

A Guide to the Assessment of Traumatic Injuries and Occupational Diseases for Work Injury Compensation



**MINISTRY OF
MANPOWER**

A Guide to the Assessment of Traumatic Injuries and Occupational Diseases for Work Injury Compensation

SIXTH EDITION

Compiled by
Work Injury Compensation Medical Board
Ministry of Manpower
Singapore

First Edition	—	June 1978
Second Edition	—	June 1987
Third Edition	—	October 1990
Fourth Edition	—	February 1999
Fifth Edition	—	December 2006
Fifth Edition (Revised)	—	June 2011
Sixth Edition	—	July 2022

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Ministry of Manpower
Singapore

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ACKNOWLEDGEMENT

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PREFACE

TO THE SIXTH EDITION (2022)

In this sixth edition, the guide is revised to align with the changes in the Work Injury Compensation Act (WICA) 2019. The chapter on the Assessment of the Spine is also amended to provide greater clarity, granularity and more prescriptive to facilitate objective medical assessment.

The WICA 2019 was revised to expedite claims processing by allowing the health professionals¹ to provide medical assessment, at the earliest opportunity after six months from the date of accident if the injuries cannot be assessed for permanent incapacity. This is known as current incapacity assessment. Health professionals will still have the discretion to assess for permanent incapacity at a later date if they believe that the extent of incapacity will change further for more complex injuries. Since January 2021, the Work Injury Compensation (WIC) designated insurers have progressively taken over the processing of work injury claims. The Ministry of Manpower or WIC designated insurers have sent requests to health professionals to assess cases based on the current incapacity. This will benefit workers with work injuries who can receive their compensation earlier.

The revision to the chapter on Assessment of the Spine was made under the guidance of the Workgroup for Development of Guidance Material for the Assessment of Work-Related Low Back Disorders and Chronic Pain Syndrome as well as the WIC Medical Board. We would like to thank all the contributors for their guidance, as well as the Singapore Spine Society and Singapore Orthopaedic Association for their valuable feedback.

The sixth edition of the guide should be used for the assessment of all work-related injuries and occupational diseases with effect from 1st August 2022 (date of assessment). This will apply to all initial assessments done on or after 1st August 2022 (irrespective of the date of injury). For objection cases (i.e those requiring re-assessment by the Work Injury Compensation Medical Board), where the initial assessment was based on the 5th edition (revised) of the guide, the assessment should continue to be based on the 5th edition (revised) for consistency. The sixth edition may be referred to in such cases where there is insufficient guidance given in the previous edition.

In this revision, it must be noted that the guide would not cover all injuries and all systems for practical reasons. For injuries or systems not included in this guide (e.g. skin, psychological, etc), reference should be made to the latest edition of the American Medical Association's Guides to the Evaluation of Permanent Impairment.

Prof V Prem Kumar
Chairman
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¹ A health professional is a registered medical practitioner under the Medical Registration Act or a registered dentist under the Dental Registration Act.

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CHAPTER 1

PERMANENT INCAPACITY, CURRENT INCAPACITY AND TEMPORARY INCAPACITY

For work injury compensation purposes under the Work Injury Compensation Act 2019, medical assessment of the degree of disability is required only for permanent incapacity or current incapacity and not for temporary incapacity.

PERMANENT INCAPACITY

This means there is some anatomic or functional abnormality or loss, after maximal medical, surgical or other forms of treatment have been applied and nothing further could be done to improve the incapacity. It is the residual incapacity which the assessing health professional considers to be stable and not likely to progress or improve further at the time of the medical evaluation. A reasonable timeframe for the stabilisation of medical conditions is three months, as long as no further medical intervention is required or the conditions will not improve or deteriorate.

CURRENT INCAPACITY

Current incapacity is the residual incapacity which health professional considers to be unlikely to change significantly after the date of assessment. Current incapacity can be assessed at the earliest opportunity after six months from the date of accident occurring on or from **01 September 2020 onward**, if the injuries cannot be assessed for permanent incapacity. For current incapacity, no separate or subsequent assessment will be required for the same injury to determine the permanent incapacity.

COMPENSATION FOR PERMANENT INCAPACITY AND CURRENT INCAPACITY

The percentages given in this guide are for the assessment of permanent incapacity and current incapacity. It is important that the assessment be made when the assessing health professional is satisfied that any incapacity present as defined above and that such assessment is made objectively, accurately and in accordance to this guide. The amount of compensation payable to an injured employee would depend on the product of the percentage of permanent incapacity or current incapacity, a factor derived from the employee's age and his monthly salary.

TEMPORARY INCAPACITY

This refers to functional abnormalities resulting from injuries which are for a limited period of time only, and that after all available and known forms of treatment, and given sufficient time for healing, there is no residual incapacity at all.

COMPENSATION FOR TEMPORARY INCAPACITY

Under the Work Injury Compensation Act 2019, the injured employee is entitled to be paid full earnings up to 14 days of outpatient medical leave and 60 days of hospitalisation leave certified by the health professional. He is further entitled to receive two-thirds of his monthly earnings for up to one year for the days which he is given medical leave. It should be noted that an injured employee with no permanent incapacity is still entitled to monetary benefits for temporary incapacity.

COMPENSATION FOR LIGHT DUTIES

Under the Work Injury Compensation Act 2019, injured employees who are given light duties will also be compensated. This is to ensure injured employees on light duties are not worse off than employees on medical leave due to work injuries. Health professionals should consider whether appropriate duties are available at the workplace, and whether the injured employee's incapacitated

condition allows him to perform those duties without aggravating his injuries. Health professionals are also to be reminded not to prescribe light duties if the injured employee's employment was terminated and outpatient medical leave should be prescribed if he has not fully recovered.

MAGNETIC RESONANCE IMAGING (MRI) SCAN FOR BACK INJURIES

The Work Injury Compensation Medical Board advised that an MRI is required for the timely and accurate assessment of the extent of back injuries. This allows health professionals to determine the seriousness of back injuries and assess the residual incapacity based on the findings from the MRI report. In the event of dispute, the MRI report can also be used as medical evidence to support the award given earlier.

COMPENSATION FOR PAIN

In general, pain is subjective and cannot be measured objectively. Much of the pain associated with a traumatic injury is also temporary in nature. However, there can be severe and persistent pain associated with certain injuries and conditions (e.g. nerve injuries, osteo-arthritis and spinal injuries) which can result in permanent loss of function and restriction of daily activities or job functions. It should be noted that the impairment percentages given for these specific disorders already include allowances for the pain that may occur with those conditions, and it is not necessary to give additional awards for pain. The assessment of pain can also be based on the limitation of movement of a joint resulting from such pain, provided there is no duplication. It is important that such assessments be made only after all available treatment and sufficient time for healing to take place has been given.

CHAPTER 2

HOW TO USE THIS GUIDE

I. ASSESSMENT OF THE MUSCULOSKELETAL SYSTEM

A. LIMITATION OF JOINT MOVEMENT

For restriction of motion:

1. Place the joint in the neutral position (0°) for that particular direction of movement (e.g. flexion).
2. Measure the range of motion of the joint from the neutral position using a goniometer.
3. If the joint cannot be placed in the neutral position, record the nearest angle from this neutral position. Ask the patient to move the joint in a given direction as far as he can. Measure the angle through which the joint has moved (arc of motion).
4. Refer to the relevant section of the guide for the particular joint. Read the percentage incapacity for that particular direction of motion (e.g. flexion) from the neutral position or arc of motion.
5. Repeat the procedure for each direction of movement (e.g. extension, abduction, adduction).
6. Add the percentage incapacity for each of the movements to obtain the total incapacity for limitation of movement of that joint.

Example:

A wrist joint cannot be placed in a neutral position but can actively dorsiflex from 20° to 40° . The arc of active dorsiflexion is 20° . Since it cannot be placed in the neutral, there is no palmar flexion at all. Radial deviation is limited to 10° and ulnar deviation to 20° .

This is a case of restriction of motion of the wrist joint. The total incapacity of the wrist joint is the sum of the percentage incapacity of each direction of motion:

Range of motion	% incapacity
Dorsiflexion of 20°	5%
Palmar flexion of 0°	8%
Radial deviation of 10°	1%
Ulnar deviation of 20°	1%
Total for wrist joint	15%

Where the award for range of movement falls between 2 rows of values, the principle of interpolation should apply.

Example:

The inter-phalangeal joint of the thumb was found to have restriction of motion with a flexion of 35°.

The values in the guide are as follows:

**Active Flexion from neutral (0°) to % Incapacity
or arc of active flexion of:**

30°	4 %
40°	3 %

Therefore, the permanent incapacity award should be 3.5% (i.e. intermediate value of 3% and 4%).

For ankylosis:

If a joint is ankylosed in a certain position, use a goniometer to measure the angle of deviation from the neutral position of that joint in each direction. Consult the guide for the percentage incapacity corresponding to the fixed angle measured in each direction. The largest percentage incapacity is taken as the incapacity of the joint (NB. The percentages for ankylosis are not added unlike restriction of motion).

Example:

A patient's wrist joint is ankylosed in 20° dorsiflexion and 10° radial deviation. The percentage incapacity of the joint is 28% (which is the largest percentage incapacity).

Position of ankylosis	% incapacity
20° dorsiflexion	14 %
10° radial deviation	28 %
% incapacity of the joint	28 %

B. NEUROLOGICAL DISORDERS**Sensory loss of fingers (digital nerves)**

1. Carry out a two point discrimination test to determine sensory quality on the palmar aspect of the fingers.
2. Identify the digital nerve(s) involved.
3. For partial sensory loss, a value of 50% of the impairment values for total loss can be given.

Peripheral nerves and plexus

1. Identify the affected peripheral nerve or plexus.
2. Assess the loss of sensory (diminished sensation or pain) and motor (loss of power) function (whether partial or total).
3. Give a proportion of the maximum percentage incapacity for sensory, motor or combined deficits. For partial loss which interferes with activity, a value of 50% of the impairment values can be given.

Deformities, pain, weakness, atrophy, restriction of motion have been taken into account in the percentage incapacity for peripheral nerves. If restriction of motion results strictly from a nerve lesion, the impairments from restriction of motion should not be applied in addition to prevent duplication.

C. DIAGNOSIS BASED ESTIMATES

Some impairments are more appropriately assessed on the basis of a diagnosis. Diagnosis based estimates are given for intra-articular fractures, fractures with complications, ligament and meniscus injuries, joint dislocations, osteo-arthritis, specific nerve and spinal injuries.

If restriction of motion or ankylosis results, then either the diagnosis based estimates or limitation of joint motion is used. They should not be combined to avoid duplication. The section providing the higher award should be used. However, the diagnosis based estimates can be combined, where appropriate eg an intra-articular fracture with osteo-arthritis and limb shortening. The total should not exceed that for amputation of that part of the limb.

II. ASSESSMENT OF OTHER SYSTEMS

Refer to the relevant systems. Where it is not found in this guide, please refer to the latest edition of the American Medical Association's Guides to the Evaluation of Permanent Impairment.

III. USE OF COMBINED VALUES CHART

In general, when there are two or more injured parts (e.g. joints, limbs, nerves), each part is assessed separately and then combined using the combined values chart (CVC) to give the total percentage incapacity. This is not a simple addition nor is it based on the combined values of the percentage incapacities considered together from the highest to the lowest.

Example:

A patient suffered amputations of right hand with restriction of motion of the joints:

Amputations:			
Thumb:	half of the distal phalanx		10 %
Index finger:	two phalanges		11 %
Middle finger:	two phalanges		9 %
Restriction of motion:			
Thumb	ip joint	flexion of 40°	3%
	mp joint	flexion of 30°	4%
Index finger	mp joint	flexion of 60°	3%

Calculation of the total percentage incapacity is based on assessing each part (finger) separately and using the CVC to combine the values:

Thumb – CVC (10%, 4%, 3%) = 17%
Index finger – CVC (11%, 3%) = 14%
Middle finger – 9%
CVC for 17%, 14%, 9% = 35%
Total PI is 35%

The percentage incapacities are assessed separately for the individual fingers and checked to ensure that they do not exceed that for the amputation of the corresponding finger. The total percentage incapacity is then obtained by combining the individual percentage incapacities for the fingers. This should not exceed that for the loss of the hand.

Note: A simple addition of the percentage incapacities would have given a value of 40%, while calculation based on CVC considering the highest to lowest % (11%, 10%, 9%, 4%, 3% and 3%) would have given a total percentage incapacity of 34%.

Example:

Assessment of Permanent Incapacity for middle finger:

DIP joint ROM 10° = 6%

PIP joint ROM 20° = 6%

Reduced sensation over fingertip = 2.5%

Combined = 14.5%

(Note: For computation of permanent incapacity involving fractions, the whole numbers should be combined first and fractions added back later. In this case, combine 6%, 6% and 2% to give 14%; 0.5% is then added back to give 14.5%.)

Compare with amputation of middle finger

Loss of 3 phalanges = 12%

As the combined Permanent Incapacity of individual parts should not > whole body part, the Permanent Incapacity awarded = 12%.

CHAPTER 3

ASSESSMENT OF THE UPPER LIMB

I. AMPUTATIONS

II. LIMITATION OF JOINT MOVEMENTS (restriction of motion or ankylosis)

Involving the following joints:

- A. Shoulder
- B. Elbow
- C. Wrist
- D. Joints of the thumb
- E. Joints of the fingers

III. NEUROLOGICAL DISORDERS

- A. Sensory Loss of Digits
- B. Peripheral Nerve Disorders
 - 1. Brachial plexus
 - 2. Major peripheral nerves
 - 3. Common entrapment neuropathies

IV. OTHER DISORDERS OF THE UPPER LIMB

- A. Fractures With Complications and Deformities
- B. Joint Instability
- C. Osteoarthritis
- D. Constrictive Tenosynovitis

I. AMPUTATIONS OF THE UPPER LIMB

Part amputated	Percentage impairment
Loss of both limbs	} 100%
Loss of both hands	}
Loss of all fingers and both thumbs	}
Loss of arm at shoulder	} 75%
Loss of arm between shoulder and elbow	}
Loss of arm at elbow	}
Loss of arm between wrist and elbow	} 70%
Loss of hand at wrist	}
Loss of four fingers and thumb of one hand	}
Loss of four fingers	60%
Loss of thumb	
Both phalanges and 1 st metacarpal	36%
Both phalanges	30%
One phalanx	20%
Loss of index finger	
Three phalanges and 2 nd metacarpal	21%
Three phalanges	14%
Two phalanges	11%
One phalanx	9%
Loss of middle finger	
Three phalanges and 3 rd metacarpal	15%
Three phalanges	12%
Two phalanges	9%
One phalanx	7%
Loss of ring finger	
Three phalanges and 4 th metacarpal	10%
Three phalanges	7%
Two phalanges	6%
One phalanx	5%
Loss of little finger	
Three phalanges and 5 th metacarpal	10%
Three phalanges	7%
Two phalanges	6%
One phalanx	5%
Loss of metacarpals	
First or second	8%
Third, fourth or fifth	3%

Note: Where there is loss of 2 or more parts of the hand, the percentage is not to be more than the loss of the whole hand.

II. LIMITATION OF JOINT MOVEMENTS OF THE UPPER LIMB

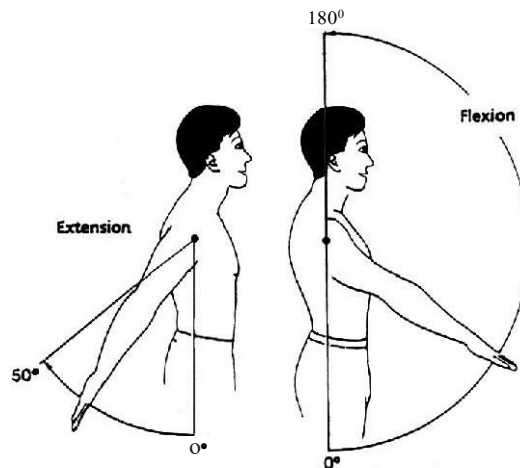
A. SHOULDER JOINT

(Gleno-humeral and scapula-thoracic motion)

1. Restricted Motion

The percentage incapacity due to restriction of motion in various directions for the same joint are added to give the total percentage incapacity.

