Spinal Impairment Rating Using the *AMA Guides, 5th Edition* Overview of Changes

What's New
And
How Does It Differ From the 4th Edition ?

Questions ?

Ronald Zipper, DO, FAOAO, FAADEP
Independent Orthopaedics & Sports Medicine

816-221-2663
kcdoczip@juno.com

When All Else Fails Read the Instructions

AMA *Guides, 4th Edition*

or

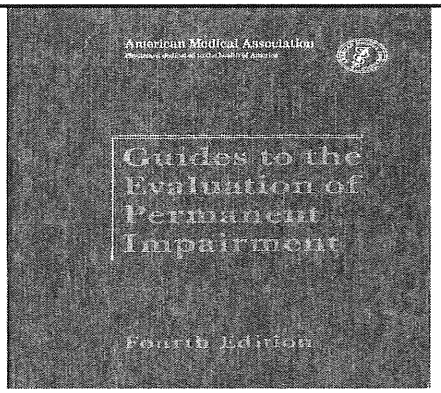
AMA *Guides, 5th Edition*

If You Have Had a Rough Day, and You Think You Won't Sleep

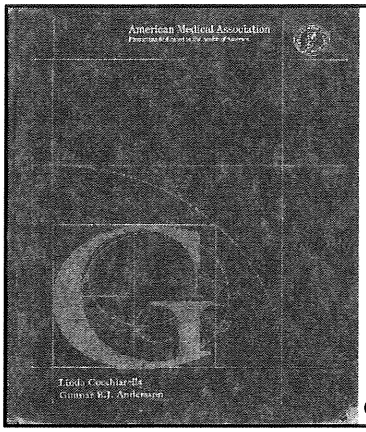
- Don't Reach for a bottle of alcohol
- Don't reach for a sleeping pill
- Pick up *The AMA Guides*
- You'll be asleep very quickly !

The Guides is a guide

- It is not set in stone
- You are at liberty to stray form the guides
- You must explain your position



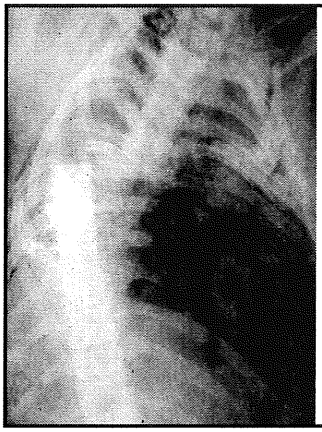
Chapter 3.3– 41 pages



Chapter 15 – 56 pages

Major differences between 4th and 5th

- Consider treatment
  - Findings at the time of the examination
- Include arthrodesis in definition of loss of structural integrity
  - Fusion now considered
- 3% Range in DRE
- 4th rates at time of injury
- 5th rates at MMI



The Spine:
Now Chapter 15
Both the "Injury Model",
A.K.A. DRE method,
And
The "Range of Motion Model"
Are retained,
But,
There are
Very Significant Changes.

DRE vs. ROM

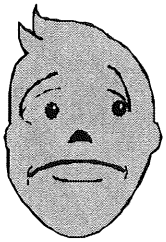
- Diagnosis Related Estimates, (Injury)
- Range of Motion, (Administrative, non-injury)

Advantages of DRE

- Based on objective findings
- Does not reward aging
- Does not reward laziness

Disadvantages of DRE

- More difficult to do



Categories Now Have a Range Lumbar, Table 15-3 (p.384)

Category	4th Edition	5th Edition
I	0 %	0 %
II	5 %	5-8 %
III	10 %	10-13 %
IV	20 %	20-23 %
V	25 %	25-28 %

Range of Potential Impairments

- "… evaluate the results (of treatment) … impact on activities of daily living. If residual symptoms or objective findings impact …ADLs… **the higher** (not "highest") **percentage** in each range should be assigned." (p. 381)
- Thus, the more impact on ADLs, the higher the rating from within the range.
- No specific guidance as to how to determine impact of symptoms/objective findings on ADLs.

Range of Potential Impairments

"If an individual had a prior condition
(including prior rating),
was asymptomatic, and now
(with or without new injury)
–at MMI – has symptoms
(does not say "new findings")
that impact the ability to perform activities of daily living, the **higher** (not "highest") **rating within a range may also be used."** (p. 381)

Examples

1. Strain rated at 5 %, later a second injury.
   4th Edition: still category II, 5 %
   5th Edition: Category II, 5 – 8 %
2. Strain rated at 5 %, later, without injury, worse
   4th Edition: still 5%
   5th Edition: 5 – 8 %
3. HNP with good to fair result, rated at 10 %, later, without re-injury, recurrent radiculopathy, worse. 4th Edition: still 10 %
   5th Edition: 10 - 13 %

Stating the Obvious

"If ratings are increased, explicit documentation of the reasons for the increase should be included in the report." (p. 381)

Advantages of ROM

- Easy
- Some conditions better evaluated
- Maybe for administrative purposes
- May be a surrogate for impairment
- Default for certain conditions

Disadvantages of ROM

- Rewards lack of rehabilitation
- Rewards aging
- Rewards degenerative conditions
- No inter-rater reliability
- Difficult to do in cord injury

Determining the Appropriate Method for Assessment (p. 379)

"Range of Motion Method":

1. No Injury (Disease, like arthritis)
2. Multilevel involvement, either by fracture, or by disc herniation, spinal stenosis, and/or radiculopathy, or by loss of "motion segment integrity" (fusion or ankylosis).
3. Recurrent radiculopathy caused by a new, or by a recurrent disc herniation, or recurrent injury in the same spinal region.
4. Multiple episodes of ? "other pathology" ? Producing LOMSI and/or radiculopathy

Determining the Appropriate Method for Assessment (p. 379)

"Range of Motion Model":

5. If Statutorily Mandated.
6. If apportioning, and the first injury/disease rating was performed using the "Range of Motion Model"

Note: even if first injury was rated by "Injury Model", and no range of motion measurements exist in old records to permit reevaluating the first injury by the "Range of Motion model", the second injury is to be rated using the "Range of Motion Model" and the first "Injury Model" rating is to be subtracted, even though "… the apportionment calculation may be a less than ideal estimate." (p. 381)

DRE is the Primary Method

- DRE
  - Used for any patient with an injury
- ROM
  - Multilevel fractures
  - Multilevel radiculopathy (not degenerative disease)
  - Recurrent radiculopathy
  - Multilevel loss of structural integrity

Regions of the Spine

- Cervical
- Thoracic
- Lumbar

"Place the Individual in the Appropriate Category"

- "Almost all individual fall within the first three DRE categories."
- A fracture and/or dislocation, with or without symptoms, permits placement with no additional verification.
- Category I: only subjective findings
- Category II: objective findings, but now @ MMI, No radiculopathy
- Category III: Radiculopathy @ MMI, and prior radiculopathy successfully treated by surgery.

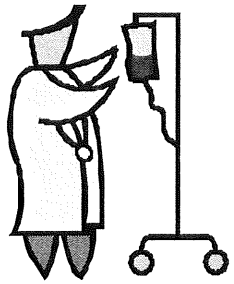
Objective Findings

- Guarding or spasm
- Loss of reflex(s)
- Decreased muscle circumference – 2cm thigh – 1cm arm, forearm and leg (5th)
- Electrodiagnosis
- Loss of structural integrity

Box 15-1 page 382-3, 5th

Objective Findings

- Non-verifiable root pain
- Tension signs
- Loss of bowel or bladder control
- Bladder studies
- Range of motion model



Diagnosis Related Estimates or "Injury Model" (15.3-15.7, p. 381-398)

- Place the individual in a Category of impairment, @ MMI, using what are now called "Clinical findings" in Box 15-1 (p.382)

  Muscle guarding: defined, "contraction to minimize motion or agitation", but "can be relaxed"

  Muscle Spasm: Common in Acute, but Rare in Chronic Back Pain, Occ. Visible, more often palpable, present supine and during "walking in place" (fails to relax side that is weight bearing).

Clinical Findings Box 15-1 p.382-3

Asymmetry of Spinal Motion: 1 of 3 planes, caused by guarding or spasm.

Non-verifiable Radicular Root Pain: pain in the distribution of a root, but no objective clinical, imaging, or EMG findings.

Reflexes: Marked Asymmetry (no longer absence) on repeated testing.

Weakness and Loss of Sensation: (weakness is New) "Loss of sensation" is NOT defined. "Significant, long standing weakness is usually accompanied by atrophy."

Clinical Findings Box 15-1 p.382-3

Atrophy: Still 2 cm. @ thigh,

But, NOW 1 cm. @ arm, forearm, & leg.

Radiculopathy: requires Dermatomal distribution of pain, numbness, and/or paresthesias. Root tension sign Usually positive. "The diagnosis … must be substantiated by an appropriate finding on an imaging study. The presence of findings on an imaging study in and of itself does not make the diagnosis of radiculopathy. There must also be clinical evidence as described above."

Clinical Findings Box 15-1 p.382-3

Electro-diagnostic Studies: "…multiple positive waves and fibrillation potentials in muscles innervated by one nerve root. However, the **quality** of the person performing and interpreting the study is critical. EMG should be performed only by a licensed physician qualified by reason of education, training, and experience in these procedures." ...does not detect all radiculopathies but can detect **non-compressive radiculopathies**, which are not identified by imaging studies.

(H Reflex has been deleted as criterion)

Clinical Findings Box 15-1 p.382-3

Alteration of Motion Segment Integrity:

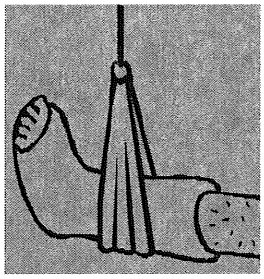
"…can be either …(increased translational or angular motion) or decreased motion secondary to developmental fusion, fracture healing, healed infection, or surgical arthrodesis. An attempt at arthrodesis may not necessarily result in solid fusion but may significantly limit motion… Motion of the individual spine segments cannot be determined by physical examination but is evaluated with flexion and extension roentgenograms."

Clinical Findings Box 15-1 p.382-3

Cauda Equina Syndrome: Bowel or Bladder dysfunction, saddle anesthesia, variable loss of motor and sensory function.

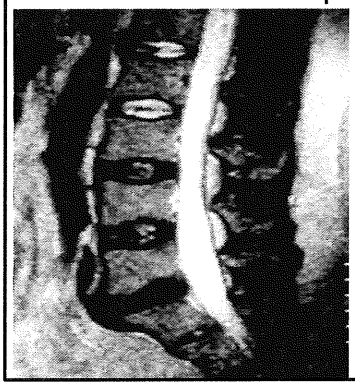
Urodynamic Tests: useful when Cauda Equina Syndrome is possible but not certain. A normal cystometrogram makes the presence of nerve related bladder dysfunction unlikely. Occasionally, more extensive urodynamic testing is necessary.

