
**Prosthetics and orthotics —
Vocabulary —**

**Part 3:
Pathological gait (excluding
prosthetic gait)**

Prothèses et orthèses — Vocabulaire —

Partie 3: Marche pathologique





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Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Pathological gait	1
4.1 General	1
4.2 Method of description	1
4.2.1 Gait deviations	1
4.2.2 Abnormal foot contact	2
4.2.3 Abnormalities of joint motion	2

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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).

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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 World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

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

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 (excluding prosthetic gait)*

Introduction

No internationally accepted vocabulary of terms is available to describe pathological gait.

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

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

The following definitions apply in understanding how to implement an ISO International Standard and other normative ISO deliverables (TS, PAS, IWA):

- “shall” indicates a requirement;
- “should” indicates a recommendation;
- “may” is used to indicate that something is permitted;
- “can” is used to indicate that something is possible, for example, that an organization or individual is able to do something.

In 3.3.1 of the ISO/IEC Directives, Part 2 (sixth edition, 2011) defines a requirement as an “expression in the content of a document conveying criteria to be fulfilled if compliance with the document is to be claimed and from which no deviation is permitted”.

In 3.3.2 of the ISO/IEC Directives, Part 2 (sixth edition, 2011) defines a recommendation as an “expression in the content of a document conveying that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others, or that a certain course of action is preferred, but not necessarily required, or that (in the negative form) a certain possibility or course of action is deprecated but not prohibited.”

Prosthetics and orthotics — Vocabulary —

Part 3: Pathological gait (excluding prosthetic gait)

1 Scope

This part of ISO 29783 specifies a method of describing abnormal gait patterns resulting from pathology (excluding prosthetic gait) by identifying the deviations from the normal pattern of gait during each sub-phase of the gait cycle. The description of the deviations includes references to abnormal foot contact and abnormalities of joint motion.

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 apply.

4 Pathological gait

4.1 General

Structural damage to the musculoskeletal system, and/or muscle weakness, and/or abnormal neuromuscular control can lead to an abnormal gait pattern. The abnormal motions of the lumbar spine, pelvis and lower limb segments can be a result of the pathology and/or be compensatory.

NOTE Abnormal motions of the remainder of the trunk, head, neck and upper limbs during gait are not described in this part of ISO 29783.

4.2 Method of description

4.2.1 Gait deviations

Abnormal gait shall be described by stating the deviations from the normal gait pattern, for each of the undernoted sub-phases of the gait cycle:

- initial contact;
- loading response;
- mid-stance;
- terminal stance;
- pre-swing;

- initial swing;
- mid-swing;
- terminal swing.

The normal gait pattern specified in ISO 29783-1 is the widely accepted pattern for the adult population. Persons applying this part of ISO 29783 shall decide what magnitude of deviation from the normal is significant and, therefore, requiring to be specified.

4.2.2 Abnormal foot contact

The area of contact of the foot can be abnormal for parts or all of the stance phase of the gait cycle.

Abnormal areas of foot contact can be

- lateral side,
- medial side,
- forefoot,
- midfoot,
- hindfoot,
- total plantar surface,
- dorsum, and
- combinations of these.

Specify the abnormal area of foot contact for each affected sub-phase of the stance phase.

4.2.3 Abnormalities of joint motion

4.2.3.1 Abnormal angular motion

Pathological conditions can result in abnormal angular motions of the joints. Abnormal angular motion of a joint can be described by specifying the joint angle at the end of each sub-phase of the gait cycle.

- An abnormal joint angle, which is in a normal plane and normal direction of motion, can be either increased or decreased.
- An abnormal joint angle, which is in a normal plane of motion, can be in the opposite direction to normal.
- An abnormal joint angle can be in an abnormal plane of motion.

Specify for each sub-phase of the gait cycle any abnormal joint angles in the relevant planes of motion.

If the angle of any joint is fixed, this shall be specified at initial contact only.

EXAMPLE 1 At initial contact in the sagittal plane, the normal knee joint angle is between 0° and 5° of flexion.

Possible abnormal joint angles are the following:

- increased knee joint flexion (i.e. >5°), e.g. knee flexion contracture;
- knee joint hyperextension, e.g. generalized ligament laxity;
- fixed knee joint flexion (e.g. 15°), e.g. severe osteoarthritis.

EXAMPLE 2 At the end of mid-stance, in the coronal plane, the normal knee joint angle is between 4° and 7° of abduction (valgus).

Possible abnormal joint angles are the following:

- increased knee joint abduction (i.e. >7°), e.g. medial collateral ligament deficiency;
- decreased knee joint abduction (i.e. <4°), e.g. generalized osteoarthritis;
- knee joint adduction (varus), e.g. medial compartment osteoarthritis.

4.2.3.2 Abnormal timing

Pathological conditions can result in abnormalities in the timing of the angular motion of joints. The abnormal timing of angular motion of a joint can be referred to as either “early” when it occurs earlier than normal or “delayed” when it occurs later than normal.

Specify for each sub-phase of the gait cycle any abnormal timings of joint motion in the relevant planes of motion.

EXAMPLE 1 At the end of mid-stance, in the sagittal plane, the heel normally remains in contact with the ground.

A possible abnormality is early heel rise, e.g. contracture of the ankle plantarflexors.

EXAMPLE 2 At the end of pre-swing, in the sagittal plane, the ankle joint is normally in 20° of plantar flexion.

A possible abnormality is delayed plantar flexion, e.g. weakness of the ankle plantarflexors.

4.2.3.3 Abnormal speed

Pathological conditions can result in abnormalities in the speed of the angular motion of joints.

Any abnormality in the speed of angular motion can be referred to as either faster than normal or slower than normal.

Specify for each sub-phase of the gait cycle any abnormal speed of the angular motion of joints in the relevant planes of motion.

EXAMPLE 1 During loading response in the sagittal plane, the ankle joint normally plantar flexes at a controlled speed to achieve foot flat.

A possible abnormality is faster uncontrolled ankle joint plantar flexion (foot slap), e.g. weakness of ankle dorsiflexors.

EXAMPLE 2 During swing phase, the hip joint flexes and the knee joint extends at a controlled speed to achieve initial contact.

A possible abnormality is faster uncontrolled knee joint extension, e.g. weakness of the knee extensors in polio.