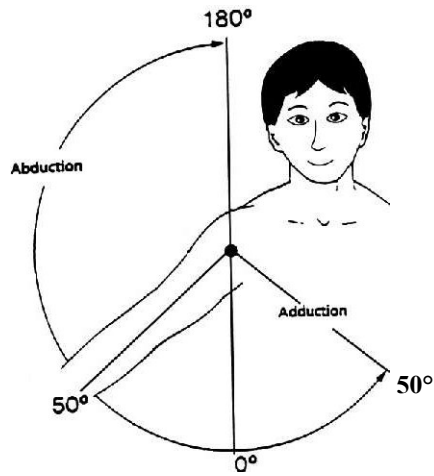
Figure 1: Shoulder extension and flexion



a. Active flexion from neutral (0°) to or arc of active flexion of:	% Incapacity
0°	13 %
10°	12 %
20°	11 %
30°	10 %
40°	9 %
50°	7 %
60°	6 %
70°	6 %
80°	5 %
90°	5 %
100°	4 %
110°	4 %
120°	3 %
130°	2 %
140°	1 %
150°	0 %

b. Active extension from neutral (0°) to or arc of active extension of:	% Incapacity
0°	3 %
10°	2 %
20°	1 %
30°	1 %
40°	0 %

Figure 2: Shoulder abduction and adduction



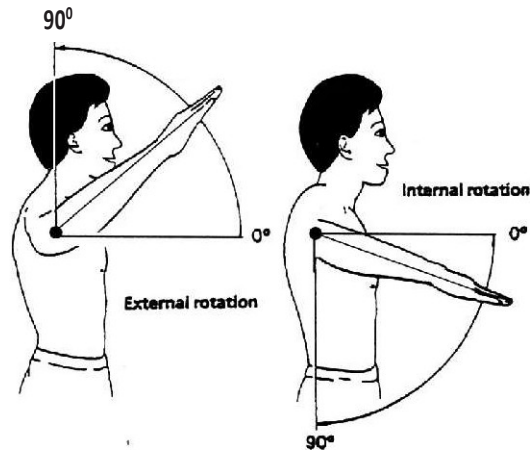
c. Active abduction from neutral (0°) to or arc of active abduction of:

	% Incapacity
0°	13 %
10°	12 %
20°	11 %
30°	10 %
40°	9 %
50°	9 %
60°	8 %
70°	7 %
80°	6 %
90°	5 %
100°	4 %
110°	4 %
120°	3 %
130°	2 %
140°	1 %
150°	0 %

d. Active adduction from neutral (0°) to or arc of active adduction of:

	% Incapacity
0°	2 %
10°	1 %
20°	1 %
30°	1 %
40°	0 %

Figure 3: Shoulder external and internal rotation



e. **Active internal rotation from neutral (0°) to or arc of active internal rotation of:**

	% Incapacity
0°	5 %
10°	4 %
20°	3 %
30°	3 %
40°	2 %
50°	1 %
60°	0 %

f. **Active external rotation from neutral (0°) to or arc of active external rotation of:**

	% Incapacity
0°	5 %
10°	5 %
20°	4 %
30°	4 %
40°	3 %
50°	2 %
60°	2 %
70°	1 %
80°	0 %

2. Ankylosis

For ankylosis in various directions involving the same joint, the largest incapacity is taken as the incapacity of that joint

a. ankylosed in flexion at:	% Incapacity
0°	27 %
10°	24 %
20°	21 %
30°}position of function	18 %
40°}position of function	18 %
50°}position of function	18 %
60°	25 %
70°	27 %
80°	29 %
90°	32%
100°	34 %
110°	36 %
120°	38 %
130°	41 %
140°	43 %
150°	45 %

b. ankylosed in extension at:	% Incapacity
0°	27 %
10°	32 %
20°	36 %
30°	41 %
40°	43 %
50°	45 %

c. ankylosed in abduction at:	% Incapacity
0°	27 %
10°	25 %
20°}position of function	18 %
30°}position of function	18 %
40°}position of function	18 %
50°}position of function	18 %
60°	22 %
70°	25 %
80°	27 %
90°	30 %
100°	32 %
110°	35 %
120°	38 %
130°	40 %
140°	43 %
150°	45 %

d. **ankylosed in adduction at:**

	% Incapacity
0°	27 %
10°	30 %
20°	33 %
30°	37 %
40°	41 %
50°	45 %

e. **ankylosed in internal rotation at:**

	% Incapacity
0°	27 %
10°	25 %
20°	22 %
30°}position of function	18 %
40°}position of function	18 %
50°}position of function	18 %
60°	25 %
70°	35 %
80°	40 %
90°	45 %

f. **Ankylosed in external rotation at:**

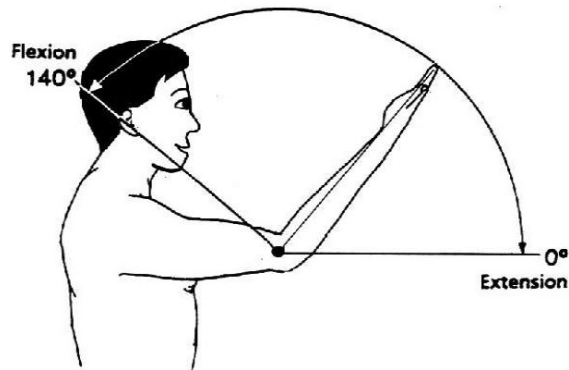
	% Incapacity
0°	27 %
10°	29 %
20°	32 %
30°	34 %
40°	36 %
50°	38 %
60°	40 %
70°	42 %
80°	44 %
90°	45 %

B. ELBOW JOINT

1. Restricted motion

The percentage incapacity due to restriction of motion in various directions for the same joint are added to give the total percentage incapacity.

Figure 4: Elbow extension and flexion



a. Arc of active flexion of:

Arc of active flexion of:	% Incapacity
0°	30 %
10°	28 %
20°	26 %
30°	24 %
40°	22 %
50°	20 %
60°	18 %
70°	16 %
80°	14 %
90°	12 %
100°	10 %
110°	8 %
120°	6 %
130°	4 %
140°	2 %
150°	0 %

b. Extension to: (flexion contracture)

Extension to: (flexion contracture)	% Incapacity
0°	0 %
10°	2 %
20°	3 %
30°	5 %
40°	7 %
50°	8 %
60°	9 %
70°	11 %
80°	13 %
90°	15 %
100°	16 %
110°	17 %
120°	18 %
130°	20 %
140°	22 %

Example:

The elbow cannot be placed in neutral position but starts active flexion only from 20° from the neutral position. It can flex from 20° to 60° i.e. an arc of active flexion of 40°. An award of 22% is given for restriction of flexion.

The elbow has a limitation of extension to 20° from the neutral position. An award of 3% is given for limitation of extension.

The percentage incapacity in this case is a simple addition of 22% and 3% i.e. 25%.

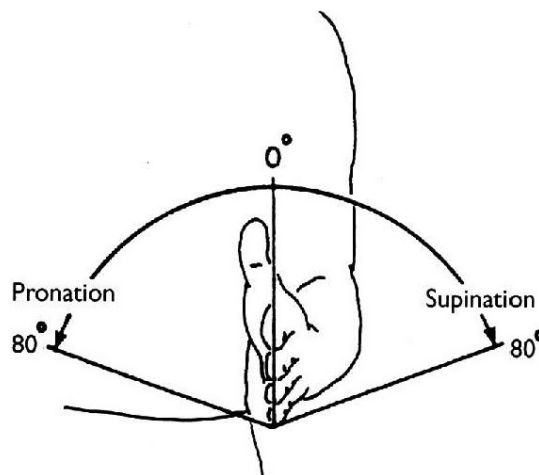
c. **Active pronation from neutral (0°) to or arc of active pronation of:**

	% Incapacity
0°	10 %
10°	8 %
20°	4 %
30°	3 %
40°	3 %
50°	2 %
60°	1 %
70°	1 %
80°	0 %

d. **Active supination from neutral (0°) to or arc of active supination of:**

	% Incapacity
0°	6 %
10°	5 %
20°	5 %
30°	4 %
40°	3 %
50°	2 %
60°	2 %
70°	1 %
80°	0 %

Figure 5: Pronation and supination at the elbow



2. Ankylosis

For ankylosis in various directions involving the same joint, the largest incapacity is taken as the incapacity of that joint.

a. Ankylosed in flexion at:	% Incapacity
0°	36 %
10°	35 %
20°	34 %
30°	34 %
40°	32 %
50°	32 %
60°	31 %
70°	29 %
80°}position of function	27 %
90°	31 %
100°	32 %
110°	33 %
120°	39 %
130°	43 %
140°	48 %
150°	53 %

b. ankylosed in pronation at:	% Incapacity
0°	36 %
10°	33 %
20°}position of function	27 %
30°	31 %
40°	33 %
50°	36 %
60°	40 %
70°	45 %
80°	53 %

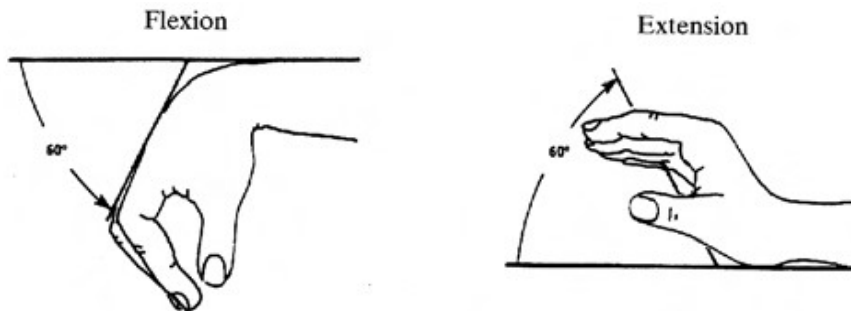
c. ankylosed in supination at:	% Incapacity
0°	36 %
10°	39 %
20°	42 %
30°	44 %
40°	46 %
50°	48 %
60°	50 %
70°	51 %
80°	53 %

C. WRIST JOINT

1. Restricted Motion

The percentage incapacity due to restriction of motion in various directions for the same joint are added to give the total percentage incapacity. If there is restriction of rotation of forearm, please refer to section on supination/pronation of elbow (pg 18) for assessment and combine the values.

Figure 6: Wrist flexion (palmar flexion) and extension (dorsiflexion)



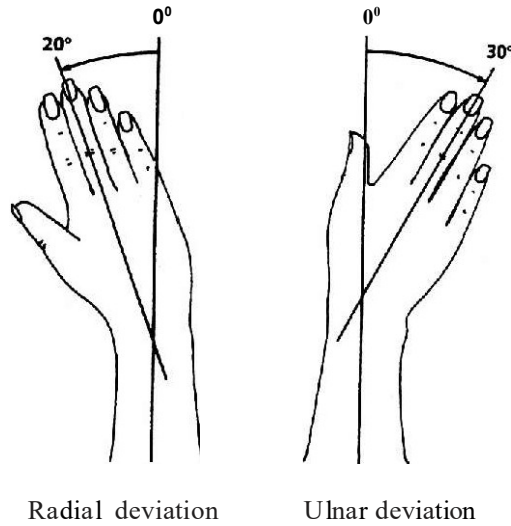
a.	Active flexion from neutral (0°) to or arc of active flexion of:	% Incapacity
	0°	8 %
	10°	7 %
	20°	6 %
	30°	5 %
	40°	4 %
	50°	3 %
	60°	1 %
	70°	0 %

b.	Active extension from neutral (0°) to or arc of active extension of:	% Incapacity
	0°	8 %
	10°	7 %
	20°	5 %
	30°	4 %
	40°	3 %
	50°	2 %
	60°	0 %

c.	Active radial deviation from neutral (0°) to arc of active radial deviation of:	% Incapacity
	0°	3 %
	10°	1 %
	20°	0 %

d. Active ulnar deviation from neutral (0°) to or arc of active ulnar deviation of:	% Incapacity
0°	4 %
10°	3 %
20°	1 %
30°	0 %

Figure 7: Wrist rotation



2. Ankylosis

For ankylosis in various directions involving the same joint, the largest incapacity is taken as the incapacity of that joint.

a. ankylosed in extension at:	% Incapacity
0°}position of function	13 %
10°}position of function	13 %
20°	14 %
30°	19 %
40°	21 %
50°	32 %
60°	42 %

b. ankylosed in flexion at:	% Incapacity
0°}position of function	13 %
10°}position of function	13 %
20°	21 %
30°	25 %
40°	29 %
50°	34 %
60°	42 %

c. **ankylosed in radial deviation at:**

	% Incapacity
0°}position of function	13 %
10°	28 %
20°	42 %

d. **ankylosed in ulnar deviation at:**

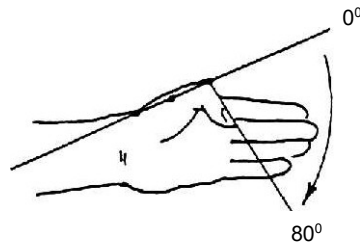
	% Incapacity
0°}position of function	13 %
10°}position of function	13 %
20°	32 %
30°	42 %

D. THUMB

D1. INTERPHALANGEAL (IP) JOINT

1. Restricted Motion

Figure 8: Flexion of thumb at IP joint



a. Active flexion from neutral (0°) to or arc of active flexion of:

	% Incapacity
0°	6 %
10°	5 %
20°	5 %
30°	4 %
40°	3 %
50°	2 %
60°	1 %
70°	1 %
80°	0 %

2. Ankylosis

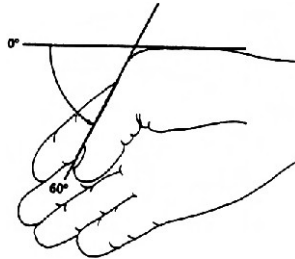
a. ankylosed at:

	% Incapacity
0°	6 %
10°	5 %
20° } position of function	5 %
30°	6 %
40°	6 %
50°	7 %
60°	7 %
70°	9 %
80°	10 %

D2. METACARPOPHALANGEAL (MP) JOINT

1. Restricted Motion

Figure 9: Flexion at thumb MP joint



a. Active flexion from neutral (0°) to or arc of active flexion of:

	% Incapacity
0°	8 %
10°	6 %
20°	5 %
30°	4 %
40°	2 %
50°	1 %
60°	0 %

2. Ankylosis

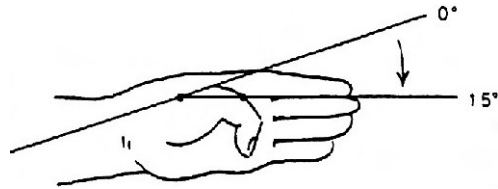
a. Joint ankylosed at:

	% Incapacity
0°	8 %
10°	7 %
20° } position of function	6 %
30°	8 %
40°	9 %
50°	10 %
60°	11 %

D3. CARPOMETACARPAL JOINT

1. Restricted Motion

Figure 10: Flexion and extension at the thumb carpometacarpal joint



a. Active flexion from neutral (0°) to or arc of active flexion of:	% Incapacity
0°	8%
10°	4%
15°	0%
b. Active extension from neutral (0°) to or arc of active flexion of:	% Incapacity
0°	8%
10°	6%
20°	2%
30°	0%

NB. Abduction and adduction of the carpometacarpal joint of the thumb is associated with the ability to flex and extend the joint. This has been taken into account in establishing the percentage incapacity for flexion and extension.