Fractures



- Certain spine fractures that may lead to significant impairment and yet not demonstrate any of the differentiators
- Undisplaced posterior element fractures
- displaced posterior element fractures
- compression fractures

Lumbar Spine



4th – 3.3g page 101-103

5th – 15.4 page 384-388

Lumbar DRE Category I 0% Impairment

- No muscle guarding
- No neurological changes
- No alteration in motion segment integrity
- No findings at the time of the examination
- No fractures

Lumbar DRE Category II 5-8% Impairment

Findings of muscle spasm, non-verifiable root pain,

or

History of radiculopathy that has resolved without surgery, with a positive imaging study

or

Compression fracture < 25%

Lumbar DRE Category III 10-13% Impairment

Radiculopathy with a positive imaging study

or

Surgery for radiculopathy

or

Compression fracture 25-50%

DRE Category IV 20 % - 23 % Impairment

Loss of Motion Segment Integrity: defined from flexion and extension radiographs as at least 4.5 mm of translation, or

angular motion > 15° at L1-2, L2-3, and L3-4
> 20° at L 4-5
> 25° at L5- S1

New criteria (different from 4th Edition)

Note: Text (p. 379) contains error. "difference in angular motion between 2 adjacent motion segments greater than …"

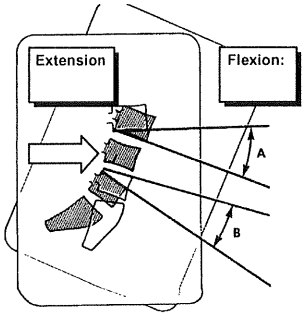
Flexion Extension Bending Films

Loss of Motion Segment Integrity **(4th ed., 98-99)**

- Abnormal segmental translation or angular motion (RARE, Degenerative, In elderly)
- Abnormal segmental translation > 3.5 mm cervical, > 5 mm thoracic or lumbar
- Abnormal angular motion exceeding next adjacent disc space by > 11 degrees, except for L5-S1 where > 15 degrees

Figure 63
(4th ed., 98)

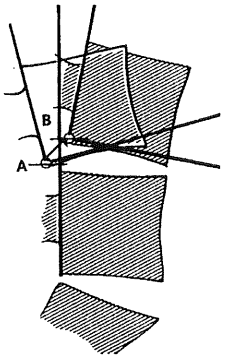
Loss of Motion Segment Integrity: Angular Motion



Compare Motion at L3-4 to Motion at L4-5

Figure 62
(4th ed., 98)

Loss of Motion Segment Integrity: Translation Lumbar > 5 mm



5th Edition:Figure 15-3a: Translation

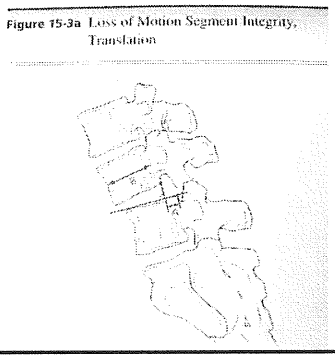
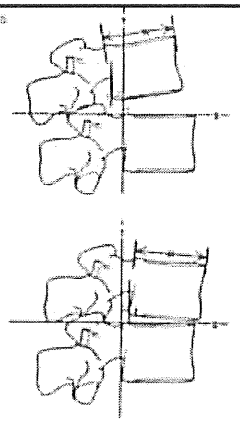


Figure 15-3a Loss of Motion Segment Integrity, Translation

New Criterion is >4.5 mm of Translation "Motion of one Vertebra over Another." p. 379 Measured on a Single film, not sum of measurements on 2 superimposed films.

Figure 15-3
Is Incomplete.
Should Contain
Both
a flexion and
an extension
View.

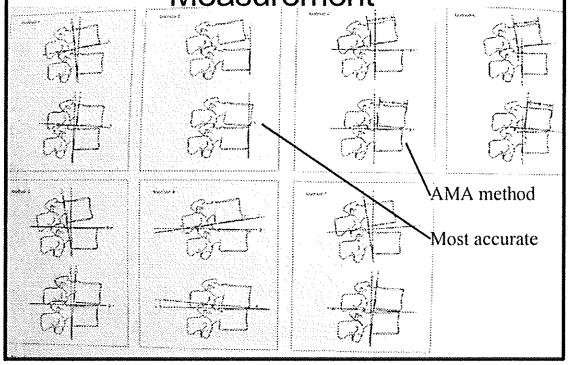


Who Needs Flexion Extension Xrays ? P. 379

- "When routine x-rays are normal and severe trauma is absent, motion segment alteration is rare: thus, flexion and extension x-rays are indicated *only* when the physician suspects motion segment alteration from history* or findings on routine x-rays*." * Not Defined, but referenced

Shaffer, et al, *Spine* 1990; 15: 741-50

Possible Methods of Measurement



AMA Method of Measuring Translation: Shaffer's Study

- Error rate in Classification of "Normal" or "Increased Translation" depends on amount of motion being measured. Measured motion (magnification adjusted) from backwards (extension film) to forwards (flexion film).

Motion	False Pos	False
Neg 3.0 to 3.0	33 %	46 %
3.5 to 3.5	29 %	50 %
4.0 to 4.0	28 %	54 %

For "AMA Method", error rate @ greater motions is not stated in the article.

DRE Category IV, continued

Fractures:

1. Greater than 50 % compression of one vertebral body, without neurologic compromise.

DRE IV: 20 – 23 % Biggest Change is Fusion

- Box 15-1: Increased motion "... or decreased motion secondary to developmental fusion, fracture healing, healed infection, or surgical arthrodesis. An attempt at arthrodesis may not necessarily result in a solid fusion but may significantly limit motion at a motion segment. Motion of the individual spine segments cannot be determined by a physical examination* but is evaluated with flexion and extension roentgenograms." (* Chiropractor or MD/DO)

Significance of "fusion changes"

- Joe has backache (5 - 8 %), or radiculopathy (10 – 13 %), but,

since he still has symptoms,

he gets a surgical "fusion".

- Usually he ends up worse, so logically, his impairment should be greater.
- 4th Edition: **rating does NOT change with treatment**
- 5th Edition: Now Category IV or V (20 – 23 % or 25 - 28 %)

DRE Category V 25 – 28 % Whole Person Imp.

- "Meets the criteria of DRE … categories III and IV; that is BOTH radiculopathy and alteration of motion segment integrity are present …
- … **or fractures**: (1) greater than 50 % compression of 1 vertebral body with unilateral neurologic compromise."

Examples

- 6 Scenarios
  - No findings
  - Minor findings
  - Radiculopathy at the time of the exam
  - Radiculopathy, resolved without surgery
  - Radiculopathy, resolved with surgery
  - Radiculopathy, unresolved with surgery

4th Edition DRE categories VI, VII, & VIII

(Table 72 – 74, page 110-111)

Replaced with "rate the neurologic deficit using the neurologic chapter". Reprinted as Table 15-6 p. 396-7

Corticospinal Tract Impairment

- Table 15-6
- One Upper Extremity
- Two Upper Extremities
- Gait and station
- Bladder
- Anorectal
- Sexual
- Respiration

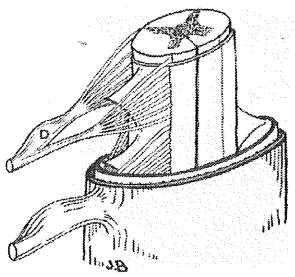


Table 72. DRE Lumbosacral Spine Impairment Categories.

DRE impairment category	Description	% Impairment of the whole person
I	Complaints or symptoms	0
II	Minor impairment: clinical signs of lumbar injury are present without radiculopathy or loss of motion segment integrity	5
III	Radiculopathy: evidence of radiculopathy is present	10
IV	Loss of motion segment integrity: criteria for this condition are described in Section 3.3b, p. 95	20
V	Radiculopathy and loss of motion segment integrity	25
VI	Cauda equina-like syndrome *without* bowel or bladder impairment	40
VII	Cauda equina syndrome *with* bowel or bladder impairment	60
VIII	Paraplegia	75

4th edition – Lumbar Spine - Category I-VIII

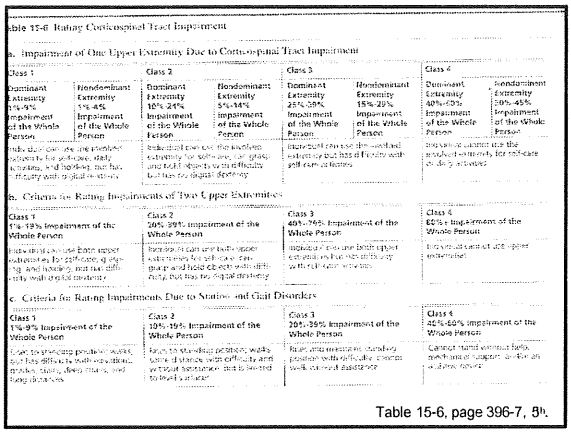


Table 15-6, page 396-7, 5th

1 Upper Extremity (CST injury)

- **Class 1: difficult** digital dexterity, but can use for ADLs.
  Dominant: 1 – 9 % Whole Person
  Non-Dominate: 1 – 4 % Whole Person
- **Class 2: No** digital dexterity, but can grasp and hold, and use for self-care.
  Dominate: 10 – 24 % Whole Person
  Non-Dominate: 5 – 14 % Whole Person

1 Upper Extremity (CST injury)

- **Class 3:** can use but difficulty with self care
  Dominate: 25 – 39 % WPI
  Non-Dominate: 15 – 29 % WPI
- **Class 4:** cannot use for self-care or ADLs
  Dominate: 40 – 60 % WPI
  Non-Dominate: 30 – 45 % WPI

2 Upper Extremities

- **Class 1:** 1 – 19 % Whole Person
  Difficult digital dexterity, but can use BOTH for self-care, grasping, and holding.
- **Class 2:** 20 – 39 % Whole Person
  No digital dexterity either U.E. but can use both for self-care. Can grasp and hold.
- **Class 3:** 40 – 79 % Whole Person
  Difficulty with self-care, but can use both.
- **Class 4:** 80 % + Whole Person Cannot use either

Station and Gait

- **Class 1:** 1 – 9 % WPI
  - Can arise and walk, but difficulty with grades, stairs, deep chairs, long distances.
- **Class 2:** 10 – 19 % WPI
  - Can arise and walk some distance with difficulty, but without assistance, limited to level surfaces .
- **Class 3:** 20- 39 % WPI
  - Arise and stand with difficulty, but cannot walk without assistance.
- **Class 4:** 40 – 60 % WPI
  - Cannot stand without help or mechanical support

Neurologic Bladder Impairment

- **Class 1:** 1 – 9 % WPI
  - Urgency or Intermittent incontinence.
- **Class 2:** 10 – 24 % WPI
  - No control, but good bladder reflex* activity, and intermittent emptying.
- **Class 3:** 25 – 39 % WPI
  - No control, with poor reflex activity.
- **Class 4:** 40 – 60 % WPI
  - No reflex or voluntary control.

* **Reflex activity** on cystometrogram

Neurologic Anorectal Impairment

- **Class 1:** 1 – 19 % WPI
  - Reflex regulation, but limited voluntary control.
- **Class 2:** 20 – 39 % WPI
  - Reflex regulation, but NO voluntary control.
- **Class 3:** 40 – 50 % WPI
  - No Reflex regulation, and NO voluntary control.

Neurologic Sexual Impairment

- **Class 1:** 1 – 9 % WPI
  - Function possible, but difficult in men, or lack or awareness, excitement, or lubrication in either sex.
- **Class 2:** 10 – 19 % WPI
  - Reflex sexual function, but NO awareness.
- **Class 3:** 20 % WPI
  - No sexual functioning.

Neurologic Respiratory Impairment

- **Class 1:** 5 – 19 % WPI
  - Can breathe, but difficulties with ADLs.
- **Class 2:** 20 – 49 % WPI
  - Can breathe, but restricted to sitting, standing, or limited ambulation.
- **Class 3:** 50 – 89 % WPI
  - Confined to bed by pulmonary status.
- **Class 4:** 90 + % WPI
  - No capacity for spontaneous respiration. On a respirator.

Spinal Cord Injury "Is that Your Final Answer?"

- Rate any and all of :
  - Upper Extremity (1 or 2 limbs)
  - Lower Extremity (Station and Gait)
  - Bladder (Incontinence)
  - Bowel (incontinence)
  - Sexual Function
  - Respiration
  - **Combine** all ratings

Dilemma, or Error in Text ?

- Chapter 15: Spine
  "… the exact value is obtained by combining the value with the corresponding additional impairments from DRE categories II through V for cervical and lumbar impairments and DRE categories II through IV for thoracic impairment." (p. 396)
- Chapter 13: Nervous System, does not contain this sentence so the impairment rating would be slighty different. Spine chapter appears to "double dip" rating the extremity impairment.

