

Guide to *the Guides*:
Evaluator's Resource Algorithm to the
AMA Guides to the
Evaluation of Permanent Impairment, Fifth Ed.
- Musculoskeletal, Nervous System and Pain

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Preface

This resource is designed to simplify use of the *AMA Guides to the Evaluation of Permanent Impairment* and improve the accuracy of ratings. The reality is that there is no easy way to learn the *AMA Guides* but this is an approach at perhaps making it a little simpler. It is critical that you keep the *AMA Guides* 5th Edition available as you review this resource. We have provided you with a format such that if the examiner answers the questions and fills out the integrated fill-in squares and check off boxes, the examiner should at least identify and address all possible issues for an *AMA Guides* impairment evaluation. We welcome your feedback.

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Orientation

The *AMA Guides to the Evaluation of Permanent Impairment, Fifth Edition* is the standard for rating impairment. Physicians and others are trying to learn it and then apply it in a fair and equitable manner.

It is imperative that the physician understand and follow the principles of the *Guides*. Chapter 1 Philosophy, Purpose and Appropriate Use of the *Guides* and Chapter 2 Practical Applications of the *Guides* define standards that apply to all ratings. The individual chapters define principles of assessment and the rating process.

Maximal Medical Improvement (MMI) or Permanent and Stationary (P&S)

The examinee **must be at maximal medical improvement (MMI)**, the equivalent of Permanent and Stationary (P&S), to produce an impairment rating. It is necessary to determine that the patient is stable, and that no further restoration of function is probable. If the examinee shows up and is in the middle of a flare-up or has had a new injury that interferes with the examination, it is premature to do an impairment rating. In other words, the examinee must be stabilized medically for the physician to fairly assess the impairment rating. If the condition is changing or likely to improve substantially with medical treatment, the impairment is not permanent and should not be rated. For example, an examinee has a known industrial injury problem, but the day before the examination is in an auto accident and has increased complaints. An impairment rating examination that is a fair representation of the examinee at MMI status in this situation cannot be done. Assuming the examinee has reached MMI and is not having a flare-up or other problem, the physician can go forward with the impairment rating.

Activities of Daily Living (ADL)

Impairment percentages or ratings are estimates that reflect the severity of the medical condition and the degree to which the impairment decreases an individual's ability to perform common activities of daily living (ADL), *excluding* work. Throughout the AMA Guides, the examiner is given the opportunity to adjust the Impairment Rating based on the extent of any ADL deficits (5th ed., Table 1-2, 4). The following are typical ADLs.

- Self-care & personal hygiene
 - Urinating, defecating, brushing teeth, combing hair, bathing, dressing oneself, eating
- Communication
 - Writing, typing, seeing, hearing, speaking
- Physical activity
 - Standing, sitting, reclining, walking, climbing stairs
- Sensory function
 - Hearing, seeing, tactile feeling, tasting, smelling
- Nonspecialized hand activities
 - Grasping, lifting, tactile discrimination
- Travel
 - Riding, driving, flying
- Sexual function
 - Orgasm, ejaculation, lubrication, erection
- Sleep
 - Restful, nocturnal sleep pattern

Chapter 13 – The Central and Peripheral Nervous System

Overview

This chapter provides criteria for evaluating permanent impairments due to documented dysfunction of the brain, cranial nerves, spinal cord, nerve roots, and/or peripheral nerves and muscles. It is comprised of the following sections:

- 13.1 Principles of Assessment
- 13.2 Criteria for Rating Impairments Due to Central Nervous System Disorders
- 13.3 Criteria for Rating Cerebral Impairments
- 13.4 Criteria for Rating Impairments of the Cranial Nerves
- 13.5 Criteria for Rating Impairments of Station, Gait, and Movement Disorders
- 13.6 Criteria for Rating Impairments of Upper Extremities Related to Central Impairment
- 13.7 Criteria for Rating Spinal Cord and Related Impairments
- 13.8 Criteria for Rating Impairments Related to Chronic Pain
- 13.9 Criteria for Rating Impairments of the Peripheral Nervous System, Neuromuscular Junction, and Muscular System
- 13.10 Nervous System Impairment Evaluation Summary

Criteria for Rating Impairment Due to Central Nervous System Disorders

Ratings are provided only for documented central nervous system dysfunction, when at maximum medical improvement. This section is not used solely for subjective complaints.

The following are considered in rating central nerve system disorder impairment, as explained in Sections 13.2 (5th ed., 308) and 13.3 (5th ed., 309-327)

- (1) State of consciousness and level of awareness, whether permanent or episodic;
 - a. See Table 13-2 (5th ed., 309), (Criteria for Rating Impairment of Consciousness and Awareness - 13.3a (5th ed., 309);
 - b. Table 13-3 (5th ed., 312), (Criteria for Rating Impairment Due to Episodic Loss of Consciousness or Awareness – 13.3b (5th ed., 311); and
 - c. Table 13-4 (5th ed., 317), (Criteria for Rating Impairment Due to Sleep and Arousal Disorders – 13.3c (5th ed., 317).
- (2) Mental status evaluation and integrative functioning - 13.3d (5th ed., 319);
 - a. Table 13-6 (5th ed., 320), Criteria for Rating Impairment Related to Mental Status.
- (3) Use and understanding of language – 13.3e (5th ed., 322); and
 - a. Table 13-7 (5th ed., 323), Criteria for Rating Impairment Due to Aphasia or Dysphasia.
- (4) Influence of behavior and mood – 13.3f (5th ed., 325).
 - a. Table 13-8 (5th ed., 325), Criteria for Rating Impairment Due to Emotional or Behavioral Disorders

Step #1: Each AMA *Guides* Table (13-2, 3, 4, 6, 7, 8 - see below for page numbers) has a description and it is your task to pick the category that best fits the impairment. Each category has a percentage range as well and the number you choose should be a function of whether the impairment is closer to the category above or below and how ADLs are affected (the greater ADL loss, the higher the range).

When you have considered the 4 categories, fill in the following Criteria for Rating Cerebral Impairments Form. You need to identify the most severe cerebral impairment from these four categories to be used to determine a cerebral impairment rating. There may be impairment in all four categories but you only take the highest impairment rating from the most severe category.

Criteria for Rating Cerebral Impairments Form (Tables (13-2, 3, 4, 6, 7, 8 - see below for page numbers)

| | | WPI Percentage |
|--|--|----------------|
| 1. State of consciousness and level of awareness, whether permanent or episodic | Impairment of Consciousness and Awareness (page 309) | |
| | Impairment Due to Episodic Loss of Consciousness or Awareness (page 312) | |
| | Impairment Due to Sleep and Arousal Disorders (page 317) | |
| | | |
| 2. Mental status evaluation and integrative functioning | Impairment Related to Mental Status (page 320) | |
| | | |
| 3. Use and understanding of language | Impairment Due to Aphasia or Dysphasia (page 323) | |
| | | |
| 4. Influence of behavior and mood | Impairment Due to Emotional or Behavioral Disorders (page 325) | |
| | Highest impairment rating from the most severe category | |
| | | |

Table 13-2 State of consciousness and level of awareness, whether permanent or episodic (5th ed., 309)

Table 13-3 Criteria for Rating Impairment Due to Episodic Loss of Consciousness or Awareness (5th ed., 312)

Table 13-4 Criteria for Rating Impairment Due to Sleep and Arousal Disorders (5th ed., 317)

Table 13-5 Clinical Dementia Rating (CDR) (5th ed., 320)

Note: To use the CDR, score the individual’s cognitive function for each category (M, O, JPS, CA, HH, and PC) independently. The maximum CDR score is 3. Memory is considered the primary category; the other categories are secondary. If at least three secondary categories are given the same numeric score as memory, then CDR = M. If three or more secondary categories are given a score greater or less than the memory score, CDR = the score of the majority of secondary categories unless three secondary categories are scored on one side of M and two secondary categories are scored on the other side of M. In this case, CDR = M.

Table 13-6 Criteria for Rating Impairment Related to Mental Status (5th ed., 320)

Table 13-7 Criteria for Rating Impairment Due to Aphasia or Dysphasia (5th ed., 323)

Table 13-8 Criteria for Rating Impairment Due to Emotional or Behavioral Disorders (5th ed., 325)

Step #2: Your next task is to combine the most severe impairment from categories 1 through 4 from the Criteria for Rating Cerebral Impairments Form that you just completed with any or multiple distinct neurologic impairments listed in Table 13-1 (5th ed., 308, using the Combined Values Chart, p. 604. The distinct neurologic impairments are as follows:

- Cranial nerve impairments
- Station, gait, and movement disorders
- Extremity disorders related to central impairment
- Spinal cord impairments
- Chronic pain
- Peripheral nerve, motor, and sensory impairments

Criteria for Rating Impairments of the Cranial Nerves

Criteria for Rating Impairments of the Cranial Nerves – 13.4 (5th ed., 327)

| | WPI |
|--|-----|
| I—the Olfactory Nerve – 13.4a (5th ed., 327) | |
| II—the Optic Nerve – 13.4b (5th ed., 327) | |
| III, IV, and VI—the Oculomotor, Trochlear, and Abducens Nerves -13.4c (5th ed., 330) | |
| V—the Trigeminal Nerve – 13.4d (5th ed., 330) | |
| VII—the Facial Nerve – 13.4e (5th ed., 332) | |
| VIII—the Vestibulocochlear Nerve – 13.4f (5th ed., 333) | |
| IX and X—the Glossopharyngeal and Vagus Nerves – 13.4g (5th ed., 334) | |
| XI—the Spinal Accessory Nerve – 13.4h (5th ed., 334) | |
| XII—the Hypoglossal Nerve – 13.4i (5th ed., 334) | |
| Combine all of the above using the CVC | |

- I—the Olfactory Nerve – 13.4a (5th ed., 327) (circle only one)

| |
|-----|
| 1 % |
| 2 % |
| 3 % |

- II—the Optic Nerve – 13.4b (5th ed., 327) (fill in %):

| |
|---|
| % |
|---|

- III, IV, and VI—the Oculomotor, Trochlear, and Abducens Nerves -13.4c (5th ed., 330) (fill in %) (also see Chapter 12).

| |
|---|
| % |
|---|

- V—the Trigeminal Nerve – 13.4d (5th ed., 330) (fill in %).

| |
|---|
| % |
|---|

- VII—the Facial Nerve – 13.4e (5th ed., 332) (fill in %).

| |
|---|
| % |
|---|

- VIII—the Vestibulocochlear Nerve – 13.4f (5th ed., 333) (fill in %).

%

- IX and X—the Glossopharyngeal and Vagus Nerves – 13.4g (5th ed., 334) (fill in %).

%

- XI—the Spinal Accessory Nerve – 13.4h (5th ed., 334) (fill in %).
 - Is Voice/Speech impaired? Go to ENT Chapter (Table 11.8) to enter Voice impairment.
 - Is Head Turning Impaired? Use Cervical ROM Method in Spine Chapter.
 - Is Shoulder Motion Impaired? Use Upper Extremity Chapter for Shoulder

%

- XII—the Hypoglossal Nerve – 13.4i (5th ed., 334) (fill in %).

%

Criteria for Rating Impairments of Station, Gait, and Movement Disorders (remember you are in Chapter 13 and an Impairment should involve The Central and Peripheral Nervous System)

Criteria for Rating Impairments of Station, Gait, and Movement Disorders – 13.5 (5th ed., 336)

- Problems maintaining balance and a stable **GAIT** can develop from a CNS or peripheral neurologic impairment. Impairment ratings for station and gait disorders are determined according to the effect on ambulation (see Table 13-15 (5th ed., 336) (fill in %).

GAIT

%

MOVEMENT DISORDERS are assessed for their interference with ADLs as described for the lower extremities in Tables 13-15 (5th ed., 336, for one upper extremity in Table 13-16 (5th ed., 338, and for two upper extremities in Table 13-17, 340.

- **MOVEMENT DISORDERS**
 - Lower extremities _____%
 - One upper extremity _____%
 - Two upper extremities _____%
 - Use the CVC Table (5th ed., 602) (fill in %).

%

Criteria for Rating Impairments of Upper Extremities Related to Central Impairment (remember you are in Chapter 13 and an Impairment should involve The Central and Peripheral Nervous System)

Criteria for Rating Impairments of Upper Extremities Related to Central Impairment – 13.6 (5th ed., 338)

- Use Tables 13-16 (5th ed., 338), for one extremity and Table 13-17 (5th ed., 340), for involvement of both upper extremities for rating upper extremity dysfunction from any lesion in the brain manifested by weakness, tremor, or pain that affects ADL.
 - One Extremity _____%
 - Two Extremities _____%

| | |
|--|---|
| | % |
|--|---|

Criteria for Rating Spinal Cord and Related Impairments (remember you are in Chapter 13 and an Impairment should involve The Central and Peripheral Nervous System such as with a spinal tumor or other spinal cord insult but if there is an associated Spine (bone) injury, then Chapter 15, The Spine, should be used with the DRE Method combining the corticospinal “spinal cord” impairment in that Chapter)

Criteria for Rating Spinal Cord and Related Impairments – 13.7 (5th ed., 340)

| | WPI |
|---|-----|
| Respiratory System Neurologic Impairments | |
| Urinary System Neurologic Impairments | |
| Anorectal System Neurologic Impairments | |
| Sexual System Neurologic Impairments | |
| Combine all of the above using the CVC | |

- **Respiratory System Neurologic Impairments – 13.7a** (5th ed., 341)
 - Neurologic impairment of one’s ability to breathe is considered in Table 13-18 (5th ed., 341), only in terms of neurologic limitations. Other aspects of respiratory function are covered in Chapter 5, The Respiratory System (fill in %).

| | |
|--|---|
| | % |
|--|---|

- **Urinary System Neurologic Impairments – 13.7b** (5th ed., 341)
 - The ability to control bladder emptying provides the criterion for evaluating permanent bladder impairment resulting from spinal cord and central nervous system disorders (see Table 13-19 (5th ed., 341) (fill in %).

| | |
|--|---|
| | % |
|--|---|

- **Anorectal System Neurologic Impairments** – 13.7c (5th ed., 342)
 - The ability to control emptying provides the criterion for evaluating permanent impairment of the anus and rectum due to spinal cord or other neurologic dysfunction (see Table 13-20 (5th ed., 342) (fill in %).

[] %

- **Sexual System Neurologic Impairments** – 13.7d (5th ed., 342)
 - Awareness and capability of having an orgasm are the criteria for evaluating permanent impairment of sexual functioning that may result from spinal cord or other neurologic system disorders (see Table 13-21 (5th ed., 342) (fill in %).

[] %

Criteria for Rating Impairments Related to Chronic Pain

Criteria for Rating Impairments Related to Chronic Pain (causalgia, posttraumatic neuralgia, and RSD – also termed CRPS) – 13.8 (5th ed., 342)

These conditions can also be assessed in Chapter 16, The Upper Extremities. If the examiner chooses to assess impairment from both chapters, the approach that appears most appropriate for the case is selected; both methods cannot be combined. It is important that there be an objective basis for the pain complaints, otherwise Chapter 18 is applicable Complex Regional Pain Syndrome and diagnostic criteria are discussed in Section 16.5e (5th ed., 495-497).

- For upper extremity involvement, use Table 13-22 (5th ed., 342) If two upper extremities are involved, calculate each limb WP% and then combine using the CVC Table (5th ed., 602).
 - Right _____%
 - Left _____%

Use the CVC Table (5th ed., 602), to Combine (fill in %) for upper extremity involvement:

[] %

- For lower extremity involvement, use the station and gait impairment criteria given in Table 13-15 (5th ed., 336) (fill in %).

[] %

Use the CVC Table (5th ed., 602), to Combine (fill in %) for upper and lower extremity involvement.

Criteria for Rating Impairments of the Peripheral Nervous System, Neuromuscular Junction, and Muscular System

Criteria for Rating Impairments of the Peripheral Nervous System, Neuromuscular Junction, and Muscular System 13.9 (5th ed., 344)

Most of the time rating of peripheral nerve injuries will be based on approaches in Chapter 16 The Upper Extremities and Chapter 17 The Lower Extremities, rather than this section. This section is more often used when the peripheral nerve dysfunction is related to a neurological illness, as opposed to injury. Note, as opposed to Chapter 16, “classes” instead of “grades” are used to rate deficits, and the ordering is inverse.

Evaluating the peripheral nervous system requires documentation of the extent of loss of function due to sensory deficit, pain, or discomfort; loss of muscular strength and control of specific muscles or groups of muscles; and alteration of autonomic nervous system (ANS) control.

Spinal nerves are evaluated by loss of function in the peripheral nerve that receives contribution from the involved spinal root. If two or more spinal roots are involved, the increased loss of function from the contribution of two spinal roots to a peripheral nerve necessitates that the impairment be rated according to the brachial plexus (see Section 13.9b).

Roots of (single) Spinal Nerves – 13.9a (5th ed., 345)

- Calculation of the sensory deficit or pain is estimated according to Table 13-23, Classification and Procedure for Determining Impairment Due to Pain or Sensory Deficit Resulting From Peripheral Nerve Disorders (5th ed., 346).
 - There are four classes, with class 2, 3, & 4 having a percentage range.
 - Pick the percentage based on ADL deficits.
- Calculate the motor deficit according to 13-24, Classification and Procedure for Determining Nervous System Impairment Due to Loss of Muscle Power and Motor Function Resulting From Peripheral Nerve Disorders (5th ed., 348).
 - There are four classes, with class 2, 3, & 4 having a percentage range.
 - Pick the Deficit Percentage based on ADL deficits.

| Nerves | Sensory Deficit or Pain Grade | | | | Strength Grade | | | |
|------------------------|-------------------------------|-----------|---------------|-----------|----------------|-----------|---------------|-----------|
| | Right | | Left | | Right | | Left | |
| | Class | Deficit % | Class | Deficit % | Class | Deficit % | Class | Deficit % |
| Spinal Nerve Root – C5 | 0 1 2 3 4 5 6 | | 0 1 2 3 4 5 6 | | 0 1 2 3 4 5 6 | | 0 1 2 3 4 5 6 | |
| Spinal Nerve Root – C6 | 0 1 2 3 4 5 6 | | 0 1 2 3 4 5 6 | | 0 1 2 3 4 5 6 | | 0 1 2 3 4 5 6 | |
| Spinal Nerve Root – C7 | 0 1 2 3 4 5 6 | | 0 1 2 3 4 5 6 | | 0 1 2 3 4 5 6 | | 0 1 2 3 4 5 6 | |
| Spinal Nerve Root – C8 | 0 1 2 3 4 5 6 | | 0 1 2 3 4 5 6 | | 0 1 2 3 4 5 6 | | 0 1 2 3 4 5 6 | |
| Spinal Nerve Root – T1 | 0 1 2 3 4 5 6 | | 0 1 2 3 4 5 6 | | 0 1 2 3 4 5 6 | | 0 1 2 3 4 5 6 | |
| Spinal Nerve Root – L3 | 0 1 2 3 4 5 6 | | 0 1 2 3 4 5 6 | | 0 1 2 3 4 5 6 | | 0 1 2 3 4 5 6 | |
| Spinal Nerve Root – L4 | 0 1 2 3 4 5 6 | | 0 1 2 3 4 5 6 | | 0 1 2 3 4 5 6 | | 0 1 2 3 4 5 6 | |
| Spinal Nerve Root – L5 | 0 1 2 3 4 5 6 | | 0 1 2 3 4 5 6 | | 0 1 2 3 4 5 6 | | 0 1 2 3 4 5 6 | |
| Spinal Nerve Root – S1 | 0 1 2 3 4 5 6 | | 0 1 2 3 4 5 6 | | 0 1 2 3 4 5 6 | | 0 1 2 3 4 5 6 | |

Next, these percent deficits in the upper extremity are multiplied by the respective maximum sensory and/or motor impairments of the spinal nerve in question, Table 16-13 (5th ed., 489).

