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Prosthetics and orthotics — Limb deficiencies —

Part 3:

Method of describing upper limb amputation
stumps

Prothèses et orthèses — Malformations des membres —

*Partie 3: Méthode de description des moignons d'amputation des
membres supérieurs*



Reference number
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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 8548-3 was prepared by Technical Committee ISO/TC 168, *Prosthetics and orthotics*.

ISO 8548 consists of the following parts, under the general title *Prosthetics and orthotics — Limb deficiencies*:

- Part 1: *Method of describing limb deficiencies present at birth*
- Part 2: *Method of describing lower limb amputation stumps*
- Part 3: *Method of describing upper limb amputation stumps*
- Part 4: *Causal conditions leading to amputation*
- Part 5: *Patient descriptors*

Annex A of this part of ISO 8548 is for information only.

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Introduction

Many different systems have been developed to classify amputation stumps, but none has achieved universal acceptance. The reasons for this are many. The members of the clinic teams in different countries, working with different patients and different technical possibilities, develop their own systems to meet their individual needs. Hence there is a need for an international system to be developed in order to compare one publication with another, one patient against another. The different care groups who will appreciate and use a standardized system of describing stumps include surgeons of different disciplines, other doctors (especially those concerned with rehabilitation), physical and occupational therapists and prosthetists. Such a system is also of value to epidemiologists and government health officials.

The system proposed has to meet the needs of the different members of the clinic team and to enable the description of the stump to be recorded in a way that can be easily incorporated in reports. This part of ISO 8548 deliberately aims at defining the minimum information to be described. It should be feasible for this information to be included in forms designed by the individual institution; the information should also be capable of ready adaptation for computer analysis.

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Prosthetics and orthotics — Limb deficiencies —

Part 3:

Method of describing upper limb amputation stumps

1 Scope

This part of ISO 8548 establishes a method of describing upper limb amputation stumps and for recording the descriptive information.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 8548. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 8548 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 8548-1:1989, *Prosthetics and orthotics — Limb deficiencies — Part 1: Method of describing limb deficiencies present at birth*.

ISO 8549-1:1989, *Prosthetics and orthotics — Vocabulary — Part 1: General terms for external limb prostheses and external orthoses*.

ISO 8549-2:1989, *Prosthetics and orthotics — Vocabulary — Part 2: Terms relating to external limb prostheses and wearers of these prostheses*.

3 Definitions

For the purposes of this part of ISO 8548, the definitions given in ISO 8548-1, ISO 8549-1 and ISO 8549-2 apply.

4 Measurement of upper limb amputation stumps

4.1 Reference levels and reference planes

Identify the reference levels and planes relevant to the particular level of amputation as described in 4.1.1 and 4.1.2, preferably with the patient standing erect and with the stump hanging unconstrained.

4.1.1 Reference levels

4.1.1.1 Axilla level — the most proximal level at which a circumferential measurement, perpendicular to the centreline of the upper arm, can be obtained.

4.1.1.2 Medial epicondyle level — the level of the medial epicondyle of the humerus.

4.1.1.3 Stump end level — the level of the end of the stump.

4.1.1.4 Ulnar styloid level — the level of the tip of the ulnar styloid in wrist disarticulation stumps and on the contralateral limb.

4.1.1.5 Bone end level — the level of the bone end in trans-humeral and trans-radial amputation stumps.

4.1.1.6 Minimum circumferential level — the level of the minimum circumferential measurement in elbow disarticulation stumps.

4.1.2 Reference planes

4.1.2.1 Posterior ulnar plane — the plane of the posterior aspect of the shaft of the ulna, parallel with the centreline of the forearm when the elbow is flexed at 90°.

4.1.2.2 Anterior elbow crease plane — the plane perpendicular to the centreline of the forearm at the level of the anterior elbow crease with the elbow flexed at 90°.

4.2 Measurements

4.2.1 Length measurements

Measure and record the length measurements as specified in the appropriate table (see tables 1 to 7) for the particular level of amputation.

4.2.2 Circumferential measurements

Measure and record the circumferential measurements as specified in the appropriate table (see tables 1 to 7) for the particular level of amputation.

4.3 Assessment of joint function

4.3.1 General

The aspects of joint function which need to be recorded include abnormalities of range of joint movement, significant reduction of muscle power and any loss of joint stability.

4.3.2 Measurement of abnormal range of joint movement

Record any abnormalities of the range of joint movement using the method of measurement of joint motion as adopted by the American Academy of Orthopaedic Surgeons in 1964 in which all motions of the joint are measured from defined zero starting positions.

