Clinical Assessment of the Spine

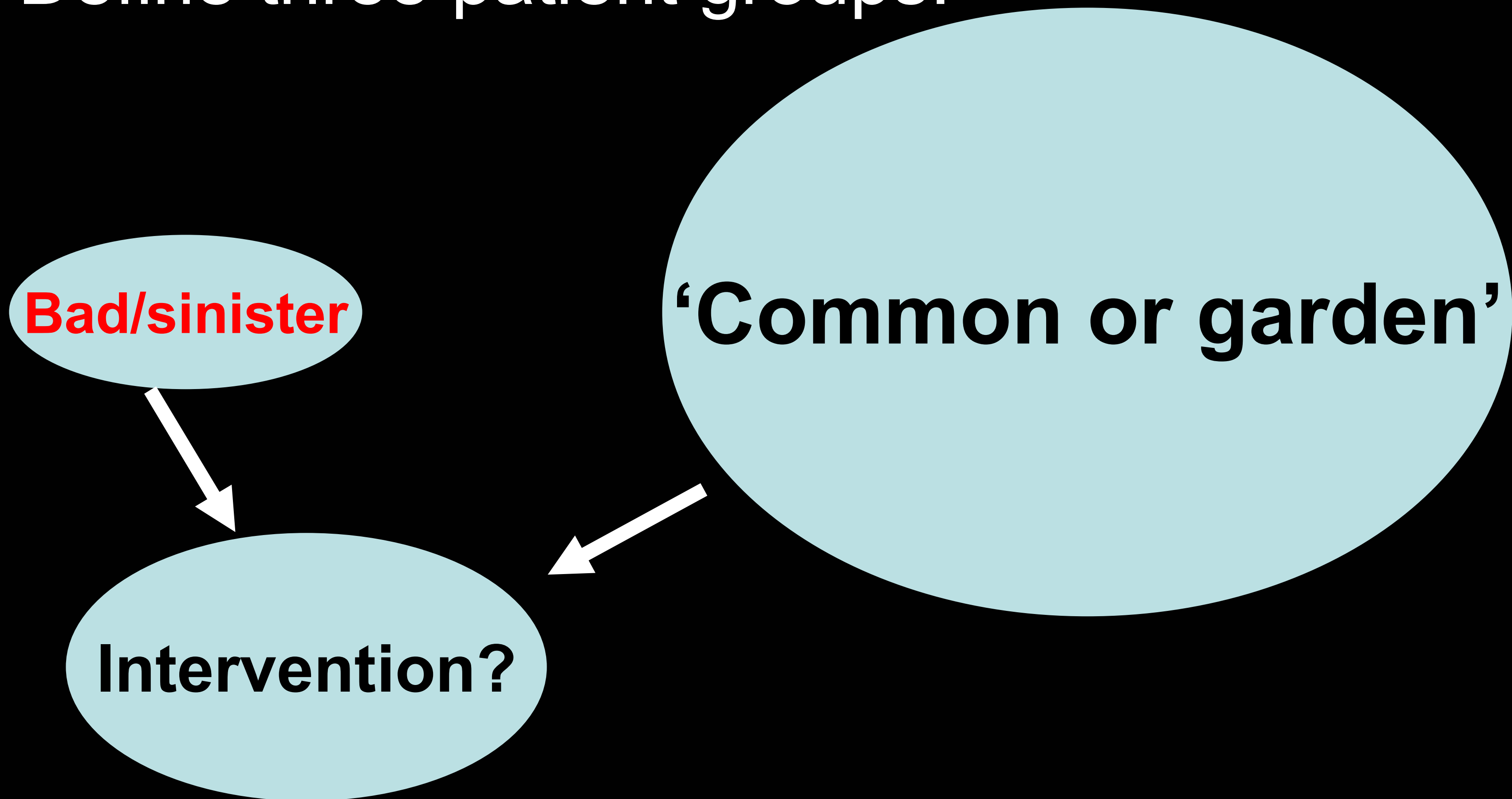
David Fender

How do we ensure good surgical outcome?

1. Patient Selection
2. Patient Selection
3. Patient Selection

Spinal Assessment

- Define three patient groups:



RED FLAGS

- Age < 20 or > 55 yrs
- Systemic upset
- Widespread neurology
- Atypical pain
  - non-mechanical, thoracic, night pain
- Structural deformity
- Significant past history
  - Carcinoma, steroids, HIV

Children

- Back pain not uncommon

- Key questions
  - Sleep disturbance
  - Time off school
  - Interferes with social life
  - Regular medication

- Spasm on examination

Back to basics…..

