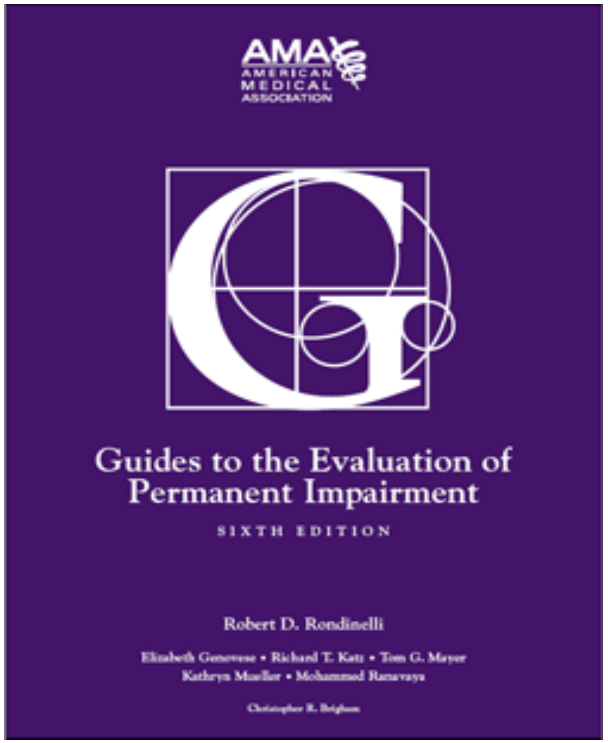
AMA *Guides 6th Edition*

AADEP and TN MIR Registry

June 10, 2017



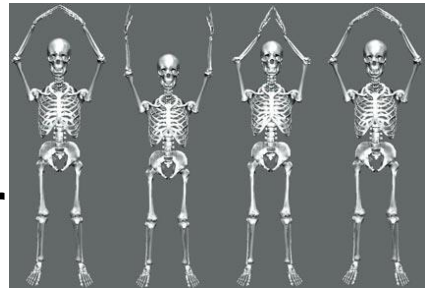
AMA **Guides, 6th Edition**

LOWER LIMB IMPAIRMENTS

Questions ?

James B. Talmage MD,

Occupational Health Center



315 N. Washington Ave, Suite 165

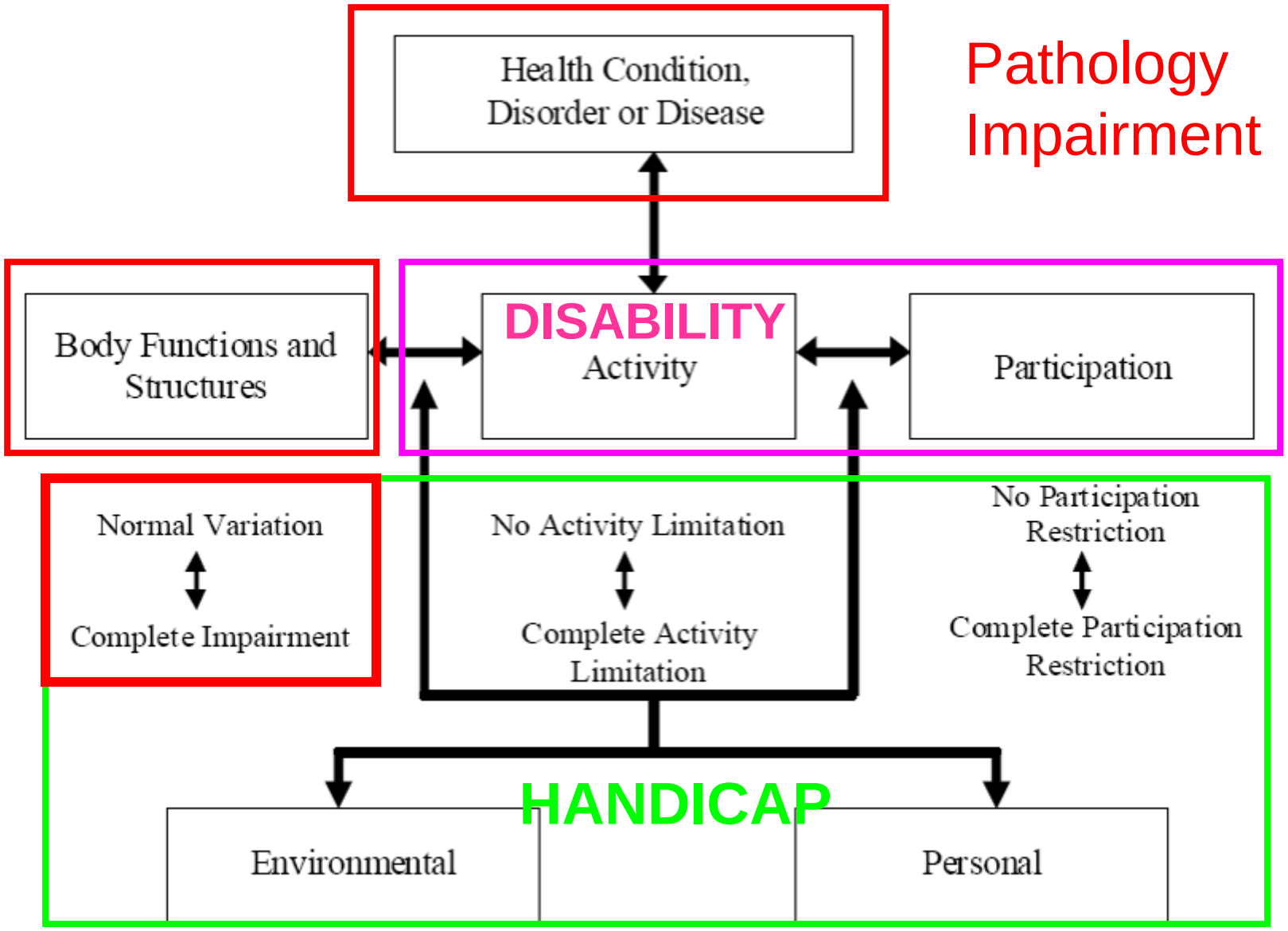
Cookeville, TN 38501

Phone 931-526-1604 (Fax 526-7378)

olddrt@frontiernet.net

olddrt@occhealth.md

ICF Model of Impairment



Chapter 16: Lower Extremities

16.1 Principles of Assessment pg 494

16.2 Diagnosis-Based Impairment pg 497

16.3 Adjustment Grid and Grade Modifiers
– Non-Key Factors pg 515

Used MOST often

16.4 Peripheral Nerve Impairment pg 531

16.5 Complex Regional Pain Syndrome Impairment pg 538

16.6 Amputation Impairment pg 542

16.7 Range-of-Motion Impairment pg 543

16.8 Summary pg 552

16.9 Appendix 16-A Lower Limb Questionnaire pg 555

Lower Extremity

- Similar in Philosophy and Methodology to the Upper Extremity and Spine.
- Most conditions will be rated by Diagnosis from the Diagnosis Based Grids.
- Many "rules" copied and pasted from the Upper Extremity chapter.

Assigning Impairment p 500

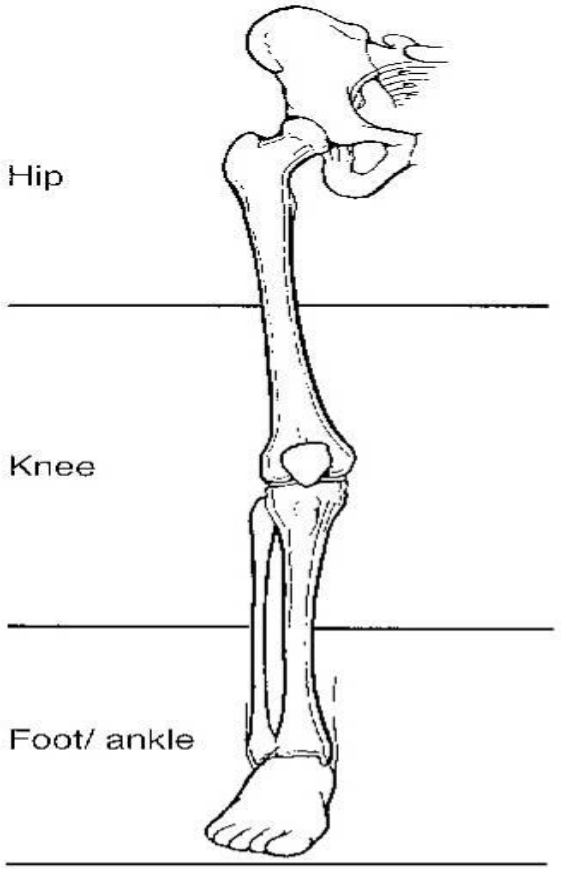
- "Range of motion will, in some cases, serve as an alternative approach to rating impairment. It is NOT combined with the diagnosis-based impairment, and stands alone as an impairment rating."

- Compared to Upper Extremity,
  - ROM will be used very little to derive actual rating.
  - **Is used as a Grade Modifier**

Assessing Lower Limb Musculoskeletal Impairment

- 6th Edition emphasizes the impact of the impairment on ADLs at MMI.
- The most accurate **DIAGNOSIS** is the foundation of the impairment
  - Diagnosis-Based Impairment (DBI). - p 495
- "The authors of this chapter recognize that the process described is still far from perfect with respect to defining impairment … however, the author's intention is to simplify the rating process, to improve interrater reliability, and to provide a solid basis for future editions of the Guides." – p 494

Lower Extremity:
Divided into 3 Regions



- Foot and Ankle
  - Midshaft tibia to tips of toes.
- Knee
  - Midshaft femur to midshaft tibia
- Hip
  - From articular cartilage of the acetabulum to midshaft of the femur.

Note 1: Pelvis ratings are found in Chapter 17.4, p. 592-97 (SPINE Chapter)

Note 2: Vascular Diseases affecting the Lower Extremities found in Chapter 4.8

Note 3: LE%= 0.4% WPI

TABLE 4-12 Criteria for Rating Impairment due to Peripheral Vascular Disease – Lower Extremity

Lower Extremity Peripheral Vascular Disease

CLASS	CLASS 0	CLASS 1	CLASS 2	CLASS 3	CLASS 4
UNILATERAL LE IMPAIRMENT RATING (%)[a]	0	2%-10%	11%-23%	24%-40%	45%-65%
SEVERITY GRADE (%)		2 4 6 8 10 (A B C D E) (Minimal)	11 14 17 20 23 (A B C D E) (Mild)	24 28 32 36 40 (A B C D E) (Moderate)	45 50 55 60 65 (A B C D E) (Severe)
HISTORY	No claudication or pain at rest or transient edema	Intermittent claudication on severe lower extremity usage or persistent edema Controlled by elastic supports	Intermittent claudication walking 25-100 yards at average pace or marked edema Partially controlled by elastic supports	Intermittent claudication walking <25 yards or pain intermittent at rest or marked edema Not controlled by elastic supports	Severe and consistent pain at rest
PHYSICAL FINDINGS	No findings except loss of pulses or minimal loss of subcutaneous tissue or venous varicosities	Vascular damage such as healed, painless stump of digit Healed ulcer	Vascular damage such as healed amputation of two or more digits or one extremity with evidence of persisting vascular disease or superficial ulceration	Vascular damage such as amputation at or above ankle or amputation of two or more digits with evidence of persistent vascular disease or persistent widespread or deep ulceration involving one extremity	Vascular damage such as amputation at or above the ankles of two extremities or amputation of all digits with evidence of persistent vascular or deep ulceration involving two extremities
OBJECTIVE TEST RESULTS[b]	Normal ABI's[c]	Normal or mildly abnormal ABI's[c] (>0.90)	Abnormal ABI's[c] (0.71-0.90) or mildly abnormal arterial or venous duplex ultrasound or peripheral angiograms documenting mild PAD[a].	Moderately abnormal ABI's[c] (0.41 - 0.70), moderately abnormal arterial or venous duplex or peripheral angiograms documenting moderate PAD[a]	Markedly abnormal ABI's[c] (≤0.40), severely abnormal arterial or venous duplex or peripheral angiograms documenting severe PAD[a]

[a] Peripheral arterial disease.

[b] Key factor.

[c] Ankle-brachial indices.

Tables in this chapter show the impairment percentages at the lower extremity level. The conversion factors for the lower extremity are:

- 40%: Lower extremity to whole person.
- 70%: Foot and ankle to lower extremity.
- 17%: Great toe to ankle/foot.
- 0/3%: Lesser toe to ankle/foot.

These values are shown in Table 16-10. An exception for conversion is made for 1% lower extremity this is equated to 1% whole person. The examiner should report values at the level appropriate for the jurisdiction.

TABLE 16-10

Impairment Values Calculated From Lower Extremity Impairment

% Impairment				
Whole Person	Lower Extremity	Foot and Ankle	Great Toe	Lesser Toe
0	0	0	0	0
Mild				
1	1	1	8	48
1	2	3	17	95
1	3	4	25	
2	4	6	34	
2	5	7	42	
2	6	9	50	
3	7	10	59	
3	8	11	67	
4	9	13	76	
4	10	14	84	
4	11	16	92	
5	12	17	100	
5	13	19		
Moderate				
6	14	20		
6	15	21		
6	16	23		
7	17	24		
7	18	26		
8	19	27		
8	20	29		
8	21	30		
9	22	31		
9	23	33		
10	24	34		
10	25	36		

% Impairment				
Whole Person	Lower Extremity	Foot and Ankle	Great Toe	Lesser Toe
0	0	0	0	0
Severe				
10	26	37		
11	27	39		
11	28	40		
12	29	40		
12	30	43		
12	31	44		
13	32	46		
13	33	47		
14	34	49		
14	35	50		
14	36	51		
15	37	53		
15	38	57		
Severe				
16	39	56		
16	40	57		
16	41	59		
17	42	60		
17	43	61		
18	44	63		
18	45	64		
18	46	66		
19	47	67		
19	48	69		
20	49	70		
Very Severe				
20	50	71		
20	51	73		
21	52	74		
21	53	76		
22	54	77		
22	55	79		
22	56	80		
23	57	81		
23	58	83		
24	59	84		
24	60	86		
24	61	87		
25	62	89		
25	63	90		
26	64	91		
26	65	93		

% Impairment				
Whole Person	Lower Extremity	Foot and Ankle	Great Toe	Lesser Toe
0	0	0	0	0
Very Severe (conintued)				
26	66	94		
27	67	96		
27	68	97		
28	69	99		
28	70	100		
28	71			
29	72			
29	73			
30	74			
30	75			
30	76			
31	77			
31	78			
32	79			
32	80			
32	81			
33	82			
33	83			
Very Severe				
34	84			
34	85			
34	86			
35	87			
35	88			
36	89			
36	90			
36	91			
37	92			
37	93			
38	94			
38	95			
38	96			
39	97			
39	98			
40	99			
40	100			

Page 530-531

Steps in Determining Impairment

1. Perform history and examination, and determine if individual is at MMI.
2. Establish the appropriate diagnosis for each part of the lower limb to be rated.
3. Use the regional grid in the corresponding region to determine the associated class.
4. Use the adjustment grid and the grade modifiers, including functional history, physical exam, and clinical studies, to determine what grade of associated impairment should be chosen within the class defined by the regional grid.
5. Use the regional grid to identify the appropriate impairment rating value for the impairment class modified by the adjustments as calculated.
6. Combine lower extremity percentages using the Combined Values Chart in the same extremity as appropriate. If both lower extremities are involved, convert impairments to whole person and combine.

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Steps in Determining Impairment.

Lower Extremity: DBI (p 495)

STEP ONE (DIAGNOSIS)

- Choose the most accurate *Regional* **DIAGNOSIS**
- Impairment class is determined by the diagnosis and specific criteria, considered the KEY FACTOR, and then adjusted by GRADE MODIFIERS or non-key factors.
- List all diagnoses for each region.
- In the event a specific diagnosis is **not** in the Diagnosis-Based Grid, use the ***closest similar condition listed*** as a guide to determining the ***Diagnosis*** portion of the Impairment , and ***explain your rationale.***

"RIGHT TABLE, RIGHT ROW"

LE Algorithm to Final DBI % - STEP ONE (**DIAGNOSIS**)

- THREE REGIONAL GRIDS, lists all possible diagnoses within each LE region (foot/ankle, knee, and hip).

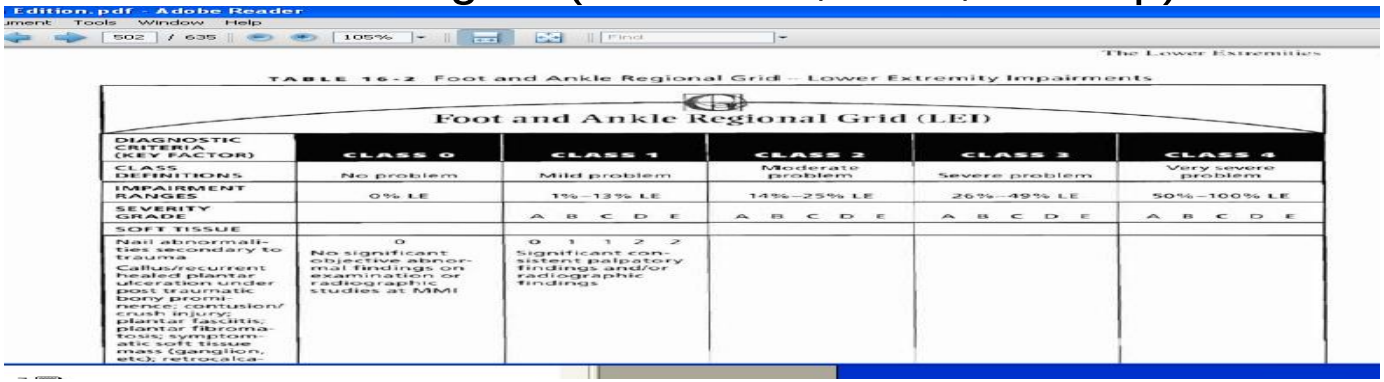


TABLE 16-2 Foot and Ankle Regional Grid – Lower Extremity Impairments

Foot and Ankle Regional Grid (LEI)

DIAGNOSTIC CRITERIA (KEY FACTOR)	CLASS 0	CLASS 1	CLASS 2	CLASS 3	CLASS 4
CLASS DEFINITIONS	No problem	Mild problem	Moderate problem	Severe problem	Very severe problem
IMPAIRMENT RANGES	0% LE	1%–13% LE	14%–25% LE	26%–49% LE	50%–100% LE
SEVERITY GRADE		A B C D E	A B C D E	A B C D E	A B C D E
SOFT TISSUE					
Nail abnormalities secondary to trauma Callus/recurrent healed plantar ulceration under post traumatic bony prominence; contusion/crush injury; plantar fasciitis; plantar fibromatosis; symptomatic soft tissue mass (ganglion, etc); retrocalca-	0 No significant objective abnormal findings on examination or radiographic studies at MMI	0 1 1 2 2 Significant consistent palpatory findings and/or radiographic findings			