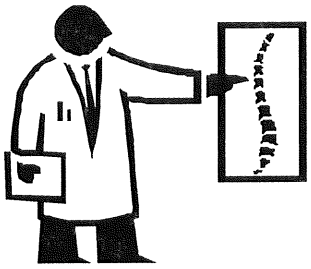
Examples

- Examples
  - No findings **at the time of the examination,** even if there were findings before, and no history of radiculopathy

Category I – **0%** Impairment

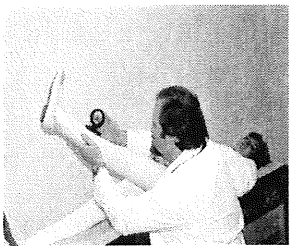
Examples

- Minor findings at the time of the examination
- Category II – **5-8%** Impairment

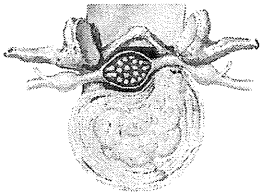


Examples

- Radiculopathy at the time of the exam
- Category III, **10-13%** Impairment

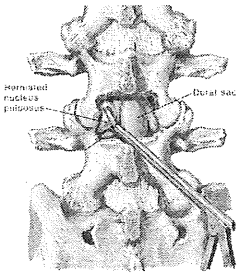


Examples



- A history of radiculopathy, resolved without surgery
- Category II, **5-8%**

Examples



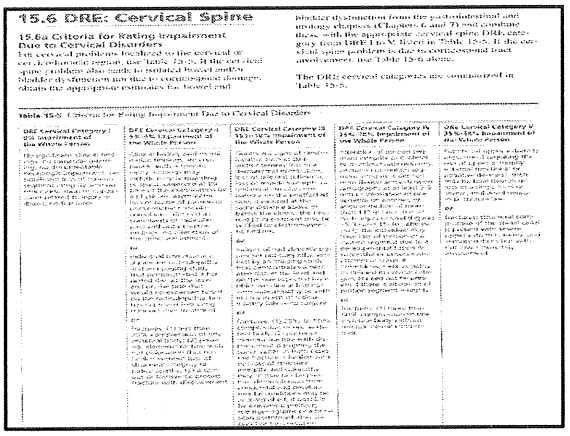
- A history of lumbar radiculopathy, resolved with surgery
- Category III,
  - **10%** - 4th
  - **10-13%** - 5th
- Cervical & Thoracic III
  - **15%** - 4th
  - **15-18%** - 5th

Examples

- A history of lumbar radiculopathy, unresolved with surgery
- Category III
  - **13%** - 4th
  - **13-15%** - 5th

ATTENTION

- With minor exceptions, cervical and thoracic DRE categories are the same as lumbar, EXCEPT Category III – 15-18%, lumbar 10-13%.
- Lumbar Table 15-3, page 384.
- Thoracic Table 15-4, page 389
- Cervical Table 15-5, page 392



15.6 DRE: Cervical Spine

15.6a Criteria for Rating Impairment Due to Cervical Disorders

For cervical problems localized to the cervical or cervicothoracic region, use Table 15-5. If the cervical spine problem also leads to isolated bowel and/or bladder dysfunction due to cauda equina damage, obtain the appropriate estimates for bowel and

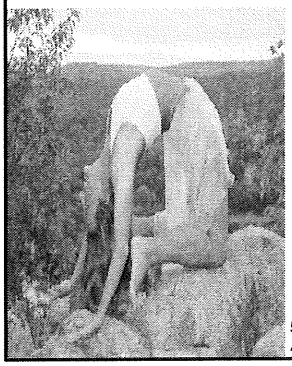
bladder dysfunction from the gastrointestinal and urology chapters (Chapter 6 and 7) and combine them with the appropriate cervical spine DRE category from DRE I to V listed in Table 15-5. If the cervical spine problem is due to a compound fracture involvement, use Table 15-6 above.

The DRE cervical categories are summarized in Table 15-5.

Table 15-5 Criteria for Rating Impairment Due to Cervical Disorders

DRE Cervical Category I 0% Impairment of the Whole Person	DRE Cervical Category II 5–7% Impairment of the Whole Person	DRE Cervical Category III 13–15% Impairment of the Whole Person	DRE Cervical Category IV 23% Impairment of the Whole Person	DRE Cervical Category V 25%–27% Impairment of the Whole Person
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Range of Motion Method

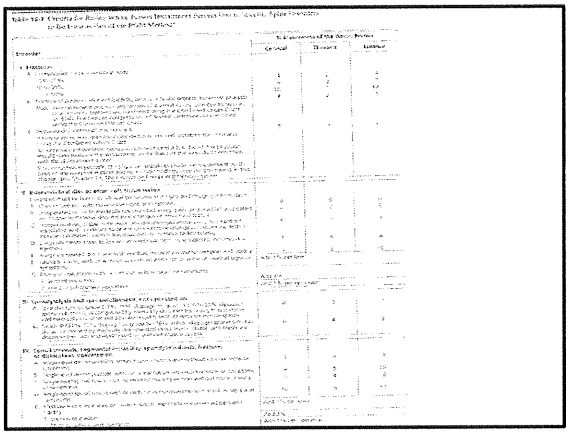


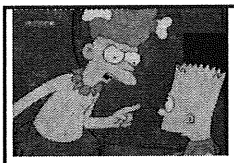
5th Edition, Section 15.8, page 405
4th Edition, Section 3.3j, page 112

"ROM" method

- Actually consider and rate each of 3 separate factors, and then combine all 3 ratings using the Combined Values Chart (p. 604-606).

1. **Diagnosis:** Table 15-7, p. 404
2. **Range of Motion/Ankylosis**
3. **Neurologic Deficit**





Pay Attention – Footnote: 4th Edition, Table 75, page 113.

Instructions were omitted on Table 15-7 page 404, 5th, but discussed in 15.12, page 423.

"Instructions:

1. Identify the most significant impairment of the primarily involved region.

2. The diagnosis-based impairment estimates and percents shown above should be combined with range of motion impairment estimates and with whole-person impairment estimates involving sensation, weakness, and conditions of the musculoskeletal, nervous, or other organ systems.

3. List the diagnosis-based, range of motion, and other whole-person impairment estimates on the Spine Impairment Summary Form (Fig. 86, p. 134).

"The words "with medically documented injury, pain, and rigidity" imply 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 data, and that a permanent impairment exists, which is at least partly due to the condition being evaluated and not only due to preexisting disease.

When Should "ROM" Method Be Utilized ? 6 Situations Listed

1. No verifiable injury.
2. If MD cannot place the individual in a DRE category. (No example given, and DRE section no longer mentions using ROM method as the "tie breaker")
3. Multilevel involvement and/or alteration of motion segment integrity has occurred in the same spinal region.

When Should "ROM" Method Be Utilized ? 6 Situations Listed

4. Recurrent radiculopathy caused by a new (or recurrent) HNP, or a recurrent injury in the same spinal region.
5. Multiple episodes of other pathology (disease) producing alteration of motion segment integrity and/or radiculopathy. (rare)
6. If Statutorily Mandated.

"ROM" method

- Actually consider and rate each of 3 separate factors, and then combine all 3 ratings using the Combined Values Chart (p. 604-606).

1. Diagnosis: Table 15-7, p. 404
2. **Range of Motion/Ankylosis**
3. **Neurologic Deficit**

"ROM Method"

1. Is individual @ MMI and "Stable", not changing over time? (not mentioned, but ROM should be consistent over time). "Spasm" is mentioned (in text) as evidence of "acuteness" or exacerbation, and therefore, not currently ratable.
2. Table 15-7, p. 404.
   Table has 4 categories. Select the category yielding the highest impairment.

Table 15-7, p. 404

1. **Fractures:** Rate by severity
2. **Intervertebral disk or other soft tissue disorders:** Most Commonly used portion of Table.
3. **Spondylolysis and Spondylolisthesis, NOT operated on:**
4. **Spinal Stenosis, segmental Instability, Spondylolisthesis, Fracture, or Dislocation, OPERATED ON:**

Table 15-7: Fractures

Fractures:

Compression		Lumbar, WPI
0 – 25 %	=	5 %
26 – 50 %	=	7 %
>50 %	=	12 %
Posterior Element		5 %
Reduced Dislocation		
One Vertebra		6 %

Note: Fractures at > 1 level are each rated, and ratings are combined.

Table 15-7: Disk and Soft Tissue

Unoperated,	Lumbar Impair.
A. No residual signs or symptoms	0 %
B. Medically documented injury, pain, and rigidity*, None to minimum degenerative changes on structural tests**	5 %
C. Same*, but with moderate to severe degenerative changes**, includes HNP with or without radiculopathy	7 %

Table 15-7: Disk and Soft Tissue

* = 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."
- "Rigidity" is a poorly chosen word.

Table 15-7: Disk and Soft Tissue

** = "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."

This footnote is **New to 5th Edition**

Table 15-7: Disk and Soft Tissue

D. Surgically treated disk, without residual signs or symptoms, Includes disk injection (but does not mention IDET).
8 % WPI

E. Surgically treated disk, with residual medically documented pain and rigidity.
10 % WPI

Table 15-7 Disk and Soft Tissue

F. Multiple levels, with or without operations, and with or without residual signs or symptoms.
Add 1 % per level

G. Multiple Operations, with or without residual signs or symptoms:
Second operation **Add 2 %**

3rd or subsequent operation
Add 1 % per level

Table 15-7 Spondylolysis or Spondylolisthesis

Spondylolysis or Grade 1 or 2 Spondylolisthesis, accompanied by medically documented injury, with residual 7 % WPI

Spondylolisthesis, Grade 3 or 4, accompanied by medically documented injury, with residual 9 % WPI

Table 15-7: Other Surgery

A. 1 level decompression, no fusion, without residual 8 % WPI
B. 1 level decompression, no fusion, with residual 10 % WPI
C. 1 level fusion, without residual 9 % WPI
D. 1 level fusion, with residual 12 % WPI

Multiple levels: add 1 % per level
Second operation: add 2 %
3rd or subsequent operation(s): add 1 % per operation

"ROM" method

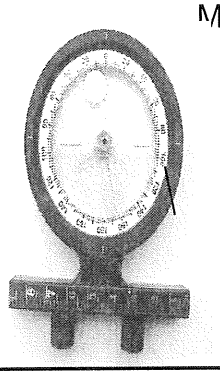
- Actually consider and rate each of 3 separate factors, and then combine all 3 ratings using the Combined Values Chart (p. 604-606).

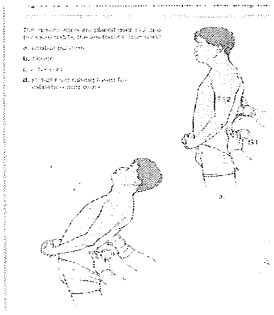
1. **Diagnosis:** Table 15-7, p. 404
2. **Range of Motion/Ankylosis**
3. **Neurologic Deficit**

Measure Range Of Motion

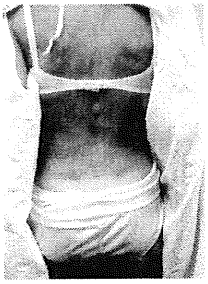
- "Inclinometer is the preferred device" (p.400)
- "An impairment rating based on loss of motion is valid only if there is medically documented injury or illness with a permanent anatomic and/or physiologic residual dysfunction." (p.398)
  (Excludes limited motion based in symptom magnification)
- "When physiologic measurements fail to match known pathology, they should be repeated and, if still inconsistent, disallowed until documented evidence is provided for the abnormalities noted on physical examination." (p. 399)

Inclinometer: Measures Angular Motion



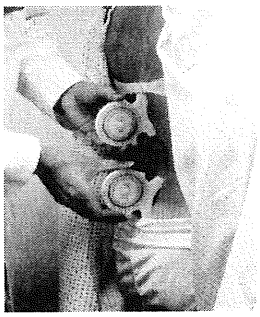


Range of Motion



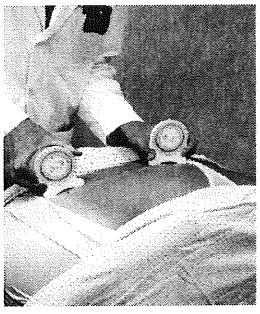
- Patient must be disrobed
- Females should have chaperone
- Place marks on T-12 and S-1

Range of Motion



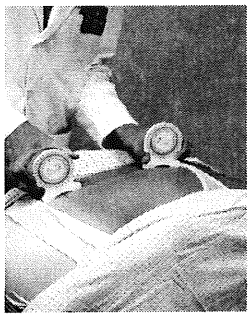
- Place inclinometers on the marks in the frontal plane and zero

Range of Motion



- Ask patient to bend forward as far as possible
- May support hands on knees if helpful
- Record reading from both inclinometers
- Repeat three times

Range of Motion



- Subtracting the lower inclinometer reading from the upper results in a measure of true lumbar flexion

Range of Motion

The proportion of flexion and extension of total lumbosacral motion is 75%.