History

Two groups of symptoms:

1. The obvious

2. The subtle

Symptoms

Two sources:

1. Musculoskeletal

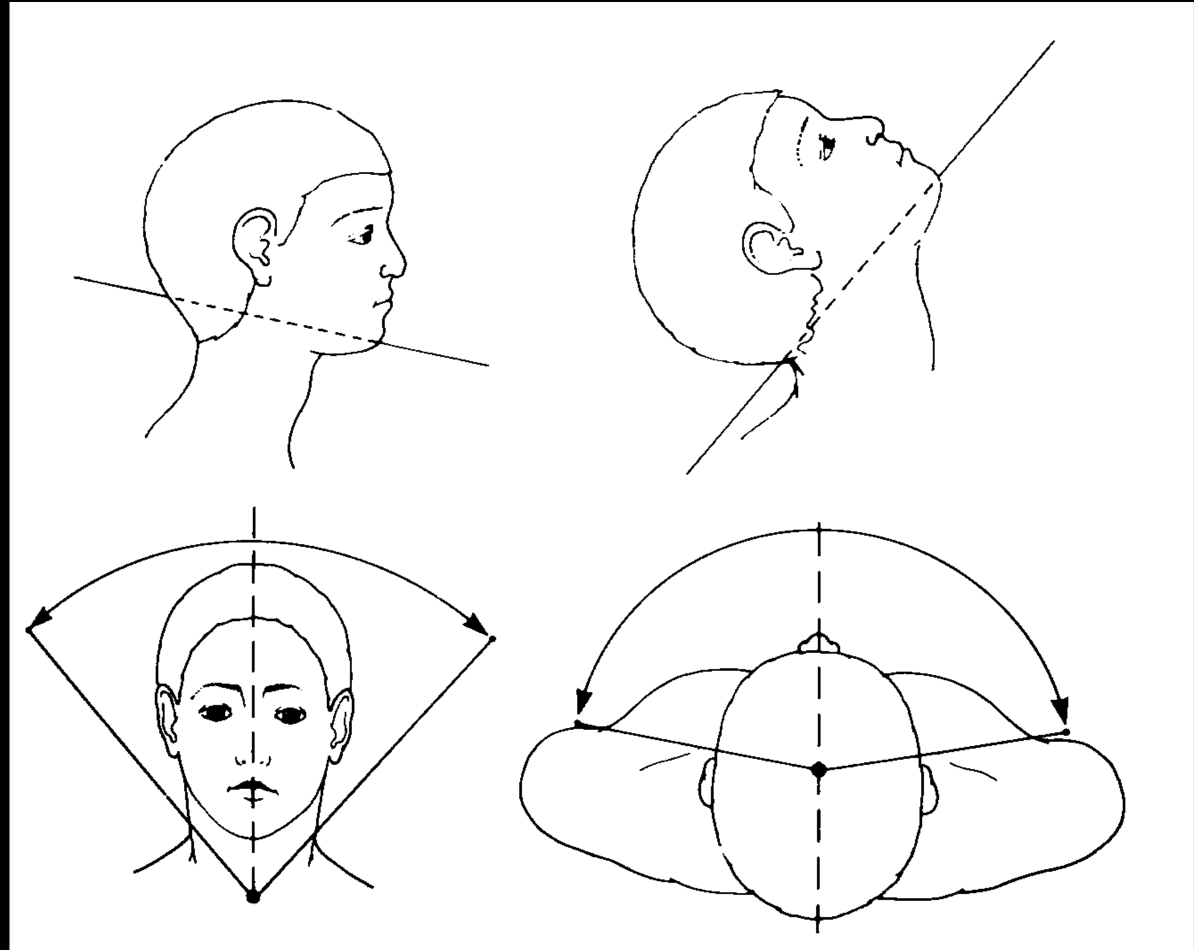
2. Neural
   - Root
   - Cord

Examination – 'Apley'

