

Recommendations for early mobilisation at Swiss Stroke Centres and Stroke Units: a practice guide and discussion paper

Martina Betschart^{a, b, *}, Lucie Sahli^{c, *}, Katrien Van den Keybus Déglon^{d, *}, Jens Wuschke^{e, *}

a Department of Health, Eastern Switzerland University of Applied Sciences, St. Gallen, OST, Switzerland; b Institute of Therapies and Rehabilitation, Cantonal Hospital Winterthur (KSW), Winterthur, Switzerland; c Department of Therapies, Hospital network of Neuchâtel (RHNe), Switzerland; d Département des neurosciences cliniques, Centre Hospitalier Universitaire Vaudois (CHUV), Lausanne, Switzerland; e Department of Neurology and Stroke Centre, Health Eastern Switzerland, Cantonal Hospital St. Gallen, St. Gallen, Switzerland; * Representing the Stroke Therapies Network and the Stroke Nursing Network (working groups of the Swiss Stroke Society)

Summary

The present recommendation document proposes a non-binding practical guide intended to support the standardised implementation of early mobilisation at Swiss Stroke Centres and Stroke Units, with application planned to begin in January 2026. It was developed by the “Early Mobilisation Working Group”, established in November 2023, to promote a consistent, evidence-based approach to mobilising stroke survivors in the (hyper)acute phase at Swiss Stroke Centres and Stroke Units. The group originated from the “Stroke Therapy Network” committee of the Swiss Stroke Society and developed into a collaboration with the “Stroke Nursing Network” committee of the Swiss Stroke Society.

The current literature does not provide sufficient evidence to define all aspects of the dose and intensity of early mobilisation of stroke survivors. Therefore, this guide also draws upon clinical expertise and considers the structural and organisational conditions specific to Swiss Stroke Centres and Stroke Units.

Some aspects of early mobilisation remain insufficiently defined and require ongoing discussion and research. The authors explicitly invite stakeholders and readers to provide feedback to support the continued development and improvement of this guide.

Introduction

The use of standardised early mobilisation protocols promotes patient-specific care and has been shown to support recovery processes. In a cohort study involving 1117 patients in a neurological intensive care unit, the introduction of a standardised, progressive early mobilisation protocol led to significantly higher levels of mobilisation as well as mobility compared to conventional practice [1, 2]. It was also associated with a 33% shorter hospital stay and a clinically relevant decrease in hospital-related anxiety and depression.

A national survey conducted by the Early Mobilisation Working Group between April and June 2025 revealed variability in the implementation of early mobilisation across Swiss Stroke Centres and Stroke Units [3]. Of the 25 institutions contacted, 24 responded, with 22 reporting the presence of an internal mobilisation protocol. Among these, 14 reported consistent adherence to their protocol. All protocols were developed based on scientific evidence and clinical expertise.

The observed 64% adherence rate to mobilisation protocols within Swiss Stroke Centres and Stroke Units aligns with findings from previous literature. In a study by Rethnam et al. [4], 40% of neurology clinicians – including physicians, nurses and therapy staff – reported relying primarily on their clinical expertise and interpretation of existing literature, citing that current clinical practice guidelines for stroke care are often perceived as insufficiently specific and lacking the necessary flexibility for real-world application.

Published

25 March 2026

doi

<https://doi.org/10.57187/4921>

Cite this as

Swiss Med Wkly. 2026;156:4921

Martina Betschart, Pt., PhD

Ostschweizer Fachhochschule
CH-9001 St. Gallen
[martina.betschart\[at\]ost.ch](mailto:martina.betschart[at]ost.ch)

The present work aims to synthesise existing high-level evidence concerning early mobilisation in Swiss Stroke Centres and Stroke Units through a narrative review, intended to serve as a practical guide and discussion paper rather than a systematic review or the development of a new guideline. It is important to emphasise that the primary focus was on the timing and dosage (including time points, duration and frequency) of early mobilisation. The guide does not provide specific recommendations regarding the type of mobilisation (e.g. techniques or concepts).

To encourage the application of the described procedures, this paper includes open questions and discussion points for the reader.

Methods

To inform this practical guide, three authors (LS, KVdKD, MB) conducted a targeted literature search in PubMed, the Cochrane Library and selected stroke guideline websites. The literature search was conducted between December 2023 and June 2024. Publications were included when published in English or German, and the study design was a systematic review or meta-analysis. Additionally, national or international guidelines published or updated after 2013 were considered. Guidelines were only included if they described the use of a standardised framework for the development of recommendations that included assessments of the validity of the included studies. Consequently, to avoid redundancy, the internal and external validity of the included publications were not analysed. Clinical trials published after the included systematic reviews and guidelines were screened by their abstracts; however, they were only included if they provided new or conflicting information. Search terms were "stroke" AND "acute mobilisation" OR "early mobilisation" OR "acute management", AND "guidelines" or "Leitlinie", "Mobilisation" and "Schlaganfall", "Neurointensiv*". This practical guide was formulated in accordance with the Scale for Assessment of Narrative Review Articles (SANRA) [5]. In this search, the term mobilisation included the activity levels of sitting (in bed) and out-of-bed mobilisation (including sitting in an armchair, standing and gait activities).