Table 16-13 Maximum Upper Extremity Impairment Due to Unilateral Sensory or Motor Deficits of Individual Spinal Nerves or to *Combined* 100% Deficits (identical to Table 15-17, 424)

| Spinal Nerve | Maximum % Upper Extremity Impairment Due to: | | |
|--------------|--|---------------|--------------------------------|
| | Sensory Deficit or Pain | Motor Deficit | Combined Motor/Sensory Deficit |
| C5 | 5 | 30 | 34 |
| C6 | 8 | 35 | 40 |
| C7 | 5 | 35 | 38 |
| C8 | 5 | 45 | 48 |
| T1 | 5 | 20 | 24 |

For the spinal roots in the lower extremity to determine the maximum lower extremity impairment due to unilateral sensory or motor deficits use Table 15-18 (5th ed., 424).

Table 15-18 Unilateral Spinal Nerve Root Impairment Affecting the Lower Extremity

| Nerve Root Impaired | Maximum % Loss of Function due to Sensory Deficit or Pain | Maximum % Loss of Function due to Strength |
|---------------------|---|--|
| L3 | 5 | 20 |
| L4 | 5 | 34 |
| L5 | 5 | 37 |
| S1 | 5 | 20 |

The sensory and motor impairments are combined using the Combined Values Chart (5th ed., 604) for the total upper extremity impairment, which is then converted to whole person impairment (Table 16-3 (5th ed., 439).

If deficits are bilateral, the whole person impairment is found for each extremity and then combined using the Combined Values Chart (5th ed., 604).

Brachial Plexus – 13.9b (5th ed., 346)

Table 16-14 (5th ed., 490, provides the maximum impairment due to unilateral sensory or motor deficits of the brachial plexus by the entire brachial plexus and the upper, middle, and lower trunks.

If there is partial recovery, individual muscles are graded according to Table 13-24 (5th ed., 348. This value is multiplied by the maximum upper extremity impairment for the nerve innervating the muscle listed in Table 16-15 (5th ed., 492).

Results from all the muscles are combined using the Combined Values Chart, p. 604, and the total upper extremity impairment converted to a whole person impairment, Table 16-3 (5th ed., 439).

Peripheral Nerve Impairments – 13.9c (5th ed., 347) *

This section is used to rate sensory and motor impairments from individual nerve lesions or multiple nerve disorders such as polyneuropathy or mononeuritis multiplex. Grading procedures for sensory and motor impairments resulting from peripheral nerve disorders in the upper and lower extremities are found in Tables 13-23 and 13-24.

Calculate the sensory deficit or pain is estimated according to Table 13-23, Classification and Procedure for Determining Impairment Due to Pain or Sensory Deficit Resulting From Peripheral Nerve Disorders (5th ed., 346).

- There are four classes, with class 2, 3, & 4 having a percentage range.
- Pick the percentage based on ADL deficits.

Calculate the motor deficit according to 13-24, Classification and Procedure for Determining Nervous System Impairment Due to Loss of Muscle Power and Motor Function Resulting From Peripheral Nerve Disorders (5th ed., 348).

- There are four classes, with class 2, 3, & 4 having a percentage range.
- Pick the percentage based on ADL deficits.

This percent impairment is multiplied by the appropriate maximum loss of function for the nerve in question due to sensory deficit and pain or motor deficit, Table 16-15 (5th ed., 492) for the upper extremity and Table 17-37 (5th ed., 552) for the lower extremity.

Sensory and motor impairments of the upper extremity are combined using the Combined Values Chart (5th ed., 604).

The result is converted to whole person impairment, Table 16-3.

If multiple nerves are involved in one extremity, the same procedure is followed for each nerve.

Once the sensory and motor impairments for each nerve have been combined using the Combined Values Chart (5th ed., 604). All the nerves rated in one extremity are combined, again using the Combined Values Chart to determine the total impairment in the affected limb.

If more than one limb is involved, each total extremity impairment is converted to a whole person impairment (Table 16-3, 439), and these values are again combined using the Combined Values Chart (5th ed., 604)

**Cases such as carpal tunnel are rated using the peripheral nerve section in Chapter 16, Upper Extremities.*

| Nerves | Sensory Class / Deficit (%) | | Motor Class / Deficit (%) | |
|---|-----------------------------|---------------|---------------------------|---------------|
| | Right | Left | Right | Left |
| Pectorals (medial and lateral) | | | | |
| Axillary | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 |
| Dorsal scapular | | | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 |
| Long thoracic | | | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 |
| Medial antebrachial cutaneous | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | | |
| Medial brachial cutaneous | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | | |
| Median (above midforearm) | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 |
| Median (anterior interosseous branch) | | | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 |
| Median (below midforearm) | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 |
| Radial palmar digital of thumb | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | | |
| Ulnar palmar digital of thumb | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | | |
| Radial palmar digital of index finger | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | | |
| Ulnar palmar digital of index finger | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | | |
| Radial palmar digital of middle finger | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | | |
| Ulnar palmar digital of middle finger | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | | |
| Radial palmar digital of ring finger | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | | |
| Musculocutaneous | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 |
| Radial (upper arm with loss of triceps) | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 |
| Radial (elbow with sparing of triceps) | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 |
| Subscapularis (upper and lower) | | | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 |
| Suprascapular | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 |
| Thoracodorsal | | | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 |
| Ulnar (above midforearm) | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 |
| Ulnar (below midforearm) | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 |
| Ulnar palmar digital of ring finger | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | | |
| Radial palmar digital of little finger | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | | |
| Ulnar palmar digital of little finger | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | | |
| Brachial plexus (C5 through C8, T1) | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 |
| Upper trunk (C5, C6, Erb-Duchenne) | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 |
| Middle trunk (C7) | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 |
| Lower trunk (C8, T1, Déjerine-Klumpke) | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 |

| Nerves | Sensory Class / Deficit (%) | | Motor Class / Deficit (%) | | Dysesthesia Class / Deficit (%) | |
|---------------------------|-----------------------------|---------------|---------------------------|---------------|---------------------------------|---------------|
| | Right | Left | Right | Left | Right | Left |
| Femoral | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 |
| Obturator | | | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | | |
| Superior gluteal | | | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | | |
| Inferior gluteal | | | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | | |
| Lateral femoral cutaneous | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | | | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 |
| Sciatic | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 |
| Common peroneal | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 |
| Superficial peroneal | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | | | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 |
| Sural | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | | | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 |
| Medial plantar | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 |
| Lateral plantar | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 | 0 1 2 3 4 5 6 |

| Class | Sensory Deficit or Pain Grade | Deficit (%) | Strength Grade | Deficit (%) |
|-------|--|-------------|--|-------------|
| 1 | No loss of sensibility, abnormal sensation, or pain | 0 | 1 Active movement against gravity with full resistance | 0 |
| 2 | Normal sensation except for pain, or decreased sensation with or without pain, forgotten during activity | 1 - 10 | 2 Active movement against gravity with some resistance | 1 -25 |
| 3 | Normal sensation except for pain, or decreased sensation with or without pain, present during activity | 11 - 25 | 3 Active movement against gravity only, without resistance | 26 – 50 |
| 4 | Decreased sensation with or without pain, interfering with activity | 26 - 60 | 4 Active movement with gravity eliminated | 51 – 75 |
| 5 | Decreased sensation with or without pain or minor causalgia that may prevent activity | 61 - 80 | 5 Slight contraction and no movement | 76 – 99 |
| 6 | Decreased sensation with severe pain or major causalgia that prevents activity | 81 - 95 | 6 No movement | 100 |

Neuromuscular Impairments – 13.9d (5th ed., 351)

Neuromuscular impairment as present in longstanding myasthenia gravis or myasthenic syndromes is accompanied by proximal weakness; impairment is rated by the impact on activities of daily living.

For the lower extremities, station and gait are rated as described in activities of Table 13-15 (5th ed., 336).

- There are four classes, with class 2, 3, & 4 having a percentage range.
- Pick the percentage based on ADL deficits.

The upper extremities are rated using Tables 13-16 (5th ed., 338, for one extremity and Table 13-17 (5th ed., 340) for both upper extremities.

- There are four classes, with class 2, 3, & 4 having a percentage range.
- Pick the percentage based on ADL deficits.

13.9e Muscular Impairments – 13.9e (5th ed., 351)

This is a varied group of disorders with proximal weakness best rated by ADL changes that includes muscular dystrophy, metabolic myopathy, abnormal potassium metabolism and muscle disease, endocrine myopathies, and inflammatory muscle disease.

For the lower extremities, station and gait are rated as described in activities of Table 13-15 (5th ed., 336).

- There are four classes, with class 2, 3, & 4 having a percentage range.
- Pick the percentage based on ADL deficits.

The upper extremities are rated using Tables 13-16 (5th ed., 338) for one extremity and Table 13-17 (5th ed., 340), for both upper extremities.

- There are four classes, with class 2, 3, & 4 having a percentage range.
- Pick the percentage based on ADL deficits.

Neuromuscular and muscular impairments otherwise for the lower extremities are rated using Tables 17-6, Impairment Due to Unilateral Leg Muscle Atrophy (5th ed., 530), and Table 17-8, Impairment Due to Lower Extremity Muscle Weakness (5th ed., 532) (Chapter 17).

- Also, Table 13-15 (5th ed., 336), is useful when gait is the most significant impairment from the neuromuscular or muscular disorder.

The Autonomic Nervous System – 13.9f (5th ed., 351)

- Neurologic conditions that have ANS involvement include polyneuropathy of various causes, familial dysautonomia, Landry-Guillain-Barré syndrome, syringomyelia, porphyria, cord and brain tumors, and myelopathy.
- Lack of control of blood pressure, body thermal regulation, and bladder and bowel elimination are prominent signs of ANS failure. Impairments related to transient loss of awareness or consciousness after a period of cerebral ischemia may be due to various mechanisms, including orthostasis, reflex actions, or cardiopulmonary disorders, and may be estimated by means of Table 13-2.
- Referring to other *Guides* chapters also may be necessary to estimate the magnitudes of the impairments (Chapters 3 through 5).
- _____%

Nervous System Impairment Evaluation Summary

Central & Peripheral Nervous System Summary Form

| | WPI |
|--|-----|
| Cerebral Impairments | |
| Cranial nerve impairments | |
| Gait | |
| Movement disorders | |
| Extremity disorders related to central impairment | |
| Spinal cord impairments | |
| Chronic pain (CRPS, causalgia, posttraumatic neuralgia, and RSD) | |
| Peripheral Nervous System, Neuromuscular Junction, and Muscular System | |
| Roots of (single) Spinal Nerves | |
| Peripheral Nerve Impairments (including brachial plexus) | |
| Neuromuscular Impairments | |
| Muscular Impairments | |
| Autonomic Nervous System | |
| Combine all of the above using the CVC Table | |

Principles of Assessment

The examiner must follow the standards defined in Section 15.1 Principles of Assessment (5th ed., 374-379) for history, physical examination and imaging studies. Standards for the physical examination are defined in Table 15-1 (5th ed., 375).

Determining the Appropriate Method for Assessment

The first step is to **choose the DRE (Diagnosis-Related Estimates) or ROM (Range of Motion) Method.**

The **DRE method** is the principal methodology used to evaluate an individual who has had a distinct injury. When the cause of the impairment is not easily determined and if the impairment can be well characterized by the DRE method, the evaluator should use the DRE method.

The **ROM method** is used in several situations. First, when an impairment is not caused by an injury, if the cause of the condition is uncertain and the DRE method does not apply, or an individual cannot be easily categorized in a DRE class. It is acknowledged that the cause of impairment (injury, illness, or aging) cannot always be determined. The reason for using the ROM method under these circumstances must be carefully supported in writing. Second, when there is multilevel involvement in the same spinal region (eg, fractures at multiple levels, or disk herniations or stenosis with radiculopathy at multiple levels or bilaterally). Third, where there is alteration of motion segment integrity (eg, fusions) at multiple levels in the same spinal region, unless there is involvement of the corticospinal tract (then use the DRE method for corticospinal tract involvement). Fourth, where there is recurrent radiculopathy caused by either a new (recurrent) disk herniation or a recurrent injury in the same spinal region. Fifth, where there are multiple episodes of other pathology producing alteration of motion segment integrity and/or radiculopathy.

Evaluate the case.

- Are there fractures at more than one level in a spinal region? No Yes
- Is there radiculopathy bilaterally or at multiple levels in the same spinal region? No Yes
- Is there multilevel motion segment alteration (such as a multilevel fusion) in the same spinal region? No Yes
- Is there recurrent disk herniation or stenosis with radiculopathy at the same or a different level in the same spinal region? No Yes

If any of above are yes, and there is no corticospinal impairment, then rate using the ROM Method

In the small number of instances in which the ROM and DRE methods can both be used, we should evaluate the individual with both methods and award the higher rating. Spinal pain attributed to “cumulative trauma” is a controversial issue, in terms of causation, apportionment, and rating of impairment. The individual evaluator should determine if the DRE method is applicable (i.e. the impairment can be well characterized), or whether the Range of Motion Method is more appropriate. Experts may differ on which method is more applicable.

Diagnosis-Related Estimates Method

The first step in using the DRE Method starts with choosing one of the three areas (Lumbar - Table 15-3 (5th ed., 384), Thoracic - Table 15-4 (5th ed., 389), or Cervical – Table 15-5 (5th ed., 392). Each spine area has five categories and it is your job to pick the category that best describes the examinee's spine condition. How do you do this? You read the descriptions and pick the one that best fits the examinee, based on your assessment and the presence of reliable findings.

The criteria for placement are provided in Box 15-1 Definitions of Clinical Findings Used to Place an Individual in a DRE Category (5th ed., 382-383). In your report you need to provide the rationale for the category you selected. Pick only one Category for each region of the spine. As with all ratings, your impairment must be based on reliable findings.

NB: It is critically important that your physical examination findings specifically document the Clinical Findings noted below.

| Clinical Finding | Category I | Category II | Category III | Category IV | Category V |
|--|------------|-------------|--------------|-------------|------------|
| Muscle Spasm | | + | | | |
| Muscle Guarding | | + | | | |
| Asymmetry of Spinal Motion | | + | | | |
| Nonverifiable Radicular Root Pain | | + | | | |
| Reflex Loss (or marked asymmetry) | | | ± | | |
| Weakness and Loss of Sensation | | | ± | | |
| Atrophy | | | ± | | |
| Radiculopathy | | | + | | |
| Electrodiagnostic Verification of Radiculopathy | | | + | | |
| Alteration of Motion Segment Integrity to include single level fusion) | | | | + | |
| Radiculopathy and Alteration of Motion Segment Integrity | | | | | + |

- except cervical

| Clinical Finding | DRE: Lumbar | DRE: Thoracic | DRE: Cervical |
|--|---------------------------------|---------------------------------|---------------------------------|
| Muscle Spasm | Category II | Category II | Category II |
| Muscle Guarding | Category II | Category II | Category II |
| Asymmetry of Spinal Motion | Category II | Category II | Category II |
| Nonverifiable Radicular Root Pain | Category II | Category II | Category II |
| Reflex Abnormality | Category III (if radiculopathy) | Category III (if radiculopathy) | Category III (if radiculopathy) |
| Weakness and Loss of Sensation | Category III (if radiculopathy) | Category III (if radiculopathy) | Category III (if radiculopathy) |
| Atrophy | Category III (if radiculopathy) | Category III (if radiculopathy) | Category III (if radiculopathy) |
| Radiculopathy | Category III | Category III | Category III |
| Electrodiagnostic Verification of Radiculopathy | Category III | Category III | Category III |
| Alteration of Motion Segment Integrity | Category IV | Category IV | Category IV |
| Radiculopathy and Alteration of Motion Segment Integrity | Category V | Category V | Category IV |

NB: Pick only one Category for each region of the spine

The second step, using these same Tables, is to pick a percentage within that category that you have picked and you have a 3% range to choose from. This is a clinical judgment call on your part and should be based on the degree of Activities of Daily Living (ADL) deficits (if any). “If residual symptoms or objective findings impact the ability to perform ADL despite treatment, the higher percentage in each range should be assigned.” If there are little or no ADL deficits you would choose the lower end but you would choose a higher number (up to 3%) based on increasing ADL deficits. You should provide your rationale in writing by explaining that there are or are not ADL deficits to justify your decision.

DRE Method: Lumbar Spine (Table 15-3 (5th ed., 384))

- DRE Category I (WPI = 0%): _____%
- DRE Category II (WPI = 5-8%): _____%
- DRE Category III: (WPI = 10-13%) _____%
- DRE Category IV: (WPI = 20-23%) _____%
- DRE Category V: (WPI = 25-28%) _____%

_____ %

DRE Method: Thoracic Spine (Table 15-4 (5th ed., 389))

- DRE Category I (WPI = 0%): _____%
- DRE Category II (WPI = 5-8%): _____%
- DRE Category III (WPI = 10-13%): _____%
- DRE Category IV (WPI = 20-23%): _____%
- DRE Category V (WPI = 25-28%): _____%

_____ %

DRE Method: Cervical Spine (Table 15-392 (5th ed., 392))

- DRE Category I (WPI = 0%): _____%
- DRE Category II (WPI = 5-8%): _____%
- DRE Category III (WPI = 15-18%): _____%
- DRE Category IV (WPI = 25-28%): _____%
- DRE Category V (WPI = 35-38%): _____%

_____ %

If you have identified WPI for more than one spine region (cervical, thoracic and/or lumbar), the WPI values should be combined to come up with a spine WPI.

Cervical Thoracic & Lumbar spine WPI:

_____ %

Rating Corticospinal Tract Damage

The third step in using the DRE Method is to ascertain if there is a corticospinal (spinal cord) involvement and if so, then you would then go to Table 15-6, Rating Corticospinal Tract Impairment (5th ed., 396). Corticospinal involvement is relatively rare, and rating by this section must be supported by objective findings of this lesion.

You are then given a number of choices.

- a) Impairment of One Upper Extremity Due to Corticospinal Tract Impairment
NB: You have to be careful to pick dominant or non-dominant extremity
- b) Criteria for Rating Impairments of Two Upper Extremities
- c) Criteria for Rating Impairments Due to Station and Gait Disorders
- d) Criteria for Rating Neurologic Impairment of the Bladder
- e) Criteria for Rating Neurologic Anorectal Impairment
- f) Criteria for Rating Neurologic Sexual Impairment
- g) Criteria for Rating Neurologic Impairment of Respiration

For each of these categories, you have a choice of four Classes (I, II, III, and IV) and you again pick the one that best fits the examinee. As you can see, each Class has a percentage range and this again involves your clinical judgment and you select a percentage impairment (rating) within the given range based on the degree of ADL deficits. Note that for the cervical and thoracic spine, corticospinal deficits involve a spinal cord injury but even for the lumbar area, when there is a cauda equina syndrome involving the nerve roots, this method is still used.

Rating Corticospinal Tract Involvement Table 15-6 (5th ed., 396)

| | | |
|--------------------------|--------------------------------------|--------|
| <input type="checkbox"/> | Impairment of One Upper Extremity | _____% |
| <input type="checkbox"/> | Impairments Two Upper Extremities | _____% |
| <input type="checkbox"/> | Station and Gait Disorders | _____% |
| <input type="checkbox"/> | Neurologic Impairment of the Bladder | _____% |
| <input type="checkbox"/> | Neurologic Anorectal Impairment | _____% |
| <input type="checkbox"/> | Neurologic Sexual Impairment | _____% |
| <input type="checkbox"/> | Neurologic Impairment of Respiration | _____% |
| | Combined Value of Above | _____% |

The corticospinal impairment is combined with the Spine DRE impairment =

| |
|---|
| % |
|---|

Range-of-Motion Method

The Range-of-Motion Method is more challenging. Although called the range-of-motion method, this evaluation method actually consists of three elements that need to be assessed (all of which are combinable): (1) the range of motion of the impaired spine region; (2) accompanying diagnoses (Table 15-7 (5th ed., 404); and (3) any spinal nerve deficit (see pages 423 - 424).