Look

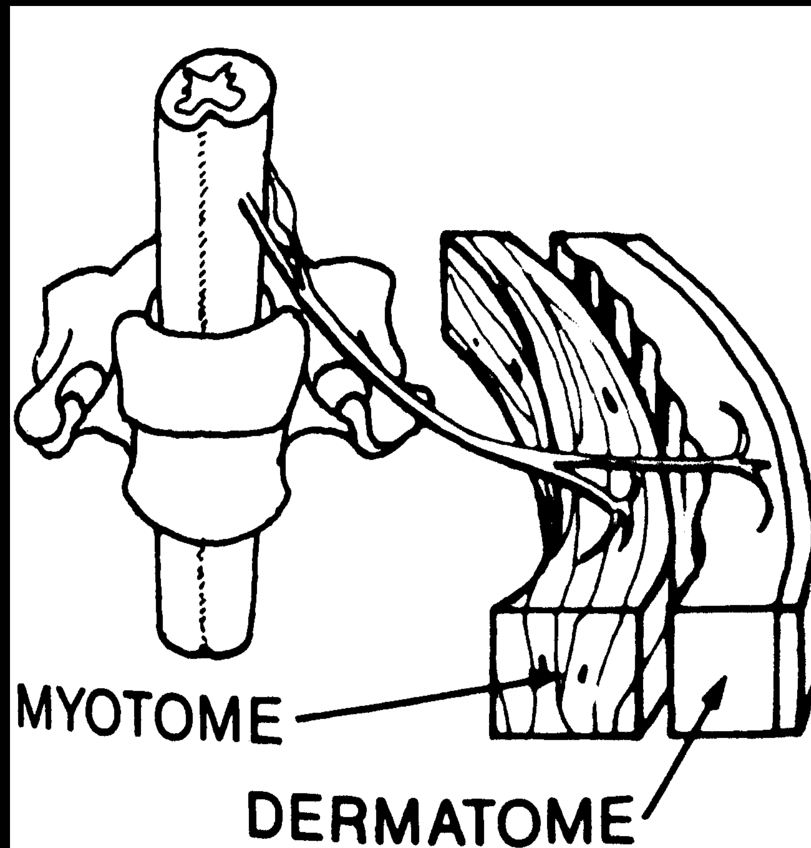
Feel

Move



Examination - neurological

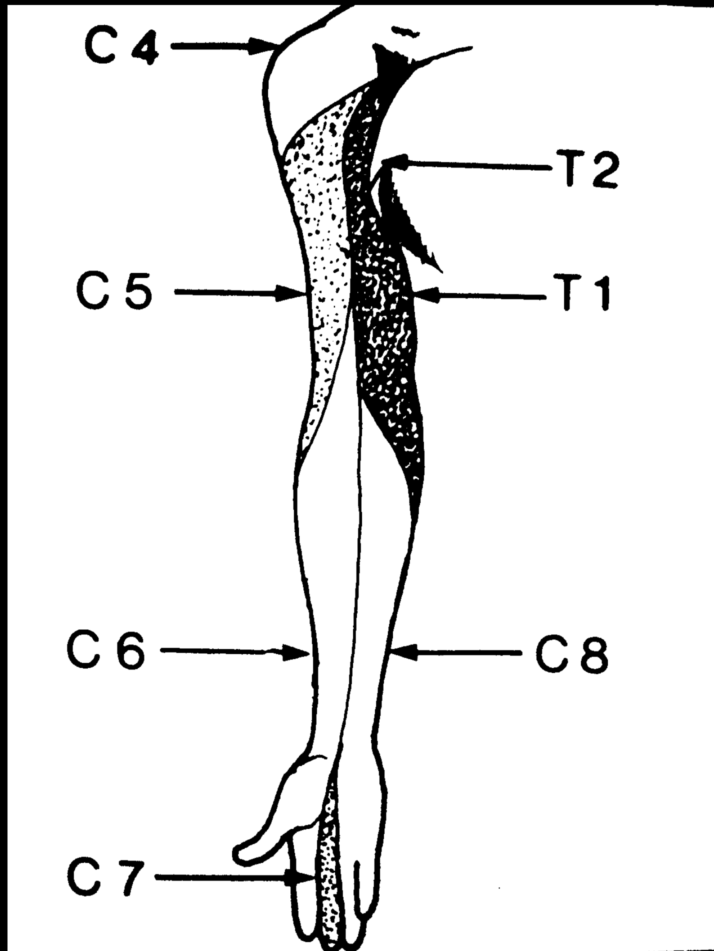
Remember the basics

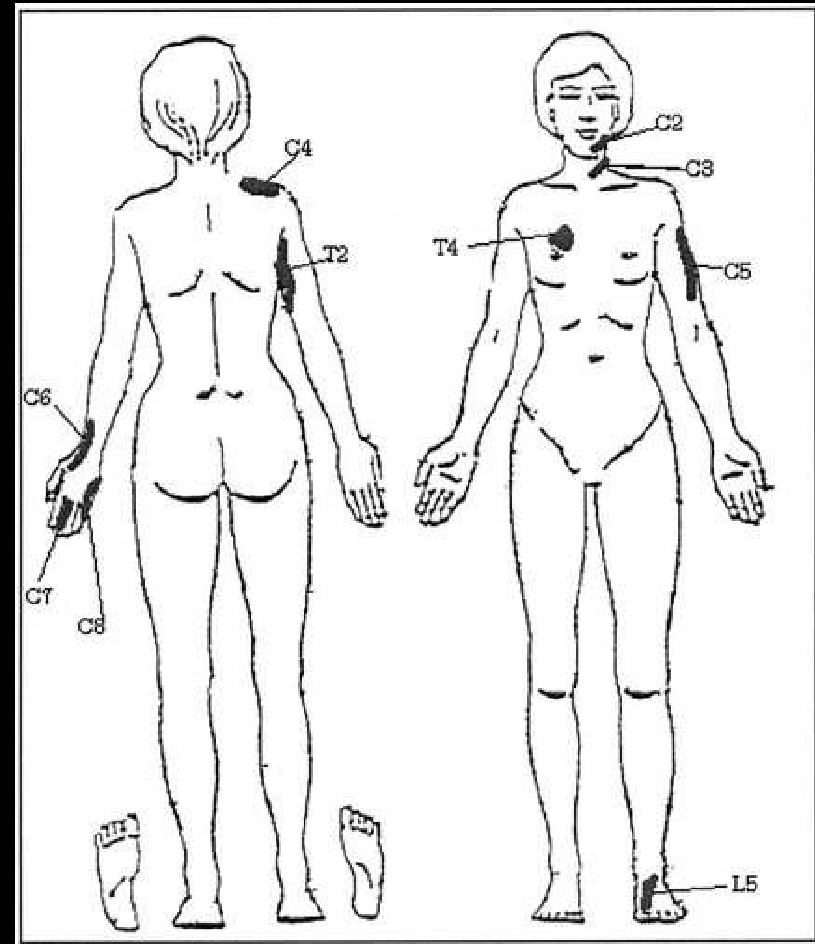


Upper Vs Lower Motor Neurone

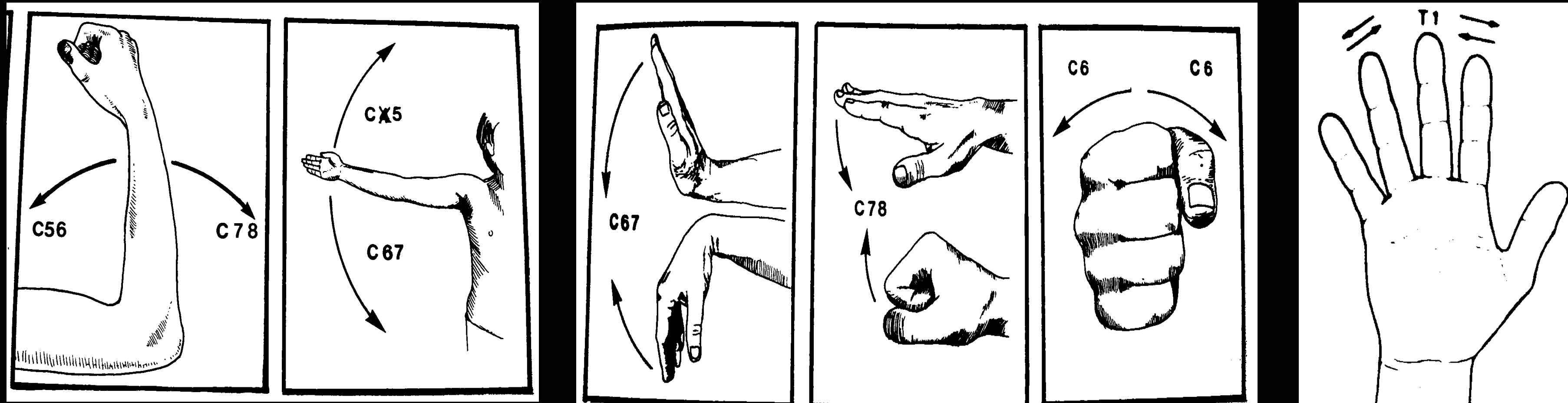
Examine Upper & Lower limbs

Dermatomes





Myotomes