The findings were presented to the Board of the Swiss Stroke Society in autumn 2024. The discussion emphasised medical aspects that, in the authors' opinion, were not adequately covered in the existing literature (e.g. inclusion of patients after haemorrhagic stroke, intravenous thrombolysis, thrombectomy, and the literature-based medical contraindications). Additionally, the discussion included the presentation of a decision tree (figure 1). The feedback was integrated into the practical guide, ensuring that the recommendations reflect both the available scientific evidence and the consensus of clinical experts in the Swiss context.

Results

Seven international guidelines [6–11], two consensus-based recommendations [12, 13] and two systematic reviews [14–16] (table 1) were retained, of which only moderate-to-strong recommendations were extracted to create the decision tree (figure 1). No clinical trials were included.

The green numbering in figure 1 is referred to in the following text with bold numbers in brackets "**(1–5)**". Based on the available evidence, these recommendations are tentative. All statements in this chapter are based on the listed evidence if not otherwise stated.

Table 1: Studies and guidelines included.

Organisation / authors		Title & reference
AHA/ASA – acute ischemic stroke guideline [6]	American Heart Association / American Stroke Association	Guidelines for the Early Management of Patients With Acute Ischemic Stroke: 2019 Update to the 2018 Guidelines for the Early Management of Acute Ischemic Stroke: A Guideline for Healthcare Professionals from the American Heart Association/American Stroke Association.
NICE – Stroke and TIA Guideline [7]	National Institute for Health and Care Excellence	Stroke and transient ischaemic attack (TIA) in over 16s: diagnosis and initial management (2019). NICE guideline NG128. Accessed June 2025.
DGAI – S3 ICU AWMF Guideline [8]	Deutsche Gesellschaft für Anästhesiologie und Intensivmedizin	Deutsche Gesellschaft für Anästhesiologie und Intensivmedizin (DGAI). S3-Leitlinie zur Lagerungstherapie und Mobilisation von kritisch Erkrankten auf Intensivstationen. Version 3.1, 2023. Chapter 5. Available at: https://register.awmf.org/de/leitlinien/detail/001-015 . Accessed June 2025.
SAP-E Stroke Action Plan Essentials [9]	European Stroke Organisation	SAP-E Essentials of Stroke Care; European Stroke Organisation Action Plan: An overview of evidence-based interventions covering the entire chain of stroke care. Available at: https://action-plan.eso-stroke.org/wp-content/uploads/2021/07/Essential-Stroke-Care_final_20210714_CPO.pdf . Accessed April 2025.
Stroke Foundation – living guideline [10]	Stroke Foundation	Stroke Foundation. Australian and New Zealand Living Clinical Guidelines for Stroke Management: Chapter 5 of 8: Rehabilitation. Available at: https://informme.org.au/guidelines/living-clinical-guidelines-for-stroke-management# . Accessed June 2025.
KNGF – Stroke Guideline for physical therapy [11]	Royal Dutch Society for Physical Therapy	Royal Dutch Society for Physical Therapy (Koninklijk Nederlands Genootschap voor Fysiotherapie, KNGF) Clinical Practice Guideline for Physical Therapy in patients with stroke.
ESO – motor rehabilitation framework [12]	European Stroke Organisation	Motor rehabilitation after stroke: European Stroke Organisation (ESO) consensus-based definition and guiding framework.
NA	Schaller et al. (2024) [13]	Guideline on positioning and early mobilisation in the critically ill by an expert panel.
Systematic reviews*		
NA	Rethnam et al. (2022) [14]	Early mobilisation post-stroke: a systematic review and meta-analysis of individual participant data.
NA	Mariana de Aquino Miranda et al. (2021) [15]	Early mobilisation in acute stroke phase: a systematic review.
EBRSR - Stroke Rehabilitation Review	Foley et al. (2018) [16]	Evidence-Based Review of Stroke Rehabilitation (EBRSR). (2018). Chapter 6: The elements of stroke rehabilitation. Available at: http://www.ebrsr.com/evidence-review . Accessed June 2025.

AWMF: Arbeitsgemeinschaft der Wissenschaftlichen Medizinischen Fachgesellschaften e. V.; ICU: intensive care unit; NA: not applicable.