Measuring Range of Motion (ROM)

- Measurements must be obtained using an inclinometer according to the procedures defined in the *Guide* (5th ed., 399-402).
- Consistency should be sought and *inconsistent results should be disregarded*. At least three consecutive measurements should be obtained and averaged. Measurements should not change substantially with repeated efforts. If the average is less than 50°, three consecutive measurements must fall within 5° of the mean; if the average is greater than 50°, three consecutive measurements must fall within 10% of the mean. Motion testing may be repeated up to six times to obtain three consecutive measurements that meet these criteria. If after six measurements inconsistency persists, the spinal motions are considered invalid. You can repeat the tests at a later date or disallow impairment related to that motion. Disallowing impairment will of course have a negative effect on the final impairment rating so it is critically important to explain to the examinee the benefits of providing good and consistent effort.
- Active ROM is done when a person can do the exercises by himself. Active-assisted ROM exercises are done by the person and a helper (this usually means the examiner provides some assistance). Passive ROM exercises are done for a person by a helper (the examiner). Remember that ROM is done actively by the examinee and the examiner should not provide any help or assistance – in other words the ROM exam should not be Passive or Active-assisted.
- Measure the range of motion in the relevant sagittal, frontal (coronal), and transverse planes (Figure 15-7 (5th ed., 402), and determine any angle of ankylosis or any restricted motion that is present. When ankylosis is present, (end-restricted movement), this value, taken as the ankylosis value, is used to determine impairment instead of the ROM. Ankylosis as a basis for impairment deficit is extremely rare. If the motion crosses the neutral position in any plane, the examiner should use the abnormal motion section of the appropriate table to determine the impairment for that plane. This is admittedly a little confusing so perhaps an example would help. For example, an individual who can flex the cervical spine from 30° to 60° but who lacks 30° of motion in reaching the neutral 0° position has restricted end motion and the same estimated impairment as if he or she had fixed ankylosis at 30° of cervical flexion. According to Table 15-12 (page 418), the individual's impairment is 30% of the whole person. On the other hand if cervical flexion (which is normally 50°) was from 0° to 60°, there would be no Impairment, and if it was from 0° to 30° (20° lost and 30° retained – note that the Table in the book is wrong), there would be a 2% Impairment of the Whole Person (see Table 15-12 (page 418).
- There are tables for abnormal motion of the Lumbar, Thoracic and Cervical regions. For each region, you use the tables to come up with a % Impairment of the Whole Person. If there are impairments due to loss of motion in more than one plane in the same spinal region (extension, flexion, or rotation), the impairments are added to determine total impairment due to loss of motion in a spinal region.

Step one for the ROM Method is to measure ROM. Record your findings using the Figures provided in the *Guide*, for the lumbar region Figure 15-10 (5th ed., 410), thoracic region Figure 15-14 (5th ed., 416), and lumbar region Figure 15-18 (5th ed., 422). Values must be consistent and the maximum value is used to define impairment.

CERVICAL SPINE ROM Method

| CERVICAL SPINE (expected normal %) <input type="checkbox"/> Normal exam | Ankylosis | ROM | | |
|---|-----------|-----|----|------------|
| | | C | T1 | True Angle |
| Flexion (50°) | | | | |
| Extension (60°) | | | | |
| Right Lateral Flexion (45°) | | | | |
| Left Lateral Flexion (45°) | | | | |
| Right Rotation (80°) | | | | |
| Left Rotation (80°) | | | | |

THORACIC SPINE ROM Method

| THORACIC SPINE (expected normal %) <input type="checkbox"/> Normal exam | Ankylosis | ROM | | |
|---|-----------|-----|-----|------------|
| | | T1 | T12 | True Angle |
| Flexion (45°) | XXXXXX | | | |
| Extension (0°) | XXXXXX | | | |
| Left Rotation (30°) | | | | |
| Right Rotation (30°) | | | | |

LUMBAR SPINE ROM Method

| LUMBAR SPINE (expected normal) <input type="checkbox"/> Normal exam | Ankylosis | ROM | | |
|---|-----------|-----|--------|------------|
| | | T12 | S1 | True Angle |
| Flexion (60°) ‡ | XXXXX | | | |
| Extension (25°) ‡ | XXXXX | | | |
| Right Lateral Flexion (25°) | | | | |
| Left Lateral Flexion (25°) | | | | |
| Right Straight Leg Raising† | XXXXX | | XXXXXX | |
| Left Straight Leg Raising† | XXXXX | | XXXXXX | |

‡Repeat the ROM at least three times and at most six times for flexion and extension to obtain a valid measurement set (three consecutive, reproducible measurements). Only the true lumbar spine flexion and extension angles need to be consistently measured within 5° if the average is less than 50°, or within 10% if the average is greater than 50°. The impairment is based on the maximum true extension and flexion angles from within the three measurements.

†If tightest SLR ROM exceeds sum of sacral flexion and extension by more than 15 degrees, lumbar flexion and extension measurements are invalid (assumes sacral flexion and extension are less than normal). *Note:* This accessory validity test is useful only when sacral flexion plus extension is less than the average for normal individuals (i.e., 65° for women and 55° for men).

Step two for the ROM Method is to clarify the Specific Spine Disorders.

Specific Spine Disorders

This is solely a component of the Range of Motion Method, and is never combined with the DRE Method.

After you have completed measuring the ROM and used the various tables to determine the Whole Person Impairment (WPI), it is time to go to Table 15-7 Criteria for Rating Whole Person Impairment Percent Due to Specific Spine Disorders (5th ed., 404). Use Table 15-7 to determine the percentage impairment for the part of the ROM diagnosis-based method. If there are two or more diagnoses within a spinal region, use that which is most significant. Here is a list of the Disorders in Table 15-7.

- I. Fractures
- II. Intervertebral disk or other soft-tissue lesion
- III. Spondylolysis and spondylolisthesis, not operated on
- IV. Spinal stenosis, segmental instability, spondylolisthesis, fracture, or dislocation, operated on

So, you have picked the single disorder that is most significant and you have used the Table to come up with a % Impairment of the Whole Person. Don't forget for II and IV to add for multiple levels and for multiple operations, as appropriate.

SPINE DIAGNOSIS (Table 15-7 Criteria for Rating Whole Person Impairment Percent Due to Specific Spine Disorders to Be Used as Part of the ROM Method* (5th ed., 404).

I. Fractures

- A. Compression of one vertebral body
 - o 0%-25%
 - o 26%-50%
 - o > 50%
- B. Fracture of posterior element (pedicle, lamina, articular process, transverse process).
- C. Reduced dislocation of one vertebra.

II. Intervertebral disk or other soft-tissue lesion

Diagnosis must be based on clinical symptoms and signs and imaging information.

- A. Unoperated on, with no residual signs or symptoms.
- B. Unoperated on, with medically documented injury, pain, and rigidity* associated with none to minimal degenerative changes on structural tests
 - o Structural tests include radiographs, myelograms with and without CT scan, CT scan and MRI with and without contrast, and diskogram with and without CT scan (* The phrase "medically documented injury, pain, and rigidity" implies not only that an injury or illness has occurred but also that the condition is stable, as shown by the evaluator's history, examination, and other diagnostic data, and that a permanent impairment exists, which is at least partially due to the condition being evaluated.)
- C. Unoperated on, stable, with medically documented injury, pain, and rigidity* associated with moderate to severe degenerative changes on structural tests;† includes herniated nucleus pulposus with or without radiculopathy.
- D. Surgically treated disk lesion without residual signs or symptoms; includes disk injection.
- E. Surgically treated disk lesion with residual, medically documented pain and rigidity.
- F. Multiple levels, with or without operations and with or without residual signs or symptoms
- G. Multiple operations with or without residual signs or symptoms

III. Spondylolysis and spondylolisthesis, not operated on

- A. Spondylolysis or grade I (1%-25% slippage) or grade II (26%-50% slippage) spondylolisthesis, accompanied by medically documented injury that is stable, and medically documented pain and rigidity with or without muscle spasm.
- B. Grade III (51%-75% slippage) or grade IV (76%-100% slippage) spondylolisthesis, accompanied by medically documented injury that is stable, and medically documented pain and rigidity with or without muscle spasm.

IV. Spinal stenosis, segmental instability, spondylolisthesis, fracture, or dislocation, operated on

- A. Single-level decompression without spinal fusion and without residual signs or symptoms.
 - B. Single-level decompression without spinal fusion with residual signs or symptoms.
 - C. Single-level spinal fusion with or without decompression without residual signs or symptoms.
 - D. Single-level spinal fusion with or without decompression with residual signs and symptoms.
 - E. Multiple levels, operated on, with residual, medically documented pain and rigidity
- Number of Operations:** Cervical spine: ___ / Thoracic spine: _____ / Lumbar spine: _____

Affected Levels Form

| | Compression Fracture (1a) | | | Fracture of Posterior Element (1b) | Dislocation (1c) | Spinal Stenosis [IV(e)] | Intervertebral Disk [2(f)] |
|-----|---------------------------|----------|------|------------------------------------|------------------|-------------------------|----------------------------|
| | 0 – 25% | 26 – 50% | >50% | | | | |
| C1 | | | | | | | C1 – C2 |
| C2 | | | | | | | C2 – C3 |
| C3 | | | | | | | C3 – C4 |
| C4 | | | | | | | C4 – C5 |
| C5 | | | | | | | C5 – C6 |
| C6 | | | | | | | C6 – C7 |
| C7 | | | | | | | C7 – T1 |
| T1 | | | | | | | T1 – T2 |
| T2 | | | | | | | T2 – T3 |
| T3 | | | | | | | T3 – T4 |
| T4 | | | | | | | T4 – T5 |
| T5 | | | | | | | T5 – T6 |
| T6 | | | | | | | T6 – T7 |
| T7 | | | | | | | T7 – T8 |
| T8 | | | | | | | T8 – T9 |
| T9 | | | | | | | T9 – T10 |
| T10 | | | | | | | T10 – T11 |
| T11 | | | | | | | T11 – T12 |
| T12 | | | | | | | T12 – L1 |
| L1 | | | | | | | L11 – L2 |
| L2 | | | | | | | L2 – L3 |
| L3 | | | | | | | L3 – L4 |
| L4 | | | | | | | L4 – L5 |
| L5 | | | | | | | L5 – S1 |

Step three of the ROM Method is to note any Spinal Nerve Deficits.

Spinal Nerve Deficits

- This is a little complicated and confusing, so follow closely.
- To determine any impairments due to neurologic deficits, such as radiculopathy or spinal nerve injury, go to page 423 for an explanation and then to page 424 for the accompanying Tables.
- You need to identify the nerve root involved based on the clinical evaluation and the dermatome distribution charts on page 377 for the lower (Figure 15-1) and upper extremity (Figure 15-2).
- Determine the extent of any sensory and motor loss due to nerve impairment, based on Tables 15-15 (5th ed., 424) and 15-16 (*424). Note that in the % Sensory Deficit and the % Motor Deficit columns on the right for each Table, there is a range. Picking a % Deficit in that range is a clinical judgment call on your part.
- Next, find the maximum impairment due to nerve dysfunction for the particular nerve root on page 424 in Table 15-17 for the upper extremity and Table 15-18 for the lower extremity. Note that in each table there is a separate column for Maximum % Loss of Function in the middle due to Sensory Deficit or Pain and on the right side due to Strength.
- The next step is to multiply the severity of the sensory or motor deficit you decided upon in Tables 15-15 and 15-16 by the maximum value of the relevant nerve (Tables 15-17, 15-18).
- If there is both sensory and motor impairment of a nerve root, the impairment percents are combined (Combined Values Chart, 5th ed., 604) to determine the extremity impairment. If both extremities are impaired, the impairment percent for each extremity is determined, converted to whole person impairment, and the two impairment ratings combined using the Combined Values Chart.
- The last step is to convert to whole person impairment by multiplying the upper extremity impairment by 0.6 and the lower extremity impairment by 0.4. For ease you can use the conversion tables. For the upper extremity Table 16-3 (5th ed., 439) is used and Table 17-3 (5th ed., 527) is used for lower extremities.

Spine Spinal Nerve Root Deficit

| Nerves | Sensory Deficit or Pain Grade | | | | Strength Grade | | | |
|------------------------|-------------------------------|-----------|-------------|-----------|----------------|-----------|-------------|-----------|
| | Right | | Left | | Right | | Left | |
| | Grade | Deficit % | Grade | Deficit % | Grade | Deficit % | Grade | Deficit % |
| Spinal Nerve Root – C5 | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | |
| Spinal Nerve Root – C6 | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | |
| Spinal Nerve Root – C7 | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | |
| Spinal Nerve Root – C8 | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | |
| Spinal Nerve Root – T1 | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | |
| Spinal Nerve Root – L3 | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | |
| Spinal Nerve Root – L4 | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | |
| Spinal Nerve Root – L5 | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | |
| Spinal Nerve Root – S1 | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | |

| Sensory Deficit or Pain Grade | | Deficit (%) | Strength Grade | | Deficit (%) |
|-------------------------------|--|-------------|----------------|--|-------------|
| 5 | No loss of sensibility, abnormal sensation, or pain | 0 | 5 | Active movement against gravity with full resistance | 0 |
| 4 | Distorted superficial tactile sensibility (diminished light touch), with or without minimal abnormal sensations or pain, that is forgotten during activity | 1 - 25 | 4 | Active movement against gravity with some resistance | 1 -25 |
| 3 | Distorted superficial tactile sensibility (diminished light touch and two-point discrimination), with some abnormal sensations or slight pain, that interferes with some activities | 26 – 60 | 3 | Active movement against gravity only, without resistance | 26 – 50 |
| 2 | Decreased superficial cutaneous pain and tactile sensibility (decreased protective sensibility), with abnormal sensations or moderate pain, that may prevent some activities | 61 – 80 | 2 | Active movement with gravity eliminated | 51 – 75 |
| 1 | Deep cutaneous pain sensibility present; absent superficial pain and tactile sensibility (absent protective sensibility), with abnormal sensations or severe pain, that prevents most activity | 81 – 99 | 1 | Slight contraction and no movement | 76 – 99 |
| 0 | Absent sensibility, abnormal sensations, or severe pain that prevents all activity | 100 | 0 | No movement | 100 |

Table 15-17 Unilateral Spinal Nerve Root Impairment Affecting the Upper Extremity (5th ed., 424)

| Spinal Nerve | Maximum % Upper Extremity Impairment Due to: | | |
|--------------|--|---------------|--------------------------------|
| | Sensory Deficit or Pain | Motor Deficit | Combined Motor/Sensory Deficit |
| C5 | 5 | 30 | 34 |
| C6 | 8 | 35 | 40 |
| C7 | 5 | 35 | 38 |
| C8 | 5 | 45 | 48 |
| T1 | 5 | 20 | 24 |

Table 15-18 Unilateral Spinal Nerve Root Impairment Affecting the Lower Extremity (5th ed., 424)

| Nerve Root Impaired | Maximum % Loss of Function due to Sensory Deficit or Pain | Maximum % Loss of Function due to Strength |
|---------------------|---|--|
| L3 | 5 | 20 |
| L4 | 5 | 34 |
| L5 | 5 | 37 |
| S1 | 5 | 20 |

Combining Range of Motion Components

- Your final task to complete ROM Method evaluation is to combine the % whole person impairment for each of the three elements - (1) the range of motion of the impaired spine region; (2) accompanying diagnoses (Table 15-7 (5th ed., 404); and (3) any spinal nerve deficit. You take the % whole person impairment for each, go to the Combined Values Chart (CVC) (5th ed., 604), and combine the values. The results will be the % whole person impairment for the spine region (the Lumbar, Thoracic or Cervical) you have selected using the ROM Method.
- You are now done with the Spine area you picked (Lumbar, Thoracic, or Cervical) and you should either now do the same thing if other Spine areas are affected the Lumbar, Thoracic or Cervical) on one of the other areas, if appropriate. If more than one Spine area is involved, when you are done calculating the % whole person impairment for each area, you then combine the values using the Combined Values Chart (CVC) (5th ed., 604).

The Pelvis

Pelvis Disorders can be determined in both Chapter 15, The Spine, but also in Chapter 17, The Lower Extremities. You may use either Chapter and take the higher Impairment Rating but not both.

Unless there is a Pelvis Disorder, you are done with the Spine Chapter. Pelvis disorders are evaluated using Table 15-19 (5th ed., 428). The table is self-explanatory and once you have chosen a % whole person Impairment, it may be combined with impairment ratings from either the DRE or ROM methods for the final spine impairment.

Pelvis Impairment – Spine Chapter Table 15-19 (5th ed., 428)

- ❑ 1. Healed fracture without displacement or residual sign(s): WPI = 0
- ❑ 2. Healed fracture with displacement and without residual sign(s) involving:
 - a. Single ramus: WPI = 0
 - b. Rami, bilateral: WPI = 0
 - c. Ilium: WPI = 0
 - d. Ischium: WPI = 0
 - e. Symphysis pubis, without separation: WPI = 5
 - f. Sacrum: WPI = 5
 - g. Coccyx: WPI = 0
- ❑ 3. Healed fracture(s) with displacement, deformity, and residual sign(s) involving:
 - a. Single ramus: WPI = 0
 - b. Rami, bilateral: WPI = 5
 - c. Ilium: WPI = 2
 - d. Ischium, displaced 1 inch or more: WPI = 10
 - e. Symphysis pubis, displaced or separated: WPI = 15
 - f. Sacrum, into sacroiliac joint: WPI = 10
 - g. Coccyx, nonunion or excision: WPI = 5
 - h. Fracture into acetabulum, evaluate on basis of restricted motion of hip joint (Table 17-9, page 537)

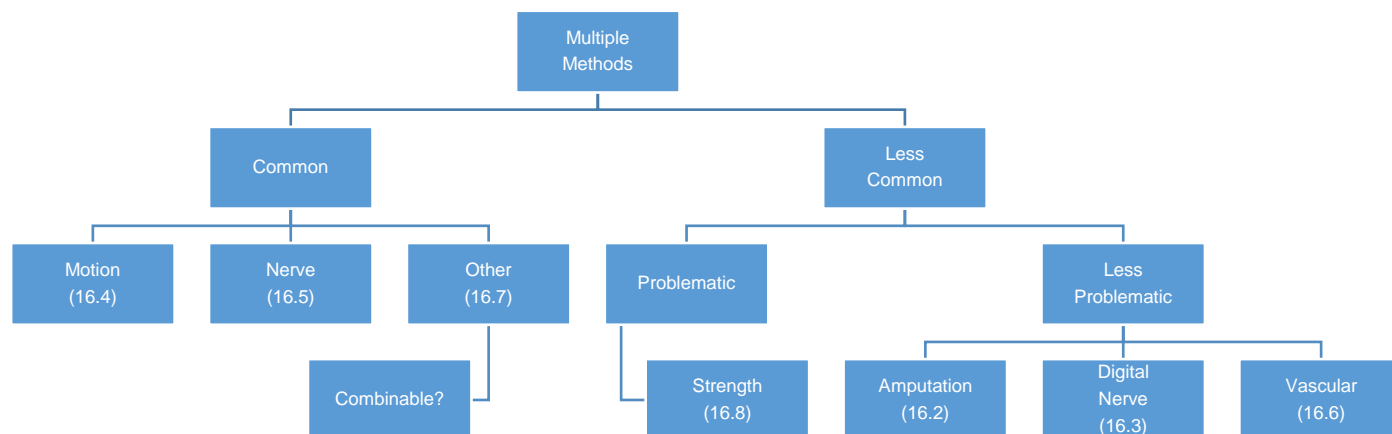
Chapter 16 – The Upper Extremities

Overview

This chapter provides criteria for evaluating permanent impairments due to anatomic impairments of the hand and the upper extremity. The methods discussed in this chapter for evaluation of upper extremity impairment due to amputation, sensory loss, and abnormal motion or ankylosis were based on A. B. Swanson's work and adapted from the fourth edition and updated with input from many of the specialty societies listed in the preface. It is comprised of the following sections:

- 16.1 Principles of Assessment
- 16.2 Amputations
- 16.3 Sensory Impairment Due to Digital Nerve Disorders
- 16.4 Evaluating Abnormal Motion
- 16.5 Impairment of the Upper Extremities Due to Peripheral Nerve Disorders
- 16.6 Impairment of the Upper Extremities Due to Vascular Disorders
- 16.7 Impairment of the Upper Extremities Due to Other Disorders
- 16.8 Impairment of the Upper Extremities Due to Other Disorders
- 16.9 Summary of Steps for Evaluating Impairments of the Upper Extremity
- 16.10 Clinical Examples

Upper Extremity Impairment Evaluation Algorithm



Principles of Assessment

The evaluation of anatomic impairment forms the basis for upper extremity assessment. The impairment ratings in this chapter reflect the degree of impairment and its impact on the ability of the individual to perform activities of daily living.

