

Lower Extremity Maximum Medical Improvement and Impairment Rating

TDI Division of Workers'
Compensation

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When there is a conflict between DWC Statutes/Rules and The *AMA Guides*

**Be aware of when DWC Statutes
and Rules take precedence**



Determining an Impairment Rating for the Lower Extremity

An impairment for the lower extremity is derived from the following methods:

- ANATOMIC
- DIAGNOSTIC
- FUNCTIONAL
- (Page 75)
 - Like the upper extremity, impairments of different regions (foot / ankle / knee / hip) are combined
 - Each region can be addressed by the different methods
 - Different systems are combined (MSK / vascular / nerve)

Determining an Impairment Rating for the Lower Extremity

- All tables show impairment percentages in lower extremity (LE) and whole person (WP)
- Impairment values are expressed and combined at the WHOLE PERSON level, for the same LE part (i.e. ankle) or for different parts of the LE (i.e. ankle and knee)
- This includes combining within a joint (APD 211091-s)

Determining an Impairment Rating for the Lower Extremity

- The lower extremity is weighted at 40% whole person
- The final impairment rating CANNOT exceed the amputation value (hip disarticulation – Table 39), as per APD 111720
- Lower extremity impairments that exceed 40% of the whole person are rated at the amputation value of 40% whole person
- The max value for BOTH lower extremities is 64%
- 40% COMBINED with 40% = 64% WP

Determining an Impairment Rating for the Lower Extremity

- Section 3.2, page 75
- *"If the patient has several impairments of the same lower part, such as the leg, or impairments of different anatomic parts, such as the ankle and a toe, the whole person estimates are combined."* (Combined Values Chart, p. 322)
- New APD 211091-s finds that this includes COMBINING ROM impairments within the same joint (lower extremity ONLY)

Determining an Impairment Rating for the Lower Extremity

- The impairment is calculated according to text and tables for each applicable parameter of the 13 possible methods
- Determine which parameters can be combined
- Select the largest and most clinically appropriate method for each region
- Per 4th Edition Guides, *“The physician, in general, should decide which estimate best describes the situation and should use only one approach for each anatomical part.”* (p. 84)



13 Methods for Determining a Lower Extremity Impairment Rating

- 1) Limb length discrepancy (T. 35, p. 75)
- 2) Gait derangement (T. 36, p. 76)
- 3) Muscle atrophy (T. 37, p. 77)
- 4) Muscle strength (T. 38 and 39, p. 77)
- 5) Range of motion (T. 40-45, p. 78)
- 6) Ankylosis (T. 46-61, pp. 79-82)
- 7) Arthritis aka "DJD" (T. 62, p. 83)
- 8) Amputation (T. 63, p. 83)



13 Methods for Determining a Lower Extremity Impairment Rating

- 9) Diagnosis Based Estimates – fractures, deformities, dislocations, ligament instability, bursitis, surgical procedures
(T. 64, 65, & 66, pp. 85-88)
- 10) Skin loss (T. 67, p. 88)
- 11) Peripheral nerve injuries (T. 68, p. 89)
- 12) Causalgia and RSD/CRPS (p. 89) see p. 56 for UE RSD discussion)
- 13) Vascular disorders (T. 69, p. 89)

Note that 10, 11, 12 and 13 are Different Organ Systems!



To Combine or Not to Combine

- Range of motion impairments are not to be combined with impairments from atrophy (see comment, pg. 78)
- The examiner should choose the impairment that is most clinically relevant to the injury that is being rated.
- Explain your rationale in your report.



To Combine or Not to Combine

- Range of motion impairments are not to be combined with a DBE.
- There is an exception in cases of malunion or nonunion of a femoral neck fracture (Table 64).
- In this exception:
The DBE impairment is assigned
The impairment from ROM loss is COMBINED with the DBE impairment (see page 85)

To Combine or Not to Combine

- An impairment due to atrophy is not to be combined with a diagnosis based estimate.
- Per the comment on page 84 related to Table 64: *“The expected muscle weakness or atrophy is included in the diagnosis-based estimates.”*

To Combine or Not to Combine

Instances where impairments can and should be combined include:

- DBE for an intra-articular fracture in Table 64 combined with an impairment for cartilage interval loss from Table 62 (Page 83)
- Impairment for malalignment of a fracture with shortening of the affected limb due to the fracture are combined (See example on page 84)
- Impairments for two different body systems such as an acetabular fracture with a sciatic nerve injury are combined (Page 84).



To Combine or Not to Combine

Instances where impairments can and should be combined include:

- Two different ligamentous injuries (collateral AND cruciate) are combined
- Ligamentous injury with meniscectomy are combined
- Fracture and ligamentous injury or meniscus injury (i.e. tibial plateau and meniscus) are combined
- This methodology applies as long as ALL impairments are in Table 64 and within a specific joint.



13 Methods for Determining Lower Extremity Impairment Ratings

**Let's look at
the specific subsections
of Chapter 3.2**

Leg Length Discrepancy

- **Section 3.2a: Limb Length Discrepancy – Table 35**
- This methodology is difficult to use in individuals with:
 - Pelvic angulation
 - Knee flexion contracture
 - Significant ankle edema
- Can assess with CT for leg length (CPT 77073).
- Tape measure and/or iliac crest level is not recommended.
- Discrepancy must be 2 cm or greater to rate > 0%
- (see T. 35, p. 75.)

Gait Derangement

- **Section 3.2b: Gait Derangement – Table 36**

- The text on page 75 states,

“Whenever possible, the evaluator should use the more specific methods of those other parts in estimating impairment.”

This impairment, *“Does not apply to abnormalities based only on subjective factors, such as pain or sudden giving way.”*

Gait Derangement

- **Section 3.2b: Gait Derangement – Table 36**
- To be an impairment, the Guides state that it MUST be permanent.
- Section 3.2b does not apply to abnormalities based only on subjective factors, such as pain or sudden giving-way, as with, for example, a patient with low-back discomfort who chooses to use a cane to ease walking.
- This impairment is not combined with any other lower extremity impairment from 3.2a to 3.2i.

Issues With Using Gait Derangement

- **Section 3.2b: Gait Derangement - Table 36**
- For an impairment from Table 36 to be assigned, the first requirement under a MILD lower limb gait derangement (sections a – c) is that there is, "*documented moderate to advanced arthritic changes to the hip, knee, or ankle*"
- While not specifically stated under in the MODERATE and SEVERE categories, an appropriate assumption would be that the higher categories would require this component as well.
- The example on page 75 supports that there must at least be moderate osteoarthritis and specific gait changes as a result.

Issues With Using Gait Derangement

- **Section 3.2b: Gait Derangement - Table 36**
- Remember that the final lower extremity impairment cannot exceed the impairment estimate from amputation of 100% of one extremity = 40 % WPI.
- Note that ALL values in the severe category on Table 36 exceed the amputation value of one LE of 40 %.
- Even if both lower extremities were amputated at the level of the hip, the combined WP value would be 64%.
- Therefore 80% for wheelchair dependent is NOT plausible or supported by the Guides in the written text.
- **See APD 111720**

Muscle Atrophy

- **Section 3.2c: Muscle Atrophy (unilateral) - Table 37**
- If clinically applicable assigning an impairment rating for unilateral muscle atrophy may be appropriate.
- For a muscle atrophy impairment to be valid, *“Neither limb should have swelling or varicosities that would invalidate the measurements.”* (Page 76)
- Measurements are to be obtained in centimeters NOT inches

Muscle Atrophy

- **Section 3.2c: Muscle Atrophy (Unilateral) - Table 37**
- Per Table 37, the thigh is measured at 10 cm above the patella.
- Per Table 37, the calf is measured at the *"maximal circumference on the normal side"* and *"compared with the circumference at the SAME level on the affected side."*
- Document the location that the maximum circumference of the calf is obtained.

Muscle Weakness

- **Section 3.2d: Manual muscle testing - Table 39**
- *"Findings varying by more than one grade between observers, or such findings made by the same observer on separate occasions are not valid." (Page 76)*
- *"Patients whose performance is inhibited by pain or fear of pain are not good candidates for using MMT." (Page 76)*



Range of Motion

- **Section 3.2e: Range of motion – Tables 40 to 45**
- Page 14 states *“evaluating the range of motion of an extremity or the spine is a valid method of estimating an impairment. To some extent, however, the ROM is subject to the patient’s control. The results of such evaluations should be consistent and concordant with the presence or absence of pathologic signs and other evidence.”*

Range of Motion

- **Section 3.2e: Range of Motion**
- This is supported by evidence elsewhere in the Guides.
- *"Active range of motion is determined with the patient's full effort and cooperation." (page 14)*
- *"Comparing the patient's active range of motion with the passive range of motion provides useful information." (page 14)*



Range of Motion

- **Section 3.2e: Range of motion – Tables 40 to 45**

- The ROM findings must make sense based on the injury.
- Variability of ROM on any given day would be expected, BUT be suspicious of:

- Wide swings of ROM

- Evidence of mismatch of ROM with functional activities observed in the exam room or documented in the records

- Passive motion far greater than active motion without an associated nerve injury

- *Don't take the measurements obtained during your exam at face value.*



Range of Motion

Appeals Panel Decision 132734, filed 01/09/14

- Section 3.2e does not require that a certifying doctor must only use the most severe impairment for range of motion within the same table. (Tables 40 through 43)
- There is no provision in the Act or Rules that adopts the AMA Guides Casebook to determine the existence and degree of an employee's impairment.
- *"There is no specific provision in the AMA Guides in the lower extremity section that restricts ROM deficits in multiple directions..."*



Range of Motion

- The use of one or more ROM within a joint is within the discretion of the certifying doctor, per APD 132734
- The impairment rating should be clinically appropriate (Pages 8,14 and 77)
- SHOW YOUR WORK!

Describe how you calculated the IR and why you chose the method you used

Remember to combine impairments - including within the same joint, per APD 211091-s, filed 9/10/21

Range of Motion

Measuring Hip Range of Motion

Correct Methods

Range of Motion

Figure 52. Using a Goniometer to Measure Flexion of the Right Hip.

- (a) Goniometer is placed at the right hip, and the pelvis is locked in the neutral position by flexing the left hip until the lumbar spine is flat.
- (b) Patient flexes the right hip until the anterior superior iliac spine begins to move, when the angle is recorded.
- (c) To measure loss of extension of the right hip, the left hip is flexed until the lumbar spine is flat on the examining table, as determined by the examiner's hand, which is placed between the lumbar spine and table surface. The right thigh should rest flat on the table; any right hip flexion is recorded as a flexion contracture.

