

# **SPINE, LOWER EXTREMITY, AND PELVIC IMPAIRMENT SECTION**

## **OBJECTIVES FOR SPINAL, LOWER EXTREMITY, AND PELVIC IMPAIRMENT RATING SECTION**

1. Demonstrate ability to properly measure range of motion for all joints found in the lower extremity.
2. Be able to use Table 53 - Impairments Due to Specific Disorders of the Spine - to determine impairment for specific clinical diagnoses.
3. Correctly determine pelvic impairment in a case scenario.
4. Determine spinal nerve root dysfunction accurately using a specific case scenario.
5. Use correctly all tables found in this chapter, including:
  - Table 47-Impairment of the Digits Foot Lower Extremity and Whole Person due to Amputations,
  - Table 45-Impairments of the Lower Extremity Due to Other Disorders of the Hip Joint,
  - Table 52-Impairment of the Lower Extremity Due to Peripheral Vascular Disease, and
  - Table 40 Impairment Ratings of the Lower Extremity for other Disorders of the Knee.
6. Demonstrate the ability to combine all the appropriate factors used in a spinal case and determine a correct impairment rating.
7. Report clinical cases properly on Figure 83, Lumbar Range of Motion form, found on Pages 84 and 85.
8. Demonstrate the ability to properly use the inclinometer to measure cervical, thoracic, and lumbar ranges of motion. (Performed in workshop)

## **SPINAL, LOWER EXTREMITY, AND PELVIC IMPAIRMENT**

### **LOWER EXTREMITY**

#### **Definition of ankylosis**

"complete absence of motion or planar restriction of motion preventing the subject from reaching the neutral position of motion in that plane."

#### **Amputation**

When an amputation occurs at a joint the physician is required to calculate the percentage impairment. Refer to Table 47, p.73 for a summary of impairments due to amputations, *except* when calculating amputation of the toes as stated below.

Distal amputation - if the amputation occurs distal to the distal joint, the percentage of lost bone is multiplied by the total percentage of loss given on the table for amputation at the distal joint. See p.56 for example.

Proximal amputation - if the loss occurs between 2 joints - the full impairment for the lost distal portion is added to the percentage of the bone lost between the joints multiplied by the remaining impairment at the proximal joint. The remaining impairment at the proximal joint is equal to the impairment given on the appropriate table for amputation at the joint minus the full impairment for amputation at the distal joint. See p.57 for example.

#### **Great Toe**

Measure range of motion of both MTP and IP joints

Table 24, p.56, interphalangeal joint - flexion and extension

Add the range of motion deficits at each joint.

Combine the total ROM deficits for MTP and IP.

Combine ROM deficit with any amputation impairment.

Convert to foot rating using Table 27, p.59.

#### **2nd through 5th Toe - Range of Motion**

Determine range of motion of applicable joints.

Table 28, p.60 - distal interphalangeal 2nd - 5th Toe  
dorsi-plantar flexion and amputation

Table 29, p.60 - proximal interphalangeal joint 2nd - 5th toe  
dorsi-plantar flexion and amputation

Table 30, p.61 metatarsophalangeal joint - 2nd toe  
dorsi-plantar flexion and amputation

Table 31, p.62 - 3rd metatarsophalangeal joint dorsi-plantar flexion

Table 32, p.62 - 4th metatarsophalangeal joint dorsi-plantar flexion

Table 33, p.63 - 5th metatarsophalangeal joint dorsi-plantar flexion

Add range of motion deficits at each joint.  
Combine the total ROM for each joint.  
Combine ROM with amputation deficits.  
Convert to foot rating using Table 34, p. 64.

### **Multiple toe involvement.**

Impairment of each toe expressed as a percentage of the foot. These values are added to arrive at the total foot impairment.

Also see Table 35, p.64 - Impairment of Foot Due to Amputation and Ankylosis of Multiple Digits.

### **Hind Foot**

Partial Foot Amputations - see Table 47, Page 73.

Measure range of motion for dorsal and plantar flexion  
and inversion and eversion

Table 37, p.66 dorsi-plantar flexion of hind foot

Table 38, p.67 inversion and eversion of hind foot

Add range of motion deficits

For ankylosis, - use the larger value for dorsi-plantar flexion and inversion/eversion Do not add or combine.

### **Knee joint**

Refer to Table 40, p.68 (Disorders of the Knee) for diagnostic and surgical impairments.

Measure range of motion - Table 39, p. 68 flexion and extension

Add flexion and extension deficits.

Combine Table 40 deficits with range of motion deficits.