4.3.3 Assessment of joint power

Record any reduction of muscle power likely to affect performance significantly.

NOTE 1 Muscle power can be measured objectively but requires expensive and bulky apparatus which is inapplicable here. The scales relating to measurements of power in poliomyelitis cases are equally inappropriate.

The subjective judgement as to whether there is significant reduction of power or not has to be based on an appreciation as to whether the power demonstrated would be sufficient to stabilize the proximal joint with the stump in a well-fitted socket.

4.3.4 Assessment of joint stability

Record an assessment of the joint stability.

NOTE 2 It is recognized that the stability of a joint is a function of the integrity of the skeletal, ligamentous and neuro-muscular elements. In the context of this part of ISO 8548, the recording of the joint instability refers solely to bony and/or ligamentous impairments and their consequences.

5 Method of describing upper limb amputation stump

5.1 General

Describe the stump using the relevant descriptors listed in the appropriate tables (see tables 1 to 7), and by the use of the guidance given in annex A.

5.2 Forequarter amputation

Use the descriptors shown in table 1.

5.3 Shoulder disarticulation

Use the descriptors shown in table 2.

NOTE 3 Shoulder disarticulation refers either to amputation at the scapula-humeral joint or to amputation above the upper reference level as described for the usual trans-humeral level (see 5.4).

5.4 Trans-humeral amputation (above-elbow)

Use the descriptors shown in table 3.

NOTE 4 The upper reference level for length measurements is the axilla but, in the case of a flexion deformity, the upper reference level for length would be the highest level

at which a circumferential measurement is possible at right angles to the centreline of the stump.

5.5 Elbow disarticulation

Use the descriptors shown in table 4.

NOTE 5 The upper reference level for length measurements is the axilla but, in the case of a flexion deformity, the upper reference level for length would be the highest level at which a circumferential measurement is possible at right angles to the centreline of the stump.

5.6 Trans-radial amputation (below-elbow)

Use the descriptors shown in table 5.

NOTE 6 The upper reference level for length measurements is the medial epicondyle but, in the case of a flexion deformity, the upper reference level for length would be the

highest level at which a circumferential measurement is possible at right angles to the centreline of the stump.

5.7 Wrist disarticulation

Use the descriptors shown in table 6.

NOTE 7 The upper reference level for length measurements is the medial epicondyle but, in the case of a flexion deformity, the upper reference level for length would be the highest level at which a circumferential measurement is possible at right angles to the centreline of the stump.

5.8 Partial hand amputation

Use the descriptors shown in table 7.

Describe the abnormality of the hand remnant in terms of deformity, range of movements and power, stability and overall function.

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Table 1 — Descriptors for recording forequarter amputations (see 5.2 and annex A)

Descriptor	Statements to be recorded
Measurements	Not relevant
Stump shape Scapular remnant Clavicular remnant	Absent/present Absent/present If the contralateral arm is the site of an amputation, state the level
Skin of the stump Amputation scar General	Healed/unhealed Mobile/adherent Skin barrier intact/skin barrier not intact Sensation normal/sensation impaired No additional scarring/additional scarring
Circulation Oedema	None/present/excessive
Soft tissues of the stump Amount Consistency	Adequate/inadequate/excessive Normal/flabby/indurated
Significant pain Spontaneous pain Tenderness Painful neuroma Phantom pain	No/yes No/yes (generalized)/yes (localized) No/yes No/yes

Table 2 — Descriptors for recording shoulder disarticulations (see 5.3 and annex A)

Descriptor	Statements to be recorded
Measurements	Not relevant
Stump shape Upper humeral remnant	Absent/present but not prominent/present and prominent If the contralateral arm is the site of an amputation, state the level
Skin of the stump Amputation scar General	Healed/unhealed Mobile/adherent Skin barrier intact/skin barrier not intact Sensation normal/sensation impaired No additional scarring/additional scarring
Circulation Oedema	None/present/excessive
Soft tissues of the stump Amount Consistency	Adequate/inadequate/excessive Normal/flabby/indurated
Significant pain Spontaneous pain Tenderness Painful neuroma Phantom pain	No/yes No/yes (generalized)/yes (localized) No/yes No/yes

Table 3 — Descriptors for recording trans-humeral (above-elbow) amputations (see 5.4, figure 1 and annex A)

