BS ISO 29783-2:2015

BSI Standards Publication

Prosthetics and orthotics — Vocabulary

Part 2: Prosthetic gait

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National foreword

This British Standard is the UK implementation of ISO 29783-2:2015.

The UK participation in its preparation was entrusted to Technical Committee CH/168, Prosthetics and orthotics.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Part 2: Prosthetic gait

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Partie 2: Marche avec prothèse

Reference number
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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information.

The committee responsible for this document is ISO/TC 168, *Prostheses and orthoses*

ISO 29783 consists of the following parts, under the general title *Prosthetics and orthotics — Vocabulary*:

— *Part 1: Normal gait*

— *Part 2: Prosthetic gait*

— *Part 3: Pathological gait*

Introduction

No internationally accepted vocabulary of terms is available to describe the gait patterns of persons who have had a unilateral lower limb amputation.

As a consequence the members of the different professions and the clinic teams in different countries have developed and adopted their own terminology to meet their own needs.

This part of ISO 29783 provides a terminology for the description of the gait of persons who have had a unilateral lower limb amputation by identifying the departures from the normal pattern of gait which they exhibit. This is achieved by reference to the sub- phase of the gait cycle in which they occur and the nature of the abnormality.

It will enable practitioners to systematically describe the gait of the persons for whom they are providing prosthetic treatment and facilitate comparisons with the experience of other practitioners.

INTERNATIONAL STANDARD ISO 29783-2:2015(E)

Prosthetics and orthotics — Vocabulary —

Part 2: Prosthetic gait

1 Scope

This part of ISO 27983 specifies a vocabulary for the description of prosthetic gait.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 29783-1, *Prosthetics and orthotics — Vocabulary — Part 1: Normal gait*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 29783-1 and the following apply.

3.1
circumduction
abnormal trajectory of the lower limb during swing phase comprising increased abduction of the hip commencing at toe off and returning to neutral at initial contact

3.2
hip hiking
upwards movement of the pelvis during swing phase

3.3
vaulting
plantarflexion of the contralateral (non-prosthetic) ankle joint during mid-stance phase resulting in increased prosthetic foot clearance during swing phase

3.4
whip
an abrupt, medial, or lateral motion of the foot commencing at toe off and returning to neutral by initial contact

4 Description of prosthetic gait abnormalities — General

The gait abnormalities commonly exhibited by a person with a unilateral amputation are described by reference to the sub-phase of the normal gait cycle during which they occur and the nature of the abnormality.

Abnormal joint angles which are in the same direction as normal are referred to as either increased when greater than normal or decreased when less than normal. Abnormal joint angles which are in the opposite direction to normal are specified. When appropriate, the magnitude of the abnormality which is considered to be significant is noted.

Any abnormality in the timing of the gait pattern is referred to as either premature when it occurs earlier than normal or delayed when it occurs later than normal.

Any abnormality in the speed of the gait pattern is referred to as either faster than normal or slower than normal

Abnormalities described include both those which are a consequence of the amputation procedure employed and those which may be a consequence of either the characteristics of the prosthetic components or the fitting procedures employed.

Abnormalities described refer to the prosthetic limb unless otherwise stated.

For comparison, the gait abnormality (Figure 1 a to Figure 20 a) and the normal gait pattern at the same instant of the gait cycle (Figure 1 b to Figure 20 b) are illustrated when appropriate.

5 Trans-tibial amputation

5.1 Initial contact and loading response (Weight acceptance)

5.1.1 Knee joint hyperextension at initial contact

See Figure 1 a.

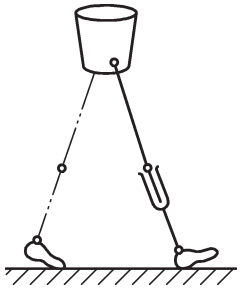

Figure 1 a — Knee joint hyperextension

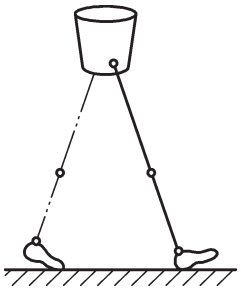

Figure 1 b — Normal – Initial contact

5.1.2 Increased knee joint flexion at initial contact (>5 °)

See Figure 2 a.