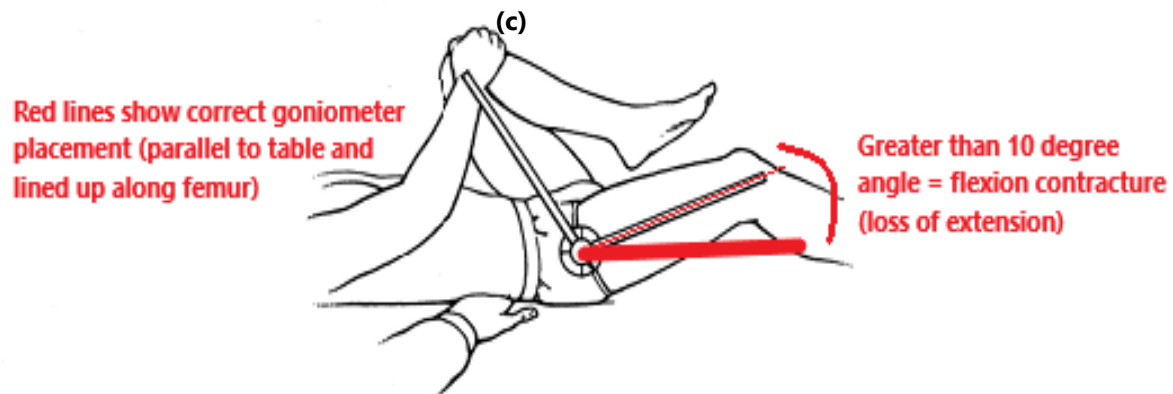
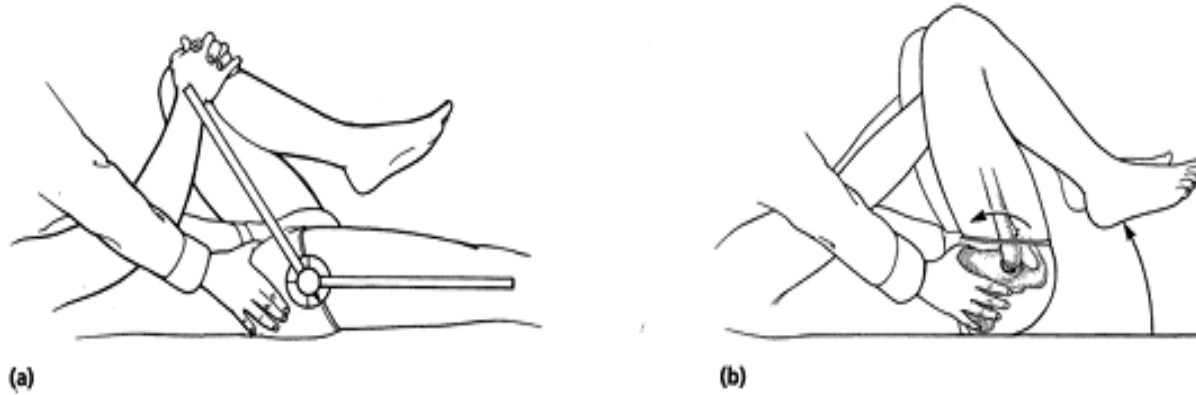
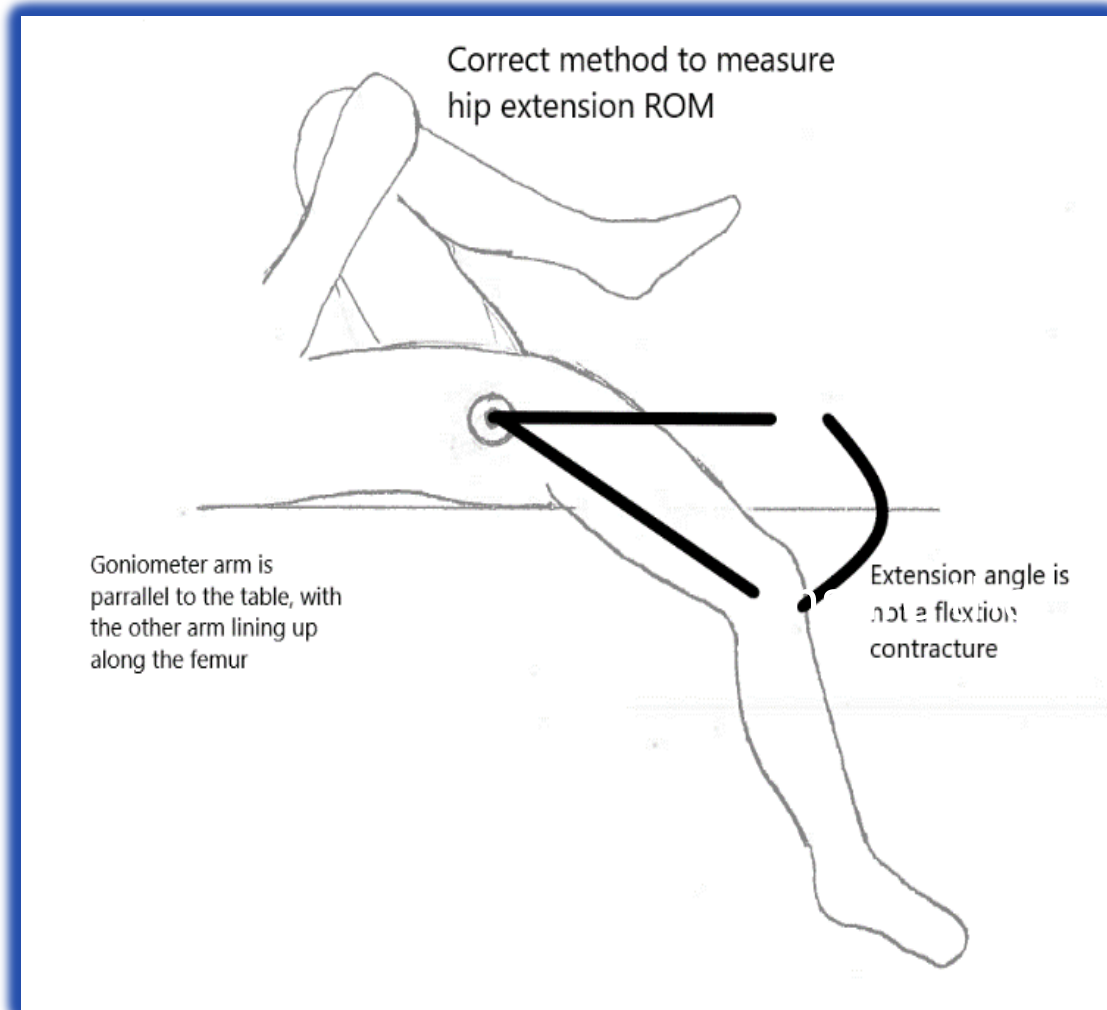


Figure 52, altered in red to show correct goniometer placement to measure flexion contracture

(c) Primary goniometer arm is parallel to the table. The measuring arm lines up with / is parallel to the femur.

Range of Motion



Additional drawing (not from the Guides) showing how to measure extension. Hip extension does not accrue impairment.

Ensure the lumbar spine remains flat on the table, just as you do for measuring flexion contracture

Range of Motion

- The AMA Guides, Table 40, Hip Motion Impairments, can be confusing and lead to disputes.

Table 40. Hip Motion Impairments.

Motion	Whole-person (lower extremity) impairment (%)		
	Mild: 2% (5%)	Moderate: 4% (10%)	Severe: 8% (20%)
Flexion	Less than 100°	Less than 80°	Less than 50°
Extension	10°- 19° flexion contracture	20°- 29° flexion contracture	30° flexion contracture
Internal rotation	10°- 20°	0°- 9°	
External rotation	20°- 30°	0°- 19°	
Abduction	15°- 25°	5°- 14°	Less than 5°
Adduction	0°- 15°	—	—
Abduction contracture*	0°- 5°	6°- 10°	11°- 20°

*An abduction contracture of greater than 20° is a 15% whole-person impairment.

Range of Motion

The word extension is listed on the left side of the table, however, hip extension does not accrue impairment.

Table 40. Hip Motion Impairments.

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Internal rotation	10°- 20°	0°- 9°	
External rotation	20°- 30°	0°- 19°	
Abduction	15°- 25°	5°- 14°	Less than 5°
Adduction	0°- 15°	—	—
Abduction contracture*	0°- 5°	6°- 10°	11°- 20°

*An abduction contracture of greater than 20° is a 15% whole-person impairment.

Impairment for EXTENSION LOSS is measured and rated based on the presence and degree of flexion contracture.

The ratable degrees of flexion contracture are given on the right side of the table.



Range of Motion

- Documenting Hip ROM - Best practice:
- If there IS NO flexion contracture, explain that the absence of flexion contracture results in 0% impairment per Table 40.
- If there IS a flexion contracture, provide the measurement finding, and explain the percent of impairment assigned per Table 40.
- If you include any measurement finding of extension, clearly explain that any degree of extension is inconsistent with a flexion contracture and is not assigned an impairment rating per Table 40.



Range of Motion

Right Knee ROM Example

Flexion = 120°

Extension = 0° (therefore there no flexion contracture)

Valgus = 7°

ROM = 0 % WP

Table 41. Knee Impairment.

Motion	Whole-person (lower extremity) impairment (%)		
	Mild: 4% (10%)	Moderate: 8% (20%)	Severe: 14% (35%)
Flexion	Less than 110°	Less than 80°	Less than 60° +1% (2%) per 10° less than 60°
Flexion contracture	5°-9°	10°-19°	20°+
Deformity measured by femoral-tibial angle; 3° to 10° valgus is considered normal			
Varus	2° valgus-0° (neutral)	1°-7° varus	8°-12° varus; add 1% (2%) per 2° over 12°
Valgus	10°-12°	13°-15°	16°-20°; add 1% (2%) per 2° over 20°

Understanding Knee ROM

Table 41. Knee Impairment.

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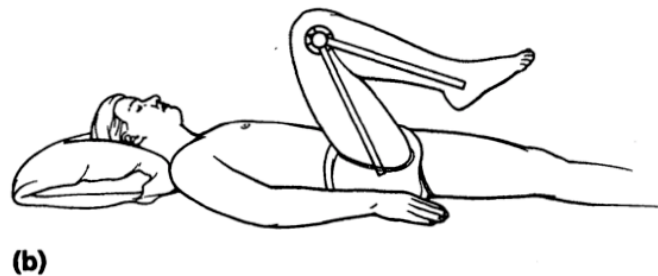
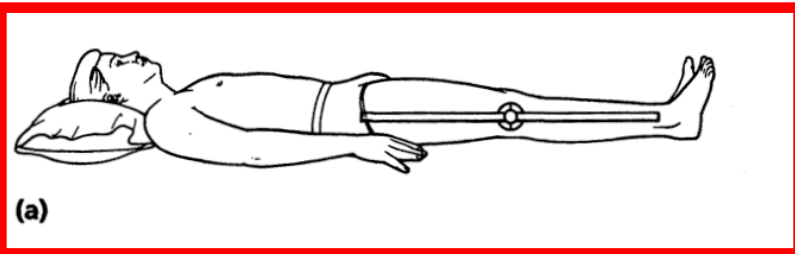
- Table 41, p. 78: rate flexion and flexion contracture (FC)
- Doctors should measure and report active knee flexion and extension and FC
- Lack of extension \neq flexion contracture
- Flexion contracture: AROM \equiv PROM
- Reasons for decreased extension:
 - ✓ Pain inhibition
 - ✓ Poor or self restricted effort
 - ✓ Weakness (neurogenic or non-neurogenic)
 - ✓ Bone spurs due to OA

Understanding Knee ROM

Figure 55. Measuring Knee Flexion.

(a) The patient is supine and the goniometer is next to the knee joint; one goniometer arm is parallel to the lower leg, and the other is parallel to the femur. Any deviation from 0° is recorded.

(b) Patient exerts maximum effort to flex the knee, and the angle subtended by the maximum arc of motion is read.



p. 91

AMA Guides, Fig 55 Measuring Knee Flexion, pg. 91

(a) the patient is supine and the goniometer is next to the knee joint; one goniometer arm is parallel to the lower leg, and the other is parallel to the femur. Any deviation from 0° is recorded.

- This shows and describes how to measure knee flexion contracture, even though it doesn't use the term "flexion contracture"
- A loss of active knee extension is reported as a minus number, e.g., -5 degrees of knee extension

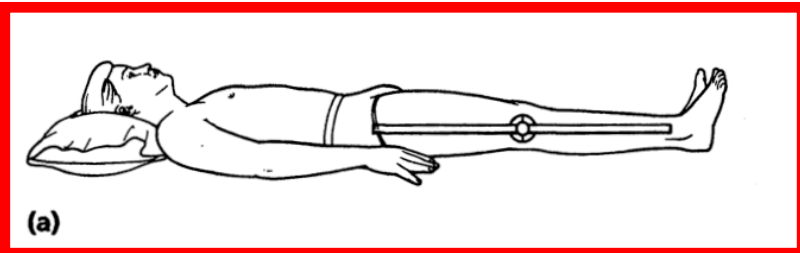
See next slide....

Understanding Knee ROM

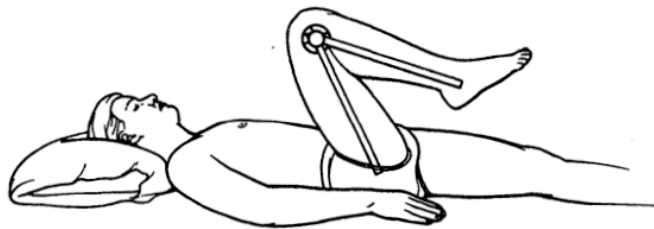
Figure 55. Measuring Knee Flexion.

(a) The patient is supine and the goniometer is next to the knee joint; one goniometer arm is parallel to the lower leg, and the other is parallel to the femur. Any deviation from 0° is recorded.

(b) Patient exerts maximum effort to flex the knee, and the angle subtended by the maximum arc of motion is read.



(a)



(b)

1

AMA Guides, Fig 55 Measuring Knee Flexion, pg. 91

(a) continued....

- Verify it is a CONTRACTURE by lifting the heel of the affected leg.
- If this allows the knee to move further into extension towards 0 degrees, it is not a flexion contracture

(b) Shows and describes measuring active knee flexion

Ankylosis

- **Section 3.2f: Ankylosis – Tables 40 to 45**

- Each joint has a baseline position of optimum ankylosis. This is the base impairment value
- Deviations from the optimum are assigned additional impairment from Table 46 to 59
- For the ankle:

The first plane of motion with deviation from optimum is
ADDED to the base value

Any additional deviation in a second plane of motion is
COMBINED

See example on page 81 of the 4th Edition AMA Guides



Ankylosis

- **Section 3.2f: Ankylosis – Tables 40 to 45**
- Follow instructions at the bottom of the relevant Tables for the hip and knee.
- The Tables 46 to 50 for the hip and Tables 51 – 54 for the knee have footnotes that state "*The appropriate ankylosis impairment is ADDED to the impairment percent for the ankylosis in the neutral position from the text*".
- The text on page 79 for the hip states, "*impairment estimates for extension, abduction and adduction are COMBINED*".



Ankylosis

- **Section 3.2f: Ankylosis – Tables 40 to 45**
- Follow instructions on relevant Tables for the hip and knee.
- The text on page 80 for the knee states, "*Impairments beyond those of the neutral position are ADDED according to tables 51 through 54*".
- No examples to follow for the hip or knee.
- EXPLAIN WHAT YOU DID, citing relevant material from the Guides.

Ankylosis

- **Section 3.2f: Ankylosis – Base for:**
 - **Hip = 20% WPI**
 - [25 – 40 degrees of flexion + neutral EX/IR/ER/ADD/ABD]
 - **Knee = 27% WPI**
 - [10 – 15 degrees of flexion with good alignment]
 - **Ankle = 4% WPI**
 - [Neutral without FLEX / EXT / VARUS / VALGUS]
 - **Foot = 4 % WPI (Hindfoot, Midfoot, Forefoot)**
 - [Subtalar neutral is 0 degrees without VARUS / VALGUS]

Arthritis

- **Section 3.2g: Arthritis – Table 62**
- Per the Guides, “ROM techniques are of limited value for estimating impairment due to arthritis.”
- “For most patients, X-ray grading is a more objective and valid method for assigning impairment estimates than physical findings, such as the ROM or joint crepitation.” (Page 82)
- Table 62 is based on residual radiographic cartilage interval
- Text on page 82 describes radiographic techniques for the joints being rated

Rating Hip and Knee Replacements

- Familiarize yourself with what questions to ask during the examination
- Correlate your findings with observed behaviors
- Order additional testing if need for alignment determination
- Utilize Table 65 for hip and Table 66 for knee
- Score the outcome and THEN apply that number to the Total Knee or Total Hip sections on Table 64
- An impairment for a “good”, “fair”, or “poor” result is based on the structural outcome.