Impairment ratings in this chapter have not been adjusted for hand dominance, as is done in Chapter 13, The Central and Peripheral Nervous System, but hand dominance should be considered in the determination of disability. If you believe that hand dominance has a significant impact on the ability to perform activities of daily living, this can be discussed in the impairment evaluation report along with the resulting impairment rating. However, no additional increase is given in the final impairment rating.

Assuming the examinee has reached MMI and is not having a flare-up or other problem that prevents you from going forward with the impairment rating examination, you can proceed. It is necessary to measure findings of both upper extremities to determine what is normal for that individual.

This is one of the most difficult chapters due to issues that confuse many people regarding what can be added and what can be combined. Also, because the upper extremities and particularly the hands, are so important for ADLs, special care is needed in providing an impairment rating for these body parts. Let's start with the concept of combining and then discuss adding.

Combined Values

A 0% whole person (WP) impairment rating is assigned when there are no significant organ or body system functional consequences and no resulting limitations in the performance of the activities of daily living. At the other extreme, a 90% - 100% whole person rating suggests very severe organ or body system impairment that results in the individual being fully dependent on others for self-care, approaching death. Typically the highest ratings are with catastrophic head and spinal cord injuries.

The AMA *Guides* provide weighted percentages for various body parts but since the total impairment cannot exceed 100%, a Combined Values Chart (p. 604) accounts for the effects of multiple impairments with a summary value. Regardless of the number of impairments, the summary value cannot exceed 100% of the whole person. Using the combined values chart, multiple impairments are combined so that the whole person impairment value is equal to or less than the sum of all the individual impairment values.

In Chapter 16, The Upper Extremities, the examiner is advised when combining multiple impairments to combine the two smallest values first. In California, however in keeping with the California Permanent Disability Rating Schedule and prior use of the Multiple Disabilities Table the California Disability Evaluation Unit (DEU) is advising to combine the two largest values first.

Adding and Combining

Most of the times values are combined, however range of motion (ROM) deficits within a joint and multiple digital impairments (when converted to hand) are added. In general, impairment ratings within the same region are combined and adjusted before combining the regional impairment rating with that from another region in the same extremity. The extremity impairment then is combined with an impairment from another extremity/region or body system (unless criteria for the second impairments are included in the primary impairment) to determine final overall WPI. In California, with the Permanent Disability Rating Schedule, individual regional impairments once converted to whole person are adjusted and combined. When to *add as* opposed to *combine* impairments is discussed in Sections 16.1c, Combining impairment ratings (5th ed., 438), and 16.1d, Principles for Adding Impairment Values (5th ed., 440), and noted in Figure 16-1. It is fairly important to read these sections.

Upper Extremity Impairment Evaluation Record

The AMA Guides suggests that one method for recording results from a systematic examination is the use of the Upper Extremity Impairment Evaluation Record (Figure 16-1a (5th ed., 436), and Figure 16-1b (5th ed., 437)). The impairment evaluation record form is designed for use with unilateral upper extremity impairments. Cases of *bilateral involvement* require completion of a separate record form for each upper extremity. Completion of this bilaterally will also assist in documenting what is normal for that individual

Part 1 (Figure 16-1a (5th ed., 436)) of the evaluation record addresses the hand region and lists impairments due to abnormal motion or ankylosis, amputation, and sensory loss resulting from digital nerve lesions and to other disorders.

Part 2 (Figure 16-1b (5th ed., 437)) is designed to assist impairment evaluation of the wrist, elbow, and shoulder due to abnormal motion or ankylosis, amputation, and "other" disorders, as well as those related to the peripheral nerve system, peripheral vascular system, and other disorders not included in regional impairments (e.g., grip strength).

Table 16-1 (5th ed., 438), gives conversions from digit to hand impairment, and Table 16-2 (5th ed., 439), gives those from hand to upper extremity impairment.

Regional impairments resulting from the hand, wrist, elbow, and shoulder regions are *combined* to provide the upper extremity impairment (Use of the Combined Values (5th ed., 604)). The upper extremity impairment is then converted to a whole person impairment by means of Table 16-3 (5th ed., 439). If both upper extremities are involved, the values derived for each are then *combined* using the Combined Values Chart (*604) to derive the total whole person impairment.

If the total combined whole person impairment does not seem to adequately reflect the actual extent of alteration in the individual's ability to perform activities of daily living, this should be noted.; however, this does not alter the impairment rating itself.

Amputations

Section 16.2 (5th ed., 441) provides the methodology to rate amputation impairment. Table 16-4 Impairment Estimates for Upper Limb Amputation at Various Levels (5th ed., 440) and Figure 16-2 Impairment Estimates for Upper Extremity Amputation at Various Levels (5th ed., 441), along with Figure 16-3 Impairments of the Digits (values outside digits) (5th ed., 442) and the Hand (values inside digits) for Amputations at Various Levels, provides the basis for calculating the amputation impairment rating value.

From distally to proximally, each anatomic unit is given a relative value to the next larger unit and, eventually, the whole person. By multiplying the appropriate percent, impairment of each unit can be converted sequentially to hand, upper extremity, and whole person impairment.

As needed, you would then go from distally to proximally to obtain the Upper Extremity Impairment using the following Tables.

- Table 16-1 Conversion of Impairment of the Digits to Impairment of the Hand (5th ed., 438)
- Table 16-2 Conversion of Impairment of the Hand to Impairment of the Upper Extremity (5th ed., 439)
- Table 16-3 Conversion of Impairment of the Upper Extremity to Impairment of the Whole Person (5th ed., 439)

Evaluation of the residual stump must assess the status of soft tissue coverage, of the peripheral nerve and vascular systems, and of the bone itself. See Conditions Associated With Amputation 16.2d (5th ed., 444) for a further discussion of this topic.

Sensory Impairment Due to Digital Nerve Lesions

Section 16.3 (5th ed., 445) is used to rate digital nerve lesions. It is not used to rate more proximal peripheral nerves. It does provide direction on the evaluation of sensibility.

Only unequivocal and permanent sensory deficits are given permanent impairment ratings. Sensory impairment is rated according to the sensory quality and the distribution of the sensory loss.

The *sensory quality* is based on the results of the two-point discrimination test carried out over the distal palmar area of the digit, or on the most distal part of the stump in the presence of a partial amputation.

Sensibility defects on the dorsal surfaces of the digits are not considered impairing. The sensory quality impairment is classified according to Table 16-5 (5th ed., 447).

In total sensory losses (>15 mm), the response to touch, pinprick, pressure, and vibratory stimuli is absent. In partial sensory losses (7-15 mm), there is poor localization and abnormal response to the sensory stimuli. Anything less than 7 mm is considered normal.

The next step is to determine the distribution, or area, of sensory loss by the level of involvement (percentage of digit length affected) of either both digital nerves (transverse sensory loss) or one digital nerve on either the radial or ulnar side of the digit (longitudinal sensory loss). The percentage of digit length involved is derived from the top scale of Figure 16-6 (5th ed., 447) for the thumb and of Figure 16-7 (5th ed., 447) for the fingers.

A total transverse sensory loss represents 100% sensory loss (>15 mm) involving both digital nerves and receives 50% of the digit amputation impairment value for the corresponding level (Figures 16-6 (5th ed., 447) and 16-7 (5th ed., 447) bottom scale, and Table 16-6 (5th ed., 448) and Table 16-7 (5th ed., 448).

A partial transverse sensory loss represents 50% sensory loss (7-15 mm) involving both digital nerves and receives 25% of the digit amputation impairment value for the corresponding digit length percentage (Tables 16-6 (5th ed., 448) and 16-7 (5th ed., 448).

Longitudinal sensory loss impairments are based on the relative importance of the side of the digit for sensory function as follows: thumb and little finger, radial side 40% and ulnar side 60%; index, middle, and ring fingers, radial side 60% and ulnar side 40%. The surfaces used for opposition in various pinch functions and the ulnar aspect of the border finger are rated more highly. If the little finger has been amputated, the relative value of the ulnar side of the ring finger becomes 60% and that of the radial side, 40%. The digit impairment values are calculated similarly as above based on the sensory quality and distribution of the sensory loss.

Section 16.3 (5th ed., 445) is used to rate digital nerve lesions. It is not used to rate more proximal peripheral nerves. It does provide direction on the evaluation of sensibility. It should be noted sensory loss must be permanent and unequivocal. Dorsal surfaces with sensibility defects are not considered impairing.

Sensory Loss using the two-point discriminator over the distal palmar area of the digit or on the distal part of the stump in amputations. The following definitions of sensory loss are noted as referenced in Table 16-5 (5th ed, 447):

- None < 7 mm
- Partial 7-15 mm
- Total > 15 mm

It is important to know if there is transverse loss (both digital nerves involved) or longitudinal (either the radial or ulnar digital nerve involved).

For ease of determination, digit impairment values for total transverse and longitudinal and partial transverse and longitudinal sensory losses were calculated according to the percentage of digit length involved and are presented in table form. Consult Table 16-6 (5th ed., 448, for the thumb and little finger and Table 16-7 (5th ed., 448), for the

index, middle, and ring fingers. Corresponding hand impairment values can be derived from Table 16-1 (5th ed., 438), as shown in Figure 16-8 (5th ed., 449), for total sensory losses involving 100% of the digit length.

16.3d Digital Nerve Sensory Impairment Determination Method – 16.3d (5th ed., 449)

1. Use the two-point discrimination test to identify the sensory quality, or type of sensory loss, as total (>15 mm) or partial (7 through 15 mm) (Table 16-5 (5th ed., 447)).
2. Determine the distribution of sensory loss involvement or whether one (longitudinal sensory loss) or both (transverse sensory loss) digital nerves are involved.
3. Identify the level of involvement, or percentage of digit length involved, using the top scale of Figure 16-6 (5th ed., 447, for the thumb and of Figure 16-7 (5th ed., 447, for the fingers).
4. Consult Table 16-6 (5th ed., 448, for the thumb and little finger and Table 16-7 (5th ed., 448, for the index, middle, and ring fingers) to determine the digit impairment for either total or partial, transverse or longitudinal (ulnar or radial) sensory loss according to the percentage of digit length involved.
5. If both digital nerves are involved in the same digit, the sensory impairments relating to the ulnar or radial palmar nerves are *added*.
6. Convert the digit impairment to hand, upper extremity, and whole person impairment by using Tables 16-1 (page 438), 16-2 (page 439), and 16-3 (page 439). When a digit has more than one impairment, obtain the total digit impairment value by combining its various impairments before converting the digit values to a hand value.

Evaluating Abnormal Motion

Section 16.4 (5th ed., 450-480) provides specific directives in rating motion impairment. It is imperative that motion deficits are reliable, i.e. values should fall within 10% of each other. If the opposite extremity is uninjured, it may serve as a baseline for what is normal for that individual. For hand ratings it is highly recommend that you complete Figure 16-1a (5th ed., 436) to assure a reliable rating, with appropriate, adding, combining and versions. It is easy to misread a pie chart, therefore make sure you are reading the correct arc, i.e. V = the measured angle, I F % = the impairment due to flexion, I E % = the impairment due to extension, I A % = the impairment due to ankylosis. Impairments of motion at the same joint are added.

The reader is referred to this section in the book as the complexity of this section does not lend itself to a summary explanation.

Impairment of the Upper Extremities Due to Peripheral Nerve Disorders

Section 16.5 (5th ed., 480) presents a method of evaluating upper extremity impairments related to disorders of the spinal nerves (C5 to C8 and T1), the brachial plexus, and major peripheral nerves of the upper extremities. It also addresses the evaluation of specific conditions, including entrapment/compression neuropathy and complex regional pain syndromes (CRPS), which include CRPS I/reflex sympathetic dystrophy (RSD) and CRPS II/causalgia. Only objective neurological deficits with reliable findings are rated.

The upper extremity impairment is calculated by multiplying the grade of severity of the sensory deficit (Table 16-10a (5th ed., 482) and/or of the motor deficit (Table 16-11a (5th ed., 484) by the respective maximum upper extremity impairment value resulting from sensory and/or motor deficits of each nerve structure involved, as listed in Section 16.5c Regional Impairment Determination ((5th ed., 488-491): spinal nerves, Table 16-13 (5th ed., 489); brachial plexus, Table 16-14 (5th ed., 490); and major peripheral nerves, Table 16-15 (5th ed., 492). When both sensory and motor functions are involved, the impairment values derived for each are *combined* (Combined Values Chart, p. 604).

The steps of the impairment determination method are detailed on page 481, [Impairment Determination Method](#), and are copied below:

1. If sensory deficits or pain is present, localize the distribution and relate it to the nerve structure involved (Table 16-12 and Figures 16-48, 16-49, and 16-50).
2. If motor deficits or loss of power is present, identify the key muscles involved and relate the motor deficit to the nerve structure(s) involved (Table 16-12 and Figures 16-47 and 16-50).
3. *Grade the severity of sensory deficits or pain* according to Table 16-10a and/or that of the *motor deficits* according to Table 16-11a.
4. Find the values for *maximum impairment of the upper extremity* due to sensory and/or motor deficits of the nerve structure involved: individual spinal nerve (Table 16-13), brachial plexus (Table 16-14), and major peripheral nerves (Table 16-15).
5. For each nerve structure involved, *multiply* the grade of severity of the sensory and/or motor deficits (see step 3 above) by the appropriate maximum upper extremity impairment value (see step 4 above) to determine the upper extremity impairment percent for each function.
6. For a *structure with mixed motor and sensory fibers*, determine the upper extremity impairment for each function (steps 1 through 5), then *combine* the sensory and motor impairment percents (Combined Values Chart, p. 604) to obtain the total upper extremity impairment value.
7. When *more than one nerve structure* is involved, *combine* their respective upper extremity impairment values (steps 1 through 5) to obtain the total upper extremity impairment resulting from peripheral nerve disorders (Combined Values Chart).
8. When *multiple impairments of the extremity* are present because of amputation, loss of motion that is not strictly attributed to a peripheral nerve lesion, or peripheral vascular disorders, *combine* the peripheral nerve upper extremity impairment value with the other upper extremity impairment values (Combined Values Chart) to obtain the total upper extremity impairment.
9. The total upper extremity impairment is *converted* to a whole person impairment by means of Table 16-3.
10. If there is *bilateral upper extremity involvement*, determine separately the impairment values for each side, and convert them to whole person impairment. *Combine* the whole person impairment values for each side (Combined Values Chart) to obtain the total whole person impairment. Consult page 435 for further comments on bilateral upper extremity involvement.

Impairment rating of Entrapment/Compression Neuropathies

Only individuals with an *objectively verifiable diagnosis* should qualify for a permanent impairment rating, as explained on page 493. The diagnosis is made not only on believable symptoms but, more important, on the presence of *positive clinical findings and loss of function*.

The sensory deficits or pain, and/or the motor deficits and loss of power, are evaluated according to the impairment determination method described in Section 16.5b (see earlier in this article, Impairment of the Upper Extremities Due to Peripheral Nerve Disorders – 16.5 (5th ed., 480). Sensory impairments strictly due to lesions of digital nerves are evaluated according to Section 16.3.

In compression neuropathies, additional impairment values are not given for decreased grip strength.

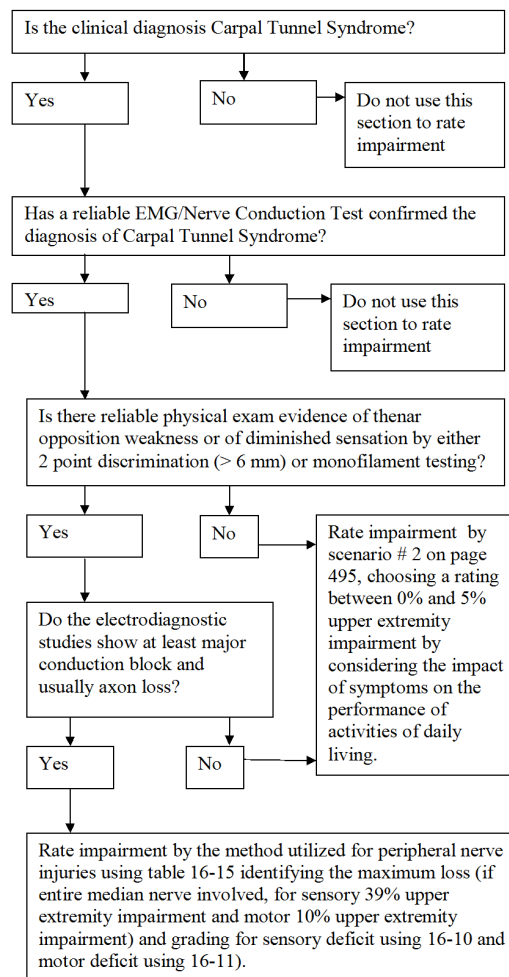
Carpal Tunnel Syndrome

The AMA Guides provide on page 495 three scenarios for impairment rating following surgical decompression when the individual continues to complain of pain, paresthesias, and/or difficulties in performing certain activities.

1. Positive clinical findings of median nerve dysfunction and electrical conduction delay(s): the impairment due to residual CTS is rated according to the sensory and/or motor deficits as described above.
2. Normal sensibility and opposition strength with abnormal sensory and/or motor latencies or abnormal EMG testing of the thenar muscles: a residual CTS is still present, and an impairment rating not to exceed 5% of the upper extremity may be justified.
3. Normal sensibility (two-point discrimination and Semmes-Weinstein monofilament testing), opposition strength, and nerve conduction studies: there is no objective basis for an impairment rating.

Scenario #2 presents an interesting dilemma for the individual who has not had surgical decompression but otherwise has normal sensibility and opposition strength with abnormal sensory and/or motor latencies or abnormal EMG testing of the thenar muscles. In other words, the individual is symptomatic, has abnormal electrodiagnostic testing, but has not had surgery. A CTS is present and we would argue that an impairment rating not to exceed 5% of the upper extremity may be justified (this is not official and is not so stated in the AMA Guides). The extent of impairment within the range of 0% to 5% upper extremity permanent impairment is based on the extent of involvement of activities of daily living.

Algorithm for Rating Carpal Tunnel Syndrome Impairment¹



¹ Algorithm developed by James B. Talmage, MD based on procedures defined in the *AMA Guides to the Evaluation of Permanent Impairment, Fifth Edition*.

