

Lower Extremity



AMA Guides, 5th Edition Lower Extremity Chapter 17

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Questions ?

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Impairment Rating Starts the Process That Compensates the Injured Worker



Workers' Compensation


- **Inhibits Recovery:**
 - *Spine* 1989; 14: 947-955
 - *Spine* 1998; 23 (21): 2319-2328
 - *Spine* 1986; 11: 141-143
 - *Spine* 1997; 22 (17): 2016-2024
- **Increases Disability:**
 - *Pain* 1992; 48: 125-130
 - *J Psychoses Res* 1998; 32: 277-283
 - *Spine* 1992; 17: 307-310
 - *Arch Physical Medicine Rehab* 1989; 70: 589-593
- **Decreases Potential to Return to Work:**
 - *Spine* 1988; 13: 351-353
 - *Arch Physical Medicine Rehab* 1986; 67: 233-236
 - *Arch Physical Medicine Rehab* 1989; 70: 589-593

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Canadian Medical Association Policy Summary

- “The Physician’s Role in Helping Patients Return to Work After Illness or Injury”
CMAJ 1997; 156 (5): 680A-F
- “Prolonged absence from one’s normal roles, including absence from the workplace, is detrimental to a person’s mental, physical, and social well being. Physicians should therefore encourage a patient’s return to function and work as soon as possible...”

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 AMERICAN COLLEGE OF
OCCUPATIONAL AND
ENVIRONMENTAL MEDICINE

ACOEM Consensus Opinion Statement April 14, 2002

**The Attending Physician's Role in Helping Patients Return to Work
After an Illness or Injury**

Approved by the ACOEM Board of Directors on April 14, 2002

Introduction

Because prolonged absence from one's normal roles, including absence from the workplace, is detrimental to a person's mental, physical, and social well-being, this policy addresses the role of attending physicians in assisting their patients to return to work after an illness or injury. A safe and timely return to work benefits the patient and his or her family by enhancing recovery, reducing disability, and minimizing social and economic derangement. The attending physician's role is to diagnose and treat the illness or injury, to advise and support the patient, to provide and communicate appropriate information to the patient and the employer, and to work closely with other involved health care professionals to facilitate the patient's safe and timely return to the most productive employment possible. Carrying out this role requires physicians to understand the patient's roles in the family and the workplace. It requires physicians to recognize and support the employee-employer relationship and the central importance of this relationship in the return to work. Finally, it requires physicians to have a good understanding of the potential roles of

AAOS Position Statement September 2000

- AAOS supports safe, early RTW...help(s) improve performance, regain functionality, and enhance quality of life.
- As patient advocates, ...early RTW ...benefits ...including prevention of deconditioning and psychological sequels of prolonged time off work.
- AAOS believes that safe, early RTW programs are in the best interest of patients. ...improves quality of life for the injured worker.

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“Compensable Injuries and Health Outcomes”

- Australian Faculty of Occupational Medicine, The Royal Australian College of Physicians, Health Policy Unit
 - ISBN 0-909783-48-9
 - www.racp.edu.au/afom/compensable/index.htm
- Review of literature on recovery/health outcomes following compensable injuries.
- Multidisciplinary panel:
 - Medical
 - Legal
 - Insurance
 - Government oversight bodies

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“Compensable Injuries and Health Outcomes”

www.racp.edu.au/afom/compensable/index.htm

- Summary:
 - “Although most people who have **compensable injuries** recover well, a **greater percentage** of these people have **poorer health outcomes** than do those with similar but non-compensable injuries.
 - ...a complex interaction of factors is responsible for this.”

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“Compensable Injuries and Health Outcomes”

www.racp.edu.au/afom/compensable/index.htm

- Summary of causes of poorer health outcomes:
 - “Unemployment itself is a risk factor for poor health.

There are multiple and interrelating effects of being away from work, including loss of sense of identity, loss of social networks, loss of economic control and independence, loss of social status, loss of financial security (such as loss of the family home), and so on.”

