



1996

Florida

Uniform

Permanent

Impairment

Rating

Schedule

1996 FLORIDA UNIFORM PERMANENT IMPAIRMENT RATING SCHEDULE

This impairment rating guide was adopted by the three-member panel, in cooperation with the Florida Division of Workers' Compensation as mandated by Section 440.15(3)(a)2, Florida Statutes, as amended.

Three-Member Panel – 1992

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Three-Member Panel - 1994

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1996 Florida Uniform Permanent Impairment Rating

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Introduction to the 1996 Florida Uniform Permanent Impairment Rating Schedule

BACKGROUND

Section 440.15(3)(a)2, Florida Statutes, as amended, requires that the State of Florida establish a guide for use in the evaluation of permanent impairments for the calculation of impairment benefits payable and to establish the permanent impairment necessary for wage-loss benefits payable under Section 440.15(3)(a)3, Florida Statutes, as amended. Moreover, “This schedule must be based on medically or scientifically demonstrable findings as well as the systems and criteria set forth in the American Medical Association’s Guides to the Evaluation of Permanent Impairment; the Snellen Charts, published by the American Medical Association Committee for Eye Injuries; and the Minnesota Department of Labor and Industry Disability Schedules. This schedule should be based upon objective findings. The schedule shall be more comprehensive than the AMA Guides to the Evaluation of Permanent Impairment and shall expand the areas already addressed and address additional areas not currently contained in the guides.”

This Guide, known also as the schedule, is established by the three-member panel, set forth in Section 440.13(12)(a), working in cooperation with the Division of Workers’ Compensation. In establishing this Guide, the three-member panel and the Division were assisted by an advisory panel of representative health care specialties and by a member of the Florida Bar.

Evaluation or rating of permanent disability has long been recognized as an important and complex subject. In the past much confusion has resulted from inadequate understanding by physicians and others of the scope of medical responsibility in the evaluation of permanent disability and the difference between “permanent disability” and “permanent impairment.”

It is vitally important for every physician to be aware of his or her proper role in the evaluation of permanent disability under any private or public program for the disabled. It is equally important that physicians have the necessary authoritative material to assist them in competently fulfilling their particular responsibility—the evaluation of permanent impairment. It is the purpose of this book to correct a past confusion of terms and to provide a series of practical guides to the evaluation of various types of permanent impairments.

The following explanation of generally used terms in programs for the disabled is provided.

- (1) **Permanent Impairment**—This is a purely medical condition. Permanent impairment is any anatomic or functional abnormality or loss after maximal medical improvement has been achieved, which abnormality or loss the physician considers stable or non-progressive at the time evaluation is made. It is always a basic consideration in the evaluation of permanent disability.
- (2) **Permanent Disability**—This is not a purely medical condition. A patient is “permanently disabled” or “under a permanent disability” when his/her actual or presumed ability to engage in gainful activity is reduced or absent because of “impairment” which, in turn, may or may not be combined with other factors. A permanent condition is found to exist if no fundamental or marked change can be expected in the future.
- (3) **Evaluation (Rating) of Permanent Impairment**—This is a function that physicians alone are competent to perform. Evaluation of permanent impairment defines the scope of medical responsibility and therefore represents the physician’s role in the evaluation of permanent disability. Evaluation of permanent impairment is an appraisal of the nature and extent of the patient’s illness or injury as it affects his personal efficiency in one or more of the activities of daily living. These activities are self-care, communication, normal living postures, ambulation, elevation, traveling and non-specialized hand activities.
- (4) **Evaluation (Rating) of Permanent Disability**—In the last analysis, this is an administrative and not solely a medical responsibility and function. Evaluation of permanent disability is an appraisal of the patient’s present and future ability to engage in gainful activity as it is affected by such diverse factors

as age, sex, education, economic and social environment, in addition to the definite medical factor—permanent impairment. The first group of factors has proved extremely difficult to measure. For this reason, permanent impairment is in fact the sole or real criterion of permanent disability far more often than is readily acknowledged. In actual practice, however, the final determination of permanent disability is an administrative decision as to the patient's entitlement. Under no circumstances shall this guide be used to determine disability. This guide is intended to be used solely for the purpose of rating impairments. Competent evaluation of permanent impairment requires an adequate and complete medical examination, and the avoidance of subjective impressions and such factors, as age, sex, or employability.

- (5) Maximum Medical Improvement or Date of Maximum Medical Improvement—the date after which further recovery from, or lasting improvement to, an injury or disease can no longer reasonably be anticipated, based upon reasonable medical probability.

PHILOSOPHY AND CONCEPTS

Section 440.02(19), Florida Statutes, as amended, states that a “Permanent impairment” means any anatomic or functional abnormality or loss determined as a percentage of the body as a whole, existing after the date of maximum medical improvement, which results from the injury.”

An organ-system approach is used for organization in this Guide, each section representing an organ system where impairment values will be found for providing a rating for diseases or disorders within that system.

The whole-person concept is used in that specific impairments within a region or organ system have an affect on the entire physical and mental status, affecting the whole person, and are thus expressed as whole-person impairment.

Impairments are expressed in terms of the whole person, and a conversion process with appropriate tables is used for converting specific regional impairments to the whole person when indicated. These conversion tables will be found in the specific organ system sections. Also, a Combined Values Chart is provided in Section 15 for determining whole-person impairments when more than one impairment value is present.

The overall final impairment rating sustained by the individual shall be the result of the physician's evaluation of permanent impairment as found in this Guide. If a permanent impairment is covered by this Guide, no assignment or rating of that permanent impairment at variance with this Guide is permissible. If a category applicable to the impairing condition cannot be found in this guide, then the category most closely resembling the impairment or the degree of impairment based on analogy should be chosen. Except as provided for in evaluating the spine when considering residual signs for ankylosis and spinal cord/or spinal injury, where a category represents the impairing condition, the impairment determination shall not be based on the cumulation of lesser included categories.

EVALUATION PROCESS

An evaluation for permanent impairment shall be performed by a physician as defined in Section 440.13(1)(r), Florida Statutes. Physician means a physician licensed under Chapter 458 an osteopath licensed under Chapters 458 and 459, a chiropractor licensed under Chapter 460, a podiatrist licensed under Chapter 461, an optometrist licensed under Chapter 463, or a dentist licensed under Chapter 466. In no case, however, may a physician as defined above give a permanent impairment rating for a condition for which that physician cannot professionally treat.

The evaluation for permanent impairment, including the assignment of any rating, shall not be determined before the date of maximum medical improvement. Furthermore, pursuant to Section 440.15(3)(a)4, Florida Statutes, an evaluation may occur up to six weeks before the end of temporary indemnity benefits.

The evaluation should be inclusive of a complete history of the condition under evaluation, including reference to treatment, response to treatment, and pre-existing conditions or aggravating factors when present. The evaluation shall include a thorough physical examination of the body system or systems

involved. Objective findings (appropriate to the specific organ involved) should include observation, palpation, auscultation, and measurements where indicated for neuromusculoskeletal conditions. This should include observation of postural and structural abnormalities, palpation of neuromuscular structures and note of tender areas found in consistent clinical distribution corresponding to subjective complaint. Rigidity, spasm or loss of range-of-motion of joints should be noted if present.

Range of motion should be determined by using a measuring device such as a goniometer or inclinometer for extremities. Consistency and validity are necessary for determining the values obtained in joint range-of-motion evaluation. Joint measurements should be performed twice and produce comparable figures varying less than ten percent of the maximum value for the involved part.

In order for an opinion of no impairment for joint range of motion, the evaluator must record the specified ranges of motion of the involved joint.

THE BASIC RULES

The following rules are provided in order for the evaluator to properly execute an impairment rating based on the *1996 Florida Uniform Permanent Impairment Rating Schedule*. These rules can be applied to all systems of the body.

1. The final impairment value, whether the result of a single or combined impairment, shall be rounded off to the nearest whole number.
2. Only upper extremities have a preferred or dominant side. When the non-preferred side is evaluated, 10% of the upper-extremity rating is subtracted before conversion to whole person.

Example:

40% impairment of left (non-preferred) upper extremity

10% of 40% = 4%

40% minus 4% = 36%

36% upper extremity = 22% whole person

For evaluation purposes, the lower extremities do not have a preferred side.

3. All impairments for one extremity are combined before conversion to whole person.
4. Ankylosis—with fixed loss of motion in more than one plane for the same joint or area, the largest value is used for rating impairment.
5. Adding vs. Combining

With range of motion loss in multiple planes of the same joint the impairment ratings are added. When dealing with multiple hand values, the values are *added*.

Everything else is combined!

NOTE: When combining is necessary, use the Combined Values Chart found in Section 15. Combining the largest figure with the next largest, and so on, is a good rule to follow.

Example:

To combine 35, 40, and 10: 40 combined with 35 = 61

61 combined with 10 = 65

6. Pre-existing conditions may not be rated unless there is objectively documented evidence of an increased loss of function to the affected area as a result of the industrial injury.
7. For those permanent impairments that are subject to confirmation only through the administration of diagnostic tests and procedures that although characterized as subjective in nature, are generally accepted and used in the medical discipline involved, the injured employee is entitled to an

impairment rating of 2% of the body as a whole. This rating cannot be added or combined to another impairment for a condition provided for in other sections of this Guide. For example, if an injured worker has a back injury and in addition has headaches as determined by subjective complaints, the headaches are not ratable since they are included in the rating allowed for the back injury and the impairment rating is only as determined by evaluating the back injury alone.

8. Employees shall be rated for a permanent impairment, if any, as of the date of maximum medical improvement or six weeks before the expiration of 104 weeks of temporary benefits, whichever occurs first, as provided for in Section 440.15(3)(a)4.

Section 1: Musculoskeletal — The Spine

EVALUATION OF THE SPINE

For evaluation purposes, the spine is divided into three sections; cervical, thoracic, and lumbosacral. Each section must be evaluated individually and then *combined*, using the Combined Values Chart found in Section 15.

The Specific Disorders of the Spine Table serves as the basis upon which, after a diagnosis has been established, an impairment can be formulated. The table serves as a basis for numerous spinal disorders ranging from fractures to herniated intervertebral discs; soft tissue injuries to spondylolisthesis.

After determination of the impairment from a spinal disorder has been obtained that value must be *combined* with the appropriate value of residual objective signs for ankylosis, and spinal cord and/or spinal nerve injury.

SPECIFIC DISORDERS OF THE SPINE TABLE

FRACTURES

Disorder	Impairment of the Whole Person		
1. Compression of one vertebral body			
1-25%	C=4%	T=2%	L=5%
26-50%	C=6%	T=3%	L=7%
51%+	C=10%	T=5%	L=12%

When two or more compression fractures are present, COMBINE.

Pre-existing compression fractures should be rated only when there has been aggravation by a new injury shown by objective radiological findings. These values should be addressed in the report as a preexisting factor.

2. Fracture of the Posterior Elements of the Vertebra (pedicles, laminae, or articular processes)			
Cervical			4%
Thoracic			2%
Lumbar			5%

This may include nonunion or mal-union.

Values given are the same whether it is a single or multiple fracture in the SAME vertebra. Fractures of the body and the posterior elements in the same vertebra are to be COMBINED.

At MMI if the fracture is healed and causes no functional impairment, it is not ratable.

3. Healed vertebral odontoid, Jefferson, and slice fractures	5%
Malunion or non-union	10%
4. Dislocation	
Dislocation reduced without fusion	5%
Dislocation reduced with surgical fusion	10%
Dislocation unreduced	5-15%

Additional segments: Combine with value from appropriate section of the spine where applicable.

INTERVERTEBRAL DISC OR OTHER SOFT TISSUE LESIONS

Disorder	Impairment of the Whole Person
1. Unoperated with no objective residual signs of injury	0%
2. Pain associated with rigidity (loss of motion or postural abnormality) and chronic muscle spasm. The chronic muscle spasm and rigidity is substantiated by objective clinical findings but without associated demonstrable degenerative changes	
Cervical.....	3%
Thoracic.....	3%
Lumbar.....	3%
3. Unoperated, with medically documented* injury and associated with minimal post traumatic changes on diagnostic tests (including disc lesions with the exception of HNP)	
Cervical.....	4%
Thoracic.....	3%
Lumbar.....	5%
4. Herniated intervertebral disc single vertebral level, not surgically treated. Diagnostic imaging studies specifically positive for herniated disc; with or without resolution of objective neurological findings**	
Cervical.....	5%
Thoracic.....	4%
Lumbar.....	6%
5. Surgically treated disc lesion with or without objective finding** neurological	
Cervical.....	6%
Thoracic.....	5%
Lumbar.....	7%

* Medically documented: e.g., records which shall include history, physical exam findings, and appropriate diagnostic studies.

** If there are no residuals, there are no values to be combined with these numbers. With objective neurologic findings the neurologic impairment must be rated in accordance with Section 5 of this Guide.

Patient should not be evaluated for permanency until the patient has reached MMI. "Objective clinical findings" as used in these guides means examination results which are reproducible and consistent. Examples of objective clinical findings are involuntary muscle spasms, consistent postural abnormalities, and changes in deep tendon reflexes. "Postural abnormality" means a deviation from normal posture caused by injury as found on anterior/posterior or lateral x-rays that involves the spine and pelvis or segments of the spine or pelvis, such as kyphosis, lordosis, or scoliosis.

- | | |
|---|------------------|
| 6. Multiple levels of disc involvement with or without operation and with or without objective residual signs of injury..... | Add 1% level |
| 7. Multiple operations with or without residual signs of injury | |
| A. Second operation | Add 2% |
| B. Third or subsequent operation..... | Add 2%/operation |
| 8. With surgically treated disc lesion including a surgical spinal fusion, increase the impairment by 1% per vertebral level fused. | |

SPONDYLOLYSIS AND SPONDYLOLISTHESIS, UNOPERATED

Disorder	Impairment of the Whole Person
1. Spondylolysis or Grade 1 (1%—25% slippage), or Grade II (26%—50% slippage) Spondylolisthesis, accompanied by objective studies documenting injury	
Cervical.....	7%
Thoracic.....	4%
Lumbar.....	8%
2. Grade III (51%—75% slippage) or Grade IV (76%—100% slippage) Spondylolisthesis, accompanied by objective studies documenting injury	
Cervical.....	9%
Thoracic.....	5%
Lumbar.....	10%

SPINAL STENOSIS AND SEGMENTAL INSTABILITY

1. Unoperated with objective signs of injury	
Cervical.....	5%
Thoracic.....	5%
Lumbar.....	5%
2. Unoperated, multiple levels.....	Add 1%/level

SPINAL STENOSIS, SEGMENTAL INSTABILITY, OR SPONDYLOLISTHESIS, OPERATED

NOTE: List impairments separately for cervical, thoracic and lumbar regions.

1. Single level operation without objective residual signs of injury	
Cervical.....	8%
Thoracic.....	4%
Lumbar.....	9%
2. Single level operation with residual objective signs of injury	
Cervical.....	10%
Thoracic.....	5%
Lumbar.....	12%
3. Multiple levels, operated, with or without residual objective signs of injury.....	Add 1%/level
4. Multiple operations with residual, objective signs of injury	
A. Second operation.....	Add 2%
B. Third or subsequent operation.....	Add 2%/operation

NOTE: All impairments listed in Specific Disorders of the Spine should be combined with only the following appropriate values of residual signs:

- a. Ankylosis secondary to surgery or injury in the spinal area (see Ankylosis table).
- b. Spinal cord or spinal nerve root injuries, with neurologic impairment (see neurological section).
- c. Any combination of the above using the Combined Values Chart.

ANKYLOSIS

The following techniques for determining impairment ratings for Ankylosis and the use of the goniometer is for the purpose of determining the degree of Ankylosis clinically rather than radiographically. In determining the impairment for this condition, loss of motion shall not be used. An alternate method for determining impairment can be based on radiographic methods as hereinafter provided. Diagrams for performing testing to determine impairment ratings are as follows:

1. Cervical Region—Flexion-Extension Technique of Measurement

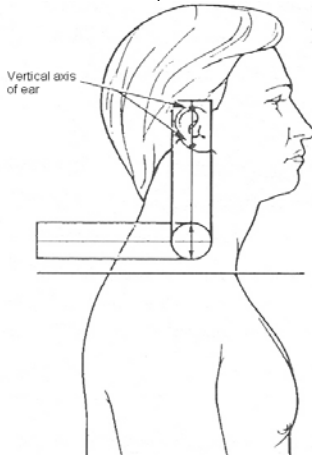
- a. Place goniometer base as if measuring the neutral position (Figure 1). Measure the deviation from neutral position with the goniometer arm and record the reading.
- b. Consult the table below to determine the impairment of the whole person.

Example: Cervical region with ankylosed at 30 degrees flexion is equivalent to 23% impairment of the whole person.

OR

- c. Determine number and position of ankylosed vertebrae by appropriate x-ray methods. (Consult Table 1)

Figure 1 – Placement of Goniometer in Neutral Position of Cervical Spine: Flexion/Extension



Impairment Due To Ankylosis of Cervical Region—Flexion/Extension

Region ankylosed at:	% Impairment of Whole Person
0° (neutral position)	14%
15°	19%
30°	23%
45° (full flexion)	35%

Region ankylosed at:	% Impairment of Whole Person
0° (neutral position)	14%
15°	19%
30°	23%
45° (full extension)	60%

2. Cervical Region—Lateral Flexion Technique of Measurement

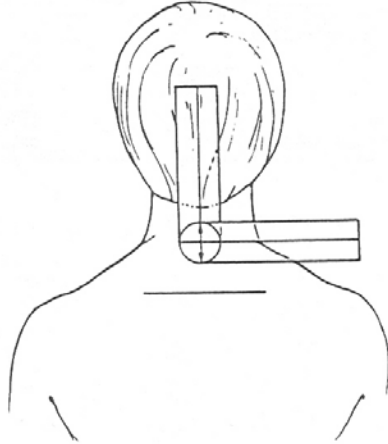
- a. Place goniometer base as if measuring the neutral position (Figure 2). Measure the deviation from the neutral position with the goniometer arm and record the reading.
- b. Consult the table below for the cervical region to determine the impairment of the whole person.

Example: A cervical region with ankylosis at 30° right lateral flexion is equivalent to 25% impairment of the whole person.

OR

- c. Determine number and position of ankylosed vertebrae by appropriate x-ray methods. (Consult Table 1)

Figure 2 – Placement of Goniometer in Neutral Position of Cervical Spine: Lateral Flexion



**Impairment Due To Ankylosis Of The Cervical Region—
Lateral Flexion**

Region ankylosed at:	% Impairment of Whole Person
0° (neutral position)	15%
15°	20%
30°	25%
45° (full right/left lateral flexion)	30%

3. Cervical Region—Rotation Technique of Measurement

- a. Place the patient in the neutral position (Figure 3) while supine; place the goniometer in the coronal plane at the crown of the head.
- b. Estimate by the position of the chin the angle at which the cervical region is ankylosed.
- c. Consult the table below to determine the impairment of the whole person.

Example: A cervical region ankylosed at 20° right rotation is equivalent to 17% impairment of the whole person.

OR

- d. Determine number and position of ankylosed vertebrae by appropriate x-ray methods. (Consult Table 1)

Figure 3 – Placement of Goniometer in Neutral Position of Thoracolumbar: Flexion/Extension



Impairment Due To Ankylosis Of The Cervical Region — Rotation

Region ankylosed at:	% Impairment of Whole Person
0° (neutral position)	14%
20°	17%
40°	21%
60°	25%
80° (full right/left rotation)	28%

4. Dorsolumbar Region—Flexion Extension Technique of Measurement

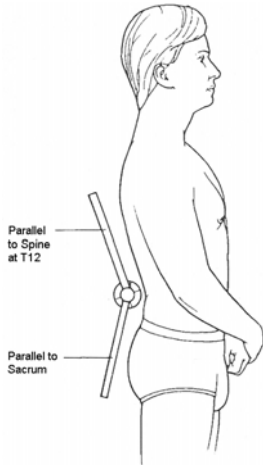
- a. Place the patient in the neutral position (Figure 4).
- b. Place the goniometer base as if measuring neutral position (Figure 4). Measure the deviation from the neutral position with the goniometer arm and record the reading.
- c. Consult table below to determine the impairment of the whole person.

Example: A thoracolumbar region ankylosed at 20° flexion is equivalent to 24% impairment of the whole person.

OR

- d. Determine number and position of ankylosed vertebrae by appropriate x-ray methods. (Consult Table 1.)

Figure 4 – Placement of Goniometer in Neutral Position of Thoracolumbar: Flexion/Extension



Region ankylosed at:	% Impairment of Whole Person
0° (neutral position)	20%
10°	22%
20°	24%
30°	27%
40°	29%
50°	31%
60°	34%
70°	36%
80°	38%
90° (full flexion)	40%
Region ankylosed at:	
0° (neutral position)	20%
10°	27%
20°	34%
30° (full flexion)	40%

5. Dorsolumbar Region—Lateral Flexion (Lateral Bending) Technique of Measurement

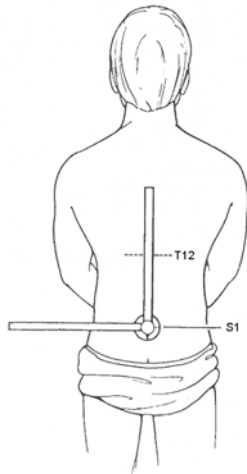
- Place the patient in the neutral position (Figure 5).
- Place the goniometer base as if measuring the neutral position (Figure 5). Measure the deviation from the neutral position with the goniometer arm and record the reading.
- Consult the table below to determine the impairment of the whole person.

Example: A thoracolumbar region with ankylosis at 10° right lateral flexion is equivalent to 27% impairment of the whole person.

OR

- Determine number and position of ankylosed vertebrae by appropriate x-ray methods. (Consult Table 1)

Figure 5 – Placement of Goniometer in Neutral Position of Thoracolumbar: Lateral Flexion



Region ankylosed at:	% Impairment of Whole Person
0° (neutral position)	20%
10°	27%
20°	34%
30° (full right/left lateral flexion)	40%

Impairment Due To Ankylosis Of The Lumbosacral Region—Lateral Flexion

Ankylosis in the lumbosacral spine has significance only if immobility occurs in both the hips and the lumbar spine region, so that the neutral position cannot be attained in the sagittal plane. This is a very rare event. Isolated fusions of either a hip or two to three spinal levels place additional stresses on adjacent segments, but do not lead to biomechanical failure of the functional unit. Thus, impairment related to fusion of part of the lumbar/hip motion complex are treated only by radiographic methods Table.

6. Dorsolumbar Region—Rotation Technique of Measurement

Determine number and position of ankylosed vertebrae by appropriate x-ray methods.

(Consult Table 1)

Impairment Due To Ankylosis Of The Thoracic Region —Rotation	
Region ankylosed at:	% Impairment of Whole Person
0° (neutral position)	20%
10°	27%
20°	34%
30° (full right/left rotation)	40%

7. Spinal Region—When Two or More Ranges of Motion Are Involved

- a. Calculate separately and record impairment contributed by ankylosis in each position of the spinal region.
- b. The largest ankylosis impairment value is the impairment of the whole person contributed by spinal region.

% Impairment of Whole Person

Example: Cervical Region ankylosed at:

20 degrees FLEXION.....	33%
10 degrees RIGHT ROTATION.....	27%

The largest ankylosis impairment value is 33%; therefore, the whole person is 33% impaired by ankylosed cervical region.

TABLE 1

**IMPAIRMENT OF CERVICAL, THORACIC AND LUMBAR REGIONS DUE TO ANKYLOSIS,
DETERMINED BY RADIOGRAPHIC METHODS**

Favorable (Neutral) Position	% Impairment of Whole Person	Unfavorable Position	% Impairment of Whole Person
Any 2 cervical	2	Any 2 cervical	4
Any 3 cervical	5	Any 3 cervical	10
Any 4 cervical	7	Any 4 cervical	14
Any 5 cervical	9	Any 5 cervical	18
Any 6 cervical	12	Any 6 cervical	24
Any 7 cervical	14	Any 7 cervical	28
C7 and T1	2	C7 and T1	4
Any 2 thoracic	1	Any 2 thoracic	2
Any 3 thoracic	2	Any 3 thoracic	4
Any 4 thoracic	3	Any 4 thoracic	5
Any 5 thoracic	4	Any 5 thoracic	7
Any 6 thoracic	5	Any 6 thoracic	9
Any 7 thoracic	5	Any 7 thoracic	11
Any 8 thoracic	6	Any 8 thoracic	13
Any 9 thoracic	7	Any 9 thoracic	15
Any 10 thoracic	8	Any 10 thoracic	16
Any 11 thoracic	9	Any 11 thoracic	18
Any 12 thoracic	12	Any 12 thoracic	20
T12 and L1	3	T12 and L1	6
Any 2 lumbar	3	Any 2 lumbar	6
Any 3 lumbar	6	Any 3 lumbar	12
Any 4 lumbar	9	Any 4 lumbar	18
Any 5 lumbar	12	Any 5 lumbar	24
C1-C7	14	C1-C7	28
T1-T12	10	T1-T12	20
L1-L5	12	L1-L5	24
C1-T12	23	C1-T12	28
L1-L5	21	T1-L5	39
C1-L5	32	C1-L5	56

This table should not be used if there are specific disorders of the spine that already have been used to determine an impairment.

PELVIS

The following shows impairment values associated with conditions of the pelvis.

Disorder	Impairment of the Whole Person
1. Healed fracture without displacement or residuals	0%
2. Healed fracture with displacement, without residuals involving:	
a. Single ramus.....	0%
b. Rami, bilateral.....	0%
c. Ilium.....	0%
d. Innominate.....	0%
e. Symphysis pubis, without separation.....	5%
f. Sacrum.....	5%
g. Coccyx.....	0%
3. Healed fracture with displacement, deformity and residuals:	
a. Single ramus.....	0%
b. Rami, bilateral.....	5%
c. Ilium.....	2%
d. Innominate, displaced 1 inch or more.....	10%
e. Symphysis pubis, displaced or separated.....	15%
f. Sacrum, into sacroiliac joint.....	10%
g. Coccyx, non-union or excision.....	5%
h. Fracture into acetabulum; evaluate on basis of restricted motion of hip joint.	

The impairment value for hemipelvectomy is 50% of the whole person.

Section 2: Introduction to Musculoskeletal — The Extremities

There are a few basic rules to follow when determining impairment ratings for the upper and lower extremities. When evaluating range of motion of a specific joint such as the wrist, elbow, shoulder, ankle, knee, or hip, the values are added. When multiple joints are involved (i.e., shoulder and elbow or hip and knee), the total value from each joint must be combined using the Combined Values Chart.

SPECIFIC DISORDERS

Upper extremity—Specific disorders of the upper extremity (i.e., persistent joint subluxation, joint swelling, etc.) are converted to impairment of upper extremity and then combined with all other upper-extremity values.

Lower extremity—Specific disorders of the lower extremity (i.e., hip disorders, specific disorders of the knee, etc.) are combined with all other lower- extremity values.

Using the specific guidelines for motor and sensory impairment, these values will also be determined separately and combined with all other values of the involved extremity.

The evaluator is cautioned to combine all the values of one extremity before conversion to whole person. (Only one conversion to whole person should be done per extremity.)

When both upper and lower extremities are involved, each extremity should be evaluated separately and converted to whole person. Then the two whole-person values (both the upper and lower extremities) should be combined to produce a single whole-person rating.

PREFERRED OR NONPREFERRED EXTREMITY

Since the basic tasks of everyday living are more dependent upon the preferred upper extremity than the nonpreferred one, dysfunction of the nonpreferred extremity results in less impairment. Therefore, when an impairment of an upper extremity has been determined, the value should be reduced by 10% if the impairment is of the nonpreferred extremity.

Example: 40% of the (upper) nonpreferred extremity
 10% of 40% = 4%
 40% minus 4% = 36% upper extremity

There is no dominant or preferred lower extremity. Most conditions of the lower extremity relative to the dominant side refer to the employability of the patient and determine disability, not physical impairment.

Ankylosis

Ankylosis is defined as absence of joint motion. Since no joint motion can be measured, ankylosis cannot be considered range of motion. Therefore ankylosis values are combined with all other values of the extremity. Since there can be many planes of movement of a joint, there can be multiple ankyloses. When multiple ankyloses occur in the same joint, the evaluator should utilize the largest value for impairment rating.

Example: Wrist joint ankyloses at 20 degrees palmar flexion and 10 degrees ulnar deviation.
 20 degrees palmar flexion ankylosed = 47% upper-extremity impairment
 10 degrees ulnar deviation ankylosed = 50% upper-extremity impairment

SOLUTION: 50% impairment for upper extremity (higher value).

Example: Hip joint ankyloses at 20 degrees flexion and 10 degrees internal rotation
 20 degrees flexion ankylosed = 54% lower-extremity impairment
 10 degrees internal rotation ankylosed = 78% lower-extremity impairment

SOLUTION: 78% impairment for lower extremity (higher value).

ADDITIONAL RATABLE DISORDERS OF THE EXTREMITIES

Painful Organic Syndrome — A musculoskeletal condition characterized by pain with use of the affected member, which may or may not limit the voluntary active range of motion, with or without any limitation of passive range of motion, and attributed to a lesion in the soft tissues (capsule, ligament, tendon, fascia, muscle), and documented by clinical findings.

Upper Extremity	Shoulder.....	3% U E
	Elbow	3% U E
	Wrist/Hand	3% U E
Lower Extremity	Hip.....	4% L E
	Knee.....	4% L E
	Ankle/Foot	4% L E

Reflex Sympathetic Dystrophy — A condition characterized by disproportionate pain, disuse and apprehension associated with changes to bone and soft tissue documented by multiple diagnostic studies.

Upper Extremity	15%—25%
Lower Extremity	5%—25%

This condition must not be rated for at least one year after onset and should not be explained by any other ratable diagnoses.

These conditions (P.O.S. and R.S.D.) should not be rated until MMI and should not be secondary to any other ratable diagnosis.

These values must be combined with all other values.

Section 3: Musculoskeletal — Upper Extremities

THUMB

TABLE 1
IMPAIRMENT DUE TO ABNORMAL MOTION AND ANKYLOSIS
OF THE INTERPHALANGEAL JOINT OF THE THUMB

Abnormal Motion

Average range of FLEXION-EXTENSION is 80 degrees
 Value to total range of joint motion is 100%

Flexion from neutral position (0°) to:	Degrees of Joint Motion		% Impairment of Thumb
	LOST	RETAINED	
0°	80	0	45
10°	70	10	39
20°	60	20	34
30°	50	30	28
40°	40	40	23
50°	30	50	17
60°	20	60	11
70°	10	70	6
80°	0	80	0

Ankylosis

Joint ankylosed at:	% Impairment of Thumb
0° (neutral position)	45
10°	43
20°	40
30°	38
*40°	35
50°	45
60°	55
70°	65
80° (full flexion)	75

*position of function

**TABLE 2
IMPAIRMENT DUE TO
ABNORMAL MOTION AND ANKYLOSIS OF THE
METACARPOPHALANGEAL JOINT OF THE THUMB**

Abnormal Motion

Average range of FLEXION-EXTENSION is 60 degrees
Value to total range of joint motion is 100%

Flexion from neutral position (0°) to:	Degrees of Joint Motion		% Impairment of Thumb
	LOST	RETAINED	
0°	60	0	55
10°	50	10	46
20°	40	20	37
30°	30	30	27
40°	20	40	18
40°	10	50	9
60°	0	60	0

Ankylosis

Joint ankylosed at:	% Impairment of Thumb
0° (neutral position)	55
10°	49
*20°	43
30°	52
40°	61
50°	70
60° (full flexion).....	80

*position of function

**TABLE 3
IMPAIRMENT DUE TO
ABNORMAL MOTION AND ANKYLOSIS OF THE
CARPOMETACARPAL JOINT OF THE THUMB**

Abnormal Motion

Average range of FLEXION-EXTENSION is 45 degrees

Flexion from neutral position (0°) to:	Degrees of Joint Motion		% Impairment of Thumb
	LOST	RETAINED	
0°	15.....	0.....	15
10°	5.....	10.....	5
15°	0.....	15.....	0

Extension From Neutral Position (0°) to:

0°	30.....	0.....	15
10°	20.....	10.....	10
20°	10.....	20.....	5
30°	0.....	30.....	0

Ankylosis

Joint Ankylosed At:

0° (neutral position)	30
10°	55
15° (full Extension)	80

Joint Ankylosed At:

0° (neutral Position)	30
10°	47
20°	63
30° (full Extension)	80



TABLE 4
RELATIONSHIP OF IMPAIRMENT OF
THE THUMB TO IMPAIRMENT OF THE HAND*

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

*Impairment of the hand contributed by the thumb may be rounded to the nearest 5 percent only when it is the sole impairment involved.

Consult Table 18 for converting hand impairment to upper-extremity impairment.