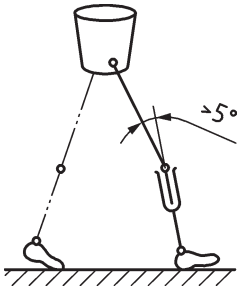

Figure 2 a — Increased knee joint flexion

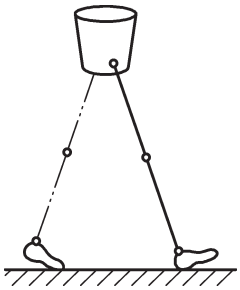

Figure 2 b — Normal – Initial contact

5.1.3 Increased hip joint flexion at initial contact (>30 °)

See Figure 3 a.

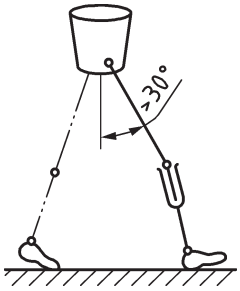

Figure 3 a — Increased hip joint flexion

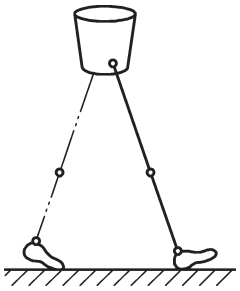

Figure 3 b — Normal – Initial contact

5.1.4 Delayed knee joint flexion during loading response

5.1.5 Reduced knee joint flexion (<5 °) during loading response (with premature forward body progression

See Figure 4 a.

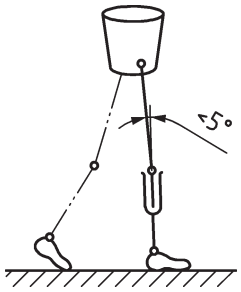

Figure 4 a — Reduced knee joint flexion

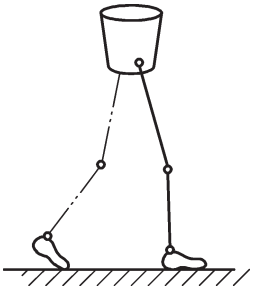

Figure 4 b — Normal – Loading response

5.1.6 Faster knee joint flexion during loading response

5.1.7 Premature and faster full foot contact during loading response (foot slap)

5.1.8 Delayed ankle unit plantar flexion during loading response

5.1.9 External foot rotation at initial contact and/or during loading response

5.2 Mid-stance and terminal stance (Single support)

5.2.1 Premature heel–off (shorter mid-stance)

See Figure 5 a.

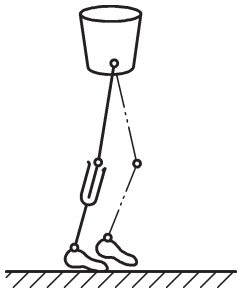

Figure 5 a — Premature heel–off

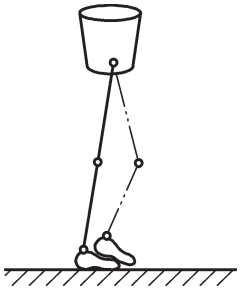

Figure 5 b — Normal – Late mid-stance

5.2.2 Knee joint hyperextension during mid-stance and/or terminal stance

See Figure 6 a.

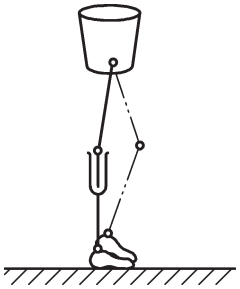

Figure 6 a — Knee joint hyperextension mid-stance

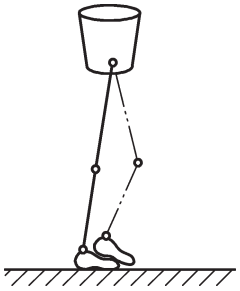

Figure 6 b — Normal – Late mid-stance

5.2.3 Prosthetic abduction during single support (medial thrust)

See Figure 7 a.