Sacral (Hip) Flexion Angle (°)	True Lumbar Spine Flexion Angle (°)	% Impairment of the Whole Person
45+	60+	0
	45	2
	30	4
	15	7
	0	10
30-45	40+	4
	20	7
	0	10
0-29	30+	5
	15	8
	0	11

True Lumbar Spine Extension From Neutral Position (0°) to:	Degrees of Lumbosacral Spine Motion Lost	Retained	% Impairment of the Whole Person
0	25	0	7
10	15	10	5
15	10	15	3
20	5	20	2
25	0	25	0

- Refer to Table 15-8 to obtain impairment due to loss of lumbar flexion
- Note that loss of sacral (hip) flexion angle results in a higher rating

Range of Motion

- Have patient return to zero position
- Ask patient to bend backwards as far as possible
- Record readings from both inclinometers
- Repeat three times

Range of Motion

The proportion of flexion and extension of total lumbosacral motion is 75%.

Sacral (Hip) Flexion Angle (°)	True Lumbar Spine Flexion Angle (°)	% Impairment of the Whole Person
45+	60+	0
	45	2
	30	4
	15	7
	0	10
30-45	40+	4
	20	7
	0	10
0-29	30+	5
	15	8
	0	11

True Lumbar Spine Extension From Neutral Position (0°) to:	Degrees of Lumbosacral Spine Motion Lost	Retained	% Impairment of the Whole Person
0	25	0	7
10	15	10	5
15	10	15	3
20	5	20	2
25	0	25	0

- Subtracting the lower inclinometer reading from the upper results in a measure of true lumbar extension

Range of Motion

- Place the inclinometers on the marks in the coronal plane and zero
- Ask the patient to bend to the right and then to the left
- Record reading from both inclinometers

Range of Motion

Range of Motion

- Refer to Table 15-9

Abnormal Motion
Average range of left and right lateral bending is 50°; the proportion of total lumbosacral motion is 40% of the total spine.

a.	Left Lateral Bending From Neutral Position (0°) to:	Degrees of Lumbosacral Motion Lost	Retained	% Impairment of the Whole Person
	0	25	0	5
	10	15	10	3
	15	10	15	2
	20	5	20	1
	25	0	25	0

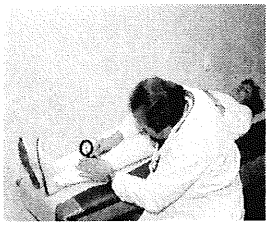
b.	Right Lateral Bending From Neutral Position (°) to:	Degrees of Lumbosacral Motion Lost	Retained	% Impairment of the Whole Person
	0	25	0	5
	10	15	10	3
	15	10	15	2
	20	5	20	1
	25	0	25	0

c.	Ankylosis Region Ankylosed at (°):	
	0 (neutral position)	10
	30	20
	45	30
	60	40
	75 (full flexion)	50

Range of Motion

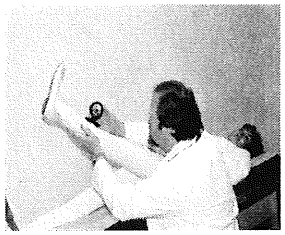
- Validity check
  - Take three measurements
  - All three should be within 10 % or 5 degrees of the mean
  - If not, obtain 3 more measurements
- Validity check
  - you want three consecutive measurements that meet the validity criteria
  - If not obtainable, invalidate that portion of the evaluation or ask the patient to return at a later date

Range of Motion



- Second Validity Check
  - Place inclinometers on the crest of the tibias and zero

Range of Motion

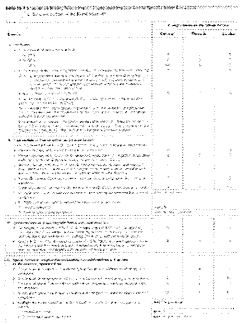


- Second validity check
  - Perform SLR and record readings
  - Repeat three times
  - Same validity requirements, (three consecutive readings within 10% or 5 degrees on the mean)

Range of Motion

- Second Validity Check
  - The tightest SLR should be within 15^0 of total sacral motion or the flexion portion of the examination is invalid
- Second Validity Check
  - Do not use if the total sacral motion, (sacral flexion + sacral extension) exceeds 55^0 in men or 65^0 in women

Range of Motion



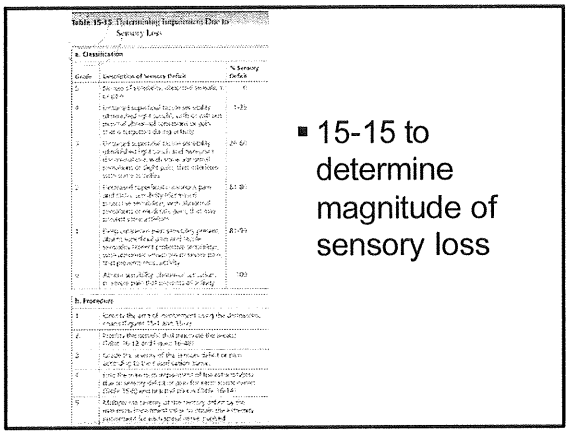
–Refer to Table 15-7 and combine appropriate rating to rating for loss of range of motion

Range of Motion

- Refer to table 15-18 to determine any rating for neurological loss

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

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	26



- 15-15 to determine magnitude of sensory loss

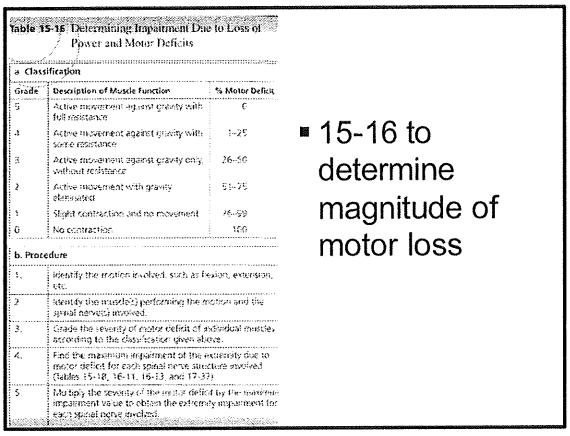
Table 15-15 Determining Impairment Due to Sensory Loss

a. Classification

Grade	Description of Sensory Deficit	% Sensory Deficit
5	[illegible]	0
4	[illegible]	1–25
3	[illegible]	26–50
2	[illegible]	51–75
1	[illegible]	76–99
0	[illegible]	100

b. Procedure

1.	[illegible]
2.	[illegible]
3.	[illegible]
4.	[illegible]
5.	[illegible]



- 15-16 to determine magnitude of motor loss

Table 15-16 Determining Impairment Due to Loss of Power and Motor Deficits

a. Classification

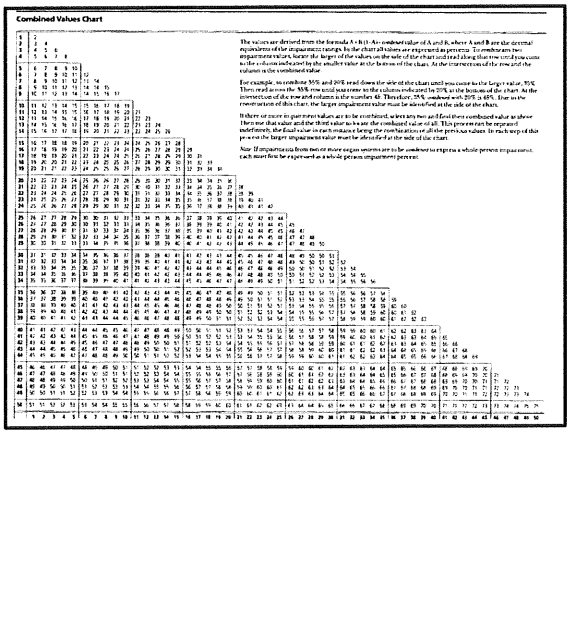
Grade	Description of Muscle Function	% Motor Deficit
5	Active movement against gravity with full resistance	0
4	Active movement against gravity with some resistance	1–25
3	Active movement against gravity only without resistance	26–50
2	Active movement with gravity eliminated	51–75
1	Slight contraction and no movement	76–99
0	No contraction	100

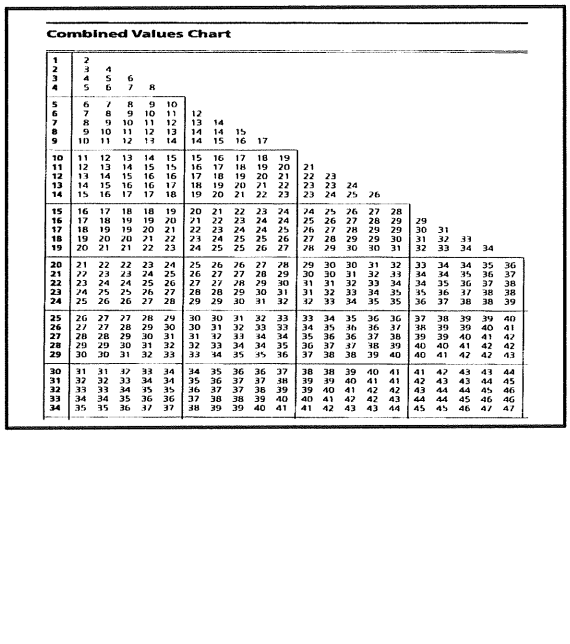
b. Procedure

1.	Identify the motion involved, such as flexion, extension, etc.
2.	Identify the muscle(s) performing the motion and the spinal nerve(s) involved.
3.	Grade the severity of motor deficit of individual muscles according to the classification given above.
4.	Find the maximum impairment of the extremity due to motor deficit for each spinal nerve structure involved (Tables 15-18, 16-11, 16-13, and 17-37).
5.	Multiply the severity of the motor deficit by the maximum impairment value to obtain the extremity impairment for each spinal nerve involved.

Range of Motion

- Combine values from ROM, Table 15-7 and Table 15-18
- Combine impairment from all involved spinal areas





ROM Method "Final Answer"

- Use Combined Values Chart, Pages 604-6, and **COMBINE** the whole person impairments for each of 3 categories:

1. Diagnosis
2. Range of Motion
3. Neurologic Deficit

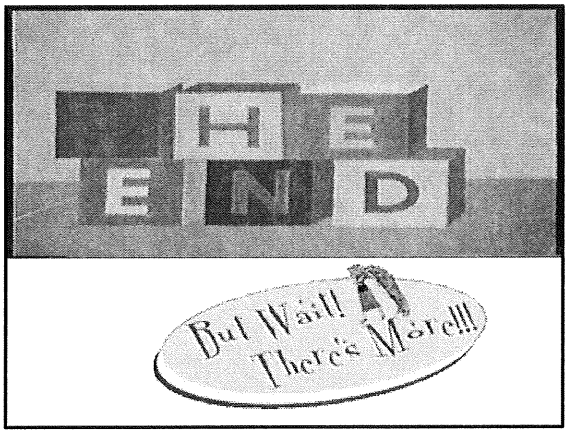
Yields "Final Answer" or
Total Whole Person Impairment.

Impairment

- The ROM model is used to help the physician categorize the patient. The final rating should rarely come from the ROM Model

15.14 The Pelvis

- Chapter 15, The Spine, Pages 427 – 428 discuss and rate Pelvic fractures.
- Table 17-33 in Lower Extremity (Chapter 17) also rates pelvic fractures, but with a different methodology, so Impairment Percentages derived for the same fracture from these 2 chapters may differ. (Example: fracture into the Sacro-Iliac Joint)



Spine Workshop

Emphasizing the
AMA Guides to the Evaluation of Permanent Impairment , 5th Edition

Questions ?

Ronald Zipper, DO, FAOAO, FAADEP

Independent Orthopaedics & Sports Medicine, P.C.
5140 NE Antioch Road, Suite A
Kansas City, Missouri 64119

816-221-BONE
kcdoczip@juno.com

Case 1

Low Back Strain
with "Spasm",
but Ultimate Recovery

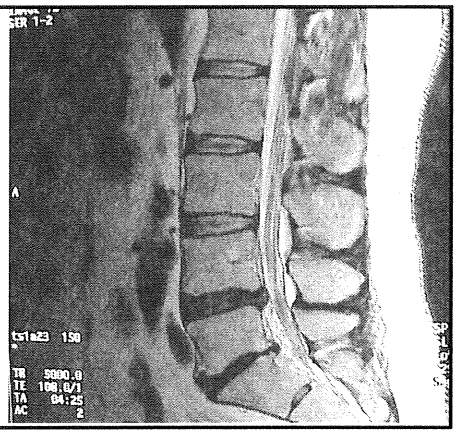
History:

- 38 year old male working in shipping dept.
- No history of prior back injuries or pain.
- Lifts and twists with a 50 pound box.
- Immediate back pain, NO leg pain.
- In ER on Date of Injury (DOI), and at 1st visit with FMD had "spasm".
- Light duty for 3 months, then full duty
- No chronic medicines, brace use, or treatment.
- At 6 months, mild intermittent back pain. NOT missing work. NO "Can't"s.

