Guides to the Evaluation of Permanent Impairment

Fifth Edition

The Lower Extremities

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The lower extremities

- Everything you need to know is in the book
- Section references listed on slide in lower left corner

Section reference

Definitions

- Impairment: A loss, loss of use, or derangement of any body part, organ system, or organ function

- Disability: An alteration of an individual's capacity to meet personal, social, or occupational demands because of an impairment.

Definitions

- Maximal Medical Improvement (MMI): Well stabilized and unlikely to change substantially in the next year with or without medical treatment

Permanent impairment

- Individual's preinjury status
- Population average

Permanent impairment

- Anatomic loss: Damage to the organ system or body structure
  - Emphasized in musculoskeletal section
- Functional loss: Change in function for the organ system or body structure

Impairment rating

- Degree to which the impairment decreases an individual's ability to perform common activities of daily living (ADL), excluding work

- Reflect functional limitations and not disability

Impairment rating

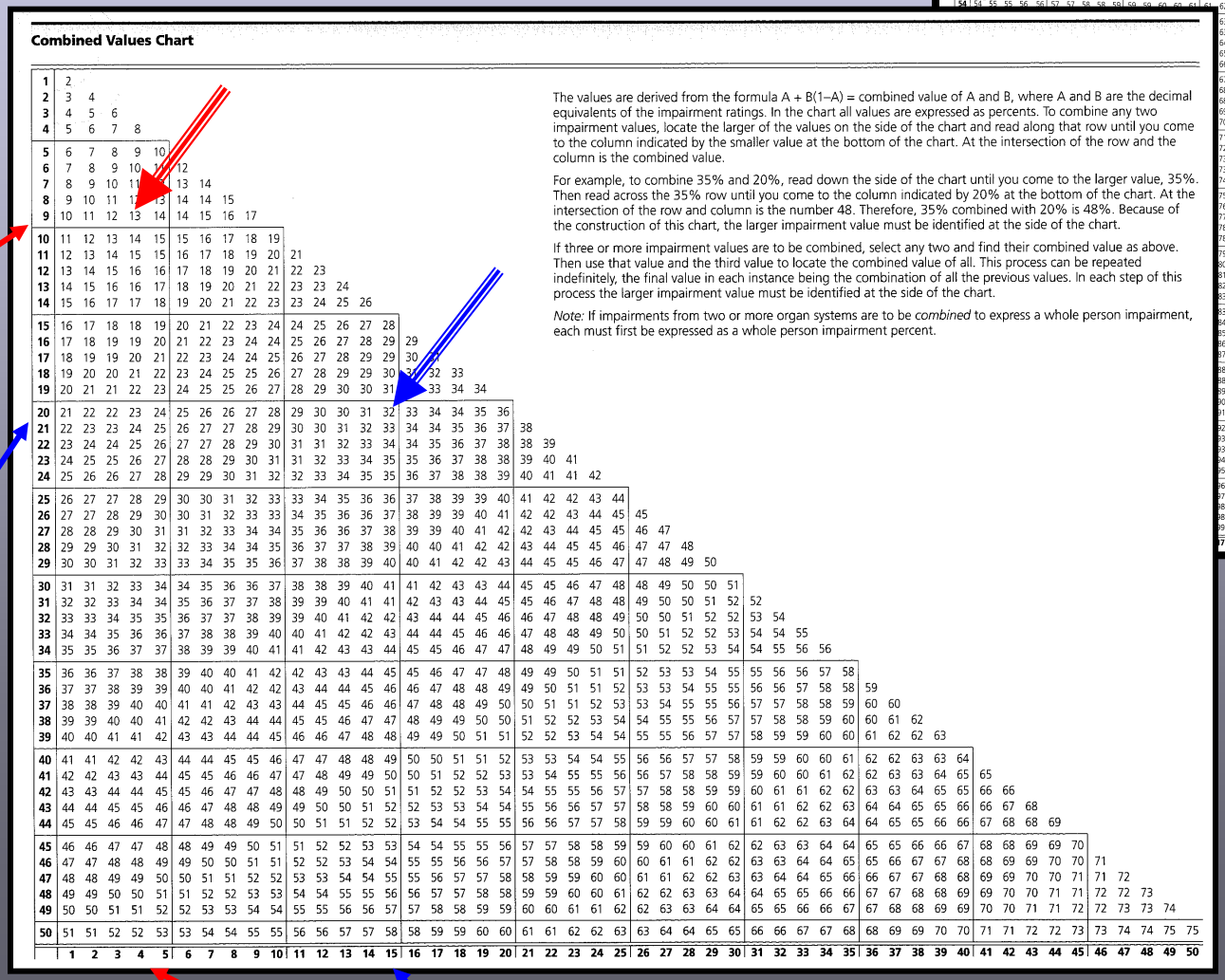
- Impairment ratings are not intended for use as a direct determinant of work disability
- 30% impairment≠ 30% reduction in work capacity
- Greater effect on laborer than sedentary worker
- Impairment percentage does not measure work disability

1.2a

Combined values chart

- Combine impairment ratings within region
- Combine regional impairments with combined values chart

Combined values chart



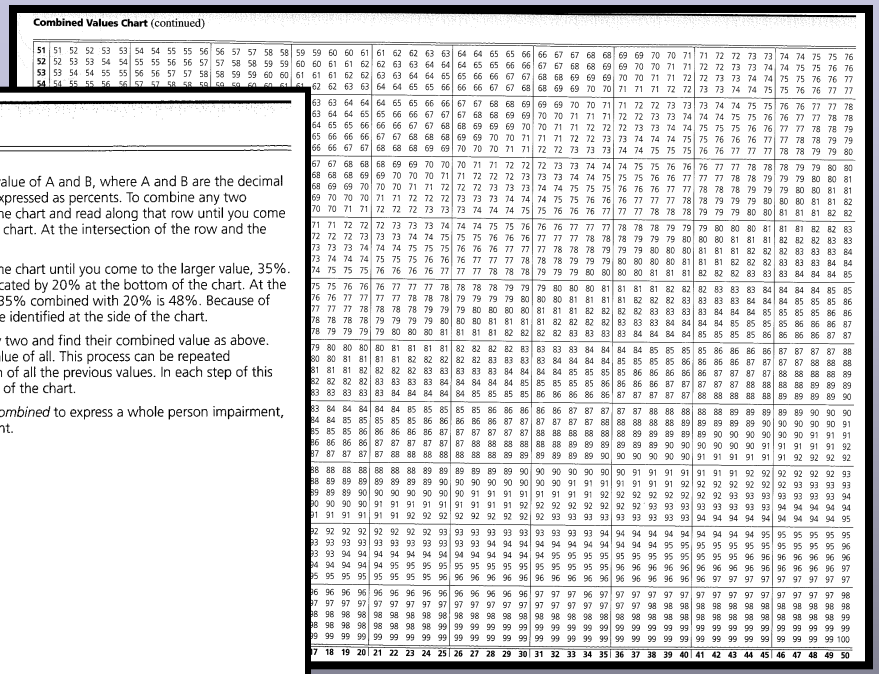
Combined Values Chart

The values are derived from the formula A + B(1–A) = combined value of A and B, where A and B are the decimal equivalents of the impairment ratings. In the chart all values are expressed as percents. To combine any two impairment values, locate the larger of the values on the side of the chart and read along that row until you come to the column indicated by the smaller value at the bottom of the chart. At the intersection of the row and the column is the combined value.

For example, to combine 35% and 20%, read down the side of the chart until you come to the larger value, 35%. Then read across the 35% row until you come to the column indicated by 20% at the bottom of the chart. At the intersection of the row and column is the number 48. Therefore, 35% combined with 20% is 48%. Because of the construction of this chart, the larger impairment value must be identified at the side of the chart.

If three or more impairment values are to be combined, select any two and find their combined value as above. Then use that value and the third value to locate the combined value of all. This process can be repeated indefinitely, the final value in each instance being the combination of all the previous values. In each step of this process the larger impairment value must be identified at the side of the chart.

Note: If impairments from two or more organ systems are to be *combined* to express a whole person impairment, each must first be expressed as a whole person impairment percent.



Combined Values Chart (continued)

Pain

- Impairment ratings include pain from area of pathology and distant to the site of pathology

Lower extremities
Chapter 17

- Feet
- Hindfeet
- Ankles
- Legs
- Knees
- Hips
- Pelvis

Evaluate on basis of anatomic changes, diagnostic categories, and functional changes

Impairment evaluation methods

- Not mutually exclusive
- Functional methods when documented

Table 17-1 Methods Used to Evaluate Impairments of the Lower Extremities

Assessment Type	Method	Section Number
Anatomic (1-9)	1. Limb length discrepancy	17.2b
	2. Muscle atrophy	17.2d
	3. Ankylosis	17.2g
	4. Amputation	17.2i
	5. Arthritis of joints	17.2h
	6. Skin loss	17.2k
	7. Peripheral nerve injury	17.2l
	8. Vascular	17.2n
	9. Causalgia/reflex sympathetic dystrophy (CRPS)	17.2m
Functional (10-12)	10. Range of motion	17.2f
	11. Gait derangement	17.2c
	12. Muscle strength (manual muscle testing)	17.2e
Diagnosis based (13)	Fractures	17.2j
	Ligament injuries	17.2j
	Meniscectomies	17.2j
	Foot deformities	17.2j
	Hip and pelvic bursitis	17.2j
	Lower extremity joint replacements	17.2j

Cross usage chart
Methods that can be combined

Table 17-2 Guide to the Appropriate Combination of Evaluation Methods

Open boxes indicate impairment ratings derived from these methods can be combined.

	Limb Length Discrepancy	Gait Derangement	Muscle Atrophy	Muscle Strength	ROM Ankylosis	Arthritis (DJD)	Amputation	Diagnosis-Based Esti-mates (DBE)	Skin Loss	Peripheral Nerve Injury	Complex Regional Pain Syndrome (CRPS)	Vascular
Limb Length Discrepancy		X					X					
Gait Derangement	X		X	X	X	X	X	X	X	X	X	X
Muscle Atrophy		X		X	X	X	X	X		X	X	
Muscle Strength		X	X		X	X		X		X	0	
ROM Ankylosis		X	X	X		X		X			0	
Arthritis (DJD)		X	X	X	X							
Amputation	X	X	X	X								
Diagnosis-Based Esti-mates (DBE)		X	X	X	X							
Skin Loss		X										
Peripheral Nerve Injury		X	X	X							X	
Complex Regional Pain Syndrome (CRPS)		X	X	0	0					X		X
Vascular		X									X	

X = Do not use these methods together for evaluating a single impairment.

0 = See specific instructions for CRPS of the lower extremity.

Cross usage chart

- Explain why method chosen
- Chose method that is most clinically accurate
- Combine methods with combined values chart
- Chose method that give highest impairment rating

Lower extremity impairment

- Lower extremity impairment x 0.4 = Whole person impairment
- Evaluate each area separately
- Convert to whole person
- Combine using combined values chart

Lower extremity impairment

- Separate methods on same region
- Combine regional impairments
- Then convert to whole person impairment rating

17.2a

Table 17-3 Whole Person Impairment Values Calculated From Lower Extremity Impairment

% Impairment of Lower Extremity	Whole Person	% Impairment of Lower Extremity	Whole Person	% Impairment of Lower Extremity	Whole Person
0	0	34	14	68	27
1	0	35	14	69	28
2	1	36	14	70	28
3	1	37	15	71	28
4	2	38	15	72	29
5	2	39	16	73	29
6	2	40	16	74	30
7	3	41	16	75	30
8	3	42	17	76	30
9	4	43	17	77	31
10	4	44	18	78	31
11	4	45	18	79	32
12	5	46	18	80	32
13	5	47	19	81	32
14	6	48	19	82	33
15	6	49	20	83	33
16	6	50	20	84	34
17	7	51	20	85	34
18	7	52	21	86	34
19	8	53	21	87	35
20	8	54	22	88	35
21	8	55	22	89	36
22	9	56	22	90	36
23	9	57	23	91	36
24	10	58	23	92	37
25	10	59	24	93	37
26	10	60	24	94	38
27	11	61	24	95	38
28	11	62	25	96	38
29	12	63	25	97	39
30	12	64	26	98	39
31	12	65	26	99	40
32	13	66	26	100	40
33	13	67	27		

Limb length discrepancy

- Supine measurement, ASIS to medial malleolus
- Flex knee to 90 degrees / tibia vs femur
- Teleroentgenography recommended