Descriptor	Statements to be recorded
Measurements	Record the following measurements: — the length from the axilla to the stump end, l_1 — the length from the bone end to the stump end, l_2 — the length of the contralateral arm from the axilla to the ulnar styloid, l_3 — the length of the contralateral arm from the axilla to the medial epicondyle, l'_4 — the length of the contralateral arm from the axilla to the posterior aspect of the shaft of the ulna when the elbow is flexed to 90°, l_5 — the circumference at the axilla, C_1 — the circumference at the bone end, C_2 If the contralateral arm is also the site of an amputation, state the level
Stump shape General End of humerus	Cylindrical/conical/bulbous Not prominent/prominent
Skin of the stump Amputation scar General	Healed/unhealed Mobile/adherent Skin barrier intact/skin barrier not intact Sensation normal/sensation impaired No additional scarring/additional scarring
Circulation Colour of skin Temperature (to the examining hand) Oedema	Normal/cyanotic/other discoloration Warm/cold None/present/excessive
Soft tissues of the stump Amount Consistency	Adequate/inadequate/excessive Normal/flabby/indurated
Significant pain Spontaneous pain Tenderness Painful neuroma Phantom pain	No/yes No/yes (generalized)/yes (localized) No/yes No/yes
Joint function Shoulder (combined gleno-humeral and scapulo-thoracic) Range of movement Muscle power Stability Pain	Normal/abnormal (specify) No significant reduction/significant reduction Normal/impaired No/yes

Table 4 — Descriptors for recording elbow disarticulations (see 5.5, figure 2 and annex A)

Descriptor	Statements to be recorded
Measurements	Record the following measurements: — the length from the axilla to the stump end, l_1 — the length of the contralateral arm from the axilla to the ulnar styloid, l_3 — the length of the contralateral arm from the axilla to the medial epicondyle, l'_4 — the circumference at the axilla, C_1 — the minimum circumference of the stump, C_4 — the circumference at epicondyles, C_3 If the contralateral arm is also the site of an amputation, state the level
Stump shape General	Cylindrical/bulbous/conical
Skin of the stump Amputation scar General	Healed/unhealed Mobile/adherent Skin barrier intact/skin barrier not intact Sensation normal/sensation impaired No additional scarring/additional scarring
Circulation Colour of skin Temperature (to the examining hand) Oedema	Normal/cyanotic/other discoloration Warm/cold None/present/excessive
Soft tissues of the stump Amount Consistency	Adequate/inadequate/excessive Normal/flabby/indurated
Significant pain Spontaneous pain Tenderness Painful neuroma Phantom pain	No/yes No/yes (generalized)/yes (localized) No/yes No/yes
Joint function Shoulder (combined gleno-humeral and scapulo-thoracic) Range of movement Muscle power Stability Pain	Normal/abnormal (specify) No significant reduction/significant reduction Normal/impaired No/yes