Case 1:

- 6 months post injury, AT MMI with:
- Normal physical exam
- Records:
  X-rays of Lumbar Spine = mild degenerative changes.
  MRI: dessication of 2 lowest discs ("Black Discs" on T2 images)

Case 1



Case 1: Ratings ?'s

- What is his PPI % using the 4th Edition ?
- What is his PPI % using the 5th Edition ?
- What if the "system" required the use of the "Range of Motion" method ?

Case 1: 4th Edition Rating

Page 102: DRE Category I: (0 % W.P.)

"The patient has no significant clinical findings, no muscle guarding or history of guarding, no documentable neurologic impairment, no significant loss of structural integrity on lateral flexion and extension roentgenograms, and no indication of impairment related to injury or illness."

Case 1: 4th Edition

DRE Category 1 is NOT appropriate.

- Rate at their worst.
- "Spasm" noted by ER MD and by Family MD at visits early after injury.
- "Spasm" to most physicians is "by palpation" and is VERY UNRELIABLE (hard for multiple MDs to examine the same patient and reach the same conclusion).

Physical Exam in LBP Not Very Helpful

- Best inter-rater agreement with neurologic signs: Weakness,
  DTR's,
  Atrophy
- Fair agreement on SLR with inclinometer
- Poor or no agreement on
  Tenderness,
  Spasm By Palpation

Physical Exam in LBP Not Very Helpful

- Spine 1989; Vol 14, #9: 908-18
- JAMA 1992; Vol 268, #6: 760-65
- Spine 1992; Vol 17, #6: 617-628
- Spine 1995; Vol 20: 318-27
- Spine 1996; Vol 21: 10S-18S
- Spine 2000; Vol 25, # 1: 91-97

Case 1: 4th Edition Rating

DRE II: **5 % W.P.**

"The clinical history and examination findings are compatible with a specific injury or illness. The findings may include significant or intermittent or continuous muscle guarding that has been observed by a physician, non-uniform loss of range of motion (dysmetria) or non-verifiable radicular complaints."

4th Edition: Table 71 Differentiators

"1. Guarding: Paravertebral muscle guarding or spasm or non-uniform loss of range of motion, dysmetria, is present, or has been documented by a physician. Radicular complaints that follow anatomic pathways but cannot be verified by neurologic findings belong with this type differentiator."

Thus, 4th Edition Rating

- DRE Category II = **5 % Whole Person**
- "Spasm" is the differentiator.
- Despite apparent recovery.

Case 1: 5th Edition Rating

- Rate At MMI (Maximal Medical Improvement).
- Said many times, beginning with page 373.
- Category I: "No significant clinical findings, no observable guarding or spasm, no documentable neurologic impairment, no documented alteration in structural integrity, and no other indication of impairment related to injury or illness; no fractures."

0 % W.P.

Case 1: What If "System" Says "Use the ROM Method" ??

- 3 Components to the "ROM Method":

1. Diagnosis: Table 15-7, p. 404
2. Range of Motion by Inclinometer
   Table 15-8 = flexion and extension
   Table 15-9 = lateral bending
3. Neurologic Deficit:
   Table 15-18 = Maximal Potential Value of lumbar nerve roots.
   Table 15-15 (Sensory) & 15-16 (Motor) Multipliers (Severity)

Case 1: ROM Method

Diagnosis: Table 15-7, p.404, ¶ II.

A. Unoperated, with no residual signs or symptoms.
B. Unoperated, with medically documented injury, pain, and rigidity* associated with none to minimal degenerative changes in structural tests.†
C. Unoperated, stable, with medically documented injury, pain, and rigidity* associated with moderate to severe degenerative changes in structural tests; †

Includes HNP with or without radiculopathy.

Aside on "Rigidity"

"Rigidity" = (Latin *rigiditas; rigidus* stiff)

Stiffness or inflexibility, chiefly that which is abnormal or morbid; rigor.

- *Dorland's Illustrated Medical Dictionary, 27th Edition*

Poorly chosen word, intending to mean "Loss of motion"

Term 1st appears in the 3rd Edition, where the Dx table says "recurrent muscle spasm or rigidity" but with no definition.

Case 1: ROM Method

Diagnosis: Table 15-7, p.404, ¶ II.

B. Unoperated, with medically documented injury, pain, and rigidity* associated with none to minimal degenerative changes in structural tests.©
C. Unoperated, stable, with medically documented injury, pain, and rigidity* associated with moderate to severe degenerative changes in structural tests;† Includes HNP with or without radiculopathy.

† = Structural tests include radiographs, myelograms with and without CT scan, CT scan and MRI with and without contrast, and diskograms.

Case 1:

- 6 months post injury, AT MMI with:
- Mild intermittent symptoms.
- Normal physical exam.
- Records:

  X-rays of Lumbar Spine = **mild** degenerative changes.

  MRI: desiccation of 2 lowest discs ("Black Discs" on T2 images)

Case 1: ROM Method

1. Diagnosis = ¶ II. B. (None to mild degenerative changes) **5 % WP**
2. ROM was normal **0 %**
3. Neurologic deficit **0 %**

"Final Answer" **5 % WPI**

Summary

Case Number	4th Edition DRE	5th Edition DRE	ROM Method
1	5 %	0 %	5 %

Case 2

Radiculopathy,
Resolved ,
With Non-Operative Treatment

Case 2

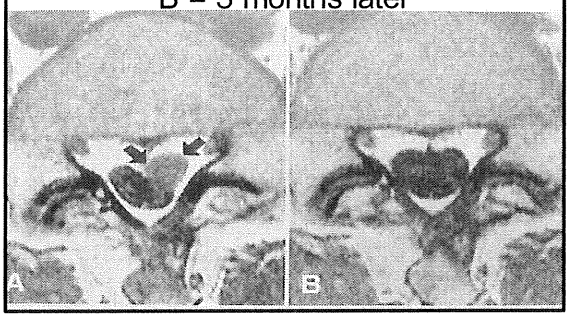
- 39 year old female, lifts a 50 lb box and twists while stocking shelves in a store.
- Immediate LBP with left leg sciatica to the lateral border of the foot.
- Ankle reflex permanently gone on the left.
- "At her worst" able to do only 6 "1 legged toe raises" on the left, with no "sharp – dull discrimination" on the lateral heel and foot.

SLR → sciatica (to the foot) at 40°.

NO "Waddell's Signs".

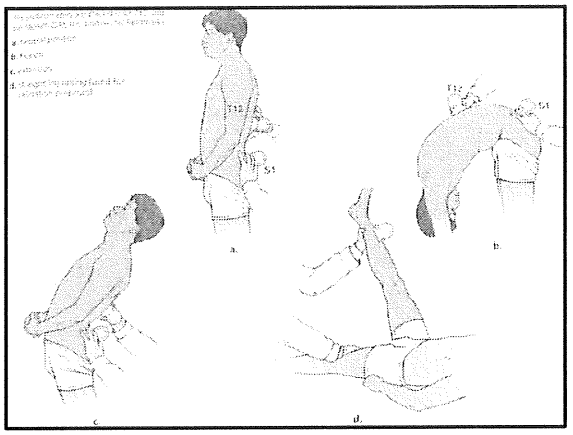
MRI @ L5 – S1

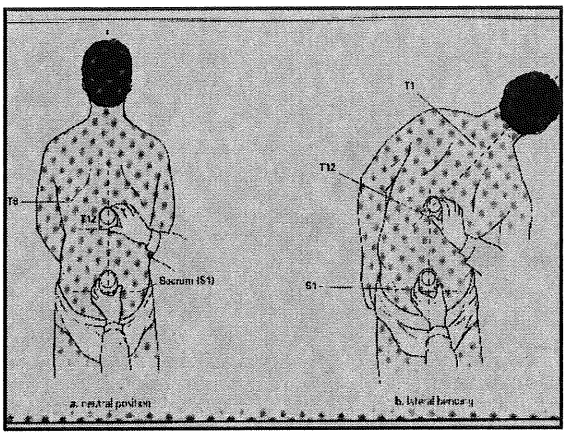
A = 1 week post – injury
B = 3 months later



Case 2: @ MMI without Surgery

- Mild constant back pain that increases with heavy activity, but back at "Full Duty".
- Once a year Mild left leg pain from the knee to the foot, that does not limit activity.
- Using only occasional OTC Meds.
- SLR = Negative
- Ankle reflex absent, persistent ↓ sharp-dull discrimination, 1.0 cm calf atrophy, No weakness.
- ROM valid: True Flexion = 50°, Extension = 15°, left bending 10°, right bending 15°.





Case 2: Ratings ?'s

- What is her PPI % using the 4th Edition ?
- What is her PPI % using the 5th Edition ?
- What if the "system" required the use of the "Range of Motion" method ?

4th Edition Rating @ "Worst"

- DRE Category III "Radiculopathy".(p. 102)
- Rate @ their worst.
- True radiculopathy verified by differentiator of "loss of relevant reflex".
- Note: While not listed in Table 71 (p. 109),
  loss of sharp – dull discrimination
  S1 root weakness (1 legged toe raises)

Should be considered as "Objective Qualifying Differentiators"

10 % WP despite improvement with time.

5th Edition Rating @ MMI

Table 15-3: Criteria: DRE II: **5 - 8 % WP**

"OR, individual had a clinically significant radiculopathy and has an imaging study that demonstrates a herniated disk at the level and on the side that would be expected based on the previous radiculopathy, but NO longer has the radiculopathy following conservative treatment." (restated, p. 383)

Is rating 5 %, or 6 %, or 7 %, or 8 % ??

DRE "Range" of Potential Ratings

- P. 381, ¶ 6:

"If residual symptoms or objective findings impact the ability to perform ADL despite treatment, the higher *(NOT HIGHEST)* percentage in each range should be assigned."

"If ratings are increased, explicit documentation of the reasons for the increase should be included in the report."

Text Example 15-2, p. 385

- S1 Radiculopathy, (MRI +), Resolved.
- No pain or numbness at rest.
- Able to perform all ADL.
- Some pain with heavy activity.
- Full ROM.
- Motor and Sensory exams are NORMAL.
- **5 % WPI**

Case 2: @ MMI without Surgery
What's Different from Example 15-2 ?

- Mild constant back pain that increases with heavy activity, but back at "Full Duty".
- Once a year Mild left **leg pain** from the knee to the foot, that does not limit activity.
- Using only occasional OTC **Meds**.
- SLR = Negative
- Ankle reflex absent, persistent ↓ **sharp-dull discrimination, 1.0 cm calf atrophy**, No weakness.
- **ROM** valid: True Flexion = 50°, Extension = 15°, left bending 10°, right bending 15°.

5th Edition Rating

"Based on very rare leg pain that does not limit activity, atrophy, decreased motion, and decreased sensation, a rating of **8 % WPI seems to be appropriate."**

Although, many might feel that she still has radiculopathy and thus, Category III 10 – 13 % WPI

Case 2

ROM Method

"ROM" method

- Actually consider and rate each of 3 separate factors, and then combine all 3 ratings using the Combined Values Chart (p. 604-606).

1. **Diagnosis:** Table 15-7, p. 404
2. **Range of Motion/Ankylosis**
3. **Neurologic Deficit**

Table 15-7, p. 404

1. **Fractures:** Rate by severity
2. **Intervertebral disk or other soft tissue disorders:** Most Commonly used portion of Table.
3. **Spondylolysis and Spondylolisthesis, NOT operated on:**
4. **Spinal Stenosis, segmental Instability, Spondylolisthesis, Fracture, or Dislocation, OPERATED ON:**

Table 15-7: Disk and Soft Tissue

Unoperated,	Lumbar Impair.
A. No residual signs or symptoms	0 %
B. Medically documented injury, pain, and rigidity*, None to minimum degenerative changes on structural tests**	5 %
C. Same*, but with moderate to severe degenerative changes**, includes HNP with or without radiculopathy	7 %

Case 2: Diagnosis: Table 15-7 Paragraph II.