Complex Regional Pain Syndromes (CRPS), Reflex Sympathetic Dystrophy (CRPS I), and Causalgia (CRPS II)

For the upper extremities you may use Section 16.5e (5th ed., 495-497) which relies on anatomical changes to define impairment or alternatively you may rate impairment as explained in Chapter 13, the Central and Peripheral Nervous System, Criteria for Rating Impairments Related to Chronic Pain (causalgia, posttraumatic neuralgia, and RSD – also termed CRPS) – 13.8 (5th ed., 342). For upper extremity involvement, use Table 13-22 (5th ed., 342). Chapter 16 requires objective findings to rate complex regional pain syndrome (CRPS) as presented in Table 16-16 (5th ed., 496).

NB: If you choose to calculate an Impairment Rating using both Chapter 13, the Central and Peripheral Nervous System, and Chapter 16, The Upper Extremities, determine which method is most appropriate and explain your rationale for that approach. These impairments cannot be combined.

Impairment of the Upper Extremities Due to Vascular Disorders

Section 16.6 (5th ed., 497) and Table 16-17 (5th ed., 498) provides a classification of impairments due to peripheral vascular disease. Physical signs of vascular damage must be present and are the primary determinants in placing the examinee into one of these categories.

- There are five classes, each having a percentage range.
- Pick the percentage based on ADL deficits.

Impairment of the Upper Extremities Due to Other Disorders

Section 16.7 (5th ed., 498) provides additional approaches to rating impairment. Conditions not previously described that can contribute to impairments of the hand and upper extremity include bone and joint disorders (Section 16.7a), presence of resection or implant arthroplasty (Section 16.7b), musculotendinous disorders (Section 16.7c), and tendinitis (Section 16.7d), and loss of strength (Section 16.8). The severity of impairment due to these disorders is rated separately according to Tables 16-19 through 16-30 and then multiplied by the relative maximum value of the unit involved as specified in Table 16-18. Appropriate impairment percents are combined with other impairment percents by means of the Combined Values Chart (p. 604).

Note: Conditions not previously described that can contribute to impairments of the hand and upper extremity include bone and joint disorders. The severity of impairment due to these disorders is rated separately according to Tables 16-19 (5th ed., 500), through 16-30 (5th ed., 507), and then multiplied by the relative maximum value of the unit involved as specified in Table 16-18 (5th ed., 499). Appropriate impairment percents are combined with other impairment percents by means of the Combined Values Chart (5th ed., 604).

Bone and Joint Deformities

Section 16.7a (5th ed., 499) explains that if the same unit presents several findings, the following rules must be followed to avoid duplication of impairments.

1. If the same unit in the digits, wrist, and elbow presents with manifestations of joint translocation including lateral deviation, rotational deformity (digit), and/or subluxation or dislocation in any combination., to avoid duplication, the impairment values cannot be combined, and only the finding with the highest impairment value is rated.
2. Limited motion impairment is rated according to Section 16.4 (5th ed., 450) and can be appropriately combined with impairments due to “other disorders” listed in this section, except with those due to joint swelling from synovial hypertrophy, persistent joint subluxation or dislocation, and musculotendinous disorders (Section 16.7c (5th ed., 506)).
3. Joint instability impairment values can be combined with other appropriate impairment values, including decreased motion, but not with arthroplasty.
4. Joint swelling due to synovial hypertrophy is rated only when no other findings are present.
5. Joint crepitation is not rated separately because other findings, such as those listed above, are more reliable indicators of the severity of the same arthritic process.

- **Joint Swelling Due to Synovial Hypertrophy (5th ed., 500)**
 - If synovial hypertrophy is the *only finding*, the joint impairment is rated according to Table 16-19 (5th ed., 500) and multiplied by the relative maximum value of the joint involved (Table 16-18 (5th ed., 499)).
 - It *cannot* be combined with impairment due to decreased joint motion or other findings.

- **Digit Lateral Deviation (5th ed., 500)**
 - If lateral deviation is the only impairment, the severity of digit impairment (Table 16-20 (5th ed., 500)) is multiplied by the relative hand value of the digit (Table 16-18 (5th ed., 499)) to determine the hand impairment.
 - The lateral deviation impairment percent can be *combined* with other impairments of the same digits, including motion, according to the rules outlined on page 499 (see above rules).

- **Digit Rotational Deformity (5th ed., 500)**
 - The digit impairment percent due to rotational deformity (Table 16-21) is multiplied by the relative hand value of the digit (Table 16-18) to obtain the hand impairment.
 - The rotational deformity impairment can be *combined* with other impairments of the same digit, including motion, according to the rules outlined on page 499 (see above rules).

- **Persistent Joint Subluxation or Dislocation (5th ed., 501)**
 - If there is no restricted motion, the values shown in Table 16-22 are multiplied by the relative value of the joint (Table 16-18) to determine the joint impairment.
 - If the same joint presents other findings, the rules outlined on page 499 (see above rules) must be followed to avoid duplication of impairments.
 - Instability and translocation of the wrist and shoulder joints are evaluated according to methods described on pages 502 and 503.

- **Joint Passive Mediolateral Instability (5th ed., 501)**
 - The severity of mediolateral joint instability is rated according to the excess number of angulation degrees compared to the opposite, “normal” side (Table 16-23).
 - If both sides are involved, a comparison to accepted normal average values is made.
 - The percentage of impairment is then multiplied by the relative value of the joint (Table 16-18) to determine the joint impairment.
 - Carpal and shoulder instabilities are discussed on pages 502 and 503.
 - If the same joint presents other findings, the rules outlined on page 499 (see above rules) must be followed to avoid duplication of impairments.

- **Wrist Elbow Joint Active Radial and Ulnar Deviations (5th ed., 502)**
 - The severity of lateral deviation is rated according to the excess number of angulation degrees compared to the normal opposite side (Table 16-24).
 - The percentage of impairment is multiplied by the relative value of the joint (Table 16-18) to obtain the upper extremity impairment.
 - If the same joint presents other findings, the rules outlined on page 499 (see above rules) must be followed to avoid duplication of impairments.

- **Carpal Instability (5th ed., 502)**
 - Carpal instability patterns are classified as mild, moderate, or severe. The classification is usually based on the roentgenographic findings listed in Table 16-25.
 - A mild carpal instability exists also when a ligament tear has been diagnosed by arthrogram, arthroscopy, or MRI, even though the static roentgenographic findings may be normal.
 - The radiocarpal joint represents 40% of the upper extremity (Table 16-18). Therefore, the grades of mild (20%), moderate (40%), and severe (60%) impairment represent upper extremity impairments of 8%, 16%, and 24%, respectively.
 - Only one category of severity of carpal instability impairment is selected, based on the greatest severity of the roentgenographic findings.
 - The severity categories *cannot* be added or combined.
 - The selected upper extremity impairment value may be *combined only with limited wrist motion*.
 - Pain and decreased strength are not rated separately.

- **Shoulder Instability (5th ed., 503)**
 - Shoulder instability patterns are based on the parameters listed in Table 16-26 and can be classified as occult instability, instability with a subluxating humeral head, and instability with a dislocating humeral head.
 - The shoulder representing 60% of the upper extremity (Table 16-18), the patterns of occult (10%), subluxating (20%), and dislocating (40%) instabilities represent upper extremity impairments of 6%, 12%, and 24%, respectively.
 - This value may be combined only with impairments due to decreased motion (Section 16.4).
 - Pain and decreased muscle strength are not rated separately.

Arthroplasty

Resection arthroplasty of a joint may be carried out with or without implant replacement, as explained in Section 16.7b (5th ed., 505). Impairment ratings for the upper extremity following arthroplasty of specific joints are listed in Table 16-27. In the presence of *decreased motion*, motion impairments are derived separately (Section 16.4) and *combined* with the arthroplasty impairment (Combined Values Chart, p. 604). If the same joint presents other findings, the rules outlined on page 499 must be followed to avoid duplication of impairments. However, impairment due to arthroplasty *cannot be combined* with impairments due to instability, subluxation, or dislocation.

After *arthrodesis* (fusion) procedures, the impairment is based on the *ankylosis impairment* (IA%) for the corresponding angle of fusion (V) according to the guidelines in Section 16.4. A severe symptomatic failure of an implant arthroplasty procedure (e.g., symptomatic breakage or subluxation of the device) is given 100% of the joint value as listed in Table 16-18. Impairments involving the resection of malignant tumors with reconstructive surgery including arthroplasty should receive individual consideration.

Musculotendinous Impairments

Section 16.7c (5th ed., 506) provides ratings for the following disorders:

- Intrinsic Tightness
- Constrictive Tenosynovitis
- Extensor Tendon Subluxation at the MP Joints of the Fingers

Tendinitis

Section 16.7d (5th ed., 507) explains:

- These conditions (e.g., lateral and medial epicondylitis) are not given a permanent impairment rating unless there is some other factor that must be considered.
- If an individual has had tendon rupture or has undergone surgical release of the flexor or extensor origins or medial or lateral epicondylitis, or has had excision of the epicondyle, there may be some permanent weakness of grip as a result of the tendon rupture or the surgery, and in this case, impairment can be given on the basis of weakness of grip strength according to Section 16.8b.
- If you are going to use grip strength to determine post-surgical disability, the determination should not be made until one year post-operative.

Strength Evaluation

In terms of rating on the basis of strength loss, the *Guides* discuss the issues of strength evaluation and its very limited role in impairment evaluation in Section 16.7 9 (5th ed., 507-511). The primary application for strength evaluation is for the individual who has a specific, objective muscular injury that cannot be adequately assessed by other means; this is not such a rare case. The *Guides* state in Section 6.8 Strength Evaluation:

Because strength measurements are functional tests influenced by subjective factors that are difficult to control, and the *Guides* for the most part is based on anatomic impairment, the *Guides* does not assign a large role to such measurements. Those who have contributed to the *Guides* believe further research is needed before loss of grip and pinch strength is given a larger role in impairment evaluation. (5th ed., 507)

The limited role for rating by strength loss is discussed in Section 16.8a Principles:

In a rare case, if the examiner believes the patient's loss of strength represents an impairing factor that has not been considered adequately, the loss of strength may be rated separately. An example of this situation would be the loss of strength due to a severe muscle tear that healed leaving a palpable muscle defect. If the examiner judges that loss of strength should be rated separately in an extremity that presents other impairments, the impairment due to loss of strength *could be combined* with the other impairments, *only* if based on unrelated etiologic or pathomechanical causes. *Otherwise, the impairment ratings based on objective anatomic findings take precedence. Decreased strength cannot be rated in the presence of decreased motion, painful conditions, deformities, or absence of parts* (eg, thumb amputation) that prevent effective application of maximal force in the region being evaluated. (5th ed., 508)

Therefore, prior to rating by this section it is important to determine if this is a rare case where this is appropriate. Manual muscle testing is subject to the individual's conscious or unconscious control and should only be utilized when the effort is credible, reliable and reproducible and is not pain or fear limited. Section 16.8b Grip and Pinch Strength emphasizes the importance of obtaining reliable measurements, e.g. less than 20% variation in the readings with readings being "usually repeated three times with each hand at different times during the examination". If there is evidence that the individual is exerting less than maximal effort, measurements are invalid for estimating impairment.

Grip strength loss is rated using an index of loss of strength and Table 16-34 (5th ed., 509). Strength loss for the shoulder and elbow is rated using Table 16-35 (5th ed., 510). The following method is used:

Subtract the limited strength from the normal strength. Divide the difference by the normal strength value. Your answer is considered the strength loss index. That number is then used to determine the impairment based on the values given in Table 16-34 (5th ed., 509).

NB: Strength testing in this section is reserved for a musculoskeletal disorder, not on a peripheral nerve injury. An example would be shoulder or elbow weakness post surgery, with normal motion and no pain.

Summary of Steps for Evaluating Impairments of the Upper Extremity

The reader is referred to pages 511-512 for a summary of steps for evaluating impairments of the upper extremity.

The following forms provide a mechanism for recording findings and considering regional impairments.

Upper Extremity Physical Examination Protocols

Amputation

| Amputation | Right | Left |
|---|-------|------|
| Scapulothoracic (forequarter) | | |
| Shoulder disarticulation | | |
| Arm: deltoid insertion and proximally | | |
| Arm/forearm: from distal to deltoid insertion to bicipital insertion | | |
| Forearm/hand: from distal to bicipital insertion to transmetacarpophalangeal loss of all digits | | |
| Hand: all digits at MP joints | | |
| Hand: all fingers at MP joints except thumb | | |
| Thumb ray at/or near: CMC joint Distal third of 1 st metacarpal | | |
| Thumb at MP joint | | |
| Thumb at IP joint | | |
| Index or middle finger at MP joint | | |
| Index or middle finger at PIP joint | | |
| Index or middle finger at DIP joint | | |
| Ring or little finger at MP joint | | |
| Ring or little finger at PIP joint | | |
| Ring or little finger at DIP joint | | |

Shoulder Examination

NB: for strength, use a circle (“O”) for weakness that is neurological or for normal (“5”) strength and draw a line (“\”) through weakness due to joint or muscle dysfunction.

NB: Strength is rarely used and then only when the weakness is non-neurological but rather related to the joint itself or muscle injury. Also, since strength is only considered in the absence of loss of ROM, only grades 3 & 4 are considered towards an impairment rating. All findings must be reliable.

| SHOULDER ROM (5th ed., * = discomfort with testing) | | Right | | | | Left | | | |
|--|-----------|-------|---|-------------|---|------|---|-------------|---|
| <input type="checkbox"/> Normal exam | Ankylosis | ROM | * | Strength | * | ROM | * | Strength | * |
| Flexion (180°) | | | | 0 1 2 3 4 5 | | | | 0 1 2 3 4 5 | |
| Extension (50°) | | | | 0 1 2 3 4 5 | | | | 0 1 2 3 4 5 | |
| Adduction (50°) | | | | 0 1 2 3 4 5 | | | | 0 1 2 3 4 5 | |
| Abduction (180°) | | | | 0 1 2 3 4 5 | | | | 0 1 2 3 4 5 | |
| External Rotation (90°) | | | | 0 1 2 3 4 5 | | | | 0 1 2 3 4 5 | |
| Internal Rotation (90°) | | | | 0 1 2 3 4 5 | | | | 0 1 2 3 4 5 | |

Use uninvolved side as baseline for comparison.

- If a contralateral “normal” joint has less than average mobility; the impairment values(s) corresponding to the uninvolved joint can serve as a baseline and are subtracted from the calculated impairment from the involved joint. The rationale for this decision should be included in the report.
- Enter rationale for using uninvolved side _____

Additional 2% motion Impairment (If an involved joint has “normal” motion according to the values specified in the *Guides* and *the contralateral uninvolved joint has greater than average motion*, there is a relative loss of motion. In rare cases, when this results in a loss of function, based on the examiner’s clinical judgment, an impairment percent not to exceed 2% of the maximum regional impairment value of a unit of motion could be given. The rationale for this decision must be explained in the report)

Rationale: _____

Upper Extremity Impairment Due to Symptomatic Shoulder Instability Patterns (Table 16-26 (5th ed., 505))

| Right | Left |
|--|--|
| Occult: UEI = 6% | Occult: UEI = 6% |
| with subluxing humeral head: UEI = 12% | with subluxing humeral head: UEI = 12% |
| with dislocating humeral head: UEI = 24% | with dislocating humeral head: UEI = 24% |

Arthroplasty (Table 16-27 (5th ed., 506))

| Right | Left |
|--|--|
| Total shoulder implant: UEI = 24% | Total shoulder implant: UEI = 24% |
| Total shoulder resection: UEI = 30% | Total shoulder resection: UEI = 30% |
| Distal clavicle resection (isolated): UEI = 10% | Distal clavicle resection (isolated): UEI = 10% |
| Proximal clavicle resection (isolated): UEI = 3% | Proximal clavicle resection (isolated): UEI = 3% |

Elbow Examination

NB: for strength, use a circle (“O”) for weakness that is neurological or for normal (“5”) strength and draw a line (“\”) through weakness due to joint or muscle dysfunction.

NB: Strength is rarely used and then only when the weakness is non-neurologic but rather related to the joint itself or muscle injury. Also, since strength is only considered in the absence of loss of ROM, only grades 3 & 4 are considered towards an impairment rating. All findings must be reliable.

| ELBOW (5th ed., * = discomfort with testing) | | Right | | | | Left | | | |
|---|-----------|-------|---|-------------|---|------|---|-------------|---|
| <input type="checkbox"/> Normal exam | Ankylosis | ROM | * | Strength | * | ROM | * | Strength | * |
| Flexion (140°) | | | | 0 1 2 3 4 5 | | | | 0 1 2 3 4 5 | |
| Extension (0°) | | | | 0 1 2 3 4 5 | | | | 0 1 2 3 4 5 | |
| Supination (80°) | | | | 0 1 2 3 4 5 | | | | 0 1 2 3 4 5 | |
| Pronation (80°) | | | | 0 1 2 3 4 5 | | | | 0 1 2 3 4 5 | |

Additional 2% motion Impairment (If an involved joint has “normal” motion according to the values specified in the *Guides* and *the contralateral uninvolved joint has greater than average motion*, there is a relative loss of motion. In rare cases, when this results in a loss of function, based on the examiner’s clinical judgment, an impairment percent not to exceed 2% of the maximum regional impairment value of a unit of motion could be given. The rationale for this decision must be explained in the report)

Rationale: _____

Use uninvolved side as baseline for comparison.

- If a contralateral “normal” joint has less than average mobility; the impairment values(s) corresponding to the uninvolved joint can serve as a baseline and are subtracted from the calculated impairment from the involved joint. The rationale for this decision should be included in the report.
- Enter rationale for using uninvolved side _____

Excessive Active Mediolateral Deviation (Table 16-22 (5th ed., 502))

| Right | Left |
|--------------------|--------------------|
| Mild (< 20) | Mild (< 20) |
| Moderate (20 – 30) | Moderate (20 – 30) |
| Severe (> 30) | Severe (> 30) |

Arthroplasty (Table 16-7 (5th ed., 506))

| Right | Left |
|--|--|
| Total elbow implant: UEI = 28% | Total elbow implant: UEI = 28% |
| Total elbow resection: UEI = 35% | Total elbow resection: UEI = 35% |
| Radial head implant (isolated): UEI = 8% | Radial head implant (isolated): UEI = 8% |
| Radial head resected (isolated): UEI = 10% | Radial head resected (isolated): UEI = 10% |

Wrist Examination

NB: for strength, use a circle (“O”) for weakness that is neurological or for normal (“5”) strength and draw a line (“\”) through weakness due to joint or muscle dysfunction.

*NB: Strength is rarely used and then only when the weakness is non-neurologic but rather related to the joint itself or muscle injury. Also, since strength is only considered in the absence of loss of ROM, only grades 3 & 4 are considered towards an impairment rating. **The AMA Guides does not consider wrist strength.***

| WRIST (5th ed., * = discomfort with testing) | Right | | | | | Left | | | | |
|---|-----------|-----|---|-------------|---|-----------|-----|---|-------------|---|
| | Ankylosis | ROM | * | Strength | * | Ankylosis | ROM | * | Strength | * |
| <input type="checkbox"/> Normal exam | | | | | | | | | | |
| Flexion (60°) | | | | 0 1 2 3 4 5 | | | | | 0 1 2 3 4 5 | |
| Extension (60°) | | | | 0 1 2 3 4 5 | | | | | 0 1 2 3 4 5 | |
| Radial Deviation (20°) | | | | 0 1 2 3 4 5 | | | | | 0 1 2 3 4 5 | |
| Ulnar Deviation (30°) | | | | 0 1 2 3 4 5 | | | | | 0 1 2 3 4 5 | |

Additional 2% motion Impairment (If an involved joint has “normal” motion according to the values specified in the *Guides* and *the contralateral uninvolved joint has greater than average motion*, there is a relative loss of motion. In rare cases, when this results in a loss of function, based on the examiner’s clinical judgment, an impairment percent not to exceed 2% of the maximum regional impairment value of a unit of motion could be given. The rationale for this decision must be explained in the report)

Rationale: _____

Use uninvolved side as baseline for comparison.