For amputation of leg below knee, see Table 47, p.73. This value would be combined with the knee joint deficit if applicable.

## Hip Joint

Measure range of motion of hip - abduction, adduction, flexion, extension and internal and external rotation.

Table 41, p.69 flexion

Table 42, p.70 extension

Table 43, p.70 abduction, adduction

Table 44, p.70 internal and external rotation

Add all range of motion deficits

If joint is ankylosed, determine ankylosis measurements for all ranges of motion. Do not add or combine values. Use the largest impairment rating for ankylosis.

Consult Table 45, p.72 for hip diagnoses which may be combined with the range of motion deficit.

Other amputation deficits are found on Table 47, p.73.

## Multiple Unit Involvement

Combine ratings in order from distal to most proximal rating using combined value chart.

Convert to whole person rating using Table 46, p.72

Remember to report lower extremity and whole person impairment on all forms.

## Peripheral Nervous System Disorders

The nerves are graded for sensory and motor deficits as discussed in the Neurological section.

Table 49, p.76 gives maximum loss for L<sub>3</sub>-S<sub>1</sub> nerve roots. Other nerve tables are found on pages 76 and 77.

Use Table 10, p.42 for sensation gradation and Table 11, p.42 for motor gradation.

Strength testing is based on confrontational resistance testing.

## Vascular disorders of the lower extremity

Rated per Table 52, p.79

## Summary of evaluation of impairment of the lower extremity

- Complete the lower extremity impairment form found on the following page
- Make all measurements in relation to the "Neutral Position."
- Work within 1 unit at a time — toes, ankle, knee, hip.
  - A. Make all of the pertinent measurements, unit by unit.
  - B. Multiple planes of motion — 1 joint — **ADD** individual impairments.
  - C. Multiple joints — 1 unit — **COMBINE** individual impairments.
  - D. Ankylosis — use only the plane of motion yielding the highest impairment.
  - E. Amputations — Sliding scale based on % of amputation.
  - F. **COMBINE** B through E above to determine unit impairment.
- Only combine impairments from individual units after they have been converted to the same level — toe, foot or lower extremity.

- Convert each total unit impairment to lower extremity impairment and combine distal to proximal.
- Remember the additional lower extremity impairments for specific disorders of the knee (Table 40) and hip (Table 45).
- Consider impairment due to Peripheral Nervous System.
- Consider impairment due to Peripheral Vascular Disease.
- **Combine** all impairments obtained in the above to obtain Total Lower Extremity Impairment.
- Use Table 46 on page 72 to obtain the equivalent Whole Person Impairment and report both.
- When impairment is bilateral, each lower extremity is rated as whole person separately and both ratings are combined for final whole person rating.



**Lower Extremity Impairment Record**

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**Patient Name:**



## SPINAL IMPAIRMENT

### Essential Elements of the Exam

Report all of the following physical findings:

- Inspection
- Palpation
- Range of Motion Testing
- Sensation
- Muscle Strength
- Reflexes
- Straight Leg Raise
- Psychometric Testing

Additional elements that must be reviewed and commented on include: chief complaint, history of present illness, past medical history, review of systems, family history and social history.

Rating must be done when the patient does not have an acute illness or acute spasm.

Use Table 53 or 54 to determine if the patient qualifies for a spinal impairment.

If Table 53 rating is used, spinal range of motion must be completed and applied to the rating.

### Diagnoses Related Factors

Only the primary diagnoses in a given region can be considered for rating.

For example, if a patient received an L<sub>4</sub> fracture he should not receive ratings for the cervical, thoracic and lumbar portions of the spine since only the lumbar area was injured. On the other hand, if the patient fractured a cervical vertebrae and L<sub>4</sub> then he would receive ratings for the cervical and the lumbar areas.

Table 53, p.80 gives ratings for fractures, intervertebral discs, soft tissue lesions, spondylolysis and spondylolisthesis as well as spinal stenosis.

Table 54, p.86 cannot be used in addition to Table 53 but may be used instead of Table 53 if ankylosis is determined by radiography. Table 54 cannot be combined with range of motion.

Table 53, p.80

Fractures

Vertebral body compression fractures

Posterior element fractures - combine (not add!)

Dislocations - combine (not add!)

Intervertebral disc or other soft tissue lesions

Review this section. Medically documented rigidity associated with an injury -related diagnosis is the minimum requirement for a rating.

Note subparagraph F - deals with the issue of multiple levels, and G with multiple operations - 1 or 2% is added per level depending on the situation.