Table 17-4 Impairment Due to Limb Length Discrepancy

Discrepancy (cm)	Whole Person (Lower Extremity) Impairment (%)
0-1.9	0
2-2.9	2-3 (5- 9)
3-3.9	4-5 (10-14)
4-4.9	6-7 (15-19)
5+	8 (20)

17.2b

Example
Leg length discrepancy

- 35 y/o male with closed femur fracture. Treated with open nailing.
- No limp, pain, or weakness.
- Full ROM, no atrophy, or loss of strength.
- Short 1.5 cm clinically and 2 cm by teleroentgenography.
- Impairment: 2% WP

Table 17-4 Impairment Due to Limb Length Discrepancy

Discrepancy (cm)	Whole Person (Lower Extremity) Impairment (%)
0-1.9	0
2-2.9	2-3 (5- 9)
3-3.9	4-5 (10-14)
4-4.9	6-7 (15-19)
5+	8 (20)

Gait derangement

- Always a secondary condition
- Support with pathologic findings
- Do not combine with other methods
- Do not use if subjective symptoms only
- Assistive device required

Table 17-5 Lower Limb Impairment Due to Gait Derangement

Severity	Individual's Signs	Whole Person Impairment
Mild	a. Antalgic limp with shortened stance phase and documented moderate to advanced arthritic changes of hip, knee, or ankle	7%
	b. Positive Trendelenburg sign and moderate to advanced osteoarthritis of hip	10%
	c. Same as category a or b above, but individual requires part-time use of cane or crutch for distance walking but not usually at home or in the workplace	15%
	d. Requires routine use of short leg brace (ankle-foot orthosis [AFO])	15%
Moderate	e. Requires routine use of cane, crutch, or long leg brace (knee-ankle-foot orthosis [KAFO])	20%
	f. Requires routine use of cane or crutch and a short leg brace (AFO)	30%
	g. Requires routine use of two canes or two crutches	40%
Severe	h. Requires routine use of two canes or two crutches and a short leg brace (AFO)	50%
	i. Requires routine use of two canes or two crutches and a long leg brace (KAFO)	60%
	j. Requires routine use of two canes or two crutches and two lower-extremity braces (either AFOs or KAFOs)	70%
	k. Wheelchair dependent	80%

Station, gait and movement disorders

- Impairment determined by effect on ambulation
- Use for complex regional pain syndrome

Table 13-15 Criteria for Rating Impairments Due to Station and Gait Disorders

Class 1 1%-9% Impairment of the Whole Person	Class 2 10%-19% Impairment of the Whole Person	Class 3 20%-39% Impairment of the Whole Person	Class 4 40%-60% Impairment of the Whole Person
Rises to standing position; walks, but has difficulty with elevations, grades, stairs, deep chairs, and long distances	Rises to standing position; walks some distance with difficulty and without assistance, but is limited to level surfaces	Rises and maintains standing position with difficulty; cannot walk without assistance	Cannot stand without help, mechanical support, and/or an assistive device

Example
Gait derangement

- 61 y/o woman suffers hip contusion from fall. Treated conservatively.
- Uses cane full time, walks 5 blocks with Trendelenburg gait.
- Impairment: 20% WP

Table 17-5 Lower Limb Impairment Due to Gait Derangement

Severity	Individual's Signs	Whole Person Impairment
Mild	a. Antalgic limp with shortened stance phase and documented moderate to advanced arthritic changes of hip, knee, or ankle	7%
	b. Positive Trendelenburg sign and moderate to advanced osteoarthritis of hip	10%
	c. Same as category a or b above, but individual requires part-time use of cane or crutch for distance walking but not usually at home or in the workplace	15%
	d. Requires routine use of short leg brace (ankle-foot orthosis [AFO])	15%
Moderate	e. Requires routine use of cane, crutch, or long leg brace (knee-ankle-foot orthosis [KAFO])	20%
	f. Requires routine use of cane or crutch and a short leg brace (AFO)	30%
	g. Requires routine use of two canes or two crutches	40%
Severe	h. Requires routine use of two canes or two crutches and a short leg brace (AFO)	50%
	i. Requires routine use of two canes or two crutches and a long leg brace (KAFO)	60%
	j. Requires routine use of two canes or two crutches and two lower-extremity braces (either AFOs or KAFOs)	70%
	k. Wheelchair dependent	80%

Muscle atrophy

- Circumference (cm)
- Calf at maximum
- No limb swelling
- Atrophy at thigh and calf is combined
- Cannot combine with other muscle function measurements

Table 17-6 Impairment Due to Unilateral Leg Muscle Atrophy

Difference in Circumference (cm)	Impairment Degree	Whole Person (Lower Extremity) Impairment (%)
a. Thigh: The circumference is measured 10 cm above the patella with the knee fully extended and the muscles relaxed.		
0-0.9 1-1.9 2-2.9 3+	None Mild Moderate Severe	0 1-2 (3-8) 3-4 (8-13) 5 (13)
b. Calf: The maximum circumference on the normal side is compared with the circumference at the same level on the affected side.		
0-0.9 1-1.9 2-2.9 3+	None Mild Moderate Severe	0 1-2 (3-8) 3-4 (8-13) 5 (13)

Example
Muscle atrophy

- 78 y/o woman with closed tibia fracture. Treated closed with cast.
- No pain, normal gait.
- Thigh circumference equal, calf atrophy 1.3 cm.

- Impairment: 1% WP

Table 17-6 Impairment Due to Unilateral Leg Muscle Atrophy

Difference in Circumference (cm)	Impairment Degree	Whole Person (Lower Extremity) Impairment (%)
a. Thigh: The circumference is measured 10 cm above the patella with the knee fully extended and the muscles relaxed.		
0-0.9	None	0
1-1.9	Mild	1-2 (3-8)
2-2.9	Moderate	3-4 (8-13)
3+	Severe	5 (13)
b. Calf: The maximum circumference on the normal side is compared with the circumference at the same level on the affected side.		
0-0.9	None	0
1-1.9	Mild	1-2 (3-8)
2-2.9	Moderate	3-4 (8-13)
3+	Severe	5 (13)

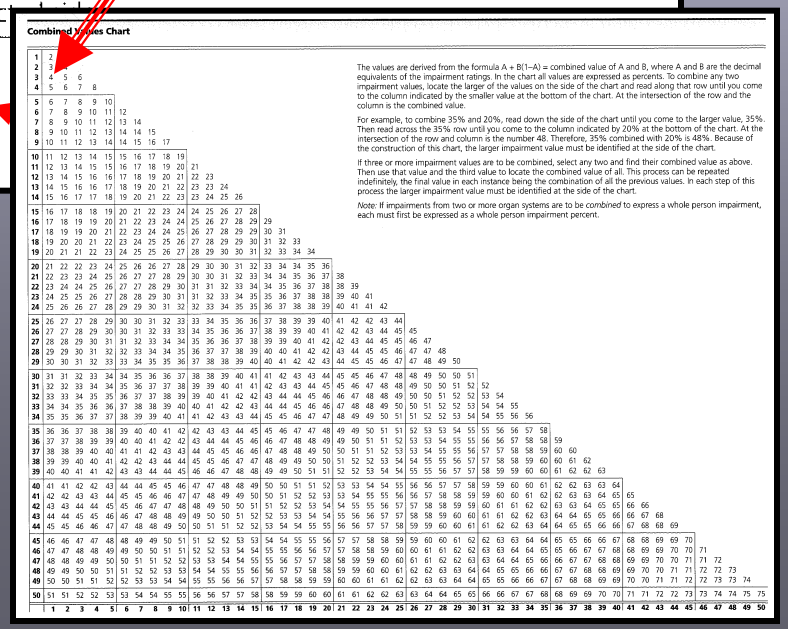
Example
Muscle atrophy

- 49 y/o male with tibia fracture. Treated conservatively.
- No pain, no motor weakness, mild limp.
- Thigh atrophy 2 cm, calf atrophy 1 cm.

- Impairment: 4% WP
  - Combine thigh and calf with combined values chart.

Table 17-6 Impairment Due to Unilateral Leg Muscle Atrophy

Difference in Circumference (cm)	Impairment Degree	Whole Person (Lower Extremity) Impairment (%)
a. Thigh: The circumference is measured 10 cm above the patella with the knee fully extended and the muscles relaxed.		
0-0.9	None	0
1-1.9	Mild	1-2 (3-8)
2-2.9	Moderate	3-4 (8-13)
3+	Severe	5 (13)
b. Calf: The maximum circumference on the normal side is compared with the circumference at the same level on the affec		
0-0.9		
1-1.9		
2-2.9		
3+		



Manual muscle testing

Table 17-7 Criteria for Grades of Muscle Function of the Lower Extremity

Grade	Description of Muscle Function
5	Active movement against gravity with full resistance
4	Active movement against gravity with some resistance
3	Active movement against gravity only, without resistance
2	Active movement with gravity eliminated
1	Slight contraction and no movement
0	No contraction

Table 17-8 Impairment Due to Lower Extremity Muscle Weakness

		Whole Person (Lower Extremity) [Foot] Impairment (%)														
Muscle Group		**Grade 0**			**Grade 1**			**Grade 2**			**Grade 3**			**Grade 4**		
Hip	Flexion	6	(15)		6	(15)		6	(15)		4	(10)		2	(5)	
	Extension	15	(37)		15	(37)		15	(37)		15	(37)		7	(17)	
	Abduction*	25	(62)		25	(62)		25	(62)		15	(27)		10	(25)	
Knee	Flexion	10	(25)		10	(25)		10	(25)		7	(17)		5	(12)	
	Extension	10	(25)		10	(25)		10	(25)		7	(17)		5	(12)	
Ankle	Flexion (plantar flexion)	15	(37)	[53]	15	(37)	[53]	15	(37)	[53]	10	(25)	[35]	7	(17)	[24]
	Extension (dorsiflexion)	10	(25)	[35]	10	(25)	[35]	10	(25)	[35]	10	(25)	[35]	5	(12)	[17]
	Inversion	5	(12)	[17]	5	(12)	[17]	5	(12)	[17]	5	(12)	[17]	2	(5)	[7]
	Eversion	5	(12)	[17]	5	(12)	[17]	5	(12)	[17]	5	(12)	[17]	2	(5)	[7]
Great toe	Extension	3	(7)	[10]	3	(7)	[10]	3	(7)	[10]	3	(7)	[10]	1	(2)	[3]
	Flexion			[17]		(12)	[17]	5	(12)	[17]	5	(12)	[17]	2	(5)	[7]

* Hip adduction weakness is evaluated as an obturator nerve impairment (see Table 17-37).

Example
Motor weakness

- 55 y/o male with patella fracture. Treated with ORIF.
- Thigh atrophy 1 cm. Quadriceps and hamstrings grade 4.
- Impairment:

  10% WP
  - Combine flexion & extension with combined values chart.

Table 17-8 Impairment Due to Lower Extremity Muscle Weakness

		Whole Person (Lower Extremity) [Foot] Impairment (%)											
Muscle Group		**Grade 0**			**Grade 1**			**Grade 2**			**Grade 3**			**Grade 4**		
Hip	Flexion	6	(15)		6	(15)		6	(15)		4	(10)		2	(5)	
	Extension	15	(37)		15	(37)		15	(37)		15	(37)		7	(17)	
	Abduction*	25	(62)		25	(62)		25	(62)		15	(27)		10	(25)	
Knee	Flexion	10	(25)		10	(25)		10	(25)		7	(17)		5	(12)	
	Extension	10	(25)		10	(25)		10	(25)		7	(17)		5	(12)	
Ankle	Flexion (plantar flexion)	15	(37)	[53]	15	(37)	[53]	15	(37)	[53]	10	(25)	[35]	7	(17)	[24]
	Extension (dorsiflexion)	10	(25)	[35]	10	(25)	[35]	10	(25)	[35]	10	(25)	[35]	5	(12)	[17]
	Inversion	5	(12)	[17]	5	(12)	[17]	5	(12)	[17]	5	(12)	[17]	2	(5)	[7]
	Eversion	5	(12)	[17]	5	(12)	[17]	5	(12)	[17]	5	(12)	[17]	2	(5)	[7]
Great toe	Extension	3	(7)	[10]	3	(7)	[10]	3	(7)	[10]	3	(7)	[10]	1	(2)	[3]
	Flexion			[17]		(12)	[17]	5	(12)	[17]	5	(12)	[17]	2	(5)	[7]

* Hip adduction weakness is evaluated as an obturator nerve impairment (see Table 17-37).