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Aphorisms

- “Love and work are the two things that give life meaning and purpose.”
 - Sigmund Freud
 - Freud was an atheist, so he missed THE BIG ONE.
- “Employment is nature’s physician, and is essential to human happiness.”
 - Galen

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General Instructions

- "Impairment ratings reflect an individual's ability to perform the activities of daily living (ADL)."
- Lower Extremity Impairments is valued at 40 % of the whole person.
- Convert Lower Extremity PPI %'s to Whole Person by multiplying by 0.4, or use Table 17-3 on page 527.

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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

Methods of Assessment: 17.2

- Evaluator should read this chapter in its entirety.
- Use "Worksheet", Figure 17-10, page 561.
- 1st Step: establish Diagnosis(es), and whether or not MMI has been reached.
- Next: Identify each part of the L.E. that might possibly warrant a PPI rating.
- Consult the "**Cross-Usage Chart**" (Table 17-2)

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Guide to the Appropriate Combination of Evaluation Methods

One or more of the 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 (13)	Skin Loss	Peripheral Nerve Injury	Foot Deformities	Lower Extremity Joint Replacements	Vascular
Limb Length Discrepancy		X											
Gait Derangement	X		X	X	X	X	X	X	X	X	X	X	X
Muscle Atrophy		X			X	X	X	X	X	X	X	X	X
Muscle Strength		X	X		X	X	X	X	X	X	X	X	X
ROM Ankylosis		X	X	X									
Arthritis (DJD)		X	X	X	X								
Amputation	X	X	X	X									
Diagnosis Based (13)		X	X	X	X	X	X						
Skin Loss		X	X	X	X	X	X						
Peripheral Nerve Injury		X	X	X	X	X	X						
Foot Deformities		X	X	X	X	X	X						
Lower Extremity Joint Replacements		X	X	X	X	X	X						
Vascular		X	X	X	X	X	X						

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

Table 17-2 Appropriate Combination

Part of (lower left) Table

X = Do NOT use these methods together

	Limb Length Difference	Gait Derangement	Muscle Atrophy	Muscle Strength
ROM		X	X	X
Ankylosis		X	X	X
Arthritis (DJD)		X	X	X
Amputation	X	X	X	
Diagnosis		X	X	X

Table 17-33

Contradictory Instructions ??

- "... select the clinically most appropriate (ie, most specific) method(s) ..." p 527
- "When uncertain about which method to choose, the evaluator should calculate the impairment using different alternatives and choose the method or combination of methods that gives the most clinically accurate impairment rating." p. 527
- "If more than one method can be used, the method that provides the higher rating should be adopted." p. 528

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17.2 b Limb Length Discrepancy

- Supine measurement from Anterior Superior Iliac Spine (ASIS) to the medial malleolus. Measure 3 times and average to ↓ error.
- Another method, evaluating level of iliac crests is not recommended, since pelvic obliquity, or hip flexion and/or adduction contractures may be the cause of apparent leg length differences.
- Both methods have at least 0.5 – 1.0 cm variance, and are difficult to perform if pelvic obliquity, knee flexion contracture, or ankle edema are present.
- Thus, **Teleroentgenography is recommended.**

Impairment Due to Limb Length Discrepancy

Table 17-4, page 528

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)

Limb Length, Text addition If due to fracture mal-alignment (Not Flexion – Extension Deformities) Slightly Higher PPI %'s

Discrepancy (cm)	Lower Extremity Impairment %
0 - 1.25	5 %
1.25 - 2.5	10 %
2.5 - 3.75	15 %
3.75 - 5.0	20 %

17.2 c Gait Derangement

- Table 17-5 is for full time gait derangements of persons who are dependent on assistive devices.
- **“Whenever possible, the evaluator should use a more specific method.”**
- **“When the gait method is used, a written rationale should be included in the report.”**
- **“The lower limb impairment percents shown in Table 17-5 stand alone and are not combined with any other... method.”**

17.2 c Gait Derangement

- “... should be supported by pathologic findings, such as x-rays.”
- “... does not apply to abnormalities based only on subjective factors, such as pain or sudden giving-way, as with, for example, an individual with low back discomfort who chooses to use a cane to assist in walking.”