Rating Hip Replacement

Table 65, page 87

	No. of points
a. Pain	
None	44
Slight	40
Moderate, occasional	30
Moderate	20
Marked	10



Rating Hip Replacement

Table 65, page 87

- Section a. for PAIN, b. for FUNCTION and c. for ACTIVITIES are mostly based on **self-report**.
- The points for these 3 sections range from 10 at the least up to 90 at the best.
- The points for just Section a. Pain ranges from 10 at the worst to 44 at the best.
- The OBJECTIVE findings of d. DEFORMITY and e. ROM total only up to 9 points at best.
- Therefore, it is imperative to VERIFY that the self reports are consistent with your exam and the other information in the records.



Rating Hip Replacement

Table 65, page 87

b. Function

Limp

None

Slight

Moderate

Severe

11

8

5

0

Supportive device

None

Cane for long walks

Cane

One crutch

Two canes

Two crutches

11

7

5

3

2

0

Distance walked

Unlimited

Six blocks

Three blocks

Indoors

In bed or chair

11

8

5

2

0



Rating Hip Replacement Table 65, page 87

c. Activities	
Stairs climbing	
Normal	4
Using railing	2
Cannot climb readily	1
Unable to climb	0
Putting on shoes and socks	
With ease	4
With difficulty	2
Unable to do	0
Sitting	
Any chair, 1 hour	4
High chair	2
Unable to sit comfortably	0
Public transportation	
Able to use	1
Unable to use	0



Rating Hip Replacement Table 65, page 87

d. Deformity

Fixed adduction

<10°

1

≥10°

0

Fixed internal rotation

<10°

1

≥10°

0

Fixed external rotation

<10°

1

≥10°

0

Flexion contracture

<15°

1

≥15°

0

Leg length discrepancy

<1.5 cm

1

≥1.5 cm

0



Rating Hip Replacement Table 65, page 87

e. Range of Motion

Flexion

>90°

≤90°

Abduction

>15°

≤15°

Adduction

>15°

≤15°

External rotation

>30°

≤30°

Internal rotation

>15°

≤15°

1

0

1

0

1

0

1

0

1

0



Rating Hip Replacement

Table 65, page 87

- * Add the points from categories a, b, c, d, and e to determine the total and characterize the result of replacement. Source: modified from refs. 42 and 43.



Rating Hip Replacement

Table 64, page 85

Hip	
Total hip replacement; includes endoprosthesis, unipolar or bipolar	
Good result, 85-100 points*	15 (37)
Fair result, 50-84 points*	20 (50)
Poor result, less than 50 points*	30 (75)

*See Table 65 (p. 87) or Table 66 (p. 88) for point rating system.

- **Questions about rating hip replacement?**



Rating Knee Replacement

Table 66, page 88

Table 66. Rating Knee Replacement Results*

	No. of points
a. Pain	
None	50
Mild or occasional	45
Stairs only	40
Walking and stairs	30
Moderate	
Occasional	20
Continual	10
Severe	0
b. Range of motion	
Add 1 point per 5°	25
c. Stability (maximum movement in any position)	
Anteroposterior	
<5 mm	10
5-9 mm	5
>9 mm	0
Mediolateral	
5°	15
6°-9°	10
10°-14°	5
≥15°	0
Subtotal	

d. Deductions (minus)	
Flexion contracture	
5°-9°	2
10°-15°	5
16°-20°	10
>20°	20
e. Extension lag	
<10°	5
10°-20°	10
>20°	15
f. Alignment	
0°-4°	0
5°-10°	3 points per degree
11°-15°	3 points per degree
>15°	20
Deductions subtotal	—

*The point total for estimating knee replacement results is the sum of the points in categories a, b, and c minus the sum of the points in categories d, e, and f. Modified from ref. 44.

Rating Knee Replacement

Table 66, page 88

The point total for estimating knee replacement results is the sum of the points in categories a, b, and c minus the sum of the points in categories d, e, and f.



Rating Knee Replacement Best Practice - ROM

**Remember the maximum value
per Table 66**

- **One point per 5°**
- **ROM of 125° = 25 points**
25 points is maximum value



Rating Knee Replacement

Flexion Contracture vs. Extension Lag

- **Flexion contracture = fixed = passive ROM**
knee cannot be fully extended either actively or passively
- **Extension lag = not fixed = active ROM**
knee cannot be fully extended actively;
but passively, more extension may be possible



Rating Knee Replacement

Best Practice – Alignment

- $0^{\circ} - 4^{\circ} = 0$ points
- $5^{\circ} - 15^{\circ} = 3$ points per degree
- $>15^{\circ} =$ add 20 points
- **SEE TABLE next slide**



Rating Knee Replacement

Best Practice - Alignment

- **5° = 3 points**
- **6° = 6 points**
- **7° = 9 points**
- **8° = 12 points**
- **9° = 15 points**
- **10° = 18 points**

Questions about rating knee replacement?



Amputation

- **Section 3.2h: Amputation: Table 63**
- Table 63 is straightforward – rate the level of the amputation.
- This table can be referenced to give an idea of what a maximum impairment should be for injuries at different levels of the leg.

Skin Loss

- **Section 3.2j: Skin Loss: Table 67**
- Full-thickness skin loss about certain areas in the lower extremity results in significant impairment even when the areas are successfully covered with skin graft
- Table 67 provides impairment values for skin loss in the lower extremity.
- Note that these are VERY specific to situations such as decubitus ulcers and osteomyelitis.
- Seems obvious, but don't use for burns! Burns of the lower extremity (or any area) should be rated as per Chapter 13

Skin Loss

Table 67. Impairments for Skin Loss.

Description	Whole-person (lower extremity) [foot] impairment (%)
Ischial covering that requires frequent unweighting and limits sitting time	5 (12)
Tibial tuberosity covering that limits kneeling	2 (5)
Heel covering that limits standing and walking time	10 (25) [35]
Plantar surface, metatarsal head covering that limits standing and walking time	
First metatarsal	5 (12) [17]
Fifth metatarsal	5 (12) [17]
Chronic osteomyelitis with active drainage	
Of femur	3 (7) [10]
Of tibia	3 (7) [10]
Of foot, requiring periodic redressing and limiting time using footwear	10 (25) [35]

Diagnosis-Based Estimates

- **Section 3.2i: Diagnosis-Based Estimates -Table 64**
- Diagnosis-based estimates are stand alone impairments
- Diagnosis-based estimates are utilized for specific types of fractures, ligamentous injuries, joint replacements, deformities, and meniscus procedures

Diagnosis-Based Estimates

- **Section 3.2i: Diagnosis-Based Estimates - Table 64**
- Per the Guides, *"The physician, in general, should decide which estimate best describes the situation and should use only one approach for each anatomic part."*
- Diagnosis-based estimates are not combined with impairments from atrophy or range of motion as the DBE takes into account any atrophy or range of motion loss. (pages 78, 81, 84)

Peripheral Nerve Injuries

Chapter 3 Method – Section 3.2k. pages 88 and 89 and Table 68.

- Three categories of nerve impairment in the LE
 - Motor deficits
 - Sensory deficits
 - Dysesthesia
- Motor, sensory, and dysesthesia impairments should be combined (text page 88)
- All values listed in Table 68 are for COMPLETE motor or sensory loss for named peripheral nerves
- Also, see APD 101481



Peripheral Nerve Injuries

Table 68. Impairments from Nerve Deficits.

Nerve	Whole-person (lower extremity) [foot] impairment (%)		
	Motor	Sensory	Dysesthesia
Femoral	15 (37)	1 (2)	3 (7)
Obturator	3 (7)	0	0
Superior gluteal	25 (62)	0	0
Inferior gluteal	15 (37)	0	0
Lateral femoral cutaneous	0	1 (2)	3 (7)
Sciatic	30 (75)	7 (17)	5 (12)
Common peroneal	15 (42)	2 (5)	2 (5)
Superficial peroneal	0	2 (5)	2 (5)
Sural	0	1 (2)	2 (5)
Medial plantar	2 (5) [7]	2 (5) [7]	2 (5) [7]
Lateral plantar	2 (5) [7]	2 (5) [7]	2 (5) [7]



Peripheral Nerve Injuries

- Not all nerve lesions are COMPLETE.
- When there is an incomplete lesion there are a couple of options for assigning impairment.
- Chapter 3 method
- Chapter 4 method

Peripheral Nerve Injuries

- **Chapter 3 Method – Section 3.2k.**
- Partial motor loss MAY be rated on the basis of manual muscle testing per Section 3.2d:
 - Table 39, page 77
 - Text on page 76
- Motor findings MUST be "*reproducible and consistent*"
- EXAMPLE: Partial motor loss for 4/5 ankle eversion = 2% WP
 - Section 3.2d, Table 39, page 77
- This methodology does not apply to a partial sensory loss, so another would have to be utilized for sensory loss



Peripheral Nerve Injuries

- **Chapter 4 Method for Determination of Partial Loss**
- The Nervous System - pages 150 and 151
- Similar to UE methodology on pages 48 and 49.
- Consider this section when partial motor and/or sensory nerve loss is present where applicable (i.e. when there is a named sensory / motor nerve in Table 68)



Peripheral Nerve Injuries

- **Chapter 4 Method**

- Determine appropriate peripheral nerve involved
- Take WP value from Chapter 3, Table 68, page 89 for complete motor or sensory loss
- Multiply value for complete motor loss (Table 68) by the grade of the partial loss for motor deficit
 - Chapter 4, Table 21, page 151
- Multiply value for complete sensory loss (Table 68) by the grade of the partial loss for sensory deficit
 - Chapter 4, Table 20, page 151
- Combine partial motor % WP with partial sensory % WP
 - Combined Values Chart, page 322



Peripheral Nerve Injuries

- **TABLE 68 (page 89)**

Errors of OMISSION

Errors based on INCORRECT information

- Refer to Figures 59 and 60 on Page 93
- If a value is not in the figure or table an impairment cannot be assigned.
- DO NOT just make up a value!
- Explain in your report that even though a nerve deficit is present, the Guides do not provide an impairment value.

Peripheral Nerve Injuries

- **TABLE 68 (page 89)**

Errors based on OMISSIONS

Saphenous extension of the femoral (sensory) on the medial lower leg

Tibial after it splits from the sciatic nerve at the popliteal region (sensory AND motor)

Deep peroneal (sensory AND motor)

- **May use the Table 39 method for the omissions of motor nerves**

Peripheral Nerve Injuries-Omissions

Table 68. Impairments from Nerve Deficits.

Nerve	Whole-person (lower extremity) [foot] impairment (%)		
	Motor	Sensory	Dysesthesia
Femoral Saphenous (S)	15 (37)	1 (2)	3 (7)
Obturator	3 (7)	0	0
Superior gluteal	25 (62)	0	0
Inferior gluteal	15 (37)	0	0
Lateral femoral cutaneous	0	1 (2)	3 (7)
Sciatic Tibial (M&S)	30 (75)	7 (17)	5 (12)
Common peroneal	15 (42)	2 (5)	2 (5)
Superficial peroneal	0	2 (5)	2 (5)
Sural Deep Peroneal (M&S)	0	1 (2)	2 (5)
Medial plantar	2 (5) [7]	2 (5) [7]	2 (5) [7]
Lateral plantar	2 (5) [7]	2 (5) [7]	2 (5) [7]

Peripheral Nerve Injuries - Incorrect

- **Chapter 3 Method – Section 3.2k.**

- TABLE 68 (page 89)

Errors based on INCORRECT information

Superficial peroneal

Motor to peroneal muscles is not noted

Obturator

Sensory innervation of the medial thigh is not noted

Peripheral Nerve Injuries - Errors

Table 68. Impairments from Nerve Deficits.

Nerve	Whole-person (lower extremity) [foot] impairment (%)		
	Motor	Sensory	Dysesthesia
Femoral	15 (37)	1 (2)	3 (7)
Obturator	3 (7)	0	0
Superior gluteal	25 (62)	0	0
Inferior gluteal	15 (37)	0	0
Lateral femoral cutaneous	0	1 (2)	3 (7)
Sciatic	30 (75)	7 (17)	5 (12)
Common peroneal	15 (42)	2 (5)	2 (5)
Superficial peroneal	0	2 (5)	2 (5)
Sural	0	1 (2)	2 (5)
Medial plantar	2 (5) [7]	2 (5) [7]	2 (5) [7]
Lateral plantar	2 (5) [7]	2 (5) [7]	2 (5) [7]

Peripheral Nerve Injuries - Table 39

USE TABLE 39 WHEN TABLE 68 DOES NOT HAVE
A MOTOR NERVE LISTED

Table 39. Imp

Muscle group		Whole-person (lower extremity) [foot] impairment (%)				
		Grade 0	Grade 1	Grade 2	Grade 3	Grade 4
Hip	Flexion	6 (15)	6 (15)	6 (15)	4 (10)	2 (5)
	Extension	15 (37)	15 (37)	15 (37)	15 (37)	7 (17)
	Abduction*	25 (62)	25 (62)	25 (62)	15 (27)	10 (25)
Knee	Flexion	10 (25)	10 (25)	10 (25)	7 (17)	5 (12)
	Extension	10 (25)	10 (25)	10 (25)	7 (17)	5 (12)
Ankle	Flexion (plantar flexion)	15 (37) [53]	15 (37) [53]	15 (37) [53]	10 (25) (35)	7 (17) [24]
	Extension (dorsiflexion)	10 (25) [35]	10 (25) [35]	10 (25) [35]	10 (25) [35]	5 (12) [17]
	Inversion	5 (12) [17]	5 (12) [17]	5 (12) [17]	5 (12) [17]	2 (5) [7]
	Eversion	5 (12) [17]	5 (12) [17]	5 (12) [17]	5 (12) [17]	2 (5) [7]
Great toe	Extension	3 (7) [10]	3 (7) [10]	3 (7) [10]	3 (7) [10]	1 (2) [3]
	Flexion	5 (12) [17]	5 (12) [17]	5 (12) [17]	5 (12) [17]	2 (5) [7]

*Hip adduction weakness is evaluated as an obturator nerve impairment (Table 68, p. 89).