Spondylolysis and spondylolisthesis, non-operated

Grades I and II - note requirements

Grades III and IV - note requirements

Spinal stenosis, segmental instability, or spondylolisthesis, operated

The "fine print"

Address the regions of the spine separately.

Combine above impairments with other residuals using the Combined Values Chart.

Definition of "residual signs or symptoms"

- Ankylosis
- Abnormal motion in spine or extremities
- Spinal cord or spinal nerve root injuries with neuropathic impairment
- Note absence of chronic pain complaints

## Range of Motion Testing

- Recognize the complexity of spinal motion
- Impossible to isolate, selected segmental motion
- Measure the upper and lower extremes of the segment to be rated

The ROM tester is encouraged to have the examinee stretch thoroughly before beginning measurements. The pelvis must remain stationary throughout the straight leg raising measurement. As soon as the tester begins to feel a rocking motion of the pelvis the straight leg raising motion should cease. The straight leg raising is not a passive measurement. Inclinometer method will be reviewed in the workshop.

## Range of motion testing of the spine

- Use maximum range of motion measurements.
- Test Validity Criteria for Spinal ROM (amended as of July 22, 1994)

- A set of valid measurements for the maximum cervical, thoracic and lumbar angles consists of 3 measurements of a motion which are within  $\pm 10\%$  or  $5^\circ$  of the median value.
  - A minimum of two sets of three full measurements must be taken before invalidating the first trial. If these do not meet validity criteria then additional measurements, up to two sets of three, must be taken on a separate testing date before the examiner can declare the range of motion results invalid.
  - There is an additional test for validity which pertains to Lumbar flexion only. The tightest of the two maximum straight leg raise angles minus (hip flexion + hip extension) must be  $\leq 10^\circ$ .
- Add whole person impairments due to restriction of motion in each plane to attain whole person impairment due to restriction of motion.
  - Ankylosis measurements.  
Ankylosis nicely defined in this edition - Page 81.
    - Complete absence of motion.
    - Inability to achieve the neutral position of motion in a given plane.
 Ankylosis and restriction of motion in a given plane are mutually exclusive.
  - Table 55, p.88 - Cervical flexion extension  
Table 56, p.90 - Cervical lateral flexion  
Table 57, p.90 - Cervical rotation  
Table 58, p.96 - Thoracic flexion extension  
Table 59, p.96 - Thoracic rotation  
Table 60, p.98 - Lumbar flexion and extension  
Remember that the "true lumbar flexion" angle is found by subtracting the sacral (hip) inclination from the T<sub>12</sub> inclination and the "true lumbar extension" is found by subtracting the sacral (hip) angle from the T<sub>12</sub> inclinometer angle.  
Table 61, p.98 - Lumbar lateral flexion

## Neurological Findings

See Neurological section and Lower Extremity section.

Remember to translate all impairment into whole body ratings before combining with other spinal impairments.

No "double dipping" - e.g., Do not rate both restriction of motion of ankle dorsiflexion and decreased motor strength of muscles dorsiflexing the ankle due to nerve root injury - unless they are independent processes.

## **Use of standardized forms in the Guides is required by the Division**

Figures 81-83 for Range of Motion/Validity checks

[NOTE: In some copies an error exists on Fig. 83. Please check your book and correct as necessary. Under Straight Leg Raising, Right and Left, 10% should read 10°.]

Figure 84 for Spine Impairment Summary

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### **Summary of the spine impairment process**

- Determine the primarily injured region
- Determine diagnosis-related whole person impairment "only the primary diagnosis should be considered"
- Determine regional range of motion to obtain whole person impairment due to loss of motion/ankylosis
- Remember mandatory validity checks
- Combine diagnosis-related and range of motion/ankylosis-based whole person impairments
- Repeat the preceding process for secondarily impaired spinal regions
- Combine whole person impairments for the various spinal regions
- Determine additional extremity impairments due to radiculopathy and convert these impairments to whole person impairment
- Combine the whole person impairments obtained in the previous two steps to determine the total whole personal impairment to the spine
- Combine spine-related whole person impairment with any whole person impairment due to other organ system conditions to arrive at a final whole person impairment
- If apportionment is appropriate because the patient qualified for a pre-injury rating under Table 53 but no pre-injury range of motion measurements were taken, complete the ROM apportionment worksheet found at the end of the administrative section of this curriculum.

## **PELVIS**

Fractures of the pelvis are rated per p.101. Whole person ratings are given for healed fractures with and without displacement, deformity, and residuals.