- o If a contralateral “normal” joint has less than average mobility; the impairment values(s) corresponding to the uninvolved joint can serve as a baseline and are subtracted from the calculated impairment from the involved joint. The rationale for this decision should be included in the report.
- o Enter rationale for using uninvolved side _____

Excessive Active Mediolateral Deviation (Table 16-22 (5th ed., 502)

| Right | Left |
|--------------------|--------------------|
| Mild (< 20) | Mild (< 20) |
| Moderate (20 – 30) | Moderate (20 – 30) |
| Severe (> 30) | Severe (> 30) |

Carpal instability (Table 16-25 (5th ed., 305)

| Roentgenographic Findings* | Mild | | Moderate | | Severe | |
|----------------------------|--------|--------|----------|----------|--------|--------|
| | Right | Left | Right | Left | Right | Left |
| Radiolunate angle† | 11-20 | 11-20 | 21-30 | 21-30 | >30 | >30 |
| Scapholunate angle | 61-70 | 61-70 | 71-80 | 71-80 | >80 | >80 |
| Scapholunate gap | > 3 mm | > 3 mm | > 5 mm | > 5 mm | > 8 mm | > 8 mm |
| Triquetrolunate stepoff | > 1 mm | > 1 mm | > 2 mm | > 2 mm | > 3 mm | > 3 mm |
| Ulnar translation‡ | Mild | Mild | Moderate | Moderate | Severe | Severe |

* Clenched fist neutral PA views.

† A positive angle (lunate extension) represents a DISI deformity.

A negative angle (lunate flexion) represents a VISI deformity.

‡ See text for description.

❑ **Arthroplasty** (Table 16-7 (5th ed., 506))

| Right | Left |
|---|---|
| Total wrist implant: UEI = 24% | Total wrist implant: UEI = 24% |
| Radiocarpal implant: UEI = 16% | Radiocarpal implant: UEI = 16% |
| Ulnar head (isolated) implant: UEI = 8% | Ulnar head (isolated) implant: UEI = 8% |
| Ulnar head (isolated) resection: UEI = 10% | Ulnar head (isolated) resection: UEI = 10% |
| Proximal row carpectomy/resection: UEI = 12% | Proximal row carpectomy/resection: UEI = 12% |
| Carpal bone (isolated) implant: UEI = 8% | Carpal bone (isolated) implant: UEI = 8% |
| Carpal bone (isolated) resection: UEI = 10% | Carpal bone (isolated) resection: UEI = 10% |
| Radial styloid (isolated) resection: UEI = 5% | Radial styloid (isolated) resection: UEI = 5% |

Hand Examination

- ❑ **Use uninvolved side as baseline for comparison.**
 - If a contralateral “normal” joint has less than average mobility; the impairment values(s) corresponding to the uninvolved joint can serve as a baseline and are subtracted from the calculated impairment from the involved joint. The rationale should be included in the report.
 - Enter rationale for using uninvolved side (identify digit)_____

- ❑ **Additional 2% motion Impairment** (If an involved joint has “normal” motion according to the values specified in the *Guides* and *the contralateral uninvolved joint has greater than average motion*, there is a relative loss of motion. In rare cases, when this results in a loss of function, based on the examiner’s clinical judgment, an impairment percent not to exceed 2% of the maximum regional impairment value of a unit of motion could be given. The rationale for this decision must be explained in the report)
 - Rationale (identify digit):_____

| THUMB | Right | | | Left | | |
|----------------------|-------|-----------|-------------|------|-----------|-------------|
| | ROM | Ankylosis | Strength | ROM | Ankylosis | Strength |
| IP Flexion (80°) | | | 0 1 2 3 4 5 | | | 0 1 2 3 4 5 |
| IP Extension (30°) | | | 0 1 2 3 4 5 | | | 0 1 2 3 4 5 |
| MP Flexion (60°) | | | 0 1 2 3 4 5 | | | 0 1 2 3 4 5 |
| MP Extension (40°) | | | 0 1 2 3 4 5 | | | 0 1 2 3 4 5 |
| CMC Radial Abd (50°) | | | 0 1 2 3 4 5 | | | 0 1 2 3 4 5 |
| CMC Add (0–8 cm) | | | 0 1 2 3 4 5 | | | 0 1 2 3 4 5 |
| CMC Opp (8 cm) | | | 0 1 2 3 4 5 | | | 0 1 2 3 4 5 |

| Index Finger | Right | | | Left | | |
|---------------------|-------|-----------|-------------|------|-----------|-------------|
| | ROM | Ankylosis | Strength | ROM | Ankylosis | Strength |
| DIP Flexion (70°) | | | 0 1 2 3 4 5 | | | 0 1 2 3 4 5 |
| DIP Extension (30°) | | | 0 1 2 3 4 5 | | | 0 1 2 3 4 5 |
| PIP Flexion (100°) | | | 0 1 2 3 4 5 | | | 0 1 2 3 4 5 |
| PIP Extension (30°) | | | 0 1 2 3 4 5 | | | 0 1 2 3 4 5 |
| MP Flexion (90°) | | | 0 1 2 3 4 5 | | | 0 1 2 3 4 5 |
| MP Extension (20°) | | | 0 1 2 3 4 5 | | | 0 1 2 3 4 5 |

| Middle Finger | Right | | | Left | | |
|---------------------|-------|-----------|-------------|------|-----------|-------------|
| | ROM | Ankylosis | Strength | ROM | Ankylosis | Strength |
| DIP Flexion (70°) | | | 0 1 2 3 4 5 | | | 0 1 2 3 4 5 |
| DIP Extension (30°) | | | 0 1 2 3 4 5 | | | 0 1 2 3 4 5 |
| PIP Flexion (100°) | | | 0 1 2 3 4 5 | | | 0 1 2 3 4 5 |
| PIP Extension (30°) | | | 0 1 2 3 4 5 | | | 0 1 2 3 4 5 |
| MP Flexion (90°) | | | 0 1 2 3 4 5 | | | 0 1 2 3 4 5 |
| MP Extension (20°) | | | 0 1 2 3 4 5 | | | 0 1 2 3 4 5 |

| Ring Finger | Right | | | Left | | |
|---------------------|-------|-----------|-------------|------|-----------|-------------|
| | ROM | Ankylosis | Strength | ROM | Ankylosis | Strength |
| DIP Flexion (70°) | | | 0 1 2 3 4 5 | | | 0 1 2 3 4 5 |
| DIP Extension (30°) | | | 0 1 2 3 4 5 | | | 0 1 2 3 4 5 |
| PIP Flexion (100°) | | | 0 1 2 3 4 5 | | | 0 1 2 3 4 5 |
| PIP Extension (30°) | | | 0 1 2 3 4 5 | | | 0 1 2 3 4 5 |
| MP Flexion (90°) | | | 0 1 2 3 4 5 | | | 0 1 2 3 4 5 |
| MP Extension (20°) | | | 0 1 2 3 4 5 | | | 0 1 2 3 4 5 |

| Little Finger | Right | | | Left | | |
|---------------------|-------|-----------|-------------|------|-----------|-------------|
| | ROM | Ankylosis | Strength | ROM | Ankylosis | Strength |
| DIP Flexion (70°) | | | 0 1 2 3 4 5 | | | 0 1 2 3 4 5 |
| DIP Extension (30°) | | | 0 1 2 3 4 5 | | | 0 1 2 3 4 5 |
| PIP Flexion (100°) | | | 0 1 2 3 4 5 | | | 0 1 2 3 4 5 |
| PIP Extension (30°) | | | 0 1 2 3 4 5 | | | 0 1 2 3 4 5 |
| MP Flexion (90°) | | | 0 1 2 3 4 5 | | | 0 1 2 3 4 5 |
| MP Extension (20°) | | | 0 1 2 3 4 5 | | | 0 1 2 3 4 5 |

Fingertips to Palm

Fingertip to palm testing is normal. All fingertips touch at the proximal, middle and distal palm.

Finger Triggering

- There is no finger triggering
- There is finger triggering:

| | Right | Left |
|--------|-------|------|
| Thumb | | |
| Index | | |
| Middle | | |
| Ring | | |
| Little | | |

Grip and Pinch Strength

Note: This is rated only in a RARE case, and you must provide an explanation for your rationale for including this in the rating.

| Grip * = with discomfort ** = pain limited | Right (kgs) | */** | Left (kgs) | */** |
|--|-------------|------|------------|------|
| Trial 1 | | | | |
| Trial 2 | | | | |
| Trial 3 | | | | |

| Pinch | Right | */** | Left | */** |
|---------|-------|------|------|------|
| Trial 1 | | | | |
| Trial 2 | | | | |
| Trial 3 | | | | |

Arthroplasty (Table 16-7 (5th ed., 506))

| Right | Left |
|--|--|
| Thumb CMC implant: UEI = 9% | Thumb CMC implant: UEI = 9% |
| Thumb CMC resection: UEI = 11% | Thumb CMC resection: UEI = 11% |
| Thumb MP implant: UEI = 2% | Thumb MP implant: UEI = 2% |
| Thumb MP resection: UEI = 3% | Thumb MP resection: UEI = 3% |
| Thumb IP implant: UEI = 4% | Thumb IP implant: UEI = 4% |
| Thumb IP resection: UEI = 5% | Thumb IP resection: UEI = 5% |
| Index or Middle Finger MP implant: UEI = 4% | Index or Middle Finger MP implant: UEI = 4% |
| Index or Middle Finger MP resection: UEI = 5% | Index or Middle Finger MP resection: UEI = 5% |
| Index or Middle Finger PIP implant: UEI = 2% | Index or Middle Finger PIP implant: UEI = 2% |
| Index or Middle Finger PIP resection: UEI = 3% | Index or Middle Finger PIP resection: UEI = 3% |
| Index or Middle Finger DIP implant: UEI = 1% | Index or Middle Finger DIP implant: UEI = 1% |
| Index or Middle Finger DIP resection: UEI = 2% | Index or Middle Finger DIP resection: UEI = 2% |
| Ring or Little Finger MP implant: UEI = 2% | Ring or Little Finger MP implant: UEI = 2% |
| Ring or Little Finger MP resection: UEI = 2% | Ring or Little Finger MP resection: UEI = 2% |
| Ring or Little Finger PIP implant: UEI = 1% | Ring or Little Finger PIP implant: UEI = 1% |
| Ring or Little Finger PIP resection: UEI = 1% | Ring or Little Finger PIP resection: UEI = 1% |
| Ring or Little Finger DIP implant: UEI = 1% | Ring or Little Finger DIP implant: UEI = 1% |
| Ring or Little Finger DIP resection: UEI = 1% | Ring or Little Finger DIP resection: UEI = 1% |

Carpal Tunnel Syndrome

If, after an optimal recovery time following surgical decompression, an individual continues to complain of pain, paresthasias, and/or difficulties in performing certain activities, three possible scenarios can be present:

1. Positive clinical findings of median nerve dysfunction and electrical conduction delay(s): the impairment due to residual CTS is rated according to the sensory and/or motor deficits.
2. Normal sensibility and opposition strength with abnormal sensory and/or motor latencies or abnormal EMG testing of the thenar muscles: a residual CTS is still present, and an impairment rating not to exceed 5% of the upper extremity may be justified (circle one for the affected side).

| Right | Left |
|-------|------|
| 1% | 1% |
| 2% | 2% |
| 3% | 3% |
| 4% | 4% |
| 5% | 5% |

3. Normal sensibility (two-point discrimination and Semmes-Weinstein monofilament testing), opposition strength, and nerve conduction studies: there is no objective basis for an impairment rating.

NB: While it is not official policy in California, some physicians would argue that even in the absence of surgery, #2 above can be used.

Upper Extremity Peripheral Nerve Deficits

Recording Form

| Nerves | Sensory Grade / Deficit (%) | | | | Motor Grade / Deficit (%) | | | |
|---|-----------------------------|----|-------------|----|---------------------------|----|-------------|----|
| | Right | | Left | | Right | | Left | |
| Pectorals (medial and lateral) | XXXXXXXX | XX | XXXXXXXX | XX | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | |
| Axillary | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | |
| Dorsal scapular | XXXXXXXX | XX | XXXXXXXX | XX | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | |
| Long thoracic | XXXXXXXX | XX | XXXXXXXX | XX | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | |
| Medial antebrachial cutaneous | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | XXXXXXXX | XX | XXXXXXXX | XX |
| Medial brachial cutaneous | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | XXXXXXXX | XX | XXXXXXXX | XX |
| Median (above midforearm) | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | |
| Median (anterior interosseous branch) | XXXXXXXX | XX | XXXXXXXX | XX | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | |
| Median (below midforearm) | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | |
| Radial palmar digital of thumb | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | XXXXXXXX | XX | XXXXXXXX | XX |
| Ulnar palmar digital of thumb | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | XXXXXXXX | XX | XXXXXXXX | XX |
| Radial palmar digital of index finger | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | XXXXXXXX | XX | XXXXXXXX | XX |
| Ulnar palmar digital of index finger | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | XXXXXXXX | XX | XXXXXXXX | XX |
| Radial palmar digital of middle finger | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | XXXXXXXX | XX | XXXXXXXX | XX |
| Ulnar palmar digital of middle finger | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | XXXXXXXX | XX | XXXXXXXX | XX |
| Radial palmar digital of ring finger | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | XXXXXXXX | XX | XXXXXXXX | XX |
| Musculocutaneous | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | |
| Radial (upper arm with loss of triceps) | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | |
| Radial (elbow with sparing of triceps) | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | |
| Subscapularis (upper and lower) | XXXXXXXX | XX | XXXXXXXX | XX | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | |
| Suprascapular | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | |
| Thoracodorsal | XXXXXXXX | XX | XXXXXXXX | XX | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | |
| Ulnar (above midforearm) | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | |
| Ulnar (below midforearm) | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | |
| Ulnar palmar digital of ring finger | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | XXXXXXXX | XX | XXXXXXXX | XX |
| Radial palmar digital of little finger | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | XXXXXXXX | XX | XXXXXXXX | XX |
| Ulnar palmar digital of little finger | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | XXXXXXXX | XX | XXXXXXXX | XX |
| Brachial plexus (C5 through C8, T1) | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | |
| Upper trunk (C5, C6, Erb-Duchenne) | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | |
| Middle trunk (C7) | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | |
| Lower trunk (C8, T1, Déjerine-Klumpke) | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | |

Table 16-10 (5th ed., 482) and Table 16-11 (484)

| Sensory Deficit or Pain Grade | | Deficit (%) | Strength Grade | | Deficit (%) |
|-------------------------------|--|-------------|----------------|--|-------------|
| 5 | No loss of sensibility, abnormal sensation, or pain | 0 | 5 | Active movement against gravity with full resistance | 0 |
| 4 | Distorted superficial tactile sensibility (diminished light touch), with or without minimal abnormal sensations or pain, that is forgotten during activity | 1 - 25 | 4 | Active movement against gravity with some resistance | 1 -25 |
| 3 | Distorted superficial tactile sensibility (diminished light touch and two-point discrimination), with some abnormal sensations or slight pain, that interferes with some activities | 26 – 60 | 3 | Active movement against gravity only, without resistance | 26 – 50 |
| 2 | Decreased superficial cutaneous pain and tactile sensibility (decreased protective sensibility), with abnormal sensations or moderate pain, that may prevent some activities | 61 – 80 | 2 | Active movement with gravity eliminated | 51 – 75 |
| 1 | Deep cutaneous pain sensibility present; absent superficial pain and tactile sensibility (absent protective sensibility), with abnormal sensations or severe pain, that prevents most activity | 81 – 99 | 1 | Slight contraction and no movement | 76 – 99 |
| 0 | Absent sensibility, abnormal sensations, or severe pain that prevents all activity | 100 | 0 | No movement | 100 |

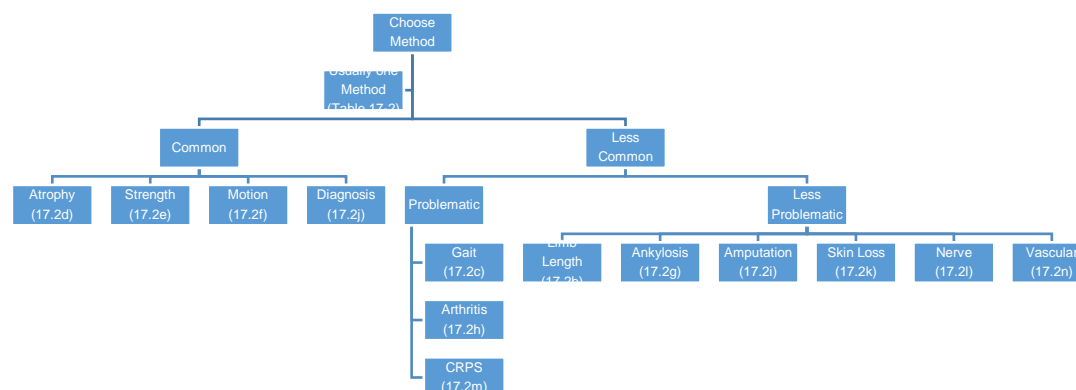
Chapter 17 – The Lower Extremities

Overview

This chapter provides criteria for evaluating permanent impairment of the lower extremities, including impairment ratings that reflect an individual's ability to perform the activities of daily living (ADL). For evaluation purposes, the lower extremities are divided into six sections: the feet, the hindfeet, the ankles, the legs, the knees, the hips, and the pelvis. In addition to the skeletal framework, assessment of the lower extremities also requires an assessment of its joints and the associated soft tissues, vascular system, and nervous system. The lower extremities are evaluated on the basis of anatomic changes, diagnostic categories, and functional changes. It is comprised of the following sections:

- 17.1 Principles of Assessment
- 17.2 Methods of Assessment
- 17.3 Lower Extremity Impairment Evaluation Procedure Summary and Examples

Lower Extremity Impairment Evaluation Algorithm



Principles of Assessment

NB: It is important to ensure that lower extremity impairment discussed in this chapter is not due to underlying spine pathology. If lower extremity impairment is due to an underlying spine disorder, the lower extremity impairment would, in most cases, be accounted for in the spine impairment rating. So you would need to go to the Spine Chapter.

- The first step is to identify each part of the lower extremity that might possibly warrant an impairment rating (Pelvis, Hip, Thigh/Knee, Calf/Ankle/Foot, & Toe) and then determines whether ROM impairment or other regional impairments are present for each relevant part and derive an impairment rating.
- Let's start first by considering all the possible methods used for an impairment rating (*we will come back later and select the clinically most appropriate (i.e., most specific) method(s) to calculate the impairment rating and then use the cross-usage chart (Table 17-2) to decide which methods and resulting impairment ratings may be combined*).
- Let's start first by considering all the 13 possible methods used for a Lower Extremity impairment rating, as specified in Table 17-1 (5th ed., 525).

13 possible methods used for a Lower Extremity impairment rating

| |
|--|
| <i>Limb Length Discrepancy</i> |
| <i>Gait Derangement</i> |
| <i>Muscle Atrophy (Unilateral)</i> |
| <i>Manual Muscle Testing</i> |
| <i>Range of Motion</i> |
| <i>Joint Ankylosis</i> |
| <i>Arthritis</i> |
| <i>Amputations</i> |
| <i>Diagnosis-Based Estimates</i> |
| <i>Skin Loss</i> |
| <i>Peripheral Nerve Injuries</i> |
| <i>Causalgia and Complex Regional Pain Syndrome (Reflex Sympathetic Dystrophy)</i> |
| <i>Vascular Disorders</i> |

Limb Length Discrepancy

- Section 17.2b (5th ed., 528)
- While x-rays are the most accurate way to measure a limb length discrepancy, the most common measurement method is to place the individual supine and measure the distance between the anterior superior iliac spine and the medial malleolus on the involved side, and compare it with the opposite side.
- Impairments from limb length discrepancy depend on the magnitude of the leg length difference and are provided in Table 17-4 (5th ed., 528). When applicable, the leg length discrepancy impairment is combined with other impairments.