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 17-5: Gait Derangement, 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 the 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 %

Table 17-5: Gait, Moderate

Requires routine use of cane, crutch, or long leg brace (knee-ankle-foot-orthosis [KAFO])	20 % WP
Requires routine use of cane or crutch and a AFO	30 % WP
Requires routine use of two canes or two crutches	40 % WP

Table 17-5: Gait Derangement, Severe

Requires routine use of two canes or two crutches AND a AFO	50 % WP
Requires routine use of two canes or two crutches AND a KAFO	60 % WP
Requires routine use of two canes or two crutches AND TWO KAFOs	70 % WP
Wheelchair dependent	80 %

17.2 d Muscle Atrophy (Unilateral)

- Must measure same level
 - Thigh 10 cm. ↑ superior patella
 - Calf at “maximal level”
- Varicose veins and/or Swelling invalidate
- One of four ways to assess muscle function (gait, weakness, nerve injury)
 - only one should be used

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Guide to the Appropriate Combination of Evaluation Methods

From body/limb impairment ratings derived from these methods can be combined

	Limb Length Discrepancy	Gait Derangement	Muscle Atrophy	Muscle Strength	ROM Ankylosis	Arthritis (DGI)	Amputation	Diagnosis Based on EMG	Skin Loss	Peripheral Nerve Injury	Complex Regional Pain Syndrome (CRPS)	Vascular
Limb Length Discrepancy	X											
Gait Derangement		X										
Muscle Atrophy			X									
Muscle Strength				X								
ROM Ankylosis					X							
Arthritis (DGI)						X						
Amputation							X					
Diagnosis Based on EMG								X				
Skin Loss									X			
Peripheral Nerve Injury										X		
Complex Regional Pain Syndrome (CRPS)											X	
Vascular												X

Do not use more than one method to evaluate a single impairment

Muscle Atrophy

- May Combine With
 1. Limb Length
 2. Skin Loss
 3. Vascular
- May Not Combine With
 1. Gait Derangement
 2. Muscle Strength
 3. ROM/Ankylosis
 4. Arthritis
 5. Amputation
 6. Diagnosis
 7. Peripheral Nerve Injury
 8. CRPS

Table 17-6 Unilateral Leg Atrophy
Thigh and Calf have the same %'s

Difference (cm)	Thigh WP % (LE %)	Calf WP % (LE %)
0 - 0.9	0	0
1 - 1.9	1 - 2 (3 - 8)	1 - 2 (3 - 8)
2 - 2.9	3 - 4 (8 - 13)	3 - 4 (8 - 13)
3 +	5 (13)	5 (13)

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17.2 e Manual Muscle Testing

- "...depends on ...cooperation and ... conscious and unconscious control."
- "... should be concordant with other observable pathologic signs and medical evidence."
- "... best used (if) ...not a primary neurologic basis, eg, a compartment syndrome or direct muscle trauma."
- "Individuals whose performance is inhibited by pain or the fear of pain are not good candidates ...and other ...methods should be considered."

17.2 e Manual Muscle Testing

- "... strength may vary from one examination to another, but not by more than one grade. If ... vary by more than one grade between observers, or by the same observer on separate occasions, the measurements should be considered invalid. In those individuals, impairment estimates should not be made using this section."

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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

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 (52)	25 (52)	25 (52)	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]
	Gr. toe	3 (7) [10]	3 (7) [10]	3 (7) [10]	3 (7) [10]	1 (2) [3]
Great toe	Extension	3 (7) [10]	3 (7) [10]	3 (7) [10]	3 (7) [10]	1 (2) [3]
	Flexion	3 (7) [10]	3 (7) [10]	3 (7) [10]	3 (7) [10]	1 (2) [3]

