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Impairment Ratings for Upper Extremities Peripheral Nerve Disorders (PND)

To Rate PND Impairments, Neurological Examination Findings Must be Present at MMI

"Only individuals with an objectively verifiable diagnosis should qualify for a permanent impairment rating. The diagnosis should be documented by electromyography as well as sensory and nerve conduction studies." **–** AMA Guides, (pg. 493)

A permanent neurologic impairment is any anatomic, physiological, or functional abnormality or loss that remains after maximum medical improvement (MMI). AMA Guides requires that physicians, before estimating the extent of any impairment, establish an accurate diagnosis. The primary requirement is the confirmation of the presence or absence of specific pathology or loss of organ function. Neurodiagnostic studies are an integral part of this process.

The entrapment of a major peripheral nerve or one of its branches is reflected by a disturbance of a specific motor, sensory, or autonomic function. In order to receive a permanent impairment, the complaints of pain and loss of sensation have to be consistent, reproducible, and in the defined anatomic pathway of the spinal nerve, brachial plexus or major peripheral nerve that is diseased. - AMA Guides, (pg. 481)

The diagnosis of entrapment/compression neuropathy is based on (1) the history and symptoms; (2) objective clinical signs and findings on detailed examination; and (3) documentation by electroneuromyography studies. Standard roentgenograms and more involved imaging studies are also useful**.** AMA Guides, (pgs. 492 to 495)

A detailed neurologic examination enables the physician to identify the location of nervous system impairment. The purpose of ancillary (diagnostic) testing is to assess the severity and location of the lesion and confirm the underlying pathology. It is important to remember that an abnormality found on ancillary testing (anatomic or physiologic) is an impairment but is not necessarily assigned an impairment rating if functions needed for activities of daily living are not affected. AMA Guides Sec. 13.1b (pg. 306)

Nerve conduction and needle electromyography (EMG) studies help to determine which nerves are involved and their anatomic location. Skillful differentiation of peripheral neuropathy and neuromuscular disorders may also be possible. These tests are objective and require minimal cooperation from the individual being tested. They reflect pathology in the largest, fastest-conducting nerve fibers. **The interpretation of these tests must be correlated with a detailed neurologic evaluation**. AMA Guides (pg. 307)