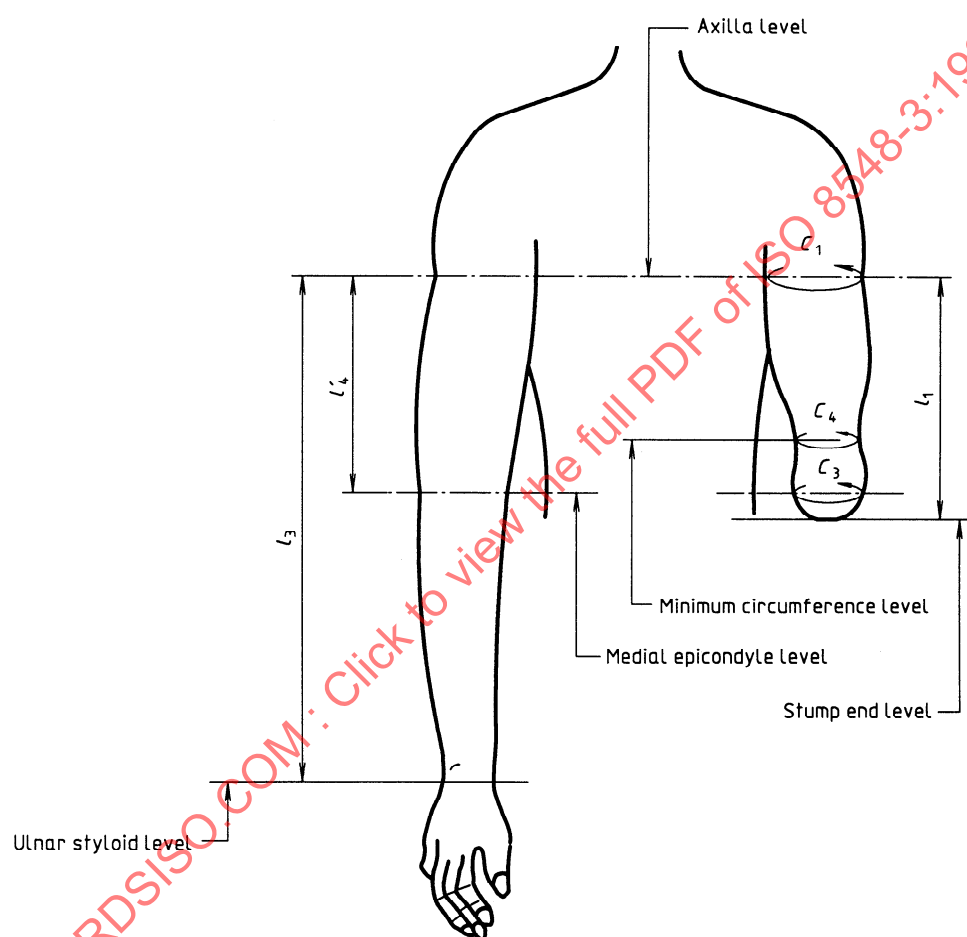


Figure 2 — Measurement of elbow disarticulation

Table 5 — Descriptors for recording trans-radial (below-elbow) amputations (see 5.6, figure 3 and annex A)

Descriptor	Statements to be recorded
Measurements	Record the following measurements: — the length from the axilla to the medial epicondyle, l_4 — the length from the medial epicondyle to the stump end, l_6 — the length from the bone end to the stump end, l_2 — the circumference, perpendicular to the centreline of the stump, at the level of the longer forearm bone, C_2 — the circumference at the level of the anterior elbow crease with the elbow supported at a right angle, in the plane perpendicular to the centreline of the stump, C_5 — the length of the contralateral arm from the axilla to the medial epicondyle, l'_4 — the length of the contralateral arm from the axilla to the ulnar styloid, l_3 If the contralateral arm is also the site of an amputation, state the level Also record if the cut end of the ulna is proximal, level with, or distal to the cut end of the radius
Stump shape General End of radius End of ulna	Cylindrical/conical/bulbous Not prominent/prominent Not prominent/prominent
Skin of the stump Amputation scar General	Healed/unhealed Mobile/adherent Skin barrier intact/skin barrier not intact Sensation normal/sensation impaired No additional scarring/additional scarring
Circulation Colour of skin Temperature (to the examining hand) Oedema	Normal/cyanotic/other discoloration Warm/cold None/present/excessive
Soft tissues of the stump Amount Consistency	Adequate/inadequate/excessive Normal/flabby/indurated
Significant pain Spontaneous pain Tenderness Painful neuroma Phantom pain	No/yes No/yes (generalized)/yes (localized) No/yes No/yes
Joint function Shoulder (combined gleno-humeral and scapulo-thoracic) Range of movement Muscle power Stability Elbow Range of movement Muscle power Stability Pain in proximal joints	Normal/abnormal (specify) No significant reduction/significant reduction Normal/impaired Normal/abnormal (specify) No significant reduction/significant reduction Normal/impaired No/yes