Example
Motor weakness

- 30 y/o male with tibia fracture and compartment syndrome. Treated with fasciotomy.
- Walks with limp and foot drop.
- Ankle extension grade 3, EHL grade 3, calf atrophy 2 cm.
- Impairment: 13% WP
  - Combine ankle and EHL weakness with combined values chart.
  - Do not combine with atrophy.

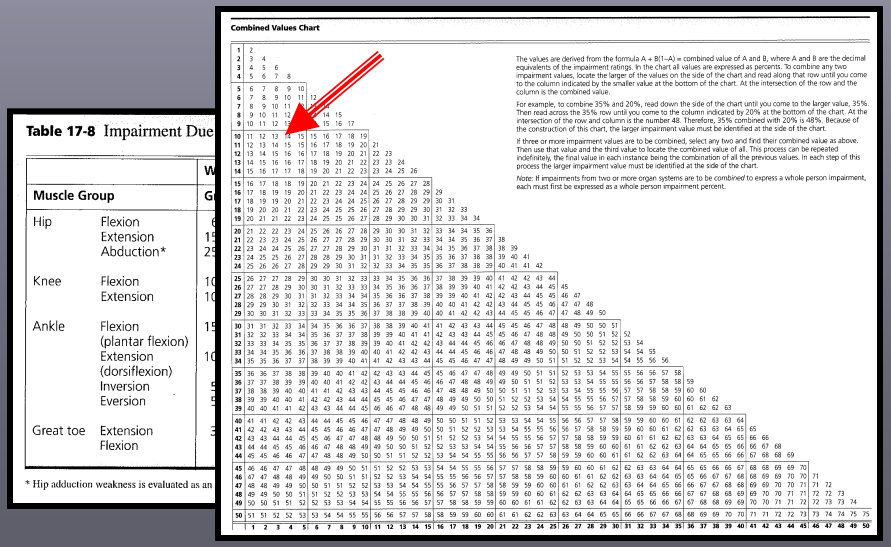


Table 17-8 Impairment Due

Muscle Group		G
Hip	Flexion	6
	Extension	1
	Abduction*	2
Knee	Flexion	1
	Extension	1
Ankle	Flexion (plantar flexion)	1
	Extension (dorsiflexion)	1
	Inversion	
	Eversion	
Great toe	Extension	
	Flexion	

* Hip adduction weakness is evaluated as an

Combined Values Chart

The values are derived from the formula A + B(1–A) = combined value of A and B, where A and B are the decimal equivalents of the impairment ratings. In the chart all values are expressed as percents. To combine any two impairment values, locate the larger of the values on the side of the chart and read along that row until you come to the column indicated by the smaller value at the bottom of the chart. At the intersection of the row and the column is the combined value.

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Note: If impairments from two or more organ systems are to be *combined* to express a whole person impairment, each must first be expressed as a whole person impairment percent.

Range of motion Hip

Figure 17-1 Using a Goniometer to Measure Flexion of the Right Hip*

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

(b) 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.

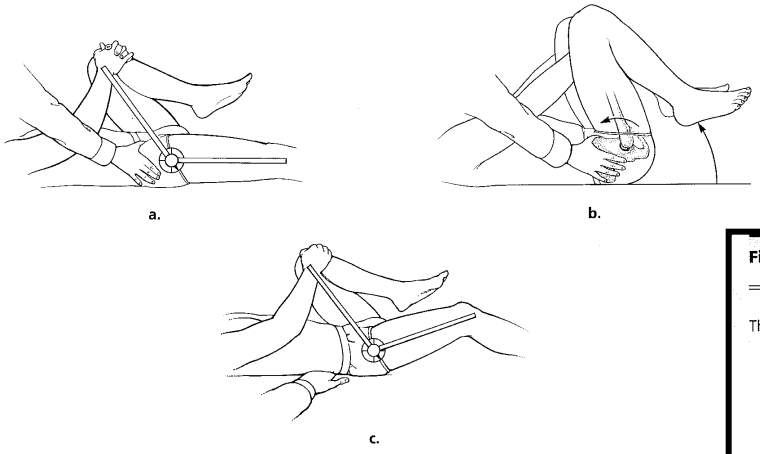
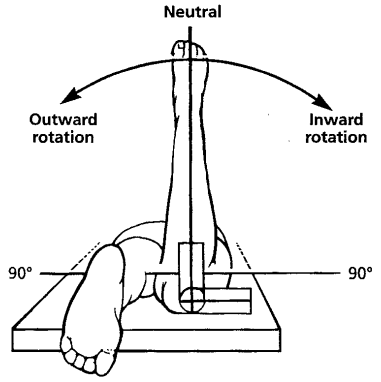


Figure 17-3 Measuring Internal and External Hip Rotation*

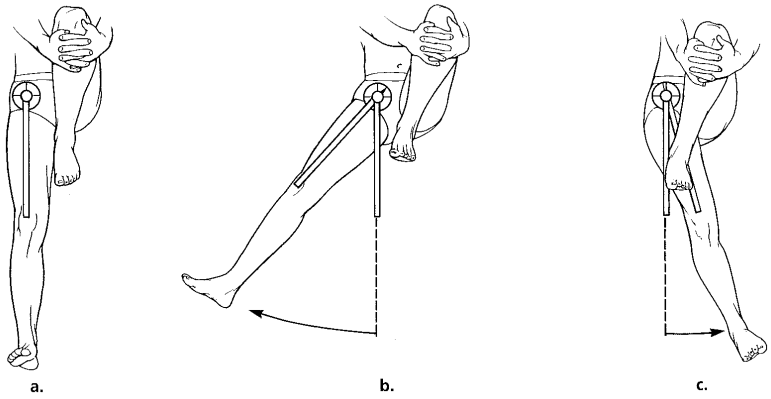
The examinee is prone on a flat surface, and the knee is flexed 90°. One part of the goniometer is parallel to the flat surface, and the other is along the tibia. While testing, the examiner should place the hand on the knee to determine whether there is significant laxity of the knee joint. Keep the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



* Adapted from American Orthopaedic Association. *Manual of Orthopedic Surgery.* Rosemont, Ill: American Orthopaedic Association; 1966.

Figure 17-2 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.

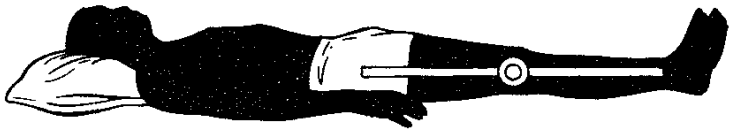


Range of motion
Knee

Figure 17-4 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.

17.2f

Range of motion
Ankle and foot

Figure 17-5 Measuring Foot Dorsiflexion and Plantar Flexion

The goniometer's pivot is centered over the ankle, and one arm parallels the tibia. The examiner reads the angles subtending the maximum arcs of motion for dorsiflexion and plantar flexion. The test is repeated with the knee flexed to 45°. The averages of the maximum angles represent dorsiflexion and plantar flexion ranges of motion.

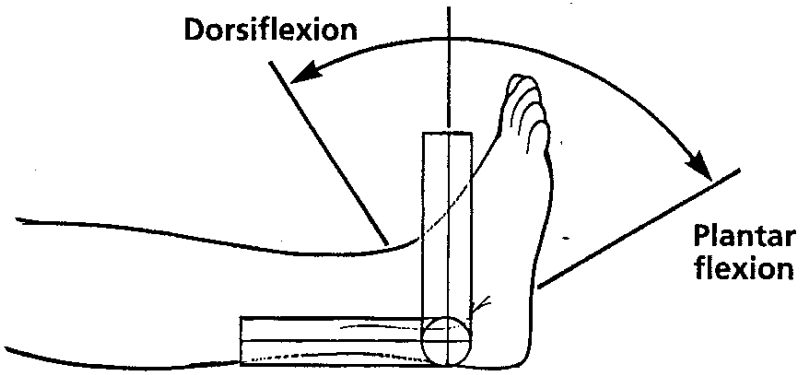
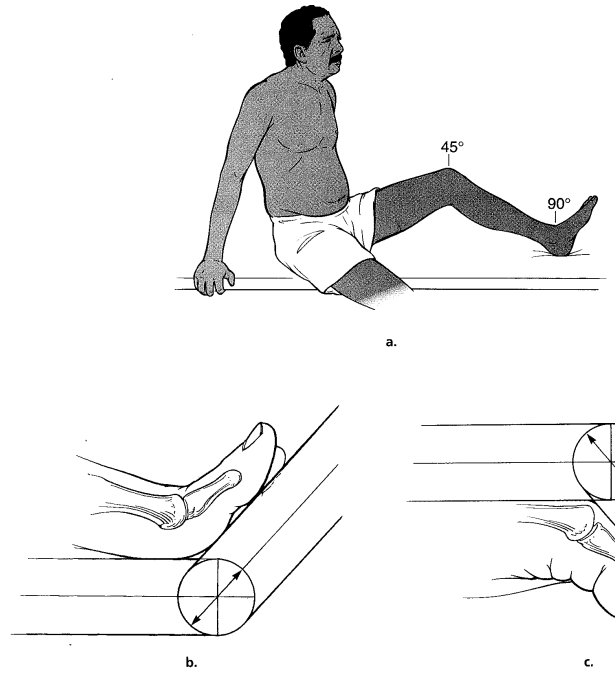


Figure 17-6 Evaluating the Range of Motion of a Toe: the Metatarsophalangeal (MTP) Joint of the Great Toe

(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.



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Range of motion
Hip and knee

Table 17-9 Hip Motion Impairment

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

* An abduction contracture of greater than 20° = 15% whole person impairment.

Table 17-10 Knee Impairment

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

Range of motion
Ankle and hindfoot

Table 17-11 Ankle Motion Impairment Estimates

	Whole Person (Lower Extremity) [Foot] Impairment		
Motion	**Mild** **3% (7%) [10%]**	**Moderate** **6% (15%) [21%]**	**Severe** **12% (30%) [43%]**
Plantar flexion capability	11°-20°	1°-10°	None
Flexion contracture	—	10°	20°
Extension	10°-0° (neutral)	—	—

Table 17-12 Hindfoot Impairment Estimates

	Whole Person (Lower Extremity) [Foot] Impairment	
Motion	**Mild** **1% (2%) [3%]**	**Moderate and Severe** **2% (5%) [7%]**
Inversion	10°-20°	0°-9°
Eversion	0°-10°	—

Range of motion
Ankle and hindfoot

Table 17-13 Ankle or Hindfoot Deformity Impairments

	Whole Person (Lower Extremity) [Foot] Impairment		
Position	**Mild** **5% (12%) [17%]**	**Moderate** **10% (25%) [35%]**	**Severe** **20% (50%) [72%]**
Varus	10°-14°	15°-24°	25°+
Valgus	10°-20°	—	—

Range of motion
Toe

Table 17-14 Toe Impairments

Type of Impairment	Whole Person (Lower Extremity) [Foot] Impairment	
	Mild 1% (2%) [3%]	**Moderate and Severe** 2% (5%) [7%]
Great toe		
Metatarsophalangeal, extension	15°-30°	Less than 15°
Interphalangeal, flexion	Less than 20°	—
Lesser toes*		
Metatarsophalangeal, extension	Less than 10°	—

* The maximum whole person impairment percent for impairment of two or more lesser toes of one foot is 2%.

Example
Range of motion

- 45 y/o woman with tibia fracture. Treated closed.
- No pain, standing limited.
- Ankle flexion 6 deg, extension 5 deg, toe extension 10 deg. Calf atrophy 1 cm.

- Impairment: 11% WP
  - Add ankle loss, combine with toe with combined values chart.

Table 17-11 Ankle Motion Impairment Estimates

	Whole Person (Lower Extremity) [Foot] Impairment		
Motion	**Mild 3% (7%) [10%]**	**Moderate 6% (15%) [21%]**	**Severe 12% (30%) [43%]**
Plantar flexion capability	11°-20°	1°-10°	None
Flexion contracture	—	10°	20°
Extension	10°-0° (neutral)	—	—

Table 17-14 Toe Impairments

	Whole Person (Lower Extremity) [Foot] Impairment	
Type of Impairment	**Mild 1% (2%) [3%]**	**Moderate and Severe 2% (5%) [7%]**
Great toe Metatarsophalangeal, extension Interphalangeal, flexion	15°-30° Less than 20°	Less than 15° —
Lesser toes* Metatarsophalangeal, extension	Less than 10°	—

* The maximum whole person impairment percent for impairment of two or more lesser toes of one foot is 2%.