MRC grading

0 Nil
1 Flicker no movement
2 Gravity eliminated
3 Against gravity
4 Gravity + resistance – NOT NORMAL
5 Normal

Reflexes

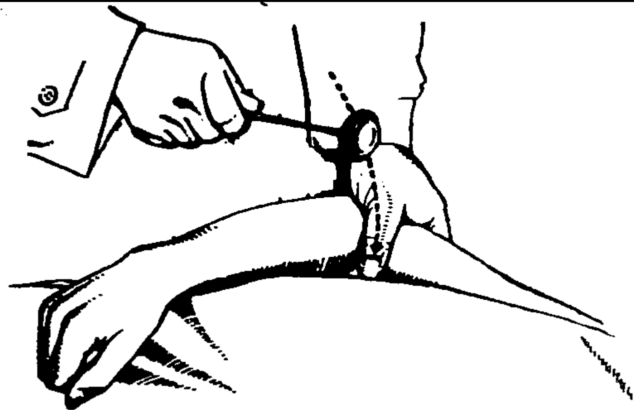


Fig. 8.19 Eliciting the biceps jerk, C.5 (C.6).

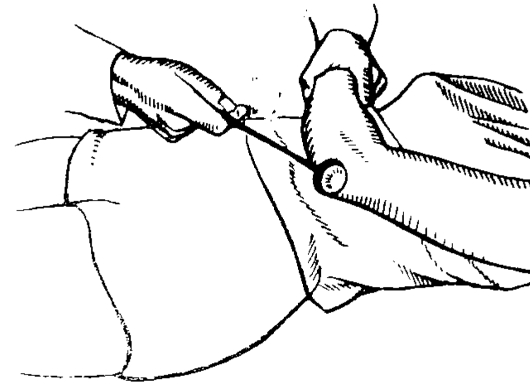


Fig. 8.20 Eliciting the triceps jerk, C.6, C.7.