Table 16-2; p 501-8

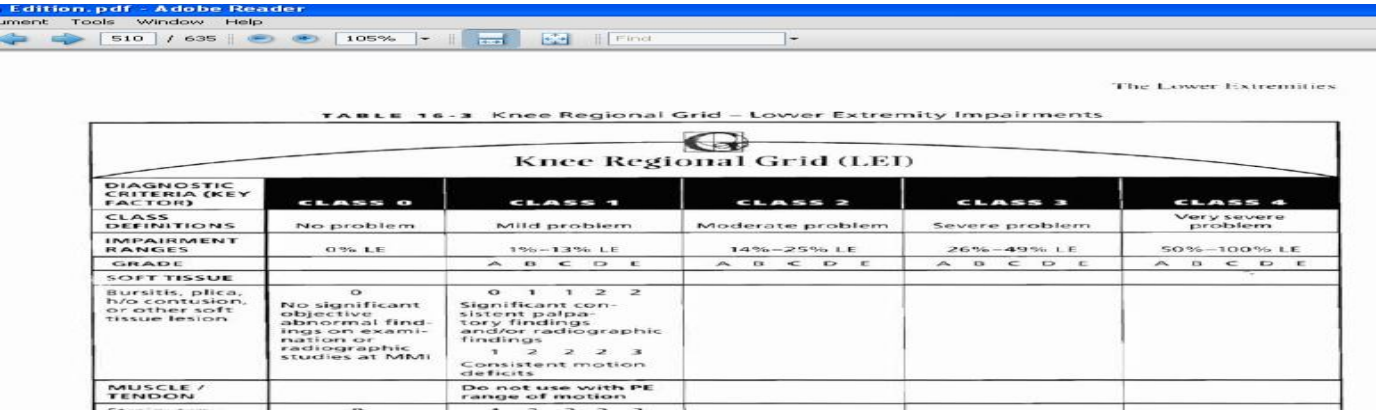


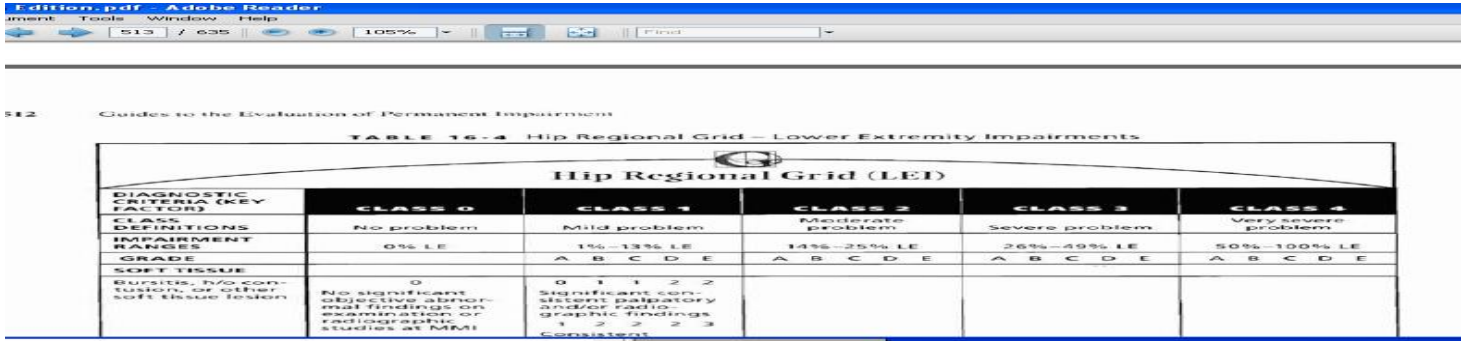
TABLE 16-3 Knee Regional Grid – Lower Extremity Impairments

Knee Regional Grid (LEI)

DIAGNOSTIC CRITERIA (KEY FACTOR)	CLASS 0	CLASS 1	CLASS 2	CLASS 3	CLASS 4
CLASS DEFINITIONS	No problem	Mild problem	Moderate problem	Severe problem	Very severe problem
IMPAIRMENT RANGES	0% LE	1%–13% LE	14%–25% LE	26%–49% LE	50%–100% LE
GRADE		A B C D E	A B C D E	A B C D E	A B C D E
SOFT TISSUE					
Bursitis, plica, h/o contusion, or other soft tissue lesion	0 No significant objective abnormal findings on examination or radiographic studies at MMI	0 1 1 2 2 Significant consistent palpatory findings and/or radiographic findings 1 2 2 2 3 Consistent motion deficits			
MUSCLE / TENDON		Do not use with PE range of motion			

Table 16-3;

p 509-11



512 Guides to the Evaluation of Permanent Impairment

TABLE 16-4 Hip Regional Grid – Lower Extremity Impairments

Hip Regional Grid (LEI)

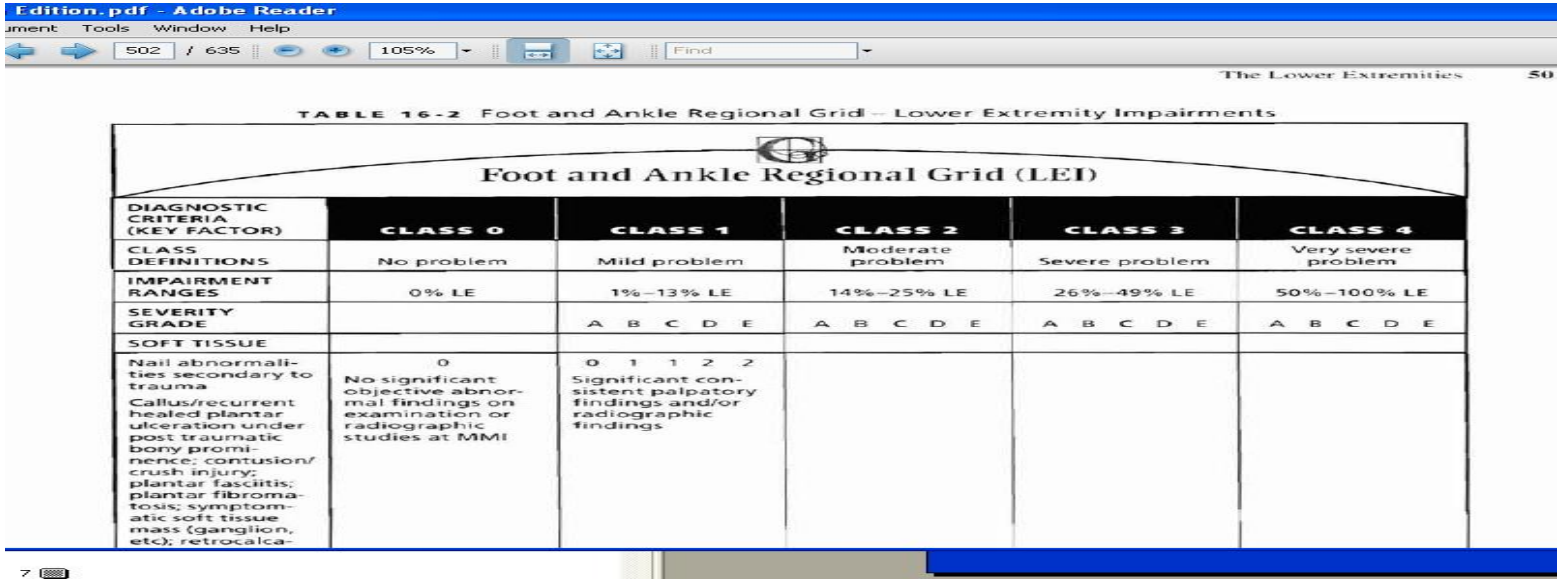
DIAGNOSTIC CRITERIA (KEY FACTOR)	CLASS 0	CLASS 1	CLASS 2	CLASS 3	CLASS 4
CLASS DEFINITIONS	No problem	Mild problem	Moderate problem	Severe problem	Very severe problem
IMPAIRMENT RANGES	0% LE	1%–13% LE	14%–25% LE	26%–49% LE	50%–100% LE
GRADE		A B C D E	A B C D E	A B C D E	A B C D E
SOFT TISSUE					
Bursitis, h/o contusion, or other soft tissue lesion	0 No significant objective abnormal findings on examination or radiographic studies at MMI	0 1 1 2 2 Significant consistent palpatory and/or radiographic findings 1 2 2 2 3 Consistent			

Table 16-4; p 512-15

Step One: Diagnostic Criteria

Grid One FOOT/ANKLE REGION

(Table 16.2, p501-8)



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The Lower Extremities 50

TABLE 16-2 Foot and Ankle Regional Grid – Lower Extremity Impairments

Foot and Ankle Regional Grid (LEI)

DIAGNOSTIC CRITERIA (KEY FACTOR)	CLASS 0	CLASS 1	CLASS 2	CLASS 3	CLASS 4
CLASS DEFINITIONS	No problem	Mild problem	Moderate problem	Severe problem	Very severe problem
IMPAIRMENT RANGES	0% LE	1%–13% LE	14%–25% LE	26%–49% LE	50%–100% LE
SEVERITY GRADE		A B C D E	A B C D E	A B C D E	A B C D E
SOFT TISSUE					
Nail abnormalities secondary to trauma Callus/recurrent healed plantar ulceration under post traumatic bony prominence; contusion/crush injury; plantar fasciitis; plantar fibromatosis; symptomatic soft tissue mass (ganglion, etc); retrocalca-	0 No significant objective abnormal findings on examination or radiographic studies at MMI	0 1 1 2 2 Significant consistent palpatory findings and/or radiographic findings			

- **Soft Tissue:** Typically assigned the *lowest* impairments
  - Nail abnormalities secondary to trauma
  - Callus/recurrent healed plantar ulceration under post traumatic bony prominence; contusion/crush injury; plantar fasciitis; plantar fibromatosis; symptomatic soft tissue mass (ganglion, etc); retrocalcaneal bursitis.

Step One: Diagnostic Criteria

FOOT/ANKLE REGION

- Muscle/Tendon:
  - Strain; tendonitis; or herniated or ruptured tendon, specifically involving posterior tibial, anterior tibial, Achilles, or peroneal tendon (all other tendons below)
  - Strain; tendonitis; or herniated or ruptured tendon
  - All other tendons

Step One: Diagnostic Criteria

FOOT/ANKLE REGION

- Ligament: (Ligament/Bone/Joint given highest impairment %)
  - Joint instability/ligamentous laxity-traumatic
  - Ankle (including syndesmosis)[*reference table* 16-8]
  - Joint instability/ligamentous laxity-traumatic; metatarsal-phalangeal [MTP].

Step One: Diagnostic Criteria

FOOT/ANKLE REGION

- Fracture/Dislocation:
  - Tibia(extra-articular); tibia(intra-articular – pilon/plafond); Ankle (malleolar, bimalleolar, trimalleolar); Talus; Calcaneus; Navicular/cuboid(transtarsal)/charcot; Metatarsal-tarsal fracture/dislocation; metatarsal(s); sesamoid; phalanx.

Step One: Diagnostic Criteria

FOOT/ANKLE REGION

- Deformity:
  - Midfoot-cavus; midfoot-”rocker bottom”
- Arthritis:
  - Degenerative condition: unrelated and symmetric; pan-talar (tibial-talar, talar-calcaneal, talar-navicular)
  - Ankle; Subtalar; talonavicular; calcaneocuboid; first metatarsophalangeal joint; other metatarsophalangeal joint; interphalangeal joints

Step One: Diagnostic Criteria

FOOT/ANKLE REGION

- Athrodesis (Joint Ankylosis, fusion):
  - Pan-talar; tibial to calcaneal fusion; ankle; subtalar; double or triple arthrodesis; toes; total ankle replacement

Foot and Ankle

TABLE 16-2 Foot and Ankle Regional Grid – Lower Extremity Impairments

Foot and Ankle Regional Grid (LEI)

DIAGNOSTIC CRITERIA (KEY FACTOR)	CLASS 0	CLASS 1	CLASS 2	CLASS 3	CLASS 4
CLASS DEFINITIONS	No problem	Mild problem	Moderate problem	Severe problem	Very severe problem
IMPAIRMENT RANGES	0% LE	1%–13% LE	14%–25% LE	26%–49% LE	50%–100% LE
SEVERITY GRADE		A B C D E	A B C D E	A B C D E	A B C D E
SOFT TISSUE					
Nail abnormalities secondary to trauma Callus/recurrent healed plantar ulceration under post traumatic bony prominence; contusion/crush injury; plantar fasciitis; plantar fibromatosis; symptomatic soft tissue mass (ganglion, etc); retrocalcaneal bursitis	0 No significant objective abnormal findings on examination or radiographic studies at MMI	0 1 1 2 2 Significant consistent palpatory findings and/or radiographic findings			
MUSCLE / TENDON		**Do not use PE range of motion if used for diagnostic criteria**			
Strain; tendonitis; or h/o ruptured tendon, specifically involving posterior tibial, anterior tibial, achilles, or peroneal tendon (all other tendons below)	0 No significant objective abnormal findings of muscle or tendon injury at MMI	0 1 1 2 2 Palpatory findings and/or radiographic findings 3 4 5 6 7 Mild motion deficits 7 8 10 12 13 Moderate motion deficits and/or significant weakness	14 15 16 17 18 Flexible deformity and loss of specific tendon function	28 31 34 37 40 Fixed deformity and loss of specific tendon function	
Strain; tendonitis; or h/o ruptured tendon All other tendons	0 No significant objective abnormal findings of muscle or tendon injury at MMI	0 1 1 2 2 Palpatory findings and/or radiographic findings 1 2 2 2 3 Mild motion deficits 3 4 5 6 7 Moderate motion deficits and/or significant weakness			

(continued)

- 8 Pages of Diagnoses

Step One: Diagnostic Based Criteria
Grid Two KNEE REGION
(Table 16-3, p509-11)

TABLE 16-3 Knee Regional Grid – Lower Extremity Impairments

Knee Regional Grid (LEI)

DIAGNOSTIC CRITERIA (KEY FACTOR)	CLASS 0	CLASS 1	CLASS 2	CLASS 3	CLASS 4
CLASS DEFINITIONS	No problem	Mild problem	Moderate problem	Severe problem	Very severe problem
IMPAIRMENT RANGES	0% LE	1%–13% LE	14%–25% LE	26%–49% LE	50%–100% LE
GRADE		A B C D E	A B C D E	A B C D E	A B C D E
SOFT TISSUE					
Bursitis, plica, h/o contusion, or other soft tissue lesion	0 No significant objective abnormal findings on examination or radiographic studies at MMI	0 1 1 2 2 Significant consistent palpatory findings and/or radiographic findings 1 2 2 2 3 Consistent motion deficits			
MUSCLE /		Do not use with PE			

- Soft Tissue:
  - Bursitis, plica, h/o contusion, or other soft tissue lesion
- Muscle/Tendon:
  - Strain; tendonitis; or ruptured tendon
  - Myositis ossificans (hypertrophic ossification)

Step One: Diagnostic Criteria

KNEE REGION

- Ligament/Bone/Joint:
  - Meniscal injury; cruciate or collateral ligament injury – surgery not rating factor; cruciate and collateral ligament injury – surgery not rating factor.
- Patellar Lesion:
  - Patellar subluxation or dislocation
  - Patellectomy

Step One: Diagnostic Criteria

KNEE REGION

- Fracture:
  - Femoral shaft fracture; supracondylar or intercondylar fracture; patellar fracture; tibial plateau fracture; proximal tibial shaft fracture
- Arthritis:
  - Primary knee joint arthritis; patellofemoral arthritis
- Arthrodesis:
  - Arthrodesis (joint ankylosis, fusion)
- Osteotomy/Knee Replacement:
  - s/p tibial osteotomy; total knee replacement

TABLE 16-3 Knee Regional Grid – Lower Extremity Impairments

Knee Regional Grid (LEI)

DIAGNOSTIC CRITERIA (KEY FACTOR)	CLASS 0	CLASS 1	CLASS 2	CLASS 3	CLASS 4
CLASS DEFINITIONS	No problem	Mild problem	Moderate problem	Severe problem	Very severe problem
IMPAIRMENT RANGES	0% LE	1%–13% LE	14%–25% LE	26%–48% LE	50%–100% LE
GRADE		A B C D E	A B C D E	A B C D E	A B C D E
SOFT TISSUE					
Bursitis, plica, knee contusion, or other soft tissue lesion	0 No significant objective abnormal findings on examination or radiographic studies at MMI	0 1 1 2 2 Significant consistent palpatory findings and/or radiographic findings 1 2 2 2 3 Consistent motion deficits			
MUSCLE / TENDON		Do not use with PE range of motion			
Muscle tendonitis or ruptured tendon	0 No significant objective abnormal findings of muscle or tendon injury at MMI	1 2 2 2 3 Palpatory findings and/or radiographic findings 5 6 7 8 9 Mild motion deficits 7 8 10 12 13 Moderate motion deficits and/or significant weakness			
Myositis ossificans (hypertrophic ossification)		0 1 1 2 2 Small 3 4 5 6 7 Large, palpable mass with decreased knee motion			
LIGAMENT / BONE / JOINT		Do not use with PE stability	Do not use with PE stability		
Meniscal injury		1 2 2 2 3 Partial (medial or lateral) meniscectomy, meniscal tear, or meniscal repair 5 6 7 8 9 Total meniscectomy (medial or lateral) or meniscal transplant (allograft) 7 8 10 12 13 Partial (medial and lateral)	19 20 22 24 25 Total (medial and lateral)		

TABLE 16-3 (CONTINUED) Knee Regional Grid – Lower Extremity Impairments

DIAGNOSTIC CRITERIA (KEY FACTOR)	CLASS 0	CLASS 1	CLASS 2	CLASS 3	CLASS 4
CLASS DEFINITIONS	No problem	Mild problem	Moderate problem	Severe problem	Very severe problem
IMPAIRMENT RANGES	0% LE	1%–13% LE	14%–25% LE	26%–48% LE	50%–100% LE
GRADE		A B C D E	A B C D E	A B C D E	A B C D E
LIGAMENT / BONE / JOINT		Do not use with PE stability	Do not use with PE stability		
Cruciate or collateral ligament injury; Surgery not rating factor	0 No instability	7 8 10 12 13 Mild laxity	14 15 16 17 18 Moderate laxity		
Cruciate and collateral ligament injury; Surgery not rating factor	0 No instability	7 8 10 12 13 Mild laxity	19 20 22 24 25 Moderate laxity	21 24 27 40 43 Severe laxity	
Patellar Lesion		Do not use with PE stability	Do not use with PE stability		
Patellar subluxation or dislocation	0 No instability	5 6 7 8 9 Mild instability	14 15 16 17 18 Moderate instability 19 20 22 24 25 Severe instability		
Patellectomy		5 6 7 8 9 Partial	19 20 22 24 25 Total		
Fracture		Do not use with CE x-ray alignment	Do not use with CE x-ray alignment	Do not use with CE x-ray alignment	
Femoral shaft fracture	0 Non-displaced, with no significant objective abnormal findings at MMI	5 6 7 8 9 Abnormal examination findings and <10° angulation	14 15 16 17 18 10°–19° angulation	21 24 27 40 43 20°+ angulation	52 56 60 64 68 Non-union and/or infected
Supracondylar or intercondylar fracture	0 Non-displaced, with no significant objective abnormal findings at MMI	3 4 5 6 7 Non-displaced with abnormal examination findings 7 8 10 12 13 5°–9° angulation	19 20 22 24 25 10°–19° angulation	21 24 27 40 43 20°+ angulation or > 2 mm articular surface step off	52 56 60 64 68 Non-union and/or infected
Patellar Fracture	0 Non-displaced, with no significant objective abnormal findings at MMI	5 6 7 8 9 Non-displaced with abnormal examination findings 7 8 10 12 13 Articular surface displaced 2 mm or less	14 15 16 17 18 Displaced with restoration		
Tibial plateau fracture	0 Non-displaced, with no significant objective abnormal findings at MMI	3 4 5 6 7 Non-displaced with abnormal examination findings 7 8 10 12 13 < 9° angulation	19 20 22 24 25 10°–19° angulation or <2 mm articular surface step off	21 24 27 40 43 20°+ angulation or > 2 mm articular surface step off	52 56 60 64 68 Non-union and/or infected, or severe comminuted, displaced

TABLE 16-3 (CONTINUED) Knee Regional Grid – Lower Extremity Impairments

DIAGNOSTIC CRITERIA (KEY FACTOR)	CLASS 0	CLASS 1	CLASS 2	CLASS 3	CLASS 4
CLASS DEFINITIONS	No problem	Mild problem	Moderate problem	Severe problem	Very severe problem
IMPAIRMENT RANGES	0% LE	1%–13% LE	14%–25% LE	26%–49% LE	50%–100% LE
GRADE		A B C D E	A B C D E	A B C D E	A B C D E
Warfare		Do not use with CS x-ray alignment	Do not use with CS x-ray alignment	Do not use with CS x-ray alignment	
Proximal tibial shaft fracture	0 Non-displaced, with no significant objective abnormal findings at MMI	3 4 5 6 7 Non-displaced with abnormal examination findings 7 8 10 12 13 <10° angulation	16 17 19 21 24 10°–19° angulation	26 28 30 32 34 20°+ angulation	50 52 54 56 58 Non-union and/or infected
Arthritis		Do not use with CS x-ray arthritis			
Primary knee joint arthritis		5 6 7 8 9 3 mm cartilage interval, full-thickness articular cartilage defect, or ununited osteochondral fracture	16 18 20 22 24 2 mm cartilage interval	26 28 30 32 34 1 mm cartilage interval	58 58 50 54 58 No cartilage interval
Patellofemoral arthritis		1 2 3 4 5 Full-thickness articular cartilage defect or ununited osteochondral fracture 7 8 10 12 13 2 mm cartilage interval	14 14 15 16 17 1 mm cartilage interval 16 18 20 22 24 No cartilage interval		
Arthrodesis					
Arthrodesis (joint ankylosis, fusion)					58 63 67 71 75 10°–15° flexion contracture and good alignment 67 71 75 79 83 >15° flexion or poor alignment
Osteotomy / Knee Replacement					
Hip tibial osteotomy			21 23 25 25 25 Fair or good result	31 34 37 40 43 Poor result (ankylosis, limited motion, instability)	
Total knee replacement			21 23 25 25 25 Good result (good position, stable, functional)	31 34 37 40 43 Fair result (fair position, mild instability and/or mild motion deficit)	58 63 67 71 75 Poor result (poor position, moderate to severe instability, and/or moderate to severe motion deficit) 67 71 75 79 83 Poor result with chronic infection