Joint ankylosis

- Immobile joint is an impairment
- Malposition increases impairment
- Interpolate between range
- Add multiple malpositions of same joint
- Deformities of multiple joints are combined using combined values chart

Joint ankylosis Hip

- 20% whole person
- Optimal position:

  25-40 deg flexion, neutral rotation, adduction, adduction
- Maximum 100% LE, or 40% WP

Table 17-15 Impairment Due to Ankylosis in Hip Flexion

Ankylosis in Flexion (°)	Whole Person (Lower Extremity) Impairment (%)
0- 9	15 (37)
10-19	10 (25)
20-24	5 (12)
25-39	0 (0)
40-49	5 (12)
50-59	10 (25)
60-69	15 (37)
70+	20 (50)

* The appropriate ankylosis impairment percent is added to the impairment percent for ankylosis in the neutral position given in the text.

Joint ankylosis Hip

Table 17-16 Impairment Due to Ankylosis in Hip Internal Rotation*

Ankylosis in Internal Rotation (°)	Whole Person (Lower Extremity) Impairment (%)
5- 9	5 (12)
10-19	10 (25)
20-29	15 (37)
30+	20 (50)

* The appropriate ankylosis impairment percent is added to the impairment percent for ankylosis in the neutral position given in the text.

Table 17-17 Impairment Due to Ankylosis in Hip External Rotation*

Ankylosis in External Rotation (°)	Whole Person (Lower Extremity) Impairment (%)
10-19	5 (12)
20-29	10 (25)
30-39	15 (37)
40+	20 (50)

* The appropriate ankylosis impairment percent is added to the impairment percent for ankylosis in the neutral position given in the text.

Joint ankylosis Hip

Table 17-18 Impairment Due to Ankylosis in Hip Abduction*

Ankylosis in Abduction (°)	Whole Person (Lower Extremity) Impairment (%)
5-14	10 (25)
15-24	15 (37)
25+	20 (50)

* The appropriate ankylosis impairment percent is added to the impairment percent for ankylosis in the neutral position given in the text.

Table 17-19 Impairment Due to Ankylosis in Hip Adduction*

Ankylosis in Adduction (°)	Whole Person (Lower Extremity) Impairment (%)
5- 9	10 (25)
10-14	15 (37)
15+	20 (50)

* The appropriate ankylosis impairment percent is added to the impairment percent for ankylosis in the neutral position given in the text.

Joint ankylosis
Knee

- 27% WP
- Optimal position: 0-10 degrees flexion, neutral alignment
- Maximum 100% LE, or 40% WP

Joint ankylosis Knee

Table 17-20 Impairment Due to Knee Ankylosis in Varus*

Ankylosis in Varus (°)	Whole Person (Lower Extremity) Impairment (%)
0- 9	5 (12)
10-19	10 (25)
20+	13 (33)

* The appropriate ankylosis impairment percent is added to the impairment percent for ankylosis in the neutral position given in the text.

Table 17-21 Impairment Due to Knee Ankylosis in Valgus*

Ankylosis in Valgus (°)	Whole Person (Lower Extremity) Impairment (%)
10-19	5 (12)
20-29	10 (25)
30+	13 (33)

* The appropriate ankylosis impairment percent is added to the impairment percent for ankylosis in the neutral position given in the text.

Joint ankylosis Knee

Table 17-22 Impairment Due to Knee Ankylosis in Flexion*

Ankylosis in Flexion (°)	Whole Person (Lower Extremity) Impairment (%)
20-29	5 (12)
30-39	10 (25)
40+	13 (33)

* The appropriate ankylosis impairment percent is added to the impairment percent for ankylosis in the neutral position given in the text.

Table 17-23 Impairment Due to Knee Ankylosis in Internal or External Malrotation*

Ankylosis in Internal or External Malrotation (°)	Whole Person (Lower Extremity) Impairment (%)
10-19	5 (12)
20-29	10 (25)
30+	13 (33)

* The appropriate ankylosis impairment percent is added to the impairment percent for ankylosis in the neutral position given in the text.

Joint ankylosis Ankle

- 4% WP
- Optimal position: neutral
- Maximum 62% LE or 25% WP

Table 17-24 Ankle Impairment Due to Ankylosis in Plantar Flexion or Dorsiflexion*

Position	Whole Person (Lower Extremity) [Foot] Impairment (%)
20°+ dorsiflexion	15 (37) [53]
10°-19° dorsiflexion	7 (17) [24]
10°-19° plantar flexion	7 (17) [24]
20°-29° plantar flexion	15 (37) [53]
30°+ plantar flexion	21 (52) [74]

* The appropriate ankylosis impairment percent is added to the impairment percent for ankylosis in the neutral position given in the text.

17.2g

Joint ankylosis Ankle

Table 17-25 Ankle Impairment Due to Ankylosis in Varus Position*

Varus Position (°)	Whole Person (Lower Extremity) [Foot] Impairment (%)
5- 9	10 (25) [35]
10-19	15 (37) [53]
20-29	18 (43) [61]
30+	21 (52) [74]

* The appropriate ankylosis impairment percent is added to the impairment percent for ankylosis in the neutral position given in the text.

Table 17-26 Ankle Impairment Due to Ankylosis in Valgus Position*

Valgus Position (°)	Whole Person (Lower Extremity) [Foot] Impairment (%)
10-19	10 (25) [35]
20-30	15 (37) [53]
30+	21 (52) [74]

* The appropriate ankylosis impairment percent is added to the impairment percent for ankylosis in the neutral position given in the text.

Joint ankylosis Ankle

Table 17-27 Ankle Impairment Due to Ankylosis in Internal Malrotation*

Internal Malrotation (°)	Whole Person (Lower Extremity) [Foot] Impairment (%)
0- 9	5 (12) [17]
10-19	10 (25) [35]
20-29	15 (37) [53]
30+	21 (52) [74]

* The appropriate ankylosis impairment percent is added to the impairment percent for ankylosis in the neutral position given in the text.

Table 17-28 Ankle Impairment Due to Ankylosis in External Malrotation

External Malrotation (°)	Whole Person (Lower Extremity) [Foot] Impairment (%)
15-19	5 (12) [17]
20-29	10 (25) [35]
30-39	15 (37) [53]
40+	21 (52) [74]

* The appropriate ankylosis impairment percent is added to the impairment percent for ankylosis in the neutral position given in the text.

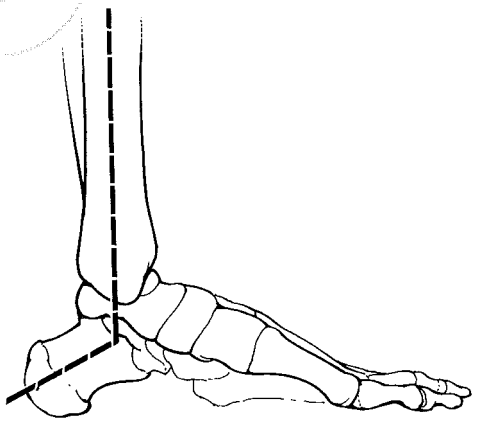
Joint ankylosis
Hindfoot

- 4% WP
- Optimal position: neutral
- Maximum 62% LE or 25% WP

- Pantalar arthrodesis
  - 10% WP
  - Optimal position: neutral

Joint ankylosis Hindfoot

Figure 17-7 Tibia–Os Calcis Angle*



* The tibia–os calcis angle is the angle between the longitudinal axis of the os calcis and the vertical tibia, as shown by this drawing based on a lateral x-ray of the foot and ankle in the *neutral* position.

Table 17-29 Impairments for Loss of the Tibia–Os Calcis Angle*

Angle (°)	Whole Person (Lower Extremity) [Foot] Impairment (%)
110-100	10 (25) [35]
99- 90	15 (37) [53]
Less than 90	21 (52) [74]

* The tibia–os calcis angle is shown in Figure 17-7.

17.2g

Joint ankylosis Toes

Figure 17-6 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.

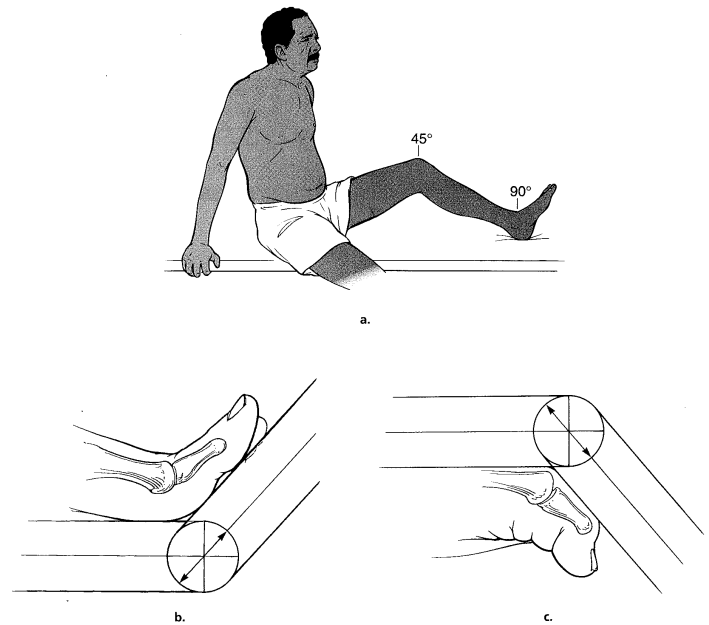


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Table 17-30 Impairment of the Foot Due to Ankylosis of Toes

	Whole Person (Lower Extremity) [Foot] Impairment (%)		
	Ankylosed in		
Digit(s) Involved	Full Extension	Position of Function	Full Flexion
Great Great, second	4 (10) [14] 5 (12) [17]	4 (9) [13] 4 (11) [15]	5 (13) [18] 6 (15) [21]
Great, second, third Great, second, fourth	6 (14) [20] 6 (14) [20]	5 (12) [17] 5 (12) [17]	7 (17) [24] 7 (17) [24]
Great, second, fifth Great, second, third, fourth	6 (14) [20] 6 (16) [23]	5 (12) [17] 5 (13) [19]	7 (17) [24] 8 (19) [27]
Great, second, third, fifth Great, second, fourth, fifth	6 (16) [23] 6 (16) [23]	5 (13) [19] 5 (13) [19]	8 (19) [27] 8 (19) [27]
Great, second, third, fourth, fifth Great, third	7 (18) [26] 5 (12) [17]	6 (15) [21] 4 (11) [15]	8 (21) [30] 6 (15) [21]
Great, third, fourth Great, third, fifth	6 (14) [20] 6 (14) [20]	5 (12) [17] 5 (12) [17]	7 (17) [24] 7 (17) [24]
Great, third, fourth, fifth Great, fourth	6 (16) [23] 5 (12) [17]	5 (13) [19] 4 (11) [15]	8 (19) [27] 6 (15) [21]
Great, fourth, fifth Great, fifth	6 (14) [20] 5 (12) [17]	5 (12) [17] 4 (11) [15]	7 (17) [24] 6 (15) [21]
Second Second, third	1 (2) [3] 2 (4) [6]	0 (1) [2] 1 (3) [4]	1 (2) [3] 2 (4) [6]
Second, third, fourth Second, third, fifth	2 (6) [9] 2 (6) [9]	1 (3) [4] 2 (4) [6]	2 (6) [9] 2 (6) [9]
Second, third, fourth, fifth Second, fourth	3 (8) [12] 2 (4) [6]	2 (6) [8] 1 (3) [4]	3 (8) [12] 2 (4) [6]
Second, fourth, fifth Second, fifth	2 (6) [9] 2 (4) [6]	2 (4) [6] 1 (3) [4]	3 (8) [12] 2 (4) [6]
Third Third, fourth	1 (2) [3] 2 (4) [6]	0 (1) [2] 1 (3) [4]	1 (2) [3] 2 (4) [6]
Third, fourth, fifth Third, fifth	2 (6) [9] 2 (4) [6]	2 (4) [6] 1 (3) [4]	2 (6) [9] 2 (4) [6]
Fourth Fourth, fifth	1 (2) [3] 2 (4) [6]	0 (1) [2] 1 (3) [4]	1 (2) [3] 2 (4) [6]
Fifth	1 (2) [3]	0 (1) [2]	1 (2) [3]

Example Ankylosis

- 64 y/o male with fracture dislocation of hip. Treated with ORIF.
- No pain, difficulty with stairs. Walks with one crutch.
- No hip motion, fused in 55 deg flexion, 12 deg external rotation, 10 deg abduction.