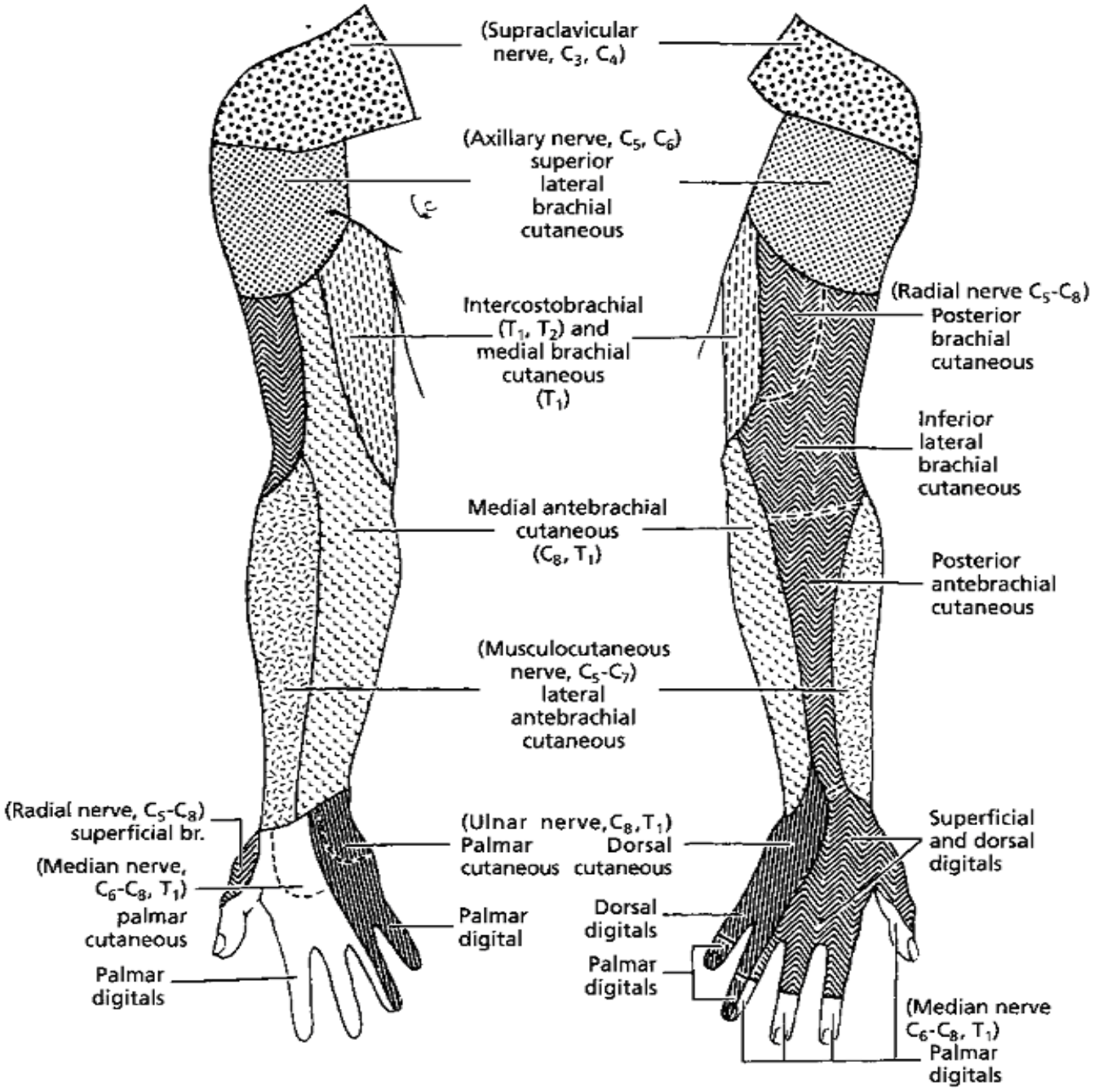
- **AMA Guides Section 16.5 & 16.5a (pg. 480):** *"Accurate diagnosis of peripheral nerve disorders is based on a detailed history, a thorough physical examination with special emphasis on the nervous and vascular system, and appropriate diagnostic tests including a variety of electrical and imaging studies.*

  The evaluation of permanent impairment resulting from peripheral nerve disorders is based on the anatomic distribution and severity of loss of function resulting from (1) sensory deficits or pain and (2) motor deficits or loss of power. "

Impairment Ratings for Upper Extremities Peripheral Nerve Disorders (PND)

"The pathology that affects the PNS produces signs and symptoms in the extremities that are specific to the level of area of injury." Only unequivocal and permanent sensory deficits are given permanent impairment ratings. Lesions of an individual nerve produce symptoms and signs in the distribution of the involved nerve." AMA Guides Section 16.3 (pgs. 445, 446); Section 16.5, pg. (480). (AMA Disability Evaluation 2nd Edition (pg. 481))

AMA Guides 5th - Figure 16-48 (pg. 488)
(AMA Disability Evaluation (2nd Edition), Figure 35-2)



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Substantial Medical Evidence Analysis of Reported Physician Impairment