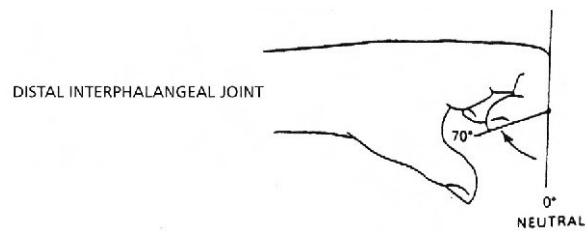
2. Ankylosis

a. Ankylosed in flexion at:	% Incapacity
0°	7%
10°	11%
15°	16%
b. Ankylosed in extension at:	% Incapacity
0°	7%
10°	11%
20°	13%
30°	16%

E. FINGERS

E1. DISTAL INTERPHALANGEAL (DIP) JOINT

1. Restricted Motion



a. Active Flexion from neutral (0°) to or arc of active flexion of:

	% Incapacity index/middle fingers	% Incapacity ring/little fingers
0°	6 %	4 %
10°	6 %	4 %
20°	5 %	3 %
30°	4 %	3 %
40°	3 %	2 %
50°	2 %	1 %
60°	1 %	1 %
70°	0 %	0 %

2. Ankylosis

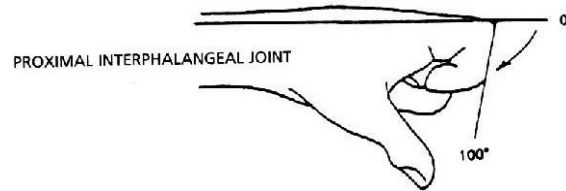
a. ankylosed at:

	% Incapacity index/middle fingers	% Incapacity ring/little fingers
0°	6 %	4 %
10°	5 %	3 %
20° } position of function	5 %	3 %
30°	6 %	4 %
40°	6 %	4 %
50°	7 %	5 %
60°	7 %	5 %
70°	7 %	5 %

E2. PROXIMAL INTERPHALANGEAL (PIP) JOINT

1. Restricted Motion

Figure 12: Flexion of finger PIP joint



a. Active Flexion from neutral (0°) to or arc of active flexion of:

	% Incapacity index/middle fingers	% Incapacity ring/little fingers
0°	8 %	6 %
10°	7 %	5 %
20°	6 %	4 %
30°	5 %	3 %
40°	5 %	3 %
50°	4 %	3 %
60°	4 %	3 %
70°	3 %	2 %
80°	2 %	1 %
90°	1 %	1 %
100°	0 %	0 %

2. Ankylosis

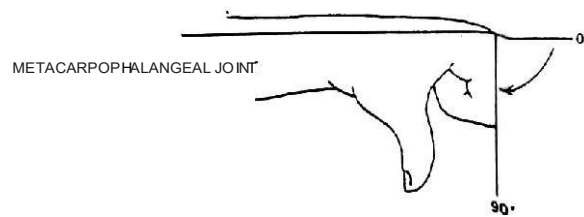
a. ankylosed at:

	% Incapacity index/middle fingers	% Incapacity ring/little fingers
0°	8 %	6 %
10°	8 %	6 %
20°	7 %	5 %
30°	7 %	5 %
40°} position of function	6 %	4 %
50°	7 %	5 %
60°	8 %	6 %
70°	8 %	6 %
80°	9 %	6 %
90°	9 %	6 %
100°	9 %	6 %

E3. METACARPOPHALANGEAL (MP) JOINT

1. Restricted Motion

Figure 13: Flexion of finger MP joint



a. Active Flexion from neutral (0°) to or arc of active flexion of:

	% Incapacity index/middle fingers	% Incapacity ring/little fingers
0°	8 %	6 %
10°	7 %	5 %
20°	6 %	4 %
30°	5 %	3 %
40°	4 %	3 %
50°	4 %	3 %
60°	3 %	2 %
70°	2 %	1 %
80°	1 %	1 %
90°	0 %	0 %

2. Ankylosis

a. ankylosed at:

	% Incapacity index/middle fingers	% Incapacity ring/little fingers
0°	8 %	6 %
10°	8 %	6 %
20°	7 %	5 %
30° } position of function	6 %	4 %
40°	7 %	5 %
50°	8 %	6 %
60°	9 %	6 %
70°	10 %	7 %
80°	11 %	7 %
90°	12 %	8 %

III. NEUROLOGICAL DISORDERS

A. SENSORY LOSS OF DIGITS

Any sensory loss or deficit that is believed to contribute to permanent impairment must be unequivocal and permanent. Impairments are estimated according to the sensory quality and its distribution on the palmar aspect of the digits. Sensory loss on the distal dorsal surface of the digits is not considered to be an impairment.

Two point discrimination test for determining sensory loss

With the patient's eyes closed, the tips of the testing device are touched lightly to the digit in the longitudinal axis. A series of touches with one or two points are made, and the subject indicates whether one or two points are felt. The distance of the tips is set first at 15 mm and this is progressively decreased. The minimum distance at which the patient can discriminate between one and two point applications is recorded. The test is carried out over the distal palmar area (from the distal phalangeal flexion crease). If there is a partial amputation, the most distal part of the digital stump is tested.

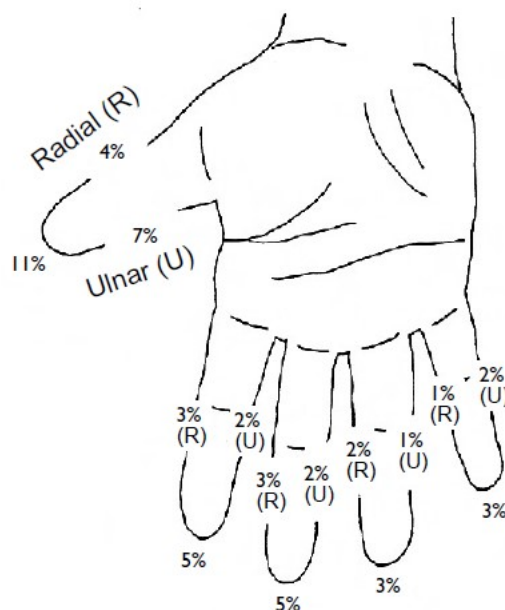
Classification of sensory quality

- a. Total sensory loss: two point discrimination > 15 mm
- b. Partial sensory loss: two point discrimination 7-15 mm
- c. No sensory loss: two point discrimination < 7 mm

Distribution of sensory loss

- a. Transverse sensory loss: both digital nerves involved
- b. Longitudinal sensory loss: one digital nerve involved (radial or ulnar side of digit)

Figure 14: Impairment due to total transverse sensory loss of digits (numbers at tips of digits) and total longitudinal sensory loss of radial and ulnar sides of digits (numbers at sides of digits). For partial sensory loss the impairment would be 50% of these numbers.



B. PERIPHERAL NERVE DISORDERS OF THE UPPER LIMB

To evaluate impairment resulting from the effects of peripheral nerve lesions, it is necessary to determine the extent of loss of function due to sensory and motor deficits.

Restricted motion, atrophy, and vasomotor, trophic, and reflex changes have been taken into consideration in the impairment percentages for peripheral nerve lesions. If restricted motion results strictly from a peripheral nerve lesion, the impairment percentages in the section on restricted motion should not be applied in addition, as this would result in duplication.

The percentage impairments given for the brachial plexus and major peripheral nerves are the maximum impairments. For partial sensory or motor loss, a value of 50% of the percent impairments can be given.

Use the combined values chart to combine impairments due to bilateral nerve involvement, multiple nerve involvement or different types of impairments.

1. Brachial plexus

Maximum impairments (%) due to unilateral sensory, motor or combined deficits of brachial plexus

Brachial plexus	Sensory	Motor	Combined
C5-C8, T1	28%	65%	75%
Upper Trunk (C5-C6)	5%	30%	34%
Middle Trunk (C7)	5%	15%	19%
Lower Trunk (C8-T1)	20%	40%	52%

2. Major peripheral nerves

Maximum impairments (%) due to unilateral sensory, motor or combined deficits of the major peripheral nerves

Nerve	Sensory	Motor	Combined
Axillary	3%	21%	23%
Median (above midforearm)	23%	26%	39%
Median (anterior interosseous branch)	.	9%	.
Median (below midforearm)	23%	6%	26%
Musculocutaneous	3%	20%	22%
Radial (upper arm with loss of triceps)	3%	25%	27%
Radial (elbow with sparing of triceps)	3%	21%	23%
Suprascapular	3%	10%	12%
Ulnar (above midforearm)	4%	28%	30%
Ulnar (below midforearm)	4%	21%	24%

3. Work-related entrapment neuropathies

As for other injuries, awards should only be given for residual permanent incapacity after all treatment has been carried out and no further improvement is expected.

Impairment (%) due to work-related entrapment neuropathies e.g. carpal tunnel syndrome and ulnar nerve entrapment neuropathy:

Mild	2%
Moderate	4%
Severe	8%

IV. OTHER DISORDERS OF THE UPPER LIMB

Some disorders are more appropriately assessed on the basis of a diagnosis. If they result in restriction of motion or ankylosis, the impairment percentages in the section on limitation of movement should not be applied in addition, as this would result in duplication.

For example, an intra-articular fracture with degenerative changes can be evaluated under this section by combining the diagnosis-based impairment (A) with that for osteo-arthritis (C). It can also be evaluated under the section on abnormal motion but not both together. The section providing the greater impairment estimate should be used.

Impairments from other associated injuries eg nerve injuries or associated shortening of limb can be combined using the combined values chart. The total percentage should not exceed that for amputation of that part of the limb.

A. FRACTURES WITH COMPLICATIONS AND DEFORMITIES AND OTHER SOFT TISSUE INJURIES

Region and condition	% Incapacity
Shoulder	
Scapular fracture (displaced)	
Undisplaced _____	1%
Displaced _____	3%
Clavicle fracture (with shortening of 2 cm) _____	2%
Glenoid fracture	
Undisplaced _____	3%
Displaced _____	6%
Humeral neck/head fracture	
Mal-union _____	4%
Non-union _____	8%
Avascular necrosis _____	12%
Humeral shaft fracture	
Healed with angulation	
Mild _____	3%
Moderate _____	6%
Severe _____	9%
Rotator cuff tears (symptomatic) _____	5%

Elbow

Olecranon fracture	
Undisplaced	3%
Mal-union	6%
Non-union	9%

Supracondylar or intercondylar fracture

Undisplaced	3%
Displaced with angulation	
Mild	4%
Moderate	8%
Severe	12%

Radial or ulnar shaft fracture

Healed with angulation

Mild	4%
Moderate	6%
Severe	9%

Wrist and hand

Distal radial (articular) fracture

Undisplaced	3%
Displaced with angulation	
Mild	4%
Moderate	8%
Severe	12%

Scaphoid or lunate fracture

Undisplaced	3%
Non-union	9%
Avascular necrosis	15%

Other carpal bone fractures

Undisplaced	2%
Displaced	4%

Metacarpal/phalangeal fracture

Healed with angulation

1 st metacarpal	6%
2 nd metacarpal	4%
3 rd metacarpal	4%
4 th metacarpal	2%
5 th metacarpal	2%

B. JOINT INSTABILITY (post-traumatic)

Impairment (%) for joint subluxation or dislocation

Joint	Subluxation	Dislocation	
	Persistent	Recurrent	Persistent (untreated)
Shoulder			
gleno - humeral	4 %	10 %	16 %
acromio - clavicular	2 %	-	6 %
sterno - clavicular	2 %	-	6 %
Elbow (ulnohumeral)	4 %	10 %	16 %
Wrist			
radiocarpal	4 %	-	12 %
distal carpal row	2 %	-	6 %
Thumb			
carpometacarpal	4 %	-	8 %
metacarpophalangeal	1 %	-	6 %
interphalangeal	1 %	-	4 %
Index and middle finger			
metacarpophalangeal	2 %	-	6 %
proximal interphalangeal	2 %	-	4 %
distal interphalangeal	1 %	-	2 %
Ring and little finger			
metacarpophalangeal	1 %	-	4 %
proximal interphalangeal	1 %	-	3 %
distal interphalangeal	0 %	-	2 %

C. OSTEO-ARTHRITIS (post-traumatic)

Classification of severity based on clinical symptoms, signs and radiological features
Impairment (%)

Joint	Mild	Moderate	Severe
Shoulder			
gleno-humeral	4%	8%	18%
acromio-clavicular	2%	4%	6%
sterno- clavicular	2%	4%	6%
Elbow (ulnohumeral)	3%	8%	16%
Proximal / Distal Radio Ulnar Joint	4%	8%	16%
Wrist			
radiocarpal	4%	8%	16%
distal carpal row	2%	6%	8%
Thumb			
carpometacarpal	3%	6%	10%
metacarpophalangeal	1%	3%	6%
interphalangeal	1%	2%	4%
Index and middle finger			
metacarpophalangeal	2%	4%	6%
proximal interphalangeal	1%	3%	5%
distal interphalangeal	1%	2%	3%
Ring and little finger			
metacarpophalangeal	1%	2%	4%
proximal interphalangeal	1%	2%	3%
distal interphalangeal	0%	1%	2%

D. CONSTRICTIVE TENOSYNOVITIS

As for other injuries, awards for impairment should only be given for residual permanent incapacity after all treatment has been carried out and no further improvement is expected. Impairment due to constrictive tenosynovitis e.g. trigger finger, De Quervains.

Mild	1%
Moderate	2%
Severe	5%

CHAPTER 4

ASSESSMENT OF THE LOWER LIMB

I. AMPUTATIONS

II. LIMITATION OF JOINT MOVEMENT (restriction of motion or ankylosis)

Involving the following joints:

- A. Hip
- B. Knee
- C. Ankle and subtalar
- D. Joints of the great toe
- E. Joints of the toes (2nd to 5th)

III. NEUROLOGICAL DISORDERS

IV. SHORTENING OF THE LOWER LIMB

V. OTHER DISORDERS OF THE LOWER LIMB

- A. Fractures With Complications and Deformities
- B. Ligamentous and Other Soft Tissue Injuries
- C. Osteoarthritis

I. AMPUTATIONS OF THE LOWER LIMB

Part amputated	Percentage impairment
Loss of both legs	} ----- 100%
Loss of both feet	
Loss of leg at or above knee	----- 75%
Loss of leg below knee	----- 65%
Loss of foot (syne)	----- 55%
Loss of midfoot	----- 35%
Loss of toes (all of one foot)	----- 20%
Loss of great toe	
Both phalanges and 1 st metatarsal	----- 23%
Both phalanges	----- 14%
One phalanx	----- 3%
Loss of 2 nd toe	
Three phalanges and 2 nd metatarsal	----- 7%
Three phalanges	----- 3%
Two phalanges	----- 2%
One phalanx	----- 1%
Loss of 3 rd toe	
Three phalanges and 3 rd metatarsal	----- 7%
Three phalanges	----- 3%
Two phalanges	----- 2%
One phalanx	----- 1%
Loss of 4 th toe	
Three phalanges and 4 th metatarsal	----- 7%
Three phalanges	----- 3%
Two phalanges	----- 2%
One phalanx	----- 1%
Loss of 5 th toe	
Three phalanges and 5 th metatarsal	----- 7%
Three phalanges	----- 3%
Two phalanges	----- 2%
One phalanx	----- 1%
Loss of metatarsals	
First	----- 10%
Second, third, fourth or fifth	----- 4%

Note:

1. Total permanent loss of the use of a member is to be treated as loss of that member.
2. Where there is loss of 2 or more parts of the limb, the percentage is not to be more than the loss of the whole limb.

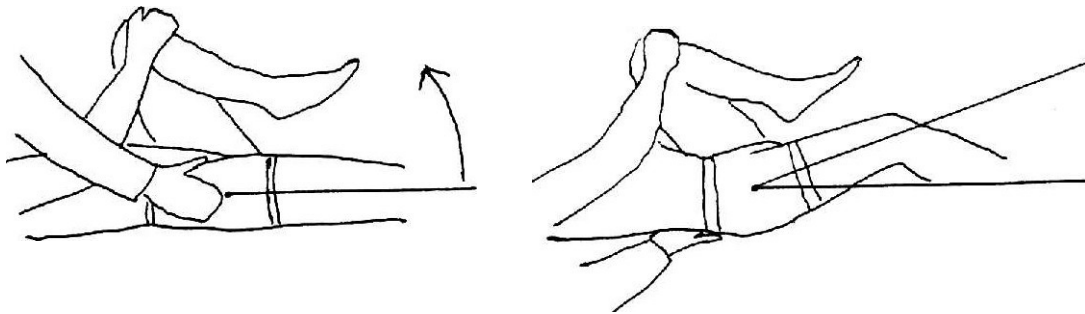
II. LIMITATION OF JOINT MOVEMENTS OF THE LOWER LIMB

A. HIP JOINT

1. Restricted Motion

The percentage incapacity due to restriction of motion in various directions for the same joint are added to give the total percentage incapacity.