- Impairment: 40% WP
  - Fusion 20%, add for malpositions.
  - Cannot be greater than amputation, 40% WP

Table 17-15 Impairment Due to Ankylosis in Hip Flexion

Ankylosis in Flexion (°)	Whole Person (Lower Extremity) Impairment (%)
0- 9	15 (37)
10-19	10 (25)
20-24	5 (12)
25-39	0 (0)
40-49	5 (12)
50-59	10 (25)
60-69	15 (37)
70+	20 (50)

* The appropriate ankylosis impairment percent is added to the impairment percent for ankylosis in the neutral position given in the text.

Table 17-17 Impairment Due to Ankylosis in Hip External Rotation*

Ankylosis in External Rotation (°)	Whole Person (Lower Extremity) Impairment (%)
10-19	5 (12)
20-29	10 (25)
30-39	15 (37)
40+	20 (50)

* The appropriate ankylosis impairment percent is added to the impairment percent for ankylosis in the neutral position given in the text.

Table 17-18 Impairment Due to Ankylosis in Hip Abduction*

Ankylosis in Abduction (°)	Whole Person (Lower Extremity) Impairment (%)
5-14	10 (25)
15-24	15 (37)
25+	20 (50)

* The appropriate ankylosis impairment percent is added to the impairment percent for ankylosis in the neutral position given in the text.

Example Ankylosis

- 41 y/o male with open, floating knee. Healed with ankylosis.
- Ankylosed in 20 deg flexion, 7 deg valgus.
- Impairment: 32% WP
  - Fusion 27%, add for malpositions.

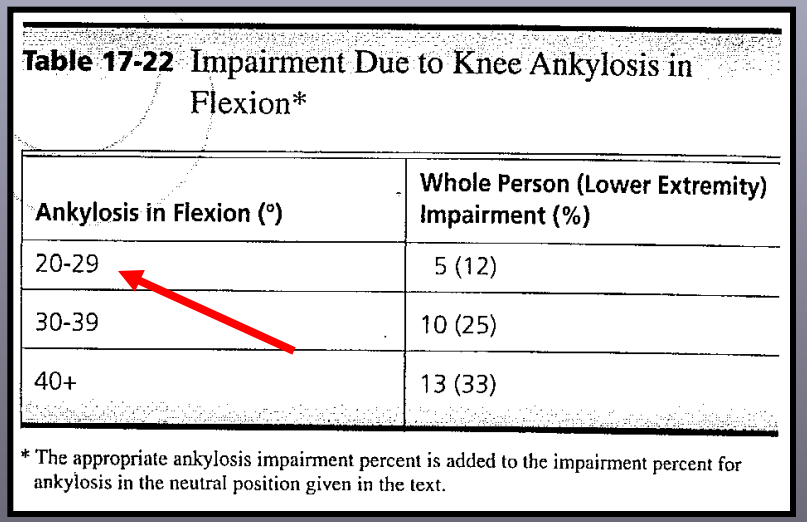


Table 17-22 Impairment Due to Knee Ankylosis in Flexion*

Ankylosis in Flexion (°)	Whole Person (Lower Extremity) Impairment (%)
20-29	5 (12)
30-39	10 (25)
40+	13 (33)

* The appropriate ankylosis impairment percent is added to the impairment percent for ankylosis in the neutral position given in the text.

Example Ankylosis

- 55 y/o male with pilon fracture. Treated with external fixation.
- No pain, ankylosed in 15 deg dorsiflexion, 7 deg varus.
- Impairment: 21% WP
  - Fusion 4%, add for malpositions.

Table 17-24 Ankle Impairment Due to Ankylosis in Plantar Flexion or Dorsiflexion*

Position	Whole Person (Lower Extremity) [Foot] Impairment (%)
20°+ dorsiflexion	15 (37) [53]
10°-19° dorsiflexion	7 (17) [24]
10°-19° plantar flexion	7 (17) [24]
20°-29° plantar flexion	15 (37) [53]
30°+ plantar flexion	21 (52) [74]

* The appropriate ankylosis impairment percent is added to the impairment percent for ankylosis in the neutral position given in the text.

Table 17-25 Ankle Impairment Due to Ankylosis in Varus Position*

Varus Position (°)	Whole Person (Lower Extremity) [Foot] Impairment (%)
5- 9	10 (25) [35]
10-19	15 (37) [53]
20-29	18 (43) [61]
30+	21 (52) [74]

* The appropriate ankylosis impairment percent is added to the impairment percent for ankylosis in the neutral position given in the text.

Example Ankylosis

- 41 y/o woman with ankle and calcaneus fractures. Treated conservatively.
- Difficulty walking, ankle fused at 5 deg plantar flexion, tibia-os calcis angle 100 deg.
- Impairment: 14% WP
  - Fusion 4%, add for tibia-os calcis angle.

Table 17-29 Impairments for Loss of the Tibia–Os Calcis Angle*

Angle (°)	Whole Person (Lower Extremity) [Foot] Impairment (%)
110-100	10 (25) [35]
99- 90	15 (37) [53]
Less than 90	21 (52) [74]

* The tibia–os calcis angle is shown in Figure 17-7.

Example Ankylosis

- 52 y/o male with crush injury to forefoot and multiple toe fractures. Treated closed.
- Stiff toes, hallux MTP 15 deg dorsiflexion, 15 deg plantar flexion, no lesser toe motion, normal position.

- Impairment: 3% WP
  - Hallux 1%, add for lesser toes 2%.

Table 17-14 Toe Impairments

Type of Impairment	Whole Person (Lower Extremity) [Foot] Impairment: Mild 1% (2%) [3%]	Moderate and Severe 2% (5%) [7%]
Great toe Metatarsophalangeal, extension Interphalangeal, flexion	15°-30° Less than 20°	Less than 15° —
Lesser toes* Metatarsophalangeal, extension	Less than 10°	—

* The maximum whole person impairment percent for impairment of two or [illegible] toes of one foot is 2%.

Table 17-30 Impairment of the Foot Due to Ankylosis of Toes

Digit(s) Involved	Whole Person (Lower Extremity) [Foot] Impairment (%) Ankylosed in: Full Extension	Position of Function	Full Flexion
Great Great, second	4 (10) [14] 5 (12) [17]	4 (9) [13] 4 (11) [15]	5 (13) [18] 6 (15) [21]
Great, second, third Great, second, fourth	6 (14) [20] 6 (14) [20]	5 (12) [17] 5 (12) [17]	7 (17) [24] 7 (17) [24]
Great, second, fifth Great, second, third, fourth	6 (14) [20] 6 (16) [23]	5 (12) [17] 5 (13) [19]	7 (17) [24] 8 (19) [27]
Great, second, third, fifth Great, second, fourth, fifth	6 (16) [23] 6 (16) [23]	5 (13) [19] 5 (13) [19]	8 (19) [27] 8 (19) [27]
Great, second, third, fourth, fifth Great, third	7 (18) [26] 5 (12) [17]	6 (15) [21] 4 (11) [15]	8 (21) [30] 6 (15) [21]
Great, third, fourth Great, third, fifth	6 (14) [20] 6 (14) [20]	5 (12) [17] 5 (12) [17]	7 (17) [24] 7 (17) [24]
Great, third, fourth, fifth Great, fourth	6 (16) [23] 5 (12) [17]	5 (13) [19] 4 (11) [15]	8 (19) [27] 6 (15) [21]
Great, fourth, fifth Great, fifth	6 (14) [20] 5 (12) [17]	5 (12) [17] 4 (11) [15]	7 (17) [24] 6 (15) [21]
Second Second, third	1 (2) [3] 2 (4) [6]	0 (1) [2] 1 (3) [4]	1 (2) [3] 2 (4) [6]
Second, third, fourth Second, third, fifth	2 (6) [9] 2 (6) [9]	1 (3) [4] 2 (4) [6]	2 (6) [9] 2 (6) [9]
Second, third, fourth, fifth Second, fourth	3 (8) [11] 2 (4) [6]	2 (6) [8] 1 (3) [4]	3 (8) [12] 2 (4) [6]
Second, fourth, fifth Second, fifth	2 (6) [9] 2 (4) [6]	2 (4) [6] 1 (3) [4]	3 (8) [12] 2 (4) [6]
Third Third, fourth	1 (2) [3] 2 (4) [6]	0 (1) [2] 1 (3) [4]	1 (2) [3] 2 (4) [6]
Third, fourth, fifth Third, fifth	2 (6) [9] 2 (4) [6]	2 (4) [6] 1 (3) [4]	2 (6) [9] 2 (4) [6]
Fourth Fourth, fifth	1 (2) [3] 2 (4) [6]	0 (1) [2] 1 (3) [4]	1 (2) [3] 2 (4) [6]
Fifth	1 (2) [3]	0 (1) [2]	1 (2) [3]

Arthritis

- Cartilage thinning, and loss of joint space
- Weight bearing
- Knee in full extension
- Ankle mortise view

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.

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

Example Arthritis

- 48 y/o male with old tibia fracture.
- Full ROM, 10 deg varus, x-rays show 2mm medial joint space.
- Impairment: 15% WP
  - Arthritis 8%, combine with tibia fracture malalignment 8% using combined values chart.

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				
First metatarsophalangeal				
Other metatarsophalangeal				

* Normal cartilage interval

† In an individual with a h
and crepitation on physic
a 2% whole person or 5%

Region and Condition	Whole Person (Lower Extremity) [Foot] Impairment (%)
Total knee replacement including unicondylar replacement	
Good result, 85-100 points†	15 (37)
Fair results, 50-84 points†	20 (50)
Poor results, less than 50 points†	30 (75)
Proximal tibial osteotomy	
Good result	10 (25)
Poor result	Estimate impairment according to examination and arthritic degeneration
Tibial shaft fracture, malalignment of	
10°-14°	8 (20)
15°-19°	12 (30)
20°+	+1 (2) per degree up to 20 (50)
Ankle	
Ligamentous instability (based on stress x-rays‡)	
Mild (2-3 mm excess opening)	2 (5) [7]
Moderate (4-6 mm)	4 (10) [14]
Severe (> 6 mm)	6 (15) [21]
Fracture	
Extra-articular with angulation	
10°-14°	6 (15) [21]
15°-19°	10 (25) [35]
20°+	+1 (2) [3] per degree up to 15 (37) [53]
Intra-articular with displacement	8 (20) [28]
Hindfoot	
Fracture	
Extra-articular (calcaneal)	
With varus angulation 10°-19°	5 (12) [17]
With varus angulation 20°+	0.5 (1) [1] per degree up to 10 (25)
With valgus angulation 10°-19°	3 (7) [11]
With valgus angulation 20°+	0.5 (2) [1] per degree up to 10 (25) [35]

Region and Condition	Whole Person (Lower Extremity) [Foot] Impairment (%)
Loss of tibia–os calcis angle§	
Angle is 120°-110°	5 (12) [17]
Angle is 100°-90°	8 (20) [28]
Angle is less than 90°	+1 (2) [3] per degree up to 15 (37) [54]
Intra-articular fracture with displacement	
Subtalar bone	6 (15) [21]
Talonavicular bone	3 (7) [10]
Calcaneocuboid bone	3 (7) [10]
Midfoot deformity	
Cavus	
Mild	1 (2) [3]
Moderate	3 (7) [10]
"Rocker bottom"	
Mild	2 (5) [7]
Moderate	4 (10) [14]
Severe	8 (20) [28]
Avascular necrosis of the talus	
Without collapse	3 (7) [10]
With collapse	6 (15) [21]
Forefoot deformity	
Metatarsal fracture with loss of weight transfer	
1st metatarsal	4 (10) [14]
5th metatarsal	2 (5) [7]
Other metatarsal	1 (2) [3]
Metatarsal fracture with plantar angulation and metatarsalgia	
1st metatarsal	4 (10) [14]
5th metatarsal	2 (5) [7]
Other metatarsal	1 (2) [3]

Amputations

Table 17-32 Impairment Estimates for Amputations

Amputation	Whole Person (Lower Extremity) [Foot] Impairment (%)
Hemipelvectomy	50
Hip disarticulation	40 (100)
Above knee	
Proximal	40 (100)
Midthigh	36 (90)
Distal	32 (80)
Knee disarticulation	32 (80)
Below knee	
Less than 3"	32 (80)
3" or more	28 (70)
Syme (hindfoot)	25 (62) [100]
Midfoot	18 (45) [64]
Transmetatarsal	16 (40) [57]
First metatarsal	8 (20) [28]
Other metatarsals	2 (5) [7]
All toes at metatarsophalangeal (MTP) joint	9 (22) [31]
Great toe at MTP joint	5 (12) [17]
Great toe at interphalangeal joint	2 (5) [7]
Lesser toes at MTP joint	1 (2) [3] each