C. Unoperated, stable, with medically documented injury, pain, and rigidity* associated with moderate to severe degenerative changes in structural tests; †

Includes HNP with or without radiculopathy.

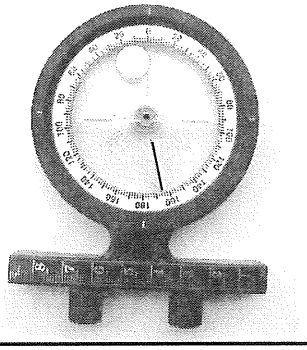
7 % WPI

"ROM" method

- Actually consider and rate each of 3 separate factors, and then combine all 3 ratings using the Combined Values Chart (p. 604-606).

1. **Diagnosis:** Table 15-7, p. 404
2. **Range of Motion/Ankylosis**
3. **Neurologic Deficit**

Inclinometer: Measures Angular Motion



Measure Range of Motion

Reproducibility of Measurement: (p. 399)

3 consecutive measurements

Calculate the mean (average)

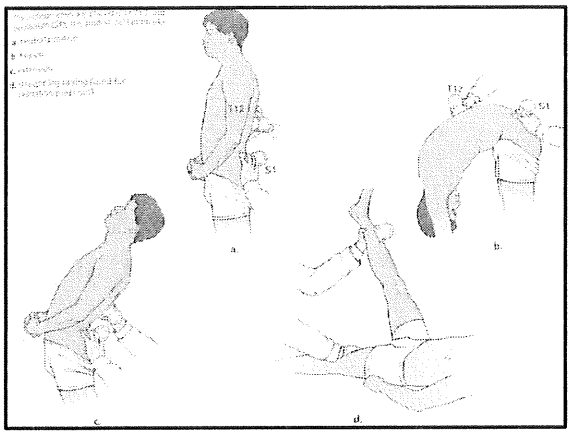
If average is < 50°, each of the 3 measurements must fall within 5° of the mean.

If average is > 50°, each of the 3 measurements must fall within 10° of the mean.

Motion testing can be repeated up to 6 times to obtain 3 consecutive measurements that meet these criteria.

Inconsistent Range of Motion ?

- "If after six measurements inconsistency persists, the spinal motions are considered invalid. The measurements and accompanying impairment estimates may then be disallowed, in part or in their entirety." (p. 399)



Additional Lumbar Validity Test

"Tightest" Straight Leg Raise minus the sum of sacral inclinometer measured sacral flexion plus sacral extension should be ≤ 15°.

Tightest SLR – [sacral flex. + sacral ext.] ≤ 15°

Holds if sum of sacral flexion and extension is less than average, < 65° in women, < 55° in men.

Either repeat the flexion-extension measurements, or disallow the impairment for flexion/extension.

Also invalid if individual resists passive SLR without other evidence of radiculopathy.

Rate by Range of Motion

- Use maximal motion from the series of measurements.
- Determine impairment from appropriate tables.
- ADD impairments for loss of:
  - Flexion
  - Extension
  - Left lateral bending
  - Right lateral bending

ADDITION yields total whole person impairment for decreased motion.

Table 15-8: Lumbar Flexion/Extension

- Find correct portion of table by amount of hip motion (sacral flexion) also present, since having both a stiff back and stiff hip(s) is more impairing than having just a stiff back, but normal hip motion, (don and doff shoes, trim toe nails, etc.).

Table 15-8 Lumbar Flexion/(Ext.)

Sacral Flexion	True Lumbar Flexion	% Whole Person
45° +	60° +	0
50° ——	45°	2
	30°	4
	15°	7
	0°	10
30° – 45°	40° +	4
	20°	7
	0°	10
0° - 29°	30° +	5
	15°	8
	0°	11

Table 15-8 Lumbar (Flexion)/Extension

Extension	% Whole Person
0°	7 %
10°	5 %
15° 15°	3 % ——
20°	2 %
25°	0 %

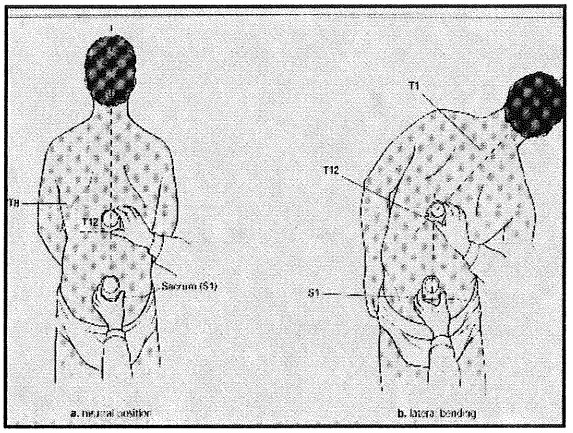


Table 15-9: Lumbar Lateral Bending
Rate Left, then Rate Right Bending

Left or Right Lateral Bending	% Whole Person Impairment	
0°	5 %	
10°	3 %	Left
15°	2 %	Right
20°	1 %	
25°	0 %	

Case 2: Range of Motion @ MMI
Valid and Reproducible*

- True Flexion = 50° 2 %
- True Extension = 15° 3 %
- Left Bending = 10° 3 %
- Right Bending = 15° 2 %

10 % WP

(SLR without pain to 70°)

* "3 of 6 consecutive measurements must lie within 5° or 10 % of the mean, whichever is greater."

"ROM" method

- Actually consider and rate each of 3 separate factors, and then combine all 3 ratings using the Combined Values Chart (p. 604-606).

1. **Diagnosis:** Table 15-7, p. 404
2. **Range of Motion/Ankylosis**

3. Neurologic Deficit

Case 2: @ MMI without Surgery

- Mild constant back pain that increases with heavy activity, but back at "Full Duty".
- Once a year Mild left leg pain from the knee to the foot, that does not limit activity.
- Using only occasional OTC Meds.
- SLR = Negative
- Ankle reflex absent, persistent ↓ sharp-dull discrimination, 1.0 cm calf atrophy, No weakness.
- ROM valid: True Flexion = 50°, Extension = 15°, left bending 10°, right bending 15°.

Neurolgic Deficit
Section 15.12 (p. 423-429)

Physical Exam: Motor loss (Weakness) &Sensory loss

1. Identify Nerve Involved.
2. Find Maximum Potential Impairment of that nerve (if no nerve function), Table 15-18
3. Select a "Severity Multiplier" for loss of sensation from table 15-15, and multiply it by the value of the nerve for sensory loss (step 2)
4. Select a "Severity Multiplier" for loss of strength from table 15-16, and multiply it by the value of the nerve for motor loss (step 2)

Table 15-18
Unilateral Spinal Nerve Root

Note: % Lower Extremity Impairment
Will (later) be converted to Whole Person

Nerve Root Impaired	Maximum % Sensory Deficit or Pain	Maximum % Loss of Strength
L3	5 %	20 %
L4	5 %	34 %
L5	5%	37 %
S1 ———	5%	20 %

Table 15-15: Sensation

Grade	Description	% multiplier
5	No loss of sensibility, abnormal sensation, or pain	0
4	Decreased light touch, sensations or pain forgotten during activity	1 – 25
3	Decreased …, some abnormal sensations or slight pain, interferes with some Activities	26 – 60 50 %
2	Decreased Protective Sensation, abnormal sensation or moderate pain, prevents some activities	61 – 80
1	No protective sensibility, abnormal sensations or severe pain prevents most activity	81 – 99
0	No sensibility, abnormal sensation or severe pain prevents all activity	100

Huge Problem with Table 15-15

Assumes good correlation between severity of sensory loss and severity of pain.

Grade 3: decreased light touch, slight pain, interferes with some activities
Grade 2: decreased protective sensation, moderate pain, Prevents some activities

Grade 1: no protective sensation, severe pain, prevents most activities.

What if there is decreased protective sensation, yet minimal pain, and normal ADLs ? (No Clear Guidance)

ROM Method: Neuro Deficit

- Sensory:
- S1 root, maximal value (totally destroyed nerve), 5 % L.E. (Table 15-18)
- Severity Multiplier, 50 % (Table 15-15)
- Multiply 5 % X 50 % = 2.5 %,
  round off to 3 % L.E.

Table 15-16: Motor Deficit

Grade	Description	% Multiplier
5	Normal	0
4	Full ROM against gravity plus resistance	1 – 25
3	Full ROM against gravity, but not with any resistance	26 – 50
2	Motion when gravity is eliminated	51 – 75
1	Slight contraction, NO movement	76 – 99
0	No Contraction	100

I'll Choose grade 4 = 10 %

ROM Method: Neuro Deficit

Motor:

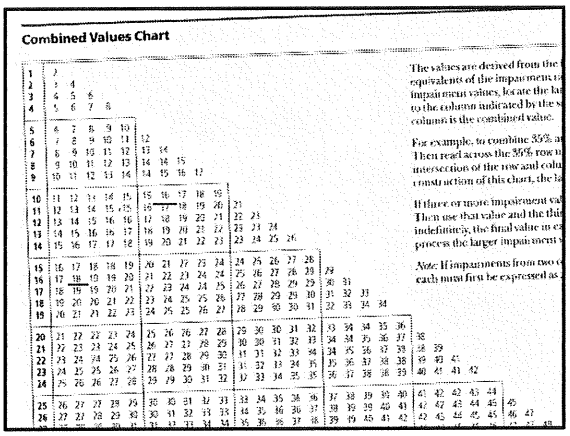
- Maximal Value of S1 root for weakness, 20 % L.E. (Table 15-18)
- Severity Multiplier, (Table 15-16)
  Normal by MMT, thus Grade 5 = 0 %
  ? Atrophy, thus Grade 4 = 1 – 25 %
- Options: 20 % X 0 % = 0 %
  20 % X 10 % = **2 % L.E.**

Case 2: Neuro Deficit

- Sensory Deficit = 3 % L.E.
- Motor Deficit = 2 % L.E.
- Combined Values Chart (p. 604) yields 5 % L.E.
- 5 % L.E. X 0.4 = **2 %** WPI

Case 2: ROM Method "Final Answer"

- Diagnosis = 7 % WPI
- ROM = 10 % WPI
- Neuro Deficit = 2 % WPI
- Combine, Yields **18 % WPI**


Combined Values Chart

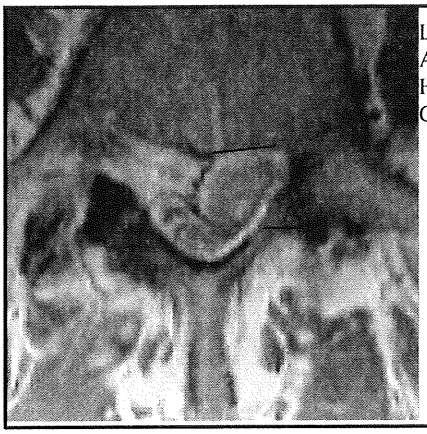
Summary

Case Number	4th Edition DRE	5th Edition DRE	ROM Method
1	5 %	0 %	5 %
2	10 %	8 %	18 %

Case 3
Radiculopathy Treated by Discectomy

Case 3: Radiculopathy

- 44 year old male, lifting injury at work.
- Immediate low back and left leg pain, to the Big toe.
- Exam: ↓ sensation on 1st dorsal web space. (sharp-dull discrimination)
- Foot Drop: Weak EHL & AT
- Does not improve with time.
- MRI large L4 – L5 HNP.



Left L_4-L_5 HNP
A-P Diameter
HNP = 11 mm
Canal = 17 mm

Case 3: Discectomy

- At 8 weeks, no improvement, miserable with sciatica, persisting foot drop.
- Surgical discectomy with partial pain relief, but no improvement in weakness.
- Returns to work at 3 months post-op using chronic sustained release oxycodone (narcotic).
- Some ADL restrictions.

Self-report:	Before Next Dose:	After a Dose:
Back Pain	6	2-3
Leg Pain	9	2-4

Case 3: @ MMI

- Physical Exam:
- ↓ sharp – dull discrimination, 1st web space.
- 1.0 cm left calf atrophy.
- EHL & AT grade 4 weakness.
- Walks without an AFO, but AT fatigues, and "mild foot drop gait" gets worse after 100 feet of walking.
- Reflexes are normal (2 + and symmetric).
- ROM: true flexion = 40°, true extension = 5°, left and right bending = 15° each. (reproducible)
- SLR to 40° → sciatica, (sum of sacral F+E = 45°)

Case 3: Radiculopathy with Discectomy and Foot Drop

- What is the 4th Edition Rating?
- What is the 5th Edition Rating?
- What if the requesting source says "Use the ROM Method"?