Peripheral Nerve Injuries – Table 39

Table 39.

USE TABLE 39 WHEN TABLE 68 DOES NOT HAVE A MOTOR NERVE LISTED

Muscle group		Whole-person (lower extremity) [foot] impairment (%)				
		Grade 0	Grade 1	Grade 2	Grade 3	Grade 4
Hip	Flexion	6 (15)	6 (15)	6 (15)	4 (10)	2 (5)
	Extension	15 (37)	15 (37)	15 (37)	15 (37)	7 (17)
	Abduction*	25 (62)	25 (62)	25 (62)	15 (27)	10 (25)
Knee	Flexion	10 (25)	10 (25)	10 (25)	7 (17)	5 (12)
	Extension	10 (25)	10 (25)	10 (25)	7 (17)	5 (12)
Ankle	Flexion (plantar flexion)	15 (37) [53]	15 (37) [53]	15 (37) [53]	10 (25) [35]	7 (17) [24]
	Extension (dorsiflexion)	10 (25) [35]	10 (25) [35]	10 (25) [35]	10 (25) [35]	5 (12) [17]
	Inversion	5 (12) [17]	5 (12) [17]	5 (12) [17]	5 (12) [17]	2 (5) [7]
	Eversion	5 (12) [17]	5 (12) [17]	5 (12) [17]	5 (12) [17]	2 (5) [7]
	Great toe	Extension	3 (7) [10]	3 (7) [10]	3 (7) [10]	3 (7) [10]
	Flexion	5 (12) [17]	5 (12) [17]	5 (12) [17]	5 (12) [17]	2 (5) [7]

Ex. A SCIATIC NERVE INJURY WITH PARTIAL REINNERVATION AND INTACT HAMSTRINGS BUT WEAK IN THE POSTERIOR TIBIAL NERVE DISTRIBUTION

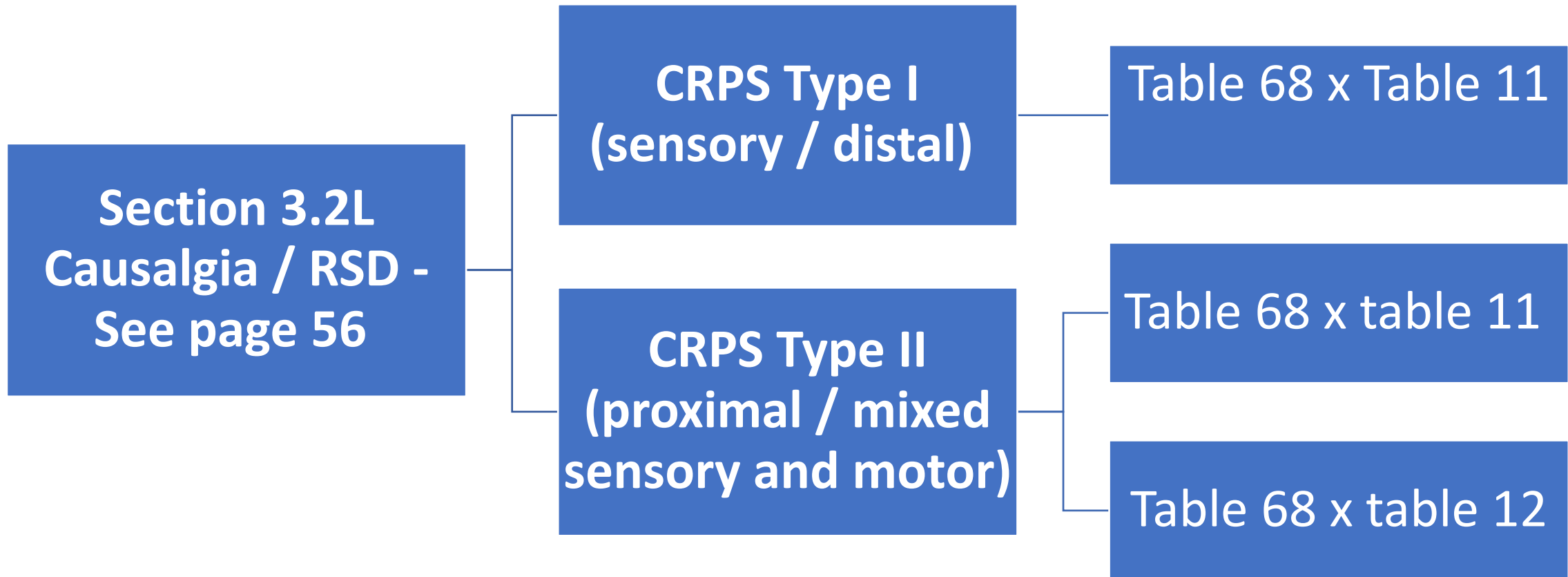
Causalgia/RSD

- **Section 3.2L Causalgia / RSD - See page 56**
- CRPS Type I (sensory / distal)
 - Table 68 x Table 11
- CRPS Type II (proximal / mixed sensory and motor)
 - Table 68 x table 11
 - Table 68 x table 12

Causalgia/RSD

- **Section 3.2L Causalgia / RSD - See page 56**
- If there is evidence of stiffness (due to edema in the acute phase or end stage dystrophic CRPS), then ROM of the affected area should also be measured and all combined
- If ROM is limited due to pain inhibition, and loss is inconsistent with degree of edema, or atrophy or other dystrophic changes, then that would already be accounted for in descriptors of higher grades of sensory loss on Table 11 (UE) or Table 20 (LE)
- [Example: Grade 4 = *“which may prevent activity, and / or causalgia”*]

Causalgia/RSD



Vascular Disorder

- **3.2M Vascular Disorder – Table 69**
- Not a common impairment in the lower extremity.
- More applicable to arterial disease than due to venous stasis such as due to work related DVT.
- Since there is a range, explain why you picked the IR % you did based on clinical evidence in the records.
- As per other non-MSK, use the ADL Table on page 317 to establish the value



**Let's take a
short break
before we start
Case I**

Case 1

History of Injury

- **35-year-old construction worker that stepped in a hole, twisted his right knee, and “heard a pop”**
- **Immediate right knee pain**
- **Difficulty bearing weight and walking**
- **Seen at urgent care the day of the injury**
- **Diagnosed with knee sprain**

Case 1

• Treatment History

- Initial treatment included rest, ice, compression, elevation, and ibuprofen
- Was placed on restricted duty
- Returned for follow up with treating doctor 1 week after the injury
- Reported no improvement with persistent swelling and loss of range of motion
- Referred to physical therapy

Case 1

- **Treatment History (cont'd)**
 - Participated in 8 sessions of PT over 4 weeks
 - Treatment consisted of e-stim, ultrasound, heat, and manual therapy
 - Returned to treating doctor at urgent care 5 weeks after injury
 - Reported no change with PT. Continued complaints of knee pain, popping, and the feeling like his knee "wants to give way"
 - Treating doctor referred him for an MRI



Case 1

• **Treatment History (cont'd)**

- MRI performed 6 weeks post injury showed a medial meniscus tear and near full thickness tear of the ACL
- Referred to an orthopedic surgeon who recommended arthroscopic partial medial meniscectomy and ACL reconstruction
- Carrier denied the recommended surgical intervention
- Carrier accepted injury as “knee sprain” only



Case 1

• Treatment History (cont'd)

- Returned to treating doctor who ordered additional PT
- Completed 16 visits of active therapy 10 weeks post injury
 - Less swelling
 - Improved range of motion
 - Better strength
 - Improved functional activity
- Returned to work but was unable to perform duties such as ladder climbing, wheel-barrow use, and extended standing
- Reported his knee continued to “give way”

Case 1

- **Treatment History (cont'd)**

- Returned to orthopedic surgeon 16 weeks post injury, surgery was again recommended and was approved by the carrier
- Arthroscopic ACL reconstruction and partial medial meniscectomy performed at 18 weeks post injury
- Post operative physical therapy started at 20 weeks post injury
- Completed 18 visits of post-operative PT 30 weeks post injury

Case 1

- **PT re-evaluation at 30 weeks post injury**
- Therapy re-evaluation findings
 - active knee ROM 125° to -5°
 - flexion contracture -5°
 - findings in medical records
 - resisted knee flexion right 30#, left 35#
 - unable to full unilateral weight bear
 - unable to hold half squat on right leg
 - complains of pain in right knee
 - complains of intermittent swelling
- Additional PT requested but denied by carrier

Case 1

- **DD Medical History – 36 weeks post injury**

- Has returned to work with restrictions per treating doctor, and report he can perform most of his duties
- Complains of knee pain at the end of the work-day
- Using NSAIDs as needed for pain control
- Feels like his “thigh is really weak”
- Scheduled to see the orthopedic surgeon next week
- Reports no recent give way episodes





Case 1

- **DD Physical Exam – 36 Weeks Post Injury**
- Stable vital signs, height 6 feet 1 inch, weight 180 pounds
- Right knee shows healed surgical scar and arthroscopic portals
- Gait shows slightly shortened swing and stance phase on right, but no assistive device used



Case 1

- **DD Physical Exam – 36 Weeks Post Injury (cont'd)**
- No obvious swelling or effusion
- Atrophy of right quadriceps
 - right thigh circumference 51 cm
 - left thigh circumference 53 cm
- 4+/5 strength of right knee extension and flexion
- Right knee ROM extension -5° and flexion 100°



Case 1

Based on medical records and physical examination of injured employee, what is the compensable injury for certifying MMI and IR?

130.1(c)(3)





Case 1

Compensable injury is defined by designated doctor.

- A. Right knee sprain
- B. ACL tear
- C. ACL tear and meniscus tear
- D. Sprain, ACL tear, medial meniscus tear





Case 1

**Question for DD to consider
in the exam:**

**Has MMI been reached?
If so, on what date?**

*(May not be greater than statutory MMI
date shown on DWC Form-032)*



Case 1

**Has MMI been reached?
If so, on what date?**

- A. Yes, 4 weeks post injury, date completed initial PT
- B. Yes, 30 weeks post injury, date of post op PT re-evaluation
- C. Yes, 36 weeks post injury, date of DD exam
- D. No, not at MMI



Questions about Case 1?





Case 1- The Sequel

- **DD Medical History – 48 Weeks Post Injury**
 - Injured employee returns for subsequent DD exam 3 months later after 10 additional post-op PT sessions and home based exercise plan
 - Released to work without restrictions at 38 weeks at IE's request



Case 1 - The Sequel

DD Medical History – 48 Weeks Post Injury

- PT discharge at 44 weeks post injury
- Records at PT discharge
 - good progress with PT
 - 5/5 right LE strength
 - extension to 0° and flexion 135°
 - continues his HEP and gym program

Case 1 - The Sequel

- **DD Medical History – 48 weeks post injury (cont'd)**
 - Is currently working in a warehouse performing order fulfillment
 - Operates a stand up forklift 8 hours a day
 - Reports minimal right knee pain with resisted knee flexion activities such as going up steps, which he rates as "1/10"





Case 1- The Sequel

DD Physical Exam – 48 weeks post injury (cont'd)

- Well-healed surgical scars
- No right knee swelling or effusion
- No weakness to right quad set
- Manual muscle testing shows 5/5 strength to right knee flexion and extension



Case 1- The Sequel

- **DD Physical Exam – 48 weeks post injury (cont'd)**
 - Mildly positive anterior drawer
 - 1+ Lachman's
 - Right knee ROM
 - extension 0°
 - flexion 140°
 - No atrophy
 - both thighs circumferences measure 53 cm



Case 1 - The Sequel

Based on medical records and physical examination of injured employee, what is compensable injury for certifying MMI and IR?

130.1(c)(3)





Case 1- The Sequel

Compensable injury for certifying MMI and IR:

- Traumatic ACL sprain / tear
- Medial meniscus tear



Case 1 - The Sequel

Question for DD to consider in the exam:

- Has MMI been reached?
- If so, on what date?

(May not be greater than statutory MMI date shown on DWC Form-032)

Case 1- The Sequel

**Has MMI been reached?
If so, on what date?**

- A. Yes, 38 weeks post injury, when he requested to be released to full duty
- B. Yes, 44 weeks post injury, date discharged from PT
- C. Yes, 48 weeks post injury, date of subsequent DDE
- D. No, not at MMI



Case 1- The Sequel

Question for DD to consider in the exam:

On MMI date, what is whole person IR?



Case 1- The Sequel

**On the date of MMI,
what is whole person IR?**

A.0%

B.1%

C.3%

D.4%



Case 1- The Sequel

Which of the 13 methods apply?

A. Range of Motion (ROM)

B. Diagnosis-Based Estimate (DBE)



**Right Knee ROM
extension 0°
flexion 140°**

**ROM
measurements
accrue 0 %
WPI**

Table 41. Knee Impairment.