Example Amputations

- 35 y/o male with BKA
- Walks with prosthesis, 5 inch retained proximal tibial stump.
- Impairment: 28% WP

Table 17-32 Impairment Estimates for Amputations

Amputation	Whole Person (Lower Extremity) [Foot] Impairment (%)
Hemipelvectomy	50
Hip disarticulation	40 (100)
Above knee Proximal Midthigh Distal	 40 (100) 36 (90) 32 (80)
Knee disarticulation	32 (80)
Below knee Less than 3" 3" or more	 32 (80) 28 (70)
Syme (hindfoot)	25 (62) [100]
Midfoot	18 (45) [64]
Transmetatarsal	16 (40) [57]
First metatarsal	8 (20) [28]
Other metatarsals	2 (5) [7]
All toes at metatarsophalangeal (MTP) joint	9 (22) [31]
Great toe at MTP joint	5 (12) [17]
Great toe at interphalangeal joint	2 (5) [7]
Lesser toes at MTP joint	1 (2) [3] each

Diagnosis based estimates

- For hip and knee replacement, rate first with table 17-34 or 17-35
- Apply table 17-33
- If both THR and TKR combine impairments with combined values chart

Total joint replacement

Table 17-34 Rating Hip Replacement Results*

	Number of Points
a. Pain	
None	44
Slight	40
Moderate, occasional	30
Moderate	20
Marked	10
b. Function	
Limp	
None	11
Slight	8
Moderate	5
Severe	0
Supportive device	
None	11
Cane for long walks	7
Cane	5
One crutch	3
Two canes	2
Two crutches	0
Distance walked	
Unlimited	11
Six blocks	8
Three blocks	5
Indoors	2
In bed or chair	0
c. Activities	
Stairs climbing	
Normal	4
Using railing	2
Cannot climb readily	1
Unable to climb	0
Putting on shoes and socks	
With ease	4
With difficulty	2
Unable to do	0
Sitting	
Any chair, 1 hour	4
High chair	2
Unable to sit comfortably	0
Public transportation	
Able to use	1
Unable to use	0
d. Deformity	
Fixed adduction	
< 10°	1
≥ 10°	0
Fixed internal rotation	
< 10°	1
≥ 10°	0
Fixed external rotation	
< 10°	1
≥ 10°	0
Flexion contracture	
< 15°	1
≥ 15°	0
Leg length discrepancy	
< 1.5 cm	1
≥ 1.5 cm	0
e. Range of Motion	
Flexion	
> 90°	1
≤ 90°	0
Abduction	
> 15°	1
≤ 15°	0
Adduction	
> 15°	1
≤ 15°	0
External rotation	
> 30°	1
≤ 30°	0
Internal rotation	
> 15°	1
≤ 15°	0

* Add the points from categories a, b, c, d, and e to determine the total and characterize the result of replacement. Source: modified from Gross AE, McDermott AGP, Lavoie MV, et al. The use of allograft bone in revision hip arthroplasty. In: Brand R, ed. *Proceeding of the Fourteenth Open Scientific Meeting of the Hip Society.* St Louis, Mo: CV Mosby Co; 1987:49; and Harris AH. Traumatic arthritis of the hip after dislocation and acetabular fractures: treatment by mold arthroplasty. *J Bone Joint Surg Am.* 1969;51A:741-742.

Table 17-35 Rating Knee Replacement Results*

	Number of Points
a. Pain	
None	50
Mild or occasional	45
Stairs only	40
Walking and stairs	30
Moderate	
Occasional	20
Continual	10
Severe	0
b. Range of Motion	
Add 1 point per 5°	25
c. Stability	
(maximum movement in any position)	
Anteroposterior	
< 5 mm	10
5-9 mm	5
> 9 mm	0
Mediolateral	
5°	15
6°-9°	10
10°-14°	5
≥ 15°	0
Subtotal	
Deductions (minus) d, e, f	
d. Flexion contracture	
5°-9°	2
10°-15°	5
16°-20°	10
> 20°	20
e. Extension lag	
< 10°	5
10°-20°	10
> 20°	15
f. Alignment	
0°- 4°	0
5°-10°	3 points per degree
11°-15°	3 points per degree
> 15°	20
Deductions subtotal	—

* The point total for estimating knee replacement results is the sum of the points in categories a, b, and c minus the sum of the points in categories d, e, and f. Modified from Insall JN, Dorr LD, Scott RD. Rationale of the Knee Society clinical rating system. *Clin Orthop.* 1989;248:14.

Diagnosis based estimates

Table 17-33 Impairment Estimates for Certain Lower Extremity Impairments

Region and Condition	Whole Person (Lower Extremity) [Foot] Impairment (%)
Pelvis*	
Pelvic fracture	
Undisplaced, nonarticular, healed, without neurologic deficit or other sign	0
Displaced nonarticular fracture: estimate by evaluating shortening and weakness	—
Acetabular fracture: estimate according to range of motion and joint changes	—
Sacroiliac joint fracture: consider displacement	1-3 (2-7)
Ischial bursitis (weaver's bottom) requiring frequent unweighting and limiting of sitting time	3 (7)
Hip	
Total hip replacement; includes endoprosthesis, unipolar or bipolar	
Good results, 85-100 points†	15 (37)
Fair results, 50-84 points†	20 (50)
Poor results, less than 50 points†	30 (75)
Femoral neck fracture, healed in	
Good position	Evaluate according to examination findings
Malunion	12 (30) plus range-of-motion criteria
Nonunion	15 (37) plus range-of-motion criteria
Girdlestone arthroplasty Or estimate according to examination findings; use the greater estimate	20 (50)
Trochanteric bursitis (chronic) with abnormal gait	3 (7)
Femoral shaft fracture	
Healed with 10°-14° angulation or malrotation	10 (25)
15°-19°	18 (45)
20°	+1 (2) per degree up to 25 (62)

Region and Condition	Whole Person (Lower Extremity) [Foot] Impairment (%)
Knee	
Patellar subluxation or dislocation with residual instability	3 (7)
Patellar fracture	
Undisplaced, healed	3 (7)
Articular surface displaced more than 3 mm	5 (12)
Displaced with nonunion	7 (17)
Patellectomy	
Partial	3 (7)
Total	9 (22)
Meniscectomy, medial *or* lateral	
Partial	1 (2)
Total	3 (7)
Meniscectomy, medial *and* lateral	
Partial	4 (10)
Total	9 (22)
Cruciate *or* collateral ligament laxity	
Mild	3 (7)
Moderate	7 (17)
Severe	10 (25)
Cruciate *and* collateral ligament laxity	
Moderate	10 (25)
Severe	15 (37)
Plateau fracture	
Undisplaced	2 (5)
Displaced	
5°-9° angulation	5 (12)
10°-19° angulation	10 (25)
20°+ angulation	+1 (2) per degree up to 20 (50)
Supracondylar or intercondylar fracture	
Undisplaced fracture	2 (5)
Displaced fracture	
5°-9° angulation	5 (12)
10°-19° angulation	10 (25)
20°+ angulation	+1 (2) per degree up to 20 (50)

* Refer also to Section 15.14 on the pelvis.

† See Table 17-34 or Table 17-35 for point rating system.

‡ A stress x-ray is an anterior-posterior view taken with a varus or valgus stress applied by a knowledgeable physician.

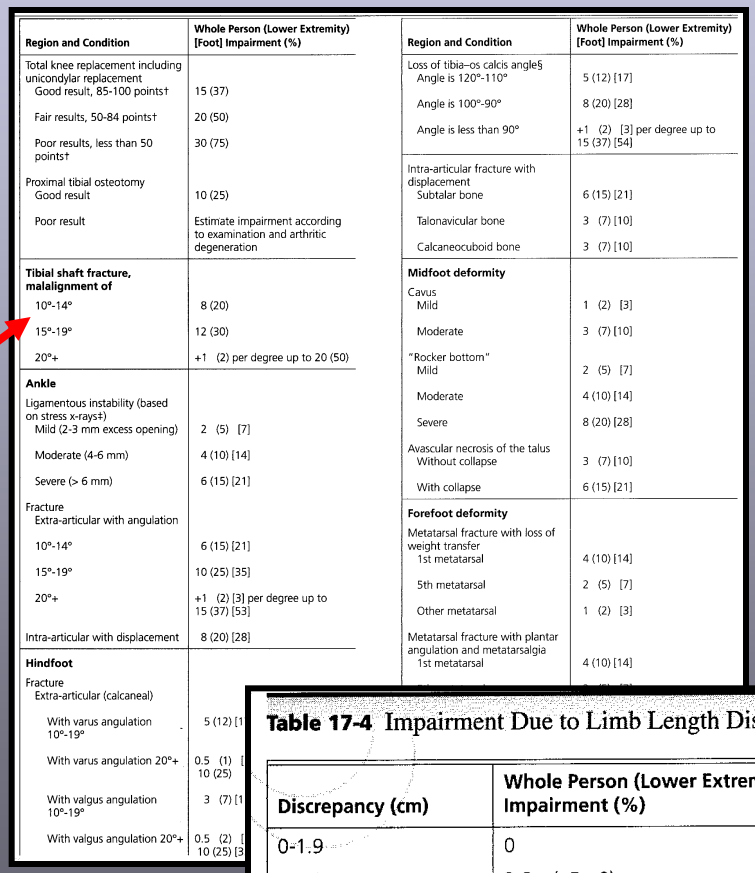
§ The tibia–os calcis angle is measured as shown in Figure 17-7.

Region and Condition	Whole Person (Lower Extremity) [Foot] Impairment (%)
Total knee replacement including unicondylar replacement	
Good result, 85-100 points†	15 (37)
Fair results, 50-84 points†	20 (50)
Poor results, less than 50 points†	30 (75)
Proximal tibial osteotomy	
Good result	10 (25)
Poor result	Estimate impairment according to examination and arthritic degeneration
Tibial shaft fracture, malalignment of	
10°-14°	8 (20)
15°-19°	12 (30)
20°+	+1 (2) per degree up to 20 (50)
Ankle	
Ligamentous instability (based on stress x-rays‡)	
Mild (2-3 mm excess opening)	2 (5) [7]
Moderate (4-6 mm)	4 (10) [14]
Severe (> 6 mm)	6 (15) [21]
Fracture	
Extra-articular with angulation	
10°-14°	6 (15) [21]
15°-19°	10 (25) [35]
20°+	+1 (2) [3] per degree up to 15 (37) [53]
Intra-articular with displacement	8 (20) [28]
Hindfoot	
Fracture	
Extra-articular (calcaneal)	
With varus angulation 10°-19°	5 (12) [17]
With varus angulation 20°+	0.5 (1) [1] per degree up to 10 (25)
With valgus angulation 10°-19°	3 (7) [11]
With valgus angulation 20°+	0.5 (2) [1] per degree up to 10 (25) [35]

Region and Condition	Whole Person (Lower Extremity) [Foot] Impairment (%)
Loss of tibia–os calcis angle§	
Angle is 120°-110°	5 (12) [17]
Angle is 100°-90°	8 (20) [28]
Angle is less than 90°	+1 (2) [3] per degree up to 15 (37) [54]
Intra-articular fracture with displacement	
Subtalar bone	6 (15) [21]
Talonavicular bone	3 (7) [10]
Calcaneocuboid bone	3 (7) [10]
Midfoot deformity	
Cavus	
Mild	1 (2) [3]
Moderate	3 (7) [10]
"Rocker bottom"	
Mild	2 (5) [7]
Moderate	4 (10) [14]
Severe	8 (20) [28]
Avascular necrosis of the talus	
Without collapse	3 (7) [10]
With collapse	6 (15) [21]
Forefoot deformity	
Metatarsal fracture with loss of weight transfer	
1st metatarsal	4 (10) [14]
5th metatarsal	2 (5) [7]
Other metatarsal	1 (2) [3]
Metatarsal fracture with plantar angulation and metatarsalgia	
1st metatarsal	4 (10) [14]
5th metatarsal	2 (5) [7]
Other metatarsal	1 (2) [3]

Example
Diagnosis based estimates

- 40 y/o female with comminuted tibia fracture. Treated closed.
- Mild pain, malunion with 10 deg varus and short 2.5 cm.
- Impairment: 11% WP
  - Malunion tibia fracture 8%, combine with shortening 3% using combined values chart