Doctor:_____ Report Date:_____

Upper Extremities Peripheral Nerve Disorders Impairments (PND) Checklist

Electrodiagnostic Testing- EMG/Nerve Conduction Studies

- **Testing Standards: *Guides*, pg. 10, 307, 493 & Section 16.5 PND**

AMA Guides Clinical & Rating Criteria	MMI Medical Findings
Electromyogram (EMG) measures the electrical activity of a muscle. Detects signs of blocking or slowing down of responses to nerve stimulation. Shows how well the muscle receives nerve stimulation.	
Tested Extremity: Right Left Both	
Upper Extremity Temperature at 32 ° C (89.6 F.) Reported?	
Tester a Board Certified Technician? http://www.aanem.org/	
EMG indicative of a Focal neuropathy? Affected Nerve:	
Median Nerve / Ulnar Nerve / Radial Nerve	
Multiple Focal Neuropathies? Generalized Neuropathy?	
EMG indicative underlying polyneuropathy? (Vocational?)	
Degree of nerve involvement: Partial or Complete?	
Contralateral extremity asymptomatic or symptomatic?	
Confirmation of PND: EMG provides objective evidence to support symptoms and clinical findings	
Focal PND Diagnosis: Confirmed by EMG Studies (needle & cutaneous) as well as sensory and motor NCS	
Nerve Conduction Study: Measures how quickly electrical impulses move along a nerve. It is often done at the same time as an electromyogram, in order to exclude or detect muscle disorders.	
Were motor and sensory latencies, conduction velocities, H reflex & F wave properly evaluated?	
Amplitudes Decreased Level?	
CNAP & SNAP Responses? / Focal Demyelination? [1]	
Proximal & Distal Amplitude Loss?	
Results of Sensory NCS? / Results of Motor NCS?	
Other pathologic nerve compression ruled out: Peripheral neuropathy? Cervical radiculopathy?	
Neurological Examination & Ancillary Clinical Testing: Objective clinical signs and findings on detailed examination Sec. 16.1b (pg. 434) & Sec. 13.1b (pg.305)& Sec. 13.10, Table 13-25 (pg. 352)	
Diminished sensation motor weakness and reflexes tested?	
Multiple tests used to reproduce symptoms? - Tinel Sign - Phalen's Median Nerve Compression – Other?	
• **MMI Medical Findings:**	
Examination findings correlate to the EMG/NCS findings? [2]	
Pre-existing non-vocational causation factors addressed?	
Differential Diagnosis? Causation Apportionment? [3]	

[1] *Longitudinal demyelination is typical of a generalized peripheral neuropathy.*

[2] *If motor weakness or sensory loss findings present; Are substantial amounts of conduction block (moderate neuropathy) and actual axon loss (severe neuropathy) or a combination of both present*

[3] *Diabetes, arthritis, alcoholism, renal disease, hormonal changes, malnutrition, obesity, alcohol abuse, systematic neurologic disorders/diseases or hypothyroidism?* AMA Guides, pgs 480, 491

Substantial Medical Evidence Analysis of Reported Physician Impairment

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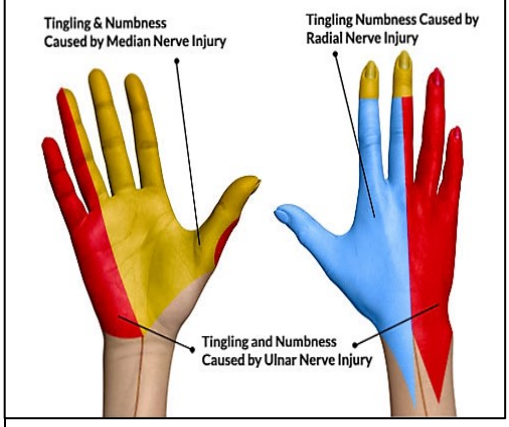
Upper Extremities Peripheral Nerve Disorders Impairments (PND) Checklist

Substantial Medical Evidence - AMA Guides, Section 16.5 PND / Neuropathies

Neurological Examination : Physical Findings, Clinical Tests & Measurements at MMI

- Testing Standards: *Guides*, pg. 10, 307, 493 & AMA Disability Evaluation 2nd Edition (pg. 459)

Sensory Testing – AMA 5th, Section 16.5, pg. 480, 481, 482

AMA Guides Clinical & Rating Criteria	MMI Medical Findings
Two-Point Discrimination Test: Provides information on the shortest distance between two points that the patient can perceive as being touched with two versus one point.	
Evaluation of **2-Point Discrimination Testing** on the pulp of all the digits for both hands? AMA Guides (pg. 449) 	No reporting that all the digits of both hands tested or that there was any sensory loss in any of the other digits innervated by the ulnar or radial nerve.
 **Median Nerve** - Numbness, tingling, pain present on the palmar surface of the 3½ radial digits (thumb, index, middle and radial aspect of the ring finger). **Ulnar Nerve** - Symptoms & signs; Palmar side of the little finger (5th digit) & adjacent ½ of the ring finger (4th digit). **Radial Nerve** - Symptoms & signs; Back of the hand (thumb, index & middle fingers)	
Sensory deficit in a dermatomal distribution?	
Sensory Loss Results by Two Point Discrimination Test:	
Within Normal Range (5mm)	
Fair Results	
Poor Results	
Protective Sensibility	
Anesthetic	
Type of sensory loss for other digits?	
Consistency Testing -7 of 10 responses were accurate?	