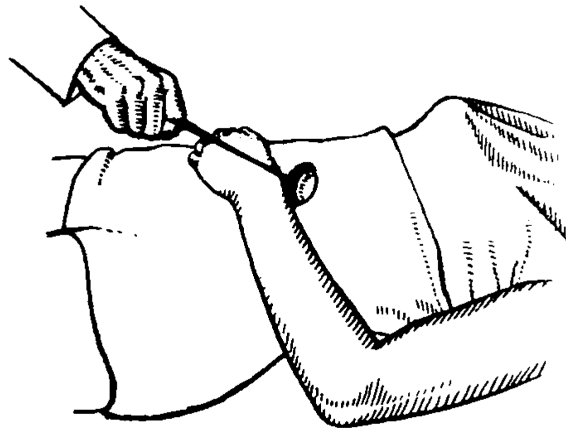


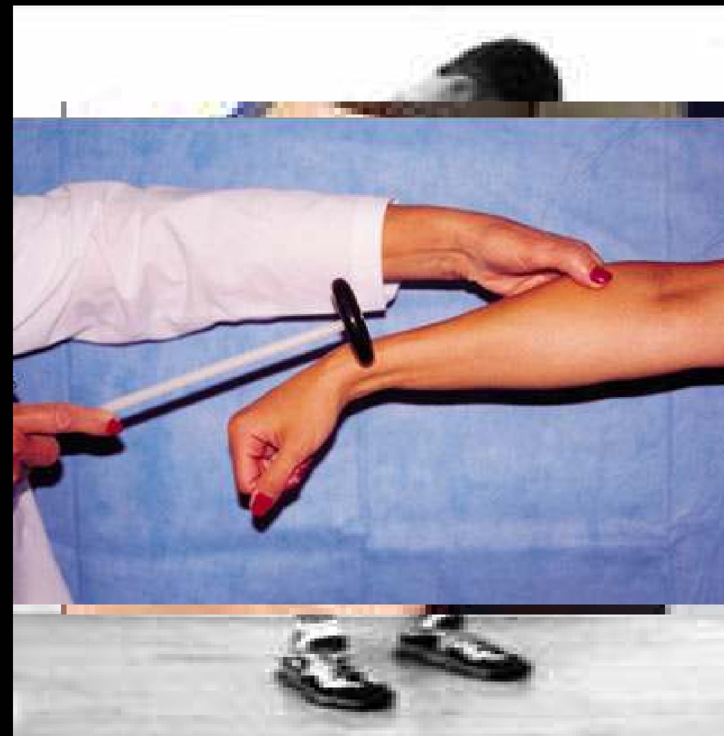
Fig. 8.21 Eliciting the supinator jerk, (C.5), C.6.

‘Special tests’