Region and Condition	Whole Person (Lower Extremity) [Foot] Impairment (%)
Total knee replacement including unicondylar replacement	
Good result, 85-100 points†	15 (37)
Fair results, 50-84 points†	20 (50)
Poor results, less than 50 points†	30 (75)
Proximal tibial osteotomy	
Good result	10 (25)
Poor result	Estimate impairment according to examination and arthritic degeneration
Tibial shaft fracture, malalignment of	
10°-14°	8 (20)
15°-19°	12 (30)
20°+	+1 (2) per degree up to 20 (50)
Ankle	
Ligamentous instability (based on stress x-rays‡)	
Mild (2-3 mm excess opening)	2 (5) [7]
Moderate (4-6 mm)	4 (10) [14]
Severe (> 6 mm)	6 (15) [21]
Fracture	
Extra-articular with angulation	
10°-14°	6 (15) [21]
15°-19°	10 (25) [35]
20°+	+1 (2) [3] per degree up to 15 (37) [53]
Intra-articular with displacement	8 (20) [28]
Hindfoot	
Fracture	
Extra-articular (calcaneal)	
With varus angulation 10°-19°	5 (12) [1
With varus angulation 20°+	0.5 (1) [10 (25)
With valgus angulation 10°-19°	3 (7) [1
With valgus angulation 20°+	0.5 (2) [10 (25) [3

Region and Condition	Whole Person (Lower Extremity) [Foot] Impairment (%)
Loss of tibia–os calcis angle§	
Angle is 120°-110°	5 (12) [17]
Angle is 100°-90°	8 (20) [28]
Angle is less than 90°	+1 (2) [3] per degree up to 15 (37) [54]
Intra-articular fracture with displacement	
Subtalar bone	6 (15) [21]
Talonavicular bone	3 (7) [10]
Calcaneocuboid bone	3 (7) [10]
Midfoot deformity	
Cavus	
Mild	1 (2) [3]
Moderate	3 (7) [10]
"Rocker bottom"	
Mild	2 (5) [7]
Moderate	4 (10) [14]
Severe	8 (20) [28]
Avascular necrosis of the talus	
Without collapse	3 (7) [10]
With collapse	6 (15) [21]
Forefoot deformity	
Metatarsal fracture with loss of weight transfer	
1st metatarsal	4 (10) [14]
5th metatarsal	2 (5) [7]
Other metatarsal	1 (2) [3]
Metatarsal fracture with plantar angulation and metatarsalgia	
1st metatarsal	4 (10) [14]

Table 17-4 Impairment Due to Limb Length Discrepancy

Discrepancy (cm)	Whole Person (Lower Extremity) Impairment (%)
0-1.9	0
2-2.9	2-3 (5- 9)
3-3.9	4-5 (10-14)
4-4.9	6-7 (15-19)
5+	8 (20)

Osteomyelitis Skin loss

Table 17-36 Impairments for Skin Loss

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

17.2k

Example
Skin loss

- 56 y/o male with diabetes and heel puncture wound. Skin graft required at heel.
- Standing & walking limited. Full ROM, wounds healed.
- Impairment: 10% WP
  - Standing & walking limited.

Table 17-36 Impairments for Skin Loss

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

Peripheral nerve injuries

Figure 17-8 Sensory Nerves of the Lower Extremity, Their Areas of Innervation and Roots of Origin

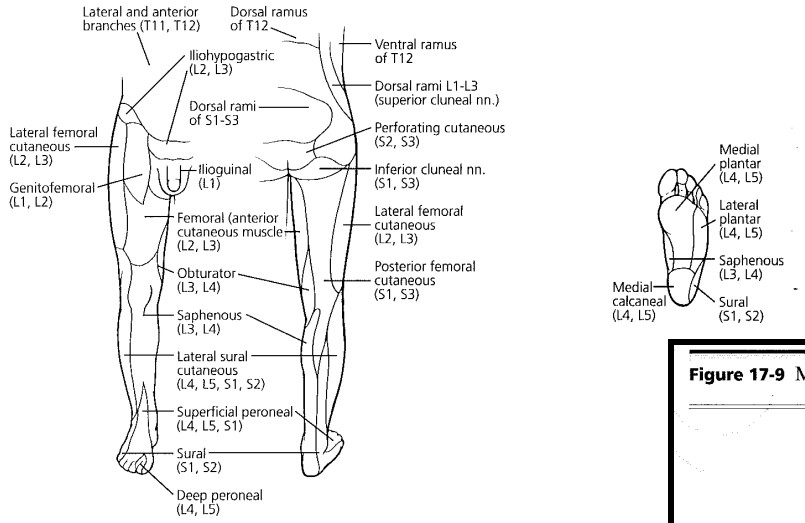
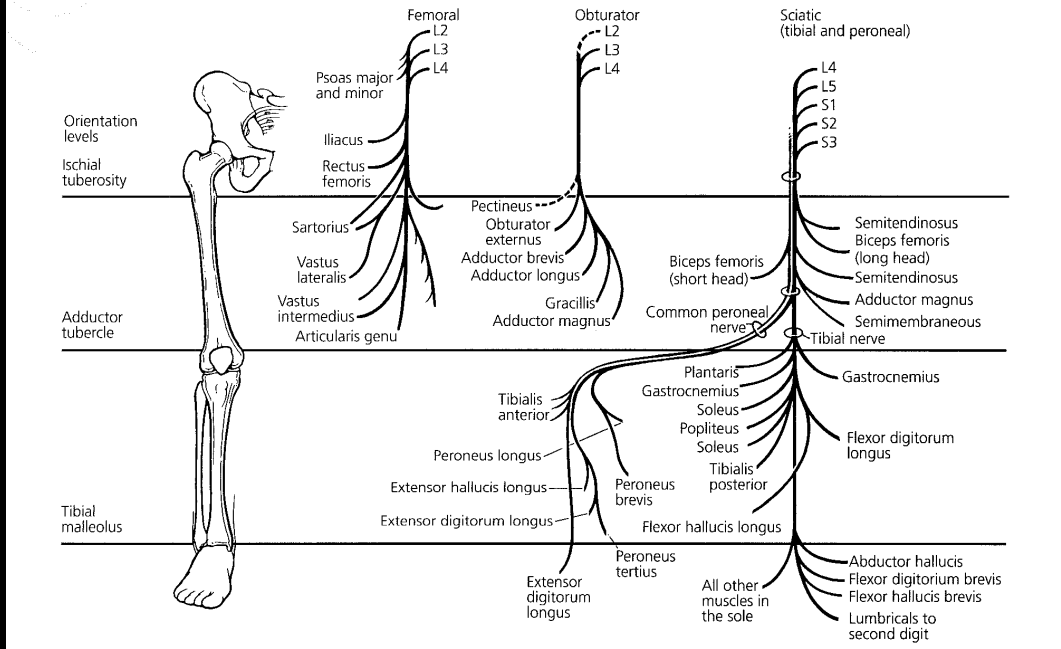


Figure 17-9 Motor Nerves of the Lower Extremity, Their Muscle Innervations and Roots of Origin



17.2l

Peripheral nerve injuries

- Separate motor and sensory
- Combine motor and sensory
- Do not exceed 40% WP
- Rate partial deficits as per table 16-10 and 16-11

17.2l

Table 17-37 Impairments Due to Nerve Deficits

	Whole Person (Lower Extremity) [Foot] Impairment (%)		
Nerve	**Motor**	**Sensory**	**Dysesthesia**
Femoral	15 (37)	1 (2)	3 (7)
Obturator	3 (7)	0	0
Superior gluteal	25 (62)	0	0
Inferior gluteal	15 (37)	0	0
Lateral femoral cutaneous	0	1 (2)	3 (7)
Sciatic	30 (75)	7 (17)	5 (12)
Common peroneal	15 (42)	2 (5)	2 (5)
Superficial peroneal	0	2 (5)	2 (5)
Sural	0	1 (2)	2 (5)
Medial plantar	2 (5) [7]	2 (5) [7]	2 (5) [7]
Lateral plantar	2 (5) [7]	2 (5) [7]	2 (5) [7]

Example
Peripheral nerve injury

- 22 y/o male with penetrating injury to groin. Femoral nerve transection. Nerve repaired with return of function.
- Gait abnormal, but no walking aids. Decreased sensation, motors grade 4.

Table 17-37 Impairments Due to Nerve Deficits

	Whole Person (Lower Extremity) [Foot] Impairment (%)		
Nerve	**Motor**	**Sensory**	**Dysesthesia**
Femoral	15 (37)	1 (2)	3 (7)
Obturator	3 (7)	0	0
Superior gluteal	25 (62)	0	0
Inferior gluteal	15 (37)	0	0
Lateral femoral cutaneous	0	1 (2)	3 (7)
Sciatic	30 (75)	7 (17)	5 (12)
Common peroneal	15 (42)	2 (5)	2 (5)
Superficial peroneal	0	2 (5)	2 (5)
Sural	0	1 (2)	2 (5)
Medial plantar	2 (5) [7]	2 (5) [7]	2 (5) [7]
Lateral plantar	2 (5) [7]	2 (5) [7]	2 (5) [7]

Example
Peripheral nerve injury

Impairment: 4% WP

- Use severity multipliers
- Sensory: 20% (x1)
- Motor: 25% (x15)
- Combine with combined values chart.

Table 16-10 Determining Impairment of the Upper Extremity Due to Sensory Deficits or Pain Resulting From Peripheral Nerve Disorders

a. Classification

Grade	Description of Sensory Deficit or Pain	% Sensory Deficit
5	No loss of sensibility, abnormal sensation, or pain	0
4	Distorted superficial tactile sensibility (diminished light touch), with or without minimal abnormal sensations or pain, that is forgotten during activity	1-25
3	Distorted superficial tactile sensibility (diminished light touch and two-point discrimination), with some abnormal sensations or slight pain, that interferes with some activities	26-60
2	Decreased superficial cutaneous pain and tactile sensibility (decreased protective sensibility), with abnormal sensations or moderate pain, that may prevent some activities	61-80
1	Deep cutaneous pain sensibility present; absent superficial pain and tactile sensibility (absent protective sensibility), with abnormal sensations or severe pain, that prevents most activity	81-99
0	Absent sensibility, abnormal sensations, or severe pain that prevents all activity	100

b. Procedure

1	Identify the area of involvement using the cutaneous innervation chart (Figure 16-48) or the dermatome chart (Figure 16-49).
2	Identify the nerve structure(s) that innervate the area(s) (Table 16-12 and Figures 16-48, 16-49, and 16-50).
3	Grade the severity of the sensory deficit or pain according to the classification given above (a). Use clinical judgment to select the appropriate percentage from the range of values shown for each severity grade.
4	Find the maximum upper extremity impairment value due to sensory deficit or pain for each nerve structure involved: spinal nerves (Table 16-13), brachial plexus (Table 16-14), and major peripheral nerves (Table 16-15).
5	*Multiply* the severity of the sensory deficit by the maximum upper extremity impairment value to obtain the upper extremity impairment for each nerve structure involved.

Table 16-11 Determining Impairment of the Upper Extremity Due to Motor and Loss-of-Power Deficits Resulting From Peripheral Nerve Disorders Based on Individual Muscle Rating

a. Classification

Grade	Description of Muscle Function	% Motor Deficit
5	Complete active range of motion against gravity with full resistance	0
4	Complete active range of motion against gravity with some resistance	1- 25
3	Complete active range of motion against gravity only, without resistance	26- 50
2	Complete active range of motion with gravity eliminated	51- 75
1	Evidence of slight contractility; no joint movement	76- 99
0	No evidence of contractility	100

b. Procedure

1	Identify the motion involved, such as flexion, extension, etc.
2	Identify the muscle(s) performing the motion and the motor nerve(s) involved.
3	Grade the severity of motor deficit of individual muscles according to the classification given above.
4	Find the maximum impairment of the upper extremity due to motor deficit for each nerve structure involved: spinal nerves (Table 16-13), brachial plexus (Table 16-14), and major peripheral nerves (Table 16-15).
5	Multiply the severity of the motor deficit by the maximum impairment value to obtain the upper extremity impairment for each structure involved.