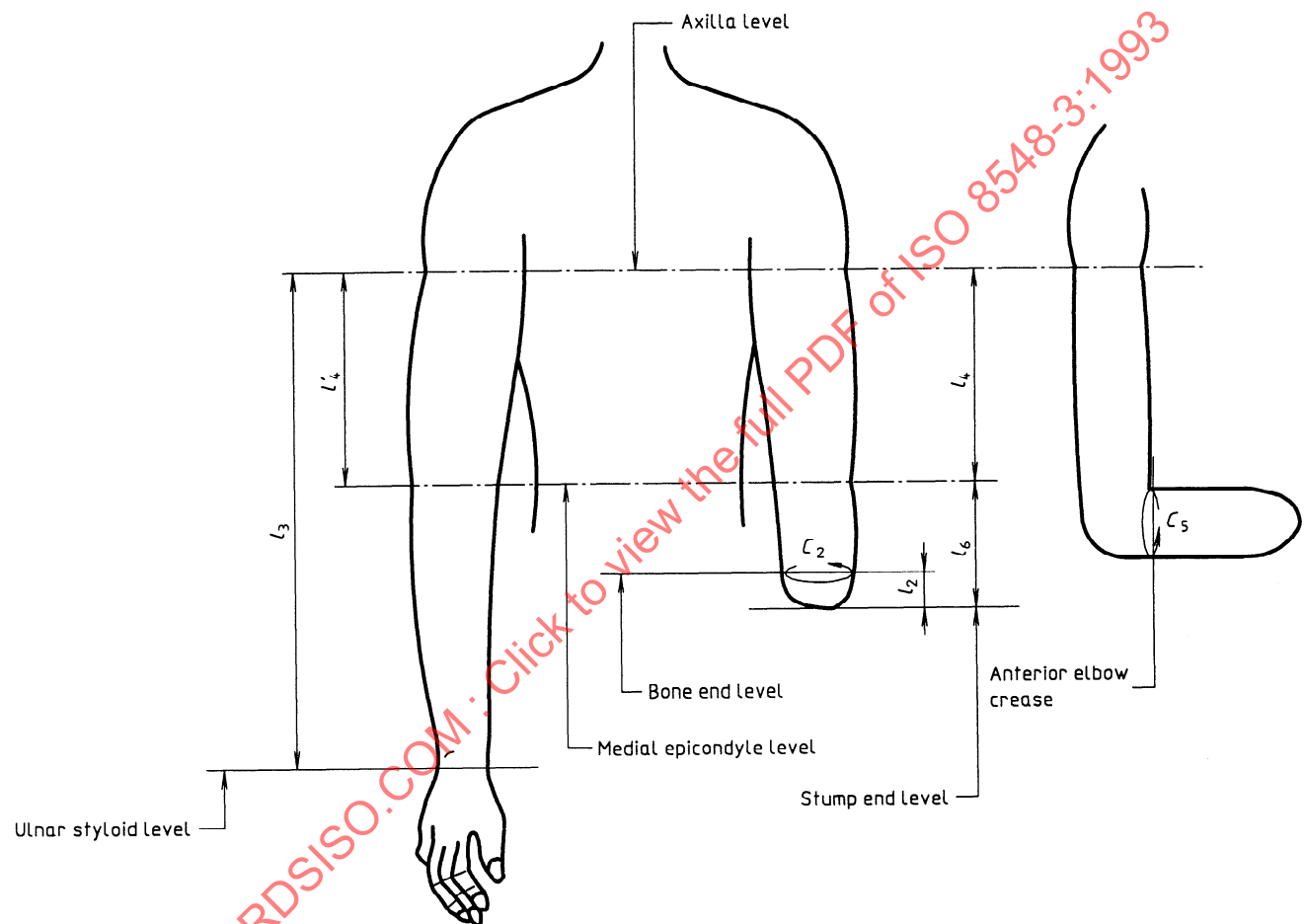


Figure 3 — Measurement of trans-radial amputation

Table 6 — Descriptors for recording wrist disarticulations (see 5.7, figure 4 and annex A)

Descriptor	Statements to be recorded
Measurements	Record the following measurements: — the length from the axilla to the medial epicondyle, l_4 — the length from the medial epicondyle to the stump end, l_6 — the length of the contralateral arm from the axilla to the ulnar styloid, l_3 — the length of the contralateral arm from the axilla to the medial epicondyle, l'_4 — the circumference at the anterior elbow crease with the elbow supported at 90°, C_5 — the circumference of the styloid process, C_6 If the contralateral arm is also the site of an amputation, state the level
Stump shape General Bone	Cylindrical/bulbous Not prominent/prominent
Skin of the stump Amputation scar General	Healed/unhealed Mobile/adherent Skin barrier intact/skin barrier not intact Sensation normal/sensation impaired No additional scarring/additional scarring
Circulation Colour of skin Temperature (to the examining hand) Oedema	Normal/cyanotic/other discoloration Warm/cold None/present/excessive
Soft tissues of the stump Amount Consistency	Adequate/inadequate/excessive Normal/flabby/indurated
Significant pain Spontaneous pain Tenderness Painful neuroma Phantom pain	No/yes No/yes (generalized)/yes (localized) No/yes No/yes
Joint function Shoulder (combined gleno-humeral and scapulo-thoracic) Range of movement Muscle power Stability Elbow Range of movement Muscle power Stability Pain in proximal joints	Normal/abnormal (specify) No significant reduction/significant reduction Normal/impaired Normal/abnormal (specify) No significant reduction/significant reduction Normal/impaired No/yes