Figure 15: Hip flexion and extension/flexion contracture



Measuring right hip flexion

Measuring flexion contracture of the right hip

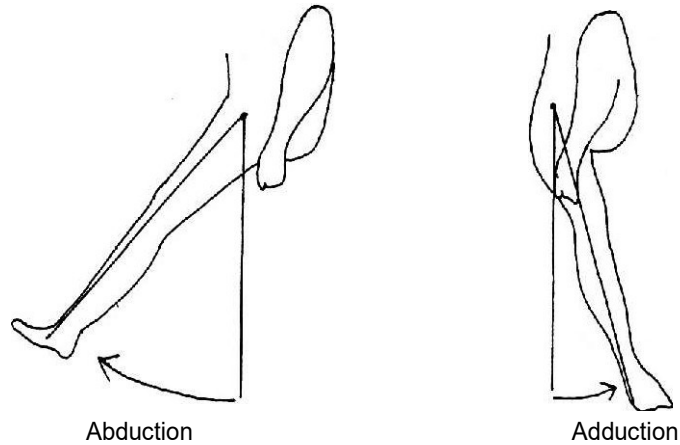
a. Active forward flexion from neutral (0°) to or arc of active forward flexion of:	% Incapacity
0°	13 %
10°	12 %
20°	10 %
30°	9 %
40°	8 %
50°	7 %
60°	6 %
70°	5 %
80°	3 %
90°	2 %
100°	0 %

b. Flexion contracture / active extension	% Incapacity
flexion contracture of:	
50°-100°	30 %
40°	20 %
30°	15 %
20°	10 %
10°	5 %
extension from neutral (0°) to:	
0°	4 %
10°	4 %
20°	2 %
30°	0 %

Example:

The hip cannot be placed in neutral position but has a flexion contracture of 30°. It can flex from 30° to 70° i.e. an arc of active flexion of 40°. An award of 8% is given for restriction of flexion. An additional award of 15% is given for the flexion contracture of 30°. The total percentage incapacity is a simple addition of 8% and 15% i.e. 23%

Figure 16: Hip abduction and adduction



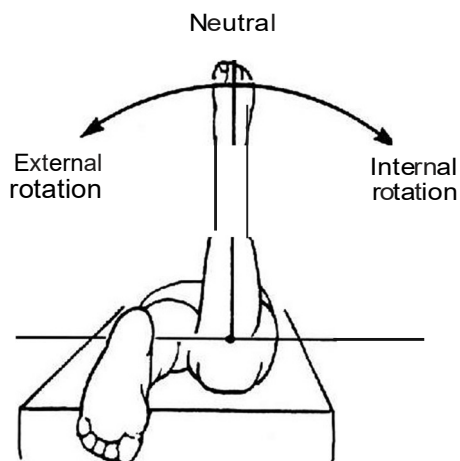
c. Active abduction from neutral (0°) to or arc of active abduction of:	% Incapacity
0°	11 %
10°	9 %
20°	6 %
30°	3 %
40°	0 %

d. Active adduction from neutral (0°) to or arc of active adduction of:	% Incapacity
0°	6 %
10°	4 %
20°	0 %

e. Active internal rotation from neutral (0°) to or arc of active internal rotation of:	% Incapacity
0°	8 %
10°	6 %
20°	4 %
30°	2 %
40°	0 %

f. Active external rotation from neutral (0°) to or arc of active external rotation of:	% Incapacity
0°	9 %
10°	8 %
20°	6 %
30°	4 %
40°	2 %
50°	0 %

Figure 17: Hip internal and external rotation



2. Ankylosis

For ankylosis in various directions involving the same joint, the largest incapacity is taken as the incapacity of that joint

a. Ankylosed in flexion at:	% Incapacity
0°	37 %
10°	33 %
20°	29 %
25° } position of function	27 %
30° } position of function	27 %
40°	32 %
50°	36 %
60°	39 %
70°	43 %
80°	46 %
90°	49 %
100°	53 %

b. ankylosed in backward extension at:	% Incapacity
0° } position of function	37 %
10°	45 %
20°	51 %
30°	56 %

c. ankylosed in abduction at:	% Incapacity
0° } position of function	37 %
10°	41 %
20°	45 %
30°	49 %
40°	53 %

d. ankylosed in adduction at:	% Incapacity
0° } position of function	37 %
10°	48 %
20°	56 %

e. ankylosed in internal rotation at:	% Incapacity
0° }position of function	37 %
10°	44 %
20°	48 %
30°	53 %
40°	56 %

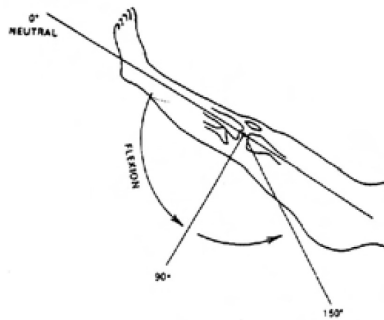
f. ankylosed in external rotation at:	% Incapacity
0° }position of function	37 %
10°	41 %
20°	43 %
30°	47 %
40°	50 %
50°	53 %

B. KNEE JOINT

1. Restricted motion

The percentage incapacity due to restriction of motion in various directions for the same joint are added to give the total percentage incapacity.

Figure 18: Knee flexion



a. Arc of active flexion of:	% Incapacity
0°	33 %
10°	31 %
20°	29 %
30°	26 %
40°	24 %
50°	23 %
60°	20 %
70°	18 %
80°	15 %
90°	13 %
100°	11 %
110°	8 %
120°	6 %
130°	4 %
140°	2 %
150°	0 %

b. Extension to: (flexion contracture)	% Incapacity
0°	0 %
10°	2 %
20°	5 %
30°	11 %
40°	17 %
50°	26 %
60°	30 %
70°	33 %
80°	35 %
90°	38 %
100°	41 %
110°	44 %
120°	48 %
130°	51 %
140°	54 %
150°	56 %

Example:

The knee cannot be placed in neutral position but starts active flexion only from 20° from the neutral position. It can flex from 20° to 80° ie an arc of active flexion of 60°. An award of 20% is given for restriction of flexion.

The knee has a limitation of extension to 20° from the neutral position. An award of 5% is given for limitation of extension.

The total percentage incapacity in this case is a simple addition of 20% and 5% i.e. 25%.

2. Ankylosis

For ankylosis in various directions involving the same joint, the largest incapacity is taken as the incapacity of that joint.

a. ankylosed in flexion at:	% Incapacity
0°	33 %
10° } position of function	32 %
20°	38 %
30°	44 %
40°	50 %
50° to 150°	56 %

b. ankylosed in varus at:	% Incapacity
0°	32 %
10°	48 %
20°	56 %

c. ankylosed in valgus at:	% Incapacity
10°	32 %
20°	48 %
30°	56 %

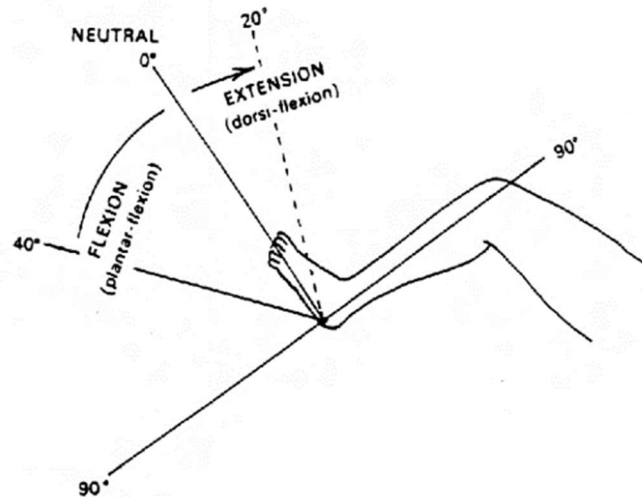
d. ankylosed in internal or external malrotation at:	% Incapacity
10°	32 %
20°	48 %
30°	56 %

C. ANKLE AND SUBTALAR JOINTS

1. Restricted Motion

The percentage incapacity due to restriction of motion in various directions for the same joint are added to give the total percentage incapacity.

Figure 19: Ankle flexion and extension



a. Active extension from neutral (0°) to or arc of active extension of:	% Incapacity
0°	6 %
10°	4 %
20°	0 %

b. Active flexion from neutral (0°) to or arc of active flexion of:	% Incapacity
0°	12 %
10°	9 %
20°	6 %
30°	3 %
40°	0 %

c. Active inversion from neutral (0°) to or arc of active inversion of:	% Incapacity
0°	4 %
10°	4 %
20°	2 %
30°	0 %

d. Active eversion from neutral (0°) to or arc of active eversion of:	% Incapacity
0°	4 %
10°	2 %
20°	0 %

2. Ankylosis

For ankylosis in various directions involving the same joint, the largest incapacity is taken as the incapacity of that joint.

a. ankylosed in extension at:

	% Incapacity
0° } position of function	14 %
10°	24 %
20°	33 %

b. ankylosed in flexion at:

	% Incapacity
0° } position of function	14 %
10°	19 %
20°	24 %
30°	29 %
40°	33 %

c. ankylosed in inversion at:

	% Incapacity
0° } position of function	14 %
10°	20 %
20°	28 %
30°	33 %

d. ankylosed in eversion at:

	% Incapacity
0° } position of function	14 %
10°	24 %
20°	33 %

D. GREAT TOE

D1. INTERPHALANGEAL JOINT

1. Restricted Motion

a. Active flexion from neutral (0°) to or arc of active flexion of:	% Incapacity
0°	2 %
10°	2 %
20°	1 %
30°	0 %

2. Ankylosis

a. ankylosed in flexion at:	% Incapacity
0° } position of function	2 %
10°	2 %
20°	2 %
30°	3 %

D2. METATARSOPHALANGEAL JOINT

1. Restricted Motion

The percentage incapacity due to restriction of motion in various directions for the same joint are added to give total percentage incapacity.

a. Active extension from neutral (0°) to or arc of active extension of:	% Incapacity
0°	6 %
10°	5 %
20°	3 %
30°	2 %
40-50°	0 %

b. Active flexion from neutral (0°) to or arc of active flexion of:	% Incapacity
0-10°	3 %
20-30°	0 %

2. Ankylosis

For ankylosis in various directions involving the same joint, the largest incapacity is taken as the incapacity of that joint.

a. Ankylosed in extension at:	% Incapacity
0°	6 %
10°}position of function	4 %
20°	6 %
30°	8 %
40°	9 %
50°	10 %

b. ankylosed in flexion at:	% Incapacity
0°	6 %
10°	8 %
20°	9 %
30°	10 %

E. TOES (2ND TO 5TH)

E1. METATARSOPHALANGEAL JOINT

1. Restricted Motion

The percentage incapacity due to restriction of motion in various directions for the same joint are added to give the total percentage incapacity.

a. Active extension from neutral (0°) to or arc of active extension of: **% Incapacity**

0 - 30°	1%
40°	0%

b. Active flexion from neutral (0°) to or arc of active flexion of: **% Incapacity**

0 - 10°	1%
20- 30°	0%

2. Ankylosis

For ankylosis in various directions involving the same joint, the largest incapacity is taken as the incapacity of that joint.

a. ankylosed in extension at: **% Incapacity**

0 - 20°	2%
30 - 40°	3%

b. ankylosed in flexion at: **% Incapacity**

0 - 20°	2%
30°	3%

E2. PROXIMAL INTERPHALANGEAL JOINT (2nd to 5th toes)

1. Restricted motion

No functional value

2. Ankylosis

a. ankylosed in:	% Incapacity
extension	3%
neutral (0°)}position of function	2%
flexion	3%

E3. DISTAL INTERPHALANGEAL JOINT (2nd to 5th toes)

1. Restricted motion

No functional value

2. Ankylosis

a. ankylosed in:	% Incapacity
extension	3%
neutral (0°)}position of function	2%
flexion (hammer toe)	3%

III. NEUROLOGICAL DISORDERS OF THE LOWER LIMB

A. THE PERIPHERAL NERVE SYSTEM

To evaluate impairment resulting from the effects of peripheral nerve lesions, it is necessary to determine the extent of loss of function due to sensory and motor deficits. Restricted motion, atrophy, and vasomotor, trophic, and reflex changes have been taken into consideration in the impairment percentages for peripheral nerve lesions.

If restricted motion results strictly from a peripheral nerve lesion, the impairment percentages in the section on restricted motion should not be applied in addition, as this would result in duplication.

The percentage impairments given for the lumbosacral plexus and major peripheral nerves are the maximum impairments. For partial sensory or motor loss, a value of 50% of the percent impairments can be given. Use the combined values chart to combine impairments due to bilateral nerve involvement, multiple nerve involvement or different types of impairments.

1. Lumbosacral plexus

Maximum impairments (%) due to unilateral sensory, motor or combined deficits

Lumbosacral plexus	Sensory	Motor	Combined
L3-S1	44 %	55 %	75 %

2. Major peripheral nerves

Maximum impairments (%) due to unilateral sensory, motor or combined deficits

Nerve	Sensory	Motor	Combined
Femoral	5 %	16 %	20 %
Obturator	-	3 %	-
Superior gluteal	-	20 %	-
Inferior gluteal	-	15 %	-
Lateral femoral cutaneous	1 %	-	-
Sciatic	15 %	30 %	41 %
Common peroneal	2 %	15 %	17 %
Superficial peroneal	2 %	-	-
Sural	1 %	-	-
Medial plantar	5 %	2 %	7 %
Lateral plantar	5 %	2 %	7 %

IV. SHORTENING OF THE LOWER LIMB

Limb length discrepancy (cm)	% incapacity
0.5	2 %
1.0	4 %
1.5	6 %
2.0	8 %
2.5	10 %
3.0	12 %
3.5	14 %
4.0	16 %
4.5	18 %
5.0	20 %
5.5	22 %
6.0	24 %
6.5	26 %
7.0	28 %
7.5 or greater	30 %

V. OTHER DISORDERS OF THE LOWER LIMB

Some disorders are more appropriately assessed on the basis of a diagnosis. If they result in restriction of motion or ankylosis, the impairment percentages in the section on limitation of movement should not be applied in addition, as this would result in duplication.

For example, an intra-articular fracture with degenerative changes can be evaluated under this section by combining the diagnosis-based impairment (A) with that for osteo-arthritis (C). It can also be evaluated under the section on abnormal motion but not both together. The section providing the greater impairment estimate should be used.

Impairments from other associated injuries eg nerve injuries or associated shortening of limb can be combined using the combined values chart. The total percentage should not exceed that for amputation of that part of the limb.