FINGERS

**TABLE 5
IMPAIRMENT DUE TO ABNORMAL
MOTION AND ANKYLOSIS OF THE DISTAL
INTERPHALANGEAL JOINT OF ANY FINGER**

Abnormal Motion

Average range of FLEXION-EXTENSION is 70 degrees
Value to total range of joint motion is 100%

Flexion from neutral position (0°) to:	Degrees of Joint Motion		% Impairment of Finger
	LOST	RETAINED	
0°	70.....	0.....	45
10°	60.....	10.....	38
20°	50.....	20.....	32
30°	40.....	30.....	26
40°	30.....	40.....	19
50°	20.....	50.....	13
60°	10.....	60.....	6
70°	0.....	70.....	0

Ankylosis

Joint ankylosed at:	% Impairment of Finger
0° (neutral position)	45
10°	41
20°	38
30°	34
*40°	30
50°	35
60°	40
70° (full flexion).....	45

*position of function

**TABLE 6
IMPAIRMENT DUE TO ABNORMAL
MOTION AND ANKYLOSIS OF THE PROXIMAL
INTERPHALANGEAL JOINT OF ANY FINGER**

Abnormal Motion

Average range of FLEXION-EXTENSION is 100 degrees
Value to total range of joint motion is 100%

Flexion from neutral position (0°) to:	Degrees of Joint Motion		% Impairment of Finger
	LOST	RETAINED	
0°	100.....	0.....	60
10°	90.....	10.....	54
20°	80.....	20.....	48
30°	70.....	30.....	42
40°	60.....	40.....	36
50°	50.....	50.....	30
60°	40.....	60.....	24
70°	30.....	70.....	18
80°	20.....	80.....	12
90°	10.....	90.....	6
100°	0.....	100.....	0

Ankylosis

Joint ankylosed at:	% Impairment of Finger
0° (neutral position)	60
10°	58
20°	55
30°	53
*40°	50
50°	55
60°	60
70°	65
80°	70
90°	75
100° (full flexion).....	80

*position of function

TABLE 7
IMPAIRMENT DUE TO ABNORMAL
MOTION AND ANKYLOSIS OF THE
METACARPOPHALANGEAL JOINT OF ANY FINGER

Abnormal Motion

Average range of FLEXION-EXTENSION is 90 degrees
 Value to total range of joint motion is 100%

Flexion from neutral position (0°) to:	Degrees of Joint Motion		% Impairment of Finger
	LOST	RETAINED	
0°	90.....	0.....	55
10°	80.....	10.....	49
20°	70.....	20.....	43
30°	60.....	30.....	37
40°	50.....	40.....	31
50°	40.....	50.....	24
60°	30.....	60.....	18
70°	20.....	70.....	12
80°	10.....	80.....	6
90°	0.....	90.....	0

Ankylosis

Joint ankylosed at:	% Impairment of Finger
0° (neutral position)	55
10°	52
20°	48
30°	45
*40°	54
50°	63
60°	72
70°	82
80°	91
90° (full flexion).....	100

*position of function

TABLE 8
RELATIONSHIP OF IMPAIRMENT OF THE DIGITS
TO IMPAIRMENT OF THE HAND

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

Note: Impairment of the hand contributed by a digit may be rounded to the nearest 5 percent only when it is the *sole* impairment involved.

WRIST JOINT

**TABLE 9
IMPAIRMENT DUE TO ABNORMAL MOTION AND
ANKYLOSIS OF THE WRIST JOINT—EXTENSION**

Abnormal Motion

Average range of EXTENSION-FLEXION is 130 degrees
Value to total range of joint motion is 70%

Extension from neutral position (0°) to:	Degrees of Joint Motion		% Impairment of Upper Extremity
	LOST	RETAINED	
0°	60.....	0.....	10
10°	50.....	10.....	8
20°	40.....	20.....	6
30°	30.....	30.....	5
40°	20.....	40.....	3
50°	10.....	50.....	2
60°	0.....	60.....	0

Ankylosis

Joint ankylosed at:		
0° (neutral position)		30
100		28
20°		27
*30°		25
40°		47
50°		68
60° (full extension).....		90

*position of function

TABLE 10
IMPAIRMENT DUE TO ABNORMAL MOTION
AND ANKYLOSIS OF THE WRIST JOINT—FLEXION

Abnormal Motion

Average range of EXTENSION-FLEXION is 130 degrees
 Value to total range of joint motion is 70%

Flexion from neutral position (0°) to:	Degrees of Joint Motion		% Impairment of Upper Extremity
	LOST	RETAINED	
0°	70.....	0.....	11
10°	60.....	10.....	10
20°	50.....	20.....	8
30°	40.....	30.....	6
40°	30.....	40.....	5
50°	20.....	50.....	3
60°	10.....	60.....	2
70°	0.....	70.....	0

Ankylosis

Joint ankylosed at:	
0° (neutral position)	30
10°	39
20°	47
30°	56
40°	64
50°	73
60°	81
70° (full flexion).....	90

**TABLE 11
 IMPAIRMENT DUE TO ABNORMAL MOTION
 AND ANKYLOSIS OF THE WRIST JOINT—RADIAL/ULNAR DEVIATION**

Abnormal Motion

Average range of RADIAL-ULNAR DEVIATION (adduction-abduction) is 50 degrees
 Value to total range of joint motion is 30%

Radial deviation from neutral position (0°) to:	Degrees of Joint Motion		% Impairment of Upper Extremity
	LOST	RETAINED	
0°	20.....	0.....	4
10°	10.....	10.....	2
20°	0.....	20.....	0

**Ulnar deviation from
neutral position (0°) to:**

0°	30.....	0.....	5
10°	20.....	10.....	4
20°	10.....	20.....	2
30°	0.....	30.....	0

Ankylosis

Joint ankylosed at:

*0 (neutral position).....	30
10°.....	60
20° (full radial deviation).....	90

Joint ankylosed at:

*0° (neutral position)	30
10°	50
20°	70
30° (full ulnar deviation).....	90

*position of function

ELBOW JOINT

**TABLE 12
IMPAIRMENT DUE TO ABNORMAL MOTION AND ANKYLOSIS
OF THE ELBOW JOINT—FLEXION/EXTENSION**

Abnormal Motion

Average range of FLEXION-EXTENSION is 150 degrees
Value to total range of joint motion is 60%

Retained Active Flexion of:	% Impairment of Upper Extremity
0°	39
10°	36
20°	34
30°	31
40°	29
50°	26
60°	23
70°	21
80°	18
90°	16
100°	13
110°	10
120°	8
130°	5
140°	3
150°	0
Extension to:	
0° (neutral position)	0
10°	2
20°	4
30°	6
40°	8
50°	10
60°	12
70°	14
80°	16
90°	18
100°	20
110°	22
120°	24
130°	26
140°	28
150°	30

Ankylosis

Joint ankylosed at:	
0° (neutral position)	65
10°	64
20°	62
30°	61
40°	59
50°	58
60°	56
70°	55
80°	53
90°	52
100°	50
110°	59
120°	68
130°	77
140°	86
150° (full flexion)	95

*position of function

In the case of bilateral ankylosis of the elbows, position of function would not necessarily be the same for both elbows; however, the corresponding impairment of the whole person can be computed by using the above figures and the conversion figures on UPPER EXTREMITY Conversion Tables.

**TABLE 13
IMPAIRMENT DUE TO ABNORMAL MOTION AND ANKYLOSIS
OF THE ELBOW JOINT—PRONATION/SUPINATION**

Abnormal Motion

Average range of ROTATION is 160 degrees
Value to total range of joint motion is 40%

Pronation from neutral position (0°) to:	Degrees of Joint Motion		% Impairment of Upper Extremity
	LOST	RETAINED	
0°	80.....	0.....	13
10°	70.....	10.....	11
20°	60.....	20.....	10
30°	50.....	30.....	8
40°	40.....	40.....	7
50°	30.....	50.....	5
60°	20.....	60.....	3
70°	10.....	70.....	2
80°	0.....	80.....	0

**Supination from
neutral position (0°) to:**

0°	80.....	0.....	13
10°	70.....	10.....	11
20°	60.....	20.....	10
30°	50.....	30.....	8
40°	40.....	40.....	7
50°	30.....	50.....	5
60°	20.....	60.....	3
70°	10.....	70.....	2
80°	0.....	80.....	0

Ankylosis

Joint ankylosed at:

0° (neutral position)	65
10°	69
20°	73
30°	76
40°	80
50°	84
60°	88
70°	91
80° (full pronation/supination).....	95

SHOULDER JOINT

Flexion/Extension

**TABLE 14
IMPAIRMENT DUE TO ABNORMAL MOTION AND ANKYLOSIS OF THE
SHOULDER JOINT—FLEXION**

Abnormal Motion

Average range of FLEXION/EXTENSION is 190 degrees
Value to total range of joint motion is 33%

Flexion from neutral position (0°) to:	Degrees of Joint Motion		% Impairment of Upper Extremity
	LOST	RETAINED	
0°	150	0	16
10°	140	10	15
20°	130	20	14
30°	120	30	13
40°	110	40	12
50°	100	50	11
60°	90	60	9
70°	80	70	8
80°	70	80	7
90°	60	90	6
100°	50	100	5
110°	40	110	4
120°	30	120	3
130°	20	130	2
140°	10	140	1
150°	0	150	0

Ankylosis

Joint ankylosed at:	
0° (neutral position)	60
10°	53
20°	47
*30°	40
40°	45
50°	50
60°	55
70°	60
80°	65
90°	70
100°	75
110°	80
120°	85
130°	90
140°	95
150° (full flexion)	100

*position of function

TABLE 15
IMPAIRMENT DUE TO ABNORMAL MOTION
AND ANKYLOSIS OF THE SHOULDER JOINT—EXTENSION

Abnormal Motion

Average range of FLEXION/EXTENSION is 190 degrees
 Value to total range of joint motion is 33%

Flexion from neutral position (0°) to:	Degrees of Joint Motion		% Impairment of Upper Extremity
	LOST	RETAINED	
0°	40	0	4
10°	30	10	3
20°	20	20	2
30°	10	30	1
40°	0	40	0

Ankylosis

Joint ankylosed at:	% Impairment of Upper Extremity
0° (neutral position)	60
10°	70
20°	80
30°	90
40° (full extension).....	100

TABLE 16
IMPAIRMENT DUE TO ABNORMAL MOTION AND ANKYLOSIS
OF THE SHOULDER JOINT—ABDUCTION-ADDUCTION

Abnormal Motion

Average range of ABDUCTION-ADDUCTION is 180 degrees
 Value to total range of joint motion is 33%

Abduction from neutral position (0°) to:	Degrees of Joint Motion		% Impairment of Upper Extremity
	LOST	RETAINED	
0°	150	0	17
10°	140	10	16
20°	130	20	14
30°	120	30	13
40°	110	40	12
50°	100	50	11
60°	90	60	10
70°	80	70	9
80°	70	80	8
90°	60	90	7
100°	50	100	6
110°	40	110	4
120°	30	120	3
130°	20	130	2
140°	10	140	1
150°	0	150	0

Adduction from neutral Position (0°) to:

0°	30	0	3
10°	20	10	2
20°	10	20	1
30°	0	30	0

Ankylosis

Joint ankylosed at:

0°	60
10°	56
20°	51
30°	47
40°	42
45°	40
50°	43
60°	49
70°	54
80°	60
90°	66
100°	71
110°	77
120°	83
130°	89
140°	94
150° (full abduction)	100

Joint ankylosed at:

0° (neutral position)	60
10°	73
20°	87
30° (full adduction)	100

Internal/External Rotation

**TABLE 17
IMPAIRMENT DUE TO ABNORMAL MOTION AND ANKYLOSIS
OF THE SHOULDER JOINT—ROTATION**

Abnormal Motion

Average range of ROTATION is 130 degrees
Value to total joint motion is 33%

Internal ROTATION from neutral position (0°) to:	Degrees of Joint Motion		% Impairment of Upper Extremity
	LOST	RETAINED	
0°	40	0	6
10°	30	10	5
20°	20	20	3
30°	10	30	2
40°	0	40	0

**External rotation from
neutral position (0°) to:**

0°	90	0	14
10°	80	10	12
20°	70	20	11
30°	60	30	9
40°	50	40	8
50°	40	50	6
60°	30	60	5
70°	20	70	3
80°	10	80	2
90°	0	90	0

Ankylosis

Joint ankylosed at:

0° (neutral position)	60
10°	70
20°	80
30°	90
40° (full internal rotation)	100

Joint ankylosed at:

0° (neutral position)	60
10°	50
*20°	40
30°	49
40°	57
50°	66
60°	74
70°	83
80°	91
90 (full external rotation)	100

*position of function

DISORDERS OF THE UPPER EXTREMITY

Derangements not previously described can contribute to impairments of the hand and upper extremity and should be considered in the final impairment determination. These include bone and joint disorders, presence of resection or implant arthroplasty, musculotendinous disorders, and loss of strength.

NOTE: *It must be stressed that impairments secondary to these disorders are usually rated by other parameters. The following disorders are to be rated only when other factors have not adequately rated the extent of impairment.* Whether to consider these disorders separately is left to the discretion of the examiner.

Table 18 shows relative impairment values for loss of function of the digits, hand, wrist, elbow, and shoulder due to the conditions described below and impairment values for the larger units. This table differs from figures 1 and 2 (p. 41), which show values for amputation at these levels.

TABLE 18
RELATIVE IMPAIRMENT VALUES

Units and Joints	Unit	Hand	% Impairment of	
			Upper Extremity	Whole Person
SHOULDER				
Glenohumeral	—	—	60	36
Acromioclavicular	—	—	30	18
ELBOW				
Entire elbow	—	—	70	42
Ulnohumeral	—	—	50	30
Proximal radioulnar	—	—	20	12
WRIST				
Entire wrist	—	—	60	36
Radiocarpal	—	—	40	24
Distal radioulnar	—	—	20	12
ENTIRE HAND	—	100	90	54
THUMB				
Entire thumb	100	40	36	22
CMC	75	30	27	16
MP	10	4	4	2
IP	15	6	5	3
INDEX OR MIDDLE				
Entire finger	100	20	18	11
MP	100	20	18	11
PIP	80	16	14	8
DIP	45	9	8	5
RING OR LITTLE				
Entire finger	100	10	9	5
MP	100	10	9	5
PIP	80	8	7	4
DIP	45	4	4	2

BONE AND JOINT DEFORMITIES

Joint Crepitation with Motion—Joint crepitation with motion can reflect synovitis or cartilage degeneration. The impairment degree is multiplied by the relative value of the joint (Table 18).

The evaluator must use judgment and avoid duplication of impairments when other findings, such as synovial hypertrophy, carpal collapse with arthritic changes, or limited motion are present. The latter findings may indicate a greater severity of the same underlying pathological process and take precedence over joint crepitation, which should not be rated in these instances.

Joint Crepitation Severity	% Joint Impairment*
Mild: Inconstant during active ROM**	10
Moderate: Constant during active ROM	20
Severe: Constant during passive ROM	30

*Use Table 18 (previous page) to find the relative value of each joint.

**ROM: Range of Motion

Joint Swelling due to Synovial Hypertrophy—*This condition would usually be rated through loss of motion and is to be considered for impairment only when there is full range of motion of the joint.* The percent of impairment is multiplied by the relative value of the joint (Table 18).

Joint Swelling Due to Synovial Hypertrophy	% Joint Impairment*
Mild	10
Moderate	20
Severe	30

*Use Table 18 to find the relative value of each joint.

Digit Lateral Deviation—The longitudinal alignment of each of the finger joints is measured in degrees during maximum active extension. Since lateral deviation at any level affects the longitudinal arch of the digit, deviation affects the entire digit. If lateral deviation is the *sole impairment*, it is multiplied by the relative value of the digit to the hand to calculate hand impairment (Table 18). If the digit has *other impairments*, the lateral deviation impairment value is *combined* with them using the Combined Values Chart, in Section 15.

Ulnar or Radial Deviation	% Digit Impairment*
Mild: Less than 10°	10
Moderate: 10° to 30°	20
Severe: Greater than 30°	30

*Use Table 18 to find the relative value of each digit.

Digit Rotational Deformity—Rotational Deformity of the distal, middle, or proximal phalanx is measured during maximum active flexion of the finger and expresses a malrotation of the normal axial alignment of the phalanx. Rotational deformity at any level affects the function of the entire digit, and the impairment percentage is applied to the entire digit. *If other impairments of the same digit are present*, rotational-deformity impairment is *combined* with them using the Combined Values Chart.

Rotational Deformity	% Digit Impairment*
Mild: Less than 15°	20
Moderate: 15° to 30°	40
Severe: Greater than 30°	60

*Use Table 18 to find the relative value of each digit.

Persistent Joint Subluxation and Dislocation—When persistent joint subluxation or dislocation results in restricted motion, impairment percentages are given for lack of motion in order to avoid duplication in the rating. If there is no restricted motion, the following table is used to determine the degree of joint impairment. The percentage of impairment is multiplied by the relative value of the joint (Table 18).

Persistent Joint Subluxation or Dislocation	% Digit Impairment
Mild: Can be completely reduced manually	20
Moderate: Cannot be completely reduced manually.....	40
Severe: Cannot be reduced.....	6

*Use Table 18 to find the relative value of each joint.

Joint Instability—Excessive passive joint motion is evaluated by comparing it with normal joint stability and graded according to the degree of severity. Then the percentage of impairment is multiplied by the relative value of the joint (Table 18). If other impairments of the same joint are present, the values are *combined* using the Combined Values Chart.

Joint Instability	% Joint Impairment
Mild: Less than 10°	20
Moderate: 10° to 20°.....	40
Severe: Greater than 20°.....	60

*Use Table 18 to find the relative value of each joint.

Wrist and Elbow Joint Lateral Deviation—These angles are measured with the wrist or elbow in maximum active extension. The degree of severity is multiplied by the relative value of the joint to the upper extremity to obtain upper extremity impairment due to lateral deviation (Table 18). If other impairments of the same joint are present, they are *combined* using the Combined Values Chart. After all impairments for either the wrist or elbow joint have been calculated, they are *combined* with any other upper-extremity impairment using the Combined Values Chart.

Lateral Deviation Severity	% Joint Impairment*
Mild: Less than 20°	10
Moderate: 20° to 30°.....	20
Severe: Greater than 30°.....	30

*Use Table 18 to find the relative value of the wrist and elbow joints.

Carpal Instability—Carpal instability patterns resulting from lunate or scaphoid pathology can be classified as mild, moderate, or severe, based on the severity of the radiographic findings (Table 19, below). The proximal carpal row represents half of the value of the wrist, or 30% of the upper extremity. Therefore the grades of mild (20%), moderate (40%), and severe (60%) represent upper- extremity impairments of 6%, 12%, and 18%, respectively. These values may be *combined* with other upper-extremity impairments due to wrist abnormalities using the Combined Values Chart.

In using Table 19, apply only the greatest impairment value determined by the radiographic findings. Do not combine or add the impairment values shown on Table 19. These radiographic parameters are to be used only when all other factors including range of motion and grip strength are normal.

TABLE 19
IMPAIRMENT OF UPPER EXTREMITY
DUE TO CARPAL INSTABILITY PATTERNS

Radiographic Findings	% Impairment of Upper Extremity		
	Mild (6%)	Moderate (12%)	Severe (18%)
Radioscaphoid angle (scaphoid)	40°—59°	60°—70°	>70°
Radiolunate angle (lunate)	<10°	10°—30°	>30°
Carpal height collapse	<5%	5%— 10%	>10%
Carpal translation	mild	moderate	severe
Arthritic changes	mild	moderate	severe

Arthroplasty—Simple resection arthroplasty is given 40% impairment of the joint value due to loss of function; implant arthroplasty is given 50% impairment of the joint value due to loss of function. Table 20 provides impairment ratings for the upper extremity for arthroplasty of specific joints, based on these values.

TABLE 20
IMPAIRMENTS OF UPPER EXTREMITY FOLLOWING
ARTHROPLASTY OF SPECIFIC BONES OR JOINTS

Level of Arthroplasty*	% Impairment of Upper Extremity	
	Resection Arthroplasty	Implant Arthroplasty
Shoulder	24	30
Total elbow	28	35
Radial head (isolated)	8	10
Total wrist	24	30
Ulnar head (isolated)	8	10
Proximal carpal row	12	15
Carpal bones	12	15
Thumb**		
Carpometacarpal	11	13
Metacarpophalangeal	1	2
Interphalangeal	2	3
Index of middle fingers***		
Metacarpophalangeal	7	9
Proximal interphalangeal	6	7
Distal interphalangeal	3	4
Ring or little fingers***		
Metacarpophalangeal	3	4
Proximal Interphalangeal	3	3
Distal Interphalangeal	2	2

* If more than one level is involved, combine from distal to proximal using the Combined Values Chart.

** If more than one thumb joint is involved, add impairments.

*** If more than one joint is involved in the same finger, combine impairments using the Combined Values Chart. If multiple digits are involved, add the impairment values for the digits.

Musculotendinous Impairments and Intrinsic Tightness—Intrinsic tightness in the hand may be demonstrated by a test described by Bunnell. Hyperextension of the metacarpophalangeal (MP) joint in a normal hand still allows passive flexion of the proximal interphalangeal (PIP) joint. If the intrinsic muscles are tight or contracted, the available stretch of these muscles is taken up by the hyperextended position of the MP joint, and passive flexion of the PIP joint will be difficult.

If there is already restriction in active range of motion at the MP or PIP joint, then no additional rating is given for intrinsic tightness.

Intrinsic tightness impairment is combined with other impairments of the same digit using the Combined Values Chart. Finger impairment is converted to hand impairment using Table 21.

Intrinsic Tightness Severity (Passive flexion of PIP Joint with MP Joints hyperextended)	% Digit Impairment*
Mild: PIP flexion 80° to 60°	20
Moderate: PIP flexion 59° to 20°	40
Severe: PIP flexion less than 20°	60

*Use Table 18 to find the relative value of each digit.

Constrictive Tenosynovitis—Impairment due to constrictive tenosynovitis is *combined* with other impairments of the digit using the Combined Values Chart. The digit impairment is converted to hand impairment with Table 21.

If there is already restriction in active range of motion, no additional rating is given for constrictive tenosynovitis.

Constrictive Tenosynovitis Severity	% Digit Impairment*
Mild: inconstant triggering during active ROM**	20
Moderate: Constant triggering during active ACM	40
Severe: Constant triggering during passive ROM.....	60

*Use Table 18 to find the relative value of each digit.

**ROM: Range of Motion

Extensor Tendon Subluxation at MP Joint—The severity of extensor tendon subluxation at the metacarpophalangeal (MP) joint is combined with other impairments of the same digit using the Combined Values Chart. The finger impairment is converted to hand impairment with Table 21.

When persistent extensor tendon subluxation results in restricted range of motion, impairment is given only for lack of motion.

Extensor Tendon Subluxation Severity	% Digit Impairment*
Mild: Ulnar subluxation on MP joint flexion only.....	10
Moderate: Reducible tendon subluxation in the intermetacarpal groove	20
Severe: Nonreducible tendon subluxation in the intermetacarpal groove	30

*Use Table 18 to find the relative value of each digit.

UPPER EXTREMITY—CONVERSION TABLES

TABLE 21—Relationship of Impairment of the Digits to Impairment of the Hand

% Impairment of Thumb		% Impairment of Hand		% Impairment of Index or Middle Finger		% Impairment of Ring or Little Finger	
0 - 1	=	0		0 - 2	=	0	
2 - 3	=	1		3 - 7	=	1	
4 - 6	=	2		8 - 12	=	2	
7 - 9	=	3		13 - 17	=	3	
9 - 11	=	4		18 - 22	=	4	
12 - 13	=	5		23 - 27	=	5	
14 - 16	=	6		28 - 32	=	6	
17 - 18	=	7		33 - 37	=	7	
19 - 21	=	8		38 - 42	=	8	
22 - 23	=	9		43 - 47	=	9	
24 - 26	=	10		48 - 52	=	10	
27 - 28	=	11		53 - 57	=	11	
29 - 31	=	12		58 - 62	=	12	
32 - 33	=	13		63 - 67	=	13	
34 - 36	=	14		68 - 72	=	14	
37 - 38	=	15		73 - 77	=	15	
39 - 41	=	16		78 - 82	=	16	
42 - 43	=	17		83 - 87	=	17	
44 - 46	=	18		88 - 92	=	18	
47 - 48	=	19		93 - 97	=	19	
49 - 51	=	20		98 - 100	=	20	
52 - 53	=	21					
54 - 56	=	22					
57 - 58	=	23					
59 - 61	=	24					
62 - 63	=	25					
64 - 66	=	26					
67 - 68	=	27					
69 - 71	=	28					
72 - 73	=	29					
74 - 76	=	30					
77 - 78	=	31					
79 - 81	=	32					
82 - 83	=	33					
84 - 86	=	34					
87 - 88	=	35					
89 - 91	=	36					
92 - 93	=	37					
94 - 96	=	38					
97 - 98	=	39					
99 - 100	=	40					

Note: Impairment of the hand contributed by a digit may be rounded to the nearest 5 percent only when it is the *sole* impairment involved.

TABLE 22—Relationship of Impairment of the Thumb to Impairment of the Hand

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

NOTE: Impairment of the hand contributed by the thumb may be rounded to the nearest 5 percent only when it is the *sole* impairment involved. Consult Table 9 for converting hand impairment to upper-extremity impairment.

TABLE 23—Relationship of Impairment of the Hand to Impairment of the Upper Extremity

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

NOTE: Impairment of the upper extremity contributed by the hand may be rounded to the nearest 5 percent only when it is the *sole* impairment involved. Consult Table 20 for converting upper extremity impairment to whole person impairment.

TABLE 24—Relationship of Impairment of the Upper Extremity to Impairment of the Whole Person

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

NOTE: Impairment of the whole person contributed by the upper extremity may be rounded to the nearest 5 percent only when it is the *sole* Impairment involved.

AMPUTATION—FINGER, THUMB, HAND, UPPER EXTREMITY

Figure 1. Impairment of upper extremity from amputation at various levels.

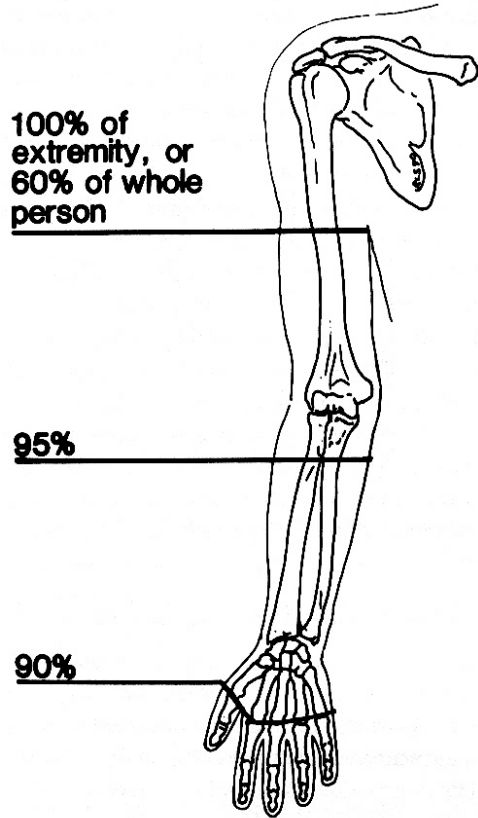


Figure 2. Impairments of the digits (percents outside digits and of hand (percents inside digits) for amputations at various levels.

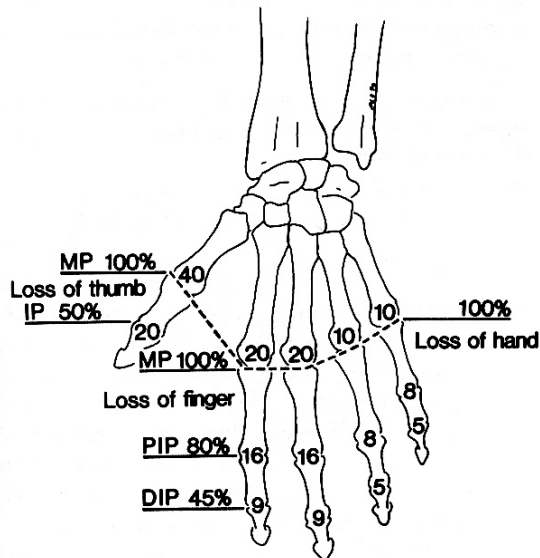


Figure 3. Impairment of finger due to amputation at various lengths (top scale) and total transverse sensory loss impairments correspond to 50% of amputation impairments.

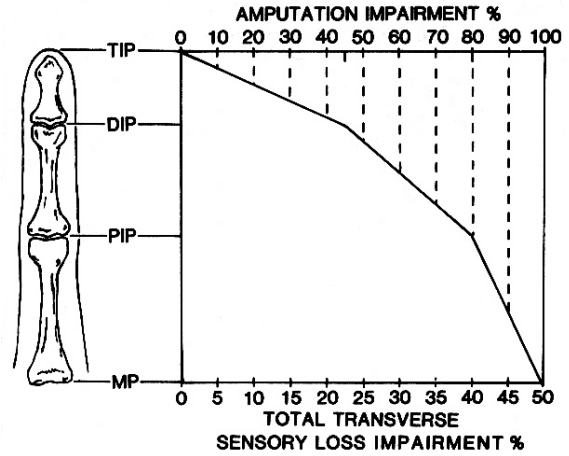
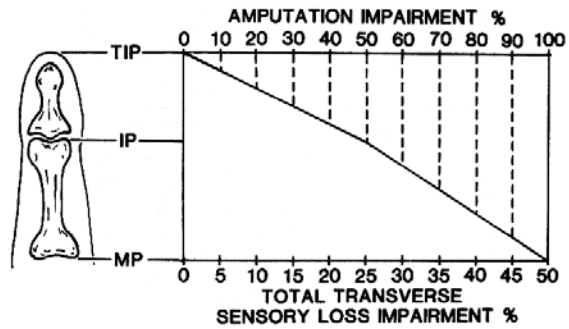


Figure 4. Impairment of thumb due to amputation at various levels (top scale) or total transverse sensory loss (bottom scale). Total transverse sensory loss impairments correspond to 50% amputation values.



Section 4: Musculoskeletal — Lower Extremities

GREAT TOE

Table 1. Impairment due to amputation, abnormal motion and ankylosis of the Interphalangeal Joint of the Great Toe

Amputation			% Impairment of Great Toe
At Joint			75
Abnormal Motion			
Average range of <i>Flexion-Extension</i> is 30° Value to total range of joint motion is 100%			
Flexion from neutral position (0°) to:	Degrees of Joint Motion		% Impairment of Great Toe
	Lost	Retained	
0°	30°	0°	45
10°	20°	10°	30
20°	10°	20°	15
30°	0°	30°	0
Ankylosis			
Joint Ankylosed at:			% Impairment of Great Toe
0° (neutral position)			45
*10°			55
20°			65
30° (full flexion)			75

* Position of function

Table 2. Impairment due to amputation, abnormal motion and ankylosis of the Metatarsophalangeal Joint of the Great Toe – Plantar-flexion

Amputation			% Impairment of Great Toe
At Joint			100
Abnormal Motion			
Average range of <i>Dorsi-Plantar-Flexion</i> is 80° Value to total range of joint motion is 100%			
Plantar-flexion from neutral position (0°) to:	Degrees of Joint Motion		% Impairment of Great Toe
	Lost	Retained	
0°	30°	0°	21
10°	20°	10°	14
20°	10°	20°	7
30°	0°	30°	0
Ankylosis			
Joint Ankylosed at:			% Impairment of Great Toe
0° (neutral position)			55
10°			70
20°			85
30° (full plantar flexion)			100

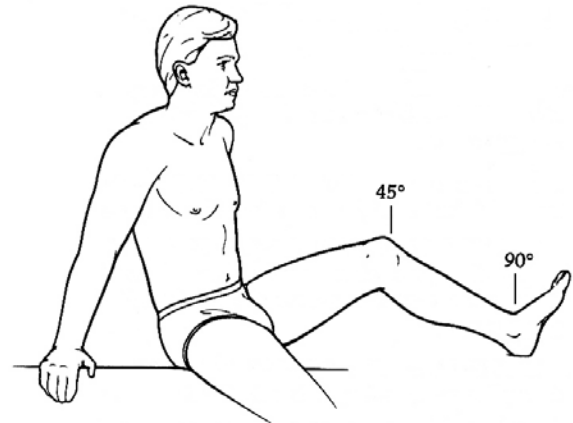
Table 3. Impairment due to amputation, abnormal motion and ankylosis of the Metatarsophalangeal Joint of the Great Toe – Dorsi-flexion

Amputation			% Impairment of Great Toe
At Joint			100
Abnormal Motion			
Average range of <i>Dorsi-Plantar-Flexion</i> is 80° Value to total range of joint motion is 100%			
Dorsi-flexion from neutral position (0°) to:	Degrees of Joint Motion		% Impairment of Great Toe
	Lost	Retained	
0°	50°	0°	34
10°	40°	10°	28
20°	30°	20°	21
30°	20°	30°	14
40°	10°	40°	7
50°	0°	50°	0
Ankylosis			
Joint Ankylosed at:			% Impairment of Great Toe
0° (neutral position)			55
*10°			49
20°			62
30°			74
40°			87
50° (full dorsi-flexion)			100

Arthroplasty at joint: 25%, combined with impairment value for either ankylosis, or loss of range of motion, if present.