Knee

- 3 Pages

TABLE 16-3 (CONTINUED) Knee Regional Grid – Lower Extremity Impairments

DIAGNOSTIC CRITERIA (KEY FACTOR)	CLASS 0	CLASS 1	CLASS 2	CLASS 3	CLASS 4
CLASS DEFINITIONS	No problem	Mild problem	Moderate problem	Severe problem	Very severe problem
IMPAIRMENT RANGES	0% LE	1%–13% LE	14%–25% LE	26%–49% LE	50%–100% LE
GRADE		A B C D E	A B C D E	A B C D E	A B C D E
Fracture		**Do not use with CS x ray alignment**	**Do not use with CS x ray alignment**	**Do not use with CS x ray alignment**	
Proximal tibial shaft fracture	0 Non-displaced, with no significant objective abnormal findings at MMI	3 4 5 6 7 Non-displaced with abnormal examination findings 7 8 10 12 13 <10° angulation	14 17 19 21 24 10°–19° angulation	26 28 30 32 34 20°+ angulation	50 52 54 56 58 Non-union and/or infected
Arthritis		**Do not use with CS x ray arthritis**			
Primary knee joint arthritis		5 6 7 8 9 3 mm cartilage interval, full-thickness articular cartilage defect, or ununited osteochondral fracture	16 18 20 22 24 2 mm cartilage interval	26 28 30 32 34 1 mm cartilage interval	50 50 50 54 58 No cartilage interval
Patellofemoral arthritis		1 2 3 4 5 Full-thickness articular cartilage defect or ununited osteochondral fracture 7 8 10 12 13 2 mm cartilage interval	14 14 15 16 17 1 mm cartilage interval 16 18 20 22 24 No cartilage interval		
Arthrodesis					
Arthrodesis (joint ankylosis, Fusion)					59 63 67 71 75 10°–15° flexion contracture and good alignment 67 71 75 79 83 >15° flexion or poor alignment
Osteotomy / Knee Replacement					
s/p tibial osteotomy			21 23 25 25 25 Fair or good result	31 34 37 40 43 Poor result (effusion, limited motion, instability)	
Total knee replacement			21 23 25 25 25 Good result (good position, stable, functional)	31 34 37 40 43 Fair result (fair position, mild instability and/or mild motion deficit)	59 63 67 71 75 Poor result (poor position, moderate to severe instability, and/or moderate to severe motion deficit) 67 71 75 79 83 Poor result with chronic infection

Knee

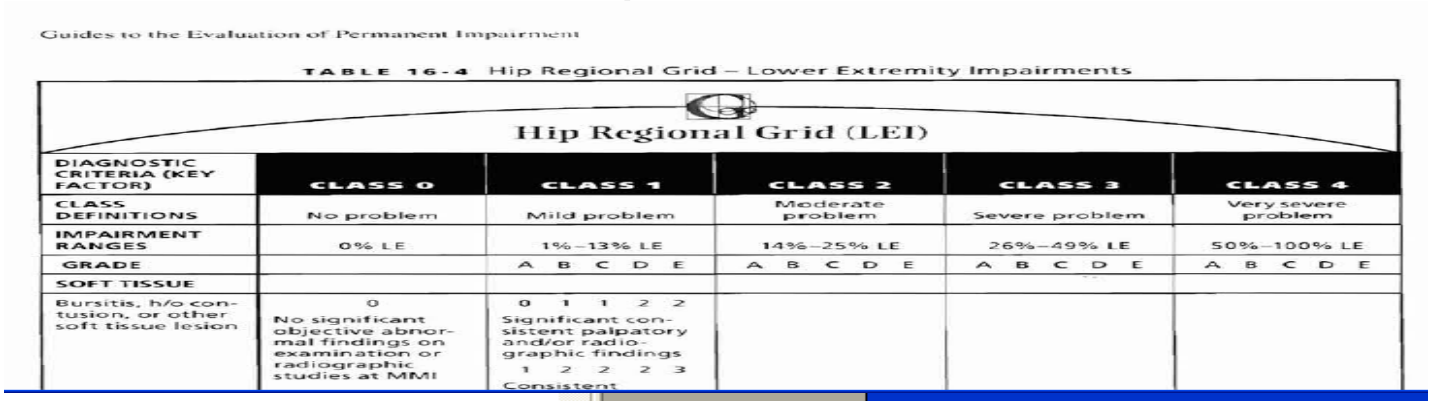
Foot and Ankle Grids: 8 pages
(501-508)

Knee Grids: Only 3 pages
(509-511)

Hip Grids: 3 ½ pages
(512-515)

Step One: Diagnostic Criteria Grid Three HIP REGION

Table 16-4, p512-515



Guides to the Evaluation of Permanent Impairment

TABLE 16-4 Hip Regional Grid – Lower Extremity Impairments

Hip Regional Grid (LEI)

DIAGNOSTIC CRITERIA (KEY FACTOR)	CLASS 0	CLASS 1	CLASS 2	CLASS 3	CLASS 4
CLASS DEFINITIONS	No problem	Mild problem	Moderate problem	Severe problem	Very severe problem
IMPAIRMENT RANGES	0% LE	1%–13% LE	14%–25% LE	26%–49% LE	50%–100% LE
GRADE		A B C D E	A B C D E	A B C D E	A B C D E
SOFT TISSUE					
Bursitis, h/o contusion, or other soft tissue lesion	0 No significant objective abnormal findings on examination or radiographic studies at MMI	0 1 1 2 2 Significant consistent palpatory and/or radiographic findings 1 2 2 2 3 Consistent			

- Soft Tissue:
  - Bursitis, h/o contusion, or other soft tissue lesion
- Muscle/Tendon:
  - Strain; tendonitis; or h/o ruptured tendon
  - Myositis ossificans (hypertrophic ossification)

Step One: Diagnostic Criteria

HIP REGION

- Ligament/Bone/Joint:
  - Hip dislocation; avascular necrosis; acetabular labral tear
- Fracture:
  - Osteochondral fracture; osteochondritis dissecans; fractures about the hip joint (acetabulum and proximal femur)
- Arthritis:
  - Degenerative conditions; hip arthritis (arthosis)

Step One: Diagnostic Criteria

HIP REGION

- Arthrodesis:
  - Hip joint arthrodesis (ankylosis, fusion)
- Osteotomy/Joint Replacement:
  - s/p Femoral osteotomy; total hip replacement

STEP TWO

(place the diagnosis in a **CLASS**)

- THREE REGIONAL GRIDS, list all possible diagnoses within each LE region
  - Foot/ankle
  - Knee
  - Hip

LE Algorithm to Final DBI % - **STEP TWO** (**CLASS**)

Table 16-1 Definition of Impairment Classes (pg. 495)

Class	Problem	Lower Extremity (LEI)	Whole Person (WPI)
0	No objective findings	0%	0%
1	Mild	1%-13% LEI	1%-5% WPI
2	Moderate	14%-25% LEI	6%-10% WPI
3	Severe	26%-49% LEI	11%-19% WPI
4	Very Severe	50%-100% LEI	20%-40% WPI

Example: Total Hip

TABLE 16-4 (CONTINUED) Hip Regional Grid – Lower Extremity Impairments

DIAGNOSTIC CRITERIA (KEY FACTOR)	CLASS 0	CLASS 1	CLASS 2	CLASS 3	CLASS 4
CLASS DEFINITIONS	No problem	Mild problem	Moderate problem	Severe problem	Very severe problem
IMPAIRMENT RANGES	0% LE	1%–13% LE	14%–25% LE	26%–49% LE	50%–100% LE
GRADE		A B C D E	A B C D E	A B C D E	A B C D E
Osteotomy / Joint Replacement					
s/p Femoral osteotomy			19 20 22 24 25 Fair or good result	31 34 37 40 43 Poor result (effusion, limited motion, instability)	
Total hip replacement		21 23 25 25 25 Errata	21 23 25 ~~27 29~~ Good result (good position, stable, functional)	31 34 37 40 43 Fair result (fair position, mild instability and/or mild motion deficit)	59 63 67 71 75 Poor result (poor position, moderate to severe instability, and/or moderate to severe motion deficit) 67 71 75 79 83 Poor result with chronic infection

3 possible classes for THR
2 sets of numbers in Class 4

LE Algorithm to Final DBI % - **STEP TWO (CLASS)**

CONTRADICTION

- REPEAT process for EACH separate DIAGNOSIS in each limb involved.
- In most cases only ***ONE*** DIAGNOSIS will be appropriate. (1 per grid)
  - **MAY** rate both an ankle and a hip fracture.

- If a patient has ***2*** significant diagnoses (i.e. ankle instability and posterior tibial tendonitis) use the (one) ***diagnosis with the highest impairment*** rating for the impairment calculation. - p 497

LE Algorithm to Final DBI % - **STEP TWO (CLASS)**

CONTRADICTION

- REPEAT process for EACH separate DIAGNOSIS in each limb involved.
- In most cases only ***ONE*** DIAGNOSIS will be appropriate.

- "If more than 1 diagnosis … can be used, the 1 that provides the **most CLINICALLY ACCURATE and causally-related** impairment rating should be used; this will generally be the more specific diagnosis. Typically 1 diagnosis will characterize the impairment and its impact on ADLs." - p 499

Example 16-9 p 526

- Subject: 52 year old man

- History: Twisting injury
  - s/p ACL reconstruction and medial meniscal repair

Example 16-9 p 526

Physical Exam: 5° flexion contracture, normal flexion and no effusion. "Give way" weakness of his quadriceps and no atrophy. There is mild laxity of the ACL. His gait was unremarkable when exiting the examination room.

Clinical Studies: Current weight-bearing X rays show bioabsorbable fixation of the ACL in good position with a normal 5 mm joint space in all 3 compartments.

Diagnosis: s/p anterior cruciate ligament reconstruction and medial meniscus repair.

Example 16-9 p 526

"The methodology requires the examiner to pick one diagnosis for the region. The anterior instability diagnosis was chosen, and the effect of the meniscal tear is reflected in the adjustments."

- **INCREASE** the **Clinical Studies Grade Modifier** to reflect the ADDITIONAL PATHOLOGY present

Example 16-9 p 526

- **Clinical Studies:** Current weight-bearing X rays show bioabsorbable fixation of the ACL in good position with a normal 5 mm joint space in all 3 compartments.

Example 16-9

- "Diagnosis: "cruciate or collateral ligament injury" with mild instability assigned to class 1 with a default value of 10% LEI.
- Functional History judged **unreliable** in the presence of only mild instability and no atrophy, and thus not used in rating.
- Physical exam instability **not** used as a grade modifier since stability was used in class assignment. No atrophy would be grade 0, but 5° **flexion contracture** would be rated at 10% LEI by table 16-23, and table 16-25 indicates a 10% LEI rating would be a mild degree of problem, or a **grade 1** modifier from table 16-7.

Example 16-9

- **Clinical Studies:** The anterior cruciate reconstruction in good position without joint space narrowing on current weight bearing x-rays **by itself would be a grade 1**, mild pathology adjustment. The presence of the **meniscal tear and subsequent repair** (documented in the operation report) would **justify moving up a grade to grade 2** for the final clinical studies adjustment.
- The net adjustment is +1, so class 1, grade D, or 12% LEI is the final rating."

Example 16-9 p 526

- Diagnosis: ACL "mild laxity"
  - Class 1
- Diagnosis: Meniscal injury
  - Class 1
- FH = grade 4, but not utilized [INVALID]
- PE = grade 1 **Flexion contracture**
- CS = grade ~~1~~ 2
  - **[Move up because of meniscal tear/repair]**
- Net Adjustment = + 1, and grade D is used for ACL.

Class1, Grade D = 12% LEI

TABLE 16-3 (CONTINUED) Knee Regional Grid – Lower Extremity Impairments

DIAGNOSTIC CRITERIA (KEY FACTOR)	CLASS 0	CLASS 1	CLASS 2	CLASS 3	CLASS 4
CLASS DEFINITIONS	No problem	Mild problem	Moderate problem	Severe problem	Very severe problem
IMPAIRMENT RANGES	0% LE	1%–13% LE	14%–25% LE	26%–49% LE	50%–100% LE
GRADE		A B C D E	A B C D E	A B C D E	A B C D E
LIGAMENT / BONE / JOINT		**Do not use with PE stability**	**Do not use with PE stability**		
Cruciate or collateral ligament injury; Surgery not rating factor	0 No instability	7 8 10 12 13 Mild laxity	14 15 16 17 18 Moderate laxity		
Cruciate and collateral ligament injury; Surgery not rating factor	0 No instability	7 8 10 12 13 Mild laxity	19 20 22 24 25 Moderate laxity	31 34 37 40 43 Severe laxity	
Patellar Lesion		**Do not use with PE stability**	**Do not use with PE stability**		
Patellar subluxation or dislocation	0 No instability	5 6 7 8 9 Mild instability	14 15 16 17 18 Moderate instability 19 20 22 24 25 Severe instability		
Patellectomy		5 6 7 8 9 Partial	19 20 22 24 25 Total		
Fracture		**Do not use with CS x ray alignment**	**Do not use with CS x ray alignment**	**Do not use with CS x ray alignment**	
Femoral shaft fracture	0 Non-displaced, with no significant objective abnormal findings at MMI	5 6 7 8 9 Abnormal examination findings and <10° angulation	14 15 16 17 18 10°–19° angulation	31 34 37 40 43 20°+ angulation	52 56 60 64 68 Non-union and/or infected
Supracondylar or intercondylar fracture	0 Non-displaced, with no significant objective abnormal findings at MMI	3 4 5 6 7 Non-displaced with abnormal examination findings 7 8 10 12 13 5°–9° angulation	19 20 22 24 25 10°–19° angulation	31 34 37 40 43 20°+ angulation or > 2 mm step off	52 56 60 64 68 Non-union and/or infected
Patellar fracture	0 Non-displaced, with no significant objective abnormal findings at MMI	5 6 7 8 9 Non-displaced with abnormal examination findings 7 8 10 12 13 Articular surface displaced 3 mm or less	14 15 16 17 18 Displaced with nonunion		
Tibial plateau fracture	0 Non-displaced, with no significant objective abnormal findings at MMI	3 4 5 6 7 Non-displaced with abnormal examination findings 7 8 10 12 13 < 9° angulation	19 20 22 24 25 10°–19° angulation or < 2 mm. step off	31 34 37 40 43 20°+ angulation or > 2 mm step off	52 56 60 64 68 Non-union and/or infected, or severe comminuted, displaced

Example 16-9

- **Final rating** for ACL reconstruction AND medial meniscal tear with repair is from **CLASS One**, **Grade D**

LE Algorithm to Final DBI % - **STEP TWO** **(CLASS)**

- "Subjective complaints ***without objective*** **physical findings or significant PE abnormalities** are typically assigned **class 0** *with no ratable impairment." - p 497*
- *"Objective findings are always given the greater weight of evidence over subjective complaints" – p 495*
- "If an examiner is routinely using multiple diagnoses without objective supporting data, the validity and reliability of the evaluation may be questioned." - p 497

TABLE 16-3 (CONTINUED) Knee Regional Grid – Lower Extremity Impairments

DIAGNOSTIC CRITERIA (KEY FACTOR)	CLASS 0	CLASS 1	CLASS 2	CLASS 3	CLASS 4
CLASS DEFINITIONS	No problem	Mild problem	Moderate problem	Severe problem	Very severe problem
IMPAIRMENT RANGES	0% LE	1%–13% LE	14%–25% LE	26%–49% LE	50%–100% LE
GRADE		A B C D E	A B C D E	A B C D E	A B C D E
LIGAMENT / BONE / JOINT		Do not use with PE stability	Do not use with PE stability		
Cruciate or collateral ligament injury; Surgery not rating factor	0 No instability	7 8 10 12 13 Mild laxity	14 15 16 17 18 Moderate laxity		
Cruciate and collateral ligament injury; Surgery not rating factor	0 No instability	7 8 10 12 13 Mild laxity	19 20 22 24 25 Moderate laxity	31 34 37 40 43 Severe laxity	
Patellar Lesion		Do not use with PE stability	Do not use with PE stability		
Patellar subluxation or dislocation	0 No instability	5 6 7 8 9 Mild instability	14 15 16 17 18 Moderate instability 19 20 22 24 25 Severe instability		
Patellectomy		5 6 7 8 9 Partial	19 20 22 24 25 Total		
Fracture		Do not use with CS x ray alignment	Do not use with CS x ray alignment	Do not use with CS x ray alignment	
Femoral shaft fracture	0 Non-displaced, with no significant objective abnormal findings at MMI	5 6 7 8 9 Abnormal examination findings and <10° angulation	14 15 16 17 18 10°–19° angulation	31 34 37 40 43 20°+ angulation	52 56 60 64 68 Non-union and/or infected
Supracondylar or intercondylar fracture	0 Non-displaced, with no significant objective abnormal findings at MMI	3 4 5 6 7 Non-displaced with abnormal examination findings 7 8 10 12 13 5°–9° angulation	19 20 22 24 25 10°–19° angulation	31 34 37 40 43 20°+ angulation or > 2 mm step off	52 56 60 64 68 Non-union and/or infected
Patellar fracture	0 Non-displaced, with no significant objective abnormal findings at MMI	5 6 7 8 9 Non-displaced with abnormal examination findings 7 8 10 12 13 Articular surface displaced 3 mm or less	14 15 16 17 18 Displaced with nonunion		
Tibial plateau fracture	0 Non-displaced, with no significant objective abnormal findings at MMI	3 4 5 6 7 Non-displaced with abnormal examination findings 7 8 10 12 13 < 9° angulation	19 20 22 24 25 10°–19° angulation or < 2 mm. step off	31 34 37 40 43 20°+ angulation or > 2 mm step off	52 56 60 64 68 Non-union and/or infected, or severe comminuted, displaced

