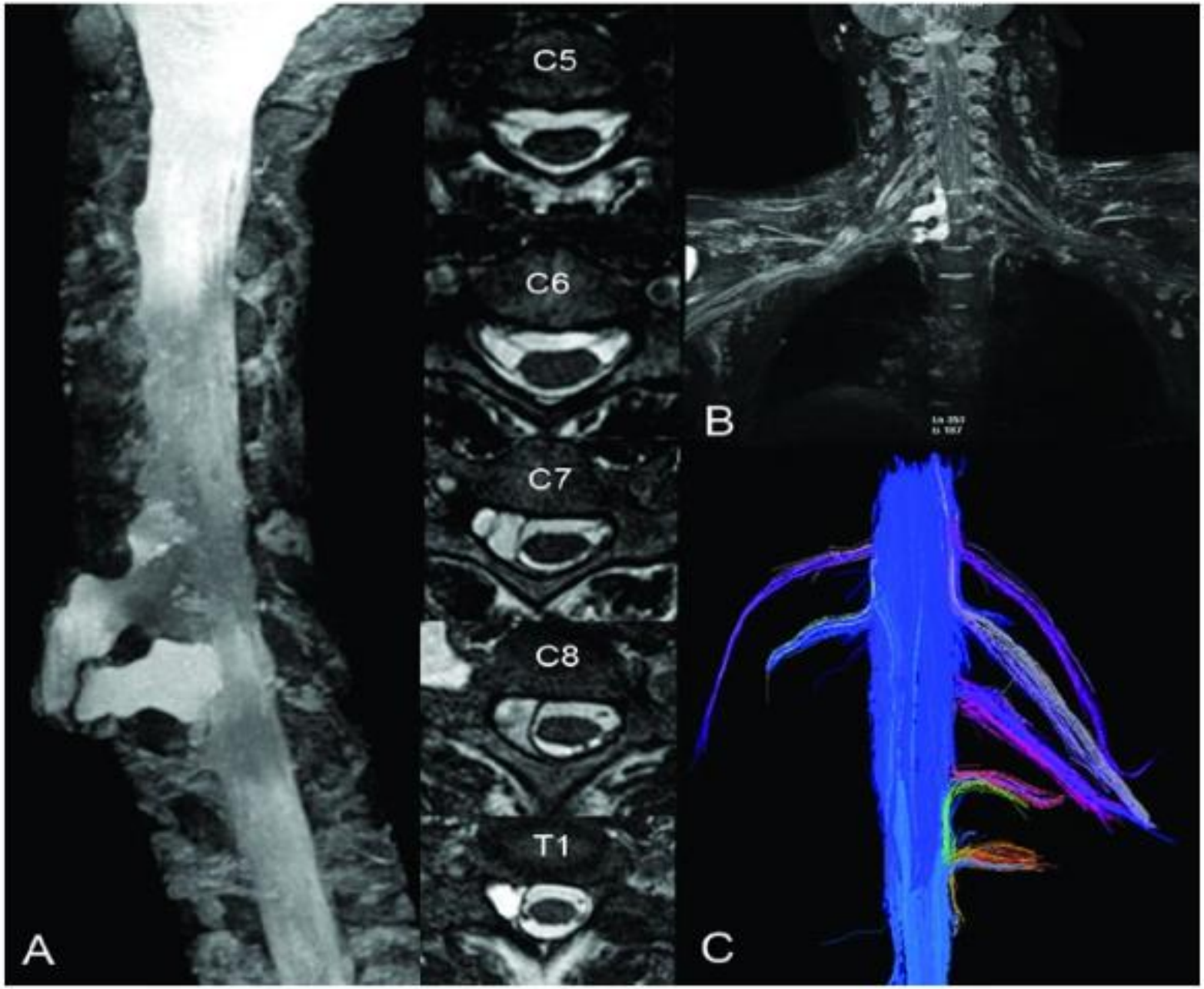


Figure 2: MR myelography (A), neurography (B) and diffusion tensor tractography demonstrating avulsions of C7, C8 and T1.

Prognosis

Partial palsy (4 roots: excellent, 2-3 roots: good, 1 root: workable)

Global palsy(No root: poor…….Wang's – workable)

Do we need to operate…?

Yes.

When to operate?

2 to 6 months is the golden time..!