* Position of function

Patient's position for evaluation of toes



2ND THROUGH 5TH TOES

Table 4. Impairment due to amputation, abnormal motion and ankylosis of the Distal Interphalangeal Joint of the 2nd through 5th toe – Dorsi-Plantar flexion

Amputation	% Impairment of Toe
At Joint	45
Abnormal Motion	
No functional value	
Ankylosis	
Joint Ankylosed in:	% Impairment of Great Toe
Dorsi-flexion	45
* Neutral position	30
Plantar-flexion (hammer toe)	45

* Position of function

Table 6. Impairment due to amputation, abnormal motion and ankylosis of the Proximal Interphalangeal Joint of the 2nd through 5th toe – Dorsi-Plantar flexion

Amputation	% Impairment of Toe
At Joint	80
Abnormal Motion	
No functional value	
Ankylosis	
Joint Ankylosed in:	% Impairment of Toe
Dorsi-flexion	80
* Neutral position	45
Plantar-flexion	80

* Position of function

Table 5. Impairment due to amputation, abnormal motion and ankylosis of the Metatarsophalangeal Joint of the Second Toe – Dorsi-Plantar-flexion

Amputation	% Impairment of Second Toe		
At Joint	100		
Abnormal Motion			
Average range of <i>Dorsi-Plantar Flexion</i> is 70° Value to total range of joint motion is 100%			
Dorsi-flexion from neutral position (0°) to:	Degrees of Joint Motion Lost	% Impairment of Second Toe	
	Retained		
0°	40°	0°	29
10°	30°	10°	21
20°	20°	20°	14
30°	10°	30°	7
40°	0°	40°	0
Plantar-flexion from Neutral position (0°) to:			
0°	30°	0°	21
10°	20°	10°	14
20°	10°	20°	7
30°	0°	30°	0
Ankylosis			
Joint Ankylosed at: (Dorsi-flexion)	% Impairment of Second Toe		
* 0° (neutral position)	50		
10°	63		
20°	75		
30°	88		
40° (full dorsi-flexion)	100		
Joint Ankylosed at: (Plantar-flexion)	% Impairment of Second Toe		
* 0° (neutral position)	50		
10°	67		
20°	83		
30° (full plantar-flexion)	100		

* Position of function

Table 7. Impairment due to amputation, abnormal motion and ankylosis of the Metatarsophalangeal Joint of the Third Toe – Dorsi-Plantar-flexion

Amputation	% Impairment of Third Toe		
At Joint	100		
Abnormal Motion			
Average range of <i>Dorsi-Plantar Flexion</i> is 50° Value to total range of joint motion is 100%			
Dorsi-flexion from neutral position (0°) to:	Degrees of Joint Motion Lost	% Impairment of Third Toe	
	Retained		
0°	30°	0°	30
10°	20°	10°	20
20°	10°	20°	10
30°	0°	30°	0
Plantar-flexion from Neutral position (0°) to:			
0°	20°	0°	20
10°	10°	10°	10
20°	0°	20°	0
Ankylosis			
Joint Ankylosed at: (Dorsi-flexion)	% Impairment of Third Toe		
* 0° (neutral position)	50		
10°	67		
20°	83		
30° (full dorsi-flexion)	100		
Joint Ankylosed at: (Plantar-flexion)	% Impairment of Third Toe		
* 0° (neutral position)	50		
10°	75		
20° (full plantar-flexion)	100		

* Position of function

METATARSOPHALANGEAL JOINT OF 4TH AND 5TH TOES

Table 8. Impairment due to amputation, abnormal motion and ankylosis of the Metatarsophalangeal Joint of the Fourth Toe – Dorsi-Plantar-flexion

Amputation			% Impairment of Fourth Toe
At Joint			100
Abnormal Motion			
Average range of <i>Dorsi-Plantar Flexion</i> is 30° Value to total range of joint motion is 100%			
Dorsi-flexion from neutral position (0°) to:	Degrees of Joint Motion Lost Retained		% Impairment of Fourth Toe
0°	20°	0°	33
10°	10°	10°	17
20°	0°	20°	0
Plantar-flexion from Neutral position (0°) to:			
0°	10°	0°	17
10°	0°	10°	0
Ankylosis			
Joint Ankylosed at:			
* 0° (neutral position)			50
10°			75
20° (full dorsi-flexion)			100
Joint Ankylosed at:			
* 0° (neutral position)			50
10° (full plantar-flexion)			100

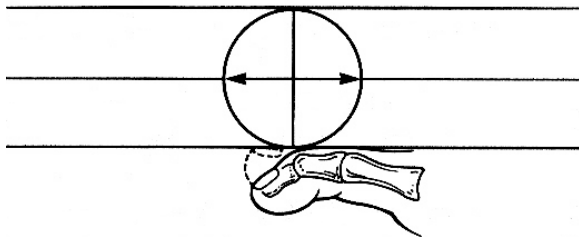
* Position of function

Table 9. Impairment due to amputation, abnormal motion and ankylosis of the Metatarsophalangeal Joint of the Fifth Toe – Dorsi-Plantar-flexion

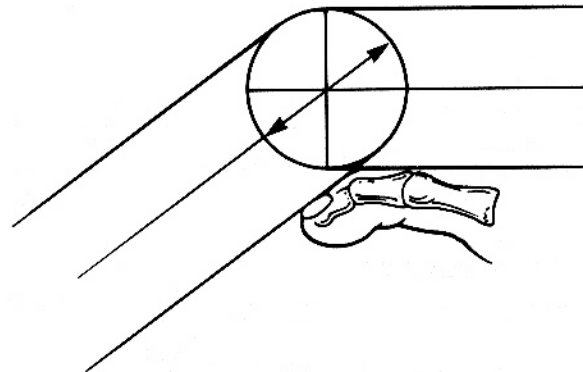
Amputation			% Impairment of Fifth Toe
At Joint			100
Abnormal Motion			
Average range of <i>Dorsi-Plantar Flexion</i> is 20° Value to total range of joint motion is 100%			
Dorsi-flexion from neutral position (0°) to:	Degrees of Joint Motion Lost Retained		% Impairment of Fifth Toe
0°	10°	0°	50
10°	0°	10°	0
Plantar-flexion from Neutral position (0°) to:			
0°	10°	0°	50
10°	0°	10°	0
Ankylosis			
Joint Ankylosed at:			
* 0° (neutral position)			50
10° (full dorsi-flexion)			100
Joint Ankylosed at:			
* 0° (neutral position)			50
10° (full plantar-flexion)			100

* Position of function

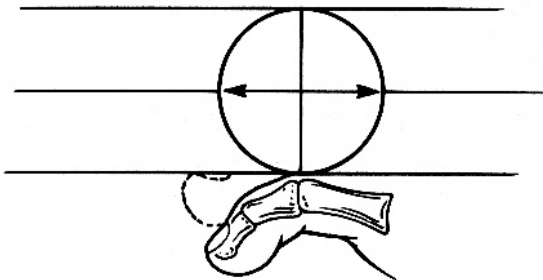
Neutral Position of DIP Joint of Small Toe



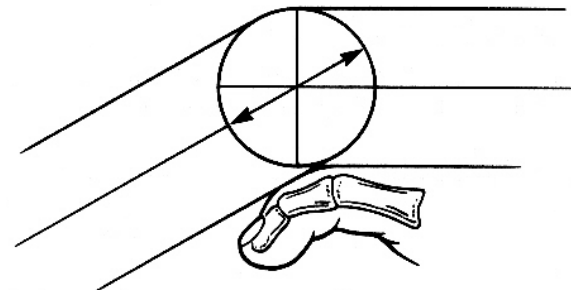
Hammer Toe Ankylosis of Little Toe



Neutral Position of PIP Joint of Small Toes



Plantar-flexion Ankylosis of Small Toes



ANKLE (HIND FOOT)

Dorsi-Plantar Flexion

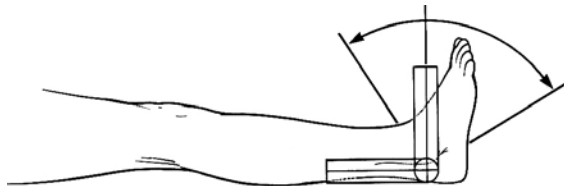
Table 10. Impairment due to amputation, abnormal motion and ankylosis of the Hind Foot (Ankle Joint Primarily) – Dorsi-Plantar-flexion

Amputation		% Impairment of Lower Extremity	
At Joint		70	
Abnormal Motion			
Average range of <i>Dorsi-Plantar Flexion</i> is 60° Value to total range of joint motion is 70%			
Dorsi-flexion from neutral position (0°) to:	Degrees of Joint Motion Lost Retained		% Impairment of Lower Extremity
0°	20°	0°	7
10°	10°	10°	4
20°	0°	20°	0
Plantar-flexion from Neutral position (0°) to:			
0°	40°	0°	14
10°	30°	10°	11
20°	20°	20°	7
30°	10°	30°	4
40°	0°	40°	0
Ankle instability due to lateral collateral ligament loss		25	
Ankle instability due to medial collateral ligament loss		15	
Ankylosis			
Joint Ankylosed at: (Dorsi-flexion)			% Impairment of Lower Extremity
* 0° (neutral position)			30
10°			50
20° (full dorsi-flexion)			70
Joint Ankylosed at: (Plantar-flexion)			
* 0° (neutral position)			30
10°			40
20°			50
30°			60
40° (full plantar-flexion)			70

Arthroplasty of joint: 25%, combined with impairment value for either ankylosis, or loss of range of motion, if present.

* Position of function

Dorsi- and Plantar-flexion of Hind Foot



Inversion/Eversion

Table 11. Impairment due to amputation, abnormal motion and ankylosis of the Hind Foot (Subtalar Joint Primarily) – Inversion/Eversion

Amputation		% Impairment of Lower Extremity	
At Joint		70	
Abnormal Motion			
Average range of <i>Inversion/Eversion</i> is 50° Value to total range of joint motion is 30%			
Dorsi-flexion from neutral position (0°) to:	Degrees of Joint Motion Lost Retained		% Impairment of Lower Extremity
0°	30°	0°	5
10°	20°	10°	4
20°	10°	20°	2
30°	0°	30°	0
Plantar-flexion from Neutral position (0°) to:			
0°	20°	0°	4
10°	10°	10°	2
20°	0°	20°	0
Ankylosis			
Joint Ankylosed at: (Inversion)			% Impairment of Lower Extremity
* 0° (neutral position)			10
10°			43
20°			57
30° (full inversion)			70
Joint Ankylosed at: (Eversion)			
* 0° (neutral position)			10
10°			50
20° (full eversion)			60

* Position of function

Inversion of Hind Foot



Eversion of Hind Foot



OTHER DISORDERS OF THE ANKLE AND FOOT

Ankle

Disorders:	Rating
Arthritis not to be rated less than 1 year after onset	5%—20% L.E.
Ligamentous instability.....	5%— 15% L.E.
Arthroplasty.....	5%—20% L.E.

Foot

Disorders:	Rating
Arthritis, not to be rated less than 1 year after onset	5%—20% L.E.
Ligamentous instability.....	5%—15% L.E.
Arthroplasty.....	5%—20% L.E.

KNEE JOINT

Flexion/Extension

Table 12. Impairment due to amputation, abnormal motion and ankylosis of the Knee Joint

Amputation	% Impairment of Lower Extremity
At Joint	90
Abnormal Motion*	
Average range of <i>Flexion-Extension</i> is 150° Value to total range of joint motion is 100%	
Retained active flexion of:	% Impairment of Lower Extremity
0°	53
10°	49
20°	46
30°	42
40°	39
50°	35
60°	32
70°	28
80°	25
90°	21
100°	18
110°	14
120°	11
130°	7
140°	4
150°	0
Extension back to (extension lag):	% Impairment of Lower Extremity
0° (neutral position)	0
10°	1
20°	7
30°	17
40°	27
50° to 150° (full flexion)	90
Ankylosis	
Joint Ankylosed at:	% Impairment of Lower Extremity
0° (neutral position)	53
**10°	50
20°	60
30°	70
40°	80
50° to 150° (full flexion)	90

* If a permanent groin-to-ankle orthosis is required for extension stability, there is a 50% impairment in the lower extremity, although there may be full range of motion to the knee joint. This rating does not apply to any other types of local knee bracing.

** Position of function

Other Disorders of the Knee

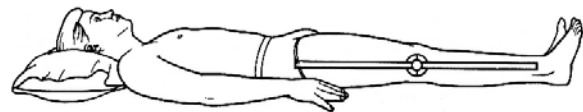
Table 13. Impairment ratings of the Lower Extremity for other disorders of the Knee

Disorder	Impairment of Lower Extremity
1. Patellectomy (with loss of power)	5-15% combined with impairment for loss of motion
2. Torn meniscus and/or meniscectomy	5-10% for one meniscus 5-20% for both meniscus combined with impairment for loss of motion
3. Knee replacement arthroplasty	10-30% if in optimum position
4. Patella replacement only	Same as for patellectomy
5. Arthritis due to any etiology, including trauma; chondromalacia	5-20% according to deformity
6. Anterior cruciate ligament loss	5-20% combined with impairment for loss of motion
7. Posterior cruciate ligament loss	5-20% combined with impairment for loss of motion
8. Collateral ligament loss	10% for moderate instability 20% for marked instability
9. Post-traumatic varus deformity (if over 15°)	5-15% combined with impairment for loss of motion
10. Post traumatic valgus deformity (if over 20°)	5-15% combined with impairment for loss of motion

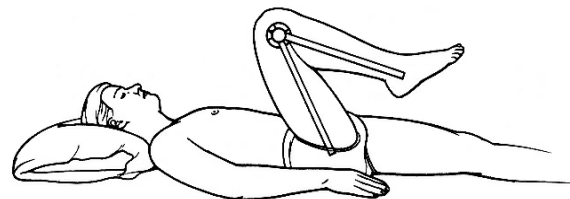
* See Table 12 for impairment ratings for loss of motion.

** The combining of any impairment value in this table with impairment for loss of motion is to be done using the Combined Values Chart.

Neutral position of Knee



Flexion of Knee



HIP JOINT

Flexion

Table 14. Impairment due to amputation, abnormal motion and ankylosis of the Hip Joint – forward flexion

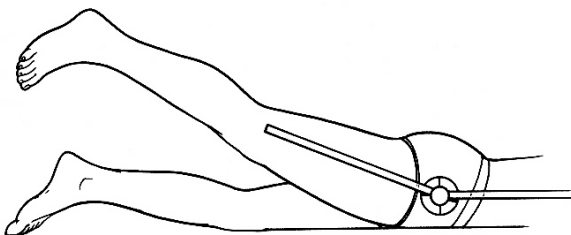
Amputation		% Impairment of Lower Extremity	
At Joint		100	
Abnormal Motion			
Average range of <i>Forward Flexion-Backward Extension</i> is 130° Value to total range of joint motion is 33%			
Forward Flexion from neutral position (0°) to:	Degrees of Joint Motion		% Impairment of Lower Extremity
	Lost	Retained	
0°	100°	0°	18
10°	90°	10°	16
20°	80°	20°	14
30°	70°	30°	12
40°	60°	40°	11
50°	50°	50°	9
60°	40°	60°	7
70°	30°	70°	5
80°	20°	80°	4
90°	10°	90°	2
100°	0°	100°	0
Ankylosis			
Joint Ankylosed at:		% Impairment of Lower Extremity	
0° (neutral position)		70	
10°		62	
20°		54	
* 25°		50	
30°		53	
40°		60	
50°		67	
60°		73	
70°		80	
80°		87	
90°		93	
100° (full flexion)		100	

* Position of function

Neutral position for extension of hip



Extension of hip



Extension

Table 15. Impairment due to amputation, abnormal motion and ankylosis of the Hip Joint – backward extension

Amputation		% Impairment of Lower Extremity	
At Joint		100	
Abnormal Motion			
Average range of <i>Forward Flexion-Backward Extension</i> is 130° Value to total range of joint motion is 33%			
Backward Extension from neutral position (0°) to:	Degrees of Joint Motion		% Impairment of Lower Extremity
	Lost	Retained	
0°	30°	0°	5
10°	20°	10°	4
20°	10°	20°	2
30°	0°	30°	0
Ankylosis			
Joint Ankylosed at:		% Impairment of Lower Extremity	
0° (neutral position)		70	
10°		80	
20°		90	
30° (full backward extension)		100	

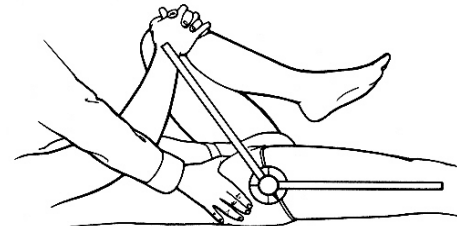
Other Disorders of the Hip Joint

Disorder	% Impairment of Lower Extremity
1. Anthroplasty	10-30
2. Non-union of hip fracture	30
3. Avascular necrosis of the hip	10-30
4. Loose hip prosthesis	40
5. Arthritis, not rated at less than 1 year after onset	5-20

Neutral position for right hip



Placement of goniometer at right hip



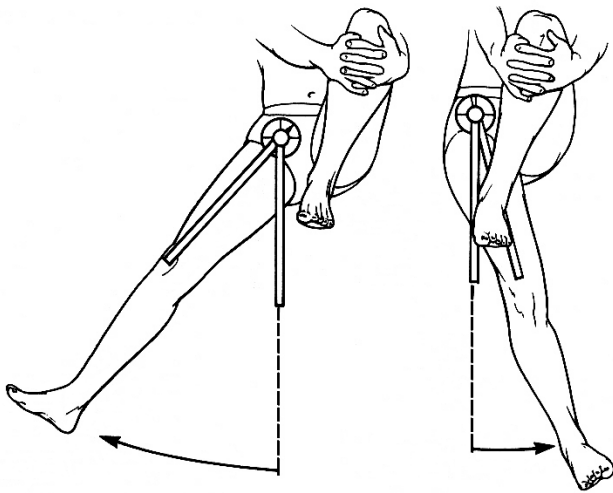
Abduction/Adduction

Table 16. Impairment due to amputation, abnormal motion and ankylosis of the Hip Joint – abduction-adduction

Amputation			% Impairment of Lower Extremity
At Joint			100
Abnormal Motion			
Average range of <i>Abduction-Adduction</i> is 60°			
Value to total range of joint motion is 33%			
Abduction from neutral position (0°) to:	Degrees of Joint Motion Lost Retained		% Impairment of Lower Extremity
0°	40°	0°	16
10°	30°	10°	12
20°	20°	20°	8
30°	10°	30°	4
40°	0°	40°	0
Adduction from Neutral position (0°) to:			
0°	40°	0°	8
10°	10°	10°	4
20°	0°	20°	0
Ankylosis			
Joint Ankylosed at:			% Impairment of Lower Extremity
* 0° (neutral position)			70
10°			78
20°			85
30°			93
40° (full abduction)			100
Joint Ankylosed at:			
* 0° (neutral position)			70
10°			85
20° (full adduction)			100

* Position of function

Abduction and Adduction of Right Hip



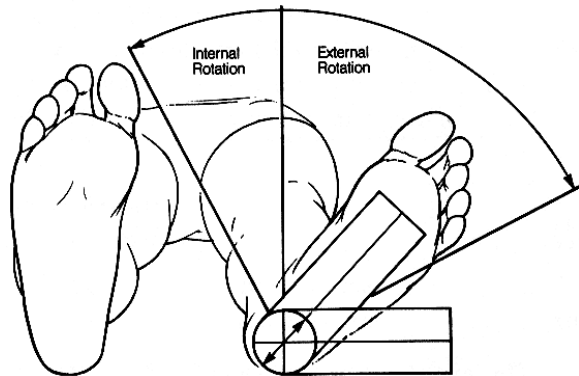
Rotation

Table 17. Impairment due to amputation, abnormal motion and ankylosis of the Hip Joint – rotation

Amputation			% Impairment of Lower Extremity
At Joint			100
Abnormal Motion			
Average range of <i>Rotation</i> is 90°			
Value to total range of joint motion is 33%			
Internal Rotation from neutral position (0°) to:	Degrees of Joint Motion Lost Retained		% Impairment of Lower Extremity
0°	40°	0°	10
10°	30°	10°	8
20°	20°	20°	5
30°	10°	30°	3
40°	0°	40°	0
External Rotation from Neutral position (0°) to:			
0°	50°	0°	13
10°	40°	10°	10
20°	30°	20°	8
30°	20°	30°	5
40°	10°	40°	3
50°	0°	50°	0
Ankylosis			
Joint Ankylosed at:			% Impairment of Lower Extremity
* 0° (neutral position)			70
10°			78
20°			85
30°			93
40° (full internal rotation)			100
Joint Ankylosed at:			
0°			70
10°			76
20°			82
30°			88
40°			94
50° (full external rotation)			100

* Position of function

Movement of foot as measure of internal and external rotation of Hip



LOWER EXTREMITY CONVERSION TABLES

Table 18. Relationship of Impairment of the Great Toe to impairment of the Foot

% Impairment of Great Toe		% Impairment of Foot	
0 - 2	=	0	
3 - 8	=	1	
9 - 13	=	2	
14 - 19	=	3	
20 - 24	=	4	
25 - 30	=	5	
31 - 35	=	6	
36 - 41	=	7	
42 - 46	=	8	
47 - 52	=	9	
53 - 57	=	10	
58 - 62	=	11	
63 - 68	=	12	
69 - 73	=	13	
74 - 79	=	14	
80 - 84	=	15	
85 - 90	=	16	
91 - 95	=	17	
96 - 100	=	18	

Note: Impairment of the foot contributed by the great toe may be rounded to the nearest 5% only when it is the *sole* impairment involved.

Consult Table 19 for converting foot impairment to lower extremity impairment.

Table 19. Relationship of Impairment of the Foot to impairment of the Lower Extremity

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

Note: Impairment of the lower extremity as contributed by the foot may be rounded to the nearest 5% only when it is the *sole* impairment involved.

Consult Table 21 for converting lower extremity impairment to whole person impairment

Table 20. Relationship of Impairment of Second through Fifth Toes to impairment of the Foot

% Impairment of Each Toe	% Impairment of Foot
0 - 16	0
17 - 49	1
50 - 83	2
84 - 100	3

Note: Impairment of the foot contributed by the toe may be rounded to the nearest 5 percent only when it is the *sole* impairment involved. Consult Table 19 for converting foot impairment to lower extremity impairment.

Table 21. Relationship of Impairment of the Lower Extremity to impairment of the Whole Person

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

Note: In case of shortening due to overriding or malalignment or fracture deformities, but not to include flexion extension deformities, combine the following values with other functional sequelae, using the Combined Values Chart.

- 0 - ½ inch = 5% of lower extremity
- ½ - 1 inch = 10% of lower extremity
- 1 - 1½ inch = 15% of lower extremity
- 1½ - 2 inch = 20% of lower extremity

Note: Impairment of the whole person contributed by lower extremity may be rounded to the nearest 5% only when it is the *sole* impairment involved.

AMPUTATION—TOE, FOOT, LOWER EXTREMITY

Table 22. Impairment of the Foot due to amputation and ankylosis of Multiple Digits

Digit(s) Involved	% Impairment of the Foot			
	Amputated	Ankylosed in		
		Full Extension	Position of Function	Full Flexion
Great	18	14	13	18
Great, Second	21	17	15	21
Great, Second, Third	24	20	17	24
Great, Second, Fourth	24	20	17	24
Great, Second, Fifth	24	20	17	24
Great, Second, Third, Fourth	27	23	19	27
Great, Second, Third, Fifth	27	23	19	27
Great, Second, Fourth, Fifth	27	23	19	27
Great, Second, Third, Fourth, Fifth	30	26	21	30
Great, Third	21	17	15	21
Great, Third, Fourth	24	20	17	24
Great, Third, Fifth	24	20	17	24
Great, Third, Fourth, Fifth	27	23	19	27
Great, Fourth	21	17	15	21
Great, Fourth, Fifth	24	20	17	24
Great, Fifth	21	17	15	21
Second	3	3	2	3
Second, Third	6	6	4	6
Second, Third, Fourth	9	9	4	9
Second, Third, Fifth	9	9	6	9
Second, Third, Fourth, Fifth	12	12	8	12
Second, Fourth	6	6	4	6
Second, Fourth, Fifth	9	9	6	9
Second, Fifth	6	6	4	6
Third	3	3	2	3
Third, Fourth	6	6	4	6
Third, Fourth, Fifth	9	9	6	9
Third, Fifth	6	6	4	6
Fourth	3	3	2	3
Fourth, Fifth	6	6	4	6
Fifth	3	3	2	3

Table 23. Impairment of the Digits, Foot, Lower Extremity and Whole Person due to amputations

	% Impairment of			
	Digit	Foot	Lower Extremity	Whole Person
Hemipelvectomy				50
Disarticulation at hip joint			100	40
Amputation above knee joint with short thigh stump (3" or less below tuberosity of ischium)			100	40
Amputation above knee joint with functional stump			90	36
Disarticulation at knee joint			90	36
Gritti-Stokes amputation			90	36
Amputation below the knee joint with short stump (3" or less below intercondylar notch)			90	36
Amputation below the knee with functional stump			70	28
Amputation at ankle (Syme)		100	70	28
Partial amputation of foot (Chopart's)		75	53	21
Mid-metatarsal amputation		50	35	14
Amputation of all toes at metatarsophalangeal joint		30	21	8
Amputation of Great Toe				
With resection of metatarsal bone		30	21	8
At metatarsophalangeal joint	100	18	13	5
At interphalangeal joint	75	14	10	4
Amputation of Lesser Toe (2nd-5th)				
With resection of metatarsal bone		5	4	2
At metatarsophalangeal joint	100	3	2	1
At proximal interphalangeal joint	80	2	1	0
At distal interphalangeal joint	45	1	1	0

Section 5: Nervous System

INTRODUCTION

1. Nervous system involvement may result in multiple impairments, which should be combined using the Combined Values Chart.
2. Sensory impairment rating utilizes the Grading Scheme on page 60 for calculation of percent of impairment.
3. Sensory impairment is measured for the digits using two-point discrimination or pain/temperature, and for other regions using pain/temperature testing.
4. Two-point discrimination testing of the digits uses a varied series of one or two points applied. If the subject is unable to distinguish between one point and two points at a distance of at least 10mm in two out of three applications, then sensation is impaired.
5. Motor impairment rating utilizes the Grading Scheme on page 60 for calculation of permanent impairment.

CENTRAL NERVOUS SYSTEM (BRAIN AND SPINAL CORD)

	% Impairment of the Whole Person
1. Language Disturbances	
a. Minimal disturbances in comprehension or expression of language symbols for daily living, with minimal impairment in functional communication.....	15
b. Moderate impairment in comprehension or expression of language symbols for daily living, with some useful functional communication.....	30
c. Severe impairment in comprehension or expression of language symbols for daily living, with little functional communication.....	75
d. Inability to comprehend or express language symbols sufficient for daily living, with no functional communication	95

2. Disturbances of Consciousness and/or Complex Integrated Cerebral Function. (Determined by medical observation and psychometric testing, excluding functional overlay or primary psychiatric disturbances.)

Disturbances of complex integrated cerebral function, include defects in orientation, thinking, memory, judgment, ability to initiate and perform planned activity, and social behavior. Disturbances of consciousness include lethargy, clouding of consciousness, delirium, stupor, coma, and persistent vegetative state.

a. Mild impairment of complex integrated cerebral function, able to live independently.....	15
b. Mild impairment of complex integrated cerebral function, able to live independently, but requiring supervision with executive function.....	30
c. Moderate impairment of complex integrated cerebral function, demonstrated by psychometric testing, with mild disturbance of consciousness, but able to perform all activities of daily living with supervision on a daily basis.....	50
d. Moderately severe impairment of complex integrated cerebral function or moderate disturbance of consciousness, requiring supervision for activities of daily living.....	75
e. Severe impairment of complex integrated cerebral function or delirium, requiring assistance as well as supervision for activities of daily living.....	95
f. Stupor, coma, or persistent vegetative state.....	99

**% Impairment of
the Whole Person**

3. Emotional Disturbances (organic dysfunction documented by medical observation, supported by psychometric testing. Not primary psychiatric disturbances.)

- a. Intermittent mild to moderate emotional disturbance under unusually stressful situations..... 15
- b. Mild to moderate emotional disturbance under ordinary stresses of daily living 30
- c. Moderate to severe emotional disturbance under ordinary stresses of daily living, requiring sheltered living 75
- d. Severe emotional disturbance that continually endangers self or others, requiring continuous supervision or protected care 95

4. Episodic Neurological Disorders

- a. Slight severity and under such control that most of the activities of daily living can be performed 10
- b. Of such severity as to interfere moderately with activities of daily living 30
- c. Of such severity and constancy as to limit activities to supervised or protected care or confinement in an institution 75
- d. Of such severity and constancy as to totally incapacitate the individual in terms of daily living 95

5. Sleep and Arousal Disorders

- a. Reduced daytime alertness due to sleepiness or sleep episodes or disturbed nocturnal sleep affecting complex cerebral functions, but ability remains to carry out most activities of daily living..... 15
- b. Reduced daytime alertness due to sleepiness or sleep episodes or disturbed nocturnal sleep affecting complex cerebral functions, requiring some supervision to carry out activities of daily living..... 30
- c. Reduced daytime alertness due to sleepiness or sleep episodes or disturbed nocturnal sleep that significantly limits activities of daily living, requiring supervision by caretakers 75
- d. Such a severe reduction of daytime alertness due to sleepiness or sleep episodes or disturbed nocturnal sleep so that activities of daily living are severely limited, individual is unable to care for self in any situation or manner 95

6. Station and Gait/Mobility

- a. Able to rise to standing position and walk, with or without assistive devices, independent at community level, except for difficulty with elevations, grades, stairs, and distances..... 10
- b. Able to rise to standing position and walk with or without assistive devices, and is independent at household but not community level 20
- c. Supervised standing and ambulation at household level 30
- d. Assisted ambulation, household level 40
- e. Nonambulatory, uses manual wheelchair, community level..... 65
- f. Nonambulatory, uses manual wheelchair, household level only 75
- g. Nonambulatory, uses power wheelchair only..... 85
- h. Nonambulatory, not able to use mobility device..... 95

	Preferred Extremity	Nonpreferred Extremity	Both Extremities
7. Use of the Upper Extremities			
a. Can use the involved extremity for self-care, grasping and holding, but with difficulty with digital dexterity	10%	5%	15%
b. Can use the involved extremity for some self-care activities and can grasp and hold objects, with difficulty but without digital dexterity.....	30%	15%	50%
c. Can use the involved extremity for few self-care activities, with difficulty.....	40%	30%	70%
d. Unable to use involved extremity for any self-care activities.....	60%	40%	90%
			% Impairment of the Whole Person

8. Respiration

a. Capable of spontaneous respiration, with difficulty in activities of daily living that require exertion.....	20
b. Capable of spontaneous respiration but to a degree that restricts functions such as standing, ambulation, and upper-extremity use	50
c. Capable of spontaneous respiration, but to a degree that results in bed confinement.....	90
d. No capacity for spontaneous respiration, requires a ventilator	95

9. Urinary Bladder Function (organic bladder disorder)

a. Impairment in form of urgency	1 – 10
b. Good reflex activity without voluntary control.....	11 – 20
c. Poor reflex activity and no voluntary control	21 – 30
d. No reflex or voluntary control	31 – 40

10. Anorectal/Bowel Function (organic disorder)

a. Mild fecal incontinence.....	1 – 5
b. Moderate but partial fecal incontinence	6 – 15
c. Complete fecal incontinence.....	16 – 25

11. Sexual Function (organic dysfunction)

a. Sexual function is possible, but with some degree of difficulty for erection or ejaculation in males, or awareness due to sensory loss in either sex.....	10
b. Reflex sexual function is possible, but without awareness due to sensory loss.....	20
c. No capacity for sexual function	30

SKULL DEFECTS

Unfilled Skull Defects	% Impairment of the Whole Person
a. Up to 5 sq cm.....	1
b. 6 – 10 sq cm	3
c. 11 – 16 sq cm	5
d. 17 – 26 sq cm	10
e. 27 – 42 sq cm	15
f. 43 or more sq cm.....	20

SKULL FRACTURES

Skull fractures 0

HEADACHES

Vascular, tension, or combination (if associated with neurologic or musculoskeletal condition of the head or neck, the primary condition may be ratable.) 0

CRANIAL NERVES

1. Olfactory

- a. Complete unilateral loss 0
- b. Complete bilateral loss 3

2. Optic

- a. Complete unilateral loss 24
- b. Complete bilateral loss 85

3, 4, 5. Oculomotor, Trochlear, Abducens (alone or in combination)

Complete loss of ability to perceive single image but correctable by covering one eye 24

6. Trigeminal

- a. Complete unilateral sensory loss 10
- b. Complete bilateral sensory loss 35
- c. Intractable typical trigeminal neuralgia or tic douloureux 50
- d. Atypical facial neuralgia 20
- e. Complete unilateral motor loss 5
- f. Complete bilateral motor loss 30

7. Facial

- a. Complete loss of taste 3
- b. Complete unilateral paralysis 15
- c. Complete bilateral paralysis 45

8. Auditory (See ENT Section)

9, 10. Glossopharyngeal or Vagus

- a. Mild dysphagia with minimal modification of diet 10
- b. Moderate dysphagia with restriction to pureed food or liquid diet 30
- c. Feeding gastronomy or tube feeding required 50
- d. Dysarthria (See ENT Section)

11. Accessory (See spinal nerve affecting head and neck)

12. Hypoglossal

- a. Unilateral paralysis 2
- b. Bilateral paralysis (see scale above for impaired swallowing)
 - 1. Mild dysphagia with minimal modification of diet 10
 - 2. Moderate dysphagia with restriction to pureed food and/or thickened liquids 30
 - 3. Feeding gastronomy or tube feeding required 50
 - 4. Dysarthria (See ENT Section)

SPINAL NERVE IMPAIRMENT AFFECTING HEAD AND NECK

Nerve	% Impairment of the Whole Person	
	Maximum % Loss of Function Due to Sensory Deficit, or Pain	Maximum % Loss of Function Due to Loss of Strength
Greater occipital	5	0
Lesser occipital	3	0
Greater articular	3	0
Spinal accessory	0	10 unilateral
.....	20 bilateral

(See Determination Procedures at the end of this section for grading schemes to determine whole-person impairment due to motor or sensory loss.)

THORACIC NERVES

Nerve	Unilateral Involvement	Bilateral Involvement
Any 2 thoracic nerves.....	5	10
Any 2 – 5 thoracic nerves.....	10	20
Any 5 or more thoracic nerves	30	50

SPINAL NERVES AFFECTING INGUINAL REGION AND PERINEUM

Nerve	Maximum % Loss of Function Due to Sensory Deficit, or Pain	Maximum % Loss of Function Due to Loss of Strength
Iliohypogastric	3	0
Ilioinguinal	5	0
Pudendal (unilateral)	5	5
(bilateral)	20	20
Coccygeal	5	0

(See Determination Procedures at the end of this section for grading schemes to determine whole-person impairment due to motor or sensory loss.)