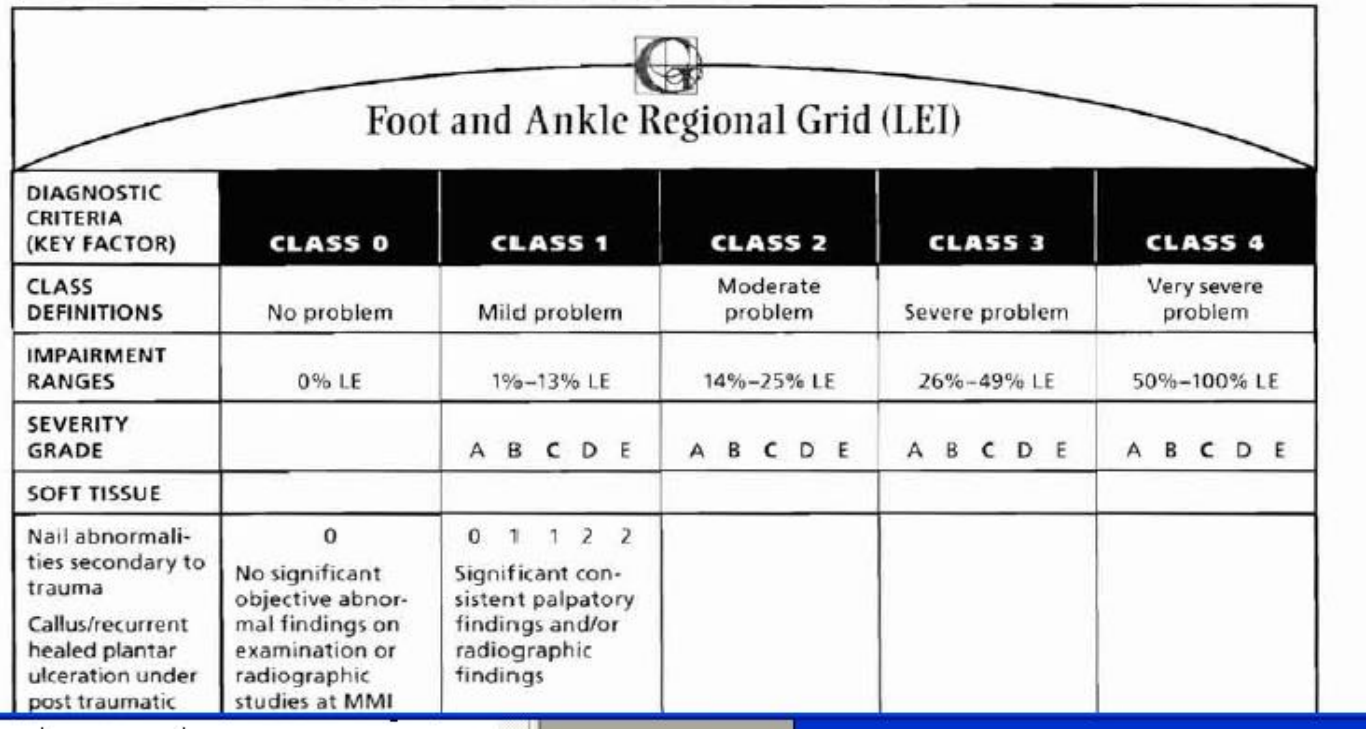
Pick the CLASS

- **Some Diagnoses have more than one Class, and the words (text) within the table direct you to the PROPER CLASS**

LE Algorithm to Final DBI % - **STEP THREE (GRADE)**

- DBI is defined by **CLASS** & **GRADE**.
- Once the Impairment (severity) Class (IC) and the GRADE (0-4) is determined, a **GRADE MODIFIER** (A, B, **C**, D, E) is initially assigned the *DEFAULT VALUE* = **C.**

TABLE 16-2 Foot and Ankle Regional Grid – Lower Extremity Impairments



Foot and Ankle Regional Grid (LEI)

DIAGNOSTIC CRITERIA (KEY FACTOR)	CLASS 0	CLASS 1	CLASS 2	CLASS 3	CLASS 4
CLASS DEFINITIONS	No problem	Mild problem	Moderate problem	Severe problem	Very severe problem
IMPAIRMENT RANGES	0% LE	1%–13% LE	14%–25% LE	26%–49% LE	50%–100% LE
SEVERITY GRADE		A B C D E	A B C D E	A B C D E	A B C D E
SOFT TISSUE					
Nail abnormalities secondary to trauma Callus/recurrent healed plantar ulceration under post traumatic	0 No significant objective abnormal findings on examination or radiographic studies at MMI	0 1 1 2 2 Significant consistent palpatory findings and/or radiographic findings			

STEP THREE (GRADE)

- The final impairment grade, within the class is calculated using **Grade** modifiers, or ***non-key factors*** (Section 16.3) - p 497
- ***Non**-key **Grade** modifiers* are determined from:
  - **Functional History (FH)**
  - **Physical Examination (PE)**
  - **Clinical Studies (CS)**

- *NON-key **Grade** modifiers* are considered ***only*** if they are reliable and associated with the DIAGNOSIS. – p 495

- *NON-key "Grade modifiers* allow movement within a class, but ***DO NOT ALLOW MOVEMENT INTO A DIFFERENT CLASS." - p 497***

Functional History p 496

- "Functional (History) assessment is **only considered for the limb impairment with the highest rating**, since it is expected that this will encompass the functional limitations related to other impairments in the same limb."
  - Also on page 516
  - Both a hip and an ankle problem, **use FH ONLY ONCE** for the greater impairment

Functional History: Page 516

- **Not affected** by "Do NOT consider Pain."

TABLE 16-6

Functional History Adjustment – Lower Extremities[a]

	Grade Modifier 0	Grade Modifier 1	Grade Modifier 2	Grade Modifier 3	Grade Modifier 4
CLASS DEFINITIONS	No problem	Mild problem	Moderate problem	Severe problem	Very severe problem
GAIT DERANGEMENT	None	Antalgic limp with asymmetric shortened stance, corrects with footwear modifications and/or orthotics	Antalgic limp (in the presence of objectively defined significant pathology) with asymmetric shortened stance; stable with use of external orthotic device (eg, ankle-foot orthosis), routine use of single gait aid (cane or crutch), or positive Trendelenburg test	Antalgic/unstable transfers and ambulation requires routine use of gait aids (2 canes or crutches) or KAFO brace	Nonambulatory
AAOS LOWER LIMB INSTRUMENT (OR OTHER INVENTORY)	Normal	Mild deficit	Moderate deficit	Severe deficit	Near-total to total deficit

Watching a limp Is part of the Physical Exam, **NOT** part of the History.

[a] KAFO indicates knee, ankle, foot orthosis; AAOS, American Academy of Orthopaedic Surgeons.

LE Algorithm to Final DBI % - **STEP THREE (GRADE)**

Non-Key Grade Modifiers

- Functional History (**FH**): -p 496
  - *Grade modifier* **0**: no demonstrable interference with function
  - *Grade modifier* **1**: interference with the vigorous or extreme use of the limb only.
  - "Grade modifier 2: antalgic **limp** that **limits** ambulation distance; **regularly uses** orthotic device (at least ankle-foot orthosis)
  - Grade modifier 3: antalgic limp; **routine use of 2** canes, or **2** crutches, **or knee**-ankle-foot orthosis
  - Grade modifier 4: **non-ambulatory**

Functional History p 496

- "A **functional assessment tool** **MAY** be used … to further evaluate this parameter. The physician is expected to weigh the patient's subjective complaints and SCORE on the … tool, relative to the expected severity for a given condition. The grade MODIFIER that reflects this analysis MAY be accepted OR NOT as a variable in the impairment calculation."

Functional History p 516

- "**If** the grade for Functional History differs by 2 or more grades from that defined by physical examination **or** clinical studies, the Functional History SHOULD be assumed to be unreliable.
- If … unreliable or inconsistent with the other documentation, it is **EXCLUDED** from the grading process."
  - Note: "or", Does not say from the higher of either the PE or the CS

Function Adjustment: Lower Limb

Functional history grade modifier should be applied only to the single, highest diagnosis-based impairment (DBI). Specific jurisdictions may modify this process such that functional history adjustment is considered for each diagnosis-based impairment (DBI) or not considered at all as a grade modifier.

TABLE 16-6

Functional History Adjustment – Lower Extremities[a]

	Grade Modifier 0	Grade Modifier 1	Grade Modifier 2	Grade Modifier 3	Grade Modifier 4
CLASS DEFINITIONS	No problem	Mild problem	Moderate problem	Severe problem	Very severe problem
GAIT DERANGEMENT	None	Antalgic limp with asymmetric shortened stance, corrects with footwear modifications and/or orthotics	Antalgic limp (in the presence of objectively defined significant pathology) with asymmetric shortened stance; stable with use of external orthotic device (eg, ankle-foot orthosis), routine use of single gait aid (cane or crutch), or positive Trendelenburg test	Antalgic/unstable transfers and ambulation requires routine use of gait aids (2 canes or crutches) or KAFO brace	Nonambulatory
AAOS LOWER LIMB INSTRUMENT (OR OTHER INVENTORY)	Normal	Mild deficit	Moderate deficit	Severe deficit	Near-total to total deficit

Note: Watching a patient's gait is part of the Physical Exam, **NOT** part of the History.

NO numbers in this table to define what a score means.

[a] KAFO indicates knee, ankle, foot orthosis; AAOS, American Academy of Orthopaedic Surgeons.

The need for assistive devices is based on objective medical reasons and not for pain or alleged insecurity. The evaluating physician may use outcome instruments and inventories as part of the process of evaluating functional symptoms. Further information on inventories for the lower extremity is provided on the Web site of the American Academy of Orthopedic Surgeons. Inventories must be widely accepted and have documented reliability and validity. The American Academy of Orthopaedic Surgery Lower Limb Instrument is 1 inventory that may be used; information and scoring is provided at the AAOS Web site. An inventory is used only to assist the examiner in defining the class for functional history and does not serve as a basis for defining further impairment nor does the score reflect an impairment percentage (see Table 16-6).

The examiner must assess the reliability of the functional reports recognizing the potential influence of behavioral and psychosocial factors. Therefore, the examiner must use appropriate clinical judgment in interpreting subjective reports. Gait abnormalities must be observed and consistent. If the grade for functional history differs by 2 or more grades from that defined by physical examination or clinical studies the functional history should be assumed to be unreliable. If the functional history is determined to be unreliable or inconsistent with other documentation, it is excluded from the grading process.

Functional History
page 516

AAOS Lower Limb Instrument
"… may be used… "
"… only to assist …"
"… does **not** serve as a basis for defining further impairment …"

"… assess the reliability of the functional reports recognizing the potential influence of behavioral and psychological factors."

If the grade for functional history differs by 2 or more grades from that defined by physical examination or clinical studies the functional history should be assumed to be unreliable."

Lower Limb Questionnaire

Instructions

Please answer the following questions for the lower limb being treated or followed up. If it is BOTH lower limbs, please answer the questions for your **worse** side. All questions are about how you have felt, on average, during the **past week.** If you are being treated for an injury that happened less than one week ago, please answer for the period since your injury.

1. During the past week, how **stiff** was your lower limb? (Circle one response.)

1 Not at all 2 Mildly 3 Moderately 4 Very 5 Extremely

2. During the past week, how **swollen** was your lower limb? (Circle one response.)

1 Not at all 2 Mildly 3 Moderately 4 Very 5 Extremely

During the past week, please tell us about how painful your lower limb was during the following activities. (Circle ONE response on each line that best describes your average ability.)

	Not painful	Mildly painful	Moderately painful	Very painful	Extremely painful	Could not do because of lower limb pain	Could not do for other reasons
3. Walking on **flat** surfaces?	1	2	3	4	5	6	7
4. Going up or down stairs?	1	2	3	4	5	6	7
5. Lying in bed at night?	1	2	3	4	5	6	7

6. Which of the following statements **best** describes your ability to get around most of the time during the past week? (Circle one response.)

1 I did not need support or assistance at all.
2 I mostly walked without support or assistance.
3 I mostly used one cane or crutch to help me get around
4 I mostly used two canes, two crutches or a walker to help me get around.
5 I used a wheelchair.
6 I mostly used other supports or someone else had to help me get around.
7 I was unable to get around at all.

7. How difficult was it for you to put on or take off socks/stockings during the past week? (Circle one response.)

1 Not at all difficult 2 A little bit difficult 3 Moderately difficult 4 Very difficult 5 Extremely difficult 6 Cannot do it at all

AAOS Outcome Instrument

Questions re-written for legibility AAOS Lower Limb Outcome Score

1. During the past week, how stiff was your lower limb?
2. During the past week, how swollen was your lower limb?

During the past week, how painful was your lower limb during:

3. Walking on **flat** surfaces?
4. Going up or down **stairs**?
5. Lying in bed **at night**?

Questions re-written for legibility
AAOS Lower Limb Outcome Score

6. Which of the following statements best describes your ability to get around most of the time during the past week?
7. How difficult was it for you to put on or take off your socks/shoes during the past week?

http://www.aaos.org/research/outcomes/Lower_LimbScoring.xls

Standardized score: 0-100

Normalized score MINUS 16 TO PLUS 57

Standardized scores are calculated so that a "0" represents a poor outcome/worse health while "100" is the best possible outcome/best health.

Missing Items: If an item contained within a scale is not answered, that item is not computed into the mean used for that scale.

Normative scores are calculated so that a higher scores indicate better functioning. All scores are referenced to the general/healthy population. Normative mean score is 50.

NOTE: There are 2 different methods that could be used to score this.

http://www.aaos.org/research/outcomes/Lower_LimbScoring.xls

The algorithm for the lower limb core scale is as follows:		
component	**value**	**Result**
a =	(Q1 -1)* 5/4	Value ranging 0 to 5
b =	(Q2 -1)*5/4	Value ranging 0 to 5
c =	(Q3 - 1) if rated 1-6; a rating of 7 (could not do for other reason) is considered missing	Value ranging 0 to 5
d =	(Q4 - 1) if rated 1-6; a rating of 7 (could not do for other reason) is considered missing	Value ranging 0 to 5
e =	(Q5 - 1) if rated 1-6; a rating of 7 (could not do for other reason) is considered missing	Value ranging 0 to 5
f =	(Q6 - 1)*5/6	Value ranging 0 to 5
g =	(Q7 - 1)	Value ranging 0 to 5
Output on Standardized & Normative Score Worksheet		**Result**
Raw score:	(sum of all components a through g)	Value ranging 0 to 35
Mean of Items:	(sum of all components a through g) / (number of non-missing items)	Value ranging 0 to 5
Standardized Mean*:	100 - 100 x (mean of items)/5	Value ranging 0 to 100
Normative Score:	10 * [(Standardized mean score - General population score) / General population standard deviation] + 50.	Value ranging -16 to 57

*** For all 0-100 scales, a "0" represents a poor outcome and a "100" represents the best possible outcome.**

Unhide rows 2-3 and all columns on the "Standardized & Normative Scores" Worksheet for more information on recoding procedures.

No Method to convert score (number) to Words (like “moderate”)

Table 16-3a Functional History Adjustment

	Grade Modifier 0	Grade Modifier 1	Grade Modifier 2	Grade Modifier 3	Grade Modifier 4
Class Definitions	No problem	Mild problem	Moderate problem	Severe problem	Very Severe problem
Gait Derangement	None	Antalgic limp with asymmetric shortened stance, corrects with footwear modifications and/or orthotics	Antalgic limp (in the presence of objectively defined significant pathology) with asymmetric shortened stance stable with use of external orthotic device (e.g. ankle-foot orthosis), routine use single gait aid (cane or crutch), or positive Trendelenburg	Antalgic / unstable transfers and ambulation requires routine use of gait aids (2 canes or crutches) or KAFO brace	Non-ambulatory
AAOS Lower Limb Instrument (or other Inventory)	Normal	Mild deficit	Moderate deficit	Severe deficit	Neat total to Total Deficit

ERRATA PROVIDES NO GUIDANCE

Chapter 16 has 19 examples:

NONE even mention the AAOS Lower Limb Instrument

LE Algorithm to Final DBI % - **STEP THREE (GRADE)**

- Physical Examination (PE): Page 496
- Document LE objective findings: gait, limb length discrepancy, deformity, MMT, atrophy, instability, ROM deficits and neuro findings (sensory/motor/DTR deficits).
- Remove braces, orthotics, etc., if appropriate
- Document quantitative POSITIVE, NEGATIVE, & nonphysiological findings bilaterally. Use opposite extremity if uninvolved TO DEFINE NORMAL. Use quantitative findings - Avoid general descriptions.

TABLE 16-7

Physical Examination Adjustment – Lower Extremities

	Grade Modifier 0	Grade Modifier 1	Grade Modifier 2	Grade Modifier 3	Grade Modifier 4
CLASS DEFINITIONS	**No problem**	**Mild problem**	**Moderate problem**	**Severe problem**	**Very severe problem**
OBSERVED AND PALPATORY FINDINGS (tenderness, swelling, mass, or crepitance)	No consistent findings	Minimal palpatory findings, consistently documented, without observed abnormalities	Moderate palpatory findings, consistently documented, and supported by observed abnormalities	Severe palpatory findings, consistently documented, and supported by observed moderate or greater abnormalities	Very severe palpatory findings, consistently documented, and supported by observed severe abnormalities
STABILITY	Stable	Grade 1 (slight) instability	Grade 2 (moderate) instability	Grade 3 (serious) instability	Gross instability
KNEE		Grade 1 Lachman's test; slight laxity patellar mechanism	Grade 2 Lachman's test; moderate laxity patellar mechanism	Grade 3 Lachman's test; severe laxity patellar mechanism	Multi-directional instability
ALIGNMENT/ DEFORMITY	Normal for individual with symmetry to opposite side	Mild	Moderate	Severe	Very severe
RANGE OF MOTION (reference Section 16.7)	None	Mild or arthrodesis in position of function	Moderate	Severe	Very severe
MUSCLE ATROPHY (asymmetry compared to opposite normal)	<1 cm	1.0–1.9 cm	2.0–2.9 cm	3.0–3.9cm+	4.0 cm+
LIMB LENGTH DISCREPANCY	<1.9 cm	2.0–2.9 cm	3–4.9 cm	5.0–5.9 cm+	6.0 cm+

Physical Examination

- “Examination findings that differ significantly from previously recorded observations AFTER the probable date of MMI should be reported, with comments noting the **discrepancy; these findings MAY BE EXCLUDED** from the impairment calculation.” – p 496

Physical Examination

- “If physical examination findings are determined to be UNRELIABLE **or** INCONSISTENT, **or** they are for conditions **unrelated** to the condition being rated, they are **EXCLUDED** from the grading process. The physician must explain, in the report, the rationale for the choice of grade.” - p 517

Physical Exam

- “If the neurologic exam points to an underlying spine disorder, the lower extremity *(impairment)* would, in most cases, be **accounted for in the spine impairment rating**, assuming there are no other primary lower extremity diagnoses requiring a concomitant rating.” - p 496

Physical Exam: Range of Motion

- "Range of motion is graded according to the process and the criteria specified in Section 16.7."
- "If it is clear to the evaluator that a restricted range of motion has an organic basis, **3 measurements** should be obtained and the **GREATEST** range measured should be **used** …" – p 517

Physical Exam: Range of Motion

- "If multiple previous evaluations have been documented, and there is **inconsistency in a rating class** [*as in ONE CLASS*] between the findings of 2 observers, **or** in the findings on separate occasions by the same observer, the results are considered **INVALID**." - p 518

Physical Exam: Range of Motion

- "Range of motion restrictions in multiple directions **DO INCREASE the impairment**."
  - **ADD** impairments for all 6 directions of hip movement.
- "Range of motion impairment is **NOT combined** with the diagnosis-based impairment." - p 518
  - Diagnosis from a different table is OK
  - May rate Hip by Dx and ankle by ROM

Physical Exam: ATROPHY

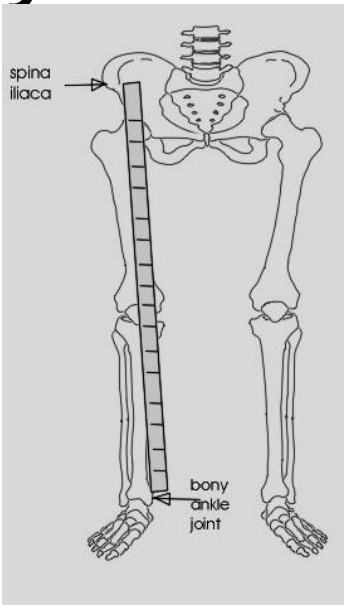
- “For muscle atrophy, the limb circumference should be measured and **compared to the OPPOSITE limb** at equal distances from either the joint line or another palpable anatomic structure. For example, thigh circumference may be measured 10 cm above the patella and compared (to) a similar measure on the other ~~leg.~~” [thigh] - p 518

Physical Exam: ATROPHY

- "Calf circumference is compared at the level of maximal circumstance bilaterally.
- **Neither limb should have swelling or varicosities** that would invalidate the measurements." - p 518

Physical Exam: p 518
Limb Length Discrepancy

- Measure with a tape measure ASIS to medial malleolus bilaterally.
- Measure **3 times** and average "… to reduce measurement error."
- **"Skeletal … teleroentgenography is recommended."**



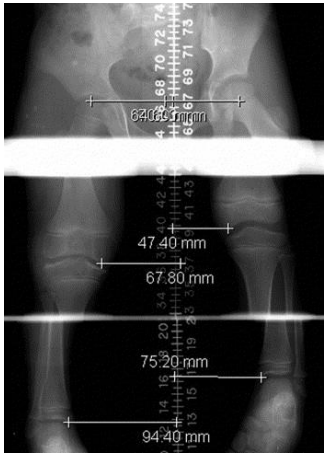


TABLE 16-8

Clinical Studies Adjustment – Lower Extremities[a]