Gait
Rombergs test

Hoffmann’s sign
Inverted reflexes

L’Hermitte’s sign
Plantar response
Ankle clonus
Proprioception
Vibration

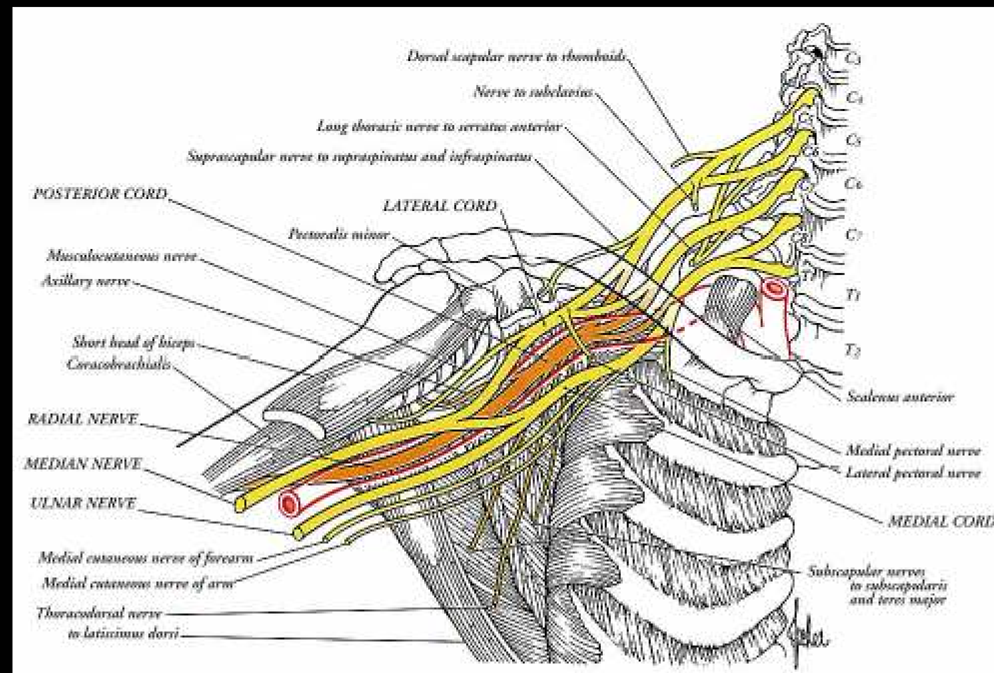


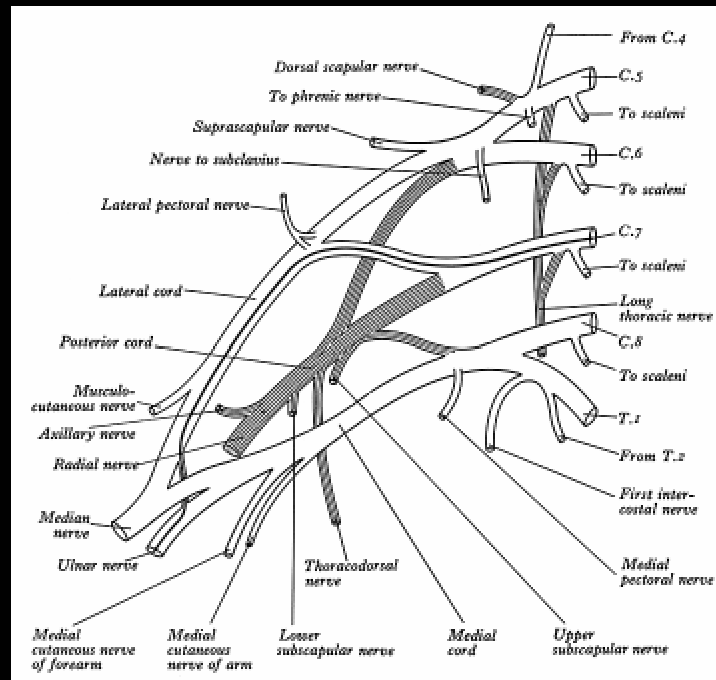
Waddell's signs

- Tenderness
  - Superficial, nonanatomical
- Simulation
  - Axial load, whole body rotation
- Distraction
  - SLR supine vs sitting
- Regional
  - Weakness, sensory
- Overreaction

Summary

- Remember the basics
- Search for the subtle
- Develop a system & be obsessive
- Patient selection vital


Dorsal scapular nerve to rhomboids
Nerve to subclavius
Long thoracic nerve to serratus anterior
Suprascapular nerve to supraspinatus and infraspinatus
POSTERIOR CORD
LATERAL CORD
Pectoralis minor
Musculocutaneous nerve
Axillary nerve
Short head of biceps
Coracobrachialis
RADIAL NERVE
MEDIAN NERVE
ULNAR NERVE
Medial cutaneous nerve of forearm
Medial cutaneous nerve of arm
Thoracodorsal nerve
to latissimus dorsi
C3
C4
C5
C6
C7
T1
T2
Scalenus anterior
Medial pectoral nerve
Lateral pectoral nerve
MEDIAL CORD
Subscapular nerves
to subscapularis
and teres major


From C.4
Dorsal scapular nerve
C.5
To phrenic nerve
To scaleni
Suprascapular nerve
C.6
Nerve to subclavius
To scaleni
Lateral pectoral nerve
C.7
To scaleni
Lateral cord
Long thoracic nerve
Posterior cord
C.8
To scaleni
Musculo-cutaneous nerve
T.1
Axillary nerve
From T.2
Radial nerve
First inter-costal nerve
Median nerve
Ulnar nerve
Thoracodorsal nerve
Medial pectoral nerve
Medial cutaneous nerve of forearm
Medial cutaneous nerve of arm
Lower subscapular nerve
Medial cord
Upper subscapular nerve

STANDARD NEUROLOGICAL CLASSIFICATION OF SPINAL CORD INJURY

MOTOR

KEY MUSCLES

	R	L	
C2			
C3			
C4			
C5			Elbow flexors
C6			Wrist extensors
C7			Elbow extensors
C8			Finger flexors (distal phalanx of middle finger)
T1			Finger abductors (little finger)
T2			
T3			
T4			
T5			
T6			
T7			
T8			
T9			
T10			
T11			
T12			
L1			
L2			Hip flexors
L3			Knee extensors
L4			Ankle dorsiflexors
L5			Long toe extensors
S1			Ankle plantar flexors
S2			
S3			
S4-5			Voluntary anal contraction (Yes/No)
TOTALS	+	=	MOTOR SCORE
(MAXIMUM)	(50)	(50)	(100)

0 = total paralysis
1 = palpable or visible contraction
2 = active movement, gravity eliminated
3 = active movement, against gravity
4 = active movement, against some resistance
5 = active movement, against full resistance
NT= not testable

SENSORY

KEY SENSORY POINTS

	LIGHT TOUCH R	LIGHT TOUCH L	PIN PRICK R	PIN PRICK L
C2				
C3				
C4				
C5				
C6				
C7				
C8				
T1				
T2				
T3				
T4				
T5				
T6				
T7				
T8				
T9				
T10				
T11				
T12				
L1				
L2				
L3				
L4				
L5				
S1				
S2				
S3				
S4-5				
(MAXIMUM)	(56)	(56)	(56)	(56)

0 = absent
1 = impaired
2 = normal
NT= not testable

Any anal sensation (Yes/No)

TOTALS { + = PIN PRICK SCORE (max: 112)

+ = LIGHT TOUCH SCORE (max: 112)