UNILATERAL SPINAL NERVE ROOT AFFECTING THE UPPER EXTREMITY

Nerve Root Impaired	Maximum % Loss of Function Due to Sensory Deficit, or Pain	Maximum % Loss of Function Due to Motor Deficit or Loss of Power
C-5	5	30
C-6	8	35
C-7	5	35
C-8	5	45
T-1	5	20

(See Determination Procedures at the end of this section for grading schemes to determine the percentage of upper extremity. Convert upper-extremity impairment to whole-person only when all upper-extremity impairments have been combined.)

UNILATERAL BRACHIAL PLEXUS DISORDERS

	Maximum % Loss of Function Due to Sensory Deficit, or Pain	Maximum % Loss of Function Due to Motor Deficit or Loss of Power
Brachial Plexus	100	100
Upper Trunk (C-5, C-6) (Duchenne-Erb)	25	70
Middle Trunk (C-7)	5	35
Lower Trunk (C-8, T-1) (Klumpke-Dejerine)	20	70

(See Determination Procedures at the end of this section for grading schemes to determine the percentage of upper extremity. Convert upper-extremity impairment to whole-person only when all upper-extremity impairments have been combined.)

SPECIFIC UNILATERAL SPINAL NERVE AFFECTING THE UPPER EXTREMITY

Nerve	Maximum % Loss of Function Due to Sensory Deficit, or Pain	Maximum % Loss of Function Due to Motor Deficit or Loss of Power
Anterior thoracic (pectoral)	0	5
Axillary (circumflex)	5	35
Dorsal scapular	0	5
Long thoracic (posterior thoracic n., external respiratory n. of Bell, n. to serratus anterior)	0	15
Medial antebrachial cutaneous	5	0
Medial brachial cutaneous	5	0
Median (above mid-forearm)	40	55
Median (below mid-forearm)	40	35
Branch to radial side of thumb	7	0
Branch to ulnar side of thumb	11	0
Branch to radial side of index finger	5	0
Branch to ulnar side of index finger	4	0
Branch to radial side of middle finger	5	0
Branch to ulnar side of middle finger	4	0
Branch to radial side of ring finger	3	0
Musculocutaneous	5	25
Radial (musculospiral) (upper arm with loss of triceps) wrist placed in position of function	5	55
Radial (musculospiral) (with sparing of triceps) wrist placed in position of function	5	40
Subscapular (upper and lower)	0	5
Suprascapular	5	15
Thoracodorsal (long subscapular; nerve to latissimus dorsi)	0	10
Ulnar (above mid-forearm)	10	35
Ulnar (below mid-forearm)	10	25
Branch to ulnar side of ring finger	2	0
Branch to radial side of little finger	3	0
Branch to ulnar side of little finger	3	0

(See Determination Procedures at the end of this section for grading schemes to determine the percentage of upper extremity. Convert upper-extremity impairment to whole-person only when all upper-extremity impairments have been combined.)

UPPER EXTREMITY DUE TO ENTRAPMENT NEUROPATHY

Entrapment Nerve	Neuropathy Site	Degree of Severity and % Upper Extremity Impairment		
		Mild	Moderate	Severe
Suprascapular		5	10	19
Axillary		10	20	38
Radial	upper arm	15	25	57
Radial	elbow	10	20	40
Median	elbow	15	35	73
Anterior interosseous	proximal forearm	5	10	13
Median	wrist	10	25	60
Ulnar	elbow	10	20	42
Ulnar	wrist	10	20	33

(Convert upper-extremity impairment to whole-person only when all upper-extremity impairments have been combined.)

(For an alternate rating method, use Grading Schemes at the end of this section for upper-extremity peripheral nerve involvement; use only one method.)

UNILATERAL SPINAL NERVE ROOT AFFECTING THE LOWER EXTREMITY

Nerve Root Impaired	Maximum %	Maximum %
	Loss of Function Due to Sensory Deficit, or Pain	Loss of Function Due to Loss of Strength
L-3	5	20
L-4	5	34
L-5	5	37
S-1	5	20

(See Determination Procedures at the end of this section for grading schemes to determine the percentage of lower extremity. Convert lower-extremity impairment to whole-person only when all lower-extremity impairments have been combined.)

UNILATERAL LUMBOSACRAL PLEXUS

Lumbosacral Plexus	Maximum %	Maximum %
	Loss of Function Due to Sensory Deficit, or Pain	Loss of Function Due to Loss of Strength
.....	40	50

(See Determination Procedures at the end of this section for grading schemes to determine the percentage of lower extremity. Convert lower-extremity impairment to whole-person only when all lower-extremity impairments have been combined.)

SPECIFIC UNILATERAL SPINAL NERVE AFFECTING THE LOWER EXTREMITY

Nerve	Maximum % Loss of Function Due to Sensory Deficit, or Pain	Maximum % Loss of Function Due to Motor Deficit or Loss of Power
Femoral (anterior crural)	5	35
Femoral (anterior Crural) (below iliacus nerve)	5	30
Genitofemoral (genito crural)	5	0
Inferior gluteal	0	25
Lateral femoral cutaneous.....	10	0
N. to obturator internus muscle		
N. to piriformis muscle.....	0	10
N. to quadratus femoris muscle		
N. to superior gemellus muscle Obturator.....	0	10
Posterior cutaneous of thigh	5	0
Superior gluteal.....	0	20
Sciatic (above hamstring innervation)	25	75
Common peroneal (lateral, or external popliteal)	5	35
Deep (above mid-shin).....	0	25
Deep (below mid-shin)		
Anterior tibial	0	5
Superficial	5	10
Tibial nerve (medial, or internal popliteal)		
Above knee	15	35
Posterior tibial (mid-calf and knee).....	15	25
Below mid-calf.....	15	15
Lateral plantar branch	5	5
Medial plantar branch	5	5
Sural (external Saphenous)	5	0

DETERMINATION OF PAIN OR LOSS OF SENSATION**Grading Scheme**

Description	Grade
1. No loss of sensation or no spontaneous abnormal sensations.....	0%
2. Impaired sensation with or without pain, which does not interfere with activity	1—15%
3. Impaired sensation with or without pain, which interferes with activity	16—30%
4. Impaired sensation with or without pain, which may prevent activity	31—60%
5. Impaired sensation with or without severe pain, which prevents activity	61—90%
6. Impaired sensation with or without pain, which prevents all activity.....	91—100%

Procedure for determining Impairment Due to Sensory Involvement

1. Identify area of involvement using appropriate anatomical chart.
2. Identify the nerve(s) or root level(s) for the involved area.
3. Find the value for the maximum loss of function of the nerve(s) or root(s), due to pain or loss of sensation, using the appropriate table.
4. Grade the degree of impaired sensation or pain according to the Grading Scheme.
5. Multiply the value of the nerve or root by the degree of impaired sensation or pain.

DETERMINATION OF STRENGTH (POWER) AND/OR MOTOR DEFICIT**Grading Scheme**

Description	Grade
1. Range of motion against gravity and full resistance (normal strength)	0%
2. Range of motion against gravity and some resistance, or reduced fine movements and motor control, may include abnormalities documented by electrophysiological studies (good strength).....	1 – 40%
3. Range of motion against gravity, but without resistance (fair strength)	41 – 60%
4. Range of motion with gravity eliminated (poor strength).....	61 – 75%
5. Slight palpable muscle contraction (trace strength).....	76 – 99%
6. No contractibility and no muscle function (zero strength).....	100%

Procedure for determining Impairment Due to Motor Involvement

1. Identify the motion involved
2. Identify the muscle(s) performing the function
3. Determine the nerve(s) that innervate the involved muscle(s) and find the value for maximum percentage loss due to loss of strength or power, according to the appropriate table.
4. Grade the degree of loss of strength or power according to the Grading Scheme.
5. Multiply the value of the nerve by the degree of loss of strength or power.

Section 6: Mental and Behavioral Disorders

INTRODUCTION

Three principles are central to assessing mental impairment:

1. Diagnosis is among the factors to be considered in assessing the severity and possible duration of the impairment, but it is by no means the sole criterion.
2. Motivation for improvement may be a key factor in the outcome of impairment.
3. A complete assessment requires a longitudinal history of the impairment, its treatment, and attempts at rehabilitation.

DIAGNOSIS AND IMPAIRMENT

The Diagnostic and Statistical Manual of Mental Disorders (3rd. ed., revised in 1987), commonly known as DSM (current edition), is a widely accepted classification system for mental disorders. It is similar to another system, the International Classification of Diseases (ICD), also in widespread use. The criteria for mental disorders include a wide range of signs, symptoms and impairments. Most mental disorders are characterized by one or more impairments. An individual may have a mental or behavioral impairment, however, without meeting the criteria for one of the mental disorders specified in the DSM (current edition) or the ICD.

DSM (current edition) calls for a multi-axial evaluation. Each of five axes refers to a different class of information. The first three constitute the official diagnostic evaluation, including the clinical syndromes and conditions that are the focus of treatment (Axis I), personality and developmental disorders (Axis II), and physical disorders and conditions that may be relevant to understanding and managing the care of the individual (Axis III). Axis IV (specifying and rating psychosocial stressors) and Axis V (rating adaptive functioning) may be particularly important for assessing severity of impairment.

Specific impairments: The degree of impairment may vary considerably among patients, and the severity of the impairment is not necessarily related to the diagnosis. Indeed, diagnosis alone is of limited relevance to the objective assessment of psychiatric impairment because it does not permit sufficient insight into the nature of the impairment.

EVIDENCE OF MENTAL IMPAIRMENT

The presence of a mental disorder should be documented primarily on the basis of reports from individual providers, such as psychiatrists, psychologists, and other state licensed mental health professionals, and facilities, such as hospitals and clinics. Adequate descriptions of functional limitations must be obtained from these or other sources, which may include programs and facilities where the individual has been observed over a considerable period of time. Longitudinal data are particularly useful.

Information from both medical and nonmedical sources may be used to obtain detailed descriptions of the individual's activities of daily living; social functioning; concentration, persistence, or pace; or ability to tolerate increased mental demands (stress). This information can be provided by programs such as community mental health centers, day care centers, sheltered workshops, etc. It can also be provided by others, including family members, who have knowledge of the individual's function.

An individual's level of functioning may vary considerably over time. Proper evaluation of the impairment must take any variations in level of functioning into account in arriving at a determination of severity of impairment over time. Information concerning the individual's behavior during any attempt to work and the circumstances surrounding termination of the work effort are particularly useful in determining the individual's ability or inability to function in a work setting. Results of work evaluations and rehabilitation programs can be significant sources of relevant data in regard to vocational and related impairments.

The results of well-standardized psychological tests and other projective techniques may be useful in establishing the existence of a mental disorder. For example, intelligence tests are useful in establishing mental retardation, and projective techniques may provide useful data in supporting diagnoses of other mental disorders. Broad-based neuropsychological assessments may be useful in determining brain-function deficiencies, particularly in cases involving subtle findings, such as may be seen in traumatic brain injury. In addition, the process of taking a standardized test requires concentration, persistence, and pace. Test results should, therefore, include both the objective data and a narrative description of clinical findings. Narrative reports of intellectual assessment should include a discussion of whether obtained IQ scores are considered valid and consistent with the individual's developmental history and degree of functional restriction.

SPECIAL CONSIDERATIONS

Particular problems often are involved in evaluating mental impairments in individuals who have long histories of repeated hospitalizations or prolonged outpatient care with supportive therapy and medication. Individuals with chronic psychotic disorders commonly have their lives structured in such a way as to minimize stress and reduce their signs and symptoms. The results of a single examination may not adequately describe these individuals' sustained ability to function. It is, therefore, vital to review pertinent information relative to the individual's condition, especially at times of increased stress.

Effects of structured settings: An evaluation of individuals whose symptoms are controlled or attenuated by psychosocial factors must consider the ability of the individual to function outside such highly structured settings.

Effects of medication: Attention must be given to the effect of medication on the individual's signs, symptoms, and ability to function. While psychotropic medications may control certain primary manifestations of a mental disorder, such as hallucinations, such treatment may or may not affect the functional limitations imposed by the mental disorder. Neuroleptics, the medicines necessary to control signs of an "amotivational" like syndrome, used in the treatment of some mental illnesses, may cause drowsiness, blunted affect, or other side effects involving other body systems. Such side effects must be considered in evaluating overall severity of impairment as well as the patient's functional capacity.

Pain: The assessment of impairment due to the perception of pain, especially in circumstances in which the complaint exceeds what is expected based on physical findings, is complex and controversial. The perception of pain may be distorted by mental disorders. Pain may be an element in a somatic delusion in a patient with a Major Depression or Psychotic Disorder. It may become the object of an obsessive preoccupation or a chief complaint in a Conversion Disorder. The latter has been called "Psychogenic Pain Disorder" or "Idiopathic Pain Disorder," but these terms often are used more loosely to describe any complaint of pain that is greater than the physician expects for the "normal" patient with the same physical findings. The more specific disorders with impairments are somewhat easier to evaluate than cases in which the perception of pain is said to have a "psychogenic component." Such cases require specialized assessment, perhaps using a multidisciplinary, multispecialty approach.

ASSESSING IMPAIRMENT SEVERITY

A method of evaluating psychiatric impairment: Solutions to the many dilemmas encountered in determining the degree of impairment resulting from a psychiatric illness can only be sought through the application of consistent and observable criteria that must be considered in relation to one another.

The table that follows, when used according to the best clinical judgment of the evaluator, will aid in the evaluation of an individual, and it should be used after all diagnostic, clinical, treatment and rehabilitation factors have been explored.

An example that follows the table gives the overall rating of a patient based upon the mental status and upon the current condition as observed by the calculator. The rating is based upon observed attributes and phenomena that are somewhat interrelated, and it necessarily must be considered to be somewhat subjective. Reduced ability to deal with activities of daily living and treatment potential may be considered in determining the severity of mental status.

TABLE 1
Evaluation of Psychiatric Impairment

Class of Impairment	1	2	3	4	5
Percentage of Impairment	0%	1-5%	6-14%	15-24%	25+%
Mental Status					
Intelligence (including intelligence lost)	normal or better	slight deficit or reduction	moderate deficit or reduction	moderately severe deficit reduction	severe deficit reduction
Thinking	no deficit	slight deficit	moderate severe deficit	moderately severe deficit	severe deficit
Perception	no deficit	slight deficit	moderate deficit	moderately severe deficit	severe deficit
Judgment	no deficit	slight deficit	moderate deficit	moderately severe deficit	severe deficit
Affect	normal	slight problem	moderate problem	moderately problem	severe problem
Behavior	normal	slight problem	moderate problem	moderately severe	severe problem

Example of Psychiatric Impairment Profile

Category	Impairment Description
Mental Status	
Intelligence	Normal
Thinking	Moderately severe deficit; cannot draw rational conclusions from single statements
Perception	Slight deficit; however, shows no signs of delusions
Judgment	Moderately severe deficit; engages in self-defeating behavior
Affect	Between moderate and severe deficit; mood swings from hostile to friendly
Behavior	Moderate to severe deficit; see Affect.

Examples of Psychiatric Impairment Profile

Category	Impairment Description	Impairment Class
Mental Status		
Intelligence	Normal	1
Thinking	Moderately severe deficit; cannot draw rational conclusions from single statements	4
Perception	Slight deficit; however, shows no signs of delusions	2
Judgment	Moderately severe deficit; engages in self-defeating behavior	4
Affect	Between moderate and severe deficit mood swings from hostile to friendly.	4
Behavior	Moderate to severe deficit; see Affect.	4
Collective Impairment*	Moderate to severe 15—24	4

* Whole-person impairment rating: Patient is vocationally unemployable and will remain so. Socially, the patient is moderately impaired, but the degree of impairment varies from time to time, depending upon the amount of stress to which the patient is subjected and whether the patient takes prescription medication regularly.

Reference

1. Social Security Administration: Federal Old-Age, Survivors and Disability Insurance; Listing of Impairments, Medical Disorders; Final Rule. Fed. Reg. 20 CFR par 404 (Reg No A) 50 (167), 35038-35070, 1985

Section 7: Respiratory System

CRITERIA FOR EVALUATING PERMANENT IMPAIRMENT RELATED TO THE RESPIRATORY SYSTEM

1. Table 1 presents the criteria for rating permanent impairment. The value of VO_2 Max* less than 15 ml/(kg. min) is not a hard and fast criterion for severe impairment; a person may be considered severely impaired if 30% to 40% of his or her VO_2 max is not sufficient to meet the VO_2 costs of his or her occupational activity over an eight-hour period. Arterial blood gas determination may itself indicate severe impairment when an individual is stable and receiving optimal therapy. A person with a resting $*P_aO_2$ of less than 60mm Hg in room air may be deemed severely impaired if he or she has evidence of one or more of the secondary conditions related to arterial hypoxemia, such as pulmonary hypertension, cor pulmonale, increasingly severe hypoxemia during exercise testing, and erythrocytosis. A resting P_aO_2 of less than 50mm Hg in room air is by itself a criterion for severe impairment.
2. Predicted normal FVC values for men and women are found in Tables 2 and 3, respectively.
3. Predicted normal FEV_1 Values for men and women are found in Tables 4 and 5, respectively.
4. Predicted normal Single Breath D_{co} values for men and women are found in Tables 6 and 7, respectively.

**TABLE 1
CLASSES OF RESPIRATORY IMPAIRMENT**

NOTE: Those factors contained in the history and physical exam should also be considered in determining the severity of the impairment.

	Class 1 1-14% Impairment of Whole Person	Class 2 15-29% Impairment of Whole Person	Class 3 30-54% Impairment of Whole Person	Class 4 55-95% Impairment of Whole Person
FVC FEV ₁ FEV ₁ /FVC (as percent D _{co})	FVC 80% of predicted and, FEV ₁ 80% of predicted, and FEV ₁ /FVC 70% and D _{co} 80% of predicted.	FVC between 60% and 79% of predicted or FEV ₁ between 60% and 79% or FEV ₁ /FVC between 60% and 69% or D _{co} between 60% and 79% of predicted.	FVC between 51% and 59% of predicted or FEV ₁ between 41% and 59% or FEV ₁ /FVC between 41% and 59% or D _{co} between 41% and 59% of predicted.	FVC 50% of predicted or FEV ₁ 40% of predicted, or FEV ₁ /FVC 40%, or D _{co} 40% of predicted
	≥25 ml/(kg.min) (kg.min)	or Between 20 and 25 ml (kg.min)	or Between 15 and 20 ml (kg.min)	or 15 ml/(kg.min)

FVC is Forced Vital Capacity; FEV₁ is Forced Expiratory Volume in the first second; D_{co} is primarily of value for persons with restrictive lung disease in Classes 2 and 3; if the FVC, FEV₁ and FEV₁/FVC ratio are normal and the D_{co} is between 41% and 79%, then an exercise test is required.

* VO_2 Max, or measured exercise capacity is useful in assessing whether a person's complaint of dyspnea (see Table 1) is a result of respiratory or other complications. A person's cardiac and conditioning status must be considered in performing the test and in interpreting the results.

**TABLE 2
PREDICTED NORMAL FVC VALUES (LITERS) FOR MEN (BTPS)**

Age	Height(cm)																								
	146	148	150	152	154	156	158	160	162	164	166	168	170	172	174	176	178	180	182	184	186	188	190	192	194
18	3.72	3.84	3.96	4.08	4.20	4.32	4.44	4.56	4.68	4.80	4.92	5.04	5.16	5.28	5.40	5.52	5.64	5.76	5.88	6.00	6.12	6.24	6.36	6.48	6.60
20	3.68	3.80	3.92	4.04	4.16	4.28	4.40	4.52	4.64	4.76	4.88	5.00	5.12	5.24	5.36	5.48	5.60	5.72	5.84	5.96	6.08	6.20	6.32	6.44	6.56
22	3.64	3.76	3.88	4.00	4.12	4.24	4.36	4.48	4.60	4.72	4.84	4.96	5.08	5.20	5.32	5.44	5.56	5.68	5.80	5.92	6.04	6.16	6.28	6.40	6.52
24	3.60	3.72	3.84	3.95	4.08	4.20	4.32	4.44	4.56	4.68	4.80	4.92	5.04	5.16	5.28	5.40	5.52	5.64	5.76	5.88	6.00	6.12	6.24	6.36	6.48
26	3.55	3.67	3.79	3.91	4.03	4.15	4.27	4.39	4.51	4.63	4.75	4.87	4.99	5.11	5.23	5.35	5.47	5.59	5.71	5.83	5.95	6.07	6.19	6.31	6.43
28	3.51	3.63	3.75	3.87	3.99	4.11	4.23	4.35	4.47	4.59	4.71	4.83	4.95	5.07	5.19	5.31	5.43	5.55	5.67	5.79	5.91	6.03	6.15	6.27	6.39
30	3.47	3.59	3.71	3.83	3.95	4.07	4.19	4.31	4.43	4.55	4.67	4.79	4.91	5.03	5.15	5.27	5.39	5.51	5.63	5.75	5.87	5.99	6.11	6.23	6.35
32	3.43	3.55	3.67	3.79	3.91	4.03	4.15	4.27	4.39	4.51	4.63	4.75	4.87	4.99	5.11	5.23	5.35	5.47	5.59	5.71	5.83	5.95	6.07	6.19	6.31
34	3.38	3.50	3.62	3.74	3.86	3.98	4.10	4.22	4.34	4.46	4.58	4.70	4.82	4.94	5.06	5.18	5.30	5.42	5.54	5.66	5.78	5.90	6.02	6.14	6.26
36	3.34	3.46	3.58	3.70	3.82	3.94	4.06	4.18	4.30	4.42	4.54	4.66	4.78	4.90	5.02	5.14	5.26	5.38	5.50	5.62	5.74	5.86	5.98	6.10	6.22
38	3.30	3.42	3.54	3.66	3.78	3.90	4.02	4.14	4.26	4.38	4.50	4.62	4.74	4.86	4.98	5.10	5.22	5.34	5.46	5.58	5.70	5.82	5.94	6.06	6.18
40	3.25	3.37	3.49	3.61	3.73	3.85	3.97	4.09	4.21	4.33	4.45	4.57	4.69	4.81	4.93	5.05	5.17	5.29	5.41	5.53	5.65	5.77	5.89	6.01	6.13
42	3.21	3.33	3.45	3.57	3.69	3.81	3.93	4.05	4.17	4.29	4.41	4.53	4.65	4.77	4.89	5.01	5.13	5.25	5.37	5.49	5.61	5.73	5.85	5.97	6.09
44	3.17	3.29	3.41	3.53	3.65	3.77	3.89	4.01	4.13	4.25	4.37	4.49	4.61	4.73	4.85	4.97	5.09	5.21	5.33	5.45	5.57	5.69	5.81	5.93	6.05
46	3.13	3.25	3.37	3.49	3.61	3.73	3.85	3.97	4.09	4.21	4.33	4.45	4.57	4.69	4.81	4.93	5.05	5.17	5.29	5.41	5.53	5.65	5.77	5.89	6.01
48	3.08	3.20	3.32	3.44	3.56	3.68	3.80	3.92	4.04	4.16	4.28	4.40	4.52	4.64	4.76	4.88	5.00	5.12	5.24	5.36	5.48	5.60	5.72	5.84	5.96
50	3.04	3.16	3.28	3.40	3.52	3.64	3.76	3.88	4.00	4.12	4.24	4.36	4.48	4.60	4.72	4.84	4.96	5.08	5.20	5.32	5.44	5.56	5.68	5.80	5.92
52	3.00	3.12	3.24	3.36	3.48	3.60	3.72	3.84	3.96	4.08	4.20	4.32	4.44	4.56	4.68	4.80	4.92	5.04	5.16	5.28	5.40	5.52	5.64	5.76	5.88
54	2.95	3.07	3.19	3.31	3.43	3.55	3.67	3.79	3.91	4.03	4.15	4.27	4.39	4.51	4.63	4.75	4.87	4.99	5.11	5.23	5.35	5.47	5.59	5.71	5.83
56	2.91	3.03	3.15	3.27	3.39	3.51	3.63	3.75	3.87	3.99	4.11	4.23	4.35	4.47	4.59	4.71	4.83	4.95	5.07	5.19	5.31	5.43	5.55	5.67	5.79
58	2.87	2.99	3.11	3.23	3.35	3.47	3.59	3.71	3.83	3.95	4.07	4.19	4.31	4.43	4.55	4.67	4.79	4.91	5.03	5.15	5.27	5.39	5.51	5.63	5.75
60	2.83	2.95	3.07	3.19	3.31	3.43	3.55	3.67	3.79	3.91	4.03	4.15	4.27	4.39	4.51	4.63	4.75	4.87	4.99	5.11	5.23	5.35	5.47	5.59	5.71
62	2.78	2.90	3.02	3.14	3.26	3.38	3.50	3.62	3.74	3.86	3.98	4.10	4.22	4.34	4.46	4.58	4.70	4.82	4.94	5.06	5.18	5.30	5.42	5.54	5.66
64	2.74	2.86	2.98	3.10	3.22	3.34	3.46	3.58	3.70	3.82	3.94	4.06	4.18	4.30	4.42	4.54	4.66	4.78	4.90	5.02	5.14	5.26	5.38	5.50	5.62
66	2.70	2.82	2.94	3.06	3.18	3.30	3.42	3.54	3.66	3.78	3.90	4.02	4.14	4.26	4.38	4.50	4.62	4.74	4.86	4.98	5.10	5.22	5.34	5.46	5.58
68	2.65	2.77	2.89	3.01	3.13	3.25	3.37	3.49	3.61	3.73	3.85	3.97	4.09	4.21	4.33	4.45	4.57	4.69	4.81	4.93	5.05	5.17	5.29	5.41	5.53
70	2.61	2.73	2.85	2.97	3.09	3.21	3.33	3.45	3.57	3.69	3.81	3.93	4.05	4.17	4.29	4.41	4.53	4.65	4.77	4.89	5.01	5.13	5.25	5.37	5.49
72	2.57	2.69	2.81	2.93	3.05	3.17	3.29	3.41	3.53	3.65	3.77	3.89	4.01	4.13	4.25	4.37	4.49	4.61	4.73	4.85	4.97	5.09	5.21	5.33	5.45
74	2.53	2.65	2.77	2.89	3.01	3.13	3.25	3.37	3.49	3.61	3.73	3.85	3.97	4.09	4.21	4.33	4.45	4.57	4.69	4.81	4.93	5.05	5.17	5.29	5.41

FVC in liters = 0.0600 H – 0.0214 A – 4.650. R² = 0.54, SEE = 0.644, 95% Confidence Interval = 1.115.

Definitions of abbreviations: R² = coefficient of determination, SEE = standard error of estimate, H = height in cm, and A = age in years. BTPS = body temperature, ambient pressure and saturated with water vapor at these conditions.

The axes of the table are age (in years) at the side, and height (in cm) at the top. The predicted normal FVC in liters for the male patient is found at the intersection of the row for his age, and the column for his height.

Adapted from Crapo RO, Morris AH, Gardner RM: Reference spirometric values using techniques and equipment that meets ATS recommendations. *Am Rev Respir Dis* 1981; 123:659-664.

**TABLE 3
PREDICTED NORMAL FVC VALUES (LITERS) FOR WOMEN (BTPS)**

Age	Height(cm)																								
	146	148	150	152	154	156	158	160	162	164	166	168	170	172	174	176	178	180	182	184	186	188	190	192	194
18	3.19	3.29	3.39	3.48	3.58	3.68	3.78	3.88	3.98	4.07	4.17	4.27	4.37	4.47	4.56	4.66	4.76	4.86	4.96	5.06	5.15	5.25	5.35	5.45	5.55
20	3.15	3.24	3.34	3.44	3.54	3.64	3.74	3.83	3.93	4.03	4.13	4.23	4.32	4.42	4.52	4.2	4.72	4.82	4.91	5.01	5.11	5.21	5.31	5.41	5.50
22	3.10	3.20	3.30	3.40	3.50	3.59	3.69	3.79	3.89	3.99	4.09	4.18	4.28	4.38	4.48	4.58	4.67	4.77	4.87	4.97	5.07	5.17	5.26	5.36	5.46
24	3.06	3.16	3.26	3.35	3.45	3.55	3.65	3.75	3.85	3.94	4.04	4.14	4.24	4.34	4.43	4.53	4.63	4.73	4.83	4.93	5.02	5.12	5.22	5.32	5.42
26	3.02	3.12	3.21	3.31	3.41	3.51	3.61	3.70	3.80	3.90	4.00	4.10	4.20	4.29	4.39	4.49	4.59	4.69	4.78	4.88	4.98	5.08	5.18	5.28	5.37
28	2.97	3.07	3.17	3.27	3.37	3.46	3.56	3.66	3.76	3.86	3.96	4.05	4.15	4.25	4.35	4.45	4.54	4.64	4.74	4.84	4.94	5.04	5.13	5.23	5.33
30	2.93	3.03	3.13	3.23	3.32	3.42	3.52	3.62	3.72	3.81	3.91	4.01	4.11	4.21	4.31	4.40	4.50	4.60	4.70	4.80	4.89	4.99	5.09	5.19	5.29
32	2.89	2.99	3.08	3.18	3.28	3.38	3.48	3.57	3.67	3.77	3.87	3.97	4.07	4.16	4.26	4.36	4.46	4.56	4.65	4.75	4.85	4.95	5.05	5.15	5.24
34	2.84	2.94	3.04	3.14	3.24	3.34	3.43	3.53	3.63	3.73	3.83	3.92	4.02	4.12	4.22	4.32	4.42	4.51	4.61	4.71	4.81	4.91	5.00	5.10	5.20
36	2.80	2.90	3.00	3.10	3.19	3.29	3.39	3.49	3.59	3.68	3.78	3.88	3.98	4.08	4.18	4.27	4.37	4.47	4.57	4.67	4.76	4.86	4.96	5.06	5.16
38	2.76	2.86	2.95	3.05	3.15	3.25	3.35	3.45	3.54	3.64	3.74	3.84	3.94	4.03	4.13	4.23	4.33	4.43	4.53	4.62	4.72	4.82	4.92	5.02	5.11
40	2.71	2.81	2.91	3.01	3.11	3.21	3.30	3.40	3.50	3.60	3.70	3.79	3.89	3.99	4.09	4.19	4.29	4.38	4.48	4.58	4.68	4.78	4.87	4.97	5.07
42	2.67	2.77	2.87	2.97	3.06	3.16	3.26	3.36	3.46	3.56	3.65	3.75	3.85	3.95	4.05	4.14	4.24	4.34	4.44	4.54	4.64	4.73	4.83	4.93	5.03
44	2.63	2.73	2.82	2.92	3.02	3.12	3.22	3.32	3.41	3.51	3.61	3.71	3.81	3.90	4.00	4.10	4.20	4.30	4.40	4.49	4.59	4.69	4.79	4.89	4.98
46	2.58	2.68	2.78	2.88	2.98	3.08	3.17	3.27	3.37	3.47	3.57	3.67	3.76	3.86	3.96	4.06	4.16	4.25	4.35	4.45	4.55	4.65	4.75	4.84	4.94
48	2.54	2.64	2.74	2.84	2.93	3.03	3.13	3.23	3.33	3.43	3.52	3.62	3.72	3.82	3.92	4.01	4.11	4.21	4.31	4.41	4.51	4.60	4.70	4.80	4.90
50	2.50	2.60	2.69	2.79	2.89	2.99	3.09	3.19	3.28	3.38	3.48	3.58	3.68	3.78	3.87	3.97	4.07	4.17	4.27	4.36	4.46	4.56	4.66	4.76	4.86
52	2.46	2.55	2.65	2.75	2.85	2.95	3.04	3.14	3.24	3.34	3.44	3.54	3.63	3.73	3.83	3.93	4.03	4.12	4.22	4.32	4.42	4.52	4.62	4.71	4.81
54	2.41	2.51	2.61	2.71	2.80	2.90	3.00	3.10	3.20	3.30	3.39	3.49	3.59	3.69	3.79	3.89	3.98	4.08	4.18	4.28	4.38	4.47	4.57	4.67	4.77
56	2.37	2.47	2.57	2.66	2.76	2.86	2.96	3.06	3.15	3.25	3.35	3.45	3.55	3.65	3.74	3.84	3.94	4.04	4.14	4.23	4.33	4.43	4.53	4.63	4.73
58	2.33	2.42	2.52	2.62	2.72	2.82	2.91	3.01	3.11	3.21	3.31	3.41	3.50	3.60	3.70	3.80	3.90	4.00	4.09	4.19	4.29	4.39	4.49	4.58	4.68
60	2.28	2.38	2.48	2.58	2.68	2.77	2.87	2.97	3.07	3.17	3.26	3.36	3.46	3.56	3.66	3.76	3.85	3.95	4.05	4.15	4.25	4.34	4.44	4.54	4.64
62	2.24	2.34	2.44	2.53	2.63	2.73	2.83	2.93	3.02	3.12	3.22	3.32	3.42	3.52	3.61	3.71	3.81	3.91	4.01	4.11	4.20	4.30	4.40	4.50	4.60
64	2.20	2.29	2.39	2.49	2.59	2.69	2.79	2.88	2.98	3.08	3.18	3.28	3.37	3.47	3.57	3.67	3.77	3.87	3.96	4.06	4.16	4.26	4.36	4.45	4.55
66	2.15	2.25	2.35	2.45	2.55	2.64	2.74	2.84	2.94	3.04	3.14	3.23	3.33	3.43	3.53	3.63	3.72	3.82	3.92	4.02	4.12	4.22	4.31	4.41	4.51
68	2.11	2.21	2.31	2.40	2.50	2.60	2.70	2.80	2.90	2.99	3.09	3.19	3.29	3.39	3.48	3.58	3.68	3.78	3.88	3.98	4.07	4.17	4.27	4.37	4.47
70	2.07	2.16	2.26	2.36	2.46	2.56	2.66	2.75	2.85	2.95	3.05	3.15	3.24	3.34	3.44	3.54	3.64	3.74	3.83	3.93	4.03	4.13	4.23	4.33	4.42
72	2.02	2.12	2.22	2.32	2.42	2.51	2.61	2.71	2.81	2.91	3.01	3.10	3.20	3.30	3.40	3.50	3.59	3.69	3.79	3.89	3.99	4.09	4.18	4.28	4.38
74	1.98	2.08	2.18	2.27	2.37	2.47	2.57	2.67	2.77	2.86	2.96	3.06	3.16	3.26	3.36	3.45	3.55	3.65	3.75	3.85	3.94	4.04	4.14	4.24	4.34

FVC in liters = 0.0491 H – 0.0216 A – 3.590. R² = 0.74, SEE = 0.393, 95% Confidence Interval = 0.676.