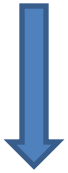
Initial Strategy

Global Palsy

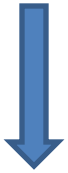
SAN to SSN

IC 3,4,5 to MCN

IC 6,7 banked in arm(Sural Graft) for future FFMT (Doi)



Wrist & Thumb Arthrodesis



FFMT for Finger Flexors (banked IC donor)

Current Recommendations

Global Palsy (Early Presentation):

SAN to MC/ Phrenic- MC

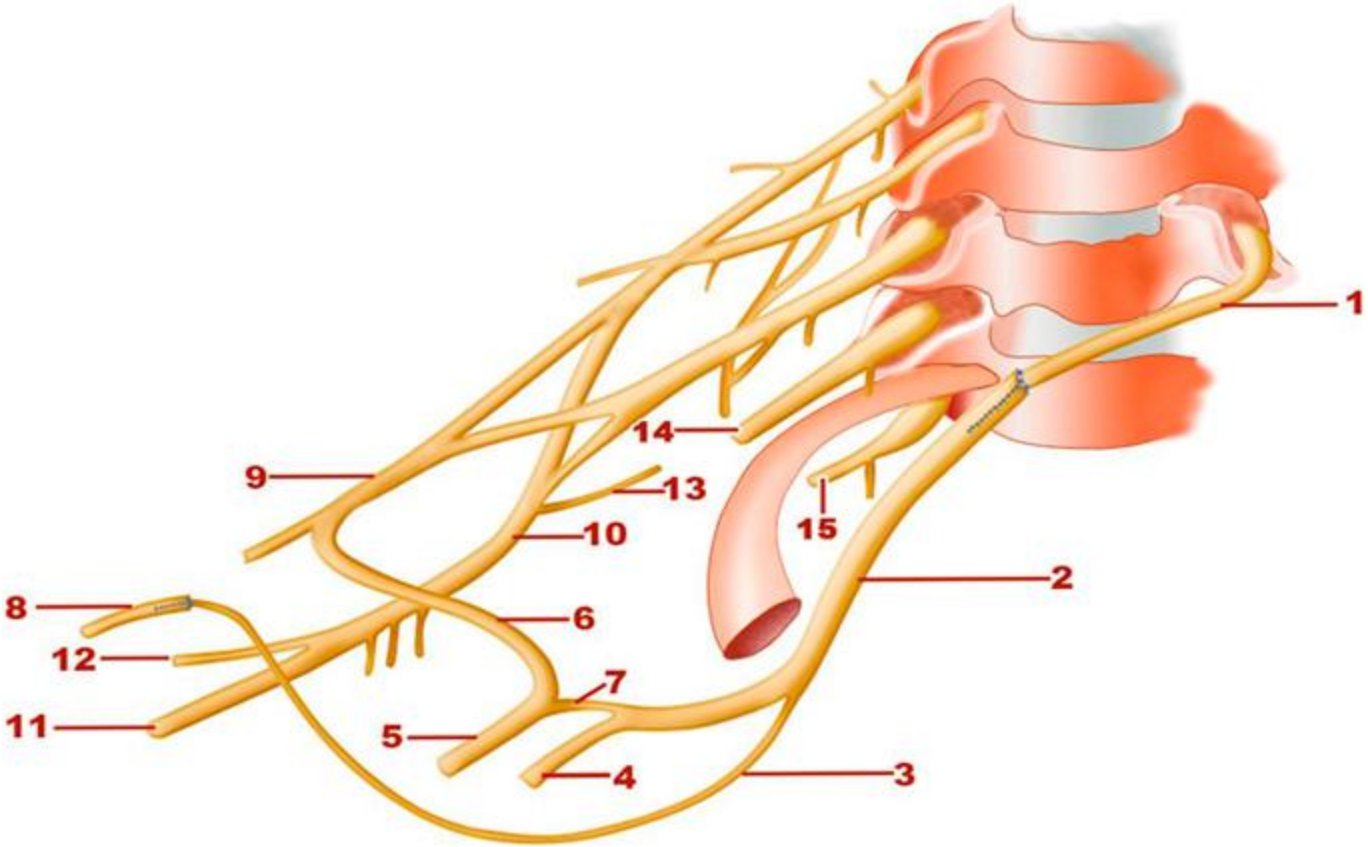
Trapezius Transfer/ SAN- SSN

IC345 : FFMT for Finger Flexors

Wrist & Thumb Arthrodesis

Alternate Strategy:

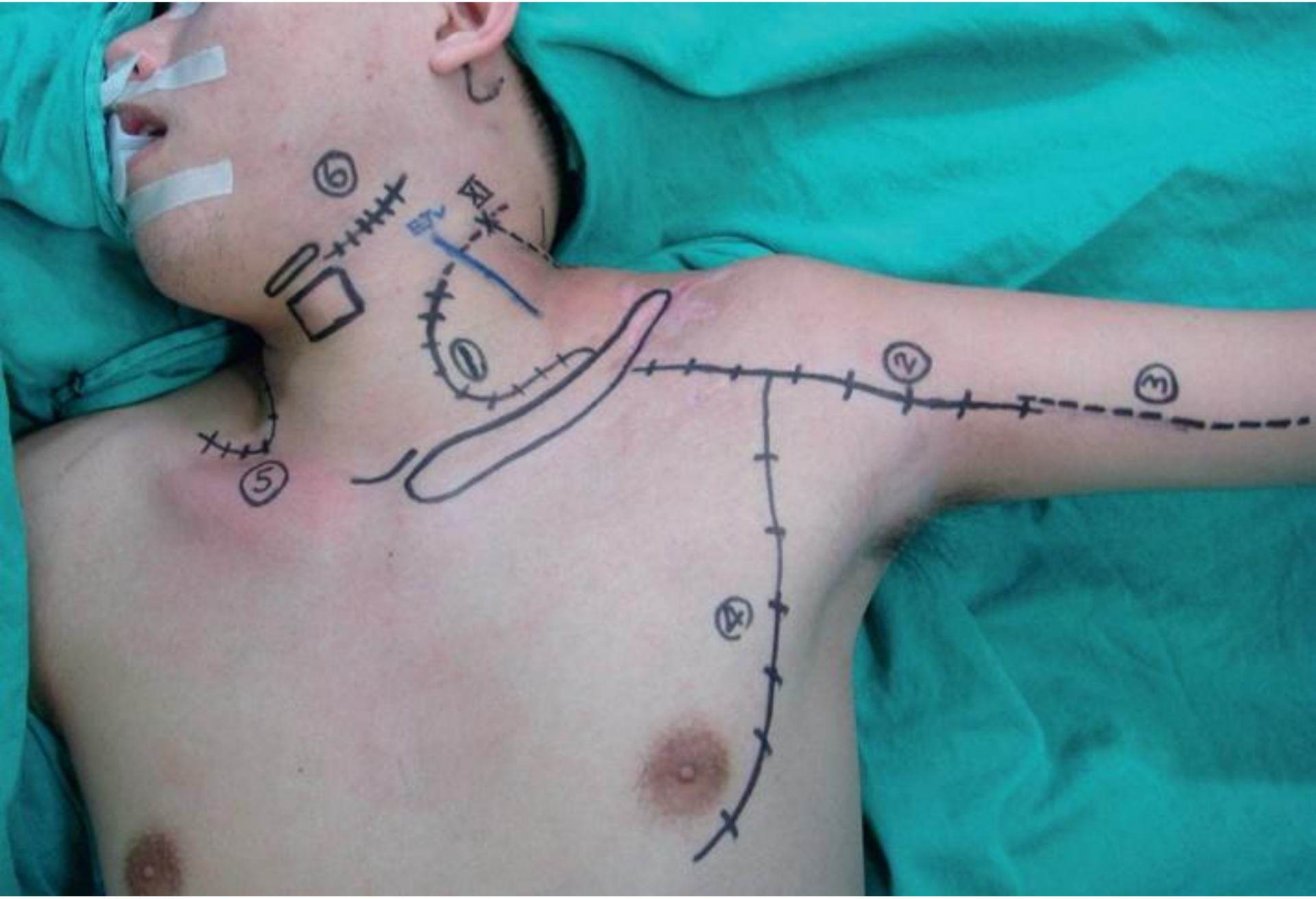
Wang's Procedure with SAN - SSN



1 = contralateral C7 nerve root, 2 = lower trunk, 3 = medial antebrachial cutaneous nerve, 4 = ulnar nerve, 5 = median nerve, 6 = lateral cord of median nerve, 7 = medial cord of median nerve, 8 = musculocutaneous nerve, 9 = lateral cord, 10 = posterior cord, 11 = radial nerve, 12 = axillary nerve, 13 = posterior division of lower trunk, 14 = C8 nerve root, and 15 = T1 nerve root.

Planning

- We rely mainly on our Clinical Examination supported by EMG/NCV investigation & Plain Chest Radiograph before planning Surgery
- The golden rule of surgery within 3 months of injury is followed.
- We routinely use a transverse incision for supraclavicular exploration and a deltopectoral groove following incision for infraclavicular exploration


6
1
2
3
5
4

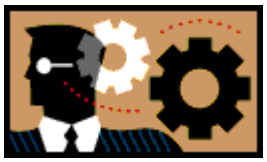
Role of Orthopedic Surgeon

Clavicle Fracture

Trapezius Transfer

Wang's Procedure for Humerus shortening

Wrist, Thumb Arthrodesis



Take Home Message

- Brachial Plexus injury should always be suspected in polytrauma involving Road Traffic accidents
- It is important to recognise and treat these injuries within the golden period of 2 to 6 months as later interventions give poor results
- Even after surgery, the results take a lot of time to be appreciated. So the patients need to be counselled for patience and motivated for Physiotherapy


obrigado
Dank U
Merci
mahalo
Köszi
спасибо
Grazie
Thank you
mauruuru
Takk
Gracias
Dziękuję
Děkuju
danke
Kiitos