A. FRACTURES WITH COMPLICATIONS AND DEFORMITIES

Region and condition	% Incapacity
----------------------	--------------

Pelvis

Healed fracture with displacement but without residual signs involving:

Symphysis pubis (no separation) _____	2%
Sacrum _____	2%

Healed fracture with displacement, deformity, and residual signs involving:

Rami, bilateral _____	5%
Ilium _____	2%
Ischium, displaced 1 inch or more _____	6%
Symphysis pubis (separated) _____	10%
Sacrum into sacroiliac joint _____	10%
Coccyx (nonunion or excision) _____	4%

Acetabular fracture	
Undisplaced	6%
Displaced	20%

Hip

Femoral neck/head fracture	
Malunion	15%
Nonunion	18%
Avascular necrosis	20%

Femoral shaft fracture	
Healed with angulation of	
10-14 degrees	6%
15-19	8%
20 or more	10%

Knee

Patellar fracture (intra-articular)	
Undisplaced, healed	3%
Articular surface displaced > 3mm	6%
Displaced with nonunion	9%

Patellectomy	
Partial	6%
Total	9%

Plateau fracture (intra-articular)	
Undisplaced	3%
Displaced with angulation /joint	
Depression which is	
Mild	4%
Moderate	8%
Severe	12%

Supracondylar fracture	
Displaced with angulation of	
5-9 degrees	3%
10-19 degrees	5%
20 or more degrees	9%

Intercondylar fracture	
Undisplaced	6%
Displaced	12%

Tibial shaft fracture	
With malalignment of	
10-14 degrees	6%
15-19 degrees	8%
20 or more degrees	10%

Ankle and Foot**% Incapacity**

Ankle fracture	
Extra-articular with angulation of	
10-14 degrees _____	3%
15-19 degrees _____	6%
20 or more degrees _____	9%
Intra-articular with no displacement _____	6%
Intra-articular with displacement _____	12%
Calcaneal fracture (extra-articular) with angulation (varus or valgus)	
< 20 degrees _____	4%
20 or more degrees _____	8%
Intra-articular fracture with displacement	
Subtalar fracture	
Undisplaced _____	7%
Displaced _____	15%
Talonavicular	
Undisplaced _____	2%
Displaced _____	5%
Calcaneocuboid	
Undisplaced _____	2%
Displaced _____	5%
Midfoot deformity resulting from fracture e.g. Lisfranc's fracture Cavus	
Mild _____	2%
Moderate _____	5%
Rocker bottom	
Mild _____	3%
Moderate _____	6%
Severe _____	9%
Talus fracture	
Undisplaced _____	5%
Displaced _____	8%
Non-union _____	10%
Avascular necrosis _____	15%
Metatarsal fracture with dorsal or plantar angulation	
1 st metatarsal _____	4%
2 nd metatarsal _____	2%
3 rd metatarsal _____	2%
4 th metatarsal _____	2%
5 th metatarsal _____	3%
Phalangeal fractures with angulation	
Big toe _____	2%
2 nd toe _____	1%
3 rd toe _____	1%
4 th toe _____	1%
5 th toe _____	1%

B. LIGAMENT AND OTHER SOFT TISSUE INJURIES

Knee **% Incapacity**

Patellar subluxation _____	3%
Dislocation (recurrent) _____	8%
Meniscectomy, medial or lateral	
Partial _____	2%
Total _____	7%
Meniscectomy, medial and lateral	
Partial _____	6%
Total _____	10%

Ligament injuries of the knee

Anterior cruciate ligament laxity	
Mild _____	5%
Moderate _____	8%
Severe _____	12%
Posterior cruciate ligament laxity	
Mild _____	5%
Moderate _____	7%
Severe _____	10%
Medial collateral ligament laxity	
Mild _____	3%
Moderate _____	5%
Severe _____	7%
Lateral collateral ligament laxity	
Mild _____	3%
Moderate _____	5%
Severe _____	7%

Ankle **% Incapacity**

Ligamentous instability	
Mild _____	3%
Moderate _____	5%
Severe _____	8%

C. OSTEO-ARTHRITIS (POST-TRAUMATIC)

Classification of severity is based on symptoms, signs and radiological features
Impairment (%)

Joint	Mild	Moderate	Severe
Sacroiliac	2 %	6 %	12 %
Hip	5 %	10 %	20 %
Knee	5 %	10 %	20 %
Patellofemoral	4 %	6 %	10 %
Ankle	4 %	8 %	12 %
Subtalar	2 %	6 %	10 %
Talonavicular	1 %	4 %	6 %
Calcaneocuboid	1 %	4 %	6 %
Tarso-metatarsal	2 %	4 %	8 %
First metatarsal - phalangeal	1 %	2 %	5 %
Second metatarsal - phalangeal	0 %	1 %	3 %
Third metatarsal - phalangeal	0 %	1 %	3 %
Fourth metatarsal - phalangeal	0 %	1 %	3 %
Fifth metatarsal - phalangeal	0 %	1 %	3 %

CHAPTER 5 ASSESSMENT OF THE SPINE

	Cervical (C1 – C7)	Thoraco-Lumbar (T1 – L1)	Lumbo-Sacral (L2 – S1)
1. FRACTURES AND DISLOCATIONS* Compression or burst fractures of 25% or more of height loss, dislocations or fracture dislocations, healed fractures a. With mild sensory and motor manifestations b. With persistent radicular pain and/or localised motor weakness c. With paraparesis or tetraparesis (ASIA D ¹)** d. With paraparesis or tetraparesis (ASIA C ¹)** e. With paraplegia or tetraplegia (ASIA B ¹ and A ¹) Compression or burst fractures of >25% with residual pain Compression or burst fractures of <25% with residual pain <i>Note: *a - d with neurogenic bladder and/or bowel condition - add 10-25% (see table below²)</i> <i>** c - d with monoparesis - disability award to be divided by 2</i>	20% 25% 70% 100% 100% 15% 5%	15% 20% 50% 100% 100% 10% 5%	20% 25% 50% 70% 100% 15% 5%
2. SPINAL CORD*/ CENTRAL CORD*/ CAUDA EQUINA INJURY* Without fractures or dislocations but involving the cord, single/multiple nerve roots a. With mild sensory and motor manifestations b. With persistent radicular pain and/or localised motor weakness c. With paraparesis or tetraparesis (ASIA D ¹)** d. With paraparesis or tetraparesis (ASIA C ¹)** e. With paraplegia or tetraplegia (ASIA B ¹ and A ¹) <i>Note: *a - d with neurogenic bladder and/or bowel condition - add 10-25% (see table below²)</i> <i>**c - d with monoparesis - disability award to be divided by 2</i>	20% 25% 70% 100% 100%	15% 20% 50% 100% 100%	20% 25% 50% 70% 100%
3. INTERVERTEBRAL DISC* 3.1 Prolapsed intervertebral disc With single/multiple nerve roots manifestations, without spinal cord involvement a. Residual pain, acceptable level of discomfort b. Persistent pain and restriction of motion with no neurological deficit c. Persistent pain and restriction of motion with sensory deficit d. Persistent pain and restriction of motion with motor deficit, or motor and sensory deficit 3.2 Degenerated disc with documented superimposed injury (e.g. annular fissure, internal disc disruption, disc bulge) a. Residual pain, acceptable level of discomfort b. Persistent pain and restriction of motion with appropriate neurological symptoms <i>Note: *if cervical or thoracic cord is involved, refer to Section 2.</i>	10% 15% 20% 25% 5% 10%	10% 15% 15% 20% 5% 10%	10% 15% 20% 25% 5% 10%
4. LUMBAR SPONDYLOLYSIS / SPONDYLOLISTHESIS Acute traumatic lesion Assess as for fractures and dislocations above Pre-existing lesion (With documented superimposed injury) a. Residual pain, acceptable level of discomfort b. Chronic or recurrent pain	- -	- -	5% 10%
5. CHRONIC PAIN SYNDROME WITH NORMAL MRI a. Residual pain attributable to the injury b. Residual pain not attributable to the injury	3% 0%	3% 0%	3% 0%

Note: The term “pain” in Sections 3-5 may refer to both radicular and/or axial pain.

CHAPTER 5

ASSESSMENT OF THE SPINE

¹ American Spinal Injury Association (ASIA) Impairment Scale (modified from the Frankel classification)		
D	Incomplete	Motor function is preserved below the neurologic level of injury and most key muscles have a muscle grade ≥ 3
C	Incomplete	Motor function is preserved below the neurologic level of injury and most key muscles have a muscle grade < 3
B	Incomplete	Sensory, but not motor function, is preserved below the neurologic level of injury and extends through to S4 – S5
A	Complete	No sensory or motor function is preserved below the neurological level of injury and extends through to S4 – S5

² Neurogenic bladder or bowel incontinence		
Incomplete incontinence	Bladder or bowel only	10%
Incomplete incontinence	Bladder and bowel	15%
Complete incontinence	Bladder or bowel only	20%
Complete incontinence	Bladder and bowel	25%

Note: The maximum awardable disability is 100% even if total of the disability exceeds 100%.

Additional compensation of 25% will be awarded for patients with Permanent Total Incapacity of 100%

Under the First Schedule of the Work Injury Compensation Act, “where the injured employee is certified by a medical practitioner to have suffered from permanent total incapacity, additional compensation shall be paid amounting to one quarter of the amount which is otherwise payable.”

Injury which falls in more than one category

Where the injury falls in more than one category, the category providing the higher award should be used.

Example:

A shipyard worker who was working on a scaffold, fell and landed on his back. He sustained a burst fracture L2 vertebral (> 25%). He was operated on successfully and there were no complications. Assessment at 6-months revealed a healed fracture with motor function preserved below the L2 level and most key muscles had power of grade < 3 (ASIA C) and residual pain from the healed fracture.

His permanent incapacity from ASIA C of the lower limbs is 70% and due to residual pain from the burst fracture is 15%. He should be awarded 70% permanent incapacity, which is the higher of the two.

Example:

A courier driver slipped and fell while moving a 10kg box. He hit his forehead on the floor and sustaining a hyperextension injury of his neck. He presented with weakness below the elbow in both upper limbs and mild sensory deficit in the lower limbs, which was consistent with the diagnosis of central cord syndrome. He was treated non-operatively and recovered partially.

Assessment at the end of 4-months revealed that he had severe motor weakness of his right hand and complete urinary incontinence. His permanent incapacity from the motor weakness due to cervical cord involvement without fracture or dislocation of the cervical spine should be awarded 25% permanent incapacity and complete urinary incontinence should be awarded 20%. His total permanent incapacity will be 45%.

Example:

A 35 year old driver who was driving goods in company van to the customer’s place and was hit from the rear by another lorry. He subsequently was able to walk but had worsening neck pain with radiation to trapezius muscles. His MRI did not demonstrate any abnormalities but he continued to have persistent pain which affected his employment. He would be awarded 3% based on residual pain attributable to the injury.

Example:

For non-contiguous segment of the spine being injured in the same accident resulting in disability of the injured employee. The assessing doctor strongly feels both the conditions are contributing to the injured employee’s disability, then one should use the combined value chart.

A 35 year old scaffold worker fell off from height resulting in burst fractures involving C6 and L2 vertebrae (both > 25% height loss). The C6 fracture was managed operatively. The L2 fracture was managed non-operatively. Assessment at 6 months revealed that the C6 fracture has healed but the worker was left with most key muscles having power of grade > 3 (ASIA D) and the L2 fracture has healed but residual pain remains. His permanent incapacity from the muscle weakness resulting from the C6 fracture (ASIA D) is 70% and due to residual pain from the healed fracture of L2 is 15%. He should be awarded 75% permanent incapacity for both injuries according to the Combined values chart.

CHAPTER 6

ASSESSMENT OF THE RESPIRATORY FUNCTION

INTRODUCTION

This chapter provides criteria for evaluating permanent impairment of respiratory function. Respiratory function may be impaired following a traumatic accident, acute inhalational injury, infection or chronic lung diseases. Examples of compensable occupational diseases that may affect respiratory function include asbestosis, silicosis, occupational asthma, pulmonary tuberculosis, severe acute respiratory syndrome and avian influenza.

ASSESSMENT OF PERMANENT/CURRENT INCAPACITY

Clinical Signs and Symptoms

While it is important to obtain the relevant history and carry out the appropriate clinical examination, the following points are only highlighted with respect to the quantitative assessment of the patient.

Dyspnoea: Specific questions should be asked as to whether or not dyspnoea is increasing in severity, because one of the manifestations of reduced lung function and impairment is shortness of breath. The severity of dyspnoea can be estimated by obtaining information about activities that lead to shortness of breath, such as the distance walked, the number of flights of stairs climbed, etc. The causes of dyspnoea are multiple and complex. The symptom of dyspnoea should be considered along with other physiological and personal factors.

Investigations

Chest x-rays: The minimum radiographic examination should consist of a full-size posterior-anterior (PA) film taken on deep inspiration. No correlation between ability to work and radiographic findings has been noted. The 1980 ILO U/C Classification of Pneumoconiosis should be used in describing radiographic findings in cases of asbestosis and silicosis. The profusion of a case of asbestosis/silicosis should be at least 1/1 for an award to be given.

Pulmonary Function Tests:

The spirometric tests should be performed as described in the 2005 ATS Statement on Standardization of Lung Function Testing. The equipment, methods of calibration, and techniques should meet the ATS criteria. The spirogram that is technically acceptable and demonstrates the best efforts by the patient should be used to calculate the Forced Expiratory Volume in the first second (FEV₁) and Forced Vital Capacity (FVC).

If a reversible respiratory condition is present, patient should be evaluated after receiving optimum therapy or when in optimum health. If wheezing or other evidence of bronchospasm is evident at the time of examination, the ventilatory studies should be done before and after the administration of a bronchodilator. The spirogram indicating the best effort, after administration of the bronchodilator should be used to calculate the FEV₁ and FVC.

The patient's spirometry results should be compared to predicted "normal" values for FVC and FEV₁.

The Diffusing Capacity of Carbon Monoxide (DLCO) is useful for evaluating patients with restrictive disease and should be carried out as described by the ATS. The results should be compared to predicted “normal” values.

Interpretations of FVC, FEV₁ and DLCO are given in the table below. At least one of these measures of pulmonary function should be abnormal to the degree described in a given class definition if an impairment is to be rated in that class.

Cardiopulmonary Exercise Testing:

Cardiopulmonary exercise testing is sometimes useful in assessing whether a person's complaint of dyspnoea is a result of respiratory or other conditions. They should be used selectively and not done routinely on every case. Usually they are not done on individuals with normal pulmonary function tests. They may be indicated in selected cases who are symptomatic (e.g. when resting pulmonary function tests do not correlate with the individual's symptoms). Note that there are medical contraindications such as unstable cardiac disease.

CRITERIA FOR EVALUATION PERMANENT/CURRENT INCAPACITY

The criteria for rating permanent/current incapacity is given in the table below. To be placed in a specific class, an individual need not meet all the criteria of that class. Overlapping of the symptoms of dyspnoea and of physiologic test results is inevitable. In determining the incapacity, the examiner should give more weight to objective findings than to subjective symptoms. The final incapacity may be expressed in terms of the nearest 5%.

A minimum degree of incapacity of 10% for radiologically definite asbestosis and silicosis cases may be awarded even if they are asymptomatic and the pulmonary function tests are apparently normal.

Occupational asthma cases who require daily maintenance medication to control their symptoms despite having been transferred from further exposure to the causative agent for one year or more and who in the opinion of the assessing physician are unlikely to improve further, may be considered mildly impaired even though their FEV₁ exceeds 80% predicted. These cases could be awarded an incapacity of 5 - 20% depending on the minimum medication required to maintain control as follows:

- | | | |
|---|---|-----|
| i) bronchodilators only | : | 5% |
| ii) low dose inhaled steroids | : | 10% |
| iii) high dose (>800 micrograms /day) inhaled steroid or inhaled combination therapy (e.g. inhaled long beta2agonist plus inhaled steroids) | : | 15% |
| iv) oral steroids | : | 20% |

Classification of Respiratory Incapacity

Tests of Pulmonary Function*	0% (no impairment)	10-25% (mild impairment)	30-45% (moderate impairment)	50-100% (severe impairment)
FVC	≥ 80% of predicted and	≥ 60% to < 80% of predicted or	≥ 51% to < 60% of predicted or	≤ 50% of predicted or
FEV₁	≥ 80% of predicted and	≥ 60% to < 80% of predicted or	≥ 41% to < 60% of predicted or	≤ 40% of predicted or
DLCO	≥ 80% of predicted or	≥ 60% to < 80% of predicted or	≥ 41% to < 60% of predicted or	≤ 40% of predicted or
Vo₂ Max** mL/(kg.min)	≥ 25	≥ 20 and < 25	≥ 15 and < 20	<15

* FVC is Forced Vital Capacity. FEV₁ is Forced Expiratory Volume in the first second and DLCO is the diffusing capacity of carbon monoxide.

** Cardiopulmonary Exercise Testing should only be done when indicated. Vo₂max is the maximum oxygen consumption.

CHAPTER 7

ASSESSMENT OF THE RENAL FUNCTION

INTRODUCTION

This chapter provides criteria for evaluating permanent impairment of renal function. Renal function may be damaged following a traumatic accident, infection or poisoning. Examples of compensable diseases that may affect renal function include leptospirosis and poisoning by arsenic, cadmium, lead and mercury.

ASSESSMENT OF PERMANENT/CURRENT INCAPACITY

In the assessment of renal dysfunction, the following should be considered:

Clinical Symptoms and Signs

These may include changes in micturition, edema, impairment of physical stamina, loss of weight and appetite, anemia, uremia, loin, abdominal or costovertebral pain, chills and fever, hypertension and its complications and abnormalities in the appearance of the urine or its sediments.

Laboratory Investigations

- (i) One or more abnormal biochemical test(s) used to assess various function of the kidneys

e.g. - urine microscopy

- serum creatinine
- serum urea
- 24-hour endogenous creatinine clearance
- 24-hour urinary protein
- maximal osmolar concentration
- dilution test
- acidification test
- urine and serum osmolality
- urine and serum beta-2 microglobulin
- glomerular filtration rate (GFR)

- (ii) Abnormal ultrasound or radiological findings e.g. reduced kidney size, tumour, renal calculi.