	Grade Modifier 0	Grade Modifier 1	Grade Modifier 2	Grade Modifier 3	Grade Modifier 4
CLASS DEFINITIONS	**No problem**	**Mild problem**	**Moderate problem**	**Severe problem**	**Very severe problem**
IMAGING STUDIES	No available clinical studies or relevant findings	Clinical studies confirm diagnosis; mild pathology	Clinical studies confirm diagnosis; moderate pathology	Clinical studies confirm diagnosis; severe pathology	Clinical studies confirm diagnosis; very severe pathology
X RAYS					
ARTHRITIS *Note:* Do not use when X-ray cartilage interval is used in diagnostic impairment definition		Cartilage interval normal or less than 25% loss compared to opposite uninjured side; cystic changes on 1 side of joint; loose body <5 mm	Cartilage interval present; however, 25% to 50% loss compared to opposite uninjured side; cystic changes on both sides of joint; loose body 5 mm or greater or multiple loose bodies; radiographic evidence of mild posttraumatic arthrosis or avascular necrosis	Cartilage interval present; however, >50% lost compared to opposite uninjured side; radiographic evidence of moderate posttraumatic arthrosis or avascular necrosis	No cartilage interval; radiographic evidence of severe posttraumatic arthrosis or avascular necrosis
STABILITY Foot/Ankle *Note:* Do not use when X-ray stress opening is used in diagnostic impairment definition		AP stress radiograph: 2- to 3-mm excess opening or 5°–9° varus opening compared to normal opposite side	AP stress radiograph: 4- to 6-mm excess translation or 10–15° varus opening compared to normal opposite side Lateral stress radiograph: anterior drawer 4- to 6-mm excess translation compared to normal side	AP stress radiographs: >6-mm excess translation or >15° varus opening compared to normal opposite side Lateral stress radiograph: anterior drawer >6-mm excess translation compared to normal side	
ALIGNMENT Foot/Ankle *Note:* Do not use when X-ray angulation is used in diagnostic impairment definition		Syndesmosis normal; healed angulation or rotational deformity <5° in any plane	Syndesmosis laxity with separation demonstrated on foot external rotation AP ankle radiograph compared to opposite normal ankle Healed, angular or rotational deformity 5°–15° in any plane	Healed, angular or rotational deformity >15° in any plane	Severe multiplanar deformity
KNEE *Note:* Do not use when X-ray angulation is used in diagnostic impairment definition		<10° angulation/ rotational deformity single plane	10°–20° angulation/ rotational deformity single plane	>20° angulation/ rotational deformity 1–2 planes	Severe multiplanar deformity

(continued)

TABLE 16-8

Clinical Studies Adjustment – Lower Extremities[a]

	Grade Modifier 0	Grade Modifier 1	Grade Modifier 2	Grade Modifier 3	Grade Modifier 4
CLASS DEFINITIONS	**No problem**	**Mild problem**	**Moderate problem**	**Severe problem**	**Very severe problem**
HIP *Note:* Do not use when X-ray angulation is used in diagnostic impairment definition			Femoral osteotomy in good position	Femoral osteotomy in suboptimal position	
NERVE CONDUCTION TESTING	Normal	Conduction Delay (sensory and/or motor)	Motor Conduction Block	Partial Axonal Loss	Total Axonal Loss/Denervation
ELECTRO-DIAGNOSTIC (EMG) TESTING *Note:* If the test results meet some of, but not all of the criteria for a specific class, the next lower class is the class to be used in rating the impairment	Normal	Needle EMG done at least 3 weeks but less than 9 months after injury shows at least 1+ fibrillation potentials and positive waves in at least 2 muscles innervated by the injured nerve. If the EMG study is first done more than 9 months post-injury, the exam shows high amplitude polyphasic muscle potentials in at least 1 muscle and recruitment in that muscle is at least mildly reduced.	Needle EMG done at least 3 weeks but less than 9 months after injury shows at least 2+ fibrillation potentials and positive waves in at least 2 muscles innervated by the injured nerve. If the EMG study is first done more than 9 months post-injury, the exam shows high amplitude polyphasic muscle potentials in at least 2 muscles and recruitment in those muscles is at least moderately decreased.	Needle EMG done at least 3 weeks but less than 9 months after injury shows at least 3+ fibrillation potentials and positive waves in at least 3 muscles innervated by the injured nerve. If the EMG study is first done more than 9 months post-injury, the exam shows high amplitude polyphasic muscle potentials in at least 3 muscles and recruitment in those muscles is severely decreased.	Needle EMG done at least 3 weeks but less than 9 months after injury shows at least 4+ fibrillation potentials and positive waves in at least 3 muscles innervated by the injured nerve. If the EMG study is first done more than 9 months post-injury, the exam shows no motor units (fibrofatty replacement of muscle) in at least 2 muscles.

Non-Key Grade Modifiers

- Clinical Studies (**CS**): p 496
- "While imaging and other studies may assist physicians in making a Diagnosis, they are **NOT the sole determinants of a Diagnosis**.
- "Clinical test results that *do not correlate* with the patient's symptoms or support the diagnosis should **not** be mentioned."
  - [considered in the final DBI = 0%]

Clinical Studies

- "In some cases, the **class** will be defined by physical examination findings **or** clinical studies results. When this is the case, **those findings** MAY **NOT** BE USED to determine the **grade** in the correlating adjustments grid." -p 500
- "If physical findings have been used to determine class placement, they should NOT be considered again, for example, range of motion in many lower extremity diagnoses." - p 517

Clinical Studies

- "For adjustment purposes **findings at maximal medical improvement are used**."

  - I.E. DO **NOT** use x-ray on day on injury, rather use the final x-ray for rating.

Clinical Studies: Imaging

P 519-520

TABLE 16-8

Clinical Studies Adjustment – Lower Extremities[a]

	Grade Modifier 0	Grade Modifier 1	Grade Modifier 2	Grade Modifier 3	Grade Modifier 4
CLASS DEFINITIONS	No problem	Mild problem	Moderate problem	Severe problem	Very severe problem
IMAGING STUDIES	No available clinical studies or relevant findings	Clinical studies confirm diagnosis; mild pathology	Clinical studies confirm diagnosis; moderate pathology	Clinical studies confirm diagnosis; severe pathology	Clinical studies confirm diagnosis; very severe pathology

No definitions for "mild", "moderate", "severe", & "very severe".

NO definition for "CONFIRM PATHOLOGY".

Clinical Studies p 518

- Arthritis is graded by cartilage interval on STANDING (Weight bearing) x-rays.
- Ideal camera-to-film distance is 90 cm (36 inches).
  - Ankle: mortise view
  - Knee: standing A-P view
    - Flexion contracture precludes evaluation
  - Patellofemoral joint: “sunrise” view
  - Hip: standing A-P view

TABLE 16-8

Clinical Studies Adjustment – Lower Extremities[a]

	Grade Modifier 0	Grade Modifier 1	Grade Modifier 2	Grade Modifier 3	Grade Modifier 4
CLASS DEFINITIONS	**No problem**	**Mild problem**	**Moderate problem**	**Severe problem**	**Very severe problem**
IMAGING STUDIES	No available clinical studies or relevant findings	Clinical studies confirm diagnosis; mild pathology	Clinical studies confirm diagnosis; moderate pathology	Clinical studies confirm diagnosis; severe pathology	Clinical studies confirm diagnosis; very severe pathology
X RAYS					
ARTHRITIS *Note:* Do not use when X-ray cartilage interval is used in diagnostic impairment definition		Cartilage interval normal or less than 25% loss compared to opposite uninjured side; cystic changes on 1 or both sides of joint; loose body <5 mm	Cartilage interval present; however, 25% to 50% loss compared to opposite uninjured side; cystic changes on both sides of joint; loose body 5 mm or greater or multiple loose bodies; radiographic evidence of mild posttraumatic arthrosis or avascular necrosis	Cartilage interval present; however, >50% lost compared to opposite uninjured side; radiographic evidence of moderate posttraumatic arthrosis or avascular necrosis	No cartilage interval; radiographic evidence of severe posttraumatic arthrosis or avascular necrosis
STABILITY Foot/Ankle *Note:* Do not use when X-ray stress opening is used in diagnostic impairment definition		AP stress radiograph: 2- to 3-mm excess opening or 5°–9° varus opening compared to normal opposite side	AP stress radiograph: 4- to 6-mm excess opening or 10–15° varus opening compared to normal opposite side Lateral stress radiograph: anterior drawer 4- to 6-mm excess opening compared to normal side	AP stress radiographs: >6 mm excess opening or >15° varus opening compared to normal opposite side Lateral stress radiograph: anterior drawer >6-mm excess opening compared to normal side	
ALIGNMENT Foot/Ankle *Note:* Do not use when X-ray angulation is used in diagnostic impairment definition		Syndesmosis normal; healed angulation or rotational deformity <5° in any plane	Syndesmosis laxity with separation demonstrated on foot external rotation AP ankle radiograph compared to opposite normal ankle Healed, angular or rotational deformity 5°–15° in any plane	Healed, angular or rotational deformity >15° in any plane	Severe multiplanar deformity
KNEE *Note:* Do not use when X-ray angulation is used in diagnostic impairment definition		<10° angulation/rotational deformity single plane	10°–20° angulation/rotational deformity single plane	>20° angulation/rotational deformity 1–2 planes	Severe multiplanar deformity

P 519-520

TABLE 16-8 (CONTINUED) Clinical Studies Adjustment – Lower Extremities

HIP *Note:* Do not use when X-ray angulation is used in diagnostic impairment definition			Femoral osteotomy in good position	Femoral osteotomy in suboptimal position	
NERVE CONDUCTION TESTING	Normal	Conduction Delay (sensory and/or motor)	Motor Conduction Block	Partial Axonal Loss	Total Axonal Loss/Denervation
ELECTRO-DIAGNOSTIC (EMG) TESTING *Note:* If the test results meet some of, but not all of the criteria for a specific class, the next lower class is the class to be used in rating the impairment	Normal	Needle EMG done at least 3 weeks but less than 9 months after injury shows at least 1+ fibrillation potentials and positive waves in at least 2 muscles innervated by the injured nerve. If the EMG study is first done more than 9 months post-injury, the exam shows high amplitude polyphasic muscle potentials in at least 1 muscle and recruitment in that muscle is at least mildly reduced.	Needle EMG done at least 3 weeks but less than 9 months after injury shows at least 2+ fibrillation potentials and positive waves in at least 2 muscles innervated by the injured nerve. If the EMG study is first done more than 9 months post-injury, the exam shows high amplitude polyphasic muscle potentials in at least 2 muscles and recruitment in those muscles is at least moderately decreased.	Needle EMG done at least 3 weeks but less than 9 months after injury shows at least 3+ fibrillation potentials and positive waves in at least 3 muscles innervated by the injured nerve. If the EMG study is first done more than 9 months post-injury, the exam shows high amplitude polyphasic muscle potentials in at least 3 muscles and recruitment in those muscles is severely decreased.	Needle EMG done at least 3 weeks but less than 9 months after injury shows at least 4+ fibrillation potentials and positive waves in at least 3 muscles innervated by the injured nerve. If the EMG study is first done more than 9 months post-injury, the exam shows no motor units (fibrofatty replacement of muscle) in at least 2 muscles.

ERRATA

Page 519, Partial Table 16-8, Clinical Studies Adjustment – Lower Extremities: Rows 5 and 6, Columns 3, 4, and 5

ARTHRITIS *Note:* Do not use when X-ray cartilage interval is used in diagnostic impairment definition		Cartilage interval normal or less than 25% loss compared to opposite uninjured side; cystic changes on 1 side of joint; loose body <5 mm	Cartilage interval present; however, 25% to 50% loss compared to opposite uninjured side; cystic changes on both sides of joint; loose body 5 mm or greater or multiple loose bodies; radiographic evidence of mild posttraumatic arthrosis or avascular necrosis	Cartilage interval present; however, >50% lost compared to opposite uninjured side; radiographic evidence of moderate posttraumatic arthrosis or avascular necrosis	No cartilage interval; radiographic evidence of severe posttraumatic arthrosis or avascular necrosis
STABILITY Foot/Ankle *Note:* Do not use when X-ray stress opening is used in diagnostic impairment definition		AP stress radiograph: 2- to 3-mm excess opening or 5°–9° varus opening compared to normal opposite side	AP stress radiograph: 4- to 6-mm excess translation or 10–15° varus opening compared to normal opposite side Lateral stress radiograph: anterior drawer 4- to 6-mm excess translation compared to normal side	AP stress radiographs: >6-mm excess translation or >15° varus opening compared to normal opposite side Lateral stress radiograph: anterior drawer >6-mm excess translation compared to normal side	

BILATERAL ? No Guidance
Perhaps 5th Ed T17-31, p 544

Table 17-31 Arthritis Impairments Based on Roentgenographically Determined Cartilage Intervals

	Whole Person (Lower Extremity) [Foot] Impairment (%)			
	Cartilage Interval			
Joint	**3 mm**	**2 mm**	**1 mm**	**0 mm**
Sacroiliac (3 mm)*	—	1 (2)	3 (7)	3 (7)
Hip (4 mm)	3 (7)	8 (20)	10 (25)	20 (50)
Knee (4 mm)	3 (7)	8 (20)	10 (25)	20 (50)
Patellofemoral†	—	4 (10)	6 (15)	8 (20)
Ankle (4 mm)	2 (5) [7]	6 (15) [21]	8 (20) [28]	12 (30) [43]
Subtalar (3 mm)	—	2 (5) [7]	6 (15) [21]	10 (25) [35]
Talonavicular (2-3 mm)	—	—	4 (10) [14]	8 (20) [28]
Calcaneocuboid	—	—	4 (10) [14]	8 (20) [28]
First metatarsophalangeal	—	—	2 (5) [7]	5 (12) [17]
Other metatarsophalangeal	—	—	1 (2) [3]	3 (7) [10]

* Normal cartilage intervals are given in parentheses.

NOTE: 5TH Ed.

- If alternate method needed.

Grade 1

Grade 2

Grade 3

Grade 4

Clinical Studies page 520

- NO Definitions in EITHER book or Errata
- **Consult** EMG Text or MD doing the EMG

NERVE CONDUCTION TESTING	Normal	Conduction Delay (sensory and/or motor)	Motor Conduction Block	Partial Axonal Loss	Total Axonal Loss/Denervation
ELECTRO-DIAGNOSTIC (EMG) TESTING *Note:* If the test results meet some of, but not all of the criteria for a specific class, the next lower class is the class to be used in rating the impairment	Normal	Needle EMG done at least 3 weeks but less than 9 months after injury shows at least 1+ fibrillation potentials and positive waves in at least 2 muscles innervated by the injured nerve. If the EMG study is first done more than 9 months post-injury, the exam shows high amplitude polyphasic muscle potentials in at least 1 muscle and recruitment in that muscle is at least mildly reduced.	Needle EMG done at least 3 weeks but less than 9 months after injury shows at least 2+ fibrillation potentials and positive waves in at least 2 muscles innervated by the injured nerve. If the EMG study is first done more than 9 months post-injury, the exam shows high amplitude polyphasic muscle potentials in at least 2 muscles and recruitment in those muscles is at least moderately decreased.	Needle EMG done at least 3 weeks but less than 9 months after injury shows at least 3+ fibrillation potentials and positive waves in at least 3 muscles innervated by the injured nerve. If the EMG study is first done more than 9 months post-injury, the exam shows high amplitude polyphasic muscle potentials in at least 3 muscles and recruitment in those muscles is severely decreased.	Needle EMG done at least 3 weeks but less than 9 months after injury shows at least 4+ fibrillation potentials and positive waves in at least 3 muscles innervated by the injured nerve. If the EMG study is first done more than 9 months post-injury, the exam shows no motor units (fibrofatty replacement of muscle) in at least 2 muscles.

Class 4 EXCEPTION P 521-522

- “If the key factor is class 4, and both non-key factors were grade modifier 4, the difference would summate to zero, and placement in a grade above the default value C in class 4 would not be possible. In order to correct this deficiency, if the key factor is **class 4**, **automatically add +1 to the value of each non-key factor**.”

Class 4 EXCEPTION P 521-522

- "For example,
  - if the key factor is class 4,
  - and the first non-key factor was grade 3,
  - the second was grade 4,
  - the differences are -1 and zero, or -1.
- Adding +1 to each of these yields **zero** and +1;
  - this summates to +1.
- Consequently, the final class (is) 4 and the final impairment is class 4 grade D."

16.4 Peripheral Nerve Impairment

- Peripheral nerve impairment ***may*** **be combined** with DBI's, **if** the DBI does *NOT* already include the nerve impairment. – p 531
- Impairment due to **chronic pain** is discussed in Chapter 3, Pain. - p 531
- **Motivation and behavioral** concerns are considered in Chapter 14, Mental and Behavioral Disorders. - p 531
- This section is **NOT** used for nerve entrapments, since nerve entrapments are not isolated traumatic events." - p 533
  - HOWEVER, There is **NO section** for Nerve Entrapment in the Lower Limb Chapter

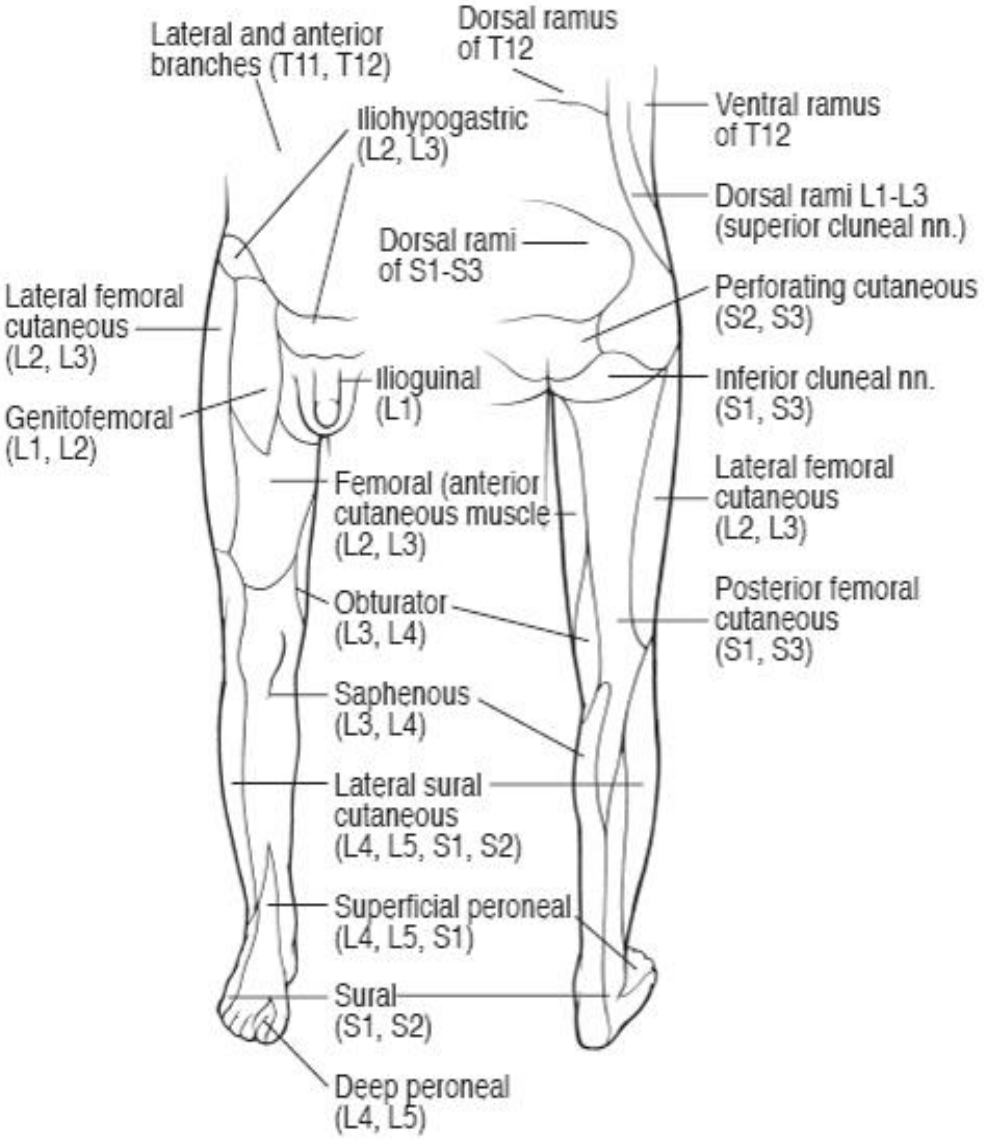
Peripheral Nerve Impairment

- "Characteristic deformities and manifestations resulting from peripheral nerve lesions, such as restricted motion, atrophy, and vasomotor, trophic, and reflex changes, have **[already] been taken into consideration** in the impairment values shown in this section." – p 531
- "Therefore, when impairment results strictly from a **peripheral nerve injury**, **no other rating method is applied** to this section to avoid duplication or unwarranted increase in the impairment." – p 531