Motion	Whole-person (lower extremity) impairment (%)		
	Mild: 4% (10%)	Moderate: 8% (20%)	Severe: 14% (35%)
Flexion	Less than 110°	Less than 80°	Less than 60° +1% (2%) per 10° less than 60°
Flexion contracture	5°- 9°	10°- 19°	20°+
Deformity measured by femoral-tibial angle; 3° to 10° valgus is considered normal			
Varus	2° valgus-0° (neutral)	1°-7° varus	8°-12° varus; add 1% (2%) per 2° over 12°
Valgus	10°- 12°	13°- 15°	16°-20°; add 1% (2%) per 2° over 20°

**DBE
Table 64,
Page 85**

**1 % c/w 3 %
=
4 % WPI**

Region and condition	Whole-person (lower extremity) impairment (%)
Knee	
Patellar subluxation or dislocation with residual instability	3 (7)
Patellar fracture	
Undisplaced, healed	3 (7)
Articular surface displaced more than 3 mm	5 (12)
Displaced with nonunion	7 (17)
Patellectomy	
Partial	3 (7)
Total	9 (22)
Meniscectomy, medial <i>or</i> lateral	
Partial	1 (2)
Total	3 (7)
Meniscectomy, medial <i>and</i> lateral	
Partial	4 (10)
Total	9 (22)
Cruciate <i>or</i> collateral ligament laxity	
Mild	3 (7)
Moderate	7 (17)
Severe	10 (25)
Cruciate <i>and</i> collateral ligament laxity	
Moderate	10 (25)
Severe	15 (37)



Case 1

Additional Scenarios

- Let's consider some additional cases / scenarios that modify some of the factors of the claim, that could affect the condition at MMI.
- This is an important exercise to recognize that each case has unique facts and potential co-morbidities or non-injury related factors that may affect the impairment assessment.



Case 1

The Sequel Additional Scenario 1

- **Condition at MMI**
 - ROM
 - extension 0°
 - flexion 105°
 - Partial medial meniscectomy
 - No cruciate ligament laxity



Case 1

The Sequel Additional Scenario 1

What is whole person IR?



Case 1

The Sequel Additional Scenario 1

What is whole person IR?

- ROM = 4% WP
- DBE = 1% WP
 - partial medial meniscectomy
- Can you combine ROM and DBE?
- Total IR = 4% WP
 - use larger value, page 84





Case 1

The Sequel Additional Scenario 2

- **Condition at MMI**

ROM

extension 0°

flexion 130°

No cruciate ligament laxity

DD notes that operative note describes surgical procedure as "*arthroscopic medial meniscus repair and ACL reconstruction*"

Case 1

The Sequel Additional Scenario 2

What is the whole person IR?





Case 1

The Sequel Additional Scenario 2

What is whole person IR?

A.ROM = 0% WP

B.DBE = 0% WP

- No laxity
- No impairment rating for meniscal repair

C.Total IR = 0% WP





Case 1

The Sequel Additional Scenario 3

- **Condition at MMI**

- ROM
 - extension (flexion contracture) -5°
 - flexion 100°
- No cruciate ligament laxity
- DD notes that operative note describes surgical procedure as "*arthroscopic partial medial meniscectomy and ACL reconstruction*"

Case 1

The Sequel Additional Scenario 3

What is the whole person IR?





ROM

Flexion 100°

**Extension -5°
(flexion contracture)**

More than 1 motion?

What do APDs say?

Table 41. Knee Impairment.

Motion	Whole-person (lower extremity) impairment (%)		
	Mild: 4% (10%)	Moderate: 8% (20%)	Severe: 14% (35%)
Flexion	Less than 110°	Less than 80°	Less than 60° +1% (2%) per 10° less than 60°
Flexion contracture	5°-9°	10°-19°	20°+
Deformity measured by femoral-tibial angle; 3° to 10° valgus is considered normal			
Varus	2° valgus-0° (neutral)	1°-7° varus	8°-12° varus; add 1% (2%) per 2° over 12°
Valgus	10°-12°	13°-15°	16°-20°; add 1% (2%) per 2°



Case 1

The Sequel Additional scenario 3

- **What is whole person IR?**
 - ROM = 4% or 8% WP
 - per APD 132734 (one or both ROM)
 - DBE = 1% WP
 - partial medial meniscectomy
 - Total IR = 4% or 8% WP
 - Explain your decision



Case 1

The Sequel Additional Scenario 4

- **Condition at MMI**

- Moderate knee OA (no change from pre-op). Antalgic gait with normal stance phase, and does not require cane or bracing.
- ROM
 - Flexion 120°, extension 0°
- No cruciate ligament laxity
- 1 cm of right thigh atrophy
- DD notes that operative note describes surgical procedure as "*arthroscopic partial medial meniscectomy and ACL reconstruction*"

Case 1

The Sequel Additional Scenario 4

What is the whole person IR?





Case 1

The Sequel Additional Scenario 4

- **What is whole person IR?**
 - ROM = 0% WP**
 - DBE = 1% WP meniscus**
 - Atrophy = 1% - 2% WP**
 - Gait = ???**
- **Total IR = 1 - 2% WP**
- **Explain how and why**



Case 1

The Sequel Additional Scenario 5

- **Condition at MMI**

- Moderate knee OA. Antalgic gait with normal stance phase, and does not require cane or bracing.
- Pre-op radiographic cartilage interval (RCA) medially was 4 mm.
- RCA at MMI was 2 mm
- ROM
 - flexion 120°, extension 0°
- No cruciate ligament laxity
- 1 cm of right thigh atrophy
- DD notes that operative note describes surgical procedure as "*arthroscopic partial medial meniscectomy and ACL reconstruction*"

Case 1

The Sequel Additional Scenario 5

What is the whole person IR?





Case 1

The Sequel Additional Scenario 5

- **What is whole person IR?**
 - ROM = 0% WP**
 - DBE = 1% WP**
 - Atrophy = 1% - 2% WP**
 - RCI = 8 % WP**
 - Gait = ???**
- **Total IR = 8% WP**
- **Explain how and why**



Case 1

The Sequel Additional Scenario 6

- **Condition at MMI**

- Gait antalgic, but near full extension of the affected knee
- Could sit on the table with knee to 90 degrees and passive ROM during McMurray's testing was greater than 110 degrees
- No atrophy
- ROM
 - Extension -20° (not a contracture based on passive ROM NORMAL)
 - flexion 75° , inhibited by "pain"
- Partial medial meniscectomy
- No cruciate ligament laxity



Case 1

The Sequel Additional Scenario 6

- **What is whole person IR?**
ROM = 0% WP = NOT VALID
DBE = 1% WP based on partial MM.
Atrophy = 0 % WP
- **Total IR = 1% WP**
- **Explain that the ROMs were inconsistent with the passive ROM and functional activities**

Questions About MMI/IR LE Case 1 and the Additional Scenarios?





Case 2

- 25-year-old laborer sustained an isolated non-displaced left proximal to mid-shaft lateral fibular fracture, with injury to the superficial peroneal nerve



Case 2

- Seen in ER
X-rays and CT show isolated **non-displaced mid to distal fibular fracture**
Orthopedic surgeon treated with a boot
- Developed numbness over the dorsum of the foot
- Weakness in the ankle everter muscles



Case 2

- 8-18 weeks post injury
24 visits of PT
- 16 weeks post injury
Follow-up x-rays showed healed fracture
- Orthopedic surgeon 24 weeks post injury
Minimally decreased ankle ROM
Ankle eversion 4/5 all other muscles 5/5
Released RTW with restrictions
3 month follow-up to evaluate nerve healing

Case 2

- DD Medical History - 36 Weeks Post Injury
Left lower leg pain "2-3/10"
chief complaint

Was working full time with restrictions for 12 weeks, then without restrictions for the last 2 weeks.





Case 2

- DD Physical Exam- 36 Weeks Post Injury
Vitals: Height 66 inches, weight 140 pounds,
BP 120/78, pulse 64,
respiration 14
Walks without limp
Does not require use of assistive device to walk



Case 2

- DD Physical Exam - 36 Weeks Post Injury (cont'd)
 - Decreased sensation dorsum of the left foot that is forgotten with activity
 - No abnormal or painful sensation
 - Manual muscle testing shows 4/5 strength of ankle eversion
 - Ankle plantar flexion, dorsiflexion, and inversion are 5/5



Case 2

- DD Physical Exam - 36 Weeks Post Injury (cont'd)
Bilaterally symmetric calf and thigh circumference
Knee Flexion 120° and extension 0°
Plantar flexion 30° and dorsiflexion 12°
Inversion 25° and eversion 15°

Case 2

Based on medical records and physical examination of injured employee, what is compensable injury for certifying MMI and IR?

130.1(c)(3)





Case 2

The compensable injury is:

- Non-displaced left lateral malleolar fracture
- Injury to superficial peroneal nerve

Case 2

Question for DD to consider in the exam:

- Has MMI been reached?
- If so, on what date?

(May not be greater than statutory MMI date shown on DWOC Form-032)

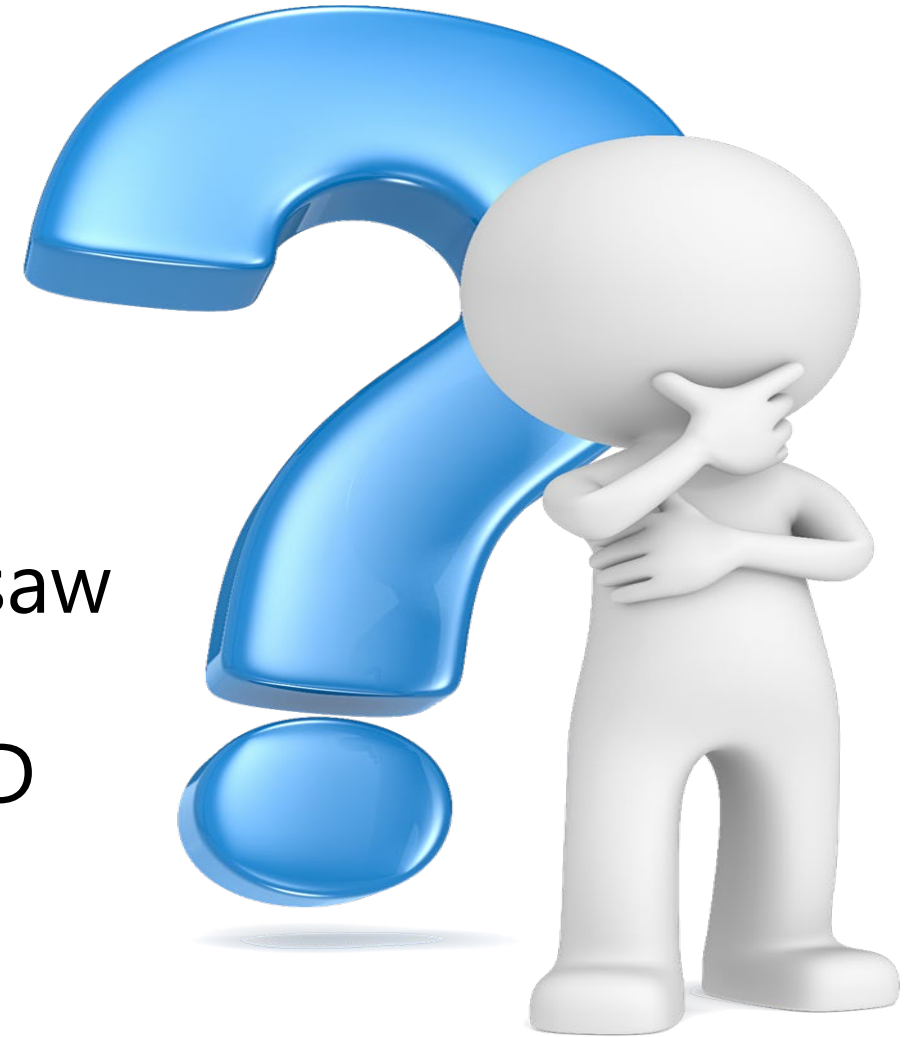




Case 2

- **Has MMI been reached?**
- **If so, what date?**

- A. Yes, 18 weeks post injury, date completed 24 visits PT
- B. Yes, 24 weeks post injury, date last saw orthopedic surgeon
- C. Yes, 36 weeks post injury, date of DD exam
- D. No, not at MMI





Case 2

Question for DD to consider in the exam:

- On MMI date, what is whole person IR?
- *Show your work!*





Case 2

On date of MMI, what is whole person IR?

- A. 0%
- B. 1%
- C. 2%
- D. 3%





Case 2

Which of 13 methods apply?

- Ankle / Hindfoot ROM

One motion within each joint vs. more than one motion within each joint

Appeals Panel Decision 132734 found it is up to the DD's discretion

0% either method

- Knee ROM

0% either method



Case 2

Which of 13 methods apply?

- What about DBE?
Non-displaced lateral malleolar fracture
see page 86 (not addressed)
- If there was a DBE, could you combine DBE and ROM?



Case 2

Which of 13 methods apply?

- Peripheral Nerve (Superficial Peroneal nerve)
3 Methods
Chapter 3 only
Chapter 4 only
HYBRID of both
- BOTH NERVE & ROM APPLY – Different Organ Systems
- *Let's review the nerve methods!*

Peripheral Nerve Injuries

- Chapter 3 Method for Determination of PARTIAL LOSS
- IN THIS CASE: Partial motor loss for 4/5 ankle eversion
2% WP
Section 3.2d, Table 39 for WEAKNESS on page 77
- This method alone does not account for partial sensory loss - would have to use another methodology.

Peripheral Nerve Injuries – This case

USE WHEN TABLE 68 DOES NOT HAVE A MOTOR NERVE LISTED

Table 39. Impairments from Lower Extremity Muscle Weakness.