Where necessary, a renal biopsy may be carried out.

Staging of Chronic Kidney Disease

Chronic kidney disease is defined as either kidney damage or decreased kidney function (decreased GFR) for 3 or more months i.e.

1. Kidney damage for 3 months, as defined by structural or functional abnormalities of the kidney, with or without decreased GFR
 - Pathological abnormalities
 - Markers of Kidney damage (including abnormalities in blood, urine or imaging tests)or
2. GFR < 60 ml/min/1.73 m² for >3 months with or without kidney damage

It can be staged as follows:

Stages of Chronic Kidney Disease*

Stage	Description	GFR, mL/min per 1.73 m ²
1	Kidney damage with normal or increased GFR	• 90
2	Kidney damage with mild decreased GFR	60-89
3	Moderately decreased GFR	30-59
4	Severely decreased GFR	15-29
5	Kidney failure	<15

* National Kidney Foundation: K/DOQI Clinical Practice Guidelines for Chronic Kidney Disease: Evaluation, classification, and stratification, Am J Kidney Dis 39:S1- S246, 2002 (suppl 1)

CRITERIA FOR EVALUATING PERMANENT/CURRENT INCAPACITY

The criteria for rating permanent/current incapacity is given in the table below. To be placed in a specific class, an individual need not meet all the criteria of that class. Overlapping of classes is inevitable. In determining the class of impairment, the assessing physician should give more weight to objective findings eg. abnormal biochemical test results, anaemia, oedema, etc. than to subjective findings eg. loss of appetite, impaired physical stamina. In the event that the creatinine clearance, serum creatinine levels or chronic kidney disease staging fall into different classes, the higher class of impairment will be taken. The final impairment value may be expressed to the nearest 5%.

If the kidney damage is from a potential number of causes e.g. diabetes mellitus, glomerulonephritis, it should be assumed that each potential injurious factor is responsible for part of the damage.

A provisional award is to be given during the first assessment with a re-assessment six months later. A final award is given after the incapacity has stabilised and no further deterioration or improvement is likely in the future, despite all practicable medical or surgical treatment has been given.

Classification of Renal Incapacity

Percentage Incapacity	0-10%	11-30%	31-60%	61-100%
Signs and Symptoms	None or intermittent not requiring treatment	Objective clinical evidence of dysfunction Necessitating continuous surveillance and frequent treatment	Objective clinical evidence of dysfunction Incompletely controlled by surgical or continuous medical treatment	Objective clinical evidence of dysfunction Persisting despite surgical or continuous medical treatment
Investigations				
Serum Creatinine (µmol/L)				
Male	111-138	139-178	179-283	> 284
Female	86-113 or	114-153 or	154-268 or	> 269 or
Creatinine Clearance (ml/min)	60 - 69 or	45 – 59 or	30 – 44 or	< 30 or
Stages of Chronic Kidney Disease *	Stage 1	Stage 2	Stage 3	Stage 4 and 5

* As defined in the text and according to the table given earlier

NB: The individual with a solitary kidney, regardless of cause, should be rated as having 10% permanent incapacity. The value is to be combined with any other permanent incapacity pertinent to the case under consideration.

CHAPTER 8

ASSESSMENT OF GASTRO DIGESTIVE TRACT FUNCTION

INTRODUCTION

This chapter provides criteria for evaluating permanent impairments of the digestive system, consisting of the alimentary canal, pancreas, liver and biliary tract. A permanent impairment is any anatomic, physiological or functional abnormality or loss that remains after maximum medical improvement.

ASSESSMENT OF PERMANENT/CURRENT INCAPACITY

The table below summarises the use of clinical and laboratory investigations in the assessment of permanent incapacity of gastro digestive tract disorders.

Disorder	History & Relevant Symptoms	Clinical Assessment	Functional Assessment	Assessment of End - Organ Damage	Diagnosis (es)
General Refer to criteria for upper digestive tract	Gastrointestinal symptoms (eg change in appetite, pain, diarrhoea) and general symptoms; impact of symptoms on function and ability to do daily activities. Prognosis if change anticipated Review of medical history	Comprehensive physical examination; detailed GI system assessment	Data derived from relevant studies (eg, barium swallow, upper and lower endoscopy)	Include assessment of sequelae, including end-organ damage and impairment	Record of pertinent diagnosis(es); note if they are at maximal medical improvement; if not, discuss under what conditions and when stability is expected
Oesophageal Disease Refer to criteria for upper digestive tract	Dysphagia for which solids and/or liquids G-E reflux Previous proximal gastrectomy or interposition surgery Need for dilations and/or medications History of aspiration Limitation of physical activity	Evidence of weight loss Duration of symptoms Evidence of scleroderma or other mesenchymal disease Previous motility studies for achalasia or diffuse spasm	Location and degree of stricture Is proximal oesophagus dilated? Endoscopic appearance and biopsy results	Motility studies if indicated Response to therapy Need for oesophageal stent or interposition surgery Frequency of dilations	GERD with inflammatory stricture Barrett's oesophagus with or without malignant change Stricture secondary to scleroderma Achalasia, diffuse spasm, Zenker's diverticulum
Stomach Diseases Refer to criteria for upper digestive tract	Vomiting, weight loss, post gastrectomy dumping symptoms; family history of ulcer or endocrinopathy Persistent ulcer giathesis despite treatment Any history of use of ulcerogenic drugs (NSAIDS, ASA) Limited physical activity	Weight loss, diabetes with neuropathy	Size of gastric pouch Location and function of gastrojejunal anastomosis Endoscopic evaluation of structures Motility studies	Response to dietary management Trial of antisecretory drugs, prokinetic agents	Postgastrectomy state Diabetic gastroparesis Possible Zollinger-Ellision syndrome Paraesophageal hernia with gastric volvulus
Small Intestine Disease Refer to criteria for upper digestive tract	Diarrhoea (frequency, nocturnal); abdominal colic and distention History of volvulus Haemorrhage Family history of celiac sprue, motility disorder Weight loss Previous surgery Limited activity	Note weight loss Abdominal distention, masses Perianal disease Arthropathy Presence of dermatitis herpetiformis	Barium studies Possible enteroclysis study, jejunal cultures, and mucosal biopsy Antigliadin antibody Motility studies Amount of intact small intestine (estimate whether more or less than 200cm)	Effects of malabsorption of iron, B ₁₂ , folate tetany Failure to grow Response to gluten restriction, steroids Parenteral nutrition	Celiac sprue possible lymphoma complication Regional enteritis; Crohn's; ischaemic bowel disease Radiation enteritis Chronic pseudo-obstruction (adhesions)

<p>Pancreatic Disease</p> <p>Refer to criteria for upper digestive track</p>	<p>History of acute pancreatitis (documented)</p> <p>Frequency; duration; associated jaundice, nausea, anorexia; alcohol intake, adequacy of pain control</p> <p>GI bleeding (consider splenic vein thrombosis)</p> <p>Associated chronic lung disease (think of cystic fibrosis)</p>	<p>Abdominal masses, fistulae; previous gallstones; evidence of weight loss; jaundice</p>	<p>Ultrasound pancreas and biliary tract</p> <p>Consider transduodenal ultrasound, CT scan, ERCP, measure of steatorrhea, plain film of abdomen for calcification</p> <p>Sweat Na+ to exclude cystic fibrosis</p>	<p>Degree of fat maldigestion and malabsorption</p> <p>Presence of diabetes mellitus</p> <p>Need for pain control, including celiac plexus and/or splanchnic block</p>	<p>Alcohol pancreatitis</p> <p>Chronic relapsing pancreatitis</p> <p>Pancreatitis secondary to biliary tract disease</p> <p>Cystic fibrosis</p>
<p>Large Intestine Disease</p> <p>Refer to criteria for colon, rectum and anus</p>	<p>History of previous colon surgery (length remaining, nature of anastomoses)</p> <p>Bleeding; need for transfusions</p> <p>Stool frequency, pattern (nocturnal incontinence)</p> <p>Abdominal pain</p> <p>Weight loss</p> <p>Limited activity</p>	<p>Abdominal masses</p> <p>Perianal disease</p> <p>Fistulae arthropathy</p>	<p>Sigmoidoscopy; colonoscopy</p> <p>Possible barium studies; mucosal biopsies</p> <p>Defecation studies; motility; possible EMG of sphincter activity</p>	<p>Uncontrollable diarrhoea; intractable constipation</p> <p>Megacolon</p>	<p>Inflammatory bowel disease; ulcerative colitis; Crohn's disease; colectomy with ileostomy or ileoanal pouch anastomosis</p>
<p>Liver disease</p> <p>Refer to criteria for liver Disease</p>	<p>Alcohol intake (past, present)</p> <p>Previous use of hepatotoxic drugs</p> <p>Presence of ascites, oedema jaundice, iron overload (multiple transfusions)</p> <p>History of GI haemorrhage</p> <p>Pruritus; primary biliary cirrhosis</p> <p>Limited physical activity</p>	<p>Cutaneous and ocular signs of chronic liver disease</p> <p>Ascites; oedema; skin pigmentation (haemochromatosis)</p> <p>Evidence of previous surgery in region of liver</p> <p>Kayser-Fleischer rings in eyes</p> <p>Evidence of ulcerative colitis</p> <p>Xanthomata</p>	<p>Nutritional status, including haemoglobin, protein, PTT</p> <p>Platelets</p> <p>Etiologic studies, including complete hepatitis serology markers</p> <p>Renal function</p> <p>HIV studies</p> <p>Diabetes if haemochromatosis (serum iron and ferritin saturation antitrypsin)</p> <p>Antimitochondrial antibody; exclude genetic and infiltrative diseases (eg, amyloidosis, sarcoidosis, polycystic disease)</p> <p>Copper studies</p>	<p>CNS tolerance to haemorrhage</p> <p>Fluid and salt overload</p> <p>Possible pancreatic insufficiency</p> <p>Secondary development of hepatoma</p> <p>Intractable prothrombin time prolongation; platelet deficiency; leukopenia</p>	<p>Alcoholic liver disease; cirrhosis; hepatoma; posthepatic cirrhosis (previous HBV, HCV); haemochromatosis; Wilson's disease</p> <p>Primary biliary cirrhosis</p> <p>Sclerosing cholangitis</p> <p>Toxic hepatitis</p> <p>Liver angiosarcoma</p>
<p>Biliary Tract Disease</p> <p>Refer to criteria for biliary tract Disease</p>	<p>Previous biliary tract surgery</p> <p>Episodes of cholecystitis, biliary colic, jaundice</p> <p>Family history of bilirubin metabolism disorder</p> <p>Bleeding; pruritus</p>	<p>Previous attempts at dissolution therapy and or lithotripsy</p> <p>Jaundice</p> <p>Presence of scratch marks</p> <p>Splenomegaly</p> <p>Abdominal fistula</p>	<p>Ultrasound studies</p> <p>ERCP</p> <p>Transhepatic cholangiography if needed</p> <p>Prothrombin time</p>	<p>Persistent hyperbilirubinemia after obstruction relieved</p> <p>Findings at surgery</p>	<p>Biliary tract structure; impacted stones; sclerosing cholangitis</p> <p>Primary biliary cirrhosis</p>
<p>Hernia</p> <p>Refer to criteria for herniation</p>	<p>Discomfort, pain associated with postural changes</p> <p>Limited physical activity</p>	<p>Abdominal protrusion or swelling</p>	<p>X-ray; CT scan</p>	<p>Possible incarceration or strangulation of bowel or omentum</p>	<p>Abdominal wall hernia; umbilical hernia; incisional hernia; inguinal hernia; femoral hernia</p>

CRITERIA FOR EVALUATING PERMANENT/CURRENT INCAPACITY

Upper Digestive Tract (Oesophagus, Stomach and Duodenum, Small Intestine and Pancreas)

Criteria for Rating Permanent Impairment Due to Upper Digestive Tract Disease

0-9%	10-24%	25-49%	50-75%
<p>Symptoms or signs of upper digestive tract disease, or anatomic loss or alteration and</p> <p>continuous treatment not required and</p> <p>maintains weight at desirable level* or</p> <p>no sequelae after surgical procedures</p>	<p>Symptoms and signs of upper digestive tract disease, or anatomic loss or alteration and</p> <p>requires appropriate dietary restrictions and drugs for control of symptoms, signs, or nutritional deficiency and</p> <p>weight loss below desirable weight but does not exceed 10%</p>	<p>Symptoms and signs of upper digestive tract disease, or anatomic loss or alteration and</p> <p>appropriate dietary restrictions and drugs do not completely control symptoms, signs or nutritional state or</p> <p>10%-20% weight loss below desirable weight due to upper digestive tract disorder</p>	<p>Symptoms and signs of upper digestive tract disease, or anatomic loss or alteration and</p> <p>symptoms uncontrolled by treatment or</p> <p>greater than 20% weight loss below the desirable weight due to upper digestive tract disorder</p>

*Refer to Asian Classification to define weight category (MOH Clinical Practice Guidelines 5/2004: Obesity)

Colonic, Rectal and Anal Disorders

Criteria for Rating Permanent Impairment Due to Colonic and Rectal Disorders

0-9%	10-24%	25-49%	50-75%
<p>Signs and symptoms of colonic or rectal disease infrequent and of brief duration and</p> <p>limitation of activities, special diet, or medication not required and</p> <p>no systemic manifestations present, and weight and nutritional state can be maintained at desirable level or</p> <p>no sequelae after surgical procedures</p>	<p>Objective evidence of colonic or rectal disease or anatomic loss or alteration and</p> <p>mild gastrointestinal symptoms with occasional disturbances of bowel function, accompanied by moderate pain and</p> <p>minimal restriction of diet or mild symptomatic therapy may be necessary and</p> <p>no impairment of nutrition results</p>	<p>Objective evidence of colonic or rectal disease or anatomic loss or alteration and</p> <p>moderate to severe exacerbations with disturbance of bowel habit, accompanied by periodic or continual pain and</p> <p>restriction of activity, special diet, and drugs required during attacks and</p> <p>constitutional manifestations (fever, anaemia, or weight loss)</p>	<p>Objective evidence of colonic or rectal disease or anatomic loss or alteration and</p> <p>persistent disturbances of bowel function present at rest with severe persistent pain and</p> <p>complete limitation of activity, continued restriction of diet, and medication do not entirely control symptoms and</p> <p>constitutional manifestations (fever, weight loss, or anaemia) present or</p> <p>no prolonged remission</p>

Criteria for Rating Permanent Impairment Due to Anal Disease

0-9%	10-19%	20-35%
Signs of organic anal disease or anatomic loss or alternation or mild incontinence involving gas or liquid stool or anal symptoms mild, intermittent, and controlled by treatment	Signs of organic anal disease or anatomic loss or alternation and moderate but partial faecal incontinence requiring continual treatment or continual anal symptoms incompletely controlled by treatment	Signs of organic anal disease and anatomic loss or alternation and complete faecal incontinence or signs of organic anal disease and severe anal symptoms unresponsive or amenable to therapy

Liver and Biliary Tract Disease

Criteria for Rating Permanent Impairment Due to Liver Disease

0-14%	15-29%	30-49%	50-95%
Persistent liver disease (ie persistently abnormal biochemical tests); no symptoms of liver disease and no history of ascites, jaundice, or bleeding oesophageal varices within 3 years and good nutrition and strength and biochemical studies indicate minimal disturbance in function (with normal PT/PTT)	Objective clinical evidence of chronic liver disease*; no liver disease symptoms and no history of ascites, jaundice, or bleeding oesophageal varices within 3 years and good nutrition and strength and biochemical studies indicate more severe liver damage (with normal PT/PTT)	Objective evidence of progressive chronic liver disease or history of jaundice, ascites, or bleeding oesophageal or gastric varices within past year and Possibly affected nutrition and strength or intermittent hepatic encephalopathy	Objective evidence of progressive chronic liver disease or persistent jaundice or bleeding oesophageal or gastric varices, with central nervous system manifestations of hepatic insufficiency or presence of hepatic tumours and poor nutritional state

*Objective clinical evidence of chronic liver disease includes spider naevi, palmar erythema, hepatosplenomegaly, signs of portal hypertension.