2-Point Discrimination Testing [1, 2]		
Test Criteria –AMA 5th, pgs. 446, 483		**Supports Grade Classification** (Table 16-10, pg. 482)
Results	**Interpretation**	
< **6mm**	**Normal**	**5** (No Nerve Impairment)
6-10mm	Fair	4-3
11-15mm	Poor	2
One Point Perceived	Protective Sensibility	1
No Points Perceived	Anesthetic	0

[1] Static 2-Point Discrimination Testing: With vision occluded the points are applied longitudinally.

[2] Moving 2-Point Discrimination Testing: Testing is carried out in a proximal to distal direction. *Following nerve repair, return or moving two-point discrimination precedes static two-point discrimination by several months.*

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Upper Extremities Peripheral Nerve Disorders Impairments (PND) Checklist

Substantial Medical Evidence - AMA Guides, Section 16.5 PND / Neuropathies

Neurological Examination : Physical Findings, Clinical Tests & Measurements at MMI

- Testing Standards: *Guides*, pg. 10, 307, 493 & AMA Disability Evaluation 2nd Edition (pg. 459)

Sensory Testing – AMA 5th, Section 16.5, pg. 480, 481, 482 (cont.)

AMA Guides Clinical & Rating Criteria	MMI Medical Findings
"The use of the Semmes-Weinstein touch-pressure threshold monofilament test may be a helpful adjunct to the two-point discrimination test to help assess changes in light-touch sensibility." - AMA 5th, pg. 482:	
Semmes-Weinstein Touch Pressure Monofilament Testing: This is a cutaneous threshold pressure test. Test provides information on protective sensation, rigorous system can detect relatively minor differences in sensory function, and changes will occur early in nerve compression. A set of 5 nylon monofilaments attached to a lucite rod are marked with a number that ranges from 2.83 to 6.65 that represent the logarithm of 10 times the force (in milligrams) required to bow the filament. They test along a continuum of touch sensibility from light touch, to moderate pressure to deep pressure.	
 Evaluator uses monofilaments to assess light touch? Peripheral Nerve Distribution Tested?: (Median, Ulnar, Radial)	
Objective sensory deficit for which Nerve Distribution?	
Results for Sensory Loss by Semmes-Weinstein Test	
• Within Normal Range?	
• Diminished Light Touch (Tactile Sensation)?	
• Reduced Protective Sensation?	
• Loss of Protective Sensation?	
• Un-testable: No response, No Sensation	
Differential Diagnoses: Has physician considered diminished values for individuals older than 55 years of age? Diabetic Neuropathy? De Quervain's Tenosynovitis? Chronic Inflammatory Demyelinating Polyradiculoneruopathy? Alcohol (Ethanol) Related Neuropathy? (toxic, metabolic, inflammatory or infectious)	

Semmes-Weinstein Touch Pressure Monofilament Test [1]

Monofilament Test Criteria			
Monofilament Size	Bending Forces (Grams)	**Interpretation**	**Supports Grade Classification**
1.65 to 2.83	.008 to .07	Normal to Light Touch	5
3.22 to 3.61	.16 to .40	Diminished Light Touch	4-3 [2]
3.84 to 4.31	.60 to 2.0	Diminished Protective Sensation	2
4.56 to 6.65	4.0 to 300.	Loss of Protective Sensation	1
> 6.65	`	No response, No Sensation	0

[1] *The use of the Semmes-Weinstein touch pressure threshold monofilaments test adjunct to the Two-Point Discrimination Test helps assess changes in light touch sensibility.* - AMA Guides, Sec. 16.5b, pg. 482 &445

[2] ***Grade 3 classification requires that both the Light Touch and Two-point Discrimination be positive for sensory abnormalities.*** - AMA Guides Table 16-10, (pg. 482)

Substantial Medical Evidence Analysis of Reported Physician Impairment
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Upper Extremities Peripheral Nerve Disorders Impairments (PND) Checklist

Substantial Medical Evidence - AMA Guides, Section 16.5 PND / Neuropathies

Neurological Examination : Physical Findings, Clinical Tests & Measurements at MMI

Sensory Testing – AMA 5th, Section 16.5, pg. 480, 481, 482 (cont.)