Definitions of abbreviations: R² = coefficient of determination, SEE = standard error of estimate, H = height in cm, and A = age in years. BTPS = body temperature, ambient pressure and saturated with water vapor at these conditions.

The axes of the table are age (in years) at the side, and height (in cm) at the top. The predicted normal FVC in liters for the male patient is found at the intersection of the row for his age, and the column for his height.

Adapted from Crapo RO, Morris AH, Gardner RM: Reference spirometric values using techniques and equipment that meets ATS recommendations. *Am Rev Respir Dis* 1981; 123:659-664.

**TABLE 4
PREDICTED NORMAL FEV₁ FOR MEN**

Age	Height(cm)																								
	146	148	150	152	154	156	158	160	162	164	166	168	170	172	174	176	178	180	182	184	186	188	190	192	194
18	3.42	3.50	3.58	3.66	3.75	3.83	3.91	3.99	4.08	4.16	4.24	4.33	4.41	4.49	4.57	4.66	4.74	4.82	4.91	4.99	5.07	5.15	5.24	5.32	5.40
20	3.37	3.45	3.53	3.61	3.70	3.78	3.86	3.95	4.03	4.11	4.19	4.28	4.36	4.44	4.53	4.61	4.69	4.77	4.86	4.94	5.02	5.11	5.19	5.27	5.35
22	3.32	3.40	3.48	3.57	3.65	3.73	3.81	3.90	3.98	4.06	4.15	4.23	4.31	4.39	4.48	4.56	4.64	4.73	4.81	4.89	4.97	5.05	5.14	5.22	5.30
24	3.27	3.35	3.43	3.52	3.60	3.68	3.77	3.85	3.93	4.01	4.10	4.18	4.26	4.35	4.43	4.51	4.59	4.68	4.76	4.84	4.92	5.01	5.09	5.17	5.26
26	3.22	3.30	3.39	3.47	3.55	3.63	3.72	3.80	3.88	3.97	4.05	4.13	4.21	4.30	4.38	4.46	4.54	4.63	4.71	4.79	4.88	4.90	5.04	5.12	5.21
28	3.17	3.25	3.34	3.42	3.50	3.59	3.67	3.75	3.83	3.92	4.00	4.08	4.16	4.25	4.33	4.41	4.50	4.58	4.66	4.74	4.83	4.91	4.99	5.08	5.16
30	3.12	3.21	3.29	3.37	3.45	3.54	3.62	3.70	3.78	3.87	3.95	4.03	4.12	4.20	4.28	4.36	4.45	4.53	4.61	4.70	4.78	4.86	4.94	5.03	5.11
32	3.07	3.16	3.24	3.32	3.40	3.49	3.57	3.65	3.74	3.82	3.90	3.98	4.07	4.15	4.23	4.32	4.40	4.48	4.56	4.65	4.73	4.81	4.90	4.98	5.06
34	3.02	3.11	3.19	3.27	3.36	3.44	3.52	3.60	3.69	3.77	3.85	3.94	4.02	4.10	4.18	4.27	4.35	4.43	4.52	4.60	4.68	4.76	4.85	4.93	5.01
36	2.98	3.06	3.14	3.22	3.31	3.39	3.47	3.56	3.64	3.72	3.80	3.89	3.97	4.05	4.14	4.22	4.30	4.38	4.47	4.55	4.63	4.71	4.80	4.88	4.96
38	2.93	3.01	3.09	3.18	3.26	3.34	3.42	3.51	3.59	3.67	3.76	3.84	3.94	4.00	4.09	4.17	4.25	4.33	4.42	4.50	4.58	4.67	4.75	4.83	4.91
40	2.88	2.96	3.04	3.13	3.21	3.29	3.38	3.46	3.54	3.62	3.71	3.79	3.87	3.95	4.04	4.12	4.20	4.29	4.37	4.45	4.53	4.62	4.70	4.78	4.87
42	2.83	2.91	3.00	3.08	3.16	3.24	3.33	3.41	3.49	3.57	3.66	3.74	3.82	3.91	3.99	4.07	4.15	4.24	4.32	4.40	4.49	4.57	4.65	4.73	4.82
44	2.78	2.86	2.95	3.03	3.11	3.19	3.28	3.36	3.44	3.53	3.61	3.69	3.77	3.86	3.94	4.02	4.11	4.19	4.27	4.35	4.44	4.52	4.60	4.69	4.77
46	2.73	2.81	2.90	2.98	3.06	3.15	3.23	3.31	3.39	3.48	3.56	3.64	3.73	3.81	3.89	3.97	4.06	4.14	4.22	4.31	4.39	4.47	4.55	4.64	4.72
48	2.68	2.77	2.85	2.93	3.01	3.10	3.18	3.26	3.35	3.43	3.51	3.59	3.68	3.76	3.84	3.93	4.01	4.09	4.17	4.25	4.34	4.42	4.50	4.59	4.67
50	2.63	2.72	2.80	2.88	2.97	3.05	3.13	3.21	3.30	3.38	3.46	3.55	3.63	3.71	3.79	3.88	3.96	4.04	4.12	4.21	4.29	4.37	4.46	4.54	4.62
52	2.59	2.67	2.75	2.83	2.92	3.00	3.08	3.17	3.25	3.33	3.41	3.50	3.58	3.66	3.74	3.83	3.91	3.99	4.08	4.16	4.24	4.32	4.41	4.49	4.57
54	2.54	2.62	2.70	2.79	2.87	2.95	3.03	3.12	3.20	3.28	3.36	3.45	3.53	3.61	3.70	3.78	3.86	3.94	4.03	4.11	4.19	4.28	4.36	4.44	4.52
56	2.49	2.57	2.65	2.74	2.82	2.90	2.98	3.07	3.15	3.23	3.32	3.40	3.48	3.56	3.65	3.73	3.81	3.90	3.98	4.06	4.14	4.23	4.31	4.39	4.48
58	2.44	2.52	2.60	2.69	2.77	2.85	2.94	3.02	3.10	3.18	3.27	3.35	3.43	3.52	3.60	3.68	3.76	3.85	3.93	4.01	4.10	4.18	4.26	4.34	4.43
60	2.39	2.47	2.55	2.64	2.72	2.80	2.89	2.97	3.05	3.14	3.22	3.30	3.38	3.47	3.55	3.63	3.72	3.80	3.88	3.96	4.05	4.13	4.21	4.29	4.38
62	2.34	2.42	2.51	2.59	2.67	2.76	2.84	2.92	3.00	3.09	3.17	3.25	3.34	3.42	3.50	3.58	3.67	3.75	3.83	3.91	4.00	4.08	4.16	4.25	4.33
64	2.29	2.38	2.46	2.54	2.62	2.71	2.79	2.87	2.96	3.04	3.12	3.20	3.29	3.37	3.45	3.53	3.62	3.70	3.78	3.87	3.95	4.03	4.11	4.20	4.28
66	2.24	2.33	2.41	2.49	2.58	2.66	2.74	2.82	2.91	2.99	3.07	3.15	3.24	3.32	3.40	3.49	3.57	3.65	3.73	3.82	3.90	3.98	4.07	4.15	4.23
68	2.20	2.28	2.36	2.44	2.53	2.61	2.69	2.77	2.86	2.94	3.02	3.11	3.19	3.27	3.35	3.44	3.52	3.60	3.69	3.77	3.85	3.93	4.02	4.10	4.18
70	2.15	2.23	2.31	2.39	2.48	2.56	2.64	2.73	2.81	2.89	2.97	3.06	3.14	3.22	3.31	3.39	3.47	3.55	3.64	3.72	3.80	3.98	3.97	4.05	4.13
72	2.10	2.18	2.26	2.35	2.43	2.51	2.59	2.68	2.76	2.84	2.93	3.01	3.09	3.17	3.26	3.34	3.42	3.51	3.59	3.67	3.75	3.84	3.92	4.00	4.08
74	2.05	2.13	2.21	2.30	2.38	2.46	2.55	2.63	2.71	2.79	2.88	2.96	3.04	3.13	3.21	3.29	3.37	3.46	3.54	3.62	3.70	3.79	3.87	3.95	4.04

FEV₁ in liters = 0.0414 H – 0.0244 A – 2.190. R² = 0.64, SEE = 0.486, 95% Confidence Interval = 0.842.

Definitions of abbreviations: R² = coefficient of determination, SEE = standard error of estimate, H = height in cm, and A = age in years. BTPS = body temperature, ambient pressure and saturated with water vapor at these conditions.

The axes of the table are age (in years) at the side, and height (in cm) at the top. The predicted normal FVC in liters for the male patient is found at the intersection of the row for his age, and the column for his height.

Adapted from Crapo RO, Morris AH, Gardner RM: Reference spirometric values using techniques and equipment that meets ATS recommendations. *Am Rev Respir Dis* 1981; 123:659-664.

**TABLE 5
PREDICTED NORMAL FEV₁ FOR WOMEN**

Age	Height(cm)																								
	146	148	150	152	154	156	158	160	162	164	166	168	170	172	174	176	178	180	182	184	186	188	190	192	194
18	2.96	3.02	3.09	3.16	3.23	3.30	3.37	3.43	3.50	3.57	3.64	3.71	3.78	3.85	3.91	3.98	4.05	4.12	4.19	4.26	4.32	4.39	4.46	4.53	4.60
20	2.91	2.97	3.04	3.11	3.18	3.25	3.32	3.38	3.45	3.52	3.59	3.66	3.73	3.79	3.86	3.93	4.00	4.07	4.14	4.20	4.27	4.34	4.41	4.48	4.55
22	2.85	2.92	2.99	3.06	3.13	3.20	3.26	3.33	3.40	3.47	3.54	3.61	3.67	3.74	3.81	3.88	3.95	4.02	4.09	4.15	4.22	4.29	4.36	4.43	4.50
24	2.80	2.87	2.94	3.01	3.08	3.15	3.21	3.28	3.35	3.42	3.49	3.56	3.62	3.69	3.76	3.83	3.90	3.97	4.03	4.10	4.17	4.24	4.31	4.38	4.44
26	2.75	2.82	2.89	2.96	3.03	3.09	3.16	3.23	3.30	3.37	3.44	3.50	3.57	3.64	3.71	3.78	3.85	3.91	3.98	4.05	4.12	4.19	4.26	4.33	4.39
28	2.70	2.77	2.84	2.91	2.97	3.04	3.11	3.18	3.25	3.32	3.39	3.45	3.52	3.59	3.66	3.73	3.80	3.86	3.93	4.00	4.07	4.14	4.21	4.27	4.34
30	2.65	2.72	2.79	2.86	2.92	2.99	3.06	3.13	3.20	3.27	3.33	3.40	3.47	3.54	3.61	3.68	3.74	3.81	3.88	3.95	4.02	4.09	4.15	4.22	4.29
32	2.60	2.67	2.74	2.80	2.87	2.94	3.01	3.08	3.15	3.21	3.28	3.35	3.42	3.49	3.56	3.63	3.69	3.76	3.83	3.90	3.97	4.04	4.10	4.17	4.24
34	2.55	2.62	2.68	2.75	2.82	2.89	2.96	3.03	3.10	3.16	3.23	3.30	3.37	3.44	3.51	3.57	3.64	3.71	3.78	3.85	3.92	3.98	4.05	4.12	4.19
36	2.50	2.57	2.63	2.70	2.77	2.84	2.91	2.98	3.04	3.11	3.18	3.25	3.32	3.39	3.45	3.52	3.59	3.66	3.73	3.80	3.87	3.93	4.00	4.07	4.14
38	2.45	2.51	2.58	2.65	2.72	2.79	2.86	2.92	2.99	3.06	3.13	3.20	3.27	3.34	3.40	3.47	3.54	3.61	3.68	3.75	3.81	3.88	3.95	4.02	4.09
40	2.40	2.46	2.53	2.60	2.67	2.74	2.81	2.87	2.94	3.01	3.08	3.15	3.22	3.28	3.35	3.42	3.49	3.56	3.63	3.69	3.76	3.83	3.90	3.97	4.04
42	2.34	2.41	2.48	2.55	2.62	2.69	2.75	2.82	2.89	2.96	3.03	3.10	3.17	3.23	3.30	3.37	3.44	3.51	3.58	3.64	3.71	3.78	3.85	3.92	3.99
44	2.29	2.36	2.43	2.50	2.57	2.64	2.70	2.77	2.84	2.91	2.98	3.05	3.11	3.18	3.25	3.32	3.39	3.46	3.52	3.59	3.66	3.73	3.80	3.87	3.93
46	2.24	2.31	2.38	2.45	2.52	2.58	2.65	2.72	2.79	2.86	2.93	2.99	3.06	3.13	3.20	3.27	3.34	3.41	3.47	3.54	3.61	3.68	3.75	3.82	3.88
48	2.19	2.26	2.33	2.40	2.46	2.53	2.60	2.67	2.74	2.81	2.88	2.94	3.01	3.08	3.15	3.22	3.29	3.35	3.42	3.49	3.56	3.63	3.70	3.76	3.83
50	2.14	2.21	2.28	2.35	2.41	2.48	2.55	2.62	2.69	2.76	2.82	2.89	2.96	3.03	3.10	3.17	3.23	3.30	3.37	3.44	3.51	3.58	3.65	3.71	3.78
52	2.09	2.16	2.23	2.29	2.36	2.43	2.50	2.57	2.64	2.70	2.77	2.84	2.91	2.98	3.05	3.12	3.18	3.25	3.32	3.39	3.46	3.53	3.59	3.66	3.73
54	2.04	2.11	2.18	2.24	2.31	2.38	2.45	2.52	2.59	2.65	2.72	2.79	2.86	2.93	3.00	3.06	3.13	3.20	3.27	3.34	3.41	3.47	3.54	3.61	3.68
56	1.99	2.06	2.12	2.19	2.26	2.33	2.40	2.47	2.53	2.60	2.67	2.74	2.81	2.88	2.94	3.01	3.08	3.15	3.22	3.29	3.36	3.42	3.49	3.56	3.63
58	1.94	2.00	2.07	2.14	2.21	2.28	2.35	2.42	2.48	2.55	2.62	2.69	2.76	2.83	2.89	2.96	3.03	3.10	3.17	3.24	3.30	3.37	3.44	3.51	3.58
60	1.89	1.95	2.02	2.09	2.16	2.23	2.30	2.36	2.43	2.50	2.57	2.64	2.71	2.77	2.84	2.91	2.98	3.05	3.12	3.18	3.25	3.32	3.39	3.46	3.53
62	1.83	1.90	1.97	2.04	2.11	2.18	2.24	2.31	2.38	2.45	2.52	2.59	2.66	2.72	2.79	2.86	2.93	3.00	3.07	3.13	3.20	3.27	3.34	3.41	3.48
64	1.78	1.85	1.92	1.99	2.06	2.13	2.19	2.26	2.33	2.40	2.47	2.54	2.60	2.67	2.74	2.81	2.88	2.95	3.01	3.08	3.15	3.22	3.29	3.36	3.42
66	1.73	1.80	1.87	1.94	2.01	2.07	2.14	2.21	2.28	2.35	2.42	2.48	2.55	2.62	2.69	2.76	2.83	2.90	2.96	3.03	3.10	3.17	3.24	3.31	3.37
68	1.68	1.75	1.82	1.89	1.95	2.02	2.09	2.16	2.23	2.30	2.37	2.43	2.50	2.57	2.64	2.71	2.78	2.84	2.91	2.98	3.05	3.12	3.19	3.25	3.32
70	1.63	1.70	1.77	1.84	1.90	1.97	2.04	2.11	2.18	2.25	2.31	2.38	2.45	2.52	2.59	2.66	2.72	2.79	2.86	2.93	3.00	3.07	3.14	3.20	3.27
72	1.58	1.65	1.72	1.78	1.85	1.92	1.99	2.06	2.13	2.19	2.26	2.33	2.40	2.47	2.54	2.61	2.67	2.74	2.81	2.88	2.95	3.02	3.08	3.15	3.22
74	1.53	1.60	1.67	1.73	1.80	1.87	1.94	2.01	2.08	2.14	2.21	2.28	2.35	2.42	2.49	2.55	2.62	2.69	2.76	2.83	2.90	2.96	3.03	3.10	3.17

FEV₁ in liters = 0.0342 H – 0.0255 A – 1.578. R² = 0.80, SEE = 0.326, 95% Confidence Interval = 0.561.

Definitions of abbreviations: R² = coefficient of determination, SEE = standard error of estimate, H = height in cm, and A = age in years. BTPS = body temperature, ambient pressure and saturated with water vapor at these conditions.

The axes of the table are age (in years) at the side, and height (in cm) at the top. The predicted normal FVC in liters for the male patient is found at the intersection of the row for his age, and the column for his height.

Adapted from Crapo RO, Morris AH, Gardner RM: Reference spirometric values using techniques and equipment that meets ATS recommendations. *Am Rev Respir Dis* 1981; 123:659-664.

**TABLE 6
PREDICTED NORMAL SINGLE BREATH D_{CO} VALUES FOR MEN (STPD)**

Age	Height(cm)																								
	146	148	150	152	154	156	158	160	162	164	166	168	170	172	174	176	178	180	182	184	186	188	190	192	194
18	29.8	30.6	31.4	32.2	33.1	33.9	34.7	35.5	36.3	37.1	38.0	38.8	39.6	40.4	41.2	42.1	42.9	43.7	44.5	45.4	46.2	47.0	47.8	48.6	49.4
20	29.3	30.2	31.0	31.8	32.6	33.4	34.3	35.1	35.9	36.7	37.5	38.4	39.2	40.0	40.8	41.6	42.5	43.3	44.1	44.9	45.7	46.6	47.4	48.2	49.0
22	28.9	29.7	30.6	31.4	32.2	33.0	33.8	34.7	35.5	36.3	37.1	37.9	38.8	39.6	40.4	41.2	42.0	42.9	43.7	44.5	45.3	46.1	47.0	47.8	48.6
24	28.5	29.3	30.1	31.0	31.8	32.6	33.4	34.2	35.1	35.9	36.7	37.5	38.3	39.2	40.0	40.8	41.6	42.4	43.3	44.1	44.9	45.7	46.5	47.4	48.2
26	28.1	28.9	29.7	30.5	31.4	32.2	33.0	33.8	34.6	35.5	36.3	37.1	37.9	38.7	39.6	40.4	41.2	42.0	42.8	43.7	44.5	45.3	46.1	46.9	47.8
28	27.7	28.5	29.3	30.1	30.9	31.8	32.6	33.4	34.2	35.0	35.9	36.7	37.5	38.3	39.1	40.0	40.8	41.6	42.4	43.2	44.1	44.9	45.7	46.5	47.3
30	27.2	28.1	28.9	29.7	30.5	31.3	32.2	33.0	33.8	34.6	35.4	36.3	37.1	37.9	38.7	39.6	40.4	41.2	42.0	42.8	43.6	44.5	45.3	46.1	46.9
32	26.8	27.6	28.5	29.3	30.1	30.9	31.7	32.6	33.4	34.2	35.0	35.8	36.7	37.5	38.3	39.1	39.9	40.8	41.6	42.4	43.2	44.1	44.9	45.7	46.5
34	26.4	27.2	28.1	28.9	29.7	30.5	31.3	32.1	33.0	33.8	34.6	35.4	36.2	37.1	37.9	38.7	39.5	40.4	41.2	42.0	42.8	43.6	44.4	45.3	46.1
36	26.0	26.8	27.6	28.4	29.3	30.1	30.9	31.7	32.5	33.4	34.2	35.0	35.8	36.6	37.5	38.3	39.1	39.9	40.7	41.6	42.4	43.2	44.0	44.8	45.7
38	25.6	26.4	27.2	28.0	28.8	29.7	30.5	31.3	32.1	32.9	33.8	34.6	35.4	36.2	37.0	37.9	38.7	39.5	40.3	41.1	42.0	42.8	43.6	44.4	45.2
40	25.1	26.0	26.8	27.6	28.4	29.2	30.1	30.9	31.7	32.5	33.3	34.2	35.0	35.8	36.6	37.4	38.3	39.1	39.9	40.7	41.5	42.4	43.2	44.0	44.8
42	24.7	25.5	26.4	27.2	28.0	28.8	29.6	30.5	31.3	32.1	32.9	33.7	34.6	35.4	36.2	37.0	37.8	38.7	39.5	40.3	41.1	41.9	42.8	43.6	44.4
44	24.3	25.1	25.9	26.8	27.6	28.4	29.2	30.0	30.9	31.7	32.5	33.3	34.1	35.0	35.8	36.6	37.4	38.2	39.1	39.9	40.7	41.5	42.3	43.2	44.0
46	23.9	24.7	25.5	26.3	27.2	28.0	28.8	29.6	30.4	31.3	32.1	32.9	33.7	34.6	35.4	36.2	37.0	37.8	38.6	39.5	40.3	41.1	41.9	42.7	43.6
48	23.5	24.3	25.1	25.9	26.7	27.6	28.4	29.2	30.0	30.8	31.7	32.5	33.3	34.1	34.9	35.8	36.6	37.4	38.2	39.1	39.9	40.7	41.5	42.3	43.1
50	23.1	23.9	24.7	25.5	26.3	27.1	28.0	28.8	29.6	30.4	31.2	32.1	32.9	33.7	34.5	35.4	36.2	37.0	37.8	38.6	39.4	40.3	41.1	41.9	42.7
52	22.6	23.4	24.3	25.1	25.9	26.7	27.6	28.4	29.2	30.0	30.8	31.6	32.5	33.3	34.1	34.9	35.7	36.6	37.4	38.2	39.0	39.9	40.7	41.6	42.3
54	22.2	23.0	23.8	24.7	25.5	26.3	27.1	27.9	28.8	29.6	30.4	31.2	32.0	32.9	33.7	34.5	35.3	36.1	37.0	37.8	38.6	39.4	40.2	41.1	41.9
56	21.8	22.6	23.4	24.2	25.1	25.9	26.7	27.5	28.3	29.2	30.0	30.8	31.6	32.4	33.3	34.1	34.9	35.7	36.5	37.4	38.2	39.0	39.8	40.6	41.5
58	21.4	22.2	23.0	23.8	24.6	25.5	26.3	27.1	27.9	28.7	29.6	30.4	31.2	32.0	32.8	33.7	34.5	35.3	36.1	36.9	37.8	38.6	39.4	40.2	41.0
60	20.9	21.8	22.6	23.4	24.2	25.0	25.9	26.7	27.5	28.3	29.1	30.0	30.8	31.6	32.4	33.2	34.1	34.9	35.7	36.5	37.3	38.2	39.0	39.8	40.6
62	20.5	21.3	22.2	23.0	23.8	24.6	25.4	26.3	27.1	27.9	28.7	29.5	30.4	31.2	32.0	32.8	33.6	34.5	35.3	36.1	36.9	37.7	38.6	39.4	40.2
64	20.1	20.9	21.7	22.6	23.4	24.2	25.0	25.8	26.7	27.5	28.3	29.1	29.9	30.8	31.6	32.4	33.2	34.1	34.9	35.7	36.5	37.3	38.1	39.0	39.8
66	19.7	20.5	21.3	22.1	23.0	23.8	24.6	25.4	26.2	27.1	27.9	28.7	29.5	30.4	31.2	32.0	32.8	33.6	34.4	35.3	36.1	36.9	37.7	38.6	39.4
68	19.3	20.1	20.9	21.7	22.6	23.4	24.2	25.0	25.8	26.6	27.5	28.3	29.1	29.9	30.7	31.6	32.4	33.2	34.0	34.9	35.7	36.5	37.3	38.1	38.9
70	18.8	19.7	20.5	21.3	22.1	22.9	23.8	24.6	25.4	26.2	27.0	27.9	28.7	29.5	30.3	31.1	32.0	32.8	33.6	34.4	35.2	36.1	36.9	37.7	38.5
72	18.4	19.2	20.1	20.9	21.7	22.5	23.3	24.2	25.0	25.8	26.6	27.4	28.3	29.1	29.9	30.7	31.5	32.4	33.2	34.0	34.8	35.6	36.5	37.3	38.1
74	18.0	18.8	19.6	20.5	21.3	22.1	22.9	23.7	24.6	25.4	26.2	27.0	27.8	28.7	29.5	30.3	31.1	31.9	32.8	33.6	34.4	35.2	36.0	36.9	37.7

D_{CO} in ml/min/mm Hg = 0.0410 H – 0.210 A – 26.31. R² = 0.60, SEE = 0.482, 95% Confidence Interval = 8.2.

Definitions of abbreviations: R² = coefficient of determination, SEE = standard error of estimate, H = height in cm, and A = age in years. STPD = temperature 0°C, pressure 760 mm Hg and dry (0 water vapor).

The regression analysis has been normalized to a standard hemoglobin of 14.6 g/dl using Cotes' modification and the relationship described by Roughton and Forster.

The axes of the table are age (in years) at the side, and height (in cm) at the top. The predicted normal FVC in liters for the male patient is found at the intersection of the row for his age, and the column for his height.

Adapted from Crapo RO, Morris AH, Gardner RM: Reference spirometric values using techniques and equipment that meets ATS recommendations. *Am Rev Respir Dis* 1981; 123:659-664.

**TABLE 7
PREDICTED NORMAL SINGLE BREATH D_{co} VALUES FOR WOMEN (STPD)**

Age	Height(cm)																								
	146	148	150	152	154	156	158	160	162	164	166	168	170	172	174	176	178	180	182	184	186	188	190	192	194
18	26.0	26.5	27.0	27.6	28.1	28.6	29.2	29.7	30.2	30.8	31.3	31.9	32.4	3.9	33.5	34.0	34.5	35.1	35.6	36.1	36.7	37.2	37.7	38.3	38.8
20	25.7	26.2	26.7	27.3	27.8	28.4	28.9	29.4	30.0	30.5	31.0	31.6	32.1	32.6	33.2	33.7	34.2	34.8	35.3	35.8	36.4	36.9	37.4	38.0	38.5
22	25.4	25.9	26.5	27.0	27.5	28.1	28.6	29.1	29.7	30.2	30.7	31.3	31.8	32.3	32.9	33.4	33.9	34.5	35.0	35.5	36.1	36.6	37.1	37.7	38.2
25.1	25.1	25.6	26.2	26.7	27.2	27.8	28.3	28.8	29.4	29.9	30.4	31.0	31.5	32.0	32.6	33.1	33.6	34.2	34.7	35.2	35.8	36.3	36.8	37.4	37.9
26	24.8	25.3	25.9	26.4	26.9	27.5	28.0	28.5	29.1	29.6	30.1	30.7	31.2	31.7	32.3	32.8	33.3	33.9	34.4	34.9	35.5	36.0	36.5	37.1	37.6
28	24.5	25.0	25.6	26.1	26.6	27.2	27.7	28.2	28.8	29.3	29.8	30.4	30.9	31.4	32.0	32.5	33.0	33.6	34.1	34.6	35.2	35.7	36.2	36.8	37.3
30	24.2	24.7	25.3	25.8	26.3	26.9	27.4	27.9	28.5	29.0	29.5	30.1	30.6	31.1	31.7	32.2	32.7	33.3	33.8	34.3	34.9	35.4	35.9	36.5	37.0
32	23.9	24.4	25.0	25.5	26.0	26.6	27.1	27.6	28.2	28.7	29.2	29.8	30.3	30.8	31.4	31.9	32.4	33.0	33.5	34.1	34.6	35.1	35.7	36.2	36.7
34	23.6	24.1	24.7	25.2	25.7	26.3	26.8	27.3	27.9	28.4	28.9	29.5	30.0	30.6	31.1	31.6	32.2	32.7	33.2	33.8	34.3	34.8	35.4	35.9	36.4
36	23.3	23.8	24.4	24.9	25.4	26.0	26.5	27.1	27.6	28.1	28.7	29.2	29.7	30.3	30.8	31.3	31.9	32.4	32.9	33.5	34.0	34.5	35.1	35.6	36.1
38	23.0	23.6	24.1	24.6	25.2	25.7	26.2	26.8	27.3	27.8	28.4	28.9	29.4	30.0	30.5	31.0	31.6	32.1	32.6	33.2	33.7	34.2	34.8	35.3	35.8
40	22.7	23.3	23.8	24.3	24.9	25.4	25.9	26.5	27.0	27.5	28.1	28.6	29.1	29.7	30.2	30.7	31.3	31.8	32.3	32.9	33.4	33.9	34.5	35.0	35.5
42	22.4	23.0	23.5	24.0	24.6	25.1	25.6	26.2	26.7	27.2	27.8	28.3	28.8	29.4	29.9	30.4	31.0	31.5	32.0	32.6	33.1	33.6	34.2	34.7	35.2
44	22.1	22.7	23.2	23.7	24.3	24.8	25.3	25.9	26.4	26.9	27.5	28.0	28.5	29.1	29.6	30.1	30.7	31.2	31.7	32.3	32.8	33.3	33.9	34.4	34.9
46	21.8	22.4	22.9	23.4	24.0	24.5	25.0	25.6	26.1	26.6	27.2	27.7	28.2	28.8	29.3	29.8	30.4	30.9	31.4	32.0	32.5	33.0	33.6	34.1	34.6
48	21.5	22.1	22.6	23.1	23.7	24.2	24.7	25.3	25.8	26.3	26.9	27.4	27.9	28.5	29.0	29.5	30.1	30.6	31.1	31.7	32.2	32.8	33.3	33.8	34.4
50	21.2	21.8	22.3	22.8	23.4	23.9	24.4	25.0	25.5	26.0	26.6	27.1	27.6	28.2	28.7	29.3	29.8	30.3	30.9	31.4	31.9	32.5	33.0	33.5	34.1
52	20.9	21.5	22.0	22.5	23.1	23.5	24.1	24.7	25.2	25.8	26.3	26.8	27.4	27.9	28.4	29.0	29.5	30.0	30.6	31.1	31.6	32.2	32.7	33.2	33.8
54	20.6	21.2	21.7	22.3	22.8	23.3	23.9	24.4	24.9	25.5	26.0	26.5	27.1	27.6	28.1	28.7	29.2	29.7	30.3	30.8	31.3	31.9	32.4	32.9	33.5
56	20.4	20.9	21.4	22.0	22.5	23.0	23.6	24.1	24.6	25.2	25.7	26.2	26.8	27.3	27.8	28.4	28.9	29.4	30.0	30.5	31.0	31.6	32.1	32.6	33.2
58	20.1	20.6	21.1	21.7	22.2	22.7	23.3	23.8	24.3	24.9	25.4	25.9	26.5	27.0	27.5	28.1	28.6	29.1	29.7	30.2	30.7	31.3	31.8	32.3	32.9
60	19.8	20.3	20.8	21.4	21.9	22.4	23.0	23.5	24.0	24.6	25.1	25.6	26.2	26.7	27.2	27.8	28.3	28.8	29.4	29.9	30.4	31.0	31.5	32.0	32.6
62	19.5	20.0	20.5	21.1	21.6	22.1	22.7	23.2	23.7	24.3	24.8	25.3	25.9	26.4	26.9	27.5	28.0	28.5	29.1	29.6	30.1	30.7	31.2	31.7	32.3
64	19.2	19.7	20.2	20.8	21.3	21.8	22.4	22.9	23.4	24.0	24.5	25.0	25.6	26.1	26.6	27.2	27.7	28.2	28.8	29.3	29.8	30.4	30.9	31.5	32.0
66	18.9	19.4	19.9	20.5	21.0	21.5	22.1	22.6	23.1	23.7	24.2	24.1	25.3	25.8	26.3	26.9	27.4	28.0	28.5	29.0	29.6	30.1	30.6	31.2	31.7
68	18.6	19.1	19.6	20.2	20.7	21.2	21.8	22.3	22.8	23.4	23.9	24.5	25.0	25.5	26.1	26.6	27.1	27.7	28.2	28.7	29.3	29.8	30.3	30.9	31.4
70	18.3	18.8	19.3	19.9	20.4	21.0	21.5	22.0	22.6	23.1	23.5	24.2	24.7	25.2	25.8	26.3	26.8	27.4	27.9	28.4	29.0	29.5	30.0	30.6	31.1
72	18.0	18.5	19.1	19.6	20.1	20.7	21.2	21.1	22.3	22.8	23.3	23.9	24.4	24.9	25.5	26.0	26.5	27.1	27.6	28.1	28.7	29.2	29.7	30.3	30.8
74	17.7	18.2	18.8	19.3	19.8	20.4	20.9	21.4	22.0	22.5	23.0	23.6	24.1	24.6	25.2	25.7	26.2	26.8	27.3	27.8	28.4	28.9	29.4	30.0	30.5

D_{co} in ml/min/mm Hg = 0.0267 H – 0.148 A – 10.34. R² = 0.60, SEE = 3.40, 95% Confidence Interval = 5.74.

Definitions of abbreviations: R² = coefficient of determination, SEE = standard error of estimate, H = height in cm, and A = age in years. STPD = temperature 0°C, pressure 760 mm Hg and dry (0 water vapor).

The regression analysis has been normalized to a standard hemoglobin of 14.6 g/dl using Cotes' modification and the relationship described by Roughton and Forster.

The axes of the table are age (in years) at the side, and height (in cm) at the top. The predicted normal FVC in liters for the male patient is found at the intersection of the row for his age, and the column for his height.

Adapted from Crapo RO, Morris AH, Gardner RM: Reference spirometric values using techniques and equipment that meets ATS recommendations. *Am Rev Respir Dis* 1981; 123:659-664.