FIGURE 16-3

Sensory Nerves of the Lower Extremity

P 537



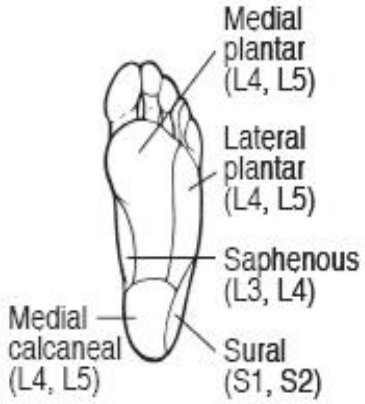
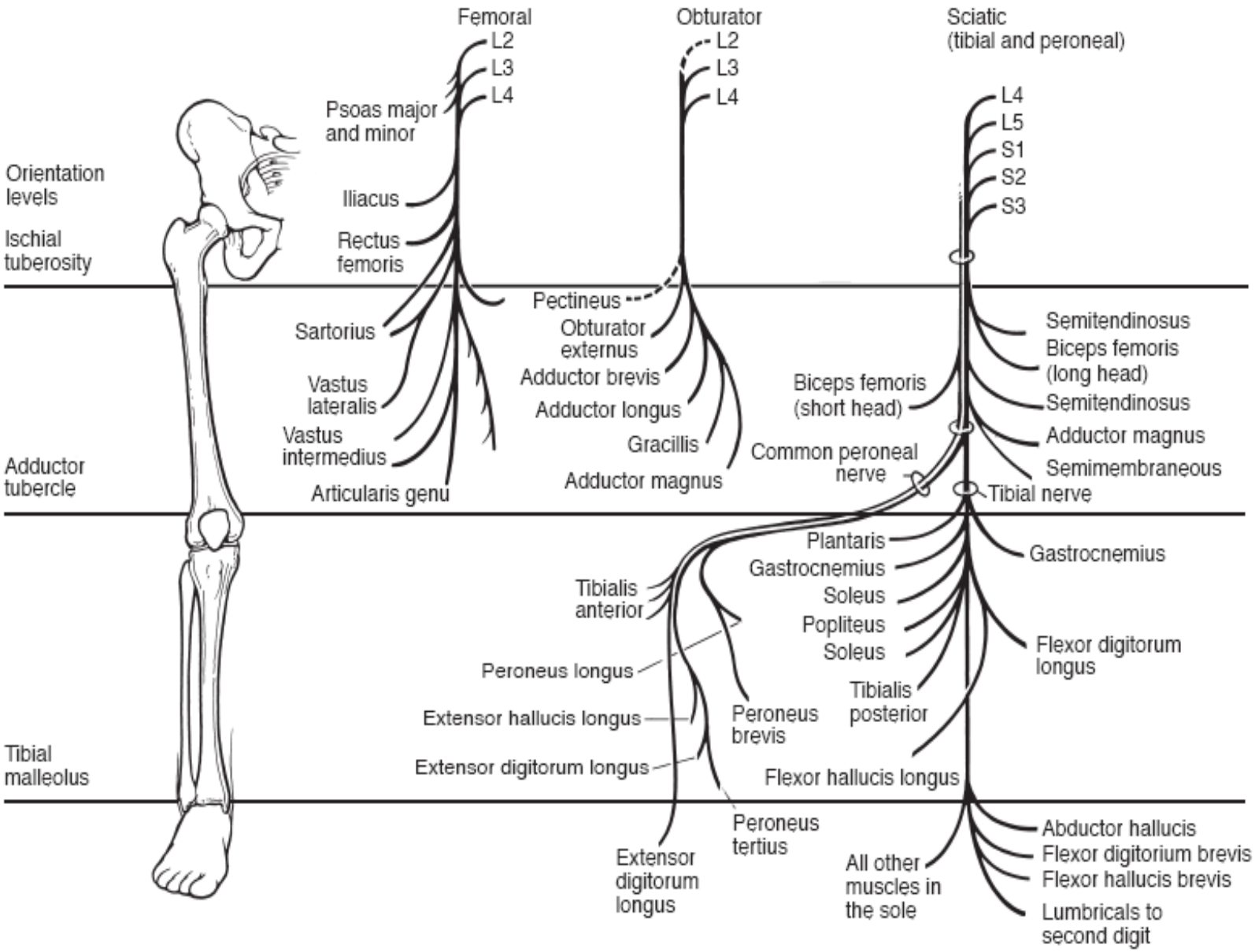


FIGURE 16-4

Motor Nerves of the Lower Extremity

P 537



Page 532: Sensory Exam

- "The examiner's finger tip, or a cotton tipped applicator can be used to assess light touch.
- Sharp dull recognition and protective sensation can be assessed using a disposable pin.

- The sensory exam results should conform to the cutaneous distribution of a peripheral nerve, or a branch of a peripheral nerve."

- "The sensory exam should be classified into one of five categories. Severity grade 0 is Normal sensibility and sensation.
- Severity grade 1 is subjectively altered sensory perception but retained light touch and sharp dull recognition. In this grade the examinee correctly reports each time he/she is touched, but stimuli are **perceived as subjectively abnormal** (paresthesia-like), but in only the distribution of a particular cutaneous nerve.
- Severity grade 2 is impaired light touch, but retained sharp dull recognition. This means several of the **light touch stimuli are not felt** by the examinee, but sharp and dull stimuli are consistently recognized correctly.
- Severity grade 3 is impaired sharp dull recognition, but retained protective sensibility. In this grade light touch recognition is severely impaired, and **sharp dull discrimination is absent**, but **the sharp side of the pin is recognized as touching** the examinee, and protective sensation is still present, as recognized by the absence of blisters, burns, abrasions, scars, etc from unrecognized trauma or repetitive activity.
- Severity grade 4 sensation is absent sensation and no protective sensibility. There should be **no recognition** of light touch and **no recognition of touch with the sharp side of the pin**, and there will usually be signs of skin injury (blisters, scars, burns, abrasions, etc.).
- ERRATA

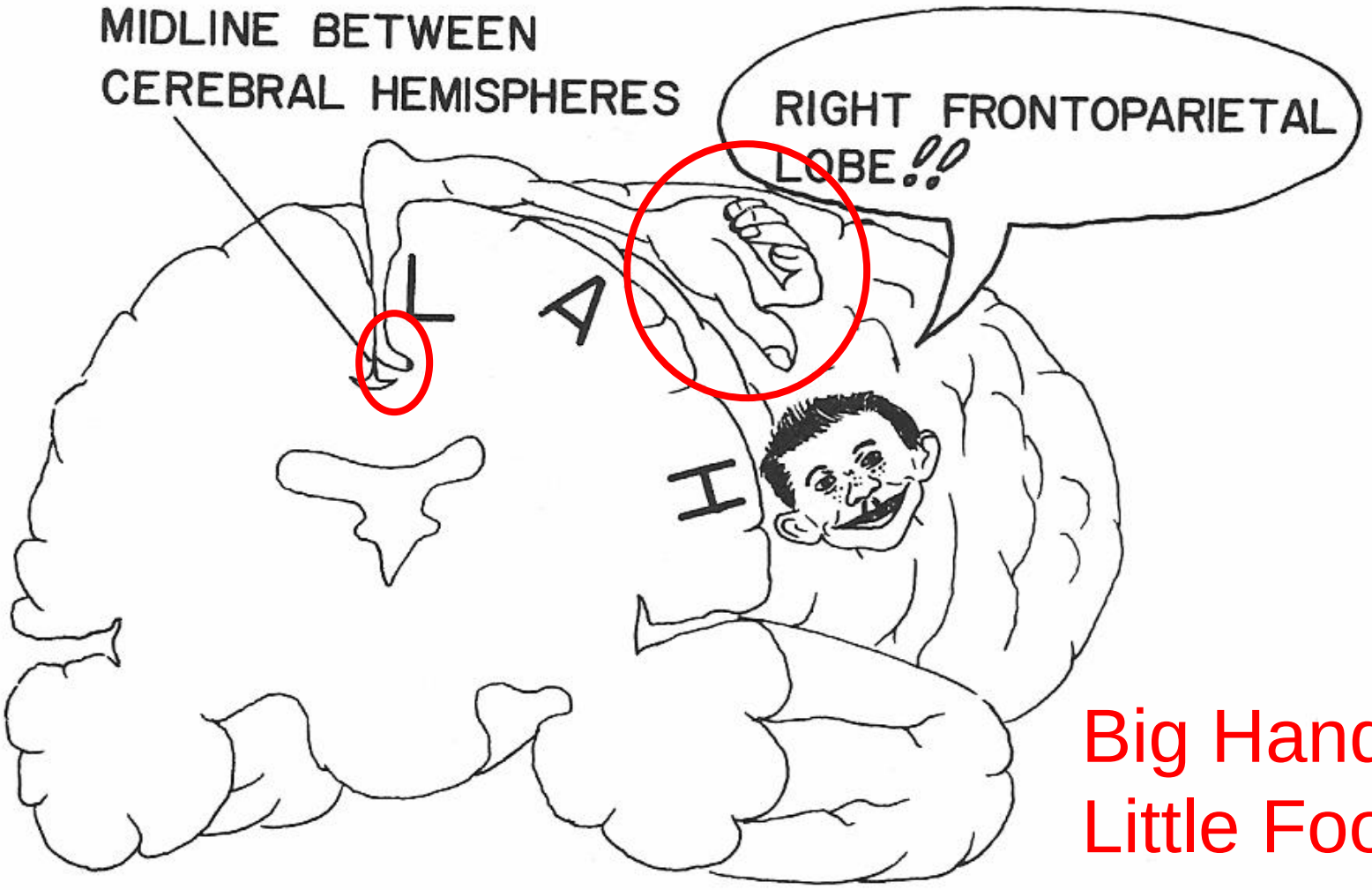
Page 532: Sensory Exam

- "**If** nerve conduction testing has been done, there should be **at least major sensory conduction block** if the physical exam is consistent with sensory severity grade 3, and
- there should be **axon loss or no recordable sensory nerve action potential (SNAP)** if the physical exam is consistent with sensory grade 4 severity."

W Lynch, et al

- Most common definition of normal monofilament testing on the foot is in the diabetic neuropathy literature and accepts 4.17 gm as normal and 5.07 gm as abnormal.
- J AM Podiatr Med Assoc: 1999; 89 (8): 383-391
  - "A Model to Assess Age-Related Changes in Two-Point Discrimination of Plantar Skin."
  - 2 point decreases linearly with age.
  - **Normal** on the toes and plantar foot varies from 10-30 mm

THE Homunculus



Big Hand
Little Foot

Peripheral Nerve Impairment

- Motor strength evaluation:
  - "Muscle strength testing is voluntary in that it requires full individual concentration and cooperation."- p 533
  - "Muscle atrophy, although not rated separately, can be a more objective sign of motor dysfunction." - p 533

Peripheral Nerve Impairment

- Motor strength evaluation:
  - "To be valid, the results should be concordant with other observable pathologic signs and medical evidence." - p 533
  - "If the measurements are made by 1 examiner, they should be consistent on different occasions.
  - If made by 2, they should be consistent between examiners." p 533

Peripheral Nerve Impairment

- "If findings **vary** by more than 1 grade between observers **or** by the same observer on separate occasions, the measurements should be considered **invalid**." - p 533

Peripheral Nerve Impairment (LEI)

Note: Classification of degree of deficit must be based on results of specific evaluation as explained in Section 16.4b and the use of Table 16.11 Sensory and Motor Severity. The examiner must document specific results of sensory testing (sensibility and two point discrimination) and motor assessment.

DIAGNOSTIC CRITERIA (KEY FACTOR)	CLASS 0	CLASS 1	CLASS 2	CLASS 3	CLASS 4
CLASS DEFINITIONS	No problem	Mild problem	Moderate problem	Severe problem	Very severe problem
IMPAIRMENT RANGES	0% LE	1%–13% LE	14%–25% LE	26%–49% LE	50%–100% LE
SEVERITY GRADE		A B C D E	A B C D E	A B C D E	A B C D E
SENSORY NERVES					
Lateral Femoral Cutaneous	0 No objective sensory deficit	1 2 3 4 5 Sensory deficit or CRPS II			
Superficial Peroneal	0 No objective sensory deficit	1 2 3 4 5 Sensory deficit or CRPS II			
Sural	0 No objective sensory deficit	1 2 3 4 5 Sensory deficit or CRPS II			
Saphaneous	0 No objective sensory deficit	1 2 3 4 5 Sensory deficit or CRPS II			
MOTOR NERVES					
Obturator	0 No objective motor deficits	0 1 1 2 2 Mild motor deficit 2 3 3 3 4 Moderate motor deficit 4 4 5 5 5 Severe motor deficit 6 6 7 7 7 Very severe motor deficit			
Superior Gluteal	0 No objective motor deficits	2 5 8 11 13 Mild motor deficit	14 19 24 25 25 Moderate motor deficit	31 36 40 45 49 Severe motor deficit	50 53 56 59 62 Very severe motor deficit

(continued)

Motor OR SENSORY

P 534-536

ERRATA

Page 534, Partial Table 16-12, Peripheral Nerve Impairment – Lower Extremity Impairments, Row 1

Note: Classification of degree of deficit must be based on results of specific evaluation as explained in Section 16.4b and the use of Table 16.11 Sensory and Motor Severity. The examiner must document specific results of sensory testing (sensibility ~~and two point discrimination~~) and motor assessment.

Page 534, Partial Table 16-12, Peripheral Nerve Impairment – Lower Extremity Impairments: Row 12, Column 3

Obturator	0 No objective motor deficits	0 1 1 2 2 Mild motor or sensory deficit 2 3 3 3 4 Moderate motor or moderate or greater sensory deficit 4 4 5 5 5 Severe motor deficit 6 6 7 7 7 Very severe motor deficit			

TABLE 16-12 (CONTINUED) Peripheral Nerve Impairment – Lower Extremity Impairments

DIAGNOSTIC CRITERIA (KEY FACTOR)	CLASS 0	CLASS 1	CLASS 2	CLASS 3	CLASS 4
CLASS DEFINITIONS	No problem	Mild problem	Moderate problem	Severe problem	Very severe problem
IMPAIRMENT RANGES	0% LE	1%–13% LE	14%–25% LE	26%–49% LE	50%–100% LE
SEVERITY GRADE		A B C D E	A B C D E	A B C D E	A B C D E
Inferior Gluteal	0 No objective motor deficits	1 3 5 7 9 Mild motor deficit	14 14 14 17 19 Moderate motor deficit 19 21 23 25 25 Severe motor deficit	28 50 33 35 37 Very severe motor deficit	
MIXED NERVES					
Femoral	0 No objective sensory or motor deficits	1 1 1 2 2 Sensory deficit or CRPS II (objectively verified) 1 3 5 7 9 Mild motor deficit	14 14 14 17 19 Moderate motor deficit 19 21 23 25 25 Severe motor deficit	28 50 33 35 37 Very severe motor deficit	
Sciatic	0 No objective sensory or motor deficits	2 3 4 6 9 Mild to moderate sensory deficit or CRPS II (objectively verified) 10 11 12 13 14 Severe sensory deficit or severe CRPS II (objectively verified) 5 7 9 11 13 Mild motor deficit	14 15 16 17 17 Very severe sensory deficit or very severe CRPS II (objectively verified) 20 23 25 25 25 Moderate motor deficit	38 43 47 48 49 Severe motor deficit	56 61 66 72 75 Very severe motor deficit
Common Peroneal	0 No objective sensory or motor deficits	1 2 3 4 5 Sensory deficit or mild CRPS II (objectively verified)	14 15 16 19 21 Moderate motor deficit	26 26 26 29 32 Severe motor deficit 33 35 37 39 42 Very severe motor deficit	

30, not 50

Errata: Delete "mild"

TABLE 16-12 (CONTINUED) Peripheral Nerve Impairment – Lower Extremity Impairments

DIAGNOSTIC CRITERIA (KEY FACTOR)	CLASS 0	CLASS 1	CLASS 2	CLASS 3	CLASS 4
CLASS DEFINITIONS	No problem	Mild problem	Moderate problem	Severe problem	Very severe problem
IMPAIRMENT RANGES	0% LE	1%–13% LE	14%–25% LE	26%–49% LE	50%–100% LE
SEVERITY GRADE		A B C D E	A B C D E	A B C D E	A B C D E
Tibial	0 No objective sensory or motor deficits	1 1 2 3 4 Mild sensory deficit or mild CRPS II (objectively verified) 1 2 2 3 4 Mild motor deficit (below midcalf) Moderate sensory deficit or moderate CRPS II (objectively verified); or moderate motor deficit (below midcalf) 1 3 5 7 9 Mild motor deficit (above knee) 9 9 10 11 11 Severe sensory deficit or severe CRPS II; or severe motor deficit (below midcalf)	14 14 14 14 15 Very severe sensory deficit or CRPS II; or very severe motor deficit (below midcalf) 14 14 14 16 18 Moderate motor deficit (above knee) 18 20 22 24 25 Severe motor deficit (above knee)	26 28 31 33 35 Very severe motor deficit (above knee)	
Medial Plantar or Lateral Plantar	0 No objective sensory or motor deficits	1 1 1 1 1 Mild sensory deficit, mild motor deficit or mild CRPS II (objectively verified) 2 2 2 3 3 Moderate sensory deficit, moderate motor deficit or moderate CRPS II (objectively verified) 3 3 3 4 4 Severe sensory deficit, severe motor deficit or severe CRPS II (objectively verified) 4 4 4 5 5 Very severe sensory deficit, very severe motor deficit or very severe CRPS II (objectively verified)			

Amputation

- Section 16.6, page 542
- Up to 40% WPI to include entire LE
- Table16-16, p. 542.
- Adjust for FH, PE, & CS → unless proximal problems are ratable.

- Amputation impairment % may be **combined** with
  - proximal DBI %, or
  - proximal ROM %,
  - creating an increased grade assignment,
  - *BUT EXPLAIN the RATIONALE FOR COMBINING! P.542.*

Amputation: Clarification

- "Amputation impairment is based on the level of the amputation with adjustments for proximal problems reflected by functional history, physical examination and clinical studies." -p 542
- "The amputation impairment may be combined with proximal diagnosed-based impairments **or** proximal range of motion impairments; the examiner must explain the rationale for combining." –p542
- **Proximal problems are rated by only 1 of these 2 methods.**

Amputation: Clarification

Page 542, Right Column

Amputation impairment is based on the level of the amputation with adjustments for proximal problems reflected by functional history, physical examination, and clinical studies, unless the proximal problems qualify for separate impairments (diagnosis, range of motion, or nerve injury). Table

TABLE 16-16 Amputation Impairment

DIAGNOSTIC CRITERIA (KEY FACTOR)	CLASS 0	CLASS 1	CLASS 2	CLASS 3	CLASS 4
IMPAIRMENT RANGES	0% LE	1%–13% LE	14%–25% LE	26%–49% LE	50%–100% LE
SEVERITY GRADE		A B C D E	A B C D E	A B C D E	A B C D E
GRADE		2 2 2 3 4 Lesser toes at MTP joint 5 5 5 6 7 Greater toe at interphalangeal joint Metatarsal (other than First) 12 12 12 13 13 Great toe at MTP joint	20 20 20 22 24 First metatarsal 22 22 22 24 25 All toes at metatarsophalangeal (MTP) joint	45 45 45 47 49 Midfoot 40 40 40 42 44 Transmetatarsal 20 20 20 22 24 First metatarsal	62 62 62 68 70 Syme (hindfoot) 70 70 70 72 74 Below knee, ≥ 3" 80 80 80 82 84 Below knee, < 3" Knee disarticulation Above knee - distal 90 90 90 92 94 Above knee – Midthigh 100 100 100 100 100 Above knee – Proximal Hip disarticulation

Grade C is consistent with PPI% in prior editions
Grade C is the minimum value.