Case 3: 4th Edition

- "With the Injury Model, surgery to treat an impairment does not modify the original impairment estimate, which remains the same in spite of any changes in signs or symptoms that may follow the surgery and irrespective of whether the patient has a favorable or unfavorable response to treatment." p. 100
- Rate the severity of the Injury, not the result after treatment.

Case 3: 4th Edition, Which DRE ?

- DRE III: Radiculopathy, p. 102

"The patient has **significant signs** of radiculopathy, such as loss of relevant reflex(es), or measured unilateral atrophy of > 2 cm above or below the knee… See Table 71, p. 109 differentiators."

Key is "significant signs".

Case 4: Table 71, Differentiators

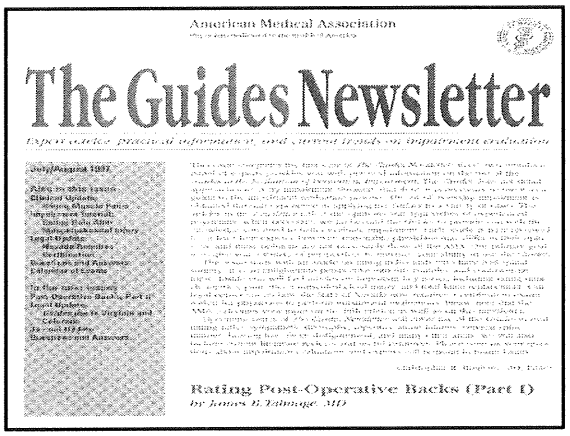
1. Guarding: Never present
2. Loss of reflexes: No
3. Atrophy > 2 cm: No
4. Incontinence: No

1. Electrodiagnostic Studies: Not performed
2. Loss of MSI: Flexion – Extension X-rays Not performed.
3. Bladder Studies: Not performed.

Key Point: Can have true radiculopathy and **not** have any of the 4th Edition "Differentiators".

Case 3: 4th Edition Rating

- DRE III = **10 % WPI.**
- No additional impairment for foot drop.
- No additional impairment for pain.
- Pain chapter (15) is for "Chronic Pain Syndrome", or "non-organic" pain with pain behavior (8 "D's").
- This case is clearly organic root pain.
- Option (?) to increase rating by 1 – 3 % for use of Opioids, page 9 (chapter 2). [Examples of insulin and levothyroxine, "total remission".]


American Medical Association

The Guides Newsletter

Rating Post-Operative Backs (Part I)

Post-Op Backs (3)

- **Foot Drop:** with or without surgery ?
- ADL limitations L_5 root > L_4 or S_1 root inj.
  (ROM model recognized this: Max PPI L_3=20%, L_4=34%, L_5=37%, S_1=20%)
- Suggestion:
  Weak, Limp, Add 5% to DRE III (15%);
  No useful function, full time brace wearer, Add 10% (20% WP PPI)

Case 3: 5th Edition Rating

- Rate @ MMI, treatment result is now considered.
- DRE III: "Significant signs of radiculopathy, such as dermatomal pain and/or in a dermatomal distribution, sensory loss, loss of relevant reflex(es), loss of muscle strength or measured unilateral atrophy above or below the knee…may be verified by EDS." **OR** "… individuals who have had **surgery for radiculopathy**, but are now asymptomatic." p. 384, Table 15-3

Case 3: 5th Edition

- "Category III is for individuals with a **symptomatic radiculopathy**, either **after** medical or **surgical treatment**, or for individuals who have a history of previous radiculopathy caused by a disk herniation or lateral spinal stenosis but have improved or become asymptomatic following surgery." p. 383

Case 3: 5th Edition Rating

- DRE III: range from 10 % to 13 % impairment.
- "If residual symptoms or objective findings impact the ability to perform ADL despite treatment, the higher percentage in each range should be assigned." p.381, ¶ 6.
- Thus, **13 % WPI.**
- Pain chapter ? (Double rating, despite Example under "Excess Pain in the Context of Verifiable Medical Condition"- "suggests > 10 %".)
- Option for rating Opioids ? Chapter 2, p. 20, same ¶ as 4th Edition.

Case 3: ROM Method

1. Diagnosis: Table 15-7, ¶ II. E.
   "Surgically treated disk lesion with residual ... **8 % WPI"**
2. ROM: Valid measurements, both by reproducibility and by SLR vs total sacral motion, thus ratable.
   True flexion = 40°, true extension = 5°, left and right bending = 15° each.

Hip ROM is normal.

Table 15-8 Lumbar Flexion/(Ext.)

Sacral Flexion	True Lumbar Flexion	% Whole Person
45° +	60° +	0
	45°	2
40° ——	30°	4
	15°	7
	0°	10
30° – 45°	40° +	4
	20°	7
	0°	10
0° - 29°	30° +	5
	15°	8
	0°	11

Table 15-8 Lumbar (Flexion)/Extension

Extension	% Whole Person
0°	7 % —— 5°
10°	5 %
15°	3 %
20°	2 %
25°	0 %

Table 15-9: Lumbar Lateral Bending Rate Left, then Rate Right Bending

Left or Right Lateral Bending	% Whole Person Impairment
0°	5 %
10°	3 %
15°	2 % —— 15° each way
20°	1 %
25°	0 %

Case 3: ROM Method

- Impairment due to loss of motion:

Motion	**WPI**
Flexion	4 %
Extension	7 %
Left Lateral	2 %
Right Lateral	2 %
ADD	**15 % WPI**

Case 3: Neurologic Deficit

- Sensory/Pain: persistent sciatica, requires opioids, ↓ sharp – dull discrimination.
- Determine "Maximal Value" for the L 5 root.
- Select a "Severity Multiplier".
- Multiply the "Max. Value" by the "Severity".
- Convert to Whole Person.

Table 15-18
Unilateral Spinal Nerve Root
Note: % Lower Extremity Impairment
Will (later) be converted to Whole Person

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

Table 15-15: Sensation

Grade	Description	% multiplier
5	No loss of sensibility, abnormal sensation, or pain	0
4	Decreased light touch, sensations or pain forgotten during activity	1 – 25
3	Decreased ..., some abnormal sensations or slight pain, interferes with some Activities	26 – 60
2	Decreased Protective Sensation, abnormal sensation or moderate pain, prevents some activities	61 – 80
1	No protective sensibility, abnormal sensations or severe pain prevents most activity	81 – 99
0	No sensibility, abnormal sensation or severe pain prevents all activity	100

Case 3: Sensory/Pain Rating

- Maximal Value of L5 root for sensation and pain is 5 %. (L.E.)
- Severity Multiplier of 80 % (grade 2).
- 5 % X 80 % = **4 % (L.E.)**

Case 3: Motor Loss (Weakness)

- Maximum Value of L5 root for weakness is 37 % L.E.
- 1.0 cm left calf atrophy.
- EHL & AT grade 4 weakness.
- Walks without an AFO, but AT fatigues, and "mild foot drop gait" gets worse after 100 feet of walking.

Table 15-16: Motor Deficit

Grade	Description	% Multiplier
5	Normal	0
4	Full ROM against gravity plus resistance	1 – 25
3	Full ROM against gravity, but not with any resistance	26 – 50
2	Motion when gravity is eliminated	51 – 75
1	Slight contraction, NO movement	76 – 99
0	No Contraction	100

20 % multiplier seems appropriate

Case 4: Weakness Rating

- 37 % Maximum for Weakness.
- 20 % Severity Multiplier.
- 37 % X 20 % = 7.4 %, rounds to **7 % L.E.**

Case 3: Neuro Deficit

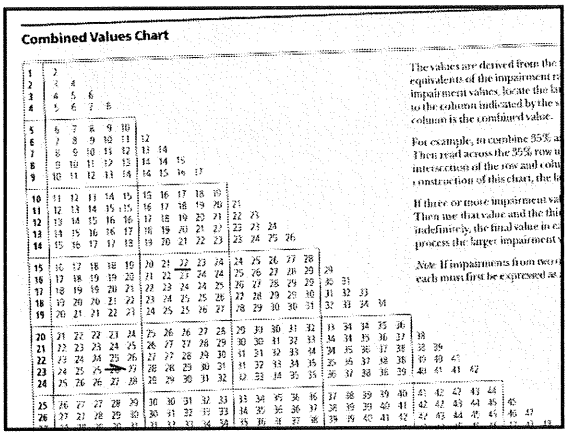
- Sensory/Pain = 4 % L.E.
- Motor Weakness = 7 % L.E.
- Combine to yield 11 % L.E. (as if added)
- Convert to WP by multiplying by 0.4 = 4.4 %,

which rounds to 4 % WPI

Case 3: ROM Method "Final Answer"

- Diagnosis: 8 %
- Range of Motion: 15 %
- Neurologic Deficit: 4 %

- Combine to **25 % WPI**



Summary

Case Number	4th Edition DRE	5th Edition DRE	ROM Method
1	5 %	0 %	5 %
2	10 %	8 %	18 %
3	10 % *	13 % *	25 % *

* = Option of adding additional rating for use of chronic opioids.

Case 4:
Backache Resulting in Spinal Fusion

Case 4: Backache

- 42 year old man, lifting twisting injury at work.
- Immediate and Persistent Backache.
- Plain X-rays: mild degenerative changes.
- At 6 months post-injury still off work despite physical therapy.
- MRI: No HNP, but "Annular Tear" at L4-L5.
- Discography: Severe Pain on injection of L5-S1, mild pain on injection of L4-L5. (4 "black discs")
- 8 months post-injury treated with L4-S1 (2 level) instrumented fusion. (pedical screws and cages).

Case 4: Backache

- At MMI 2 years post-injury.
- "Solid Fusion" by X-ray.
- Pain: "Worse than before surgery."
- NO leg pain or numbness.
- Neurologic exam normal in both legs (NO weakness, sensory loss, reflex alteration, or atrophy).
- Still off work, appealing Social Security agency finding that he is fit for sedentary work.

Case 4: Backache

- Medications:

1. Oxycodone 5 mg/Acetomenophen 500 mg, 4 tabs 5 times a day.
2. Carisoprodal 350 mg, 2 tabs 5 times a day.
3. Diazepam 10 mg, 2 tabs @ HS.

Walks with full time use of a cane.

Wears lumbosacral corset outside his clothing.

Case 4: Backache Spinal Motion

Test	Pre-OP	Post-Op
Flexion	65°	30°
Extension	20°	5°
Left Bending	30°	10°
Right Bending	30°	10°
SLR	Back pain @ 60°	Back pain @ 20°
Total Sacral Motion	55°	15°

If SLR > Sacral motion by 15°, Flexion test is invalid.

Case 4: Backache

- What is the 4th Edition rating ?
- What is the 5th Edition rating ?
- What if the requesting source says "Use the ROM Method" ?

Case 4: 4th Edition Rating

- Rate severity of injury, "at Worst", but do not consider results of surgery (p. 100).
- Objective sign of injury ?
- Pre-Op records do not contain any documentation of objective sign by examination.
- Option: DRE Category I = 0 % ??
- Option: DRE **Category II = 5 %,** calling the discogram the "objective sign" ?
- Option: **DRE II = 5 %,** calling the decrease in extension pre-op the "objective sign" ?

Case 4: 5th Edition Rating

- Which DRE Category ?
- "Alteration of motion segment integrity can be either …(increased translation or angular motion) or decreased motion resulting from …surgical arthrodesis." (p. 378)
- DRE Category IV = 20 – 23 %. ??
- "ROM Method is used in several situations: 3. 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."

Case 4: 5th Edition Rating Uses the ROM Method (Not DRE)

- Diagnosis: "Discogenic Pain" -2 level fusion
- Range of Motion: Stiffness
- Neurologic Deficit: In this case there is none.

Case 4: ROM Method

Diagnosis: Table 15-7, p. 404, ¶ II.

E. Surgically treated disk lesion with residual, medically documented pain and rigidity **10 % WPI.**

F. Multiple levels, with or without operations and with or without residual signs or symptoms, **Add 1 % per level**.

11 % WPI for diagnosis.

Case 4: Backache Spinal Motion

Test	Post-Op	Impairment
Flexion	30°	
Extension	5°	
Left Bending	10°	
Right Bending	10°	
SLR	Back pain @ 20°	
Total Sacral Motion	15°	

If SLR > Sacral motion by 15°, Flexion test is invalid.