Criteria for Rating Permanent Impairment Due to Biliary Tract Disease

0-14%	15-29%	30-49%	50-95%
Occasional biliary tract dysfunction episode	Recurrent biliary tract impairment, irrespective of treatment	Irreparable biliary tract obstruction with recurrent cholangitis	Persistent jaundice; progressive liver disease due to common bile duct obstruction

Herniation

Criteria for Rating Permanent Impairment Due to Herniation

0-9%	10-19%	20%-30%
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 most activities of daily living	Palpable defect in supporting structures of abdominal wall and frequent or persistent protrusion at site of defect with increased abdominal pressure; manually reducible or frequent discomfort, precluding heavy lifting but not hampering some activities of daily living	Palpable defect in supporting structures of abdominal wall and persistent, irreducible, or irreparable protrusion at site of defect and limitation in activities of daily living

CHAPTER 9

ASSESSMENT OF HEARING

INTRODUCTION

Hearing loss can result from accidents or injuries sustained at work eg following a blast injury, head injury or barotrauma. In such cases, there is a specific incident and the hearing loss is sudden and may be accompanied by pain, bleeding, tinnitus or giddiness. The hearing loss may be unilateral or bilateral and it may or may not improve over time. The worker may also be entitled to temporary disability benefits such as medical leave and paid medical expenses.

Hearing loss can also result gradually over a period of time as a result of prolonged exposure to excessive noise at work, resulting in noise induced deafness. By definition, the hearing loss is bilateral.

ASSESSMENT OF PERMANENT/CURRENT INCAPACITY

1. Associated tinnitus is not compensable.
2. The assessment should be carried out when the hearing loss is stabilised and not expected to improve further.
3. The assessment is based on the pure tone audiogram.
4. The audiometric examination should be conducted in a proper acoustic environment* by a trained person. There should be at least a 14 hour noise free period prior to the examination to exclude temporary threshold shift.
5. The assessment is based on the hearing thresholds for air-conduction.
6. The AHL of the thresholds for 1,2 or 3 kHz is taken.
7. Compensation is only payable for hearing loss levels of 50 dB or above (averaged over 1,2 or 3 kHz)
8. Comparison should be made with any pre-incident or previous audiogram records where these are available.

*complying with the following standards for background noise:

frequency	(Hz)	500	1000	2000	3000	4000	6000
	dBA	18	26	36	39.5	38.5	40

CRITERIA FOR EVALUATING PERMANENT/CURRENT INCAPACITY

Noise Induced Deafness

Diagnosis and classification of noise induced deafness

The diagnosis of noise induced deafness is based on:

1. an audiogram consistent with the diagnosis i.e. showing bilateral sensorineural hearing loss (>30 dB) affecting more but not limited to the higher frequencies (ie 4 or 6 kHz).
2. the exclusion of other causes of hearing loss.
3. an adequate history of occupational exposure to high noise levels.

Cases of noise induced deafness may be classified into:

1. Noise Induced Deafness (early)

These are cases which have an occupational history of exposure to noise of 5 years or more. However, the audiogram shows an average hearing loss (AHL) at 1,2 and 3 kHz of less than 50 dB in the better ear. These cases require notification to the Ministry of Manpower but are not compensable for permanent disability.

2. Noise Induced Deafness (advanced)

These are cases which have an occupational history of exposure to noise of 10 years or more and an audiogram with an AHL at 1,2 and 3 kHz of 50 dB or more in the better ear (air conduction). Such cases are compensable for permanent disability.

Assessment of noise induced deafness

1. The assessment is always based on the **better** ear. Refer to the column for NID in the table below.
2. Correction should be made for presbycusis for workers who are aged 50 years or more (less half percent for each year above 50).

Example:

A 54 year old shipyard worker has been exposed to high noise levels as a steelworker in various shipyards for the past 25 years. His audiogram showed a bilateral sensorineural hearing loss more pronounced in the higher frequencies. His hearing thresholds ranged from 65 to 90 dB in all the frequencies tested. A repeat audiogram showed similar results. His AHL (1-3 kHz) was 75 dB in the left ear and 60 dB in the right ear.

1. A diagnosis of noise induced deafness (advanced) was made.
2. The AHL (1-3 kHz) of the better ear which was 60 dB.
3. Based on the table below, using the column for NID, the percentage incapacity is 15%.
4. Correct for presbycusis: minus 2% (4 years above 50)
5. Final incapacity award is 13%.

Hearing Loss Resulting from Injuries or Accidents

The assessment of hearing loss resulting from injuries or accidents is different from that of noise induced deafness. Unilateral hearing loss can be compensated in this case. For bilateral hearing loss, each ear is evaluated separately. The resulting percentage incapacity can be different depending on whether the case is assessed as a case of noise induced deafness or resulting from an accident or injury.

It is therefore very important that the correct diagnosis be made. There should be a definite history of an incident and pre-incident audiogram records should be valued (where available).

Assessment of hearing loss resulting from injuries or accidents

1. The assessment is based on the **affected** ear or ears depending on whether one or both ears were affected.
2. Refer to the column for injuries or accidents in the table below.
3. Where both ears are affected (and this is not a case of NID), the total incapacity for hearing loss would be the sum of the incapacity for each ear.

Example:

A 30 year old worker suffered a sudden loss of hearing and tinnitus in his left ear after a blast injury occurred at his workplace. An audiogram conducted two weeks after the incident showed a AHL (1-3 kHz) of 60 dB in his left ear and a AHL (1-3 kHz) of 25 dB in his right ear. A repeat audiogram done six months later showed a AHL of 50 dB in his left ear.

1. The diagnosis of hearing loss due to a blast injury was made.
2. Assessment was made after the condition had stabilised.
3. The affected ear had a AHL (1-3 kHz) of 50 dB.
4. Based on the table below, using the column for injuries and accidents, the incapacity was 3%.

Example:

A 48 year old worker suffered a sudden loss of hearing and tinnitus in both his ears after a blast injury at work. He had a AHL (1-3 kHz) of 90 dB in his left ear and a AHL (1-3 kHz) of 60 dB in his right ear. Prior to the accident, his medical records showed that his AHL (1-3 kHz) was 40 dB in his left ear and 35 dB in his right ear.

1. A diagnosis of blast injury of both ears was made.
2. For the blast injury of the left ear, the incapacity was 30%.
3. For the blast injury of the right ear, the incapacity was 8%.
4. The total incapacity was $30 + 8 = 38\%$.

Assessment of hearing loss

Hearing threshold (dBA) (AHL :1,2 and 3 kHz)	Injuries or Accidents (affected ear) % Incapacity	Noise induced deafness (better ear) % Incapacity
50	3	5
55	5	10
60	8	15
65	10	20
70	13	25
75	15	30
80	20	40
85	25	50
90	30	60

Note: For sudden hearing loss resulting from accidents or injuries, assess each affected ear and add the percentage incapacities to get the total percentage incapacity. For noise induced deafness, assess the better ear

CHAPTER 10

ASSESSMENT OF THE CENTRAL NERVOUS SYSTEM FUNCTION

INTRODUCTION

This chapter provides criteria for evaluating permanent impairments due to documented dysfunction of the brain, cranial nerves and spinal cord. A permanent neurological impairment is any anatomic, physiological or functional abnormality or loss that remains after maximum medical improvement.

ASSESSMENT OF PERMANENT/CURRENT INCAPACITY

When disease or injury affects the central nervous system (CNS), several areas of functions may be impaired. Therefore, the most severe category of impairment is based on the neurological evaluation and relevant clinical investigations in four categories: (1) state of consciousness and level of awareness; (2) mental status and integrative functioning; (3) use and understanding of language; and (4) influence of behaviour and mood. The most severe of these 4 categories should be used to determine a cerebral impairment rating. The motor and sensory systems, gait, and coordination are evaluated once the four categories of cerebral impairment have been evaluated. If impairments involve several nervous system areas, calculate separate impairment ratings for each area and combine them using the Combined Values Chart.

- Step 1:** The initial step in assessing cerebral function is to determine whether disturbance is present in the level of consciousness or awareness, or arousal. (*Refer Group 1A: Impairment of Consciousness and Awareness, and 1B) Impairment due to Episodic Loss of Consciousness or Awareness; and 1C) Impairment Due to Sleep and Arousal Disorders*).
- Step 2:** Evaluate mental status and highest integrative function. (*Refer to Group 2: Impairment Related to Mental Status*).
- Step 3:** Identify any difficulty with understanding and use of language (*Refer to Group 3: Impairment Due to Aphasia or Dysphasia*).
- Step 4:** Evaluate any emotional or behavioural disturbances, such as depression, that can modify cerebral function (*Refer to Group 4: Impairment Due to Emotional or Behavioural Disorders*).
- Step 5:** Identify the most severe cerebral impairment listed above. Combine the most severe impairment categories Group 1A or 1B or 1C or 2 or 3 or 4 with any or multiple distinct neurological impairments listed below (as in Group 5) using the Combined Values Chart.

Neurological Impairments that are combined with the Most Severe Cerebral Impairments

Cranial nerve impairments
Station, gait, and movement disorders
Extremity disorders related to central impairment
Spinal cord impairments
Peripheral nerve, motor, and sensory impairments
Chronic pain

Additional compensation for Permanent Total Incapacity (100%)

Under the First Schedule of the Work Injury Compensation Act 2019, "where the injured employee is certified by a medical practitioner to have suffered from permanent total incapacity, additional compensation shall be paid amounting to one quarter of the amount which is otherwise payable."

Example:

A 40 year old man employed as a driver for a courier company was injured in a road traffic accident while delivering a parcel to a client. He had traumatic right frontal and temporal contusions that were managed conservatively. He was completely anosmic after the accident. He was discharged in a satisfactory condition after 2 weeks stay in hospital. However, he developed epileptic seizures several months later and was given anti-convulsants to control the seizures.

Current Situation: He is compliant with his treatment but still had the occasional breakthrough seizures even though blood tests showed therapeutic anti-convulsant levels. He became depressed as a result of this and had to be treated by a psychiatrist. Physical examination showed complete anosmia and gum hypertrophy caused by phenytoin treatment.

Diagnosis: Post-traumatic epilepsy and traumatic avulsion of olfactory nerves.

Assessment of impairment:

Step 1: Cerebral impairment present - epilepsy - prevents him from driving but still able to perform other jobs except working at heights, working with moving machinery or cooking / carrying hot food / liquid: 70% impairment.

Step 2: N.A.

Step 3: N.A.

Step 4: Applicable depression: 25% impairment.

Step 5: Most severe cerebral impairment is epilepsy (70%). This was chosen and combined with 5% impairment for anosmia using the Combined Values Chart.

Final Award: 72%.

CRITERIA FOR EVALUATING PERMANENT/CURRENT INCAPACITY

Cerebral Impairments

GROUP 1

A. Disturbances of Consciousness and Awareness

Individuals experiencing disturbances in consciousness may be suffering from a range of symptoms from episodes of altered awareness to being in a persistent vegetative state or unresponsive coma. These conditions are evaluated based on the neurological examination and ancillary testing such as computed tomography (CT) Scan, magnetic resonance imaging (MRI), Single-photon emission computed tomography (SPECT), electroencephalogram (EEG), evoked potentials, and vestibular testing. The examination and tests will provide the extent of the underlying pathology and help examiners form a prognosis for patient management.

Criteria for evaluating impairment of consciousness and awareness

Brief repetitive or persistent alteration of state of consciousness and minimal limitation in performance of activities of daily living	5-25%
Brief repetitive or persistent alteration of state of consciousness and moderate limitation in performance of activities of daily living	26-99%
Prolonged impairment of state of consciousness, which diminishes capabilities in personal care and activities of daily living	100%
Coma requiring total medical support, or semi-coma with complete dependency and subsistence on nursing care	100%

B. Episodic Neurological impairment e.g. epileptic seizures

In assessing permanent impairment due to this, ensure that the individual's condition has reached maximal medical improvement and is unlikely to change significantly.

Criteria for evaluating impairment due to episodic loss of consciousness or awareness

Paroxysmal disorder with predictable characteristics and unpredictable occurrence that does not limit usual activities but there is a risk to the individual or limits daily activities or occupations	10%-25%
Paroxysmal disorder that interferes with some daily activities	26%-99%
Severe paroxysmal disorder of such frequency that it limits activities to those that are supervised, protected or restricted, <i>and</i> additional neurological symptoms or signs of focal or generalized nature	100%
Uncontrolled paroxysmal disorder of such frequency and constancy that it severely limits the individual's daily activities	100%

C. Arousal and Sleep Disorders

Arousal and sleep disorders include disorders related to initiating and maintaining sleep; excessive somnolence, including sleep-induced respiratory impairment; and sleep-wake schedules.

Neurological disorders associated with increased daytime sleepiness include central sleep apnoea syndrome, narcolepsy, idiopathic hypersomnia, periodic limb movement disorder, restless leg syndrome, depression, brain tumours, posttraumatic hypersomnolence, multiple sclerosis, encephalitis, and post encephalopathy, Alzheimer's disease, Parkinson's disease, multisystem atrophy and neuromuscular disorders with sleep apnoea. It is expected that the diagnosis of excessive daytime sleepiness has been supported by formal studies in a sleep laboratory. The clinician can evaluate sleepiness with the Epworth Sleepiness Scale, which assesses the likelihood of dozing (Never= 0 to high chance =3) in different situations.

Criteria for evaluating impairment due to sleep and arousal disorders

Reduced daytime alertness; sleep pattern such that individual can perform most activities of daily living	10%-25%
Reduced daytime alertness; interferes with ability to perform some activities of daily living	26%-99%
Reduced daytime alertness; ability to perform activities of daily living significantly limited	100%
Severe reduction of daytime alertness; individual unable to care for self in any situation or manner	100%

GROUP 2

Mental status, Cognition and Highest Integrative Function

Mental status and integrative functions include the general effects of organic brain syndrome; dementia; and some specific, focal, and neurological deficiencies. Referral for neuropsychologist for assessment is required as impairment has to be confirmed and quantified by neuropsychologist.

Criteria for evaluating impairment related to mental status

Fully capable of selfcare, but has some of the following: Consistent slight forgetfulness; partial recollection of events; fully oriented except for slight difficulty with time relationships; slight impairment in solving problems, similarities and differences; life at home, hobbies and intellectual interests slightly impaired.	5-10%
Suffers from a combination of several of the following: Moderate memory loss, more marked for recent events; defect interferes with everyday activities; moderate difficulty with time relationships, oriented for place at examination, may have geographic disorientation elsewhere; moderate difficulty in solving problems, similarities and differences; social judgment usually maintained; mild but definite impairment of function at home; more difficult chores abandoned, more complicated hobbies and interests abandoned; needs prompting in personal care.	11-99%
Suffers from a combination of several of the following: Severe memory loss, only highly learned material retained, new material rapidly lost; severe difficulty with time relationships; usually disconnected to time, often to place; severely impaired in solving problems, similarities and differences; social judgment usually impaired; only simple chores preserved; very restricted interests, poorly maintained; needs assistance in dressing, hygiene, keeping of personal effects.	100%
Suffers from a combination of several of the following: Severe memory loss, only fragments remain. oriented in person only; unable to make judgments or solve problems; no significant function at home; requires much help with personal care; frequent incontinence	100%

GROUP 3

Communicative Impairments: Dysphasia and Aphasia

Aphasia is a condition in which language function is defective or absent. It includes a lack of comprehension with deficits in vision, hearing, and language (both spoken and written) and also the inability to implement discernible and appropriate language symbols by voice, action, writing or pantomime. Dysphasia is a language impairment that is less severe than aphasia. Dysphasia and aphasia are different from dysarthria, which is imperfect articulation of speech due to disordered muscle control, and dysphonia which is an impairment of sound production that causes difficulty speaking and understanding.

Criteria for evaluating impairment due to dysphasia or aphasia

Minimal disturbance in comprehension and production of language symbols of daily living	10%-25%
Moderate impairment in comprehension and production of language symbols of daily living	26%-99%
Able to comprehend nonverbal communication; production of unintelligible or inappropriate language for daily activities or Complete inability to communicate or comprehend language symbols	100%

GROUP 4

Impairment due to emotional or behavioural disorders

Emotional disturbances originating in verifiable neurological impairments (e.g. stroke, head injury) are assessed here. Psychiatric features may also exist with primary neurological disorders, and can range from irritability to outbursts of rage or panic and from aggression to withdrawal. Psychiatric impairments may include depression, manic states, emotional fluctuations, socially unacceptable behaviour, involuntary laughing or crying, impulsivity, general disinhibition with obsessive and scatological behaviour, etc. These disorders should be confirmed and assessed by a psychiatrist. (Psychiatric manifestations and impairments that do not have documented neurological impairments are not evaluated under this heading.)

