

Guidelines for Evaluation of Permanent Physical Impairment in Upper Limbs

1. The estimation of permanent impairment depends upon the measurement of functional impairment, and is not expression of a personal opinion.
2. The estimation and measurement must be made when the clinical condition is fixed and unchangeable.
3. The upper extremity is divided into two component parts the arm component and the hand component.
4. Measurement of the loss of function of arm component consists in measuring the loss of motion, muscle strength and co-ordinated activities.
5. Measurement of the loss of function of hand component consists in determining the Prehension, Sensation & Strength. For estimation of Prehension : Opposition, lateral pinch, Cylindrical grasp, spherical grasp and hook grasp have to be assessed as shown in the column of "prehension component in the proforma.
6. The impairment of the entire extremity depends on the combination of the functional impairment of both components.

ARM COMPONENT

Total value of arm component is 90%.

Principles of Evaluation of range of motion of joints

1. The value for maximum R.O.M. in the arm component is 90%.
2. Each of the three joints of the arm is weighted equally (30%).

Example

A. fracture of the right shoulder joint may affect range of motion so that active adduction is 90°. The left shoulder exhibits a range of active abduction of 180°. Hence there is loss of 50% of abduction movement of the right shoulder. The percentage loss of arm component in the shoulder is 50×0.3 or 15% loss of motion for the arm component. If more than one joint is involved, same method is applied, and the losses in each of the affected joints are added.

Say,

Loss of abduction of the shoulder = 60%

Loss of extension of the wrist = 40%

Then, loss of range of motion for the arm = $(60 \times 0.3) + (40 \times 0.3) = 30\%$

Principles of Evaluation of strength of muscles

1. Strength of muscles can be tested by manual testing like 0-5 grading.
2. Manual muscle gradings can be given percentages like
3. – 100%
4. – 80%
5. – 60%
6. – 40%
7. – 20%
8. – 0%
9. The mean percentage of muscle strength loss is multiplied by 0.30.
10. If there has been a loss of muscle strength of more than one joint, the values are added as has been described for loss of range of motion.

Principles of Evaluation of co-ordinated activities

1. The total value for co-ordinated activities is 90%.
2. Ten different co-ordinated activities are to be tested as given in the Proforma.
3. Each activity has a value of 9%.

Combining values for the Arm Component

1. The value of loss of function of arm component is obtained by combining the values of range of movement, muscle strength & co-ordinated activities, using the combining formula

$$A + b(90-a)/90$$

Where a = higher value

& b = lower value

Example

Let us assume that an individual with a fracture of the right shoulder joint has in addition to 16.5% loss of motion of his arm, 8.3% loss of strength of muscles, and 5% loss of co-ordination. We combine these values as :

$$\text{Range of motion : } 16.5\% + 8.3(90-16.5)/90 = 23.3 \%$$

Strength of Muscles : 8.3%

Co-ordination : $5\% \cdot 23.3 + 5(90-23.3)/90 = 27.0\%$

So total value of arm component = 27.0%

HAND COMPONENT

Total value of hand component is 90%.

The functional impairment of hand is expressed as loss of prehension, loss of sensation, loss of strength.

Principles of Evaluation of Prehension

Total value of Prehension is 30%. It includes :

(A) Opposition (8%). Tested against

Index finger (2%). Middle finger (2%)

Ring finger (2%) & Little finger (2%)

(B) Lateral Pinch (5%). Tested by asking the patient to hold a key.

(C) Cylindrical Grasp (6%). Tested for

(D) Large object of 4 inch size (3%)

(E) Small object of 1 inch size (3%)

(F) Spherical Grasp (6%). Tested for

(G) Large object 4 inch size (3%)

(H) Small object 1 inch size (3%)

(I) Hook Grasp (5%). Tested by asking the patient to lift a bag.

Principles of Evaluation of Sensations

Total value of sensation is 30%. It includes :

1. Grip Strength (20%)

2. Pinch Strength (10%)

3. Strength will be tested with hand dynamo-meter or by clinical method (Grip Method).

10% additional weightage to be given to the following factors :

1. Infection

2. Deformity

3. Malalignment
4. Contractures
5. Cosmetic appearance
6. Abnormal Mobility
7. Dominant Extremity (4%)

Combining values of the hand component

The final value of loss of function of hand component is obtained by summing up values of loss of prehension, sensation and strength.

Combining Values for the Extremity

Values of impairment of arm component and impairment of hand component are combined by using the combining formula.

Example

Impairment of the arm = 27.0% $64 + 27(90-64)/90$

Impairment of the hand = 64%

Total= 71.8%