Table 15-8 Lumbar Flexion/(Ext.)

Sacral Flexion	True Lumbar Flexion	% Whole Person
45° +	60° +	0
	45°	2
———	30°	4
	15°	7
	0°	10
30° – 45°	40° +	4
	20°	7
	0°	10
0° - 29°	30° +	5
	15°	8
	0°	11

Table 15-8 Lumbar (Flexion)/Extension

Extension	% Whole Person
0° 5°	7 % ———
10°	5 %
15°	3 %
20°	2 %
25°	0 %

Table 15-9: Lumbar Lateral Bending Rate Left, then Rate Right Bending

Left or Right Lateral Bending	% Whole Person Impairment
0°	5 %
10°	3 %
15°	2 %
20°	1 %
25°	0 %

Case 4: Spinal Motion

Test	Post-Op	Impairment
Flexion	30°	4 %
Extension	5°	7 %
Left Bending	10°	3 %
Right Bending	10°	3 %
SLR	Back pain @ 20°	
Total Sacral Motion	15°	

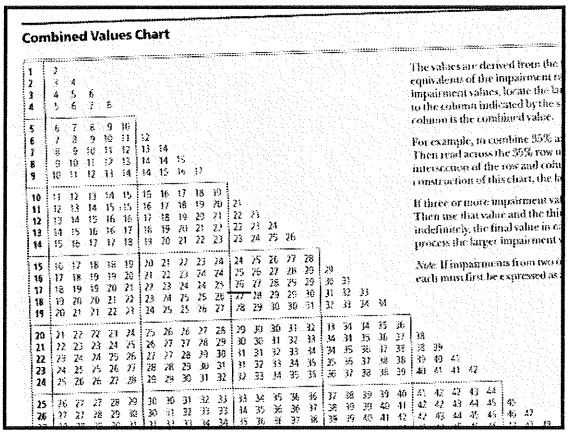
Add impairments to get 17 % WPI.

Case 4: ROM Method "Final Answer"

Combine:

1. Diagnosis 11 %
2. ROM 17 %
3. Neuro Deficit 0 %

Combined Values = 26 % WPI



Summary

Case Number	4th Edition DRE	5th Edition DRE	ROM Method
1 sprain	5 %	0 %	5 %
2 HNP	10 %	8 %	18 %
3 discectomy	10 % *	13 % *	25 % *
4 fusion	5 % *	ROM	26 % *

* = Option of adding additional rating for use of chronic opioids.

Case 5

2 Injuries

Apportionment

Case 5:

- @ age 28, L5-S1 HNP incurred during recreational weight lifting at a health club.
- Severe left leg sciatica.
- Discectomy @ 8 weeks post-injury.
- No back or leg pain for 10 years, full activity.
- Last office note from surgeon, "No ankle reflex, Otherwise Normal Exam. No Permanent Restrictions."[NO ROM recorded]
- @ age 38, On-the-Job lifting injury, L5-S1 recurrent HNP, recurrent left leg sciatica.

Case 5:

- No improvement with time or non-operative treatment. (PT, Meds, Epidural Steroids)
- Repeat discectomy @ 12 weeks post-injury (without fusion).
- @ MMI 1 year after injury # 2, still has moderate low back pain (3-6), and left leg pain (5-7) to the lateral foot (toes 4 & 5).
- Ankle reflex still absent.
- 0.5 cm calf atrophy. No detectable weakness.
- Normal sensory exam (light touch perception, sharp-dull discrimination, and vibration perception)

Case 5: @ MMI

True lumbar

- Flexion 40°
- Extension 10°
- Left Bending 15°
- Right Bending 15°
- SLR on the left 40°
- Sum of sacral flexion and extension 30°

Case 5:

- @ MMI
- Back at work in lighter job with less pay.
- Using only over-the-counter medications.
- Gave up recreational sports.
- Hires neighborhood teenager to mow his lawn.
- Decreased interest in sex, because it hurts.

Case 5: Impairment Rating

- What is the 4th Edition rating ?
- What is the 5th Edition rating ?
- What if the requesting source says "Use the ROM Method" ?

Case 5: 4th Edition Rating

- 1st Injury, "True Radiculopathy" or DRE III.
- Loss of reflex (differentiator), and Surgery, which clearly "counts" as a differentiator.
- 2nd Injury, Still Radiculopathy, DRE III.
- Thus, after 1st injury, 10 % Whole Person.
- After 2nd injury, still 10 % Whole Person.
- Apportionment:
  0 % attributable to the **2nd injury**, despite the major change in function.

Case 5: 5th Edition Rating

- ? DRE or ROM Method ?
- Use the ROM Method when:

  "4. Where there is recurrent radiculopathy caused by a new (recurrent) disk herniation or a recurrent injury in the same spinal region." p. 380
- Directions:

  "9. If requested, apportion findings to the current or prior condition following jurisdiction practices and assuming adequate information is available on the prior condition." p 381

Case 5: p. 381, ¶ 9 Continued

"In some instances, to apportion ratings, the percent impairment due to previous findings can simply be subtracted form the percent based on the current findings. Ideally, use the same method to compare the individual's prior and present conditions. If the ROM method has been used previously, it must be used again. If the previous evaluation was based on the DRE method and the individual now is evaluated with the ROM method, and prior ROM measurements do not exist to calculate a ROM impairment rating, the previous DRE percent can be subtracted from the ROM ratings. Because there are two methods and complete data may not exist on an earlier assessment, the apportionment calculation may be a less than ideal estimate."

Case 5: 5th Edition Rating

Options:

1. Rate 1st injury by the DRE Method. Rate the 2nd injury by the ROM Method, and subtract.
2. Rate the 1st injury by the ROM Method, assuming that the ROM was normal and that there was no neurolgic deficit. Rate the 2nd injury by the ROM Method.

Case 5: 5th Edition, Option 1

- Rate the 1st injury by the DRE Method.
- Radiculopathy is DRE III 10 – 13 %. WP
- Radiculopathy, resolved with surgery, is **10 %.** Example 15-3, p. 386
- Must rate the 2nd injury by the ROM Method.

1. Diagnosis
2. ROM
3. Neurologic Deficit

Case 5: Option 1, 2nd Injury by ROM Method

1. Diagnosis: Table 15-7 (p. 404), ¶ II.

E. Surgically treated disk lesion with residual medically documented pain and rigidity **10 %.**

G. Multiple operations *with* or without residual signs or symptoms

1. Second operation **Add 2 %**

Thus, diagnosis = 12 % WPI

Case 5: Option 1, ROM rating

Motion	Degrees	Impairment
Flexion	40°	
Extension	10°	
Left Bending	15°	
Right Bending	15°	

Table 15-8 Lumbar Flexion/(Ext.)

Sacral Flexion	True Lumbar Flexion	% Whole Person
45° +	60° +	0
	45°	2
40° ——	30°	4
	15°	7
	0°	10
30° – 45°	40° +	4
	20°	7
	0°	10
0° - 29°	30° +	5
	15°	8
	0°	11

Table 15-8 Lumbar (Flexion)/Extension

Extension	% Whole Person
0°	7 %
10°	5 % ——
15°	3 %
20°	2 %
25°	0 %

Table 15-9: Lumbar Lateral Bending Rate Left, then Rate Right Bending

Left or Right Lateral Bending	% Whole Person Impairment
0°	5 %
10°	3 %
15°	2 % ——
20°	1 %
25°	0 %

Case 5: Option 1, ROM rating

Motion	Degrees	Impairment
Flexion	40°	4 %
Extension	10°	5 %
Left Bending	15°	2 %
Right Bending	15°	2 %

Addition yields 13 %

Case 5: Option 1, 2nd Injury by ROM Method

3. Neurologic Deficit

- @ MMI 1 year after injury # 2, still has moderate low back pain (3-6), and left leg pain (5-7) to the lateral foot (toes 4 & 5).
- Normal sensory exam (light touch perception, sharp-dull discrimination, and vibration perception)
- Ankle reflex still absent.
- 0.5 cm calf atrophy. No detectable weakness.

Table 15-18 Unilateral Spinal Nerve Root

Note: % Lower Extremity Impairment Will (later) be converted to Whole Person

Nerve Root Impaired	Maximum % Sensory Deficit or Pain	Maximum % Loss of Strength
L3	5 %	20 %
L4	5 %	34 %
L5 ——	5%	37 %
S1	5%	20 %

Table 15-15: Sensation

Grade	Description	% multiplier
5	No loss of sensibility, abnormal sensation, or pain	0
4	Decreased light touch, sensations or pain forgotten during activity	1 – 25
3	Decreased …, some abnormal sensations or slight pain, interferes with some Activities	26 – 60
2 ___	Decreased Protective Sensation, abnormal sensation or moderate pain, prevents some activities 70 %	61 – 80
1	No protective sensibility, abnormal sensations or severe pain prevents most activity	81 – 99
0	No sensibility, abnormal sensation or severe pain prevents all activity	100

Case 5: Sensory Deficit & Pain

- Since Sensory Exam is Normal, some may choose grade 5 (normal = 0 %)
- But since pain is moderately limiting, and since pain is "believable", it may be reasonable to choose grade 2 (61 - 80 %).
- L5 root value 5 % X multiplier of 70 % gives a 3.5 % L.E. rating which rounds off to **4 % L.E.**
- No weakness, so despite slight atrophy, 0 % severity multiplier.
  [Hence 0 % for weakness]

Table 15-16: Motor Deficit

Grade	Description	% Multiplier
5 ___	Normal	0
4	Full ROM against gravity plus resistance	1 – 25
3	Full ROM against gravity, but not with any resistance	26 – 50
2	Motion when gravity is eliminated	51 – 75
1	Slight contraction, NO movement	76 – 99
0	No Contraction	100

0 % multiplier seems appropriate
Strength, not atrophy !

Case 5: ROM Method, Neurologic Deficit

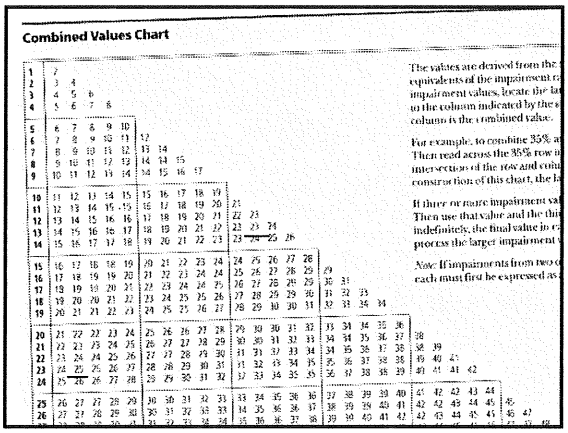
- Sensory/Pain 4 %
- Motor 0 %
- Combine **4 % L.E.**
- **Convert** to WPI

4 % X 0.4 = 1.6 % which rounds to **2 % WPI**

Case 5: ROM Method: 2nd Injury

1. Diagnosis 12 %
2. ROM 13 %
3. Neurologic Deficit 2 %

Combine **25 % WPI**



Case 5: Option 1 "Final Answer"

- After 2nd injury (ROM) 25 %
- After 1st injury (DRE) 10 %

  15 %

- Subtract to apportion,
  15 % WPI for the second injury

Case 5: Option 2 Rate Both Injuries by ROM

- Just calculated the ROM Method rating for "after" the 2nd injury as 25 % WP.
- Need to calculate the ROM Method rating for "after" the 1st injury.

Case 5: ROM Method, Diagnosis

Table 15-7, II.

D. Surgically treated disk lesion without residual signs or symptoms. 8 % WP

Assume ROM is normal, and Assume no neurologic deficit.

Thus, 1st Injury is **8 % WPI**

Case 5: Option 2, "Final Answer"

- After 2nd injury (ROM) 25 %
- After 1st injury (ROM) 8 %
- Subtract **17 % WPI**

- **Apportion 17 % for the 2nd injury.**

Summary

Case Number	4th Edition DRE	5th Edition DRE	ROM Method
1 sprain	5 %	0 %	5 %
2 HNP	10 %	8 %	18 %
3 discectomy	10 % *	13 % *	25 % *
4 fusion	5 % *	ROM	26 % *
5 apportionment	0 %	DRE/ROM 15 %	ROM/ROM 17%

* = Option of adding additional rating for use of chronic opioids.