CRITERIA FOR EVALUATING IMPAIRMENT NOT DIRECTLY RELATED TO LUNG FUNCTION

Certain respiratory conditions may cause impairment that is not readily quantifiable by spirometry, diffusing capacity, or measured exercise testing. Table 8 highlights these conditions, with some general comments. The evaluation of impairments of persons with these conditions should be done by physicians with expertise in lung disease, and the final impairment should be left to the physician's judgment.

**TABLE 8
IMPAIRMENT NOT DIRECTLY RELATED TO LUNG FUNCTION**

Condition	Comment
Asthma	<p>An asthmatic person, who despite optimum medical therapy, including daily administration of bronchodilator under regular physician care, and whose physiologic tests of impairment fall under Class 4 (Table 2) after administration of an inhaled bronchodilator in a laboratory, is considered to be severely impaired. This level of impairment should be found on three successive tests, performed at least one week apart.</p> <p>(It is recognized that persons whose asthma causes less-than-severe impairment, or whose asthma is related directly to a job-related exposure (such as toluene diisocyanate) may occasionally be evaluated for the purposes of determining employability or employment-related disability. The final determination, which is a nonmedical decision, relies in part on medical evidence. The physician's thorough documentation of the nature of asthmatic condition, as well as nonmedical evidence such as exposure data and reports of supervisors or fellow employees, are crucial to this determination.)</p>
Hypersensitivity pneumonitis	<p>A person with this condition may need to be removed from exposure to the causative agent or other agents with similar sensitizing properties in order to avoid future attacks and chronic sequelae.</p>
Pneumoconiosis	<p>Although pneumoconiosis may cause no psychologic impairment, its presence usually requires removal from exposure to the dust that caused the condition.</p>
Sleep Disorders	<p>Obstructive sleep apnea, central sleep apnea and Cheyne-Stokes respiration may prevent progression through normal stages of sleep and may lead to hypersomnolence, hypoxia, hemodynamic changes and personality disorders. Impairment due to sleep disorders should be evaluated according to the criteria in the neurologic, cardiovascular, and mental behavior chapters.</p>
Lung Cancers	<p>All persons with lung cancers are to be considered severely impaired at the time of diagnosis. At a re-evaluation at one year after the diagnosis is established, if the person is found to be free of all evidence of tumor recurrence, then he or she should be rated according to the physiologic parameters in Table 8. If there is evidence of tumor, the person remains severely impaired. If the tumor recurs at a later date, the person immediately is considered to be severely impaired.</p>

Section 8: Cardiovascular System

SYMPTOMATIC LIMITATION

In this section reference is made to limitation of activities of daily living because of symptoms. Information about such limitation is subjective, and it is open to interpretation on the part of both patient and examiner. Therefore, when it is possible, the examiner should obtain objective data about the extent of the limitation before attempting to estimate the degree of permanent impairment. When estimating the extent of a limitation due to symptoms, the physician should use the functional classification in Table 1.

TABLE 1
FUNCTIONAL CLASSIFICATIONS

- Class 1:** The patient has cardiac disease, but no resulting limitation of physical activity. Ordinary physical activity does not cause undue fatigue, palpitation, dyspnea, or anginal pain.
- Class 2:** The patient has cardiac disease resulting in slight limitation of physical activity. The patient is comfortable at rest and in the performance of ordinary, light, daily activities. Greater-than-ordinary physical activity, such as heavy physical exertion, results in fatigue, palpitation, dyspnea, or anginal pain.
- Class 3:** The patient has cardiac disease resulting in marked limitation of physical activity. The patient is comfortable at rest. Ordinary physical activity results in fatigue, palpitation, dyspnea, or anginal pain.
- Class 4:** The patient has cardiac disease resulting in inability to carry on any physical activity without discomfort. Symptoms of inadequate cardiac output, pulmonary congestion, systemic congestion, or the anginal syndrome, may be present, even at rest. If any physical activity is undertaken, discomfort is increased.

EXERCISE TESTING

In most circumstances the physician should attempt to quantitate limitations due to symptoms by observing the patient during exercise. The most widely used and standardized exercise protocols involve the use of a motor-driven treadmill with varying grades and speeds. The protocols vary slightly, but they all attempt to relate the exercise to excess energy expended and to functional class. The excess energy expended usually is expressed with the "MET," a term that represents the multiples of resting metabolic energy utilized for any given activity. One MET is considered to be 3.5 ml(kg.min). The 70kg person who burns 1.2 kilocalories per minute sitting at rest uses approximately 3 METs when walking 4 kilometers per hour.

Table 2 displays the relationship of excess energy expenditures in METs to functional class according to the protocols of several investigators. With all the protocols, the exercise periods last for three minutes; the periods are represented in the table by boxes with numbers giving the estimated METs involved.

If a treadmill is not available, steps may be used to attempt to quantitate the exercise capacity of a patient. Table 3 shows the relationships of exercise with steps of various heights, excess energy expenditure, and functional class. Estimations of excess energy expenditure also can be made with a bicycle ergometer (Table 4).

Some laboratories are equipped to measure oxygen consumption and carbon dioxide production during exercise. Data on a patient acquired by these techniques may become the most accurate method of estimating a patient's exercise capacity.

A major problem with using any exercise-testing technique to attempt to quantitate an individual's functional capacity is the marked variability in the patient's abilities and willingness to cooperate. Therefore, the physician also must estimate the individual's cooperation and effort during the test; some patients will continue far beyond where they should, while others will stop after minimal effort because they feel fatigued.

**TABLE 2
RELATIONSHIP OF METS AND FUNCTIONAL CLASS
ACCORDING TO FIVE TREADMILL PROTOCOLS**

METS	1.6	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Treadmill Tests																
Ellestad				1.7		3.0		4.0			5.0					
	10 percent grade															
Bruce				1.7		2.5		3.4			4.2					
				10		12		14			16					
Balke	3.4 miles per hour															
	2	4	6	8	10	12	14	16	18	20	22	24	26			
Balke	3.0 miles per hour															
	0	2.5	5	7.5	10	12.5	15	17.5	20	22.5						
Naughton	1.0	2.0 miles per hour														
	0	0	3.5	7	10.5	14	17.5									
METS	1.6	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Clinical Status	Symptomatic Patients															
	Diseased, Recovered															
	Sedentary Healthy															
	Physically Active Subjects															
Functional Class	IV	III	II				I and Normal									

In the Ellestad protocol, the numbers in the boxes are miles per hour (mph); in the Bruce protocol the top numbers are mph and the bottom numbers are the percent grade. In the Balke and Naughton protocols the numbers are the percent grade.

Adapted from Fox SM III, Naughton JP, Haskell WL: Physical activity and the prevention of coronary heart disease. Annals of Clinical Research 1971; 3:404-432 Copyright © 1971 The Finnish Medical Society Duodecim.

**TABLE 3
RELATIONSHIP OF METS AND FUNCTIONAL CLASS
ACCORDING TO TWO-STEP PROTOCOL**

Height of Step (cm)	30 Steps per Minute															
	4	8	12	16	20	24	28	32	36	40						
	24 Steps per Minute															
	5	12	18	25	32	35										
METS	1.6	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Clinical Status	Symptomatic Patients															
	Diseased, Recovered															
	Sedentary Healthy															
	Physically Active Subjects															
Functional Class	IV	III	II				I and Normal									

Source: Fox SM III, Naughton JP, Haskell WL: Physical activity and the prevention of coronary heart disease. Annals of Clinical Research 1971; 3:404-432 Copyright © 1971 The Finnish Medical Society Duodecim.

**TABLE 4
ENERGY EXPENDITURE IN METS DURING BICYCLE ERGOMETRY**

Body Weight		Work Rate on Bicycle Ergometer (kg m-1 min-1 and Watts)													
(kg)	(lb)	75 12	150 25	300 50	450 75	600 100	750 125	900 150	1050 175	1200 200	1350 225	1500 250	1650 275	1800 300	(kg m-1 min-1) (Watts)
20	44	4.0	6.0	10.0	14.0	18.0	22.0								
30	66	3.4	4.7	7.3	10.0	12.7	15.3	17.9	20.7	23.3					
40	88	3.0	4.0	6.0	8.0	10.0	12.0	14.0	16.0	18.0	20.0	22.0			
50	110	2.8	3.6	5.2	6.8	8.4	10.0	11.5	13.2	14.8	16.3	18.0	19.6	21.1	
60	132	2.7	3.3	4.7	6.0	7.3	8.7	10.0	11.3	12.7	14.0	15.3	16.7	18.0	
70	154	2.6	3.1	4.3	5.4	6.6	7.7	8.8	10.0	11.1	12.2	13.4	14.0	15.7	
80	176	2.5	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	
90	198	2.4	2.9	3.8	4.7	5.6	6.4	7.3	8.2	9.1	10.0	10.9	11.8	12.6	
100	220	2.4	2.8	3.6	4.4	5.2	6.0	6.8	7.6	8.4	9.2	10.0	10.8	11.6	
110	242	2.4	2.7	3.4	4.2	4.9	5.6	6.3	7.1	7.8	8.5	9.3	10.0	10.7	
120	264	2.3	2.7	3.3	4.0	4.7	5.3	6.0	6.7	7.3	8.0	8.7	9.3	10.0	

Source: American College of Sports medicine. *Guidelines for Graded Exercise Testing and Exercise Prescription*. Philadelphia, Lea and Febiger, 1975, p.17. Copyright © 1975, American College of Sports Medicine.

**TABLE 5
MAXIMAL AND 90% OF MAXIMAL
ACHIEVABLE HEART RATE, BY AGE AND SEX**

Heart Rate	Age	30	35	40	45	50	55	60	65
		Men	Maximal	193	191	189	187	184	182
	90% Maximal	173	172	170	168	166	164	162	160
Women	Maximal	190	185	181	177	172	168	163	159
	90% Maximal	171	167	163	159	155	151	147	143

Source: Sheffield LH: Exercise stress testing in Braunwald, E. (ed): *Heart Disease – A Textbook of Cardiovascular Medicine*, ed 3, Philadelphia, WB Saunders Company 1988, p. 227. Copyright © 1988, WB Saunders Company.

VALVULAR HEART DISEASE

The severity of valvular heart disease can be reduced, but not fully reversed, by operative procedures on the valves or by replacement of the valve with a prosthetic device. After such a procedure, sufficient time from the date of operation must elapse to allow maximum recovery of the heart, lungs, and other organs before estimating permanent impairment due to valvular disease.

In addition, medications may affect the severity of valvular heart disease, especially limitations due to symptoms. Therefore, sufficient time must be allowed for these medications to be introduced and adjusted, and for them to exert their effects, before an estimate of permanent impairment is made.

Impairment Classification for Valvular Heart Disease

Class 1—Impairment of the Whole Person, 1—14%

The patient has evidence by physical examination or laboratory studies of valvular heart disease but no symptoms in the performance of ordinary daily activities or even upon moderately heavy exertion (functional class 1);

and

The patient does not require continuous treatment, although prophylactic antibiotics may be recommended at the time of a surgical procedure to reduce the risk of bacterial endocarditis;

and

The patient remains free of signs of congestive heart failure; and there are no signs of ventricular hypertrophy or dilation, and the severity of the stenosis or regurgitation is estimated to be mild;

or

In the patient who has recovered from valvular heart surgery, all of the above criteria are met.

Class 2—Impairment of the Whole Person, 15—29%

The patient has evidence by physical examination or laboratory studies of valvular heart disease and there are no symptoms in the performance of ordinary daily activities, but symptoms develop on moderately heavy physical exertion (function class 2);

or

The patient requires moderate dietary adjustment or drugs to prevent symptoms. The patient has signs or laboratory evidence of cardiac chamber hypertrophy and/or dilation, and the severity of the stenosis or regurgitation is estimated to be moderate, and surgical correction is not feasible or advisable;

or

The patient has recovered from valvular heart surgery and meets the above criteria

Class 3—Impairment of the whole person, 30-54%

The patient has signs of valvular heart disease and has slight to moderate symptomatic discomfort during the performance of ordinary daily activities (functional class 3);

and

Dietary therapy or drugs do not completely control symptoms or prevent congestive heart failure;

and

The patient has signs or laboratory evidence of cardiac chamber hypertrophy or dilation, the severity of the stenosis or regurgitation is estimated to be moderate or severe, and surgical correction is not feasible;

or

The patient has recovered from heart valve surgery but continues to have symptoms and signs of congestive heart failure, including cardiomegaly.

Class 4—Impairment of the whole person, 55-95%

The patient has signs by physical examination of valvular heart disease, and symptoms at rest or in the performance of less-than-ordinary daily activities (functional class 4);

and

Dietary therapy and drugs cannot control symptoms or prevent signs of congestive heart failure;

and

The patient has signs or laboratory evidence of cardiac chamber hypertrophy and/or dilation; and the severity of the stenosis or regurgitation is estimated to be moderate or severe, and surgical correction is not feasible;

or

The patient has recovered from valvular heart surgery but continues to have symptoms or signs of congestive heart failure.

CORONARY HEART DISEASE

Impairment due to coronary heart disease can be reduced, but not eliminated by diet, exercise training programs, cessation of cigarette smoking, use of medication, and surgical procedures. Sufficient time must be allowed for these measures to have an effect before an estimate of permanent impairment is made.

Impairment Classification for Coronary Heart Disease

Class 1—Impairment of the Whole Person, 0—14%

Because of the serious implications of reduced coronary blood flow, it is not reasonable to classify the degree of impairment as 0% to 10% in any patient who has symptoms of coronary heart disease corroborated by physical examination or laboratory tests. This class of impairment should be reserved for the patient with an equivocal history of angina pectoris in whom coronary angiography is performed, or for a patient on whom coronary angiography is performed for other reasons and in whom is found less than 50% reduction in the cross-sectional area of a coronary artery.

Class 2—Impairment of the Whole Person, 15—29%

The patient has history of a myocardial infarction or angina pectoris that is documented by appropriate laboratory studies, but at the time of evaluation the patient has no symptoms while performing ordinary daily activities or even moderately heavy physical exertion (functional class 1);

and

The patient may require moderate dietary adjustment and/or medication to prevent angina or to remain free of signs and symptoms of congestive heart failure;

and

The patient is able to walk on the treadmill or bicycle ergometer and obtain a heart rate of 90% of his or her predicted maximum heart rate without developing significant ST segment shift, ventricular tachycardia, or hypotension; if the patient is uncooperative or unable to exercise because of disease affecting another organ system, this requirement may be omitted.

or

The patient has recovered from coronary artery surgery or angioplasty, remains asymptomatic during ordinary daily activities, and is able to exercise as outlined above. If the patient is taking a beta adrenergic blocking agent, he or she should be able to walk on the treadmill to a level estimated to cause an energy expenditure of at least 10 METs as a substitute for the heart rate target.

Class 3—Impairment of the Whole Person, 30—54%

The patient has a history of myocardial infarction that is documented by appropriate laboratory studies, and/or angina pectoris that is documented by changes on a resting or exercise ECG or radioisotope study that is suggestive of ischemia;

or

The patient has either a fixed or dynamic focal obstruction of at least 50% of a coronary artery, demonstrated by angiography;

and

The patient requires moderate dietary adjustment or drugs to prevent frequent angina or to remain free of symptoms and signs of congestive heart failure, but may develop angina pectoris or symptoms of congestive heart failure after moderately heavy physical exertion (functional class 2);

or

The patient has recovered from coronary artery surgery or angioplasty, continues to require treatment, and has the symptoms described above.

Class 4—Impairment of the Whole Person, 55—95%

The patient has history of a myocardial infarction that is documented by appropriate laboratory studies, or angina pectoris that has been documented by changes on a resting ECG or radioisotope study that is highly suggestive of myocardial ischemia;

or

The patient has either fixed or dynamic focal obstruction of at least 50% of one or more coronary arteries, demonstrated by angiography;

and

Moderate dietary adjustments or drugs are required to prevent angina or to remain free of symptoms and signs of congestive heart failure, but the patient continues to develop symptoms of angina pectoris or congestive heart failure during ordinary daily activities (functional class 3 or 4), or there are signs or laboratory evidence of cardiac enlargement and abnormal ventricular function;

or

The patient has recovered from coronary artery bypass surgery or angioplasty and continues to require treatment and have symptoms as described above.

CONGENITAL HEART DISEASE

Impairment Classification for Congenital Heart Disease

Class 1-Impairment of the Whole Person, 0—14%

The patient has evidence by physical examination or laboratory studies of congenital heart disease and has no symptoms in the performance of ordinary daily activities, or even upon moderately heavy physical exertion;

and

Continuous treatment is not required, although prophylactic antibiotics may be recommended after surgical procedures to reduce the risk of bacterial endocarditis; and the patient remains free of signs of congestive heart failure and cyanosis;

and

There are no signs of cardiac chamber hypertrophy or dilation; the evidence of residual valvular stenosis or regurgitation is estimated to be mild; there is no evidence of left-to-right or right-to-left shunt; and the pulmonary vascular resistance is estimated to be normal;

or

In the patient who has recovered from corrective heart surgery, all of the above criteria are met.

Class 2-Impairment of the Whole Person, 15—29%

The patient has evidence by physical examination or laboratory studies of congenital heart disease, has no symptoms in the performance of ordinary daily activities, and has no symptoms with moderately heavy physical exertion (functional class 2);

or

The patient requires moderate dietary adjustments or drugs to prevent symptoms or to remain free of signs of congestive heart failure or other consequences of congenital heart disease, such as syncope, chest pain, emboli, or cyanosis;

or

There are signs or laboratory evidence of cardiac chamber hypertrophy or dilation, or the severity of valvular stenosis or regurgitation is estimated to be moderate; or there is evidence of a small residual left-to-right or right-to-left shunt; or there is evidence of moderate elevation of the pulmonary vascular resistance, which should be less than one-half the systemic vascular resistance;

or

The patient has recovered from surgery for the treatment of congenital heart disease and meets the above criteria for impairment.

Class 3—Impairment of the Whole Person, 30—54%

The patient has evidence by physical examination or laboratory studies of congenital heart disease and experiences symptoms during the performance of ordinary daily activities (functional class 3);

and

Diet modification and drugs do not completely control symptoms or prevent signs of congestive heart failure;

and

There are signs or laboratory evidence of cardiac chamber hypertrophy or dilation; or the severity of valvular stenosis or regurgitation is estimated to be moderate or severe; or there is evidence of a right-to-left shunt; or there is evidence of a left-to-right shunt with the pulmonary flow being greater than two times the systemic flow; or the pulmonary vascular resistance is elevated to greater than one-half the systemic vascular resistance;

or

The patient has recovered from surgery for the treatment of congenital heart disease but continues to have functional class 3 symptoms, or continues to have signs of congestive failure or cyanosis, and there is evidence of cardiomegaly and significant residual valvular stenosis or regurgitation, left-to-right shunt, right-to-left shunt, or elevated pulmonary vascular resistance.

Class 4—Impairment of the Whole Person, 55—95%

The patient has signs of congenital heart disease and experiences symptoms of congestive heart failure at less than ordinary daily activities (functional class 4);

and

Dietary therapy and drugs do not prevent symptoms or signs of congestive heart failure;

and

There is evidence from physical examination or laboratory studies of cardiac chamber hypertrophy or dilation, or the pulmonary vascular resistance remains elevated at greater than one-half of the systemic vascular resistance; or the severity of the valvular stenosis or regurgitation is estimated to be moderate to severe; or there is a left-to-right shunt with the pulmonary flow being greater than two times the systemic flow; or there is a left-to-right shunt with the pulmonary vascular resistance being elevated to greater than one-half the systemic vascular resistance; or there is a right-to-left shunt;

or

The patient has recovered from heart surgery for the treatment of congenital heart disease and continues to have symptoms or signs of congestive heart failure causing impairment as outlined above.

HYPERTENSIVE CARDIOVASCULAR DISEASE

In the patient in whom a diagnosable disorder causes the hypertension, estimation of permanent impairment should not be undertaken until adequate time has elapsed after treatment of the disorder. If other organs are affected, as with the kidneys in chronic renal disease, then the degree of impairment due to the hypertension should be combined with that due to the other organ system, using the Combined Values Chart.

Drugs are now available with acceptable side effects that can maintain blood pressure in the normal range in most patients with primary hypertension and in most with secondary hypertension and no correctable cause. Ratings of impairment due to hypertension should be delayed until after the drugs have been prescribed and their doses have been adjusted to achieve maximum effect.

Before classifying a patient as having hypertensive cardiovascular disease, the physician should make several determinations of the arterial pressure. Hypertensive cardiovascular disease is not necessarily present when a patient exhibits transient or irregular episodes of elevated arterial pressure; these could be associated with an emotional or environmental stimulus or with signs or symptoms of cardiovascular system hyperactivity. Most authorities agree that hypertensive cardiovascular disease is present when the diastolic pressure is repeatedly in excess of 90 mm Hg.

Impairment Classification for Hypertensive Cardiovascular Disease

Class 1—Impairment of the Whole Person, 0—14%

The patient has no symptoms and the diastolic pressures are repeatedly in excess of 90mm Hg;

and

The patient is taking antihypertensive medications but has none of the following abnormalities: (1) abnormal urinalysis or renal function tests; (2) history of hypertensive cerebrovascular disease; (3) evidence of left ventricular hypertrophy; (4) hypertensive vascular abnormalities of the optic fundus, except minimal narrowing of arterioles.

Class 2—Impairment of the Whole Person, 15—29%

The patient has no symptoms and the diastolic pressures are repeatedly in excess of 90mm Hg;

and

The patient is taking antihypertensive medication and has any of the following abnormalities: (1) proteinuria and abnormalities of the urinary sediment, but no impairment of renal function as measured by blood urea nitrogen (BUN) and serum creatinine determinations; (2) history of hypertensive cerebrovascular damage; (3) definite hypertensive changes in the retinal arterioles, including crossing defects and old exudates.

Class 3—Impairment of the Whole Person, 30—54%

The patient has no symptoms and the diastolic pressure readings are consistently in excess of 90 mm Hg;

and

The patient is taking antihypertensive medication and has any of the following abnormalities: (1) diastolic pressure readings usually in excess of 120 mm Hg; (2) proteinuria or abnormalities in the urinary sediment, with evidence of impaired renal function as measured by elevated BUN and serum creatinine, or by creatinine clearance below 50%; (3) hypertensive cerebrovascular damage with permanent neurological residual; (4) left ventricular hypertrophy according to findings of physical examination, ECG, or chest radiograph, but no symptoms, signs, or evidence by chest radiograph of congestive heart failure; or (5) retinopathy, with definite hypertensive changes in the arterioles, such as “copper or silver wiring,” or A-V crossing changes, with or without hemorrhages and exudates.

Class 4—Impairment of the Whole Person, 55-95%

The patient has a diastolic pressure consistently in excess of 90 mm Hg;

and

The patient is taking antihypertensive medication and has any two of the following abnormalities:

(1) diastolic pressure readings usually in excess of 120 mm Hg; (2) proteinuria and abnormalities in the urinary sediment, with impaired renal function and evidence of nitrogen retention as measured by elevated BUN and serum creatinine or by creatinine clearance below 50%; (3) hypertensive cerebrovascular damage with permanent neurological deficits; (4) left ventricular hypertrophy; (5) retinopathy as manifested by hypertensive changes in the arterioles, retina, or optic nerve; (6) history of congestive heart failure;

or

The patient has left ventricular hypertrophy with the persistence of congestive heart failure despite digitalis and diuretics.

CARDIOMYOPATHIES

Cardiomyopathies result in impairment of the whole person by causing abnormal ventricular function. Abnormal ventricular function may not result in abnormal hemodynamics, or it may result in pulmonary and/or systemic organ congestion and decreased cardiac output. Abnormal ventricular functions related to coronary heart disease, valvular heart disease, and hypertensive heart disease are covered in their respective sections. Cardiomyopathies may also cause arrhythmias; these are considered in a different section of this chapter. Some cardiomyopathies are reversible. Every effort should be made to identify the reversible forms and to treat them appropriately over an adequate period of time before estimating any suspected permanent impairment.

Impairment Classification for Cardiomyopathies

Class 1—Impairment of the Whole Person, 0—14%

The patient is asymptomatic and there is evidence of impaired left ventricular function from clinical examination or laboratory studies;

and

There is no evidence of congestive heart failure or cardiomegaly from physical examination or laboratory studies.

Class 2—Impairment of the Whole Person, 15—29%

The patient is asymptomatic and there is evidence of impaired left ventricular function from physical examination or laboratory studies;

and

Moderate dietary adjustment or drug therapy is necessary for the patient to be free of symptoms and signs of congestive heart failure;

or

The patient has recovered from surgery for the treatment of hypertrophic cardiomyopathy and meets the criteria above.

Class 3—Impairment of the Whole Person, 30-54%

The patient develops symptoms of congestive heart failure on greater than ordinary daily activities (functional class 3) and there is evidence of abnormal ventricular function from physical examination or laboratory studies;

and

Moderate dietary restriction or the use of drugs is necessary to minimize the patient's symptoms, or to prevent the appearance of signs of congestive heart failure or evidence of it by laboratory study;

or

The patient has recovered from surgery for the treatment of hypertrophic cardiomyopathy and meets the criteria described above.

Class 4—Impairment of the Whole Person, 55—95%

The patient is symptomatic during ordinary daily activities despite the appropriate use of dietary adjustment and drugs, and there is evidence of abnormal ventricular function from physical examination or laboratory studies;

or

There are persistent signs of congestive heart failure despite the use of dietary adjustment and drugs;

or

The patient has recovered from surgery for the treatment of hypertrophic cardiomyopathy and meets the above criteria.

PERICARDIAL HEART DISEASE

It is important to allow adequate time for resolution of an acute illness, and for medical or surgical therapy to be effective before assessing permanent impairment.

Impairment Classification for Pericardial Disease**Class 1—Impairment of the Whole Person, 0—14%**

The patient has no symptoms in the performance of ordinary daily activities or moderately heavy physical exertion but does have evidence from either physical examination or laboratory studies of pericardial heart disease;

and

Continuous treatment is not required, and there are no signs of cardiac enlargement or of congestion of lungs or other organs;

or

In the patient who has had surgical removal of the pericardium, there are no adverse consequences of the surgical removal and the patient meets the criteria above.

Class 2—Impairment of the Whole Person, 15—29%

The patient has no symptoms in the performance of ordinary daily activities but does have evidence from either physical examination or laboratory studies of pericardial heart disease;

but

Moderate dietary adjustment or drugs are required to keep the patient free from symptoms and signs of congestive heart failure;

or

The patient has signs or laboratory evidence of cardiac chamber hypertrophy or dilation;

or

The patient has recovered from surgery to remove the pericardium and meets the criteria above.

Class 3—Impairment of the Whole Person, 30—54%

The patient has slight to moderate discomfort in the performance of greater than ordinary daily activities (functional class 2) despite dietary or drug therapy, and the patient has evidence from physical examination or laboratory studies of pericardial heart disease;

and

Physical signs are present, or there is laboratory evidence of cardiac chamber enlargement, or there is evidence of significant pericardial thickening and calcifications;

or

The patient has recovered from surgery to remove the pericardium but continues to have the symptoms, signs, and laboratory evidence described above.

Class 4—Impairment of the Whole Person, 55—95%

The patient has symptoms on performance of ordinary daily activities (functional class 3 or 4) in spite of using appropriate dietary restrictions or drugs, and evidence from physical examination or laboratory studies of pericardial heart disease;

and

The patient has signs or laboratory evidence of congestion of the lungs or other organs;

or

The patient has recovered from surgery to remove the pericardium and continues to have symptoms, signs, and laboratory evidence described above.

ARRHYTHMIAS

Arrhythmias tend to fluctuate remarkably in the frequency with which they occur. Thus, adequate documentation of the arrhythmia and estimation of the frequency with which it occurs must be made. The associated symptoms may be considerably different from the symptoms of other forms of heart disease. Arrhythmias may cause syncope, palpitation, dizziness, light headedness, chest heaviness, or shortness of breath or combinations of these symptoms.

The degree of impairment from cardiac arrhythmias often will have to be combined with the degree of impairment due to an underlying heart disease; this combining should be done according to the Combined Values Chart. After instituting therapy for the arrhythmias, one should allow an appropriate amount of time to pass before estimating the extent of the permanent impairment.

Impairment Classification for Cardiac Arrhythmias

Class 1—Impairment of the Whole Person, 0—14%

The patient is asymptomatic during ordinary activities and a cardiac arrhythmia is documented by ECG;

and

There is no documentation of three or more consecutive ectopic beats or periods of asystole greater than 1.5 seconds, and both the atrial and ventricular rates are maintained between 50 and 100 beats per minute;

and

There is no evidence of organic heart disease.

Class 2—Impairment of the Whole Person, 15—29%

The patient is asymptomatic during ordinary daily activities and a cardiac arrhythmia is documented by ECG;

and

Moderate dietary adjustment, or the use of drugs, or an artificial pacemaker, is required to prevent symptoms related to the cardiac arrhythmia;

or

The arrhythmia persists and there is organic heart disease.

Class 3—Impairment of the Whole Person, 30—54%

The patient has symptoms despite the use of dietary therapy or drugs or of an artificial pacemaker and a cardiac arrhythmia is documented with ECG;

but

The patient is able to lead an active life and the symptoms due to the arrhythmia are limited to infrequent palpitations and episodes of lightheadedness or other symptoms of temporarily inadequate cardiac output.

Class 4—Impairment, 55—95%

The patient has symptoms due to documented cardiac arrhythmia that are constant and interfere with ordinary daily activities (functional class 3 or 4);

or

The patient has frequent symptoms of inadequate cardiac output documented by ECG due to frequent episodes of cardiac arrhythmia;

or

The patient continues to have episodes of syncope that are either due to or have a high probability of being related to the arrhythmia. To fit into this category of impairment, the symptoms must be present despite the use of dietary therapy, drugs, or artificial pacemakers.

If an arrhythmia is a result of organic heart disease, the arrhythmia should be evaluated separately and its impairment rating should be combined with the impairment rating for the organic heart disease using the Combined Values Chart.

VASCULAR DISORDERS OF THE UPPER EXTREMITY

When amputation due to peripheral vascular disease is involved, the impairment due to amputation should be evaluated and combined using the Combined Values Chart.

Impairment of the Upper Extremity Due to Peripheral Vascular Disease

Class 1—Impairment of Upper Extremity, 0—5%

The patient experiences neither intermittent claudication nor pain at rest;

and

The patient experiences only transient edema;

and

On physical examination, not more than the following findings are present: loss of pulses, minimal loss of subcutaneous tissue of fingertips; calcification of arteries as detected by radiographic examination; asymptomatic dilation of arteries or of veins, not requiring surgery and not resulting in curtailment of activity.

or

Raynaud's phenomenon that occurs with exposure to temperatures lower than 0°C (32°F) but is readily controlled by medication.

Class 2—Impairment of Upper Extremity, 6—24%

The patient experiences intermittent claudication on severe usage of the upper extremity;

or

There is persistent edema of a moderate degree, incompletely controlled by elastic supports;

or

There is vascular damage evidenced by a sign such as a healed, painless stump of an amputated digit showing evidence of persistent vascular disease, or a healed ulcer;

or

Raynaud's phenomenon occurs on exposure to temperatures lower than 4°C (39°F) but is controlled by medication.

Class 3—Impairment of Upper Extremity, 25—50%

The patient experiences intermittent claudication on moderate upper-extremity usage;

or

There is marked edema that is only partially controlled by elastic supports;

or

There is vascular damage evidenced by a healed amputation of two or more digits of one extremity, with evidence of persisting vascular disease or superficial ulceration;

or

Raynaud's phenomenon occurs on exposure to temperatures lower than 10°C (50°F), and it is only partially controlled by medication.

Class 4—Impairment of Upper Extremity, 51—79%

The patient experiences intermittent claudication on mild upper-extremity usage;

or

The patient has marked edema that cannot be controlled by elastic supports;

or

There is vascular damage evidenced by signs such as an amputation at or above a wrist; or amputation of two or more digits of both extremities with evidence of persistent vascular disease; or persistent widespread or deep ulceration involving one extremity;

or

Raynaud's phenomenon occurs on exposure to temperatures lower than 15°C (59°F), and it is only partially controlled by medication.

Class 5—Impairment of Upper Extremity, 80—95%

The patient experiences severe and constant pain at rest;

or

There is vascular damage evidenced by signs such as amputation at or above the wrists of both extremities; or amputation of all digits of both extremities with evidence of persistent vascular disease; or persistent, widespread, or deep ulceration involving both extremities;

or

Raynaud's phenomenon occurs on exposure to temperatures lower than 20°C (68°F) and is poorly controlled by medication.

VASCULAR DISORDERS OF THE LOWER EXTREMITY

When amputation due to peripheral vascular disease is involved, the impairment due to amputation should be evaluated and combined with the appropriate value using the Combined Values Chart

Impairment of Lower Extremity Due to Peripheral Vascular Disease

Class 1—Impairment of Lower Extremity, 0—5%

The patient experiences neither claudication nor pain at rest;

and

The patient experiences 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 radiographic examination; asymptomatic dilation of arteries or of veins, not requiring surgery and not resulting in curtailment of activity.

Class 2—Impairment of Lower Extremity, 6—24%

The patient experiences intermittent claudication on walking at least 100 yards at an average pace;

or

There is persistent edema of a moderate degree, incompletely controlled by elastic supports;

or

There is vascular damage as evidenced by a sign, such as that of a healed, painless stump of an amputated digit showing evidence of persistent vascular disease, or of a healed ulcer.

Class 3—Impairment of Lower Extremity, 25—50%

The patient experiences intermittent claudication on walking as few as 25 yards and no more than 100 yards at average pace;

or

There is marked edema that is only partially controlled by elastic supports;

or

There is 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.