Table 17-8 Weakness

Muscle Group	Grade 3	Grade 4
Hip Flexion	4 (10)	2 (5)
Extension	15 (37)	7 (17)
Abduction*	15 (37) typo 27?	10 (25)
Knee Flexion	7 (17)	5 (12)
Extension	7 (17)	5 (12)
Ankle Flexion	10 (25)	7 (17)
Extension	11 (25)	5 (12)
Inversion	5 (12)	2 (5)
Eversion	5 (12)	2 (5)
Gr. Toe Ext.	3 (7)	1 (2)
Flexion	5 (12)	2 (5)

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RANGE OF MOTION

- Motivation and Pain may affect measurement
- Invalid with inconsistency
- Needs an organic basis
- Use Instrument e.g. Goniometer
- Different Joint Positions may affect measurement: e.g. ankle with knee 45° flexed and extended (Figure 17-5)

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17.2 f Range of Motion

- Pain and Motivation can affect measurements.
- Must have “organic basis”.
- 3 measurements, GREATEST ONE is used.
- “If multiple evaluations exist, and there is inconsistency of a rating class between the findings of two observers, or in the findings on separate occasions by the same observer, the results are considered invalid.”
- Figures 17-1 thru 17-6 show illustrations of how* motion is to be measured for each joint.

* = “one method”

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17.2 f Range of Motion

- Unlike the 4th Edition:
“Range of motion restrictions in multiple directions do increase the impairment. Add ... impairments for a single joint to determine the total joint ... impairment. For example, hip motion is evaluated and any impairment *added* in each of the six principle directions of motion.”

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Figure 17-1: Hip Flexion and Hip Flexion Contracture

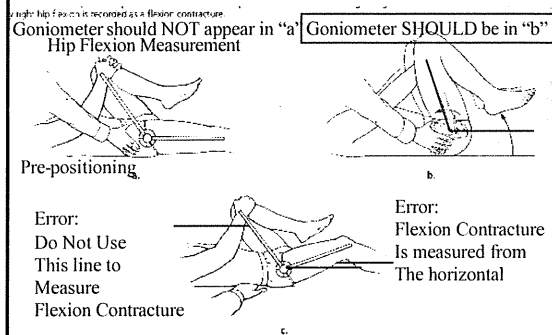


Figure 17-2: Neutral Position, Abduction, & Adduction

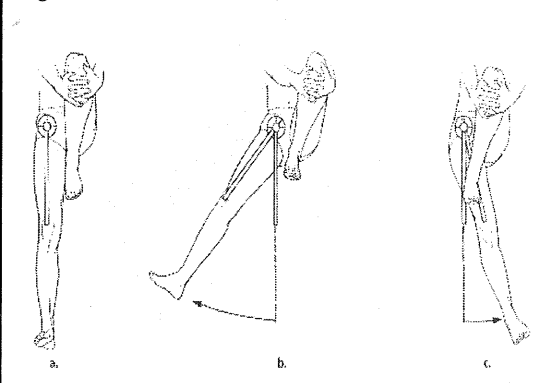


Figure 17-3: Hip Rotation

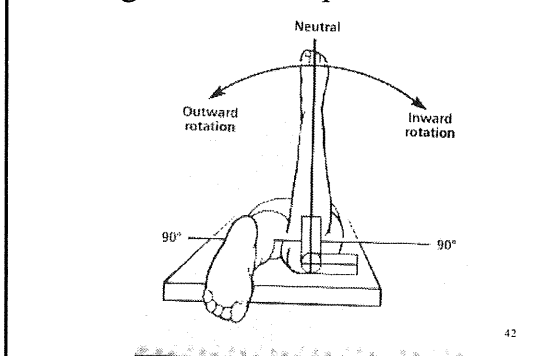


Figure 17-4: Knee Flexion

Note:
No Picture
Of Knee
Extension,
And
Table 17-10
Lists
"Flexion
Contracture"
(Passive)
-Not Active
Extension
??