It is crucial to emphasise that the patient's unique clinical condition must always be considered when applying these recommendations. An interprofessional exchange is crucial for this purpose. However, the current literature does not provide evidence-based guidance on which professional group is responsible for prescribing mobilisation, determining continuation of bed rest or coordinating interprofessional roles. In the absence of such data, these responsibilities must be defined at the institutional level, according to local organisational structures and interprofessional agreements.

Furthermore, these recommendations do not supersede medical prescriptions or contraindications. Recommendations for medical contraindications or criteria for discontinuation are delineated in table 2. The contraindication criteria provide cut-offs to support clinical decision-making regarding when mobilisation should be paused, discontinued or refrained from.

The recommendations are for people who have had an ischaemic stroke **(1)**. This practical guide does not provide recommendations regarding mobilisation after endovascular thrombectomy, and on the duration of bed rest after intravenous thrombolysis due to a lack of recommendations in the literature included **(2)**. Details such as procedures, materials, provider roles, delivery modes, personalisation strategies, and harm monitoring were not included, as these data were insufficiently reported in the literature and would have required a systematic expert consensus process, which was outside the scope of this work.

Figure 1: Early mobilisation decision tree. Numbers 1–5 are placed in the “Results” section next to the corresponding explanation. (?): no recommendations regarding Thrombolysis; *: Core-Set assessment (see appendix); ADL: activities of daily living; HRmax: maximal heart rate; HRR: heart rate reserve; OOB: out-of-bed; NIHSS: National Institutes of Health Stroke Scale (ranging from 0 to 42; the higher the score, the more severe the stroke); RPE: rate of perceived exertion measured on the modified Borg scale ranging from 0 to 10.

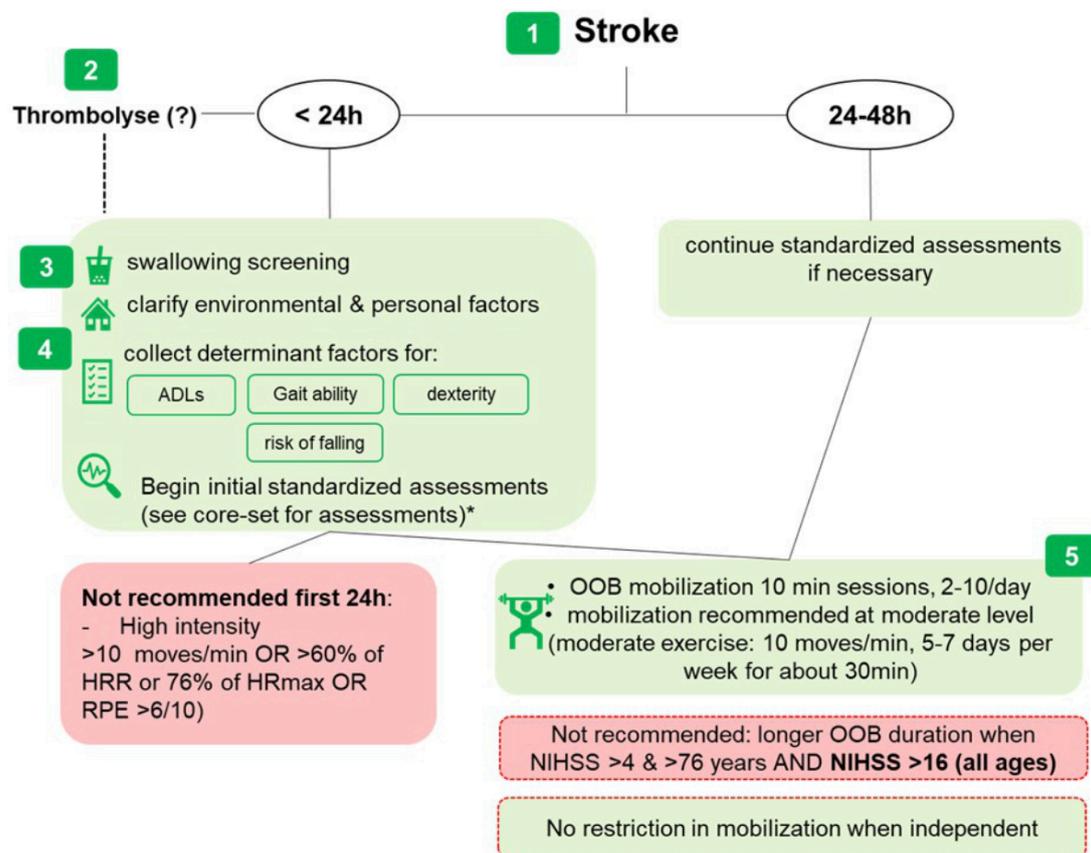


Table 2: Contraindications and termination criteria. Contraindications based on the DGAI guideline, 2023, “Empfehlung 3.10” [8] and adapted from the evaluation of a modified Early Warning Score to identify patients at risk (Subbe et al. [17]). The criteria were suggested as cut-offs when mobilisation should be paused, discontinued or refrained from. Age >70 years = higher risk of reaching unstable conditions / high dependency [17].