Range of Motion, Section 16.7

- "Diagnosis-Based Impairment is the method of choice for calculating impairment.
- **Range of motion is used principally as a factor in the Adjustment Grid…**
- **Some** of the diagnosis based … grids refer to the range of motion section when that is the most appropriate mechanism for grading the impairment." – p 543

Range of Motion, Section 16.7

- "This section is to be used as a STAND ALONE rating when other grids refer you to this section **OR** no other diagnosis based sections of this chapter are applicable for impairment rating of a condition." – p 543
- Examples … include burns or other severe scarring causing permanent passive and active ROM losses, complex … or multiple tendon injuries, severe crush injuries, residual compartment syndromes, **or** other conditions not addressed in the regional grids, but having significant functional loss." – p 543

Range of Motion, Section 16.7

- "There are **additional exceptions** when using ROM as the primary impairment is accepted." – p 543

  1. For **amputation** rating, **deficits of ROM for the remaining portion of the limb…"**

Range of Motion, Section 16.7

- "There are additional exceptions when using ROM as the primary impairment is accepted." – p 543
  - 2. In very **rare** cases, **severe injuries** may result in **passive ROM losses** qualifying for **class 3 or 4** impairment. **If** the active ROM impairment percentage is greater than the percentage impairment derived from the diagnosis-based class, then the impairment is rated by ROM as a STAND ALONE rating. This ROM …impairment may only be used if the active ROM is within 10° of the passive ROM measured. The ACTIVE ROM is what determines the final impairment rating." - 543

Physical Exam:Range of Motion

- Instructions EARLIER in the chapter:
- "**If** the **opposite** extremity is **uninvolved**, it should be used to define normal for that individual." – p 496
- "Range of motion will, in some cases, serve as an alternative approach to rating impairment. It is **not** combined with the diagnosis-based impairment, and **STANDS ALONE** as an impairment rating." – p 500

Physical Exam: Range of Motion

- "If it is clear to the evaluator that a restricted range of motion has an organic basis, 3 measurements should be obtained and the **GREATEST** range measured should be **used** …" – p 517
- "Range of motion restrictions in multiple directions **DO INCREASE the impairment**." [i.e. Add the impairments within a single joint.]

Range of Motion: Instructions

- “Both extremities should be compared. If the contralateral joint is **uninjured** it may serve as defining normal for the individual.” – page 544
  - Very similar to wording on page 496

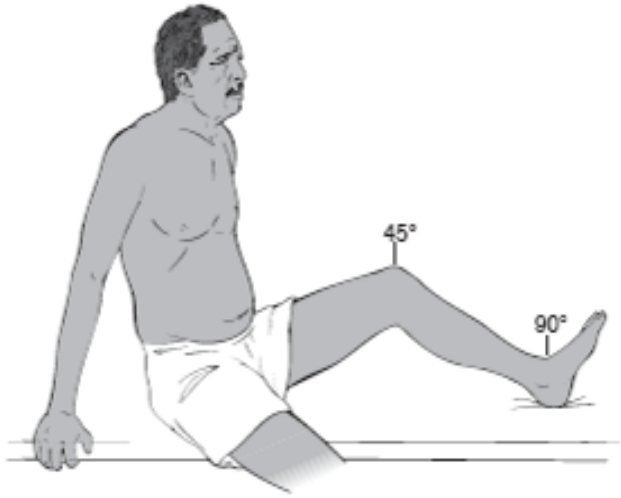
FIGURE 16-5

Evaluating the Range of Motion of a Toe: The Metatarsophalangeal (MTP) Joint of the Great Toe

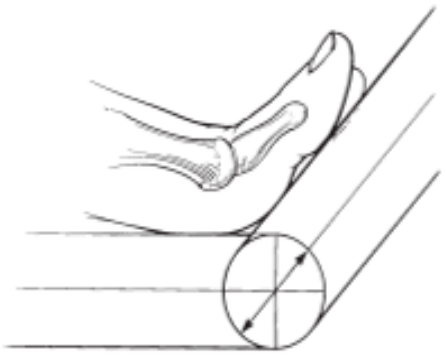
(a) The examinee is seated in the position for evaluation of the toes. The knee is flexed to 45°, and the foot and MTP joint are in the neutral position.

(b) Extension: The goniometer is under the MTP joint, and its angle is read as a baseline. The examinee extends (dorsiflexes) the toe maximally, and the angle subtending the maximum arc of motion is read; the baseline angle is subtracted.

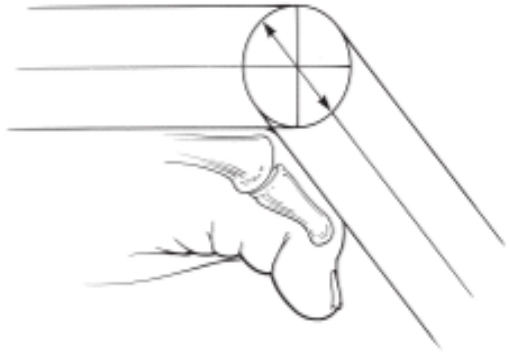
(c) Flexion: the goniometer is placed over the MTP joint. The baseline angle is read. The examinee plantar flexes the MTP joint maximally. The angle subtending the maximum arc of motion is read, and the baseline angle is subtracted.



a.



b.



c.

P 545

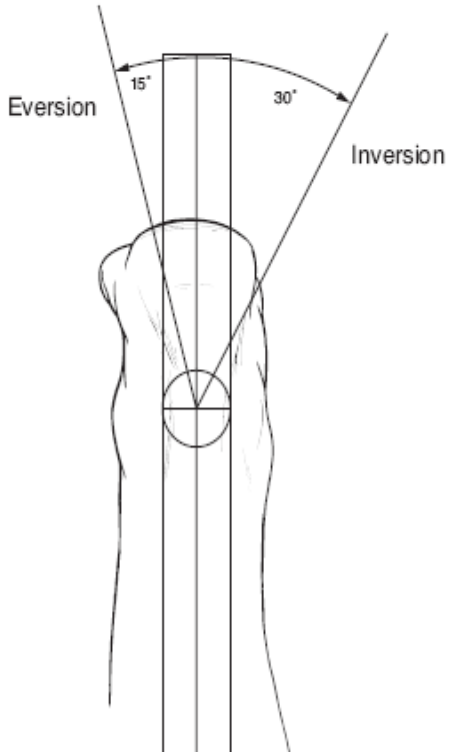
Error? P 546

Selec

FIGURE 16-6

Measuring Inversion and Eversion

The patient should be seated on the examination table in front of the examiner who is seated at foot level. The heel (calcaneous) is placed inline with the long axis of the leg (tibia). With the ankle joint in neutral the calcaneous is held with 1 hand and the forefoot with the other hand. The sub-talar joint is moved to inversion and then the heel is brought into eversion with the angle measured between the tibia and calcaneous. Note: there is usually twice as much inversion as eversion.



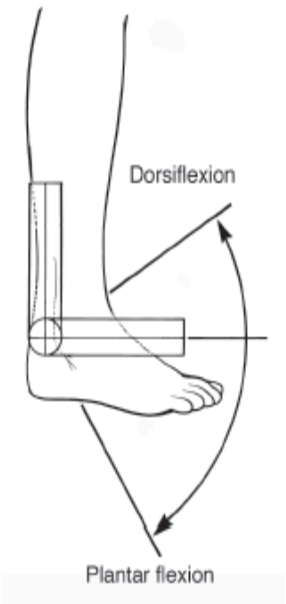
- Text says <u>patient should be seated on the examination table in front of the examiner</u>, YET this figure shows what you would see with the <u>patient prone and the knee flexed 90°</u>.

& Zoom

FIGURE 16-7

Measuring Ankle Dorsiflexion (Extension) and Plantar Flexion

Ankle motion should be measured with the knee in flexion at 90° to eliminate any effect of gastrocnemius or soleus contratures. The goniometer's pivot is centered over the ankle and 1 arm parallels the tibit. The examiner reads the angles subtending the maximum arcs of motion for dorsiflexion and plantar flexion. The averages of the maximum angles represent dorsiflexion (extension) and plantar flexion ranges of motion.



Error ? p 546

- Text describes only 1 knee position for measurement, (90°) then says to <u>average</u> the readings.
- 5th Edition, Fig 17-5 & 4th Edition Figure 56 (p 3/91) implied 2 measurements
  - Knee @ 0°, and 45°

Page 517: Greatest of 3 measurements is used

3rd Edition, pages 55-56 and Figures 62-63 measurements were to be made with the Knee @ 0°, and 45°

Knee ROM p 546

- Note:
  - Flexion is actually gravity assisted flexion.
  - Extension is actually Passive extension.

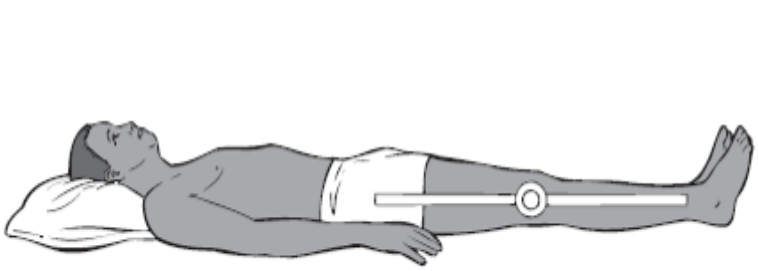
Note: Table 16-23 rates "Flexion Contracture", and text on page 544 clearly differentiates between these 2 concepts

FIGURE 16-8

Measuring Knee Flexion

(a) The examinee 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) The examinee exerts maximum effort to flex the knee. The flexion angle is obtained from the goniometer.



a.

b.

Flexion Contracture Versus Extension Lag (p 544)

- "Knee extension lag and flexion contracture are different concepts, the former is dynamic and the later is static.
  - A patient lying supine, with his heel on the bed, fully relaxed, who cannot fully [passively] extend his knee, even with external force applied, has a flexion contracture of the knee. A seated patient who cannot fully [actively] extend her knee the last few degrees has an extension lag."

FIGURE 16-9

Using a Goniometer to Measure Flexion of the Right Hip*

(a) Goniometer is placed at the right hip, and the pelvis is blocked in the neutral position by flexing the left hip until the lumbar spine is flat.

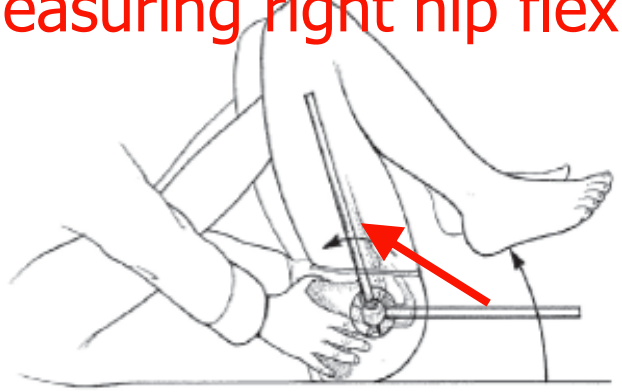
(b) Examinee flexes the right hip until the anterior superior iliac spine begins to move, when the angle is recorded.

(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.

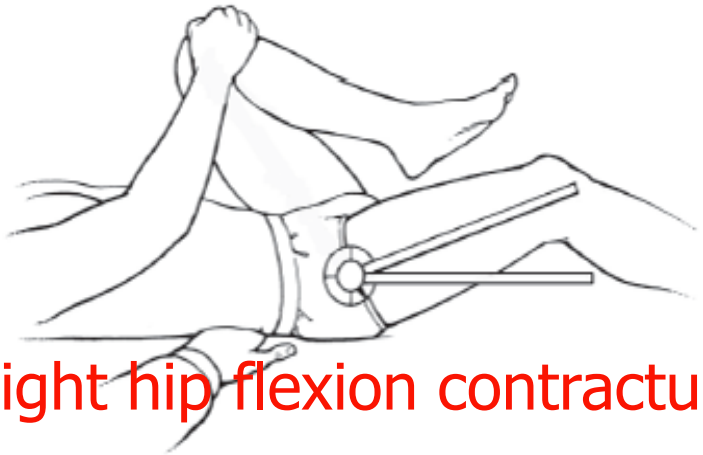
Pre-positioning

a.

Measuring right hip flexion



b.



Measuring right hip flexion contracture

c.

*Accurate measurements of the lower extremity can also be obtained using a proper inclinometer (see Appendix).

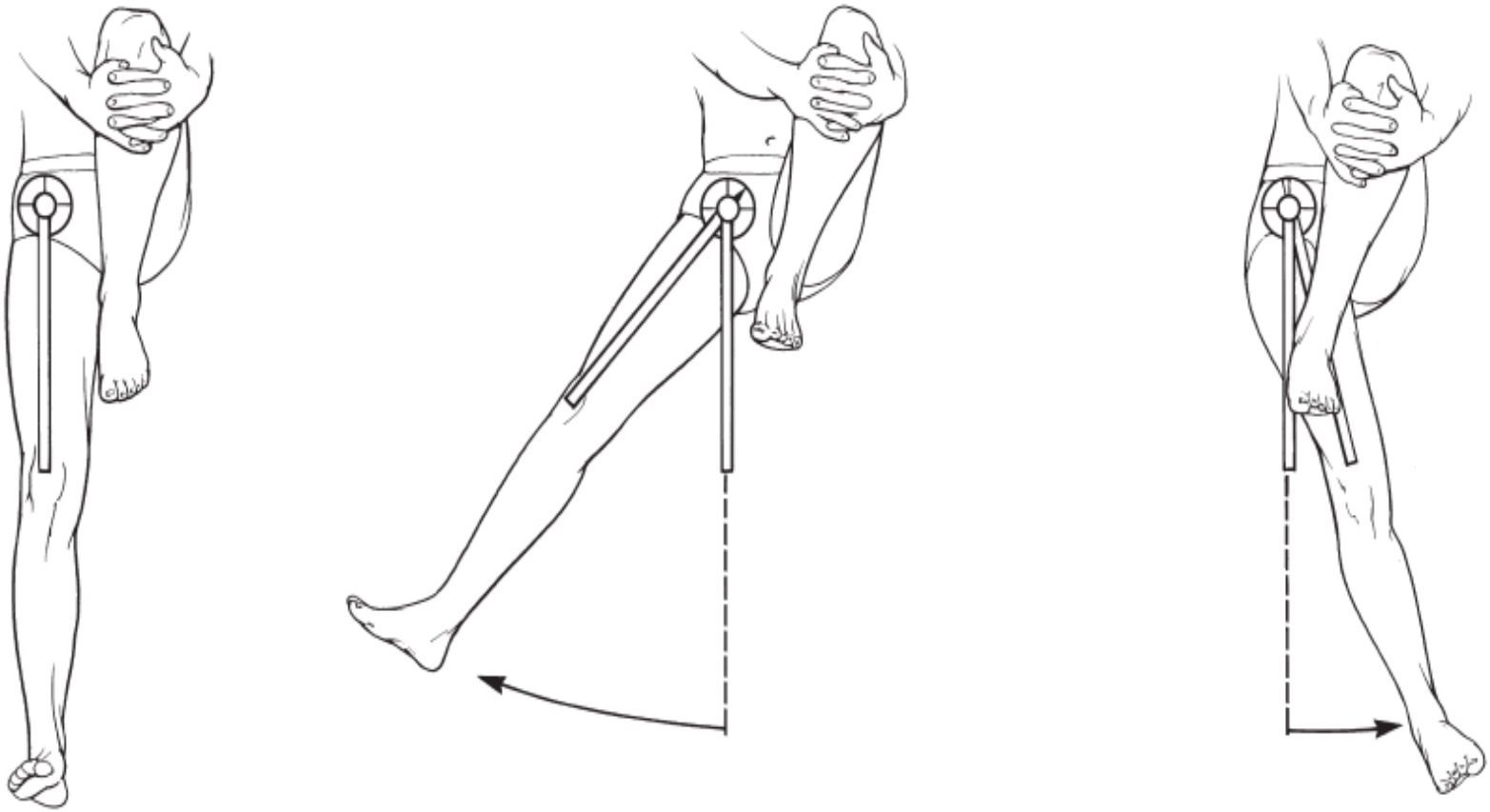
P 547

Figure was mislabeled in prior editions.

FIGURE 16-10

Neutral Position (a), Abduction (b), and Adduction (c) of Right Hip

The examinee is supine on a flat surface. To improve consistency, flex the knee to stabilize the pelvis.



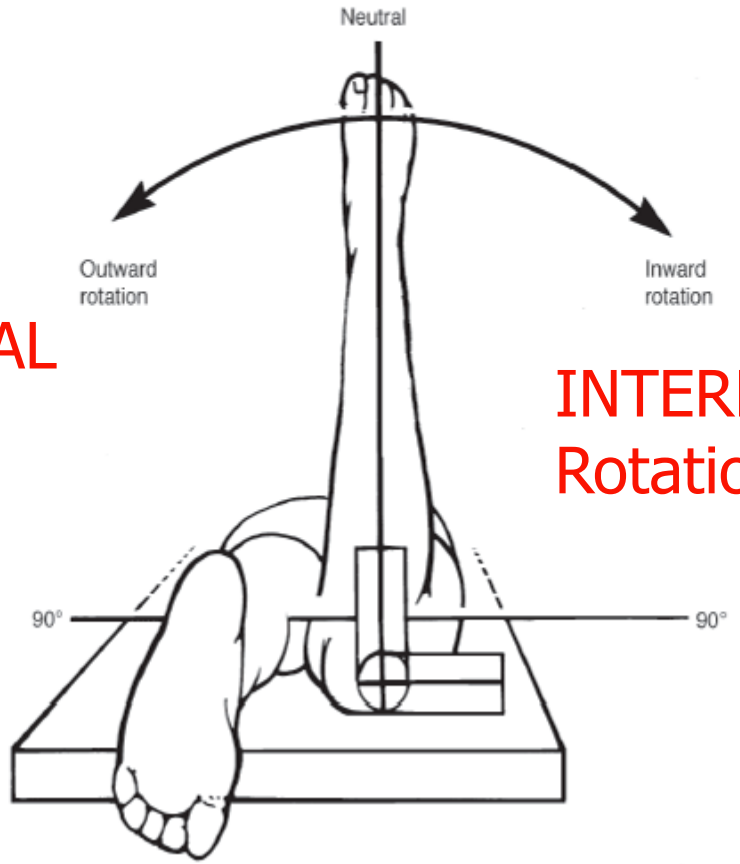
a. b. c.

Hip Rotation p 548

FIGURE 16-11

Measuring Internal and External Hip Rotation

The examinee is prone on a flat surface, and the knee is flexed 90°. One part of the goniometer is parallel to the flat surface, and the other is along the tibia. While testing, the examiner should place the hand on the knee to determine whether there is significant laxity of the knee joint. Keep the pelvis flat on the table.