Muscle group		Whole-person (lower extremity) [foot] impairment (%)				
		Grade 0	Grade 1	Grade 2	Grade 3	Grade 4
Hip	Flexion	6 (15)	6 (15)	6 (15)	4 (10)	2 (5)
	Extension	15 (37)	15 (37)	15 (37)	15 (37)	7 (17)
	Abduction*	25 (62)	25 (62)	25 (62)	15 (27)	10 (25)
Knee	Flexion	10 (25)	10 (25)	10 (25)	7 (17)	5 (12)
	Extension	10 (25)	10 (25)	10 (25)	7 (17)	5 (12)
Ankle	Flexion (plantar flexion)	15 (37) [53]	15 (37) [53]	15 (37) [53]	10 (25) (35)	7 (17) [24]
	Extension (dorsiflexion)	10 (25) [35]	10 (25) [35]	10 (25) [35]	10 (25) [35]	5 (12) [17]
	Inversion	5 (12) [17]	5 (12) [17]	5 (12) [17]	5 (12) [17]	2 (5) [7]
	Eversion	5 (12) [17]	5 (12) [17]	5 (12) [17]	5 (12) [17]	2 (5) [7]
Great toe	Extension	3 (7) [10]	3 (7) [10]	3 (7) [10]	3 (7) [10]	1 (2) [3]
	Flexion	5 (12) [17]	5 (12) [17]	5 (12) [17]	5 (12) [17]	2 (5) [7]

*Hip adduction weakness is evaluated as an obturator nerve impairment (Table 68, p. 89).



Peripheral Nerve Injuries

Chapter 4 Method for Determination of Partial Loss

- In this case the partial sensory nerve loss is applicable.
- May use this when there is a motor nerve listed in Table 68, but it is an incomplete lesion.
- Because Table 68 does not list a value for the motor component of this nerve, cannot apply the same Chapter 4 method for this nerve.

Peripheral Nerve Injuries

- **Chapter 4 Method (in general)**

- Determine appropriate peripheral nerve involved
- Take WP value from Chapter 3, Table 68, page 89 for complete motor or sensory loss
- Multiply value for complete motor loss (Table 68), IF there is one, by the grade of the partial loss for motor deficit
 - Chapter 4, Table 21, page 151
- Multiply value for complete sensory loss (Table 68) , IF there is one, by the grade of the partial loss for sensory deficit
 - Chapter 4, Table 20, page 151
- COMBINE partial motor % WP with partial sensory % WP if there are both

Peripheral Nerve Injuries

- **Chapter 4 Method (cont'd) - THIS CASE**
- Determine appropriate peripheral nerve involved
 - ✓ superficial peroneal nerve
- Take WP value from Chapter 3, Table 68, page 89 for complete motor or sensory loss
 - ✓ motor 0% WP (Due to error in TABLE 68)
 - ✓ sensory 2% WP

Impairments from Nerve Deficits

Table 68, Page 89

Table 68. Impairments from Nerve Deficits.

Nerve	Whole-person (lower extremity) [foot] impairment (%)		
	Motor	Sensory	Dysesthesia
Femoral	15 (37)	1 (2)	3 (7)
Obturator	3 (7)	0	0
Superior gluteal	25 (62)	0	0
Inferior gluteal	15 (37)	0	0
Lateral femoral cutaneous	0	1 (2)	3 (7)
Sciatic	30 (75)	7 (17)	5 (12)
Common peroneal	15 (42)	2 (5)	2 (5)
Superficial peroneal	0	2 (5)	2 (5)
Sural	0	1 (2)	2 (5)
Medial plantar	2 (5) [7]	2 (5) [7]	2 (5) [7]
Lateral plantar	2 (5) [7]	2 (5) [7]	2 (5) [7]

Peripheral Nerve Injuries

Chapter 4 Method (this case - cont'd)

- Multiply value for complete sensory loss (*Table 68*) by grade of partial loss for sensory deficit
 - ✓ Chapter 4, Table 20, page 151
 - ✓ $2\% \text{ WP} \times 25\% = 1\% \text{ WP}$
- Multiply value for complete motor loss (*Table 68*) by grade of partial loss for motor deficit
 - ✓ Chapter 4, Table 21, page 151
 - ✓ $0\% \text{ WP} \times 25\% = 0\%$ (due to error in Table 68)
- Combine partial sensory WP% with partial motor WP%
 - ✓ Combined Values Chart, page 322
 - ✓ $1\% \text{ WP} \text{ cw } 0\% \text{ WP} = 1\% \text{ WP}$

Chapter 4, Tables 20 (sensory) and 21 (motor) - Page 151

Table 20. Classification and Procedure for Determining Impairment Due to Pain or Sensory Deficit Resulting from Peripheral Nerve Disorders.

a. Classification		
Class	Description of sensory loss or pain	% Sensory impairment
1	No loss of sensation, abnormal sensation, or pain	0
2	Normal sensation except for pain, or decreased sensation with or without pain, forgotten during activity	1 - 25
3	Decreased sensation with or without pain, interfering with activity	26 - 60
4	Decreased sensation with or without pain or minor causalgia that may prevent activity	61 - 80
5	Decreased sensation with severe pain or major causalgia that prevents activity	81 - 95

- b. Procedure**
1. Identify the area of involvement, using the dermatome charts in Chapter 3 (pp. 50 and 52).
 2. Identify the nerve, part of plexus, or root that innervates the area.
 3. Find the value for maximum loss of function of the specific nerve or root due to pain or loss of sensation, using the appropriate table in the *Guides* chapter on the musculoskeletal system (Chapter 3, p. 13).
Use Table 13 (p. 51) for the cervical roots; Table 14 (p. 52) for the brachial plexus; Table 15 (p. 54) for upper extremity nerves; Table 83 (p. 130) for the lumbosacral roots; and Table 68 (p. 89) for the lower extremity nerves.
 4. Grade the degree of decreased sensation or pain according to the classification given above.
 5. Multiply the percentage associated with the nerve identified in procedure 3 (above) by the percentage associated with the decreased sensation.
 6. Determine other nerve impairments by the same procedure; *combine* the impairments using the Combined Values Chart (p. 322) to determine the whole-person impairment of the nervous system.

Table 21. Classification and Procedure for Determining Nervous System Impairment Due to Loss of Muscle Power and Motor Function Resulting from Peripheral Nerve Disorders.

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 or extension.
 2. Identify the muscle(s) performing the motion and the motor nerve(s) involved.
 3. Grade the severity of motor deficit of the individual muscles according to the classification given above.
 4. Find the maximum impairment due to the motor deficit for each nerve structure involved, as listed in Chapter 3: upper extremity (Table 15, p. 54), brachial plexus (Table 14, p. 52), lower extremity nerves (Table 68, p. 89); and lumbosacral nerves (Table 83, p. 130).
 5. Multiply the severity of the motor deficit by the percentage associated with the nerve(s) identified in procedure 4 (above) to obtain the estimated impairment from strength deficit for each structure involved.

Peripheral Nerve Injuries

Chapter 4 Method (This Case - cont'd)

- What is "missing" from CHAPTER 4 METHOD?
- For Table 68, dysesthesia is either present or it is NOT. There is no partial.
- However, if Chapter 4 is used for sensory loss, then, dysesthesia will be accounted for in the higher categories in Table 20 (Class 3, 4 and 5).



Case 2

Peripheral Nerve Injuries Methods of Impairment:

- **Chapter 3** (Section 3.2d)
 - ✓ Partial motor = 2% WP
 - ✓ No rating for partial sensory
- **Chapter 4** (Section 4.4c)
 - ✓ Partial sensory = 1% WP
 - ✓ No rating partial motor / dysesthesia
- 2% WP or 1% WP (or 3% WP)?

Explain how and why you used the methods you did

Case 2

What is Total Lower Extremity IR?

- **Musculoskeletal (MSK)**

- ✓ Knee / Ankle / Hindfoot ROM = 0 % WP
- ✓ DBE = 0 WP%

- **Peripheral nerve = 2% WP**

- MSK 0 % WP combined with Peripheral nerve 2% WP (if we chose the greatest) OR 3 % WP (if we chose the hybrid method)
- 0% WP c/w 2% WP (3 % WP) = 2% WP (or 3% WP)





Questions about Case 2?





**Let's take a
short break
before we start
Case 3**



Case 3

History of Injury

- **58 year old librarian**
- Was on the 3rd step of a step stool placing books on a shelf
- Lost her footing coming off the top step and fell, planting her right foot causing a valgus twisting load to the right knee
- Went to the ER where X-rays were negative for fracture but positive for a large suprapatellar effusion
- Established care with treating doctor the next week when the unusual swelling did not resolve



Case 3

- **Treating Doctor evaluation 1 week post injury**
 - Complains of "8/10" "constant" pain and swelling
 - Clinical Exam Right Knee
 - Mildly antalgic gait
 - ROM extension - 4 ° and flexion 115° due to large suprapatellar effusion
 - Pain at the medial femur at MCL.
 - Mild joint line opening with valgus stress
 - Trace laxity with anterior drawer, (-) posterior drawer.
 - Joint line pain medially > laterally



Case 3

- **Treating Doctor evaluation 1 week post injury (cont.)**
 - Referred to PT
 - Completed 10 sessions of PT six weeks post injury

Case 3

- **Treating doctor re-evaluation 7 weeks post injury**

- Exam findings unchanged from initial visit
- Reported swelling had gone down some, but pain had not improved with PT
- Knee feels unstable and has mechanical symptoms
- TD referred IE to orthopedist

- **IE evaluated by orthopedist 10 weeks post injury**

- IE complained of constant pain in her right knee
- Reported that her right knee hurts worse at the end of the day and her knee would buckle or give way when fatigued
- Taking ibuprofen for pain, using Voltaren gel



Case 3

- **Orthopedic exam findings**

- Non-painful crepitation of the patella
- Range of motion -5 to 100 degrees, limited by pain but also by persistent effusion
- Muscle strength 5/5 in the affected LE, except for 4/5 in the affected quadriceps
- "Positive McMurray's" [No other specific information given.]
- 1- 2 laxity with good endpoint with valgus stress compared to contralateral extremity. Produces pain at the distal medial femur.



Case 3

- **Orthopedic findings (cont.)**
 - Radiographs taken at orthopedic office showed tricompartmental arthritis with severe narrowing of the medial compartment and a large effusion
- Cortisone injection performed by orthopedist
- Referred by orthopedist for an MRI of the knee to *"define the pathology"*
- MRI performed 14 weeks post injury



Case 3

MRI imaging at 14 weeks post-injury demonstrated:

- Tricompartamental OA; medial > patellofemoral / > lateral.
 - ✓ Severe chondral thinning with associated osteophytes of the medial compartment
 - ✓ Moderate chondromalacia of the patellofemoral compartment
 - ✓ Mild chondromalacia lateral compartment
- Large complex tear of the posterior horn of medial meniscus with extrusion and horizontal signal changes in the posterior lateral meniscus
- Large suprapatellar effusion



Case 3

MRI imaging at 14 weeks ALSO demonstrated:

- Large areas of bone contusion at the posterolateral corner and medial femoral condyle near MCL attachment
- Incomplete bundles of the anterior cruciate ligament (ACL) observed, with increased T2 signal changes within the ACL, consistent with acute / subacute tear
- Acute / subacute intrasubstance signal changes in the MCL with questionable partial avulsion of proximal fibers at the medial femoral condyle

Case 3

Follow up by the orthopedist at 16 weeks

- Exam findings and subjective complaints unchanged from previous visit; but she noted having more give-away episodes
- Reported that injection provided relief for about 3 – 7 days, but large effusion continues
- Working without restrictions
- Diagnoses by orthopedist
 - Medial meniscus tear
 - ACL tear
 - Osteoarthritis

Case 3

- 16 weeks - Follow up by the orthopedist
 - ✓ Due to no change with therapy or injection and continued pain, the orthopedist recommended knee replacement
- 22 weeks post injury - IE underwent total right knee arthroplasty
- 40 weeks post injury - Completed post surgical PT consistent with ODG (18 weeks of therapy)
- 50 weeks - Ortho exam
 - ✓ Demonstrated extension lag of 20 degrees and flexion contracture of -10 degrees and 95 degrees of flexion
 - ✓ There was 2 cm calf atrophy.



Case 3

- **60 weeks post injury - DD evaluation**
- **Subjective:**
 - IE ambulates with cane out of preference, because she feels "uneasy" on her "new knee"
 - Has occasional moderate pain while walking longer than 10 minutes at a time
 - Knee pain rated 6/10, eased with use of ibuprofen
 - Reports difficulty kneeling and squatting to pick up objects from floor

Case 3

- **60 weeks post injury - DD evaluation (continued)**
- **DD exam findings**
 - ✓ Healed surgical scar consistent with TKA
 - ✓ No signs of infection
 - ✓ ROM extension -10° , flexion 100
 - ✓ Flexion contracture 5° and extension lag 5°
 - ✓ Alignment 7°
 - ✓ A-P instability 8 mm, M-L instability 7°
 - ✓ Comparison to contralateral LE -
 - 1 cm calf atrophy of at 12 cm below patella
 - 1.5 cm atrophy of right thigh at 10 cm

Case 3

Based on the medical records and physical examination of injured employee, what is compensable injury for certifying MMI and IR?

130.1(c)(3)





Case 3

What is compensable injury for certifying MMI and IR?

- A. Knee strain
- B. ACL tear and MCL tear
- C. Aggravation of Degenerative OA of the knee
- D. Aggravation of Complex tear of medial meniscus





Case 3

What is the compensable injury for certifying MMI and IR?

- A. This is non-specific diagnosis and there are more notable objective DXs
- B. There was evidence of acute injury or SPRAIN / tear to the ACL and the MCL as per MRI and correlating clinical exam.
- C. There was objective evidence of injury to the knee joint complex (ACL and MCL), and there were large areas of bone contusion at the posterolateral corner and medial femoral condyle near MCL attachment. This would be consistent with AGGRAVATION of the underlying degenerative condition of OA.
- D. The complex tear is degenerative. It is hard to aggravate a degenerative meniscus without specific anatomic changes adjacent to the complex tear.