Complex regional pain syndrome

- Diagnosis based on clinical findings
- Three-phase bone scan
- Use terms causalgia and RSD
- LE rate using table 13-15

Table 13-15 Criteria for Rating Impairments Due to Station and Gait Disorders

Class 1 1%-9% Impairment of the Whole Person	Class 2 10%-19% Impairment of the Whole Person	Class 3 20%-39% Impairment of the Whole Person	Class 4 40%-60% Impairment of the Whole Person
Rises to standing position; walks, but has difficulty with elevations, grades, stairs, deep chairs, and long distances	Rises to standing position; walks some distance with difficulty and without assistance, but is limited to level surfaces	Rises and maintains standing position with difficulty; cannot walk without assistance	Cannot stand without help, mechanical support, and/or an assistive device

Example
Complex regional pain syndrome

- 32 y/o woman with knee injury. Develops CRPS.
- Walks with two crutches and NWB on involved side.
- Impairment: 39% WP

Table 17-5 Lower Limb Impairment Due to Gait Derangement

Severity	Individual's Signs	Whole Person Impairment
Mild	a. Antalgic limp with shortened stance phase and documented moderate to advanced arthritic changes of hip, knee, or ankle	7%
	b. Positive Trendelenburg sign and moderate to advanced osteoarthritis of hip	10%
	c. Same as category a or b above, but individual requires part-time use of cane or crutch for distance walking but not usually at home or in the workplace	15%
	d. Requires routine use of short leg brace (ankle-foot orthosis [AFO])	15%
Moderate	e. Requires routine use of cane, crutch, or long leg brace (knee-ankle-foot orthosis [KAFO])	20%
	f. Requires routine use of cane or crutch and a short leg brace (AFO)	30%
	g. Requires routine use of two canes or two crutches	40%
Severe	h. Requires routine use of two canes or two crutches and a short leg brace (AFO)	50%
	i. Requires routine use of two canes or two crutches and a long leg brace (KAFO)	60%
	j. Requires routine use of two canes or two crutches and two lower-extremity braces (either AFOs or KAFOs)	70%
	k. Wheelchair dependent	80%

Table 13-15 Criteria for Rating Impairments Due to Station and Gait Disorders

Class 1 1%-9% Impairment of the Whole Person	Class 2 10%-19% Impairment of the Whole Person	Class 3 20%-39% Impairment of the Whole Person	Class 4 40%-60% Impairment of the Whole Person
Rises to standing position; walks, but has difficulty with elevations, grades, stairs, deep chairs, and long distances	Rises to standing position; walks some distance with difficulty and without assistance, but is limited to level surfaces	Rises and maintains standing position with difficulty; cannot walk without assistance	Cannot stand without help, mechanical support, and/or an assistive device

Vascular disorders

- LE impairment, multiply by 0.4 for WP

Table 17-38 Lower Extremity Impairment Due to Peripheral Vascular Disease

Class 1 0%-9% Impairment	Class 2 10%-39% Impairment	Class 3 40%-69% Impairment	Class 4 70%-89% Impairment	Class 5 90%-100% Impairment
Neither claudication nor pain at rest ***and*** only transient edema ***and*** on physical examination, not more than the following findings are present: loss of pulses; minimal loss of subcutaneous tissue; calcification of arteries as detected by x-ray examination; asymptomatic dilation of arteries or of veins, not requiring surgery and not resulting in curtailment of activity	Intermittent claudication on walking at least 100 yards at an average pace ***or*** persistent edema of a moderate degree, incompletely controlled by elastic supports ***or*** vascular damage as evidenced by a sign such as a healed, painless stump of an amputated digit showing evidence of persistent vascular disease or healed ulcer	Intermittent claudication on walking as few as 25 yards and no more than 100 yards at average pace ***or*** marked edema that is only partially controlled by elastic supports ***or*** vascular damage as evidenced by a sign such as healed amputation of two or more digits of one extremity, with evidence of persisting vascular disease or superficial ulceration	Intermittent claudication on walking less than 25 yards or intermittent pain at rest ***or*** marked edema that cannot be controlled by elastic supports ***or*** vascular damage as evidenced by signs such as an amputation at or above an ankle, or amputation of two or more digits of two extremities with evidence of persistent vascular disease, or persistent widespread or deep ulceration involving one extremity	Severe and constant pain at rest ***or*** vascular damage as evidenced by such signs as amputations at or above the ankles of two extremities, or amputation of all digits of two or more extremities, with evidence of persistent vascular disease or of persistent, widespread, or deep ulceration involving two or more extremities

Example
Vascular disorders

- 45 y/o male with tibia fracture. Develops DVT.
- Standing and walking limited, no weakness, full ROM, chronic venous insufficiency, edema not controlled with Jobst stocking.

- Impairment: 8% WP
  - Class 2, 20% LE x 0.4 = 8%

Table 17-38 Lower Extremity Impairment Due to Peripheral Vascular Disease

Class 1 0%-9% Impairment	Class 2 10%-39% Impairment	Class 3 40%-69% Impairment	Class 4 70%-89% Impairment	Class 5 90%-100% Impairment
Neither claudication nor pain at rest ***and*** only transient edema ***and*** on physical examination, not more than the following findings are present: loss of pulses; minimal loss of subcutaneous tissue; calcification of arteries as detected by x-ray examination; asymptomatic dilation of arteries or of veins, not requiring surgery and not resulting in curtailment of activity	Intermittent claudication on walking at least 100 yards at an average pace ***or*** persistent edema of a moderate degree, incompletely controlled by elastic supports ***or*** vascular damage as evidenced by a sign such as a healed, painless stump of an amputated digit showing evidence of persistent vascular disease or healed ulcer	Intermittent claudication on walking as few as 25 yards and no more than 100 yards at average pace ***or*** marked edema that is only partially controlled by elastic supports ***or*** vascular damage as evidenced by a sign such as healed amputation of two or more digits of one extremity, with evidence of persisting vascular disease or superficial ulceration	Intermittent claudication on walking less than 25 yards or intermittent pain at rest ***or*** marked edema that cannot be controlled by elastic supports ***or*** vascular damage as evidenced by signs such as an amputation at or above an ankle, or amputation of two or more digits of two extremities with evidence of persistent vascular disease, or persistent widespread or deep ulceration involving one extremity	Severe and constant pain at rest ***or*** vascular damage as evidenced by such signs as amputations at or above the ankles of two extremities, or amputation of all digits of two or more extremities, with evidence of persistent vascular disease or of persistent, widespread, or deep ulceration involving two or more extremities

Impairment worksheet

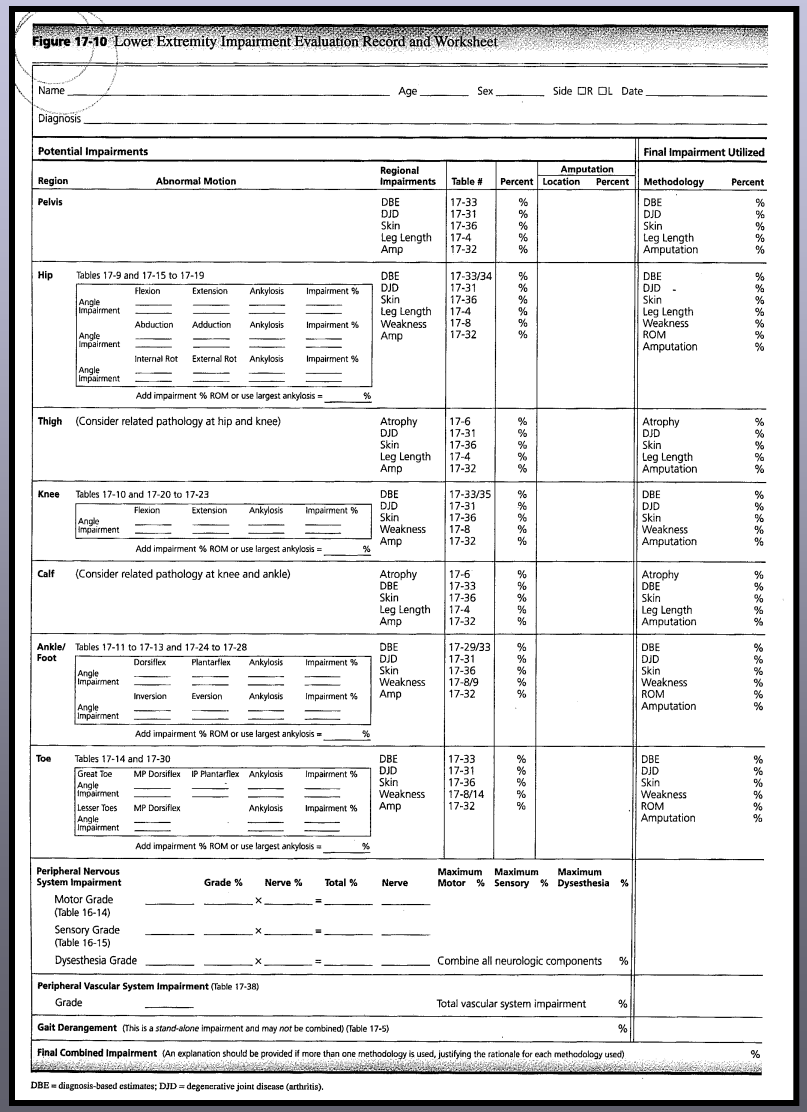


Figure 17-10 Lower Extremity Impairment Evaluation Record and Worksheet

Name _____ Age _____ Sex _____ Side ☐R ☐L Date _____

Diagnosis _____

Potential Impairments

Region	Abnormal Motion	Regional Impairments	Table #	Percent	Amputation Location	Amputation Percent
Pelvis		DBE DJD Skin Leg Length Amp	17-33 17-31 17-36 17-4 17-32	% % % % %		
Hip	Tables 17-9 and 17-15 to 17-19 Flexion / Extension / Ankylosis / Impairment % Angle / Impairment Abduction / Adduction / Ankylosis / Impairment % Angle / Impairment Internal Rot / External Rot / Ankylosis / Impairment % Angle / Impairment Add impairment % ROM or use largest ankylosis = _____ %	DBE DJD Skin Leg Length Weakness Amp	17-33/34 17-31 17-36 17-4 17-8 17-32	% % % % % %		
Thigh	(Consider related pathology at hip and knee)	Atrophy DJD Skin Leg Length Amp	17-6 17-31 17-36 17-4 17-32	% % % % %		
Knee	Tables 17-10 and 17-20 to 17-23 Flexion / Extension / Ankylosis / Impairment % Angle / Impairment Add impairment % ROM or use largest ankylosis = _____ %	DBE DJD Skin Weakness Amp	17-33/35 17-31 17-36 17-8 17-32	% % % % %		
Calf	(Consider related pathology at knee and ankle)	Atrophy DBE Skin Leg Length Amp	17-6 17-33 17-36 17-4 17-32	% % % % %		
Ankle/ Foot	Tables 17-11 to 17-13 and 17-24 to 17-28 Dorsiflex / Plantarflex / Ankylosis / Impairment % Angle / Impairment Inversion / Eversion / Ankylosis / Impairment % Angle / Impairment Add impairment % ROM or use largest ankylosis = _____ %	DBE DJD Skin Weakness Amp	17-29/33 17-31 17-36 17-8/9 17-32	% % % % %		
Toe	Tables 17-14 and 17-30 Great Toe / MP Dorsiflex / IP Plantarflex / Ankylosis / Impairment % Angle / Impairment Lesser Toes / MP Dorsiflex / Ankylosis / Impairment % Angle / Impairment Add impairment % ROM or use largest ankylosis = _____ %	DBE DJD Skin Weakness Amp	17-33 17-31 17-36 17-8/14 17-32	% % % % %		

Final Impairment Utilized	
Methodology	Percent
DBE	%
DJD	%
Skin	%
Leg Length	%
Amputation	%
DBE	%
DJD	%
Skin	%
Leg Length	%
Weakness	%
ROM	%
Amputation	%
Atrophy	%
DJD	%
Skin	%
Leg Length	%
Amputation	%
DBE	%
DJD	%
Skin	%
Weakness	%
Amputation	%
Atrophy	%
DBE	%
Skin	%
Leg Length	%
Amputation	%
DBE	%
DJD	%
Skin	%
Weakness	%
ROM	%
Amputation	%
DBE	%
DJD	%
Skin	%
Weakness	%
ROM	%
Amputation	%

Peripheral Nervous System Impairment

	Grade %	Nerve %	Total %	Nerve	Maximum Motor %	Maximum Sensory %	Maximum Dysesthesia %
Motor Grade (Table 16-14)	_____	_____ × _____	= _____	_____			
Sensory Grade (Table 16-15)	_____	_____ × _____	= _____	_____			
Dysesthesia Grade	_____	_____ × _____	= _____	_____	Combine all neurologic components		%

Peripheral Vascular System Impairment (Table 17-38)

Grade _____ Total vascular system impairment %

Gait Derangement (This is a *stand-alone* impairment and may *not* be combined) (Table 17-5) %

Final Combined Impairment (An explanation should be provided if more than one methodology is used, justifying the rationale for each methodology used) %

DBE = diagnosis-based estimates; DJD = degenerative joint disease (arthritis).

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