Gait Derangement

- Section 17.2b (5th ed., 529)
- Gait derangement is always secondary to another condition. An impairment rating due to a gait derangement should be supported by pathologic findings, such as x-rays. Except as otherwise noted, the percentages given in Table 17-5 (5th ed., 529, are for full-time gait derangements of persons who are dependent on assistive devices. *Whenever possible, the evaluator should use a more specific method.* When the gait method is used, a written rationale should be included in the report. Gait Derangement does not apply to abnormalities based only on subjective factors, such as pain or sudden giving-way, as with, for example, an individual with low-back discomfort who chooses to use a cane to assist in walking. Go to Table 17-5, Lower Limb Impairment Due to Gait Derangement (page 529), and you should pick the descriptor that best match the examinee's Gait Derangement. Record the WPI.

Muscle Atrophy (Unilateral)

- Section 17.2d (5th ed., 530-521)
- In evaluating muscle atrophy, the leg circumference should be measured and compared to the opposite leg at equal distances from either the joint line or another palpable anatomic structure. Thigh atrophy may involve measuring the thigh circumference with a tape measure 10cm above the patella and comparing it to a similar measure on the other leg. Calf circumference is compared at the maximum level bilaterally. Neither limb should have swelling or varicosities that would invalidate the measurements. Do not provide an impairment rating for Muscle Atrophy unless there is legitimate muscle atrophy. Impairment ratings from atrophy are provided in Table 17-6 (5th ed., 530).
- Diminished muscle function can be estimated using four different methods. Only one should be used; that is, use only one method for assessing muscle function. Atrophy ratings should not be combined with any of the other three possible ratings of diminished muscle function (gait derangement, muscle weakness, and peripheral nerve injury). When muscle dysfunction is present, assess the condition with all four methods. Use the method that most accurately and objectively reflects the individual's impairment.

Manual Muscle Testing

- Section 17.2e (5th ed., 531-533)
- There is considerable misunderstanding about manual muscle testing. This section is meant to be used for legitimate muscle weakness that is not due to a spinal or peripheral nerve injury. An example would be quadriceps weakness due to a direct muscle injury. Since muscle strength is under voluntary control, to be included as an impairment, any weakness must be correlated with pathological findings and medical evidence. Muscle "weakness" secondary to pain or fear of pain is not considered valid. Table 17.7 (5th ed., 531) lists the Criteria for Grades of Muscle Function of the Lower Extremity with "0" being no contraction and "5" being normal (active movement against gravity with full resistance). You then go to Table 17-8 (5th ed., 532) Impairment Due to Lower Extremity Muscle Weakness, to figure out the impairment rating.

Range of Motion

- Section 17.2f (5th ed., 533-538)
- Since pain and motivation can affect ROM, you must determine that there consistency of measurements and a true loss of motion to use ROM for the impairment rating. Figure 17-1 to 17-6 show ROM methods for the various lower extremity joints. Three measurements should be taken and the greatest one used. Use Tables 17-9 to 17-14 (5th ed., 537) to obtain lower extremity impairment ratings.

Joint Ankylosis

- Section 17.2g (5th ed., 538-544)
- An immobile joint is an impairment even when the ankylosis is in the optimal position. Malposition of the ankylosed joint increased the impairment. Tables 17-15 through 17-30 (5th ed., 538 to 543, are used to obtain the impairment ratings for ankylosed joints in optimal and malposition.

Arthritis

- Section 17.2h (5th ed., 544-545)
- Degenerative arthritis impairment is determined by x-ray grading of the cartilage interval (joint space narrowing) is more valid than ROM or crepitation. It is recommended that the bilateral films be taken for purposes of comparison. The following views should be taken:
 - Patellofemoral joint x-rays - “sunrise view” at 40 °.
 - Knee Joint - Proper-standing view in neutral flexion/extension position.
 - Hip Joint - positioning not critical
 - Ankle Joint - mortise view at 10 ° of internal rotation, flexion or extension
 - Hindfoot Joint - lateral view
 - Mid/forefoot joints - anteroposterior view
- Table 17-31 (5th ed., 544) Arthritis Impairments Based on Roentgenographically Determined Cartilage Intervals, provides the impairment rating for the various lower extremity joints (abnormalities involve cartilage intervals of 0, 1, 2 and 3 mm). If the contralateral joint is asymptomatic but also has an “abnormal” cartilage interval (i.e., 3mm or less), you would then have to consider this the “normal” cartilage interval for this individual. The best way to explain this is with an example. If the injured knee has a 1mm cartilage interval but the unaffected “normal” other knee has a 3mm cartilage interval, you would only calculate the impairment rating for the injured knee as 2mm.
- For the knee, in an individual with a history of direct trauma, a complaint of patellofemoral pain, and crepitation on physical examination, but without joint space narrowing on x-rays, a 2% whole person or 5% lower extremity impairment is given.

Amputations

- Section 17.21 (5th ed., 545)
- Impairments of the lower extremity due to amputations are estimated using Table 17-32 (5th ed., 545).

Diagnosis-Based Estimates

- Section 17.2j (5th ed., 545-549)
- Some impairment estimates are best based on the diagnosis rather than on physical examination findings. Table 17-33 (5th ed., 546) provides impairment estimates for certain lower extremity impairments.
- Hip replacements should first be rated using Table 17-34 (5th ed., 548) and knee replacements with Table 17-35 (5th ed., 549) The points obtained from the assessment are then applied to Table 17-33 (5th ed., 546) for the diagnosis impairment rating. Also, if there is a limb length discrepancy, the impairment value should be combined with the one from the joint replacement.

Skin Loss

- Section 17.2k (5th ed., 550)
- Full-thickness skin loss (even when successfully covered with a skin graft) can result in significant impairment as shown in Table 17-36 (5th ed., 550). This table is also used for chronic osteomyelitis.

Peripheral Nerve Injuries

- Section 17.2l (5th ed., 550-551)
- Peripheral nerve injuries are divided in two components, sensory and motor deficits. Table 17-37 (5th ed., 552), lists the impairment for a complete motor or sensory deficit. Note that there is additional impairment given for a dysesthesia (a condition in which an unpleasant sensation is produced by ordinary stimuli).
- Most peripheral nerve deficits though are not complete. Partial motor and sensory deficits should be rated using Tables 16-10 for sensory deficits and 16-11 for motor deficits in the Upper Extremity Chapter 16.
- The next step may seem a little confusing but basically you multiply the value for a complete peripheral nerve injury that you obtain from Table 17-37 by the value in Tables 16-10 for sensory deficits and 16-11 for motor deficits.
- Motor and sensory deficits should be combined but remember that the impairments from multiple peripheral nerves cannot exceed 40% (the maximum whole person impairment loss for one leg).
 - Note: This does get a little confusing so an example seems to be in order (see example 17-17 (5th ed., 552), for a complete description of this case). The examinee has a partial femoral nerve palsy with both a sensory and motor component. The sensory impairment can be rated using Tables 17-37 and 16-10. According to Table 17-37, the maximum value for a totally destroyed and nonfunctioning femoral nerve due to sensory loss and pain is 9% lower extremity impairment. The

sensory deficit and pain are forgotten with activity, so a severity multiplier of grade 4 may be chosen from Table 16-10; grade 4 includes a range of multipliers from 1% to 25%. If a multiplier of 20% is chosen, 20% of the 9% maximum value of the nerve is 2% lower extremity impairment for loss of sensation and pain. The motor weakness impairment can be calculated in a similar manner. Table 17-37 indicates that the maximal impairment for total loss of femoral nerve motor function is 37% lower extremity impairment. The exam shows that the examinee can move the leg through a full range of motion against gravity, but with only minimal added resistance. This is grade 4 weakness according to manual muscle testing criteria. Table 16-11 indicates that grade 4 weakness can qualify for a severity multiplier of anywhere from 1% to 25%. If a multiplier of 25% is chosen since the weakness is very significant, 25% multiplied by the 37% maximal value of the nerve for weakness yields a total of 9% lower extremity impairment. Using the Combined Values Chart (p. 604) to combine the 9% lower extremity impairment for motor weakness with the 2% lower extremity impairment for loss of sensation and pain yields a rating of 11% lower extremity impairment. The 11% lower extremity impairment is equivalent to 4% ($11\% \times 0.4 = 4\%$) whole person impairment (the 0.4 multiplier comes from the lower extremity maximum value of 40% WPI).

Causalgia and Complex Regional Pain Syndrome (Reflex Sympathetic Dystrophy)

- Section 17.2m (5th ed., 553-534)
- The pathology in CRPS is currently believed to occur in the central nervous system, so the evaluator should use the station and gait impairment criteria in Chapter 13, Table 13-15 (5th ed., 336, to rate lower extremity impairments due to lesions in the central nervous system (brain and/or spinal cord). You should choose one of the four categories that best describes the examinee's impairment. There is a wide range for each category and you should choose the percentage impairment based on whether the impairment is closer to the category above or below the one you have pick and the extent of the examinee's ADL deficits.

Vascular Disorders

- Section 17.2n (5th ed., 553)
- Table 17-38 (5th ed., 554, classifies and provides criteria for impairments due to peripheral vascular disease.

Combining Lower Extremity Impairment

- It is imperative that you reference Table 17-2 Guide to the Appropriate Combination of Evaluation Methods (5th ed., 526) to determine which methods can be combined. "Typically one method will adequately characterize the impairment." (5th ed., 527).
- For each region of the lower extremity with an impairment, you may come up with an impairment rating but remember that the Lower Extremity impairment rating cannot exceed 100% and the whole person impairment cannot exceed 40%.
- If there are several impairments involving different regions of the lower extremity (eg, the thigh and the foot), evaluate each impairment separately, convert these regional impairments to whole person impairments, and combine the whole person impairment rating using the Combined Values Chart (p. 604). If there are multiple impairments within a region (eg, the toes and the ankle), combine these regional, lower

extremity impairments of the foot and convert the combined foot impairment to a whole person impairment. Similarly, when using separate methods on the same region, combine the regional impairments before converting to a whole person impairment rating.

Calculating Lower Extremity Impairment

- The last steps are to select the clinically most appropriate (i.e., most specific) method(s) to calculating the impairment rating and then to use the cross-usage chart (Table 17-2) to decide which methods and resulting impairment ratings may be combined.
- This can be a little confusing. You have made a series of measurements of the affected lower extremity body parts using the AMA Guides recommended 13 possible methods used for a Lower Extremity impairment rating. But, which ones can you use and which ones can be combined?
- The AMA Guides tells us to select the most appropriate method(s) based on the history and physical examination. It is the responsibility of the evaluating physician to explain in writing why a particular method(s) to assign the impairment rating was chosen. When uncertain about which method to choose, the evaluator should calculate the impairment using different alternatives and choose the method or combination of methods that gives the most clinically accurate impairment rating.
- Typically, one method will adequately characterize the impairment and its impact on the ability to perform ADL. In some cases, however, more than one method needs to be used to accurately assess all features of the impairment. When more than one rating method is used, the individual impairment ratings are combined using the Combined Values Chart (p. 604). Avoid combining methods that rate the same condition. Selecting the optimal approach or combining several methods requires judgment and experience. A careful examination and review of supporting material is essential to produce accurate and consistent results. If more than one method can be used, typically the one resulting in the higher rating is chosen, assuming that this method is reliable. (For example, if a patient demonstrates marked strength deficits and pain behaviors, however has minimal atrophy, a rating by strength may not be reliable and therefore would not be chosen.
- Some of the 13 methods can be combined and some can't. Some, such as Gait Derangement, cannot be combined with other methods and further, are not to be used unless no other method adequately describes the impairment.
- The next step is to use the cross-usage table (Table 17-2 (5th ed., 526) to ensure only the proper methods are combined. Simply put, open boxes indicate impairment ratings derived from these methods can be combined and an "X" means you cannot use these methods together for evaluating a single impairment.
- Although diminished muscle function can be evaluated by means of four methods (peripheral nervous system impairment, atrophy, manual muscle testing, or gait), the AMA Guides recommends using only the method that has the greatest specificity (e.g., a peripheral nerve injury, if present).
- Selecting the optimal approach or combining several methods requires judgment and experience. A careful examination and review of supporting material is essential to produce accurate and consistent results. If more than one method can be used, the method that provides the higher rating should be adopted.
- Converting from lower extremity to Whole Person Impairment (WPI) can be a little confusing. The tables in this chapter show the impairment percentages of the whole person (not in parentheses); the lower limb impairment percents are in parentheses (); and, when applicable, the specific part impairments are in brackets []. To calculate the lower extremity impairment percent from a specific part impairment percent (e.g., foot), multiply by 0.7. To calculate whole person impairment from a lower extremity impairment, multiply by 0.4. These values are shown in Table 17-3 (5th ed., 527).

- Some individuals may have several impairments involving different parts of the same lower extremity; others may have several impairments of the same lower extremity part. If there are several impairments involving different regions of the lower extremity (e.g., the thigh and the foot), evaluate each impairment separately, convert these regional impairments to whole person impairments, and combine the whole person impairment rating using the Combined Values Chart (5th ed., 604).
- If there are multiple impairments within a region (e.g., the toes and the ankle), combine these regional, lower extremity impairments of the foot and convert the combined foot impairment to a whole person impairment. Similarly, when using separate methods on the same region, combine the regional impairments before converting to a whole person impairment rating.
- If there are several alternatives, use the grouping that provides the greatest impairment percent. Convert a lower extremity impairment rating to whole person impairment using the appropriate tables. Combine whole person impairments for each injury/illness for the same extremity using the Combined Values Chart (5th ed., 604).
- If more than one leg is involved, each lower extremity is rated separately and converted to whole person; then both whole person ratings (right and left leg) are combined using the Combined Values Chart.

Lower Extremity Physical Examination Protocols

Amputation

| Right | Left |
|--|--|
| <input type="checkbox"/> Hemipelvectomy | <input type="checkbox"/> Hemipelvectomy |
| <input type="checkbox"/> Hip disarticulation | <input type="checkbox"/> Hip disarticulation |
| <input type="checkbox"/> Above knee | <input type="checkbox"/> Above knee |
| <input type="checkbox"/> Proximal | <input type="checkbox"/> Proximal |
| <input type="checkbox"/> Midthigh | <input type="checkbox"/> Midthigh |
| <input type="checkbox"/> Distal | <input type="checkbox"/> Distal |
| <input type="checkbox"/> Knee disarticulation | <input type="checkbox"/> Knee disarticulation |
| <input type="checkbox"/> Below knee | <input type="checkbox"/> Below knee |
| <input type="checkbox"/> Less than 3” | <input type="checkbox"/> Less than 3” |
| <input type="checkbox"/> 3” or more | <input type="checkbox"/> 3” or more |
| <input type="checkbox"/> Syme (hindfoot) | <input type="checkbox"/> Syme (hindfoot) |
| <input type="checkbox"/> Midfoot | <input type="checkbox"/> Midfoot |
| <input type="checkbox"/> Transmetatarsal | <input type="checkbox"/> Transmetatarsal |
| <input type="checkbox"/> First metatarsal | <input type="checkbox"/> First metatarsal |
| <input type="checkbox"/> Other metatarsals | <input type="checkbox"/> Other metatarsals |
| <input type="checkbox"/> All toes at metatarsophalangeal | <input type="checkbox"/> All toes at metatarsophalangeal |
| <input type="checkbox"/> (MTP) joint | <input type="checkbox"/> (MTP) joint |
| <input type="checkbox"/> Great toe at MTP joint | <input type="checkbox"/> Great toe at MTP joint |

The following forms provide a mechanism for recording findings and considering regional impairments.

Hip Examination

(Note: Rate each extremity separately.)

| HIP (RANGE OF MOTION): | Right | | Left | |
|-------------------------|-------|-----------|------|-----------|
| | ROM | Strength | ROM | Strength |
| Flexion (100°) | | 0 1 2 3 4 | | 0 1 2 3 4 |
| Extension (30°) | | 0 1 2 3 4 | | 0 1 2 3 4 |
| Abduction (40°) | | 0 1 2 3 4 | | 0 1 2 3 4 |
| Abduction contracture | | XXXXX | | XXXXX |
| Adduction (20°) | | 0 1 2 3 4 | | 0 1 2 3 4 |
| External Rotation (50°) | | 0 1 2 3 4 | | 0 1 2 3 4 |
| Internal Rotation (40°) | | 0 1 2 3 4 | | 0 1 2 3 4 |

- Use uninvolved side as baseline for comparison.**
 - If a contralateral “normal” joint has less than average mobility; the impairment values(s) corresponding to the uninvolved joint can serve as a baseline and are subtracted from the calculated impairment from the involved joint. The rationale for this decision should be included in the report.
 - Enter rationale for using uninvolved side _____

Diagnosis Based Estimate (DBE) (do each side separately)

- Arthritis Impairments Based on Roentgenographically Determined Cartilage Intervals (Table 17-31 (5th ed., 544)

| Right | Left |
|-------|------|
| 0 mm | 0 mm |
| 1 mm | 1 mm |
| 2 mm | 2 mm |
| 3 mm | 3 mm |

- Limb Length Discrepancy (Table 17-4 (5th ed., 528)
 - _____ cm
 - shortening due to overriding or malalignment or fracture deformities, but not to include flexion or extension deformities
- Impairment for Skin Loss (Table 17-36 (5th ed., 550)
 - Ischial covering that requires frequent unweighting and limits sitting time
- Femoral neck fracture, healed in
 - Good position (Evaluate according to examination findings)
 - Malunion plus range-of-motion criteria
 - Nonunion plus range-of-motion criteria
- Girdlestone arthroplasty Or estimate according to examination findings; use the greater estimate
- Trochanteric bursitis (chronic) with abnormal gait
- Total hip replacement (see Rating Hip Replacement Results below); includes endoprosthesis, unipolar or bipolar
 - Good results, 85-100 points
 - Fair results, 50-84 points
 - Poor results, less than 50 points

Table 17-34 Rating Hip Replacement Results (5th ed., 548 (do each hip separately if bilateral THR).

| | |
|---|--|
| <input type="checkbox"/> a. Pain | <input type="checkbox"/> d. Deformity |
| ○ None | ○ Fixed adduction < 10° |
| ○ Slight | ○ Fixed adduction ≥ 10° |
| ○ Moderate, Occasional | ○ Fixed internal rotation < 10° |
| ○ Moderate | ○ Fixed internal rotation ≥ 10° |
| ○ Marked | ○ Fixed external rotation < 10° |
| <input type="checkbox"/> b. Function | ○ Fixed external rotation ≥ 10° |
| ○ Limp | ○ Flexion contracture < 15° |
| ▪ None | ○ Flexion contracture ≥ 15° |
| ▪ Slight | ○ Leg length discrepancy < 1.5 cm |
| ▪ Moderate | ○ Leg length discrepancy ≥ 1.5 cm |
| ▪ Severe | <input type="checkbox"/> e. Range of Motion |
| ○ Supportive device | ○ Flexion > 90° |
| ▪ None | ○ Flexion ≤ 90° |
| ▪ Cane for long walks | ○ Abduction > 15° |
| ▪ Cane | ○ Abduction ≤ 15° |
| ▪ One crutch | ○ Adduction > 15° |
| ▪ Two canes | ○ Adduction ≤ 15° |
| ▪ Two crutches | ○ External rotation > 30° |
| ○ Distance walked | ○ External rotation ≤ 30° |
| ▪ Unlimited | ○ Internal rotation > 15° |
| ▪ Six blocks | ○ Internal rotation ≤ 15° |
| ▪ Three blocks | <input type="checkbox"/> d. Deformity |
| ▪ Indoors | ○ Fixed adduction < 10° |
| ▪ In bed or chair | ○ Fixed adduction ≥ 10° |
| <input type="checkbox"/> c. Activities | ○ Fixed internal rotation < 10° |
| ○ Stairs climbing | ○ Fixed internal rotation ≥ 10° |
| ▪ Normal | ○ Fixed external rotation < 10° |
| ▪ Using railing | ○ Fixed external rotation ≥ 10° |
| ▪ Cannot climb readily | ○ Flexion contracture < 15° |
| ▪ Unable to climb | ○ Flexion contracture ≥ 15° |
| ○ Putting on shoes and socks | ○ Leg length discrepancy < 1.5 cm |
| ▪ With ease | |
| ▪ With difficulty | |
| ▪ Unable to do | |
| ○ Sitting | |
| ▪ Any chair, 1 hour | |
| ▪ High chair | |
| ▪ Unable to sit comfortably | |
| ○ Public transportation | |
| ▪ Able to use | |
| ▪ Unable to use | |

Knee Examination

(Note: Rate each extremity separately.)

| KNEE | Right | Left | Right | Left |
|---|------------|-----------------|------------|-----------------|
| <input type="checkbox"/> Normal exam | ROM | Strength | ROM | Strength |
| Flexion (150°) | | 0 1 2 3 4 | | 0 1 2 3 4 |
| Extension (0°)† | | 0 1 2 3 4 | | 0 1 2 3 4 |
| Varus†† | | XXXXX | | XXXXXX |
| Valgus†† (3° to 10° valgus = normal) | | XXXXX | | XXXXXX |
| Ankylosis in internal or external malrotation | | XXXXXX | | XXXXXX |

† flexion contracture = loss of extension

†† Deformity measured by femoral-tibial angle

3° to 10° valgus = normal

| <input type="checkbox"/> KNEE Special Tests | Right | Left |
|---|-----------------------------------|-----------------------------------|
| Lachman’s | <input type="checkbox"/> Positive | <input type="checkbox"/> Positive |
| McMurray | <input type="checkbox"/> Positive | <input type="checkbox"/> Positive |
| Anterior drawer | <input type="checkbox"/> Positive | <input type="checkbox"/> Positive |
| Posterior drawer | <input type="checkbox"/> Positive | <input type="checkbox"/> Positive |
| Ligamentous laxity | <input type="checkbox"/> Positive | <input type="checkbox"/> Positive |

* If laxity present, grade magnitude of laxity

Use uninvolved side as baseline for comparison.