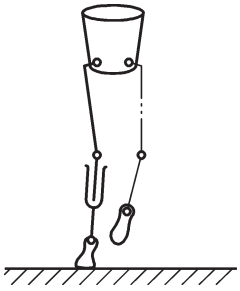

Figure 7 a — Prosthetic abduction

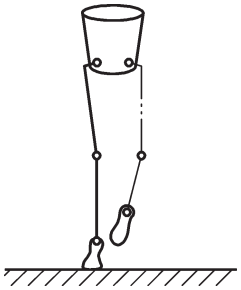

Figure 7 b — Normal – Mid-stance

5.2.4 Prosthetic adduction during single support (lateral thrust)

See Figure 8 a.

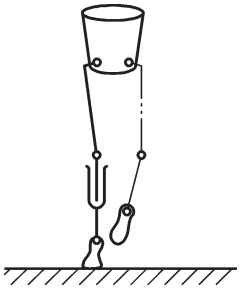

Figure 8 a — Prosthetic adduction

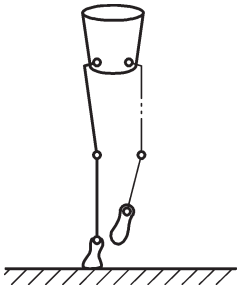

Figure 8 b — Normal – Mid-stance

5.2.5 Hip joint flexion during mid-stance (>0 °)

See Figure 9 a.

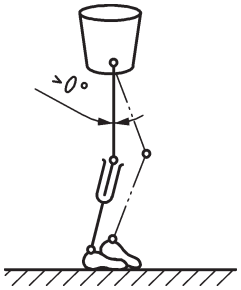

Figure 9 a — Reduced hip extension

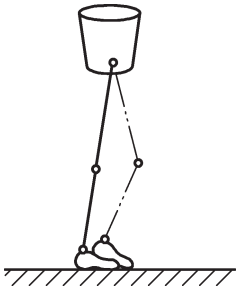

Figure 9 b — Normal – Late mid-stance

5.2.6 Reduced hip joint extension during terminal stance (<10 °)

See Figure 10 a.

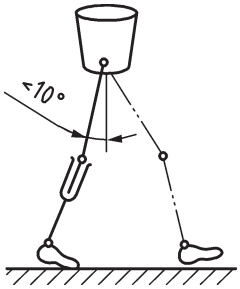

Figure 10 a — Reduced hip extension

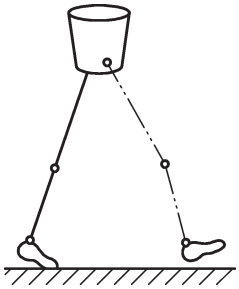

Figure 10 b — Normal – Terminal stance

5.2.7 Lateral trunk bending during single support

5.3 Pre-swing and swing

5.3.1 Reduced foot clearance at mid-swing

5.3.2 Medial or lateral whip during swing

5.4 Gait cycle abnormalities

5.4.1 Unequal step length

5.4.2 Unequal step timing

5.4.3 Narrow or wide walking base

5.5 Walking aid(s) (specify type)

5.5.1 Contralateral side

5.5.2 Prosthetic side

5.5.3 Both sides (e.g. walkers)

6 Trans-femoral amputation

6.1 Initial contact and loading response (Weight acceptance)

6.1.1 Increased heel impact at initial contact

6.1.2 Knee unit instability at initial contact

6.1.3 Knee unit in full extension at initial contact (maintained throughout stance)

See Figure 11 a.