Table 16-10: Grading Sensory Deficits/Pain - AMA Guides, pg. 482

This table is to be used for pain that is due to *nerve injury* or disease that has been documented with objective physical findings or electrodiagnostic abnormalities. *It is not to be used for pain in the distribution of a nerve that has not been injured* except in diagnosed cases of complex regional pain syndromes.

"This table is to be used for pain that is due to nerve injury or disease that has been documented with objective physical findings or electrodiagnostic abnormalities. It is not to be used for pain in the distribution of a nerve that has not been injured..." AMA Guides pg. 482

a. Classification:

Grade	Description of % Sensory Grade Sensory Deficit or Pain	% Of Sensory Deficit
Grade 4	Distorted superficial tactile sensibility with or without minimal abnormal sensations or pain that is forgotten during activity - Diminished Light Touch Testing, i.e., Semmes-Weinstein.	1-25 %
Grade 3	Distorted superficial tactile sensibility with some abnormal sensations or slight pain, that interferes with some activities - Diminished Light Touch And Two-Point Discrimination Test	26-60 %
Grade 2	Decreased superficial cutaneous pain and tactile sensibility with abnormal sensations or moderate pain that may prevent some activities. (Decreased Protective Sensibility)	61-80%
**Individuals in grade 2 have decreased protective sensibility, which is defined as a conscious appreciation of pain, temperature, or pressure before tissue damage results from the stimulus. It is possible to have a gross appreciation of two-point discrimination (11-15 mm) at this level. Individuals in grade 1 have no protective sensibility*		
Grade 1	Deep cutaneous pain sensibility present; absent superficial pain and tactile sensibility with abnormal sensations or severe pain that prevents most activity. (Absent Protective Sensibility)	81-99%
Grade 0	Absent sensibility, abnormal sensations, 100 or severe pain that prevents all activity	100%

b. Procedure

1. Identify area of involvement using the cutaneous Innervation chart (Fig. 16-48) or the dermatome chart (Fig. 16-49).
2. Identify the nerve structure(s) that innervate the area(s) (Table 16-12 and Figures 16-48, 16-49, and 16-50).
3. Grade the severity of the sensory deficit or pain according to the classification given above (a). Use clinical judgment to select the appropriate percentage from the range of values shown for each severity grade.
4. Find the maximum upper extremity impairment value due to sensory deficit or pain for each nerve structure involved: major peripheral nerves (Table 16-15).
5. Multiply the severity of the sensory deficit by the Maximum upper extremity impairment value to obtain the upper extremity impairment for each nerve structure involved.

Grade Assigned? Table use documented with objective physical findings or electrodiagnostic abnormalities?	**Reasons provided for the specific % of deficit used?, Section 2.6ab, (pg. 22)**

If Grade 3 ≤ or less given, are both the Light Touch and 2-Point Discrimination Tests positive?

Examination Findings at MMI

Substantial Medical Evidence Analysis of Reported Physician Impairment

Doctor:_____ Report Date:_____

Substantial Medical Evidence - AMA Guides, Section 16.5 PND / Neuropathies

Neurological Examination : Physical Findings, Clinical Tests & Measurements at MMI

- Testing Standards: *Guides*, pg. 10, 307, 493 & AMA Disability Evaluation 2nd Edition (pg. 459)

Motor Deficits & Loss of Power – AMA 5th, Section 16.5, pg. 480 to483

AMA Guides Clinical & Rating Criteria	MMI Medical Findings

Grading Motor Loss & Power Deficits –Guides Table 16-11, pg. 484

Grade	Description of Muscle Function	Deficit
Grade 5	Complete Active Range of Motion Against Gravity with full resistance	00%
Grade 4	Complete active range of motion against gravity with some resistance	1-25 %
Grade 3	Complete active range of motion against gravity only, without resistance	26-60%
Grade 2	Complete active range of motion against gravity with gravity eliminated	61-80%
Grade 1	Evidence of slight contractility; no joint movement	81-99%
Grade 0	Evidence of slight contractility; no joint movement	100%

b. Procedure

1. . Identify the motion involved, such as flexion, extension, etc.
2. Identify the muscle(s) performing the motion and the motor nerve(s) involved.
3. Grade the severity of motor deficit of individual muscles according to the classification given above.
4. Find the maximum impairment of the upper extremity due to motor deficit for each nerve structure involved: major peripheral nerves (Table 16-1 5).
5. *Multiply* the severity of the motor deficit by the maximum impairment value to obtain the upper extremity impairment for each structure involved.