## ***Spinal Measurement Techniques – Inclinator Method***

### **Philosophy:**

The healthy spine is composed of 24 moving vertebrae, 1 sacrum and 1 coccyx. Each segment has the potential to move and this movement is measurable as is common of diarthrodial joints. (1) The loss of spinal mobility may lead to disability and loss of function. (2) It is, therefore, medically necessary to ascertain any loss of motion and document it accurately.

### **Objectives:**

1. Measure the cervical, thoracic and lumbopelvic motions in the classic planes as defined by Dr. Tom Mayer, et.al.
2. Implement validity checks to ensure that the measurements are indeed valid, accurate and reproducible
3. Identify invalid range of motion efforts

### **Bubble Inclinator Measurement Techniques:**

1. The patient must be an appropriate candidate for impairment rating as outlined in the AMA Guides to Impairment.
2. Instruct patient in proper movements, three to five repetitions
3. Landmark
4. Inclinator placement
5. Measure spinal motion
  - A. **Cervical**
    1. Landmark:
      - a. upper inclinometer:  
Midsagittal line of the occipital bone or midcoronal line of the parietal bone
      - b. lower inclinometer:  
Midsagittal line of the first thoracic vertebrae

2. Place the inclinometers on the landmarks so that gravity will affect the liquid within the inclinometer (sagittal plane).
3. Hold the inclinometer firmly in place and request the patient to complete the desired motion.
4. Repeat the measurements three (3) times and check for consistency of efforts.
5. Pitfalls:  
often the inclinometer is not held steady as the patient flexes the neck.

**B. Thoracic**

1. Landmark:
  - a. upper inclinometer:  
Midsagittal line of the spinous process of the first thoracic vertebrae
  - b. lower inclinometer:  
Midsagittal line of the spinous process of the twelfth thoracic vertebrae
2. Place the inclinometer over the landmarks so that gravity will affect the liquid within. For measuring kyphosis and flexion, the inclinometer must be in the sagittal plane and for measuring rotation, the inclinometer must be in the coronal plane.
3. Hold the inclinometer firmly in place and request the patient to complete the desired motion.
4. Repeat steps 4 and 5 of the cervical section
5. Pitfalls:
  - a. scapular retraction will tilt the inclinometer and inflate the upper inclinometer reading during rotation.
  - b. knee flexion of the contralateral side will affect the readings during rotation.
  - c. often the patient cannot bend to 90 degrees of trunk flexion when measuring rotation and consequently, the inclinometer must be angled perpendicular to gravity in order to get the proper reading.
  - d. when reading minimum kyphosis, it is easiest to add the T-1 and T-12 measurements, i.e., values above the zero are positive and values below zero are negative. Subtraction of a negative number is defined as changing the sign and adding.

C. **Lumbar**

1. Landmark
  - a. upper inclinometer:  
Midsagittal line of the spinous process of the twelfth thoracic vertebrae
  - b. Midsagittal line of the second fused vertebrae of the sacrum.
2. Place the inclinometer over the landmark so that gravity will affect the liquid within the inclinometer.
3. Repeat steps 3, 4 and 5 of the cervical section.
4. Pitfalls:
  - a. Patient bends knees
  - b. Patient lifts foot during side bending
  - c. The inclinometer moves

D. **Straight leg raise**

1. Landmark:
    - a. distal two thirds of the anterior tibia
  2. Place the inclinometer over the landmark
  3. Request patient to complete a straight leg raise while holding the opposite leg down.
  4. Read the correct scale of the inclinometer once the end of range is achieved and document it.
  5. Repeat the motions three times and check for consistency of efforts.
  6. Pitfalls:
    - a. patient bends the knees
    - b. patient jerks the leg at end range
6. Calculate validity of efforts as outline in the AMA Guides
  7. Notifying the patient of their efforts
    - A. Valid efforts
    - B. Invalid efforts — Physician must retest the patient once in an attempt to obtain a valid range of motion exam.
  8. Correlate findings to norms and calculate impairment rating if all of the criterion are reached.

Spinal Apportionment form goes here.

May be found on Division's website as DeskAid 10 (DK 10),

[www.coworkforce.com/dwc/](http://www.coworkforce.com/dwc/)

## **CURRICULUM - LEVEL II ACCREDITATION**

### **DAY 2 TOPICS**

Impairment of the Pulmonary/Cardiovascular System

Impairment for Skin Diseases - to include scars and disfigurement

Impairment Ratings for Vision, Hearing, Ear, Nose, and Throat and  
Gastrointestinal conditions

Mental Impairment

Workshops:

Pulmonary/Cardiovascular  
Mental Impairment

Written Accreditation Examination

\*Order of topics for actual seminar agenda is subject to change