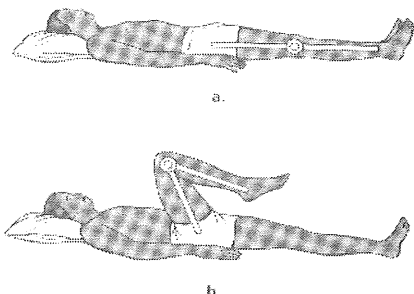


Figure 17-5 Ankle Flexion and Extension

Note: No picture of hindfoot Inversion and Eversion
Repeat with Knee Flexed to 45°, average the 2 measurements

Figure 17-7: Tibia – Os Calcis Angle

Used for Hindfoot Ankylosis (Table 17-29) and
for deformity after Fracture of Os Calcis (Table 17-33: Diagnosis)

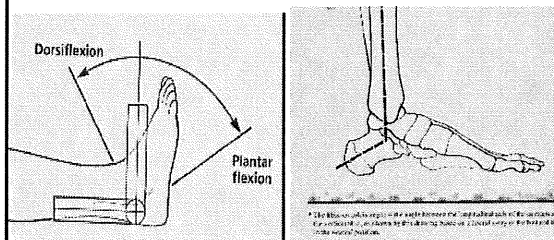


Table 17-10 Knee Impairment Whole Person %, (Lower Extremity %)			
Motion	4% (10%)	8% (20%)	14% (35%)
Flexion	< 110°	< 80°	< 60°, + 1% (2%) / 10° < 60°
Flexion Contracture	5 – 9°	10 – 19°	> 20°
Deformity measured by femoral-tibial angle; 3° to 10° valgus is considered normal. (Don't rate congenitally Bow-legged)			
Varus	2° valgus - 0° Neutral	1° - 7° varus	8° - 12° varus; add 1 % (2%) / 10° > 12°
Valgus	10° - 12°	13° - 15°	16°-20°; add 1% (2%) / 10° > 20° ⁴³

17.2 g Joint Ankylosis

- PPI %s for "Optimal position" for joint ankylosis (fusion) is stated in the TEXT.
- Deviations from Optimal are rated using the appropriate table(s).
- PPI % for MALPOSITION are added to the TEXT rating for optimal position.
- Multiple malposition deformities are each rated.

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Ankylosis: Example

- "The optimal position of hip ankylosis is 25° to 40° flexion, and neutral rotation, adduction, and abduction. This position represents a 20 % whole person impairment and a 50 % lower extremity impairment." p. 538
- Example: hip ankylosed at:
 - Flexion 55°
 - External Rotation 12°
 - Abduction 10°

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Table 17-15: Hip Ankylosis

Flexion in degrees	Whole Person % (Lower Extremity %)
0 - 9	15 (37)
10 - 19	10 (25)
20 - 24	5 (12)
25 - 39	0 (0) Still 50 % L.E.
40 - 49	5 (12)
50 - (55) - 59	10 (25)
60 - 69	15 (37)
> 70	20 (50)

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Table 17-17: Hip Ankylosis
External Rotation

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

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Table 17-18: Hip Ankylosis
Abduction

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

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Example: Hip Ankylosis

- Optimal position = 50 % L.E.
- Flexion (55°) = 25 %
- External Rotation (12°) = 12 %
- Abduction (10°) = 25 %
- **Add the impairments = 112%**
- **But, Since NO impairment can be > 100%, the “final answer” is 100% lower extremity (40 % whole person).**

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17.2 h Arthritis

- X-ray grading of severity by “Cartilage Interval”, or space occupied by articular cartilage (between the bones), as the thinning of articular cartilage correlates well with the progression of arthritis.
- Impairment estimates from range of motion, weakness, and crepitus do not correlate as well, and thus, if arthritis is present, the preferred method is Roentgenographic grading.

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Arthritis: Positioning for X-rays

- Standard positions, Standing if possible.
- Idea film-to-camera distance is 90 cm (36 inches).
- Beam should be at the level of and parallel to the joint surface.
- Patellofemoral joint: “sunrise” (40° flexion), or a true lateral view.
- If knee flexion contracture, x-ray measurements are unreliable, and Range-of Motion should be used instead.
- Hindfoot, uses lateral view, while Midfoot and Forefoot use A-P view.