* Key Sensory Points

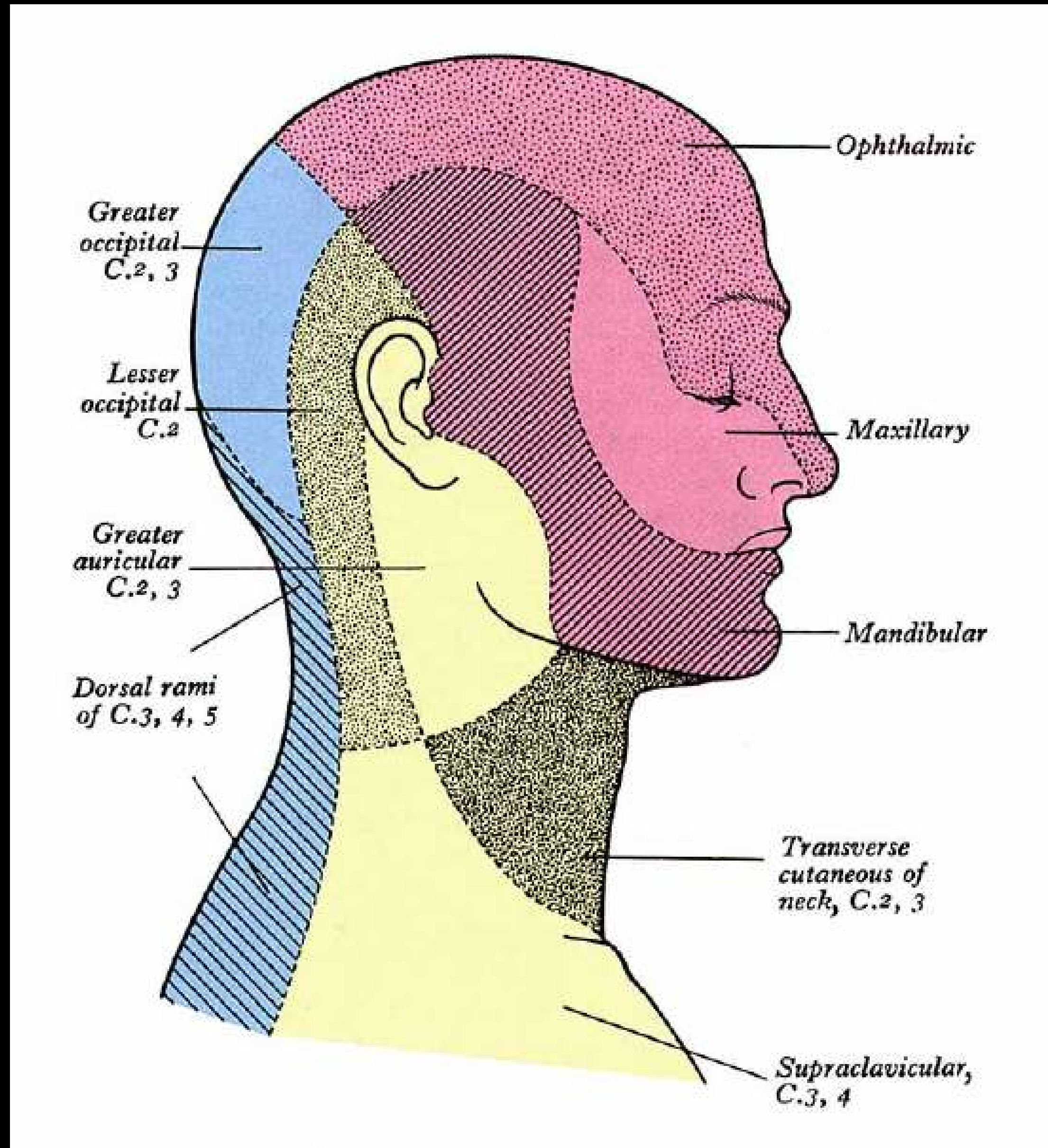
NEUROLOGICAL LEVELS		R	L
The most caudal segment with normal function	SENSORY		
	MOTOR		

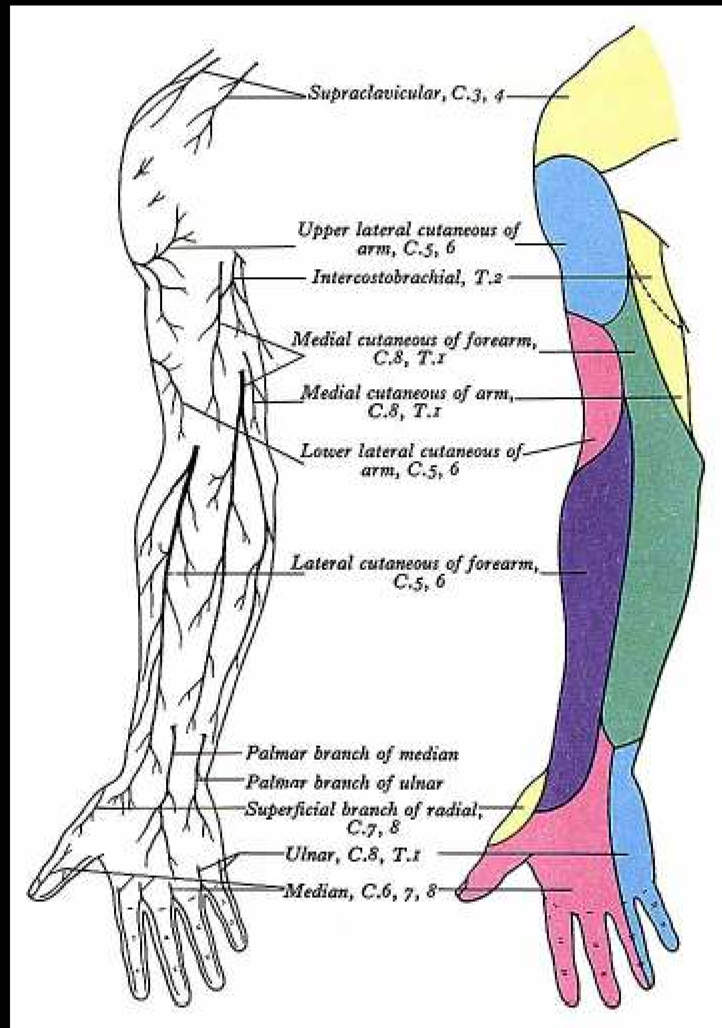
COMPLETE OR INCOMPLETE?