Case 3

Question for DD to consider in the exam:

Has the IE reached MMI and if so, when?



Case 3

**Has MMI been reached?
If so, on what date?**

- A. Yes, when completed 10 sessions of PT six weeks post injury.
- B. Yes, 16 weeks post injury at orthopedic follow up
- C. Yes, 40 weeks post injury, completion of post-op PT
- D. Yes, Ortho exam at 50 weeks
- E. Yes, 60 weeks, date of DD exam
- F. No, not at MMI





Case 3

- A. If there was aggravation of the pre-existing OA, AND there was evidence of other acute injury, then this date is premature. There are other ODG related treatments that would be recommended.
- B. If the OA had not been aggravated, this could have been a potential MMI date.
- C. IF it has been explained that the OA was aggravated and there were other acute injuries, Appendix D would support the TKA .
 - This would seem to be a good inflection point as it was at completion of ODG recommended treatment for TKA
 - However, formal treatment is not always necessary to continue to improve.
 - Was there anticipation or actual improvement between 40 weeks and 50 weeks? Or 40 weeks and 60 weeks?



Case 3

D. Was there anticipation or actual improvement between 40 weeks and 50 week. Was the IE compliant in a HEP?

E. Is the **BEST** answer

- ✓ 60 weeks is just less than on year from the DOI.
- ✓ The IE is older and return to normal activities would be anticipated to result in further material recovery
- ✓ It did result in further material (objective) recovery.
- ✓ This was 20 weeks (5 months) after completion of PT

Case 3

On the date of MMI, what is whole person IR?

- A. 0%
- B. 2%
- C. 4%
- D. 30%



Table 66. Rating Knee Replacement Results*

	No. of points
a. Pain	
None	50
Mild or occasional	45
Stairs only	40
Walking and stairs	30
Moderate	
Occasional	20
Continual	10
Severe	0
b. Range of motion	
Add 1 point per 5°	25
c. Stability (maximum movement in any position)	
Anteroposterior	
<5 mm	10
5-9 mm	5
>9 mm	0
Mediolateral	
5°	15
6°-9°	10
10°-14°	5
≥15°	0
Subtotal	
d. Deductions (minus)	
Flexion contracture	
5°-9°	2
10°-15°	5
16°-20°	10
>20°	20
e. Extension lag	
<10°	5
10°-20°	10
>20°	15
f. Alignment	
0°-4°	0
5°-10°	3 points per degree
11°-15°	3 points per degree
>15°	20
Deductions subtotal	—

*The point total for estimating knee replacement results is the sum of the points in categories a, b, and c minus the sum of the points in categories d, e, and f. Modified from ref. 44.

Rating Knee Replacement Table 66, Page 88

Results for a-f

- a. Moderate occasional pain 6/10 with walking
- b. ROM flexion 100°
- c. Stability A-P 8 mm
- d. Flexion contracture 5°
- e. Extension lag < 10°
- f. Alignment 7°



Table 66. Rating Knee Replacement Results.*

	No. of points
a. Pain	
None	50
Mild or occasional	45
Stairs only	40
Walking and stairs	30
Moderate	
Occasional	20
Continual	10
Severe	0
b. Range of motion	
Add 1 point per 5°	25
c. Stability (maximum movement in any position)	
Anteroposterior	
<5 mm	10
5-9 mm	5
>9 mm	0
Mediolateral	
5°	15
6°-9°	10
10°-14°	5
≥15°	0
Subtotal	
d. Deductions (minus)	
Flexion contracture	
5°-9°	2
10°-15°	5
16°-20°	10
>20°	20
e. Extension lag	
<10°	5
10°-20°	10
>20°	15
f. Alignment	
0°-4°	0
5°-10°	3 points per degree
11°-15°	3 points per degree
>15°	20
Deductions subtotal	—

*The point total for estimating knee replacement results is the sum of the points in categories a, b, and c minus the sum of the points in categories d, e, and f. Modified from ref. 44.

Rating Knee Replacement Table 66, Page 88

SUMMARY

$$(a + b + c) - (d + e + f)$$

$$(20+20+15) = 55$$

$$(2+5+9) = 16$$

- 55 - 16 = 39 points
- Next, don't forget to refer to Table 64, page 85
- Less than 50 points is a POOR result = 30% WP



Rating Knee Replacement

Best Practice - Alignment

- $0^{\circ} - 4^{\circ} = 0$ points
- $5^{\circ} - 15^{\circ} = 3$ points per degree
- $> 15^{\circ} =$ add 20 points

SEE TABLE next slide

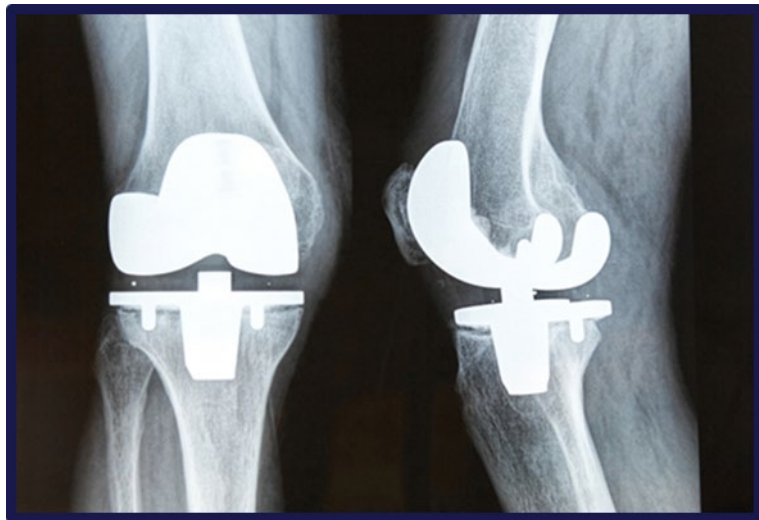
Rating Knee Replacement

Best Practice - Alignment

- **5° = 3 points**
- **6° = 6 points**
- **7° = 9 points**
- **8° = 12 points**
- **9° = 15 points**
- **10° = 18 points**

- **11° = 21 points**
- **12° = 24 points**
- **13° = 27 points**
- **14° = 30 points**
- **15° = 33 points**
- **> 15° = 53 points***

Questions?





Case 3

This is an Alternate Scenario to Case 3

It will hopefully allow for critical thinking of

- The MOI and how it relates to what you would likely see clinically and with imaging
- How the subjective and objective relate to the imaging
- What the EBM would indicate about typical OA findings



Case 3 - Alternate Scenario

- 58 year-old librarian
- Was on a 3 rung step stool placing books on a shelf
- Missed / slipped off the last step coming of the step stool, fell, and landed on the front of her knee
- Went to the ER, x-rays were negative for fracture but presence of tricompartmental OA
- Established care with treating doctor the next week with complaint of pain, swelling, and stiffness of the knee.



Case 3 Alternate Scenario

Physical exam 1 week post injury

- Knee
 - “8/10” “constant” pain
 - mildly antalgic gait
 - ROM extension -5° with crepitation and flexion 115°
 - no laxity with anterior drawer, posterior drawer
 - no laxity with medial or lateral stress testing
 - “Positive McMurray’s”
 - visible bruising at the anterior patella
- Referred to PT
- Completed 10 sessions of PT six weeks post injury

Case 3 Alternate Scenario

Treating doctor re-evaluation 7 weeks post injury

- Pain complaints unchanged
- Exam findings mostly unchanged from initial visit
- Range of motion 0 extension with crepitation and flexion to 120 degrees
- No laxity or MCL pain on medial stress testing

TD referred IE to orthopedist

- IE evaluated by orthopedist 10 weeks post injury
- IE complained of constant pain in her right knee
- Reported that her knee hurts worse at the end of the day
- Taking ibuprofen for pain, using Voltaren gel



Case 3 Alternate Scenario

Orthopedic exam findings 10 weeks post injury

- Tenderness with palpation of the patella
- Range of motion 0 to 110 degrees "limited by pain"
- Retropatellar crepitus noted with active and passive motion
- Muscle strength 5/5
- "Positive McMurray's" [No specific remarks as to medial or lateral location or palpable meniscus movement]
- Negative Lachman's
- No laxity or pain with lateral stress testing. Mild bilateral opening at 30 degrees with valgus



Case 3 Alternate Scenario

Orthopedic findings (continued)

- Radiographs taken at the orthopedic office show arthritis of the knee with severe narrowing at the medial compartment
- No fracture of the patella
- Cortisone injection performed by orthopedist
- Referred by orthopedist for MRI to *“rule out meniscus tear or other pathology.”*
- MRI performed 14 weeks post injury



Case 3 Alternate Scenario

MRI impression:

- OA of the knee; medial
 - Severe chondral thinning with associated osteophytes of the medial compartment
 - Mild chondromalacia lateral compartment
 - Minimal chondromalacia of the patellofemoral articulation
- Large complex tear of posterior horn of medial meniscus with extrusion and horizontal signal changes in the posterior lateral meniscus



Case 3 Alternate Scenario

MRI impression:

- Subchondral cystic changes / subchondral bone marrow edema (SBME), but no bone contusions
- Incomplete visualization of the anterior cruciate ligament with areas of thickening / scarring, but no acute signal changes
- Remaining ligaments, including MCL intact without acute / subacute changes
- Trace soft tissue swelling anterior to the patella, BUT no bone contusion of the patella or femoral trochlea
- Mild knee effusion

Case 3 Alternate Scenario

IE returns to orthopedist 16 weeks post injury

- Exam findings and subjective complaints unchanged from previous visit
- Reported that injection provided relief for about 3 days
- Working without restrictions
- Diagnoses by orthopedist
 - Medial meniscus tear
 - ACL tear
 - Osteoarthritis

Case 3 Alternate Scenario

- Due to no change with therapy or injection and continued pain orthopedist recommended knee replacement
- Initial request for surgery denied by carrier
- Second request for surgery approved 34 weeks post injury
- IE underwent total right knee arthroplasty 36 weeks post injury
- Referred for post surgical PT
- PT delayed by COVID-19 infection causing respiratory compromise
- Post surgical therapy started 46 weeks post injury

Case 3 Alternate Scenario

DD exam performed 50 weeks post injury

- Subjective complaints
 - ✓ IE ambulates with cane
 - ✓ Healed surgical scar at right knee
 - ✓ No swelling or signs of infection
 - ✓ Knee pain 6/10

Case 3 Alternate Scenario

- **DD exam findings continued**
 - ✓ ROM extension -10° , flexion 100°
 - ✓ Flexion contracture 5° (confirmed with passive ROM) and extension lag $<10^{\circ}$
 - ✓ Alignment 7°
 - ✓ A-P instability 8 mm, M-L instability 7°
 - ✓ No atrophy of calf or thigh
- Has completed 10 sessions of PT and reports that PT is helping
- Has not returned to work



Case 3 Alternate Scenario

Based on the medical records and physical examination of injured employee, what is compensable injury for certifying MMI and IR?

130.1(c)(3)





Case 3 Alternate Scenario

What is compensable injury for certifying MMI and IR?

- A. Knee Contusion
- B. ACL tear
- C. Osteoarthritis of the knee
- D. Complex tear of the medial meniscus





Case 3 Alternate Scenario

Compensable Injury?

Knee contusion

- MOI = direct trauma
- No clinical findings to support an aggravation.
- MRI showed no acute findings: The complex tear and extrusion are consistent with longstanding anatomic changes.

- COMPENSABILITY is not determined by
 - ✓ Treating / consulting doctor recommendations...
 - ✓ Pre-authorization of or completement of a treatment...

Case 3 Alternate Scenario

Question for DD to consider in the exam:

Has the IE reached MMI and if so when?





Case 3 Alternate Scenario

**Has MMI been reached?
If so, on what date?**

- A. Yes, follow up with treating doctor 7 weeks post injury
- B. Yes, 16 weeks post injury at orthopedic follow up after cortisone injection
- C. Yes, 50 weeks, date of DD exam
- D. No, not at MMI





Case 3 Alternate Scenario

Has MMI been reached?

- A. YES - at follow up with treating doctor 7 weeks post injury
This is consistent with the mechanism and diagnosis of knee contusion that has physiological healing time of 6-8 weeks
- B. Not correct - cortisone not indicated for soft tissue contusion without bone contusion or aggravation of the OA.
- C. and D. - Not correct - joint replacement not related to the compensable injury

Case 3 Alternant Scenario

On the date of MMI, what is whole person IR?

- A. 0 %
- B. 2%
- C. 12%
- D. 30%



Case 3

Initial and Alternate Scenario

Any questions as to how these scenarios are presented

- Compensable Injury?
- MMI?
- IR?



Case 3 Alternate Scenario - Impairment Rating?

A or B is the BEST answer.

- **Footnote on Table 62, page 83. An IE accrues 2 % WP IR, IF there is:**
 - ✓ Direct trauma to the anterior knee.
 - ✓ Patellofemoral pain
 - ✓ Findings of crepitation on physical examination,
 - ✓ No joint space narrowing on roentgenograms,
- **IN THIS CASE, the IE had the first 3 criteria AND**
 - ✓ X-ray at ortho office did not comment on PF articulation
 - ✓ Table 62 footnote indicates that 3mm or greater is "normal"
 - ✓ MRI reported minimal PF chondromalacia but no thickness given

Case 3 Alternate Scenario

- **A or B (continued)**
 - ✓ Could obtain x-rays as per described method on page 82
 - ✓ OR EXPLAIN and defend WHY your opinion was 0 % for “some chondromalacia” or 2 % for no defined joint space narrowing
- **C. Rates ROM from DD exam**
 - ✓ -10 extension = 8% combined with flexion = 4% for combined value of 12 % WP.
 - ✓ BUT Recall that ROM before the TKA was 0-125 and this value should be used for diagnosis of knee contusion
- **D. Joint replacement is not due to compensable injury in this case**

Questions?