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Arthritis Impairments Based on Roentgenographically Determined Cartilage Intervals

Joint	Whole Person (Lower Extremity) [Foot] Impairment (%)			
	Cartilage Interval			
	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 crepitus on physical examination, but without joint space narrowing on x-rays, a 2% whole person or 4% lower extremity impairment is given.

Rating arthritis

- Pick the narrowest joint space on the film to represent the degree of narrowing.
- Example: If the knee medial joint space is 1 mm while the lateral joint space is 4 mm, rate the impairment by looking up a 1 mm joint space for the knee.

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Table 17-31 Arthritis (p. 544) Post-Traumatic Chondromalacia Patella Footnote

- “† If 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.”

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AMPUTATIONS Impairment Estimates for Amputations

Amputation	Whole Person (Lower Extremity) [Foot] Impairment (%)
Hemipellectomy	50
Hip disarticulation	40 (100)
Above knee	
Proximal	40 (100)
Midhigh	36 (90)
Distal	32 (80)
Knee disarticulation	32 (80)
Below knee	
Less than 3"	32 (80)
3" or more	28 (70)
Syme (thudfoot)	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

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17.2 j Diagnosis Based Estimates

Sections to rate:

- Pelvis (“see also section 15.14, p 428)
- Hip (Hip replacement based on “score”, Table 17-34)
- Femoral shaft Fracture
- Knee (replacement based on “score”, Table 17-35)
- Tibial shaft Fracture
- Ankle
- Foot (Hindfoot, Midfoot, Forefoot)

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17.2 j Diagnosis Based Estimates

- “Fractures in and about joints with degenerative changes should be rated EITHER by using this section (DBE) and combining the rating with that for arthritis, OR by using the loss of range-of-motion method. It is recommended that the method providing the greater of the two impairment estimates be used.”

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17.2 j “OOPS”

- “A diagnosis of isolated full-thickness articular cartilage defects and ununited osteochondral fractures requires arthroscopic or surgical confirmation.” p. 549
- Yet, Table 17-33 (Diagnosis) does not list ratings for these conditions.
- Comment belongs in section on Arthritis, where there should have been an instruction to consider these as “Mild” arthritis.

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Table 16-10 (p. 482)		
Grade	Description	% multiplier
5	No loss of sensibility, abnormal sensation, or pain	0
4	Decreased light touch, sensations or pain forgotten during activity	1 – 25
3	Decreased light touch and 2 PD, some abnormal sensations or slight pain, interferes with some Activities	26 – 60
2	Decreased Protective Sensation, abnormal sensation or moderate pain, prevents some activities	61 – 80
1	No protective sensibility, abnormal sensations or severe pain prevents most activity	81 – 99
0	No sensibility, abnormal sensation or severe pain prevents all activity	100 ⁶⁷

Table 15-15: Sensation (p. 424)		
Grade	Description	% multiplier
5	No loss of sensibility, abnormal sensation, or pain	0
4	Decreased light touch, sensations or pain forgotten during activity	1 – 25
3	Decreased ..., some abnormal sensations or slight pain, interferes with some Activities	26 – 60
2	Decreased Protective Sensation, abnormal sensation or moderate pain, prevents some activities	61 – 80
1	No protective sensibility, abnormal sensations or severe pain prevents most activity	81 – 99
0	No sensibility, abnormal sensation or severe pain prevents all activity	100 ⁶⁸

Table 15-16 and Table 16-11 (same): Motor Deficit		
Grade	Description	% Multiplier
5	Normal	0
4	Full ROM against gravity plus resistance	1 – 25
3	Full ROM against gravity, but not with any resistance	26 – 50
2	Motion when gravity is eliminated	51 – 75
1	Slight contraction, NO movement	76 – 99
0	No Contraction	100 ⁶⁹