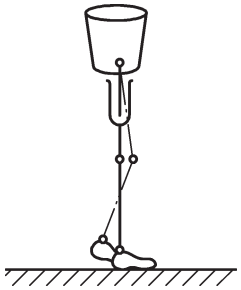

Figure 11 a — Full knee unit extension

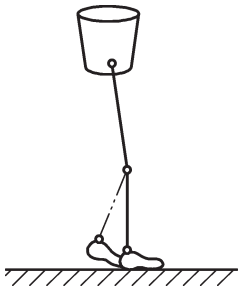

Figure 11 b — Normal – Mid-stance

6.1.4 Premature and faster full foot contact during loading response (foot slap)

6.1.5 Premature hip joint extension during loading response

6.1.6 Medial or lateral trunk bending during loading response

6.1.7 Delayed ankle unit plantar flexion during loading response

6.1.8 External or internal foot rotation at initial contact and/or during loading response

6.2 Mid-stance and terminal stance (Single support)

6.2.1 Abducted hip joint during mid-stance

See Figure 12 a.

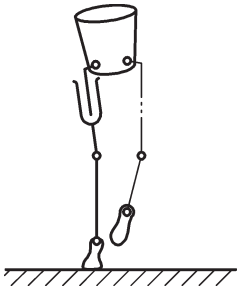

Figure 12 a — Abducted hip joint

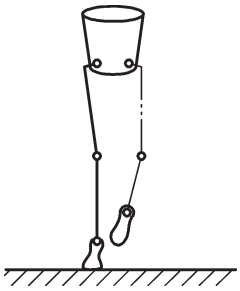

Figure 12 b — Normal – Mid-stance

6.2.2 Prosthetic adduction during single support

See Figure 13 a.

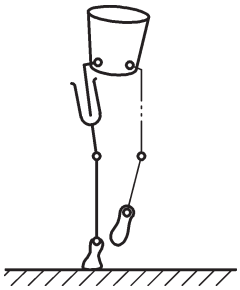

Figure 13 a — Prosthetic adduction

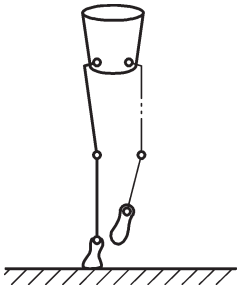

Figure 13 b — Normal – Mid-stance

6.2.3 Lateral or medial trunk bending during single support

6.2.4 Increased lumbar lordosis during single support

See Figure 14 a.

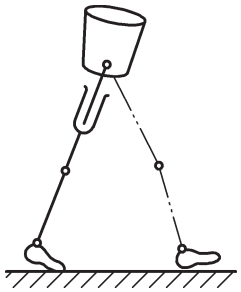

Figure 14 a — Increased lumbar lordosis

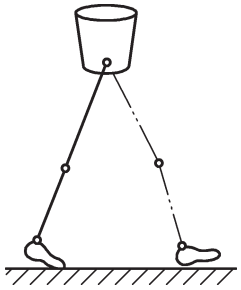

Figure 14 b — Normal – Mid-stance

6.2.5 Externally or internally rotated foot during single support

6.3 Pre-swing and swing

6.3.1 Absent or reduced knee unit flexion (with consequent increased hip joint extension) during pre-swing

See Figure 15 a.

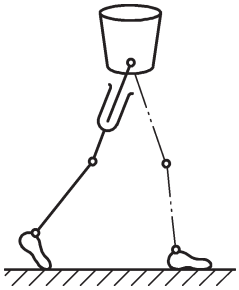

Figure 15 a — Reduced knee unit flexion

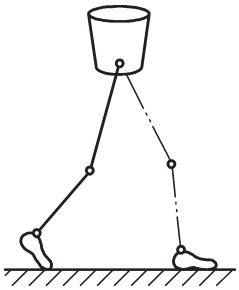

Figure 15 b — Normal – Pre-swing

6.3.2 Delayed hip joint and knee unit flexion during pre-swing

6.3.3 Premature upward movement and increased forward (transverse plane) rotation of the pelvis during pre-swing

6.3.4 Increased knee unit flexion during initial swing

See Figure 16 a.