Class 4—Impairment of Lower Extremity, 51 —79%

The patient experiences intermittent claudication on walking less than 25 yards, or the patient experiences intermittent pain at rest;

or

The patient has marked edema that cannot be controlled by elastic supports;

or

There is 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.

Class 5—Impairment of Lower Extremity, 80—95

The patient experiences severe and constant pain at rest;

or

There is 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.

Section 9: The Hematopoietic System

Neither quantitative nor qualitative disorders necessarily imply impairment. Rather, impairment depends on the severity of the defect and the mode of clinical expression.

Within this section, general reference is made to symptomatology and to limitations of the patient's daily activities. The physician should determine whether these fit into one of the following categories:

- a. **NONE** there are no complaints or evidence of disease, and the usual activities of daily living can be performed;
- b. **MINIMAL** some signs or symptoms of disease are present, and there is some difficulty in performing the usual activities of daily living;
- c. **MODERATE** signs and symptoms of disease are present, and difficulty is experienced in performing the usual activities of daily living that now require varying amount of assistance from others; or
- d. **MARKED** signs and symptoms of disease are present, and assistance is needed in performing most to all activities of daily living.

ANEMIA

Persistent refractory anemia may cause impairment, regardless of etiology; the degree of impairment is related to the severity of the anemia and the need for transfusions.

Under the best of circumstances, with normal survival of the transfused red cells, the beneficial effects of transfusions last 6—8 weeks. In patients with hemolytic anemias due to serum factors, and in some patients who have been transfused many times, the survival of transfused cells becomes shortened and transfusions must be repeated at shorter intervals of 1—5 weeks. As hemolysis becomes more severe, impairment increases.

(Mild anemia with a hemoglobin level of about 10gm/100ml is associated with little impairment in a patient who has a normal cardiovascular system)

TABLE 1
CRITERIA FOR EVALUATING PERMANENT IMPAIRMENT
RELATED TO ANEMIA

Symptoms	Hemoglobin Level (gm/100m)	Transfusion Requirement	Impairment (%)
None	10 – 12.....	None	0
Minimal.....	8 – 10.....	None	30
Moderate-Marked.....	5 – 8*	2 –3 units every 4-6 weeks or treatment with EPO***	70
Moderate-Marked.....	5 – 8*	2 –3 units every 2 weeks** or treatment with EPO***	70 - 100

* Level before transfusion

** Implies hemolysis of transfused blood

*** Recombinant human erythropoietin

TABLE 2
CRITERIA FOR EVALUATING PERMANENT IMPAIRMENT
RELATED TO POLYCYTHEMIA

ERYTHROCYTOSIS: History of persistent erythrocytosis substantiated by objective tests, and uncorrected by continuous therapy for 12 months.

Symptoms	% Impairment
Hemoglobin less than 18 gm/100 ml with no or infrequent therapy	0
Hemoglobin less than 18 gm/100 ml and requiring frequent or continuous therapy	5
Hemoglobin greater than 18 gm/100 ml despite continuous therapy	10

WHITE BLOOD CELL DISEASES OR ABNORMALITIES

Class 1—Impairment of the Whole Person, 1—10%

A patient belongs in Class 1 when (a) there are symptoms or signs of leukocyte abnormality; and (b) no or infrequent treatment is needed; and (c) all or most of the activities of daily living can be performed.

Class 2—Impairment of the Whole Person, 11—25%

A patient belongs in Class 2 when (a) there are symptoms and signs of leukocyte abnormality; and (b) although continuous treatment is required, most of the activities of daily living can be performed.

Class 3—Impairment of the Whole Person, 26—50%

A patient belongs in Class 3 when (a) there are symptoms and signs of a leukocyte abnormality; and (b) continuous treatment is required; and (c) there is interference with the performance of daily activities that require occasional assistance from others.

Class 4—Impairment of the Whole Person, 51—90%

A patient belongs in Class 4 when (a) there are symptoms and signs of a leukocyte abnormality and (b) continuous treatment is required; and (c) difficulty is experienced in the performance of the activities of daily living that requires continuous care from others.

PLATELET AND/OR BLEEDING DISORDERS

Class 1—Impairment of the Whole Person, 1—10%

A person belongs in Class 1 when (a) there are symptoms or signs of a platelet and/or bleeding abnormality; and (b) no or infrequent treatment is needed; and (c) all or most of the activities of daily living can be performed.

Class 2—Impairment of the Whole Person, 11—25%

A patient belongs in Class 2 when (a) there are symptoms and signs of a platelet and/or bleeding abnormality; and (b) although continuous treatment is required, most of the activities of daily living can be performed.

Class 3—Impairment of the Whole Person, 26—50%

A patient belongs in Class 3 when (a) there are symptoms and signs of a platelet and/or bleeding abnormality; and (b) continuous treatment is required; and (c) there is interference with the performance of daily activities that requires occasional assistance from others.

Class 4—Impairment of the Whole Person, 51—90%:

A patient belongs in Class 4 when (a) there are symptoms and signs of a platelet and/or bleeding abnormality and (b) continuous treatment is required; and (c) difficulty is experienced in the performance of the activities of daily living that requires continuous care from others.

Section 10: Visual System

INTRODUCTION

Visual impairment results from a deviation from normal in one or more of the three primary functions of the eye.

1. Near and far acuity
2. Visual fields
3. Motility (presence of diplopia)

The primary functions are not equally important, but perfect vision requires the coordination of all three.

Second and subordinate functions are:

1. Color vision
2. Light/dark adaptation
3. Accommodation
4. Iridoplegia
5. Entropion
6. Ectropion
7. Epiphora
8. Lagophthalmos
9. Scarring (globe)

If these secondary impairments are present and do not contribute to the impairment of primary functions, they must be evaluated independently under the appropriate body system and the respective impairments added to the impairment of the visual system.

Tertiary impairments must be calculated as contributing an additional 5 to 10% impairment to the involved eye. Such are:

1. Vitreous opacities
2. Nonreactive pupil
3. Light-scattering abnormalities

Skeletal or soft-tissue abnormalities that do not alter ocular function should be considered individually and may contribute up to 10% of whole-person impairment.

LOSS OF VISION

Clearly distinguish between complete and partial loss of vision and rate complete loss of vision in both eyes as 85%, while complete loss of vision in one eye when the vision in the opposite eye is normal is rated at 24%.

For partial loss of vision, rules to be followed in determining impairment include:

1. All medically acceptable attempts to correct must have been exhausted.
2. Determination must await 6 months freedom from all external signs of inflammation.
3. Determination to be deferred 12 months in case of
 - a. Extrinsic muscle disturbance
 - b. Retinal injury
 - c. Sympathetic ophthalmia
 - d. Traumatic cataract
4. Testing is to be performed with corrective lenses unless otherwise stipulated.

PRIMARY COORDINATE FACTORS

The primary functions are:

1. Central Visual Acuity (CVA)
2. Visual Field Efficiency (VFE)
3. Ocular Motility (OM)

Maximum Limits for each Coordinate Factor—MPPI states the standards for testing and the normal limits for each factor. The standards prescribed are identical to those established in the AMA document.

Central visual acuity refers to the ability to recognize letters that subtend an angle of five minutes, each part of which subtends an angle of one minute at the distance viewed. The normal, or 100%, VA is considered to be 20/20 Snellen or AMA chart or 14/14/AMA card for near vision. These standards refer to a chart imprinted with block letters or numbers in gradually decreasing sizes, identified by distances at which they are normally visible. It is used in testing visual acuity. The numerator is the test distance in feet. The denominator is the distance at which the smallest letter discriminated by the patient would subtend five minutes of arc.

Visual Field Efficiency—The maximum, or normal, visual field is defined as 500 degrees, which is the sum of degrees in the eight principal meridians from the central point of fixation to the outermost limits of visual perception, using a 3 mm white target at 33 centimeters. 100%, or normal, VFE is visual extension from central point of fixation in the following eight principal meridians.

- 1. Outward..... 85°
 - 2. Down and outward 85°
 - 3. Down 65°
 - 4. Down and in 50°
 - 5. Inward..... 60°
 - 6. In and up..... 55°
 - 7. Upward..... 60°
 - 8. Up and out 55°
- Total..... 500°

The minimum of the visual field is defined as 5% concentric central contraction.

Ocular Motility—Maximum ocular motility is present if there is normal ocular motor coordination with no diplopia in all parts of the field of binocular fixation. The minimum limit of ocular motility is defined as diplopia in all parts of the field of binocular fixation, or absence of binocular motor coordination.

MEASURE AND COMPUTATION OF LOSS

Central Visual Acuity

- a. Near and distance vision will be measured separately with correction.
- b. Snellen chart for distance and the AMA chart for near vision will be used.
- c. Illumination will be at least five foot candles
- d. Loss of central vision will be computed from a table provided, using the corrected near and far vision for each eye. The upper figure of the two figures provided will be the percentage loss of central vision for that eye. In the case of aphakia or pseudoaphakia, the lower of the two figures will be used.

Visual Field

- a. Perimetric standards for determination are as previously described, except that in cases of aphakia the white disc shall be 6mm rather than 3mm.
- b. The amount of radial contraction shall be determined in the eight principal meridians, as defined. The visual field loss of each eye, expressed as a percentage, is the sum of the degrees of field vision loss in the principal meridians divided by 500.
- c. If the central contraction is 5 degrees, the loss is 100%
- d. If the field impairment is irregular and not fairly disclosed by the principal meridians, the loss in a number of additional radii shall be used and the divisor in the equation shall be adjusted accordingly.

- e. When the loss is limited to less than the full visual field, the degrees of loss in each included meridian shall be added to one-half of the sum of the two boundary meridians, boundary perimeters being the principal meridians on either side of the impaired field.

Ocular motility will be measured in all parts of the motor field either with or without correction as determined by the examiner to provide the most accurate determination.

- a. All directions of gaze shall be tested from the extent of diplopia, with a test light on the perimeter at 300mm or on a tangent screen at a distance of one meter from the eye.
- b. Reference is made to the AMA Guides for description of plotting requirements for the test results; (see Figure 1)
- c. The percentage loss of ocular motility is the sum of the percentages of loss on motility due to diplopia in the meridian of maximum impairment. This percentage is assigned to the injured eye, or in the case of bilateral injury to the eye with the greatest impairment of CVA and VF. This is considered to be the eye with the greatest loss of CVA and the greatest loss of visual field and the percentage loss of ocular motility in the contralateral eye is considered to be 0, and for purposes of calculation, a value of 0 is deemed to be 1%.

IMPAIRMENT OF THE EYE

The visual impairment of one eye is the combination of the percentage losses of CVA, of VF, and of OM. To determine this, the visual loss is combined with the field loss for each eye. The loss in the eye that is greater is then combined with the loss of ocular motility.

Each of the following conditions present due to the injury causes an increase in the impairment rating of 2%.

- a. Loss of color vision
- b. Loss of adaptation to light and dark
- c. Metamorphopsia
- d. Uncorrected entropion or ectropion
- e. Lagophthalmos
- f. Epiphora
- g. Muscle disturbances such as tics, not included under diplopia.

If glasses are required as a result of the injury, or if refractive error increases by at least one diopter of sphere, cylinder, or both, 5% is added to the impairment rating.

If a non-cosmetic contact lens is required as a result of the injury, 7% is added to the impairment rating.

WHOLE BODY IMPAIRMENT DUE TO VISION LOSS

The eye with the lower percentage impairment is considered the better eye and the one with the higher impairment is the poorer.

- a. Multiply the percentage impairment of the better eye by 3
- b. To this, add the percentage impairment of the poorer eye
- c. Divide the sum of a. and b. by 4. This result is the percentage impairment of the visual system. (Round fractions to the nearest whole number, rounding up and down from the midpoint.)

The percentage of impairment of the visual system is translated to the percentage of impairment of the whole body by using the following table.

**TABLE 1
 IMPAIRMENT OF THE VISUAL SYSTEM AS IT RELATES
 TO IMPAIRMENT OF THE WHOLE PERSON**

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

Section 11: Ear, Nose, Throat, and Related Structures

INTRODUCTION

This section includes impairment determination for hearing, equilibrium (vertigo), the face (cosmetic deformity), respiration (air passage defects), mastication and deglutition, olfactory and taste, speech (dysarthria), and temporomandibular joint.

If there is more than one category of impairment, use the Combined Values Chart to determine total impairment.

HEARING LOSS

For objective techniques to determine hearing impairment, take the following steps.

- a. Test each ear separately with a pure-tone audiometer and record the hearing levels at 500Hz, 1,000 Hz, 2,000 Hz, and 3,000 Hz. It is necessary that the hearing level for each frequency be determined in every patient.

The following rules apply for extreme values.

1. If the hearing level at a given frequency is greater than 100dB or is beyond the range of the audiometer, the level shall be taken as 100dB.
 2. If the hearing level for a given frequency is better than normal, the level shall be taken as 0 dB.
- b. Total these four decibel values for each ear separately. Hearing levels are determined in dB according to ANSI-1969 standards.
 - c. Consult Table 1 for percentage of monaural hearing impairments(s). "DSHL" is the decibel sum of the hearing threshold levels at 500, 1,000, 2,000 and 3,000 Hz, and is equated to percent of monaural hearing impairment.
 - d. Consult Table 3 to determine percent of binaural hearing impairment.
 - e. Consult Table 2 to determine impairment of the whole person.

**TABLE 1
MONAURAL HEARING IMPAIRMENT**

DSHL [†]	%	DSHL	%	DSHL	%
100	0.0	190	33.8	285	69.3
		195	35.6	290	71.2
105	1.9	200	37.5	295	73.1
110	3.8			300	75.0
115	5.6	205	39.4		
120	7.5	210	41.2	305	76.9
		215	43.1	310	78.8
125	9.4	220	45.0	315	80.6
130	11.2			320	82.5
135	13.1	225	46.9		
140	15.0	230	48.9	325	84.4
		235	50.6	330	86.2
145	16.9	240	52.5	335	88.1
150	18.8			340	90.0
155	20.6	245	54.4		
160	22.5	250	56.2	345	90.9
		255	58.1	350	93.8
165	24.4	260	60.0	355	95.6
170	26.2			360	97.5
175	28.1	265	61.9		
180	30.0	270	63.8	365	99.4
		275	65.6	368	100.0
185	31.9	280	67.5	or greater	

**TABLE 2
THE RELATIONSHIP OF BINAURAL
HEARING IMPAIRMENT TO
IMPAIRMENT OF THE WHOLE PERSON**

% Binaural Hearing Impairment	% Impairment of the Whole Person	% Binaural Hearing Impairment	% Impairment of the Whole Person
0 – 1.7	0	50.0 – 53.1	18
1.8 – 4.2	1	54.2 – 55.7	19
4.3 – 7.4	2	55.8 – 58.8	20
7.5 – 9.9	3	58.9 – 61.4	21
10.0 – 13.1	4	61.5 – 64.5	22
13.2 – 15.9	5	64.6 – 67.1	23
16.0 – 18.8	6	67.2 – 70.0	24
18.9 – 21.4	7	70.1 – 72.8	25
21.5 – 24.5	8	72.9 – 75.9	26
24.6 – 27.1	9	76.0 – 78.5	27
27.2 – 30.0	10	78.6 – 81.7	28
30.1 – 32.8	11	81.8 – 84.2	29
32.9 – 35.9	12	84.3 – 87.4	30
36.0 – 38.5	13	87.5 – 89.9	31
38.6 – 41.7	14	90.0 – 93.1	32
41.8 – 44.2	15	93.2 – 95.7	33
44.3 – 47.4	16	95.8 – 98.8	34
47.5 – 49.9	17	98.9 – 100.0	35

* Audiometers are calibrated to ANSI-1969 standard reference levels.

† Decibel sum of the hearing threshold levels at 500, 1,000, 2,000 and 3,000 Hz.

EQUILIBRIUM

Equilibrium or orientation in space is maintained by the visual, kinesthetic, and vestibular mechanisms.

Vertigo, or vestibular dysequilibrium, is a sense movement that is perceived by the patient as “subjective,” in the case of movement of self, or as “objective,” in the case of movement of the environment.

The movements may be described as a sense of spinning, pulsion, or tilting of the visual environment with change of head position.

This section is primarily concerned with permanent impairment resulting from defects of the vestibular (labyrinthine) mechanisms and its central connections. The defects are evidenced by loss of equilibrium produced by: (1) loss of vestibular function; or (2) disturbances of vestibular function. (Light-headedness and abnormalities of gait not associated with vertigo are not considered.)

Class 1—Impairment of the Whole Person, 0%

A patient belongs in Class 1 when (a) signs of vestibular dysequilibrium are present without supporting objective findings (e.g., nystagmus, ataxia); and (b) the usual activities of daily living can be performed without assistance.

Class 2—Impairment of the Whole Person, 5 - 10%

A patient belongs in Class 2 when (a) signs of vestibular dysequilibrium are present with supporting objective findings (e.g., nystagmus, ataxia); and (b) the usual activities of daily living are performed without assistance, except for complex activities such as bike riding, or certain activities related to the patient’s work, such as walking on girders or scaffolds.

Class 3—Impairment of the Whole Person, 11 - 30%

A patient belongs in Class 3 when (a) signs of vestibular dysequilibrium are present with supportive objective findings (e.g., nystagmus, ataxia); and (b) the patient’s usual activities of daily living cannot be performed without assistance, except such simple activities as self care, some household duties, walking on the street, and riding in a motor vehicle operated by another person.

Class 4—Impairment of the Whole Person, 31 - 60%

A patient belongs in Class 4 when (a) signs of vestibular dysequilibrium are present with supportive objective findings (e.g., nystagmus, ataxia); and (b) usual activities of daily living cannot be performed without assistance, except for self care.

Class 5—Impairment of the Whole person, 61 - 95%

A patient belongs in Class 5 when (a) signs of vestibular dysequilibrium are present with supportive objective findings (e.g., nystagmus, ataxia); and (b) the usual activities of daily living cannot be performed without assistance, except self-care not requiring ambulation; and (c) confinement to the home or premises is necessary.

DISORDERS OF THE FACE

In evaluating permanent impairment from a disorder of the face, functional capacity as well as structural integrity are considered. Impairment in this section is limited to abnormality in structural integrity only. (For loss of function, refer to sections regarding specific anatomical areas). Loss of structural integrity can result from cutaneous disfigurement, such as that due to abnormal pigmentation or scars, or from loss of supporting structures, such as soft tissue, bone, or cartilage of the facial skeleton.

Class 1—Impairment of the Whole Person, 1 - 5%

A patient belongs in Class 1 when the facial abnormality is limited to a disorder of the cutaneous structures, such as visible scars and abnormal pigmentation.

Class 2—Impairment of the Whole Person, 6 - 10%

A patient belongs in Class 2 when there is loss of supporting structures of part of the face, with or without cutaneous disorder. Depressed cheek, nasal, or frontal bones constitute a Class 2 impairment.

Class 3—Impairment of the Whole Person, 11 - 15%

A patient belongs in Class 3 when there is absence of a normal anatomical area of the face. Loss of an eye (see Section 10) or loss of part of the nose with the resulting cosmetic deformity constitute a Class 3 impairment.

Class 4—impairment of the Whole Person, 16 - 35%

A patient belongs in Class 4 when facial disfigurement is so severe that it precludes social acceptance. Massive distortion of normal facial anatomy constitutes a Class 4 impairment.

RESPIRATION

Air passage defects may result in permanent impairment. The following provides a rating classification system for air passage defects (excluding larynx air ways and lung parenchyma). Permanent impairment from obstructive sleep apnea should be evaluated using the neurologic section.

Classes of Air Passage Defects**Class 1—Impairment of the Whole Person, 0 - 10%**

A recognized air passage defect exists.

Dyspnea does not occur at rest.

Dyspnea is not produced by walking or climbing stairs freely, performance of other usual activities of daily living, stress, prolonged exertion, hurrying, hill climbing, or recreation* requiring intensive effort or similar activity.

Examination reveals one or more of the following: partial obstruction of oropharynx, laryngopharynx, larynx, upper trachea (to 4th ring), lower trachea, bronchi, or complete obstruction of the nose (bilateral), or nasopharynx.

*prophylactic restriction of activity such as strenuous competitive sports does not exclude patient from Class 1.

NOTE: Patients with successful permanent tracheostomy or stoma should be rated at 25% impairment of the whole person.

Class 2—Impairment of the Whole Person, 11 - 30%

A recognized air passage defect exists.

Dyspnea does *not* occur at rest.

Dyspnea is *not* produced by walking freely on the level, climbing at least one flight of ordinary stairs, or the performance of other usual activities of daily living.

Dyspnea is produced by stress, prolonged exertion, hurrying, hill climbing, recreation except sedentary forms, or similar activity.

Examination reveals one or more of the following: partial obstruction of oropharynx, laryngopharynx, larynx, upper trachea (to 4th ring), lower trachea, bronchi, or complete obstruction of the nose (bilateral) or nasopharynx.

Class 3—Impairment of the Whole Person, 31 - 50%

A recognized air passage defect exists.

Dyspnea does not occur at rest.

Dyspnea is produced by walking more than one or two blocks on the level, climbing one flight of ordinary stairs even with periods of rest, performance of other usual activities of daily living, stress, hurrying, hill climbing, recreation, or similar activity.

Examination reveals one or more of the following: partial obstruction of oropharynx, laryngopharynx, larynx, upper trachea (to 4th ring), lower trachea, or bronchi.

Class 4—Impairment of the Whole Person, 51 -75%

A recognized air passage defect exists.

Dyspnea occurs at rest, although patient is not necessarily bedridden.

Dyspnea is aggravated by the performance of any of the usual activities of daily living beyond personal cleansing, dressing, grooming or its equivalent.

Examination reveals one or more of the following: partial obstruction of oropharynx, laryngopharynx, larynx, upper trachea (to 4th ring), lower trachea, or bronchi.

MASTICATION AND DEGLUTITION

Numerous conditions of non-gastrointestinal origin may interfere with these functions and dietary restrictions may result. If these restrictions are permanent, impairment may be determined as follows:

Restriction	Impairment of the Whole Person
Mild dysphagia with minimal modification of diet	10%
Moderate dysphagia with restriction of pureed or liquid diet	30%
Feeding gastrostomy or tube feeding required	50%

OLFACTION AND TASTE

(See neurologic impairment rating section.)

DYSARTHRIA

Impairment rating in this section is concerned with voice production and articulate speech. Language content and receptive speech disorders are considered in the section on impairment rating of neurologic disorders.

A classification chart, oral reading paragraph, and examining procedures for use in estimating speech impairment are described below.

Classification Chart Judgments as to the amount of impairment should be made with reference to the classes, percentages, and examples provided in the Speech Classification Chart (on page 98-99). The fifteen categories of the chart suggest activities or situations with different levels of impairment. Data gathered from direct observation of the patient or from interviews should be compared with these categories, and values should be assigned considering the specific impairments that are present.

Oral Reading Paragraph The paragraph of 100 words, entitled, "The Smith House," composed of 10 sentences, provides a uniform means of comparing a speech example of the patient with the performance of normal speakers. The phonetic elements of the paragraph are selected particularly for their relevance to intelligibility of speech.

"The Smith House"

Larry and Ruth Smith have been married nearly 14 years. They have a small place near Long Lake. Both of them think there's nothing like the country for health. Their two boys would rather live there than any other place. Larry likes to keep some saddle horses close to the house. These make it easy to keep his sons amused. If they wish, the boys can go fishing along the shore. When it rains, they usually want to watch television. Ruth has a cherry tree on each side of the kitchen door. In June they enjoy the juice and jelly.

Examining Procedures

General Orientation The examining physician should have normal hearing as defined in the earlier section on Hearing.

The setting of the examination should be a reasonably quiet office that approximates the noise level conditions of everyday living. The examiner should base judgments of impairment on two kinds of evidence: (1) Direct observation of the patient's speech in the office; for example, during conversation, during the interview, and while reading and counting aloud; and (2) reports pertaining to the patient's performances in situations of everyday living. The reports or the evidence should be supplied by observers who know the patient well.

The standard of evaluation is the concept of a normal speaker's performance in average situation of everyday living. It is assumed in this context that an average speaker usually can perform as follows: (1) Talk in a loud voice when the occasion demands it. (2) Sustain phonation for at least 10 seconds in one breath. (3) Complete at least a 10 word sentence in one breath. (4) Form all of the phonetic units of American speech, and join them together intelligibly. (5) Maintain a rate of at least 75 to 100 words per minute, and sustain a flow of speech for a reasonable length of time.

Specific Procedures

- a. Place the patient approximately 8 feet from the examiner.
- b. Interview the patient. This will permit observation of the patient's speech in ordinary conversation while obtaining information pertinent to his or her history.
- c. Listen to the patient's speech as the patient reads aloud the short paragraph, "The Smith House." For this exercise, seat the patient with the back towards the physician; maintaining a separation of 8 feet. Instruct the patient as follows: "You are to read this passage so that I can hear you plainly. Be sure to speak so that I can understand you".
- d. If additional reading procedures are required, simple prose paragraphs from a magazine may be used. A nonreader may be requested to give name, address, the days of the week, the months of the year, etc. Additional evidence regarding the patient's rate of speech and ability to sustain it may be obtained by noting the time required to count to 100 by ones. Completion of the latter task in 60 to 75 seconds is accepted as normal.
- e. Record judgment of the patient's speech capacity with regard to each of the three sections of the Speech Classification Chart.
- f. The degree of impairment of the speech function is equivalent to the greatest percentage of impairment recorded in any one of the three sections of the classification chart.

SPEECH CLASSIFICATION CHART

Audibility

<p>Class 1 0—10% Speech Impairment</p>	<p>Can produce speech of intensity sufficient for most of the needs of everyday speech communication, although this sometimes may require effort and occasionally may be beyond the patient's capacity.</p>
<p>Class 2 11—35% Speech Impairment</p>	<p>Can produce speech of intensity sufficient for many of the needs of everyday speech communication, and is usually heard under average conditions; however, may have difficulty in automobiles, buses, trains, stations, restaurants, etc.</p>
<p>Class 3 35—60% Speech Impairment</p>	<p>Can produce speech of intensity sufficient for some of the needs of everyday speech communication, such as close conversation; however, has considerable difficulty in such noisy places as listed above; the voice tires rapidly and tends to become inaudible after a few seconds.</p>
<p>Class 4 61—85% Speech Impairment</p>	<p>Can produce speech of intensity sufficient for a few of the needs of everyday speech communication; can barely be heard by a close listener or over the telephone, perhaps may be able to whisper; audibly, but has no voice.</p>
<p>Class 5 86—100% Speech Impairment</p>	<p>Can produce speech of intensity sufficient for none of the needs of everyday speech communication.</p>

Intelligibility

Class 1 0—10% Speech Impairment	Can perform most of the articulatory acts necessary for everyday speech communication, although listeners occasionally ask the patient to repeat and the patient may find it difficult or even impossible to produce a few phonetic units.
Class 2 11—35% Speech Impairment	Can perform many of the necessary articulatory acts for everyday speech communication. Can speak name, address, etc., and be understood by a stranger, but may have numerous inaccuracies; sometimes appears to have difficulty articulating.
Class 3 36—60% Speech Impairment	Can perform some of the necessary articulatory acts for everyday speech communication; can usually converse with family and friends, however, strangers may find it difficult to understand the patient; may often be asked to repeat.
Class 4 61—85% Speech Impairment	Can perform a few of the necessary articulatory acts for everyday speech communication; can produce some phonetic units; may have approximations for a few words such as names of own family; however, unintelligible out of context.
Class 5 86—100% Speech Impairment	Can perform none of the articulatory acts necessary for everyday speech communication.

Functional Efficiency

Class 1 0—10% Speech Impairment	Can meet most of the demands of articulation and phonation for everyday speech communication with adequate speed and ease, although occasionally the patient may hesitate or speak slowly.
Class 2 11—35% Speech Impairment	Can meet many of the demands of articulation and phonation for everyday speech communication with adequate speed and ease, but sometimes gives impression of difficulty, and speech may sometimes be discontinuous, interrupted, hesitant, or slow.
Class 3 36—60% Speech Impairment	Can meet some of the demands of articulation and phonation for everyday speech communication with adequate speed and ease, but often can only sustain consecutive speech for brief periods, may give the impression of being rapidly fatigued.
Class 4 61—85% Speech Impairment	Can meet a few of the demands of articulation and phonation for everyday speech communication with adequate speed and ease, such as single words or short phrases, but cannot maintain uninterrupted speech flow; speech is labored, rate is impractically slow.
Class 5 86—100% Speech Impairment	Can meet none of the demands of articulation and phonation for everyday speech communication with adequate speed and ease.

**SPEECH IMPAIRMENT AS RELATED TO
IMPAIRMENT OF THE WHOLE PERSON**

% Speech Impairment	% Impairment of the Whole Person	%Speech Impairment	% Impairment of the Whole Person
0	0	50	18
5	2	55	19
10	4	60	21
15	5	65	23
20	7	70	24
25	9	75	26
30	10	80	28
35	12	85	30
40	14	90	32
45	16	95	33
		100	35

NOTE: Impairment of the whole person contributed by speech impairment rounded to the nearest 5% only when it is the sole impairment involved.

TEMPOROMANDIBULAR JOINT DISORDERS

For permanent impairment of disorders of the temporomandibular joint consider range of motion, arthroplasty, and permanent dietary restrictions. If more than one category is used, the values should be combined using the Combined Values Chart.

Range of Motion

Only vertical opening of the jaw is measured and considered in determining impairment. Normal-50mm opening (from incisal edge of maxillary teeth to incisal edge of mandibular teeth)

Range	% Impairment of the Whole Person
Class 1 40-50mm	0
Class 2 30-40mm	5
Class 3 20-30mm	10
Arthroplasty (rated not earlier than 1 year post surgery)	5-20

Section 12: Digestive System

INTRODUCTION

For the purposes of determining impairment due to disorders of the upper digestive tract, “desirable” weight may be defined as follows:

- A. If the examiner is able to determine by history or from previous medical records a weight before onset of the patient’s digestive illness that he or she considers “usual,” the examiner should use that weight as the “desirable” weight from which any deviations are measured.
- B. If the examiner is not able to determine by history or from previous medical records a pre-illness “usual” weight, the examiner should refer to a table of “desirable” weights and should determine deviations from the lower end of the range of the “desirable” weight for the patient’s sex, height, and body build. Table 1, which is based on the 1979 Body Build Study by the Society of Actuaries and Association of Life Insurance Medical Directors of America, is recommended.

For an obese patient, the pre-illness weight may not be as physiologically “desirable” as the present weight; thus, the examiner should use judgment in assessing the relative importance of weight loss in determining the impairment rating.

In most cases, the examiner should use the definition shown under A. The definition and reference in B will be helpful if A cannot be used.

**TABLE 1
DESIRABLE WEIGHTS IN ENGLISH AND METRIC
BY SEX, HEIGHT AND BODY BUILD**

[Indoor Clothing Weighing 5 lb (2.3 kg) for men and 3 lb. (1.4 kg) for Women; and shoes with 1 in (2.5 cm) Heels)]*

Men				Women			
Height in (cm)	Weight lb (kg)			Height in (cm)	Weight lb (kg)		
	Small Frame	Medium Frame	Large Frame		Small Frame	Medium Frame	Large Frame
62(157)	128-134(58.0-60.7)	131-141(59.2-63.9)	138-150(62.5-67.8)	58(147)	102-111(46.2-50.2)	109-121(49.3-54.7)	118-131(53.3-59.3)
63(160)	130-136(59.0-61.7)	133-143(60.3-64.9)	140-153(63.5-69.4)	59(150)	103-113(46.7-51.3)	111-123(50.3-55.9)	120-134(54.4-60.9)
64(163)	132-138(60.0-62.7)	135-145(61.3-66.0)	142-156(64.5-71.1)	60(152)	104-115(47.1-52.1)	113-126(51.1-57.0)	122-137(55.2-61.9)
65(165)	134-140(60.8-63.5)	137-148(62.1-67.0)	144-160(65.3-72.5)	61(155)	106-118(48.1-53.6)	115-129(52.2-58.6)	125-140(56.8-63.6)
66(168)	136-142(61.8-64.6)	139-151(63.2-68.7)	146-164(66.4-74.7)	62(157)	108-121(48.8-54.6)	118-132(53.2-59.6)	128-143(57.8-64.6)
67(170)	138-145(62.5-65.7)	142-154(64.3-69.8)	149-168(67.5-76.1)	63(160)	111-124(50.3-56.2)	121-135(54.9-61.2)	131-147(59.4-66.7)
68(173)	140-148(63.6-67.3)	145-157(65.9-71.4)	152-172(69.1-78.2)	64(163)	114-127(51.9-57.8)	124-138(56.4-62.8)	134-151(61.0-68.8)
69(175)	142-151(64.3-68.3)	148-160(66.9-72.4)	155-176(70.1-79.6)	65(165)	117-130(53.0-58.9)	127-141(57.5-63.9)	137-155(62.0-70.2)
70(178)	144-154(65.4-70.0)	151-163(68.6-74.0)	158-180(71.8-81.8)	66(168)	120-133(54.6-60.5)	130-144(59.2-65.5)	140-159(63.7-72.4)
71(180)	146-157(66.1-71.0)	154-166(69.7-75.1)	161-184(72.8-83.3)	67(170)	123-136(55.7-61.6)	133-147(60.2-66.6)	143-163(64.8-73.8)
72(183)	149-160(67.7-72.7)	157-170(71.3-77.2)	164-188(74.5-85.4)	68(173)	126-139(57.3-63.2)	136-150(61.8-68.2)	146-167(66.4-75.9)
73(185)	152-164(68.7-74.1)	160-174(72.4-78.6)	168-192(75.9-86.8)	69(175)	129-142(58.3-64.2)	139-153(62.8-69.2)	149-170(67.4-76.9)
74(188)	155-168(70.3-76.2)	164-178(74.4-80.7)	172-197(78.0-89.4)	70(178)	132-145(60.0-65.9)	142-156(64.5-70.9)	152-173(69.0-78.6)
75(190)	158-172(71.4-77.6)	167-182(75.4-82.2)	176-202(79.4-91.2)	71(180)	135-148(61.0-66.9)	145-159(65.6-71.9)	155-176(70.1-79.6)
76(193)	162-176(73.5-79.8)	171-187(77.6-84.8)	181-207(82.1-93.9)	72(183)	138-151(62.6-68.4)	148-162(67.0-73.4)	158-179(71.6-81.2)

*Source: 1979 Body Build Study, Society of Actuaries and Association of Life Insurance Medical Directors of America, 1980. Copyright ©1983, The Metropolitan Life Insurance Company. Courtesy Statistical Bulletin, Metropolitan Life Insurance Company.