Impairments Due to Nerve Deficits			
Nerve	Whole Person (Lower Extremity) [Foot] Impairment (%)		
	Motor	Sensory	Dysesthesia
Femoral	15 (37)	1 (2)	3 (7)
Obturator	3 (7)	0	0
Superior gluteal	25 (62)	0	0
Inferior gluteal	15 (37)	0	0
Lateral femoral cutaneous	0	1 (2)	3 (7)
Sciatic	30 (75)	7 (17)	5 (12)
Common peroneal	15 (40)	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 (17-17) of Nerve Injury

- Shrapnel injury to femoral nerve near the groin.
- Walks without cane, but limps hyper-extending the knee using hip extensors.
- MMT: Quadriceps = Grade 4
- Table 17-37, max. motor value of femoral nerve = 37 % L.E.
- Table 16-11 Grade 4 weakness multiplier ranges from 1 – 25 %.
- Select 25 % since weakness is impairing
- Multiply 37 % by 25 % = 9 % L.E.

Example 17-17: Femoral Nerve

- Sensory: Decreased light touch in Saphenous distribution, with retained sharp dull perception, but shoe rubbing blisters at medial malleolus.
- Sensory deficit and pain are forgotten during activity.
- Error in example: Maximum value for sensory loss (totally destroyed nerve) from Table 17-37 = 2 % L.E. (not 9 %).
- Severity Multiplier from Table 16-10, Grade 4 range is 1 – 25 %.
- Multiply 20 % by 2 % = 0.4 %, round to 1 % L.E.

Example 17-17 Corrected “Final Answer”

- Motor = 9 % L.E.
- Sensory = 1 % L.E.
- Combined = 10 % L.E.
- Table 17-3 converts to
4 % whole person impairment
(same as multiplying by 0.4)

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Complex Regional (Awful) Pain Syndrome

- Characterized by pain, swelling, stiffness, discoloration, and demineralization.
- May follow a sprain, fracture, or nerve or vascular injury.
- Further described, and should be evaluated by the Neurology Chapter.
- Example 17-18 points out that traditional physical examination (MMT, reflexes, sensory exam, ROM) all provoke “severe pain”, or Allodynia.

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17.2 n: Vascular Disorder Criteria for Rating

VENOUS:

- Edema: controlled or persistent despite Rx
- Ulcers: Healed, or Active
- Dilated Veins: (varices)

Arterial:

- Claudication: present or absent, distance to onset, or pain at rest.
- Amputations:
- Loss of pulses or Subcutaneous tissue
- Ulcers: Healed, or Active
- X-ray: calcified arteries⁷⁵

VASCULAR DISORDERS

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
Intermittent claudication on walking at least 100 yards at an average pace and only transient edema 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 confinement of activity	Intermittent claudication on walking as few as 25 yards and no more than 100 yards at 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 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 a sign such as a healed amputation of two or more digits of one extremity, with evidence of persisting vascular disease or superficial ulceration involving one extremity	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 signs such 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

Table 17-38: Peripheral Vascular

Class	% <u>Lower Extremity</u>
1	0 - 9 %
2	10 - 39 %
3	40 - 69 %
4	70 - 89 %
5	90 - 100 %

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Potential Impairments: Region, Tables, Percent

Hip
Thigh
Knee
Calf
Ankle/Foot
Toe

Peripheral Nervous System
Peripheral Vascular System
Gait Derangement

Final Combined Impairment

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[illegible]

Box 17-1, p. 562-3
Choosing a L.E. Rating

1. Establish the Diagnosis
2. Determine whether MMI has been reached.
3. Identify each anatomic region with abnormalities related to injury or disease in question. List potential methods of rating.
4. Calculate impairment for each applicable method.
5. Rate peripheral nervous system.
6. Rate peripheral vascular system.
7. Rate CRPS

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Box 17-1, p. 562-3
Choosing a L.E. Rating

8. IF no other method is available, determine impairment from Gait Derangement Table, if clinically applicable.
9. Consult "Cross Usage Table" to determine possible method groupings.
10. Consider all medical data, select the "largest and most clinically appropriate methods." Combine. Use Whole Person Units*.
11. Use Combined Values Chart to combine regional impairments of the same limb.
L.E. PPI % is then converted* to WP PPI %