- If a contralateral “normal” joint has less than average mobility; the impairment values(s) corresponding to the uninvolved joint can serve as a baseline and are subtracted from the calculated impairment from the involved joint. The rationale for this decision should be included in the report.
- Enter rationale for using uninvolved side _____

Diagnosis Based Estimate (DBE) (do each side separately)

Arthritis Impairments Based on Roentgenographically Determined Cartilage Intervals (Table 17-31 (5th ed., 544)

- Knee – cartilage interval

| Right | Left |
|-------|------|
| 0 mm | 0 mm |
| 1 mm | 1 mm |
| 2 mm | 2 mm |
| 3 mm | 3 mm |

- Patellofemoral – cartilage interval

| Right | Left |
|-------|------|
| 0 mm | 0 mm |
| 1 mm | 1 mm |
| 2 mm | 2 mm |
| 3 mm | 3 mm |

- In an individual with a history of direct trauma, a complaint of patellofemoral pain, and crepitation on physical exam. but without joint space narrowing on x-rays, a 2% whole person or 5% lower extremity impairment is given

- Patellar subluxation or dislocation with residual instability

- Patellar fracture
 - Undisplaced, healed
 - Articular surface displaced more than 3 mm
 - Displaced with nonunion
- Patellectomy
 - Partial / Total
- Meniscectomy, medial *or* lateral
 - Partial / Total
- Meniscectomy, medial *and* lateral
 - Partial / Total
- Cruciate *or* collateral ligament laxity
 - Mild // Moderate / Severe
- Cruciate *and* collateral ligament laxity
 - Moderate / Severe
- Plateau fracture
 - Undisplaced / Displaced: 5°-9° angulation / 10°-19° angulation 20°+ angulation
- Supracondylar or intercondylar fracture
 - Undisplaced fracture
 - Displaced fracture
 - Angulation: 5°-9° / 10°-19° / 20°+
 -
- Total knee replacement including unicondylar replacement (see TKR Chart Table 17-35 below)
 - Results: Good / Fair / Poor

Table 17-35 Rating Knee Replacement Results (5th ed., 549 (do each knee separately if bilateral TKR). The point total for estimating knee replacement results is calculated as the sum of the points in categories a, b, and c minus the sum of the points in categories d, e, and f.

| |
|--|
| <input type="checkbox"/> a. Pain |
| ○ None |
| ○ Mild or occasional |
| ▪ Stairs only |
| ▪ Walking and stairs |
| ○ Moderate |
| ▪ Occasional |
| ▪ Continual |
| ▪ Severe |
| <input type="checkbox"/> b. Range of Motion (flexion and extension added) |
| ○ Add 1 point per 5° |
| <input type="checkbox"/> c. Stability (maximum movement in any position) |
| ○ Anteroposterior |
| ▪ < 5 mm |
| ▪ 5-9 mm |
| ▪ > 9 mm |
| ○ Mediolateral |
| ▪ 5° |
| ▪ 6°-9° |
| ▪ 10°-14° |
| ▪ ≥ 15° |

| |
|--|
| <input type="checkbox"/> d. Flexion contracture |
| <input type="radio"/> 5°-9° |
| <input type="radio"/> 10°-15° |
| <input type="radio"/> 16°-20° |
| <input type="radio"/> > 20° |
| <input type="checkbox"/> e. Extension lag |
| <input type="radio"/> < 10° |
| <input type="radio"/> 10°-20° |
| <input type="radio"/> > 20° |
| <input type="checkbox"/> f. Alignment |
| <input type="radio"/> 0°- 4° |
| <input type="radio"/> 5°-10° |
| <input type="radio"/> 11°-15° |
| <input type="radio"/> > 15° 20 |

- Proximal tibial osteotomy
 - Good result
 - Poor result (Estimate impairment according to examination and arthritic degeneration)

- Femoral shaft fracture Healed with 10°-14° angulation or malrotation 15°-19° & 20°+

- Skin Loss
 - Tibial tuberosity covering that limits kneeling
 - Chronic osteomyelitis with active drainage of upper tibia
 - Chronic osteomyelitis with active drainage of femur

- Unilateral Thigh Muscle Atrophy ____cm (The circumference is measured 10 cm above the patella with the knee fully extended and the muscles relaxed)

Calf / Ankle / Foot Examination

(Note: Rate each extremity separately.)

| ANKLE (ROM) | | | | |
|--------------------------------------|-----|-----------|-----|-----------|
| <input type="checkbox"/> Normal exam | ROM | Strength | ROM | Strength |
| Ankle Dorsiflexion (40°) | | 0 1 2 3 4 | | 0 1 2 3 4 |
| Ankle Plantar Flexion (20°) | | 0 1 2 3 4 | | 0 1 2 3 4 |
| Ankle flexion contracture | | XXXXX | | XXXXX |
| Foot Inversion (30°) | | 0 1 2 3 4 | | 0 1 2 3 4 |
| Foot Eversion (20°) | | 0 1 2 3 4 | | 0 1 2 3 4 |
| Ankle Varus | | XXXXX | | XXXXX |
| Ankle Valgus | | XXXXX | | XXXXX |
| Ankle Internal Malrotation | | XXXXX | | XXXXX |
| Ankle External Malrotation | | XXXXX | | XXXXX |

- Arthritis Impairments Based on Roentgenographically Determined Cartilage Intervals (Table 17-31 (5th ed., 544))

| Joint | Cartilage Interval | | Cartilage Interval | | Cartilage Interval | | Cartilage Interval | |
|----------------|--------------------|------|--------------------|------|--------------------|------|--------------------|------|
| | Right | Left | Right | Left | Right | Left | Right | Left |
| Ankle | 3 | 3 | 2 | 2 | 1 | 1 | 0 | 0 |
| Subtalar | 3 | 3 | 2 | 2 | 1 | 1 | 0 | 0 |
| Talonavicular | 3 | 3 | 2 | 2 | 1 | 1 | 0 | 0 |
| Calcaneocuboid | 3 | 3 | 2 | 2 | 1 | 1 | 0 | 0 |

- Unilateral Calf Muscle Atrophy ____ cm
- Use uninvolved side as baseline for comparison.
 - If a contralateral “normal” joint has less than average mobility; the impairment values(s) corresponding to the uninvolved joint can serve as a baseline and are subtracted from the calculated impairment from the involved joint. The rationale for this decision should be included in the report.
 - Enter rationale for using uninvolved side _____

Diagnosis Based Estimate (DBE) (do each side separately)

- Tibial shaft fracture, malalignment of
 - 10°-14° / 15°-19° / 20°+
- Ankle Ligamentous instability (based on stress x-rays‡)
 - Mild (2-3 mm excess opening) / Moderate (4-6 mm) / Severe (> 6 mm)
- Fracture Extra-articular with angulation
 - 10°-14° / 15°-19° / 20°+
- Fracture Intra-articular with displacement
- Hindfoot Fracture Extra-articular (calcaneal)
 - With varus angulation: 10°-19° / 20°+
 - With valgus angulation 10°-19° / 20°+
- Loss of tibia–os calcis angle§
 - Angle is 120°-110° / Angle is 100°-90° / Angle is less than 90°

- ❑ Intra-articular fracture with displacement
 - Subtalar bone
 - Talonavicular bone
 - Calcaneocuboid bone
- ❑ Midfoot deformity
 - Cavus
 - Mild / Moderate
 - “Rocker bottom”
 - Mild / Moderate / Severe
 - Avascular necrosis of the talus
 - Without collapse / With collapse
- ❑ Skin loss
 - Chronic osteomyelitis with active drainage of tibia
 - Heel covering that limits standing and walking time
 - Chronic osteomyelitis with active drainage of foot, requiring periodic redressing and limiting time using footwear

Toe Examination

(Note: Rate each extremity separately.)

Use uninvolved side as baseline for comparison.

- If a contralateral “normal” joint has less than average mobility; the impairment values(s) corresponding to the uninvolved joint can serve as a baseline and are subtracted from the calculated impairment from the involved joint. The rationale for this decision should be included in the report.
- Enter rationale for using uninvolved side _____

Diagnosis Based Estimate (DBE)

Forefoot deformity

- Metatarsal fracture with loss of weight transfer

| Right | Left |
|------------------|------------------|
| 1st metatarsal | 1st metatarsal |
| 5th metatarsal | 5th metatarsal |
| Other metatarsal | Other metatarsal |

- Metatarsal fracture with plantar angulation and metatarsalgia

| Right | Left |
|------------------|------------------|
| 1st metatarsal | 1st metatarsal |
| 5th metatarsal | 5th metatarsal |
| Other metatarsal | Other metatarsal |

Skin Loss

- Plantar surface, metatarsal head covering that limits standing and walking time

| Right | Left |
|----------------|----------------|
| 1st metatarsal | 1st metatarsal |
| 5th metatarsal | 5th metatarsal |

Muscle Weakness Great Toe

| Right | Left |
|-------|------|
| 0 | 0 |
| 1 | 1 |
| 2 | 2 |
| 3 | 3 |
| 4 | 4 |

Arthritis Impairments Based on Roentgenographically Determined Cartilage Intervals (Table 17-31 (5th ed., 544))

| Metatarsophalangeal | Cartilage Interval | | Cartilage Interval | | Cartilage Interval | | Cartilage Interval | |
|---------------------|--------------------|------|--------------------|------|--------------------|------|--------------------|------|
| | Right | Left | Right | Left | Right | Left | Right | Left |
| First | 3 | 3 | 2 | 2 | 1 | 1 | 0 | 0 |
| Second | 3 | 3 | 2 | 2 | 1 | 1 | 0 | 0 |
| Third | 3 | 3 | 2 | 2 | 1 | 1 | 0 | 0 |
| Fourth | 3 | 3 | 2 | 2 | 1 | 1 | 0 | 0 |
| Fifth | 3 | 3 | 2 | 2 | 1 | 1 | 0 | 0 |

☐ ROM

| TOE | ROM | | Ankylosis (position) | | | | | |
|-------------------------|-------|------|----------------------|------|----------------------|------|--------------|------|
| | Right | Left | Full-extension | | Position-of-function | | Full-flexion | |
| | | | Right | Left | Right | Left | Right | Left |
| Great Toe MTP Extension | | | | | | | | |
| Great Toe IP Flexion | | | | | | | | |
| MTP Extension Toe #2 | | | | | | | | |
| MTP Extension Toe #3 | | | | | | | | |
| MTP Extension Toe #4 | | | | | | | | |
| MTP Extension Toe #5 | | | | | | | | |

Lower Extremity Peripheral Nerve Deficits

(Note: Rate each extremity separately.)

| Nerves | Sensory Grade / Deficit (%) | | | | Motor Grade / Deficit (%) | | | | Dysesthesia Grade / Deficit (%) | | | |
|---------------------------|-----------------------------|---|-------------|---|---------------------------|---|-------------|---|---------------------------------|---|-------------|---|
| | Right | | Left | | Right | | Left | | Right | | Left | |
| | Grade | % | Grade | % | Grade | % | Grade | % | Grade | % | Grade | % |
| Femoral | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | |
| Obturator | XXXXXX | X | XXXXXX | X | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | XXXXXX | X | XXXXXX | X |
| Superior gluteal | XXXXXX | X | XXXXXX | X | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | XXXXXX | X | XXXXXX | X |
| Inferior gluteal | XXXXXX | X | XXXXXX | X | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | XXXXXX | X | XXXXXX | X |
| Lateral femoral cutaneous | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | XXXXXX | X | XXXXXX | X | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | |
| Sciatic | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | |
| Common peroneal | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | |
| Superficial peroneal | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | XXXXXX | X | XXXXXX | X | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | |
| Sural | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | XXXXXX | X | XXXXXX | X | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | |
| Medial plantar | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | |
| Lateral plantar | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | | 0 1 2 3 4 5 | |

| | Sensory Deficit or Pain Grade | Deficit (%) | Strength Grade | Deficit (%) |
|---|--|-------------|--|-------------|
| 5 | No loss of sensibility, abnormal sensation, or pain | 0 | 5 Active movement against gravity with full resistance | 0 |
| 4 | Distorted superficial tactile sensibility (diminished light touch), with or without minimal abnormal sensations or pain, that is forgotten during activity | 1 - 25 | 4 Active movement against gravity with some resistance | 1 -25 |
| 3 | Distorted superficial tactile sensibility (diminished light touch and two-point discrimination), with some abnormal sensations or slight pain, that interferes with some activities | 26 – 60 | 3 Active movement against gravity only, without resistance | 26 – 50 |
| 2 | Decreased superficial cutaneous pain and tactile sensibility (decreased protective sensibility), with abnormal sensations or moderate pain, that may prevent some activities | 61 – 80 | 2 Active movement with gravity eliminated | 51 – 75 |
| 1 | Deep cutaneous pain sensibility present; absent superficial pain and tactile sensibility (absent protective sensibility), with abnormal sensations or severe pain, that prevents most activity | 81 – 99 | 1 Slight contraction and no movement | 76 – 99 |
| 0 | Absent sensibility, abnormal sensations, or severe pain that prevents all activity | 100 | 0 No movement | 100 |

Pelvis Examination

(Pelvis Disorders can be determined in both Chapter 17, The Lower Extremities, and in Chapter 15, The Spine. You may use either Chapter and take the higher Impairment Rating but not both.)

- ❑ Pelvic fracture (Table 17-33 (5th ed., 546))
 - Undisplaced, nonarticular, healed, without neurologic deficit or other sign
 - Displaced nonarticular fracture: — estimate by evaluating shortening and weakness
 - Acetabular fracture: estimate — according to range of motion and joint changes
 - Sacroiliac joint fracture: consider displacement
 - Ischial bursitis (weaver's bottom) requiring frequent unweighting and limiting of sitting time

- ❑ Sacroiliac Joint: Arthritis Impairments Based on Roentgenographically Determined Cartilage Intervals (Table 17-31 (5th ed., 544))
 - 3 mm (normal for the SI joint)
 - 2 mm
 - 1 mm
 - 0 mm

Chapter 18 – Pain

While the Guides emphasize objective assessment, subjective symptoms are “included” within the diagnostic criteria. There is a separate allowance for up to an additional 3% whole person permanent impairment when pain is above and beyond what would be expected for a particular condition, as explained in Chapter 18, Pain. However, non-verifiable pain conditions (such as fibromyalgia) are not ratable.

Workers compensation jurisdictions may provide specific directives on rating pain. For example, in California the Schedule For Rating Permanent Disabilities states on page 1-12:

3. Rating Impairment Based on Pain

Pursuant to Chapter 18 of the AMA Guides, a whole person impairment rating based on the body or organ rating system of the AMA Guides (Chapters 3 through 17) may be increased by 0% up to 3% WPI if the burden of the worker's condition has been increased by pain-related impairment in excess of the pain component already incorporated in the WPI rating in Chapters 3-17. (AMA Guides, p. 573.)

A physician may perform a formal pain-related impairment assessment if deemed necessary to justify the increase of an impairment rating based on the body or organ rating system. (See Section 18.3f of the AMA Guides starting on page 575.)

The maximum allowance for pain resulting from a single injury is 3% WPI regardless of the number of impairments resulting from that injury.

The addition of up to 3% for pain is to be made at the whole person level. For example, if an elbow impairment were to be increased by 3% for pain, the rating for the elbow would first be converted to the whole person scale, and then increased. The resultant rating would then be adjusted for diminished future earning capacity, occupation and age.

In the case of multiple impairments, the evaluating physician shall, when medically justifiable, attribute the pain in whole number increments to the appropriate impairments. The additional percentage added for pain will be applied to the respective impairments as described in the preceding paragraph.

The following criteria must be met to give an additional impairment rating for pain.

- When There Is Excess Pain in the Context of Verifiable Medical Conditions That Cause Pain
- When There Are Well-Established Pain Syndromes Without Significant, Identifiable Organ Dysfunction to Explain the Pain (i.e., headache, postherpetic neuralgia, Tic douloureux & CRPS/RSD)

There is no impairment rating for low credibility, non-verifiable, ambiguous or controversial pain syndromes.

In California, the physician must apportion by body part (region). The Pain impairment rating can be divided by affected body part but can never be greater than 3% WPI total.

To justify an additional impairment rating for pain, the following questions must be answered.

1. Does the body system impairment rating adequately encompass the individual's pain?
 - a. Yes; stop here, you cannot give an additional impairment for Pain.
 - b. No; go on to the next question.
2. Does the pain related impairment increase the burden of the individual's condition slightly or severely?

- a. No; stop here, you cannot give an additional impairment for Pain.
 - b. Yes; go on to the next question.
3. Is the individual credible?
- a. No; stop here, you cannot give an additional impairment for Pain.
 - b. Yes; go on to the next question.
4. Do the individual's pain symptoms and/or physical findings match any known medical condition?
- a. No; stop here, you cannot give an additional impairment for Pain.
 - b. Yes; go on to the next question.
5. Is the individual's pain presentation typical of the diagnosed condition?
- a. No; stop here, you cannot give an additional impairment for Pain.
 - b. Yes; go on to the next question.
6. Is the diagnosed pain condition one that is widely accepted by physicians as having a well-defined pathophysiological basis?
- a. No; stop here, you cannot give an additional impairment for Pain.
 - b. Yes; you may give up to an additional 3% Whole Person impairment rating by body region.

Pain Rating _____%

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