Case 3 - Alternate Scenario 2

History of Injury

- **63 year old school librarian**
- Was on the 3rd step of a step stool placing books on a shelf
- She lost her footing coming off the top step. As she fell, she planted her foot causing a valgus twisting load to the right knee
- She then fell to the floor onto her knee

Case 3 - Alternate Scenario 2

History of Injury, Cont.

- She went to the ER the day of the injury
- X-rays showed a what appeared to be an acute fracture at the lateral tibial plateau with some mild displacement
- Ortho was consulted and she was given a knee immobilizer
- She was discharged to follow up with ortho as an outpatient
- The next week she established care with a treating doctor



Case 3 - Alternate Scenario 2

- **Treating Doctor evaluation 1 week post injury**

- Complains of "8/10" "constant" pain and swelling
- Clinical Exam Right Knee
 - Mildly antalgic and asymmetric gait because knee immobilizer in place
 - ROM extension 0° and flexion 90° due to large suprapatellar effusion and pain
 - Pain at the medial femur at MCL insertion
 - Mild joint line opening with valgus stress
 - Laxity with anterior drawer, (-) posterior drawer.
 - Joint line pain laterally > medially

Case 3 - Alternate Scenario 2

- **Treating doctor re-evaluation 2 weeks post injury**
 - Exam findings unchanged from initial visit
 - Reported swelling had gone down some, but the pain was not improved
 - TD referred IE to orthopedist
- **IE evaluated by orthopedist 3 weeks post injury**
 - IE complained of constant pain in her right knee
 - Reported that she has been using the knee immobilizer
 - Taking ibuprofen for pain

Case 3 - Alternate Scenario 2

- **Orthopedic exam findings**
 - Effusion at the knee
 - Tenderness at the medial joint line
 - Range of motion 0 to 90 degrees, limited by pain but also by persistent effusion
 - Muscle strength 4/5 in the affected quadriceps
 - 1- 2 laxity with good endpoint anterior drawer

Case 3 - Alternate Scenario 2

- **Orthopedic findings (continued)**
 - Radiographs taken at the orthopedic office showed interval healing of the plateau fracture. Tricompartmental arthritis with severe narrowing of the medial compartment and a large effusion was noted
 - Referred by orthopedist for an MRI of the knee to *"define the pathology"*
 - MRI performed 4 weeks post injury



Case 3 - Alternate Scenario 2

- **MRI imaging at 4 weeks post-injury demonstrated:**
 - Tricompartmental OA
 - Severe chondral thinning with associated osteophytes of the medial compartment
 - Moderate chondromalacia of the patellofemoral compartment
 - Mild chondromalacia lateral compartment
 - Interval healing of plateau fracture at the lateral tibial plateau. Fracture extends to the superior surface of the tibia.
 - Large chondral fracture with fragment displacement in the lateral compartment.



Case 3 - Alternate Scenario 2

- **MRI imaging at 4 weeks cont.:**
 - Large areas of bone contusion at the medial femoral condyle near MCL attachment
 - Incomplete bundles of the anterior cruciate ligament (ACL) observed, with increased T2 signal changes within the ACL, consistent with acute / subacute tear
 - Acute / subacute intrasubstance signal changes in the MCL with questionable partial avulsion of proximal fibers at the medial femoral condyle

Case 3 - Alternate Scenario 2

- **Orthopedic follow up 6 weeks post injury**
 - Effusion at the knee, improved from previous visit
 - Tenderness at the medial joint line
 - Range of motion 0 to 90 degrees, limited by pain
 - Passive motion to 110 degrees flexion with pain
 - Muscle strength 4/5 in the affected quadriceps
 - Grade 2 laxity with good endpoint anterior drawer
 - Difficulty ambulating due to stiffness in the knee

Case 3 - Alternate Scenario 2

- **Orthopedic follow up 6 weeks post injury, cont.**
 - Radiographs show full healing of tibial plateau fracture with congruency
 - Immobilizer discontinued
 - Referred to PT for strengthening and ROM
 - Work restrictions of sedentary work assigned
 - Celebrex prescribed

Case 3 - Alternate Scenario 2

- **Orthopedic follow up 12 weeks post injury**
 - 12 sessions of PT completed, week 11
 - Reports pain 5/10 on a daily basis, taking Celebrex as prescribed
 - Reports difficulty kneeling due to pain
 - Tried to reshelve books on a step stool but knee felt like it was going to "give way"
 - Exam showed laxity in ACL and MCL was unchanged
 - ROM 0 to 115 degrees with pain at end range

Case 3 - Alternate Scenario 2

- **Orthopedic follow up 12 weeks post injury, cont.**
 - Due to failure to respond to conservative treatment the orthopedist recommended surgery
 - Ortho determined that due to the extensive OA in the knee that arthroplasty would be appropriate
 - Knee injection performed
 - Arthroplasty was not approved by carrier, opined OA was pre-existing and non-compensable
 - Carrier ordered Designated Doctor exam to determine MMI and IR

Case 3 - Alternate Scenario 2

- **DD exam findings at 18 weeks**
 - IE states her knee is better but she is still having pain in the medial knee and her knee feels "weak"
 - She has been working full time but still is uneasy on step stool which she has to use everyday
 - Ambulatory with a cane
 - Has continued use of Celebrex which brings her pain down to a 2-3/10
 - She has not returned to the ortho since carrier denied surgery
 - PLN-11 issued: compensable diagnoses tibial plateau fracture, knee sprain only

Case 3 - Alternate Scenario 2

- **DD exam findings at 18 weeks / 4.5 months**
 - Antalgic gait favoring right knee
 - Mild suprapatellar effusion
 - Medial joint line tenderness
 - ROM -5 to 115 degrees
 - 2+ laxity in the ACL
 - Moderate laxity in the MCL
 - Mild crepitus with passive knee motion
 - Pain in the medial knee with McMurray's, audible click noted
 - 4/5 knee flexion, knee extension

Case 3 – Alternate Scenario 2

Based on the medical records and physical examination of injured employee, what is compensable injury for certifying MMI and IR?

130.1(c)(3)



Case 3 – Alternate Scenario 2

What is compensable injury for certifying MMI and IR?

- A. Knee sprain
- B. Tibial plateau fracture
- C. ACL tear
- D. MCL tear
- E. OA of the knee, aggravation
- F. B, C, D, E
- G. A, B, C, D and E



Case 3 – Alternate Scenario 2

What is the compensable injury for certifying MMI and IR?

- A. This is non-specific diagnosis and there are several more notable objective changes**
- B. There was evidence of acute tear to the ACL**
- C. There was evidence of acute tear to the MCL**
- D. There was radiographic evidence of acute tibial plateau fracture**
- E. In light of the objective evidence of injury to the knee joint stabilizers and chondral displacement, there was AGGRAVATION of the underlying degenerative condition of OA.**

B, C, D, E = BEST ANSWER.

Could defend using the sprain as a generic form of B and C.

Case 3 – Alternate Scenario 2

Question for DD to consider in the exam:

Has the IE reached MMI and if so, when?



Case 3 – Alternate Scenario 2

**Has MMI been reached?
If so, on what date?**

- A. Yes, 11 weeks post injury at completion of PT.
- B. Yes, 12 weeks post injury at orthopedic follow up
- C. Yes, 18 weeks post injury, at DD exam
- D. No, not at MMI



Case 3 – Alternate Scenario 2

- ✓ A and B. If the injury was a low-grade sprain then these dates would be reasonable considering ODG treatment was completed. DD would give rationale for using final date of PT or ortho follow up, both being reasonable with explanation.
- ✓ C. No rationale for using the date of the DD exam
- ✓ D. Considering the aggravation of OA and the tears of the ACL and MCL and specifically considering Appendix D, there are still treatments available that are anticipated to bring about further material recovery

- ✓ Despite the PLN-11 filed by carrier, the DD defines the compensable injury and bases the MMI determination on his / her determination of the compensable injury

How was the OA aggravated?

- An aggravation of a pre-existing condition means there was an enhancement, acceleration, or material worsening of the condition as a result of the work injury
- In this case the fracture extended into the superior metaphysis of the tibia and disrupted the chondral surface in the lateral compartment
- There was displacement of the chondral fracture fragment
- The intraarticular fracture accelerated the OA and caused new structural changes

Case 3 – Alternate Scenario 2

- **Orthopedic follow up**

- Request for surgery approved by carrier after DD exam
- TKA performed at 24 weeks post injury
- Post operative therapy began 25 weeks post injury
- 24 PT sessions completed 35 weeks post injury
- At PT re-evaluation still had some difficulty using step stool and some stiffness, 10 additional PT sessions recommended
- 34 sessions of PT completed at 40 weeks post injury
- DD exam ordered by carrier

Case 3 – Alternate Scenario 2

- **Orthopedic follow up, 42 weeks post injury**
 - Reports she has returned to work at full duty
 - Has some discomfort in her knee after long periods of standing
 - Has been doing home exercises daily to "strengthen" her leg
 - Uses ibuprofen as needed
 - Exam findings show range of motion and strength "WNL"
 - Sensation intact
 - Released to follow up as needed



Case 3 – Alternate Scenario 2

- **DD exam performed 60 weeks post injury**
- **DD exam findings:**
 - IE ambulates with cane out of preference, because she feels “uneasy” on her “new knee”
 - Has occasional moderate pain while walking longer than 10 minutes at a time
 - Knee pain rated 6/10, eased with use of ibuprofen
 - Reports difficulty kneeling and squatting to pick up objects from floor

Case 3 – Alternate Scenario 2

- **DD exam findings at 60 weeks (continued)**
 - Healed surgical scar consistent with TKA
 - No signs of infection
 - ROM extension -10° , flexion 100
 - Flexion contracture 5° and extension lag 5°
 - Alignment 7°
 - A-P instability 8 mm, M-L instability 7°
 - Comparison to contralateral LE -
 - 1 cm calf atrophy of at 12 cm
 - 1.5 cm atrophy of right thigh at 10 cm

Case 3 – Alternate Scenario 2

**Has MMI been reached?
If so, on what date?**

- A. Yes, 35 weeks post injury when completed 24 sessions of PT per ODG
- B. Yes, 40 weeks post injury when additional PT completed
- C. Yes, 42 weeks post injury at ortho follow up
- D. Yes, 60 weeks, date of DD exam
- E. No, not at MMI



Case 3

On the date of MMI, what is whole person IR?

- A. 0%
- B. 2%
- C. 4%
- D. 30%



Table 66. Rating Knee Replacement Results*

	No. of points
a. Pain	
None	50
Mild or occasional	45
Stairs only	40
Walking and stairs	30
Moderate	
Occasional	20
Continual	10
Severe	0
b. Range of motion	
Add 1 point per 5°	25
c. Stability (maximum movement in any position)	
Anteroposterior	
<5 mm	10
5-9 mm	5
>9 mm	0
Mediolateral	
5°	15
6°-9°	10
10°-14°	5
≥15°	0
Subtotal	
d. Deductions (minus)	
Flexion contracture	
5°-9°	2
10°-15°	5
16°-20°	10
>20°	20
e. Extension lag	
<10°	5
10°-20°	10
>20°	15
f. Alignment	
0°-4°	0
5°-10°	3 points per degree
11°-15°	3 points per degree
>15°	20
Deductions subtotal	—

*The point total for estimating knee replacement results is the sum of the points in categories a, b, and c minus the sum of the points in categories d, e, and f. Modified from ref. 44.

Rating Knee Replacement Table 66, Page 88

Results for a-f

- a. Moderate occasional pain 6/10 with walking
- b. ROM flexion 100°
- c. Stability A-P 8 mm
- d. Flexion contracture 5°
- e. Extension lag < 10°
- f. Alignment 7°

Table 66. Rating Knee Replacement Results.*

	No. of points
a. Pain	
None	50
Mild or occasional	45
Stairs only	40
Walking and stairs	30
Moderate	
Occasional	20
Continual	10
Severe	0
b. Range of motion	
Add 1 point per 5°	25
c. Stability (maximum movement in any position)	
Anteroposterior	
<5 mm	10
5-9 mm	5
>9 mm	0
Mediolateral	
5°	15
6°-9°	10
10°-14°	5
≥15°	0
Subtotal	
d. Deductions (minus)	
Flexion contracture	
5°-9°	2
10°-15°	5
16°-20°	10
>20°	20
e. Extension lag	
<10°	5
10°-20°	10
>20°	15
f. Alignment	
0°-4°	0
5°-10°	3 points per degree
11°-15°	3 points per degree
>15°	20
Deductions subtotal	—

*The point total for estimating knee replacement results is the sum of the points in categories a, b, and c minus the sum of the points in categories d, e, and f. Modified from ref. 44.

Rating Knee Replacement

Table 66, Page 88

SUMMARY

$$(a + b + c) - (d + e + f)$$

$$(20 + 20 + 15) = 55$$

$$(2 + 5 + 9) = 16$$

- $55 - 16 = 39$ points
- Next, don't forget to refer to Table 64, page 85
- Less than 50 points is a POOR result = 30% WP

Questions?



Don't forget!

- **Please submit your evaluation for Lower Extremity MMI/IR presentation.**

<https://www.tdi.texas.gov/wc/dd/training.html>

- **Please submit your attestation form for the pre-recorded presentations.**

<https://www.tdi.texas.gov/wc/dd/documents/ddattestation.pdf>