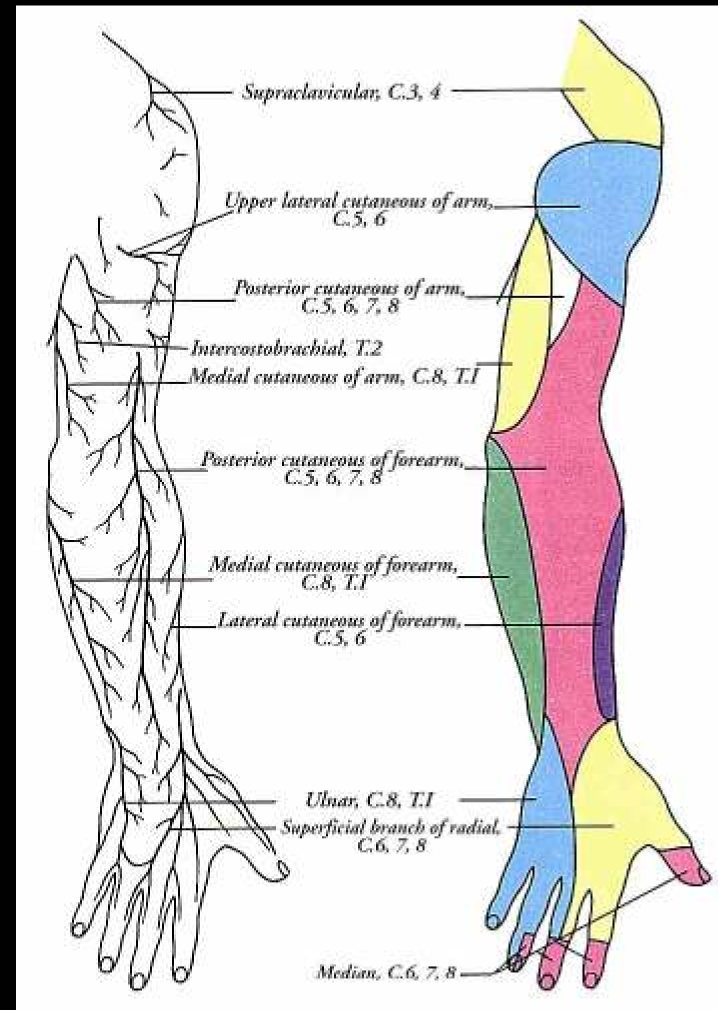
Incomplete = Any sensory or motor function in S4-S5

ASIA IMPAIRMENT SCALE

ZONE OF PARTIAL PRESERVATION		R	L
Partially innervated segments	SENSORY		
	MOTOR		


Ophthalmic
Greater occipital C.2, 3
Lesser occipital C.2
Maxillary
Greater auricular C.2, 3
Mandibular
Dorsal rami of C.3, 4, 5
Transverse cutaneous of neck, C.2, 3
Supraclavicular, C.3, 4


Supraclavicular, C.3, 4
Upper lateral cutaneous of arm, C.5, 6
Intercostobrachial, T.2
Medial cutaneous of forearm, C.8, T.1
Medial cutaneous of arm, C.8, T.1
Lower lateral cutaneous of arm, C.5, 6
Lateral cutaneous of forearm, C.5, 6
Palmar branch of median
Palmar branch of ulnar
Superficial branch of radial, C.7, 8
Ulnar, C.8, T.1
Median, C.6, 7, 8


Supraclavicular, C.3, 4
Upper lateral cutaneous of arm, C.5, 6
Posterior cutaneous of arm, C.5, 6, 7, 8
Intercostobrachial, T.2
Medial cutaneous of arm, C.8, T.1
Posterior cutaneous of forearm, C.5, 6, 7, 8
Medial cutaneous of forearm, C.8, T.1
Lateral cutaneous of forearm, C.5, 6
Ulnar, C.8, T.1
Superficial branch of radial, C.6, 7, 8
Median, C.6, 7, 8