EXTERNAL Rotation

INTERNAL Rotation

FIGURE 16-12

Lower Extremity Range of Motion Record

Name _____ Date _____

File No. _____ Dominant Side Right Left Ambidextrous

Injured Side __Right __Left __Bilateral

			Right __Injured __Uninjured		Left __Injured __Uninjured		Impaired __Right __Left	
	Motion	Normal	Motion	Impairment	Motion	Impairment	Impairment	
Toe, Lesser								
Second	MP Extension	>10°		% LEI		% LEI		% LEI
Third	MP Extension	>10°		% LEI		% LEI		% LEI
Fourth	MP Extension	>10°		% LEI		% LEI		% LEI
Fifth	MP Extension	>10°		% LEI		% LEI		% LEI
	Add (Maximum 6% LEI)			% LEI		% LEI		% LEI
Toe, Greater	Motion	Normal	Motion	Impairment	Motion	Impairment	Impairment	
	IP Flexion	>20°		% LEI		% LEI		% LEI
	MP Extension	>30°		% LEI		% LEI		% LEI
	Add			% LEI		% LEI		% LEI
Ankle or Hindfoot Deformity	Deformity	absent		% LEI		% LEI		% LEI
Hindfoot	Motion	Normal	Motion	Impairment	Motion	Impairment	Impairment	
	Inversion	>20°		% LEI		% LEI		% LEI
	Eversion	>10°		% LEI		% LEI		% LEI
	Add			% LEI		% LEI		% LEI
Ankle	Motion	Normal	Motion	Impairment	Motion	Impairment	Impairment	
	Plantar Flexion	>20°		% UE		% UE		% UE
	Flexion Contracture	absent		% LEI		% LEI		% LEI
	Extension	>10°		% UE		% UE		% LEI
	Add			% UE		% UE		% LEI
Knee	Motion	Normal	Motion	Impairment	Motion	Impairment	Impairment	
	Flexion	>110°		% LEI		% LEI		% LEI
	Flexion Contracture	<5°		% LEI		% LEI		% LEI
	Add			% LEI		% LEI		% LEI
Hip	Motion	Normal	Motion	Impairment	Motion	Impairment	Impairment	
	Flexion	>100°		% LEI		% LEI		% LEI
	Extension	<10° Flex Contracture		% LEI		% LEI		% LEI
	Internal rotation	>20°		% LEI		% LEI		% LEI
	External rotation	>30°		% LEI		% LEI		% LEI
	Abduction	>25°		% LEI		% LEI		% LEI
	Adduction	>15°		% LEI		% LEI		% LEI
	Abduction Contracture	absent		% LEI		% LEI		% LEI
	Add			% LEI		% LEI		% LEI
Combined	Combine LE Joints			% LEI		% UE		% LEI
	Convert to Whole Person			% WP		% WP		% WP

P 551

Form suggests

contralateral limb with mild age related loss of motion would have its "impairment" subtracted from that of the injured or involved limb.

TABLE 16-18

Lesser Toe Impairments

Note: The maximum LEI of 2 or more lesser toes is 6% LEI.

Severity	Mild	Moderate	Severe
Impairment	2% LEI		
Motion			
Metatarsophalangeal, extension	0°–10°		

TABLE 16-19

Greater Toe Impairments

Severity	Mild	Moderate	Severe
Impairment	2% LEI	5% LEI	
Motion			
Metatarsophalangeal, extension	15°–30°	0°–9°	
Interphalangeal, flexion	< 20°		

TABLE 16-20

Hindfoot Motion Impairments

Severity	Mild	Moderate	Severe
Impairment	2% LEI	5% LEI	
Motion			
Inversion	10°–20°	0°–9°	
Eversion	0°–10°		

TABLE 16-21

Ankle or Hindfoot Deformity Impairments

Severity	Mild	Moderate	Severe
Impairment	12% LEI	25% LEI	50% LEI
Motion			
Varus	10°–14°	15°–24°	> 24°
Valgus	10°–20°		

TABLE 16-22

Ankle Motion Impairments

Severity	Mild	Moderate	Severe
Impairment	7% LEI	15% LEI	30% LEI
Motion			
Plantar flexion capability	11°–20°	1°–10°	None
Flexion Contracture (Equinus deformity)		10°–19°	> 19°
Extension (Dorsiflexion)	10°–0° (neutral)		

TABLE 16-23

Knee Motion Impairments

Note: If multiple deficits of motion the values are added. Varus / valgus Deformity measured by femoral-tibial angle; 3° to 10° valgus is considered normal.

Severity	Mild	Moderate	Severe
Impairment	10% LEI	20% LEI	35% LEI
Motion			
Flexion	80°–109°	60°–79°	< 60°
Flexion Contracture	5°–9°	10°–19°	> 19°

TABLE 16-24

Hip Motion Impairments – Lower Extremity Impairment

Severity	Mild	Moderate	Severe
Impairment	5% LEI	10% LEI	20% LEI
Motion			
Flexion	80°–100°	50°–79°	< 50°
Extension	10°–19° flexion contracture	20–19° flexion contracture	≥ 30° flexion contracture
Internal rotation	10°–20°	0°–9°	
External rotation	20°–30°	0°–19°	
Abduction	15°–25°	5°–14°	< 5°
Abduction	0°–15°		
Abduction Contracture	0°–5°	6°–10°	11°–20°

ADDuction

P 544

"The ranges listed in Tables 16-18 to 16-24 define the severity of impairment (mild, moderate, severe) …"

USE the word, like "mild" to go to the diagnosis grid **or** the physical exam Grade Modifier table

Not in Errata

"**Add** all impairment values at a joint." –p 548

Footnote should apply to all ROM tables.

TABLE 16-23

Knee Motion Impairments

Note: If multiple deficits of motion the values are added.

~~Varus/valgus Deformity measured by femoral tibial angle; 3° to 10° valgus is considered normal.~~

Severity	Mild	Moderate	Severe
Impairment	10% LEI	20% LEI	35% LEI
Motion			
Flexion	80°–109°	60°–79°	< 60°
Flexion Contracture	5°–9°	10°–19°	> 19°

Ignore the Comment on Knee deformity

5th Edition knee ROM table had Rows for knee deformity

ERRATA

TABLE 16-24

Hip Motion Impairments – Lower Extremity Impairment

Severity	Mild	Moderate	Severe
Impairment	5% LEI	10% LEI	20% LEI
Motion			
Flexion	80°–100°	50°–79°	< 50°
Extension	10°–19° flexion contracture	20–19° flexion contracture	≥ 30° flexion contracture
Internal rotation	10°–20°	0°–9°	
External rotation	20°–30°	0°–19°	
Abduction	15°–25°	5°–14°	< 5°
~~Abduction~~	0°–15°	ADDuction	
Abduction Contracture	0°–5°	6°–10°	11°–20°

ROM Rating METHODOLOGY p 548

1. Measure ROM
2. From Tables 16-18 to 16-24 get impairment %s
   - If opposite limb's joint is uninjured, adjust.
3. Add all impairments within a joint.
   - Combine impairments of separate joints.
4. Using Table 16-25 classify the severity
   - Derive a class.
5. **If** FH Grade Modifier exceeds the impairment class consider adjusting using Table 16-17 (p 545) for add on impairment.

Page 550

- This is ALL you need to translate a ROM impairment % (number) to a WORD (Class)

TABLE 16-25 Range of Motion ICF Classification

DIAGNOSTIC CRITERIA (KEY FACTOR)	CLASS 0	CLASS 1	CLASS 2	CLASS 3	CLASS 4
LOWER EXTREMITY SEVERITY	Normal	Mild	Moderate	Severe	Very Severe or Complete
IMPAIRMENT RANGES	0% LE	1%–13% LE	14%–25% LE	26%–49% LE	50%–100% LE

Range of Motion, Section 16.7

"The final impairment may be ADJUSTED for Functional History, in certain circumstances."- p 543

"Adjustments for Functional History MAY be made if:

1.
2.
3.
4.

The adjustment is a percentage **ADD-ON** to the total range of motion impairment…"

Range of Motion, Section 16.7

Adjustments for Functional History MAY be made **if**:

1. ROM is the only approach used in the extremity.
2. ROM measurements are reliable.
3. ROM impairment does Not adequately reflect the functional loss.
4. Functional reports are reliable.

The adjustment is a percentage ADD-ON to the total range of motion impairment…"

Page 544

How to Adjust Rating by ROM for Functional History p 544-545

- Take Functional History class and **subtract** the ROM grade.
- Use the resulting number in Table 16-17, p 545 to get the ADD-ON Percentage.
- Example: FH= Class 3
  ROM grade = Class 1

  Difference is 2

  Use Column for “Net Modifier 2” in Table 16-12, p 545

How to Adjust Rating by ROM for Functional History p 544-545

- Example: FH= Class 3
  ROM grade = Class 1
  Difference is 2
  Use Column for 2 in Table 16-12

TABLE 16-17

Functional History Net Modifier

Net Modifier	0	1	2	3
Functional History Grade Adjustment compared to Range of Motion ICF Class	Equal	1 Higher	2 Higher	3 Higher
Increase to Total Range of Motion Impairment	No change	Total Range of Motion Impairment × 5%	Total Range of Motion Impairment × 10%	Total Range of Motion Impairment × 15%

Adjustment Example

- Example on pages 544 and 548
  - ROM impairment is 10% LEI
  - FH = 3
  - Class =1
  - Difference is 2
  - From Table 16-17 the MULTIPLIER is 10%
  - 10% (Multiplier) of the 10% LEI is 1% LEI
- **10% LEI** + 1% LEI = **11% LEI** (Final answer)

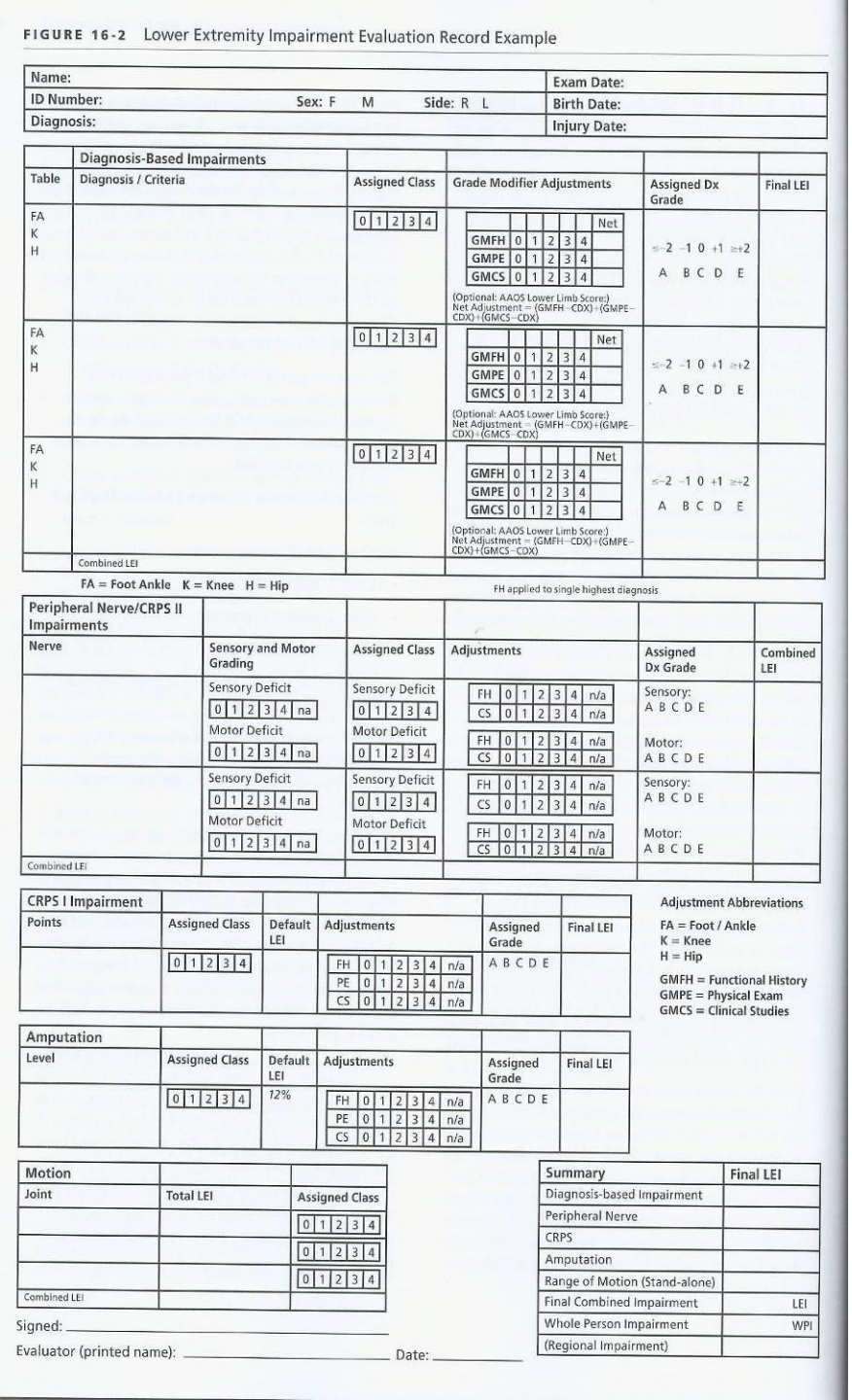


FIGURE 16-2 Lower Extremity Impairment Evaluation Record Example

Name:		Exam Date:
ID Number:	Sex: F M Side: R L	Birth Date:
Diagnosis:		Injury Date:

	Diagnosis-Based Impairments				
Table	Diagnosis / Criteria	Assigned Class	Grade Modifier Adjustments	Assigned Dx Grade	Final LEI
FA K H		0 1 2 3 4	Net: GMFH 0 1 2 3 4; GMPE 0 1 2 3 4; GMCS 0 1 2 3 4. (Optional: AAOS Lower Limb Score:) Net Adjustment = (GMFH−CDX)+(GMPE−CDX)+(GMCS−CDX)	≤−2 −1 0 +1 ≥+2 A B C D E	
FA K H		0 1 2 3 4	Net: GMFH 0 1 2 3 4; GMPE 0 1 2 3 4; GMCS 0 1 2 3 4. (Optional: AAOS Lower Limb Score:) Net Adjustment = (GMFH−CDX)+(GMPE−CDX)+(GMCS−CDX)	≤−2 −1 0 +1 ≥+2 A B C D E	
FA K H		0 1 2 3 4	Net: GMFH 0 1 2 3 4; GMPE 0 1 2 3 4; GMCS 0 1 2 3 4. (Optional: AAOS Lower Limb Score:) Net Adjustment = (GMFH−CDX)+(GMPE−CDX)+(GMCS−CDX)	≤−2 −1 0 +1 ≥+2 A B C D E	
	Combined LEI				

FA = Foot Ankle K = Knee H = Hip

FH applied to single highest diagnosis

Peripheral Nerve/CRPS II Impairments					
Nerve	Sensory and Motor Grading	Assigned Class	Adjustments	Assigned Dx Grade	Combined LEI
	Sensory Deficit 0 1 2 3 4 na; Motor Deficit 0 1 2 3 4 na	Sensory Deficit 0 1 2 3 4; Motor Deficit 0 1 2 3 4	FH 0 1 2 3 4 n/a; CS 0 1 2 3 4 n/a; FH 0 1 2 3 4 n/a; CS 0 1 2 3 4 n/a	Sensory: A B C D E; Motor: A B C D E	
	Sensory Deficit 0 1 2 3 4 na; Motor Deficit 0 1 2 3 4 na	Sensory Deficit 0 1 2 3 4; Motor Deficit 0 1 2 3 4	FH 0 1 2 3 4 n/a; CS 0 1 2 3 4 n/a; FH 0 1 2 3 4 n/a; CS 0 1 2 3 4 n/a	Sensory: A B C D E; Motor: A B C D E	
Combined LEI					

CRPS I Impairment					
Points	Assigned Class	Default LEI	Adjustments	Assigned Grade	Final LEI
	0 1 2 3 4		FH 0 1 2 3 4 n/a; PE 0 1 2 3 4 n/a; CS 0 1 2 3 4 n/a	A B C D E	

Adjustment Abbreviations

FA = Foot / Ankle
K = Knee
H = Hip

GMFH = Functional History
GMPE = Physical Exam
GMCS = Clinical Studies

Amputation					
Level	Assigned Class	Default LEI	Adjustments	Assigned Grade	Final LEI
	0 1 2 3 4	12%	FH 0 1 2 3 4 n/a; PE 0 1 2 3 4 n/a; CS 0 1 2 3 4 n/a	A B C D E	

Motion		
Joint	Total LEI	Assigned Class
		0 1 2 3 4
		0 1 2 3 4
		0 1 2 3 4
Combined LEI		

Summary	Final LEI
Diagnosis-based Impairment	
Peripheral Nerve	
CRPS	
Amputation	
Range of Motion (Stand-alone)	
Final Combined Impairment	LEI
Whole Person Impairment	WPI
(Regional Impairment)	

Signed: _____

Evaluator (printed name): _____ Date: _____

Form

- Page 498
- To clarify how the rating was derived.

FIGURE 16-13

Lower Extremity Impairment Evaluation Record Example

Name: *Jane Doe*	**Exam Date:** *8/8/07*
ID Number: **Sex:** (F) M **Side:** R (L)	**Birth Date:** *11/9/73*
Diagnosis: *Ankle Fracture, ACL Tear, Amputation Great Toe*	**Injury Date:** *7/1/05*

Diagnosis-Based Impairments

Table	Diagnosis / Criteria	Assigned Class	Grade Modifier Adjustments	Assigned Dx Grade	Final LEI
(FA) K H	*Ankle (Fibula) Fracture, healed*	0 (1) 2 3 4	GMFH 0 1 2 3 4 Net GMPE 0 (1) 2 3 4 0 GMCS 0 (1) 2 3 4 0 (Optional: AAOS Lower Limb Score:)	A B (C) D E	5%
FA (K) H	*Anterior cruciate ligament tear, with mild laxity*	0 (1) 2 3 4	GMFH 0 (1) 2 3 4 Net GMPE 0 (1) 2 3 4 0 GMCS 0 (1) 2 3 4 0 (Optional: AAOS Lower Limb Score:)	A B (C) D E	7%
FA K H		0 1 2 3 4	GMFH 0 1 2 3 4 Net GMPE 0 1 2 3 4 GMCS 0 1 2 3 4 (Optional: AAOS Lower Limb Score:)	A B C D E	
	Combined LEI				12%

FA = Foot Ankle K = Knee H = Hip

FH applied to single highest diagnosis

Peripheral Nerve/CRPS II Impairments

Nerve	Sensory and Motor Grading	Assigned Class	Adjustments	Assigned Dx Grade	Combined LEI
	Sensory Deficit 0 1 2 3 4 na Motor Deficit 0 1 2 3 4 na	Sensory Deficit 0 1 2 3 4 Motor Deficit 0 1 2 3 4	FH 0 1 2 3 4 n/a; CS 0 1 2 3 4 n/a FH 0 1 2 3 4 n/a; CS 0 1 2 3 4 n/a	Sensory: A B C D E Motor: A B C D E	
	Sensory Deficit 0 1 2 3 4 na Motor Deficit 0 1 2 3 4 na	Sensory Deficit 0 1 2 3 4 Motor Deficit 0 1 2 3 4	FH 0 1 2 3 4 n/a; CS 0 1 2 3 4 n/a FH 0 1 2 3 4 n/a; CS 0 1 2 3 4 n/a	Sensory: A B C D E Motor: A B C D E	

CRPS I Impairment

Points	Assigned Class	Default LEI	Adjustments	Assigned Grade	Final LEI
	0 1 2 3 4		FH 0 1 2 3 4 n/a; PE 0 1 2 3 4 n/a; CS 0 1 2 3 4 n/a	A B C D E	

Amputation

Level	Assigned Class	Default LEI	Adjustments	Assigned Grade	Final LEI
Amputation great toe at MTP	0 (1) 2 3 4	12%	FH 0 (1) 2 3 4 n/a; PE 0 (1) 2 3 4 n/a; CS 0 1 2 3 4 n/a	A B (C) D E	13%

Adjustment Abbreviations

FA = Foot / Ankle
K = Knee
H = Hip
GMFH = Functional History
GMPE = Physical Exam
GMCS = Clinical Studies

Amputation

Level	Assigned Class	Default LEI	Adjustments	Assigned Grade	Final LEI
Amputation great toe at MTP	0 (1) 2 3 4	12%	FH 0 (1) 2 3 4 n/a; PE 0 (1) 2 3 4 n/a; CS 0 1 2 3 4 n/a	A B (C) D E	13%

Motion

Joint	Total LEI	Assigned Class
		0 1 2 3 4
		0 1 2 3 4
		0 1 2 3 4
Combined LEI		

Summary

	Final LEI
Diagnosis-based Impairment	12%
Peripheral Nerve	
CRPS	
Amputation	13%
Range of Motion (Stand-alone)	
Final Combined Impairment	24 % LEI
Whole Person Impairment	10 % WPI
(Regional Impairment)	

Figure 16-13
Page 554
Form filled in
to show an example
On pages 552-553

Thanks for Your Attention

Your friendship is a very special gift,
I won't be able to thank you enough for it…