UPPER DIGESTIVE TRACT (ESOPHAGUS, STOMACH, DUODENUM, SMALL INTESTINE AND PANCREAS)

Esophagus—Objective procedures useful in establishing impairment include, but are not limited to: (1) fluoroscopy and radiography with contrast materials; (2) peroral endoscopy; (3) cytology and/or biopsy; and (4) manometry.

Stomach and Duodenum—Objective procedures useful in establishing impairment include, but are not limited to: (1) fluoroscopy and radiography with contrast materials; (2) peroral endoscopy; (3) cytology and/or biopsy; (4) gastric secretory tests; (5) assimilation tests; and (6) stool examination.

Small Intestine—Objective procedures useful in establishing impairment include, but are not limited to: (1) fluoroscopy and radiography with contrast materials; (2) peroral mucosal endoscopy; and (3) measures of intestinal assimilation, for example, test for fecal fat excretion and urinary d-xylose excretion, C₁₄ breath test, serum bile determination and Schilling test.

Pancreas—Objective procedures useful in establishing impairment include but are not limited to: (1) radiography including plain or scout films of the abdomen, ultrasonography, CT scan, and endoscopic pancreatography; (2) determination of plasma glucose and glucose tolerance; (3) assay of pancreatic enzyme activity in blood, urine, and feces; (4) sweat electrolyte test; and (5) selected secretory tests such as the secretion test, and cytology.

Classes of Upper Digestive Tract Impairment

Class 1—Impairment of the Whole Person, 1—5%

Symptoms or signs of upper-digestive-tract disease are present or there is anatomic loss or alteration;

and

Continuous treatment is not required;

and

Weight can be maintained at the desirable level;

or

There are no sequelae after surgical procedures.

Class 2—Impairment of the Whole Person, 6—20%

Symptoms and signs of organic upper-digestive-tract disease are present; or there is anatomic loss or alteration;

and

Appropriate dietary restrictions and drugs are required for control of symptoms, signs and/ or nutritional deficiency;

and

Loss of weight below the “desirable weight” does not exceed 10%

Class 3—Impairment of the Whole Person, 21—45%

Symptoms and signs of organic upper-digestive-tract disease are present or there is anatomic loss or alteration;

and

Appropriate dietary restrictions and drugs do not completely control symptoms, signs, and/or nutritional state;

or

There is 10 - 20 pound loss of weight below the “desirable weight,” which is ascribable to a disorder of the upper digestive tract.

Class 4—Impairment of the Whole Person, 46—75%

Symptoms and signs of organic upper-digestive-tract disease are present or there is anatomic loss or alteration;

and

Symptoms are not controlled by treatment;

or

There is greater than a 20 pound loss of weight below the “desirable weight,” which is ascribable to a disorder of the upper digestive tract.

COLON AND RECTUM

Objective procedures useful in establishing impairment of the colon and rectum include, but are not limited to: (1) digital and endoscopic examination including anoscopy, proctoscopy, sigmoidoscopy, and colonoscopy; (2) fecal microscopy and culture; (3) biopsy; and (4) fluoroscopy and radiography with contrast materials.

Classes of Colonic and Rectal Impairment

Class 1—Impairment of the Whole Person, 1—5%

Signs and symptoms of colonic or rectal disease are infrequent and of brief duration;

and

No limitation of activities, special diet, or medication is required;

and

No systemic manifestations are present, and weight and nutritional state can be maintained at a desirable level;

or

There are no sequelae after surgical procedures.

Class 2—Impairment of the Whole Person, 6—20%

There is objective evidence of colonic or rectal disease or anatomic loss or alteration;

and

There are mild gastrointestinal symptoms with occasional disturbances of bowel function accompanied by moderate pain;

and

Minimal restriction of diet or mild symptomatic therapy may be necessary;

and

No impairment of nutrition results.

Class 3—Impairment of the Whole Person, 21—45%

There is objective evidence of colonic or rectal disease or anatomic loss or alteration;

and

There are moderate to severe exacerbations with disturbance of bowel habit, accompanied by periodic or continual pain;

and

Restriction of activity, special diet, and drugs are required during attacks;

and

There are constitutional manifestations (fever, anemia or weight loss).

Class 4—Impairment of the Whole Person, 46—75%

There is objective evidence of colonic or rectal disease or anatomic loss or alteration;

and

There are persistent disturbances of bowel function present at test with severe persistent pain;

and

Complete limitation of activity, continued restriction of diet, and medication do not entirely control the symptoms;

and

There are constitutional manifestations (fever, weight loss, and/or anemia) present;

or

There is no prolonged remission.

ENTEROCUTANEOUS FISTULAS OF THE GASTROINTESTINAL TRACT, BILIARY TRACT, OR PANCREAS

Surgical Stoma	% Impairment of the Whole Person
Esophagostomy	10 - 15
Gastrostomy.....	10 - 15
Jejunostomy.....	15 - 20
Ileostomy.....	15 - 20
Colostomy	5 - 10

ANUS

Classes of Anal Impairment

Class 1—Impairment of the Whole Person, 1—5%

Signs of organic anal disease are present or there is anatomic loss or alteration;

or

There is mild incontinence involving gas and/or liquid stool;

or

Anal symptoms are mild, intermittent, and controlled by treatment.

Class 2—Impairment of the Whole Person, 6—15%

Signs of organic anal disease are present or there is anatomic loss or alteration;

and

Moderate but partial fecal incontinence is present requiring continual treatment;

or

Continual anal symptoms are present and incompletely controlled by treatment.

Class 3—Impairment of the Whole Person, 16—25%

Signs of organic anal disease are present and there is anatomic loss or alteration;

and

Complete fecal incontinence is present;

or

Signs of organic anal disease are present and severe anal symptoms unresponsive or not amenable to therapy are present.

HEPATOBIILIARY SYSTEM

Objective procedures useful in establishing hepatobiliary impairment include, but are not limited to: (1) radiography employing contrast materials, including percutaneous and endoscopic cholangiography, and nuclide scintigraphy; (2) ultrasonography; (3) computerized tomography (CT scan); (4) angiography (5) liver biopsy; and (6) selected laboratory tests to assess various functions of the liver and biliary ducts.

Classes of Liver and Biliary Impairment (Liver Impairment)

Class 1—Impairment of the Whole Person, 1—5%

There is objective evidence of persistent liver disease even though no symptoms of liver disease are present, and no history of ascites, jaundice, or bleeding esophageal varices within 3 years;

and

Nutrition and strength are good;

and

Biochemical studies indicate minimal disturbance in liver function;

or

Primary disorders of bilirubin metabolism are present.

Class 2—Impairment of the Whole Person, 6—20%

There is objective evidence of chronic liver disease even though no symptoms of liver disease are present, and no history of ascites, jaundice, or bleeding esophageal varices within 3 years;

and

Nutrition and strength are good;

and

Biochemical studies indicate more severe liver damage than Class 1.

Class 3—Impairment of the Whole Person, 21—45%

There is objective evidence of progressive chronic liver disease, or history of jaundice, ascites, or bleeding esophageal or gastric varices within the past year;

and

Nutrition and strength may be affected;

or

There is intermittent hepatic encephalopathy.

Class 4—Impairment of the Whole Person, 46—75%

There is objective evidence of progressive chronic liver disease, or persistent ascites or persistent jaundice or bleeding esophageal or gastric varices, with central nervous system manifestations of hepatic insufficiency;

and

Nutritional state is poor.

Classes of Liver and Biliary Impairment (Biliary Tract Impairment)**Class 1—Impairment of the Whole Person, 1—5%**

There is an occasional episode of biliary tract dysfunction.

Class 2—Impairment of the Whole Person, 6—20%

There is recurrent biliary tract impairment irrespective of treatment.

Class 3—Impairment of the Whole Person, 21—45%

There is irreparable obstruction of the bile tract with recurrent cholangitis.

Class 4—Impairment of the Whole Person, 46—75%

There is persistent jaundice and progressive liver disease due to obstruction of the common bile duct.

Classes of Hernial Impairment**Class 1—Impairment of the Whole Person, 1—5%**

Palpable defect in supporting structures of abdominal wall;

and

Slight protrusion at site of defect with increased abdominal pressure; readily reducible;

or

Occasional mild discomfort at site of defect but not precluding normal activity.

Class 2—Impairment of the Whole Person, 6—15%

Palpable defect in supporting structures of abdominal wall; and

Frequent or persistent protrusion at site of defect with increased abdominal pressure; still manually reducible;

or

Frequent discomfort precluding heavy lifting, but not hampering normal activity.

Class 3—Impairment of the Whole Person, 16—30%

Palpable defect in supporting structures of abdominal wall;

and

Persistent, irreducible or irreparable protrusion at site of defect;

and

Limitation in normal activity.

Use the Combined Values Chart for determining the total whole person impairment if more than one category of impairment is used.

UPPER URINARY TRACT

Class 1—Impairment of the Whole Person, 1—14%

Diminution of upper-urinary-tract function is present as evidenced by creatinine clearance of 75 to 90 liters/24 hr (52 to 62.5 ml/min), or PSP excretion of 15% to 20% in 15 minutes.

or

Intermittent symptoms and signs of upper-urinary-tract dysfunction are present that do not require continuous treatment or surveillance.

Class 2—Impairment of the Whole Person, 15—34%

Diminution of upper-urinary-tract function is present as evidenced by creatinine clearance of 60 to 75 liters/24 hr. (42 to 52 ml/min.), or PSP excretion of 10% to 15% in 15 minutes.

or

Although creatinine clearance is greater than 75 liters/24 hr (52 ml/min.), or PSP excretion is more than 15% in 15 minutes, symptoms and signs of upper-urinary-tract disease or dysfunction necessitate continuous surveillance and frequent treatment.

Class 3—Impairment of the Whole Person, 35—64%

Diminution of upper-urinary-tract function is present as evidenced by creatinine clearance of 40 to 60 liters/24 hr. (28 to 42 ml/min.), or PSP excretion of 5% to 10% in 15 minutes.

or

Although creatinine clearance is 60 to 75 liters/24 hr (42 to 52 ml/min.), or PSP excretion is 10% to 15% in 15 minutes, symptoms and signs of upper-urinary-tract-disease or dysfunction are incompletely controlled by surgical or continuous medical treatment.

Class 4—Impairment of the Whole Person, 65—90%

Diminution of upper-urinary tract function is present as evidenced by creatinine clearance below 40 liters/24 hr (28 ml/min.), or PSP excretion below 5% in 15 minutes.

or

Although creatinine clearance is 40 to 60 liters/24 hr (28 to 42 ml/min.), or PSP excretion is 5% to 10% in 15 minutes, symptoms and signs of upper-urinary-tract disease or dysfunction persists despite surgical or continuous medical treatment.

NOTE: The individual with a solitary kidney, regardless of cause, should be rated as having 10% impairment of the whole person. This value is to be combined with any other permanent impairment (including any impairment in the remaining kidney) pertinent to the case under consideration. The normal ranges of creatinine clearance are: Males: 130 to 200 liters/24 hr (90 to 139 ml/min.), Females: 115 to 180 liters/24 hr (80 to 125 ml/min.). The normal PSP excretion is 25% or more in urine in 15 minutes.

URINARY DIVERSION

Permanent, surgically created forms of urinary diversion usually are provided to compensate for anatomic loss and to allow for egress of urine. They are evaluated as a part of, and in conjunction with, the assessment of the involved portion of the urinary tract.

Irrespective of how well these diversions function in the preservation of renal integrity and the disposition of urine, the following values for the diversions should be combined with those determined under the criteria previously given for the portion of the urinary tract involved.

Type of Diversion	% Impairment of the Whole Person
Uretero-intestinal.....	10
Cutaneous Ureterostomy	10
Nephrostomy or Intubated Ureterostomy	15
Cystectomy with Urinary Diversion.....	24

URINARY BLADDER

When evaluating permanent impairment of the bladder, the status of the upper urinary tract must also be considered. The appropriate impairment values for both should be combined using the Combined Values Charts in order to determine the extent of impairment of the whole person.

Class 1—Impairment of the Whole Person, 1—10%

A person belongs in Class 1 when the patient has symptoms and signs of bladder disorder requiring intermittent treatment with normal function between episodes of malfunction.

Class 2—Impairment of the Whole Person, 11—20%

A person belongs in Class 2 when (a) there are symptoms and/or signs of bladder disorder requiring continuous treatment, or (b) there is good bladder reflex activity, but no voluntary control.

Class 3—Impairment of the Whole Person, 21 —30%

A patient belongs in Class 3 when the bladder has poor reflex activity, that is, there is intermittent dribbling, and no voluntary control.

Class 4—Impairment of the Whole Person, 31—40%

A patient belongs in Class 4 when there is no reflex or voluntary control of the bladder, that is, there is continuous dribbling.

URETHRA

When evaluating permanent impairment of the urethra, one must also consider the status of the upper urinary tract and bladder. The values for all parts of the urinary system should be combined using the Combined Values Charts to determine the extent of impairment of the whole person.

Class 1—Impairment of the Whole Person, 1—9%

A patient belongs in Class 1 when symptoms and signs of urethral disorder are present that require intermittent therapy for control.

Class 2—Impairment of the Whole Person, 10—20%

A person belongs in Class 2 when there are symptoms and signs of a urethral disorder that cannot be effectively controlled by treatment.

MALE REPRODUCTIVE ORGANS

The male reproductive organs include the penis, scrotum, testes, epididymides, spermatic cords, prostate, and seminal vesicles. The values of impairment of the male reproductive organs are given in the following sections for men 40-65 years of age. These values may be increased by 25% of a given value for those below the age of 40 years, and decreased by 25% for those over the age of 65 years. For instance, a 25% increase of a 20% impairment equals 25% impairment.

Penis

When evaluating impairment of the penis, it is necessary to consider impairment of both the sexual and the urinary functions. The degree of impairment of sexual function should be determined in accordance with the criteria that follow, and it should be combined with the appropriate value for an impairment of urinary function that is present to determine the impairment of the whole person.

Class 1—Impairment of the Whole Person, 1—9%

A patient belongs in Class 1 when sexual function is possible, but there are varying degrees of difficulty of erection, ejaculation, and/or sensation.

Class 2—Impairment of the Whole Person, 10—20%

A patient belongs in Class 2 when sexual function is possible and there is sufficient erection, BUT ejaculation and sensation are absent.

Class 3—Impairment of the Whole Person, 25%

A patient belongs in Class 3 when no sexual function is possible.

Scrotum**Class 1—Impairment of the Whole Person, 1—9%**

A patient belongs in Class 1 when there are symptoms and signs of scrotal loss or disease and there is no evidence of testicular malfunction, although there may be testicular malposition.

Class 2—Impairment of the Whole Person, 10—15%

A patient belongs in Class 2 when (a) there are symptoms and signs of architectural alteration or disease such that the testes must be implanted in other than a scrotal position to preserve testicular function, and pain or discomfort is present with activity; OR (b) there is total loss of the scrotum.

Testes, Epididymides, and Spermatic Cords**Class 1—Impairment of the Whole Person, 1—9%**

A patient belongs in Class 1 when (a) symptoms and signs of testicular, epididymal, and/or spermatic cord disease are present and there is anatomic alteration; and (b) continuous treatments not required; and (c) there is no abnormality of seminal or hormonal function; or (d) a solitary testis is present.

Class 2—Impairment of the Whole Person, 10—15%

A patient belongs in Class 2 when (a) symptoms and signs of testicular, epididymal and/or spermatic cord disease are present and there is anatomic alteration; and (b) frequent or continuous treatment is required; and (c) there are detectable seminal or hormonal abnormalities.

Class 3—Impairment of the Whole Person, 16—20%

A patient belongs in Class 3 when trauma or disease produces bilateral anatomical loss, or there is no detectable seminal or hormonal function of the testes, epididymides, or spermatic cords.

Prostate and Seminal Vesicles**Class 1—Impairment of the Whole Person, 1—9%**

A person belongs in Class 1 when (a) there are symptoms and signs of prostatic and/or seminal vesicular dysfunction or disease, and (b) anatomic alteration is present; and (c) continuous treatment is not required.

Class 2—Impairment of the Whole Person, 10-15%

A patient belongs in Class 2 when (a) frequent severe symptoms and signs of prostatic and/or seminal vesicular dysfunction or disease are present; and (b) anatomic alteration is present; and (c) continuous treatment is required.

Class 3—Impairment of the Whole Person, 16—20%

A patient belongs in Class 3 when there has been ablation of the prostate and/or seminal vesicles.

FEMALE REPRODUCTIVE ORGANS**Vulva-Vagina****Class 1—Impairment of the Whole Person, 1—14%**

A patient belongs in Class 1 when (a) symptoms and signs of disease or deformity of the vulva and/or vagina are present that do not require continuous treatment; and (b) sexual intercourse is possible; and (c) the vagina is adequate for childbirth during the premenopausal years.

Class 2—Impairment of the Whole Person, 15—29%

A patient belongs in Class 2 when (a) symptoms and signs of disease or deformity of the vulva and/or vagina are present that require continuous treatment; and (b) sexual intercourse is possible with varying degrees of difficulty; and (c) during the premenopausal years, adequacy for vaginal delivery is limited.

Class 3—Impairment of the Whole Person, 30—35%

A patient belongs in Class 3 when (a) symptoms and signs of disease or deformity of the vulva and/or vagina are present that are not controlled by treatment; and (b) sexual intercourse is not possible; and during the premenopausal years, vaginal delivery is not possible.

Cervix-Uterus

Class 1—Impairment of the Whole Person, 1 – 14%

A patient belongs in Class 1 when (a) symptoms and signs of disease or deformity of the cervix and/or uterus are present that do not require continuous treatment; or (b) cervical stenosis, if present, requires no treatment; or (c) there is anatomic loss of the cervix and/or uterus in the postmenopausal years.

Class 2—Impairment of the Whole Person, 15 – 29%

A patient belongs in Class 2 when (a) symptoms and signs of disease or deformity of the cervix and/or uterus are present that require continuous treatment; or (b) cervical stenosis, if present, requires periodic treatment.

Class 3—Impairment of the Whole Person, 30 – 35%

A patient belongs in Class 3 when (a) symptoms and signs of disease or deformity of the cervix and/or uterus are present that are not controlled by treatment; or (b) cervical stenosis is complete; or (c) anatomic or complete functional loss of the cervix and/or uterus occurs in premenopausal years.

Fallopian Tubes-Ovaries

Class 1—Impairment of the Whole Person, 1 – 14%

A patient belongs in Class 1 when (a) symptoms and signs of disease or deformity of the fallopian tubes and/or ovaries are present that do not require continuous treatment; or (b) only one fallopian tube and/or ovary is functioning in the premenopausal years; or (c) there is bilateral loss of function of the fallopian tubes and/or ovaries in the postmenopausal years.

Class 2—Impairment of the Whole Person, 15 – 29%

A patient belongs in Class 2 when (a) symptoms and signs of disease or deformity of the fallopian tubes and/or ovaries are present that require continuous treatment, but tubal patency persists and ovulation is possible.

Class 3—Impairment of the Whole Person, 30 – 35%

A patient belongs in Class 3 when (a) symptoms and signs of disease or deformity of the fallopian tubes and/or ovaries are present and there is total loss of tubal patency or total failure to produce ova in the premenopausal years; or (b) bilateral loss of the fallopian tubes and/or ovaries occurs in premenopausal years.

Section 13: Endocrine System

INTRODUCTION

Abnormal findings in other body systems may be associated with hypersecretion or hyposecretion of hormones, and some of these findings may persist indefinitely, even after therapy of the underlying hormonal dysfunction. Such impairment should be evaluated in accordance with criteria in the appropriate sections, and when appropriate, impairment ratings of other body systems should be combined with impairment ratings based on this section, using the Combined Values Chart to determine impairment of the whole person.

Neoplasms of the endocrine glands may produce nonhormonal permanent impairments manifested by pain or by effects involving other body systems. Such impairments should be evaluated with criteria set forth in the sections concerning the respective body systems. It is recognized that, in addition to those discussed in this section, other abnormalities may occur that involve the endocrine system. If such abnormalities produce permanent impairment, the physician should attempt to assign a value based on the degree of the impairment and one that is consistent with established values.

The focus of this section is the evaluation of physical impairment that may result from endocrine dysfunction. Since many of the endocrine abnormalities produce cosmetic and/or psychological abnormalities, the evaluator may wish to consider the criteria for impairment from mental and behavioral disorders. Similarly, many of the abnormalities require chronic replacement medications, perhaps for the lifetime of the individual. At the discretion of the evaluating physician, an added impairment of 0% to 5% may be allotted for this aspect of an endocrine disorder.

HYPOTHALAMIC PITUITARY AXIS

Class 1—Impairment of the Whole Person, 1 - 10%

A patient with hypothalamic-pituitary disease belongs in Class 1 when the disease can be controlled effectively with continuous treatment.

Class 2—Impairment of the Whole Person, 11—24%

A patient with hypothalamic-pituitary disease belongs in Class 2 when the symptoms and signs are inadequately controlled by treatment.

Class 3—Impairment of the Whole Person, 25—50%

A patient with hypothalamic-pituitary disease belongs in Class 3 when severe symptoms and signs persist despite treatment.

When appropriate, other impairments, i.e., neurologic or visual impairments, may be combined with the above impairments.

THYROID STRUCTURE OR FUNCTION

Class 1—Impairment of the Whole Person, 1—10%

A patient belongs in Class 1 when (a) continuous thyroid therapy is required for correction of the thyroid insufficiency or for maintenance of normal thyroid anatomy; and (b) there is no objective physical or laboratory evidence of inadequate replacement therapy.

Class 2—Impairment of the Whole Person, 11—20%

A patient belongs in Class 2 when (a) symptoms and signs of thyroid disease are present or there is anatomic loss or alteration; and (b) continuous thyroid hormone replacement therapy is required for correction of the confirmed thyroid insufficiency; but (c) the presence of a disease process in another body system or systems permits only partial replacement of the thyroid hormone.

May combine with other disorders where appropriate, i.e., cardiovascular disease.

PARATHYROID STRUCTURE OR FUNCTION

Severity of Hyperparathyroidism	% Impairment of the Whole Person
Symptoms and signs are easily controlled with medical therapy.....	1—10
There is persistent mild hypercalcemia with a mild nausea and polyuria.....	11—20
There is severe hypercalcemia with nausea and lethargy.....	21—90

Hypoparathyroidism is a chronic condition of variable severity that requires long term medical therapy in most cases. The degree of severity determines the degree of permanent impairment according to the following:

Severity of Hypoparathyroidism	% Impairment of the Whole Person
Symptoms and signs easily controlled by medical therapy	1—5
Intermittent hypercalcemia and/or hypocalcemia and more frequent symptoms in spite of careful medical attention.....	6—20

When other disorders exist, i.e., renal calculi, renal failure, these disorders may be combined with the above impairments.

STRUCTURAL OR FUNCTIONAL DISORDERS OF THE ADRENAL CORTEX

Impairment of the whole person may result from hypersecretion or hyposecretion of the cortical hormones. Such an abnormality may be associated with dysfunction of another endocrine gland, for instance, the pituitary. If this occurs, impairment from the adrenal abnormality is evaluated together with the other dysfunction using the Combined Values Chart.

Severity of Hypoadrenalism	% Impairment of the Whole Person
Symptoms and signs controlled with medical therapy.....	1—10
Symptoms and signs controlled inadequately, usually during the course of acute illnesses	11—50
Severe symptoms of adrenal crisis during major illness, usually due to severe glucocorticoid deficiency and/or sodium depletion	51—90

Severity of Hyperadrenocorticism	% Impairment of the Whole Person
Minimal, as with hyperadrenocorticism that is surgically correctable by removal of a pituitary or adrenal adenoma.....	1—10
Moderate, as with bilateral hyperplasia that is treated with medical therapy or adrenalectomy.....	11—50
Severe, as with aggressively metastasizing adrenal carcinoma	51—90

STRUCTURAL OR FUNCTIONAL DISORDERS OF THE ADRENAL MEDULLA

Pheochromocytoma—Permanent impairment from the pheochromocytoma may be classified using the following table.

Severity of Pheochromocytoma	% Impairment of the Whole Person
Minimal, as when the duration of hypertension has not led to cardiovascular disease and a benign tumor can be removed surgically	1—10
Moderate, as with inoperable malignant pheochromocytomas, if signs and symptoms of catecholamine excess can be controlled with blocking agents	11—50
Severe, as with widely metastatic malignant pheochromocytomas, in which symptoms of catecholamine excess cannot be controlled	51—90

STRUCTURAL OR FUNCTIONAL DISORDERS OF THE ENDOCRINE PANCREAS (ISLETS OF LANGERHANS)

Diabetes Mellitus—Criteria for evaluating permanent impairment related to diabetes mellitus are as follows.

Class 1—Impairment of the Whole Person, 1—5%

A person with diabetes mellitus belongs in Class 1 if he or she has noninsulin dependent (Type II) diabetes mellitus that can be controlled by diet; the person may or may not have evidence of diabetic microangiopathy, as indicated by the presence of retinopathy and/or albuminuria greater than 30 mg/100 ml.

Class 2—Impairment of the Whole Person, 6—14%

A patient belongs in this classification when there is diagnosis of noninsulin dependent (Type II) diabetes mellitus; and when satisfactory control of the plasma glucose requires both a restricted diet and hypoglycemic medication, either an oral agent or insulin. Evidence of microangiopathy, as indicated by retinopathy or by albuminuria of greater than 30 mg/100 ml, may or may not be present.

Class 3—Impairment of the Whole Person, 15—24%

A patient belongs in this class when insulin dependent (Type I) diabetes mellitus is present with or without evidence of microangiopathy.

Class 4—Impairment of the Whole Person, 25—40%

A patient belongs in Class 4 when the patient has the diagnosis of insulin dependent (Type I) diabetes mellitus and when hyperglycemic and/or hypoglycemic episodes occur frequently in spite of conscientious efforts of both the patient and his or her physician.

HYPOGLYCEMIA

Class 1—Impairment of the Whole Person, 0%

A patient has Class 1 impairment when surgical removal of an islet-cell adenoma results in complete remission of the symptoms and signs of hypoglycemia, and there are no postoperative sequelae.

Class 2—Impairment of the Whole Person, 1—50%

A patient with symptoms and signs of hypoglycemia has Class 2 impairment of the whole person ranging from 1% to 50%, depending on the degree of control obtained with diet and medications and on how the condition affects activities of daily living.

GONADS

A patient with anatomic loss or alteration of the gonads that results in an absence or abnormally high level of gonadal hormones would have 0% to 5% impairment of the whole person. Impairment due to inability to reproduce and other impairments associated with gonadal dysfunction should be evaluated in accordance with the criteria set forth in the genitourinary section.

MAMMARY GLANDS

The mammary glands make, store, and deliver milk. Absence of the mammary glands does not cause impairment of the whole person in males, but in females it will prevent nursing. Absence of mammary gland function in females due to an endocrine disorder can be rated 0—20% of the whole person. Cosmetic deformities should be rated under the section covering skin. In some endocrine disorders there may be galactorrhea in the female and gynecomastia in the male. Gynecomastia in the male may be accompanied by galactorrhea.

A female patient in the childbearing age with absence of the breasts, a patient with galactorrhea sufficient to require the use of absorbent pads, and a male patient with painful gynecomastia that interferes in the performance of daily activities would each have 0% to 5% impairment of the whole person.

METABOLIC BONE DISEASE

Metabolic bone disease such as osteoporosis, vitamin D-resistant osteomalacia, and Paget's disease, may require continuous therapy. These conditions; unless accompanied by pain, skeletal deformity, or peripheral nerve involvement, should be rated at 0% impairment of the whole person. When continuous hormones and mineral therapy give complete relief of symptoms, impairment of the whole person may be considered to be 3%. When continuous therapy is required to relieve pain, and the activities of daily living are restricted because of pain, the rating should be 5% to 15% impairment of the whole person. Any associated loss of motion should be evaluated in accordance with the criteria set forth in the section on the extremities and spine, and the section on the nervous system.

Section 14: Skin Disorders

Permanent impairment of the skin is any anatomic or functional abnormality or loss, including burns (thermal or electrical), scarring, and acquired immunologic capacity to react to antigens that persists after medical treatment and rehabilitation, and after a length of time sufficient to permit regeneration and other physiologic adjustments. The degree of permanent impairment of the skin may not be static. Therefore, findings should be subject to review and the patient's impairment should be reevaluated at appropriate intervals. In the evaluation of a permanent impairment resulting from a skin disorder, the actual functional loss is the prime consideration, although the extent of cosmetic or cutaneous involvement may also be important.

Impairments of other body systems, such as behavioral problems and restriction of motion or ankylosis of joints, and respiratory, cardiovascular, endocrine, and gastrointestinal disorders, may be associated with a skin impairment.

When there is permanent impairment in more than one body system, the degree of impairment for each system should be evaluated separately and combined using the Combined Values Chart, to determine the impairment of the whole person. Manifestations of skin disorders may be influenced by physical and/or chemical agents that a patient may encounter. While the avoidance of these irritant agents, possibly through a change in occupation, might alleviate the manifestations of the skin disorder, the presence of a skin disorder should be recognized and evaluated in accordance with the following criteria.

Impairment Classification for Skin Disease

Class 1—Impairment of the Whole Person, 1—9%

A patient belongs in Class 1 when signs or symptoms of skin disorder are present;

and

With treatment, there is no limitation, or minimal limitation, in the performance of the activities of daily living, although exposure to certain physical or chemical agents might increase limitation temporarily.

Class 2—Impairment of the Whole Person, 10—25%

A patient belongs in Class 2 when signs and symptoms of skin disorder are present;

and

Intermittent treatment is required;

and

There is limitation in the performance of some of the activities of daily living.

Class 3—Impairment of the Whole Person, 26—55%

A patient belongs in Class 3 when signs and symptoms of skin disorder are present;

and

Continuous treatment is required;

and

There is limitation in the performance of many activities of daily living.

Class 4—Impairment of the Whole Person, 56—80%

A patient belongs in Class 4 when signs and symptoms of skin disorder are present;

and

Continuous treatment is required, which may include periodic confinement at home or other domicile;

and

There is limitation in the performance of many of the activities of daily living.

Class 5—Impairment of the Whole Person, 81—95%

A patient belongs in Class 5 when signs and symptoms of skin disorder are present;

and

Continuous treatment is required, which necessitates confinement at home or other domicile;

and

There is severe limitation in the performance of activities of daily living.

Signs or symptoms of skin disorders classified in Classes 1 and 2 may be intermittent and may not be present at the time of examination.

NOTE: For specific examples of patients within each class, refer to the AMA “Guides to the Evaluation of Permanent Impairment” (current edition), chapter on Skin Disease. Disfigurement and behavioral changes that may be present should be evaluated in accordance with the section on Mental and Behavioral Disorders.

Section 16: Definitions

Activity of Daily Living (ADL)—The self-care, communication, and mobility skills required for independence in everyday living.

Division—The Division of Workers' Compensation within the Department of Labor and Employment Security of the State of Florida.

Durable Medical Equipment (DME), Orthotics, and Prosthetics—Articles of a more permanent nature that are generally prescribed for prolonged or continuous use. Orthotics are mechanical appliances used to support and correct deformities. Prosthetics are artificial substitutes used to replace missing parts or a device to augment performance of a natural function.

DWC—An acronym for the Division of Workers' Compensation, which is responsible for the administration of the Florida Workers' Compensation program. Current Workers' Compensation forms, including health care claim forms, have this designation. **Health Care Provider**—As defined in s.440.13, F.S., a physician or any recognized practitioner who provides skilled services pursuant to the prescription of, or under the supervision or direction of, a physician.

Independent Medical Evaluation (IME)—As defined in s.440.13(1)(k), F.S., means an objective evaluation of the injured employee's medical condition by a physician. An IME may be requested by the carrier or the injured employee and may include the treating physician. Each party, however, is bound by his or her selection of an independent medical examiner pursuant to s.440.13(5),

F.S. LES Form DWC—An acronym for Department of Labor and Employment Security, Division of Workers' Compensation, which is found on all forms, including appropriate health care forms that are designed to report Workers' Compensation information. (This acronym replaced the LES form BCL acronym in April; 1990.)

Maximum Medical Improvement—The date after which further recovery from, or lasting improvement to, an injury or disease can no longer be reasonably anticipated, based upon reasonable medical probability.

Medical Report—Any written transcript of information in outline or narrative form that documents circumstances pertaining to a medical condition and services provided. This includes, but is not limited to, clinical notes, test results, special reports, operative reports, etc.

Medical Services—Remedial treatment, care, and attendance provided Workers' Compensation claimants by health care providers (s.440.13, F.S.).

Permanent Impairment—Any anatomic or functional abnormality or loss, existing after the date of Maximum Medical Improvement, which results from injury.

Permanent Impairment Rating—Rating the extent of dysfunction or loss, if any, to the body as a whole based on criteria set forth in the Florida Impairment Rating Guide, 1996 edition.

Physician—A physician licensed under chapter 458, an osteopath licensed under chapter 459, a chiropractor licensed under chapter 460, a podiatrist licensed under chapter 461, an optometrist licensed under chapter 463, or a dentist licensed under chapter 466, F.S.

Psychologist—A psychologist licensed under chapter 470, F.S.