Grade Assigned? Table use documented with objective physical findings or electrodiagnostic abnormalities?	
Reasons provided for the specific % of deficit used? AMA Guides, pg. 22 – Section 2.6ab	
Evaluator examined all muscle groups, identifying which are weak if motor deficits or loss of power is present?	
Is weakness neurogenic (EMG) or due to pain and/or decreased effort?	
Do the EMG studies confirm motor function of a specific muscle or group of muscles? - AMA 5th Ed, pg. 484	
Does the motor examination reveal atrophy of abductors and adductors of the fingers (interrossei), abductor pollicis and ulnar lumbricales?	
Is the clinical evidence supportive of physician's determination that the motor weakness is due to the loss of nerve function and not pain? AMA Guides, pg. 484.	
Late Stage Findings - Does the motor examination reveal atrophy of the thenar eminence muscles at the base of the thumb? 	
Weakness of the abductor pollicis brevis and opponents pollicis muscles?	
Was the 'extensor digitorum brevis; examined?	
Was pinch and grip properly evaluated?	
Are circumferences of pertinent musculature provided?	
Radial Neuropathy	
Weakness of the extensor muscles of the wrist fingers and thumb?	

Substantial Medical Evidence - AMA Guides, Section 16.5 PND / Neuropathies

Neurological Examination : Physical Findings, Clinical Tests & Measurements at MMI

- Testing Standards: *Guides*, pg. 10, 307, 493 & AMA Disability Evaluation 2nd Edition (pg. 459)

Clinical Corroboration Checklist

Table 16-12A&B Refer to AMA Guides 5th , (pgs. 485 &486)

FUNCTIONS OF THE UPPER EXTREMITIES PERIPHERAL NERVE * †

Nerve Root	Sensory	Pain	Reflex	Motor	(R)	(L)
Musculocutaneous Nerve (very rarely damaged)	Lateral Forearm to Wrist	Lateral Forearm	Biceps Jerk	Elbow Flexion with elbow fully supinated (biceps & brachialis)		
Suprascapular Nerve (Direct blow to neck base)	Posterolateral Shoulder	Posterolateral Shoulder & Periscapular Region		Supraspinatus (Initiates Abduction) & Infraspinatus Muscle (externally rotates arm)		
Axillary Nerve (dislocated shoulder, deep IM injection)	Over Deltoid (Small area)	Across Shoulder Tip	None	Second 90^0 of shoulder abduction (deltoid) (teres minor cannot be evaluated)		
Radial Nerve (Crutch Palsy)	Lateral dorsal forearm Back of 1st & 2nd finger	Dorsum(back) of thumb & index finger	Triceps & Supinator jerk	Elbow Extension (Triceps) Wrist Extension / Finger Extension Elbow Flexion, half supinated (brachioradialis)		
Median Nerve (Carpal Tunnel / Wrist Trauma)	Lateral Palm & lateral fingers	1st, 2nd and 3rd digits Spreads up forearm	Finger Jerks	Wrist Flexors / Pronators of Forearm Long Finger Flexors (1st, 2nd & 3rd) Abductor Pollicis Brevis		
Ulnar Nerve (elbow: trauma, bed rest, # olecranon) (wrist: local trauma, ganglion of wrist joint)	Medial Palm 5th digit and medial half of 4th	Ulnar supplied fingers and palm distal to the wrist	None	All small hand muscles except APB. However injury at elbow seems to preferentially affect first dorsal interosseous muscle flexor carpi ulnaris (clinical evidence of involvement unusual) Finger flexors (medial 2 fingers). Again clinical involvement unusual		

*See Table 16-10a to grade sensory deficit or pain.
† See Table 16 11a to grade motor deficit.

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Friday, October 7, 2016