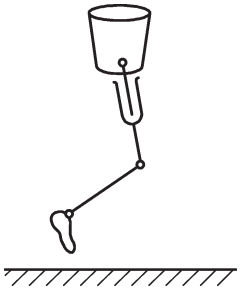

Figure 16 a — Increased knee unit flexion

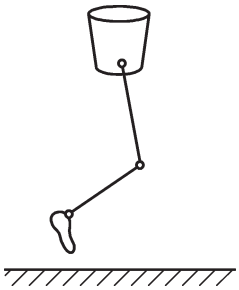

Figure 16 b — Normal – Initial swing

6.3.5 Plantar flexion of the contralateral ankle joint during swing (vaulting)

6.3.6 Increased hip joint flexion during initial and mid-swing

See Figure 17 a.

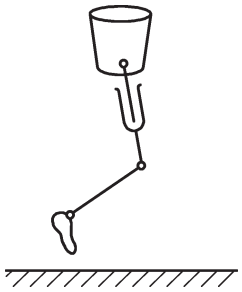

Figure 17 a — Increased hip joint flexion

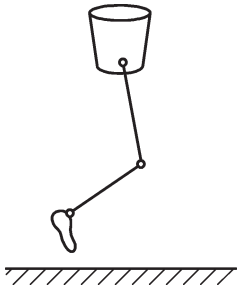

Figure 17 b — Normal – Initial swing

6.3.7 Medial trunk bending with hip hiking during swing

See Figure 18 a.

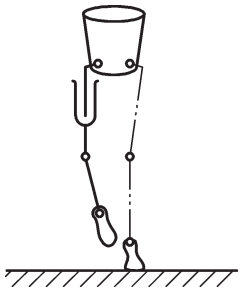

Figure 18 a — Medial trunk bending with hip hiking

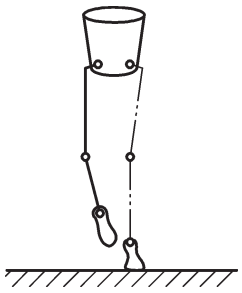

Figure 18 b — Normal – Mid-swing

6.3.8 Delayed knee unit extension during mid-swing

See Figure 19 a.

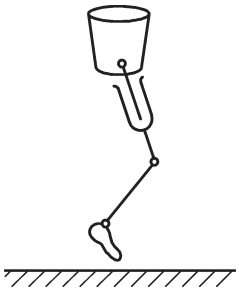

Figure 19 a — Delayed knee unit extension

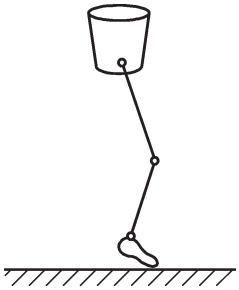

Figure 19 b — Normal – Mid-swing

6.3.9 Faster knee unit extension during terminal swing

6.3.10 Terminal knee unit extension impact

6.3.11 Medial or lateral foot whip during swing

6.3.12 Reduced foot clearance during swing

6.3.13 Hip hiking during swing

6.3.14 Circumduction during swing

See Figure 20 a.

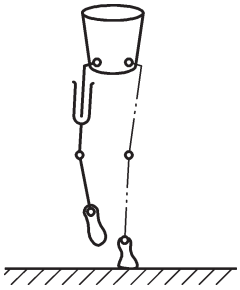

Figure 20 a — Circumduction

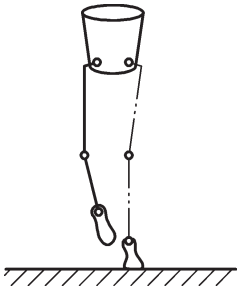

Figure 20 b — Normal – Mid-swing

6.4 Gait cycle abnormalities

6.4.1 Unequal step length

6.4.2 Unequal step timing

6.4.3 Narrow or wide walking base

6.5 Walking aid(s) (specify type)

6.5.1 Contralateral side

6.5.2 Prosthetic side

ICS 11.040.40; 01.040.11

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