Criteria for evaluating impairment due to emotional or behavioural disorders

Mild limitation of activities and daily living and daily social and interpersonal functioning	10-25%
Moderate limitation of some activities of daily living and daily social and interpersonal functioning	26%-99%
Severe limitation in performing most activities of daily living, impeding useful action in most daily social and interpersonal functioning, or Severe limitation of all daily activities, requiring total dependence on another person	100%

Other Neurological Impairments

GROUP 5

A. Cranial Nerve Impairments

Criteria for evaluating Impairment of Olfaction

The maximum impairment from anosmia is 5%

Criteria for evaluating Impairment of Optic Nerves

Refer to the chapter on assessment of Visual function.

Criteria for evaluating Impairment of Facial Nerves

Complete loss of taste of anterior tongue, or mild unilateral facial weakness	1-4%
Mild to moderate bilateral facial weakness or severe unilateral facial weakness with 75% or greater facial involvement and with inability to control eyelid closure	5-19%
Severe bilateral facial paralysis with 75% or greater facial involvement and with inability to control eyelid closure	20-45%

Criteria for evaluating Impairment of Equilibrium due to Vestibulocochlear Nerve Dysfunction

Assessment by an ENT specialist is required to confirm cause of disequilibrium. For impairment of hearing refer to chapter on assessment of hearing.

Minimal equilibrium impairment, limitation required only of activities in hazardous surroundings	25-50%
Moderate equilibrium impairment, limitation required of all daily activities except simple ones for self-care or Moderately severe equilibrium impairment, limitation required of all daily activities including those for self-care	51-100%
Severe equilibrium impairment, such that assistance is required for self-care and ambulation, and confinement may be needed	100%

Criteria for evaluating Impairment of Cranial Nerves IX, X and XII Nerves

Mild dysarthria, dystonia or dysphagia with choking on liquids or semisolids	50%
Moderately severe dysarthria or dysphagia with hoarseness, nasal regurgitation, and aspiration of liquids or semisolids	100%
Severe inability to swallow or handle oral secretions without choking, with need for assistance and suctioning	100%

B) Criteria for evaluating Impairment of Station and Gait

Rises to standing position; walks but has difficulty with elevations, grades, stairs, and long distances	25-50%
Rises to standing position, walks some distance with difficulty and without assistance, but is limited to level surfaces	51-99%
Rises and maintains standing position with difficulty, cannot walk without assistance or Cannot stand without help, mechanical support, or assistive device	100%

C) Impairment of Limb Power due to Neurological Dysfunction

For paralysed limbs or part of a limb, the Fourth Schedule of the Act states that "total permanent loss of the use of a member is to be treated as loss of that member." Rate each limb as per amputation of limbs. Total impairment cannot exceed 100%. If both upper limbs are involved (i.e. 100%), additional 25% to be provided for under the First Schedule of the Act.

D) Spinal Cord Impairment

Criteria for evaluating neurological impairment of respiration

Individual is capable of spontaneous respiration but is restricted to sitting, standing or limited ambulation	100%
Individual is capable of spontaneous respiration but to such a limited degree that he or she is confined to bed	100%
Individual has no capacity for spontaneous respiration	100%

Lesser degrees of respiratory impairment are evaluated under the Chapter on "Assessment of Respiratory Function".

E. Injury of the Peripheral Nervous System

Refer to the chapters on the "Assessment of the Upper Limb" and "Assessment of the Lower Limb".

F. Headache following Neurological Injury

Post-concussion syndrome may follow a concussion and produces symptoms of headache, poor concentration, mild memory loss, irritability, trouble sleeping, bad dreams, and sometimes mild personality changes. It does not produce any abnormalities on physical examination or on any tests such as CT scan or MRI. These symptoms usually resolve completely during the course of weeks to months. Usually there is gradual improvement during this period. In a small minority the symptoms seem intractable despite treatment.

Accurate objective evaluation is confounded by absence of any abnormality on physical examination or on any tests, impending litigation, potential compensation or other psychological or social factors.

Intractable cases should be referred to a pain clinic for assessment and treatment first before determining that maximum medical improvement has been achieved. During the period of treatment the patient must necessarily be compliant with medication prescribed by his caregivers.

The medical examiner has to confirm that the symptoms are consistent with established conditions, consistent with anatomic location and physiology and consistent with inter-observer assessment over time and situation. For example, a person with a positive straight leg raising test at 45 degrees will not be able to sit with the legs outstretched and touch his or her toes. The examiner should also look out for pain behaviours that are exaggerated and discordant with his or her presumed medical condition. Exaggerated, discordant pain behaviours tend to cast doubt on the validity of the information that people provide regarding their condition.

The impairment rating should not factor in other impairments that have already been evaluated in other areas.

For brachial plexus avulsion pain and "phantom limb", impairment percentages already include allowances for the pain that may occur with these conditions and it is not necessary to give additional awards for pain.

CHAPTER 11

ASSESSMENT OF THE VISUAL FUNCTION

INTRODUCTION

This chapter provides criteria for evaluating permanent impairment of visual function following ophthalmic injuries or diseases. A permanent visual impairment is any anatomic, physiological or functional abnormality or loss that remains after maximum medical improvement.

ASSESSMENT OF PERMANENT/CURRENT INCAPACITY

Timing of assessment

The assessment for visual function should take place between 6 to 8 weeks from the time of injury or emergency surgery. Definitive surgery to correct residual visual deficits need not have taken place.

Visual acuity

The **best spectacle corrected distant and near visual acuity** should both be measured. Refraction should be conducted with fogging as part of the assessment technique. Any standard Snellen test type may be used for assessment. Near vision should be assessed using the Moorfields reading test type.

Contrast

Contrast acuity and acuity under conditions of glare should be assessed using any of the standardised tests such as the Pelli-Robson charts, Optec 2000 Vision Testing System, etc

Visual fields

The visual fields may be measured by static or kinetic perimetry but must include and assessment of the monocular field of vision beyond 60 as well as the binocular field of vision (120). The assessment should include the horizontal and vertical meridians passing through fixation.

Colour vision

Colour vision may be assessed with pseudoisochromatic test charts (such as the Ishihara or HRR test charts) or with more quantitative measures such as the Farnsworth-Munsell 100 Hue test.

Diplopia

The field of binocular single vision should be assessed using an arc perimeter or similar device. An effort should be made to determine if the diplopia can be corrected with prisms.

CRITERIA FOR EVALUATING PERMANENT/CURRENT INCAPACITY

The table below gives the percentage incapacity for the loss of visual function for **each eye**. Add the percentages for each eye noting that the maximum percentage incapacity should not exceed 50% for each eye. The percentage incapacity for each eye may be added to derive the total for both eyes which should not exceed 100%.

For legal blindness in both eyes (best corrected visual acuity <6/60) the percentage incapacity is 100%. For diplopia which affects both eyes, refer to the separate table on diplopia.

Criteria for evaluating permanent impairment of visual function in each eye

Visual Function	Percentage Incapacity																																																
<p>Visual Acuity</p> <p>Legal blindness in one eye (best corrected visual acuity < 6/60)</p> <p>50%</p> <p>Remaining vision in any eye:</p> <table border="0" style="width: 100%; text-align: center;"> <tr> <td style="width: 30%;"></td> <td style="width: 20%;">Log MAR</td> <td style="width: 20%;">Snellen (equivalent)</td> <td style="width: 30%;"></td> </tr> <tr> <td></td> <td>0</td> <td>6/6</td> <td>0%</td> </tr> <tr> <td></td> <td>0.1</td> <td>6/7.5</td> <td>5%</td> </tr> <tr> <td></td> <td>0.2</td> <td>6/9</td> <td>10%</td> </tr> <tr> <td></td> <td>0.3</td> <td>6/12</td> <td>15%</td> </tr> <tr> <td></td> <td>0.4</td> <td>6/15</td> <td>20%</td> </tr> <tr> <td></td> <td>0.5</td> <td>6/18</td> <td>25%</td> </tr> <tr> <td></td> <td>0.6</td> <td>6/24</td> <td>30%</td> </tr> <tr> <td></td> <td>0.7</td> <td>6/30</td> <td>35%</td> </tr> <tr> <td></td> <td>0.8</td> <td>6/36</td> <td>40%</td> </tr> <tr> <td></td> <td>0.9</td> <td>6/48</td> <td>45%</td> </tr> <tr> <td></td> <td>1.0</td> <td>6/60</td> <td>50%</td> </tr> </table> <p>Non-perception of light, light perception, hand movements, counting fingers</p> <p>50%</p>		Log MAR	Snellen (equivalent)			0	6/6	0%		0.1	6/7.5	5%		0.2	6/9	10%		0.3	6/12	15%		0.4	6/15	20%		0.5	6/18	25%		0.6	6/24	30%		0.7	6/30	35%		0.8	6/36	40%		0.9	6/48	45%		1.0	6/60	50%	
	Log MAR	Snellen (equivalent)																																															
	0	6/6	0%																																														
	0.1	6/7.5	5%																																														
	0.2	6/9	10%																																														
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	0.6	6/24	30%																																														
	0.7	6/30	35%																																														
	0.8	6/36	40%																																														
	0.9	6/48	45%																																														
	1.0	6/60	50%																																														
<p>Loss of accommodation (e.g. pseudophakia /aphakia) requiring reading glasses</p>	<p>20%</p>																																																

Any loss of contrast acuity or acuity under glare in addition to loss of best corrected visual acuity	10%																						
<p>Visual field loss If visual acuity and visual fields are normal in the fellow eye, compensation should first be based on the visual acuity in the affected eye</p> <p>Remaining horizontal field of vision</p> <table style="margin-left: auto; margin-right: auto;"> <tr><td><20 degrees</td><td>50%</td></tr> <tr><td>20 to 30 degrees</td><td>45%</td></tr> <tr><td>30 to 40 degrees</td><td>40%</td></tr> <tr><td>40 to 50 degrees</td><td>35%</td></tr> <tr><td>50 to 60 degrees</td><td>30%</td></tr> <tr><td>60 to 70 degrees</td><td>25%</td></tr> <tr><td>70 to 80 degrees</td><td>20%</td></tr> <tr><td>80 to 90 degrees</td><td>15%</td></tr> <tr><td>90 to 100 degrees</td><td>10%</td></tr> <tr><td>100 to 110 degrees</td><td>5%</td></tr> <tr><td>110 to <120 degrees</td><td>2.5%</td></tr> </table>	<20 degrees	50%	20 to 30 degrees	45%	30 to 40 degrees	40%	40 to 50 degrees	35%	50 to 60 degrees	30%	60 to 70 degrees	25%	70 to 80 degrees	20%	80 to 90 degrees	15%	90 to 100 degrees	10%	100 to 110 degrees	5%	110 to <120 degrees	2.5%	
<20 degrees	50%																						
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40 to 50 degrees	35%																						
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60 to 70 degrees	25%																						
70 to 80 degrees	20%																						
80 to 90 degrees	15%																						
90 to 100 degrees	10%																						
100 to 110 degrees	5%																						
110 to <120 degrees	2.5%																						
<p>Colour vision Any loss of ability to differentiate colour that is in addition to loss of visual acuity</p>	10%																						
<p>Astigmatism and aniseikonia If cylinder is above -3.50D and /or if significant aniseikonia is present</p>	10%																						

Criteria for evaluating permanent impairment for diplopia (applies to both eyes)

<p>Diplopia Diplopia which is expected not to be reasonably corrected by prisms or surgery</p>	40%
<p>Diplopia which is expected to be reasonably corrected by surgery occurring</p> <ul style="list-style-type: none"> • within the central 30 degrees (i.e. 15 degrees in any direction of fixation) • between 30 and 60 degrees • beyond 60 degrees 	<p>30%</p> <p>15%</p> <p>7.5%</p>

Specific Ophthalmic Conditions arising from Injury

(to be awarded in addition to visual loss to a maximum award of 50% per eye)

Glaucoma	5%
Cataract /lens subluxation	3%
Corneal opacity /scar /decompensation	5%
Orbital deformities (Enophthalmos /hypoglobus /hyperglobus)	5%
Traumatic mydriasis and other pupillary or iris abnormalities	1%

USEFUL REFERENCES

1. For more information, please visit our website at: www.mom.gov.sg/workplace-safety-and-health/work-injury-compensation
2. Guides to the Evaluation of Permanent Impairment, Sixth Edition, 2008, American Medical Association, ed. Robert D. Rondinelli.
3. Guidelines to the Evaluation of Impairment of Oral and Maxillofacial Region, 2018, American Association of Oral and Maxillofacial Surgeons.
4. Work Injury Compensation Act 2019.

COMBINED VALUES CHART

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

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

If three or more impairment values are to be combined, select the two highest values and find their combined value as above. Then use that value and the third value to locate the combined value of all. This process can be repeated indefinitely, the final value in each instance being the combination of all the previous values. In each step of this process the larger impairment value must be identified at the side of the chart. Refer to Page 10 (Part III - Use of Combined Values Chart) for example.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
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COMBINED VALUES CHART (continued)

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64	82 83 83 84 84 85 85 86 86 87 87
65	83 83 84 84 85 85 86 86 87 87 88
66	83 84 84 85 85 86 86 87 87 88 88
67	84 84 85 85 86 86 87 87 88 88 89 89
68	84 85 85 86 86 87 87 88 88 89 89 90
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WORK INJURY COMPENSATION ACT 2019

FOURTH SCHEDULE

Sections 4(2) and 81, and
paragraph 3(1) of First Schedule

**INJURIES DEEMED TO RESULT IN
PERMANENT INCAPACITY**

<i>Injury</i>	<i>Percentage of loss of earning capacity</i>
1. Loss of 2 limbs	100
2. Loss of both hands or of all fingers and both thumbs	100
3. Loss of both feet	100
4. Total loss of sight, including the loss of sight to such extent as to render the employee unable to perform any work for which eyesight is essential	100
5. Total paralysis	100
6. Injuries resulting in being permanently bedridden	100
7. Any other injury causing permanent total incapacity	100
8. Loss of arm at shoulder	75
9. Loss of arm between elbow and shoulder	75
10. Loss of arm at elbow	75
11. Loss of arm between wrist and elbow	70
12. Loss of hand at wrist	70
13. Loss of 4 fingers and thumb of one hand	70
14. Loss of 4 fingers	60
15. Loss of thumb —	
(a) both phalanges	30
(b) one phalanx	20
16. Loss of index finger —	
(a) 3 phalanges	14
(b) 2 phalanges	11
(c) one phalanx	9
17. Loss of middle finger —	
(a) 3 phalanges	12
(b) 2 phalanges	9
(c) one phalanx	7
18. Loss of ring finger —	
(a) 3 phalanges	7
(b) 2 phalanges	6
(c) one phalanx	5

FOURTH SCHEDULE — *continued*

<i>Injury</i>	<i>Percentage of loss of earning capacity</i>
19. Loss of little finger —	
(a) 3 phalanges	7
(b) 2 phalanges	6
(c) one phalanx	5
20. Loss of metacarpals —	
(a) first or second (<i>additional</i>)	8
(b) third, fourth or fifth (<i>additional</i>)	3
21. Loss of leg —	
(a) at or above knee	75
(b) below knee	65
22. Loss of foot	55
23. Loss of toes —	
(a) all of one foot	20
(b) great, both phalanges	14
(c) great, one phalanx	3
(d) other than great, if more than one toe lost, each	3
24. Loss of sight of one eye	50
25. Loss of hearing, one ear	30
26. Total loss of hearing	60

Note:

1. Total permanent loss of the use of a member is to be treated as loss of that member.
2. Where there is loss of 2 or more parts of the hand, the percentage is not to be more than the loss of the whole hand.
3. Loss of remaining arm, leg or eye if one has already been lost, is to be the difference between the compensation for the total incapacity, and compensation already paid or that which would have been paid for the previous loss of limb or eye.