Clinical parameter	Value
SpO ₂	<86%
Heart rate increase or heart rate (bpm)	>30% increase from initial value <40 or ≥130 bpm
Cardiac arrhythmia	New onset or increased symptoms
Systolic blood pressure increase	≥40 mm Hg
Diastolic blood pressure increase	≥20 mm Hg
Mean arterial pressure	<60 or ≥110 mm Hg; nicardipine pump
Respiratory rate	>40 / min
Body temperature	≤36°C or ≥38.5°C
Intracranial pressure (haemorrhagic lesions only)	≥20 cmH ₂ O
Surgical contraindications	E.g. unstable fractures
Deterioration of the state of consciousness	Compared to the start of mobilisation
Pain	Not amenable to effective analgesic intervention

bpm: beats per minute

First 24 hours after stroke (hyperacute phase)

According to the literature provided in table 1, mobilisation out of bed (OOB) during the first 24 hours post-stroke can be performed in the absence of medical contraindications [17] (figure 1 and table 1). The only essential criterion is the aforementioned swallowing screening **(3)**. Generally, frequent but brief OOB mobilisations are recommended (e.g. 10-minute sessions, 2–10 times per day) **(5)**. This is particularly relevant for individuals who are severely affected, as measured by an initial National Institutes of Health Stroke Scale (NIHSS) score >16, or for individuals who are aged >76 years and have an initial NIHSS score ≥ 4 [18]. Not recommended in the first 24 hours are intensive activities [10, 12, 18]. Sitting out of bed should be actively promoted to reduce sedentary time, particularly in patients who are unable to reposition themselves independently [19]. However, prolonged sitting should be avoided, in order to minimise the risk of inactivity-related complications. For patients who are already independent and safely mobile in the first 24 hours, there are no arguments in favour of restrictions.

Within 24 hours of admission to the Stroke Unit or Stroke Centre, clinical observation, including standardised assessments covering “body function”, “activities” and “environmental and personal factors” as per the International Classification of Functioning, Disability and Health, is recommended [11] **(4)**. If bed rest is prescribed, the assessments are modified accordingly or conducted once the bed rest has been discontinued. These observations serve two primary purposes. First, to assess the patient’s abilities and the external contributing factors to determine therapy needs and aftercare support recommendations. Second, they promote safe mobilisation and therapy **(4)**. A further working group of the Stroke Therapy Network has compiled a core set of physiotherapeutic assessments to serve these purposes. This Core-Set assessment is based on convergent items from the literature and international guidelines and is available in the supplemental files. It is not a formal consensus product, nor has it been validated or published as guidance. Therefore, it should be viewed as a non-binding aid rather than a strict standard.

24 hours to 48 hours

Three guidelines strongly recommended that OOB mobilisation take place within the first 48 hours [9–11]. During this period, the recommendation of short but more frequent mobilisation out of bed continues to apply. Assessments should also be repeated for follow-up documentation during the Stroke Unit or Stroke Centre stay. No specific recommendations for 48 hours to 72 hours were found.

Discussion

In this practical guide on mobilisation during the (hyper)acute phase following ischaemic stroke, we aimed to follow the framework proposed by Rethnam et al. [4], seeking a balance between the accuracy of information and feasibility. Specifically, we addressed key factors such as patient characteristics relevant to decision-making, intervention dose and intensity, and known contraindications.

Our review indicates that current evidence regarding the influence of patient characteristics and mobilisation dosage remains limited and inconclusive. These limitations and their implications are further explored in the subsequent section.

Inclusion of haemorrhagic strokes

While one systematic review included in our analysis incorporated 268 individuals with haemorrhagic stroke (alongside 2362 individuals with ischaemic stroke), the evidence base remains comparatively limited for this subgroup [14]. Further, none of the included reviews or guidelines provided robust data on lesion size, anatomical location or other imaging-based parameters relevant to mobilisation decisions in haemorrhagic stroke. Haemorrhagic strokes are associated with higher mortality rates [20]; however, clinical parameters such as a Glasgow Coma Scale (GCS) score below nine may serve as more direct predictors of outcomes than stroke subtype alone [21].

This subject was a main discussion point with the Board of the Swiss Stroke Society. A consensus was reached at the Board, suggesting not to include this patient population in the present guide. In light of these gaps, we recommend that future guidelines cautiously incorporate this patient group, guided by individual clinical status and known contraindications specific to haemorrhagic events (table 2). Additionally, more research is needed for this patient group.

Bedrest after intravenous thrombolysis

The included literature did not contain any recommendations regarding OOB mobilisation in connection with intravenous thrombolysis. Research indicates that mobilisation at six or twelve hours does not increase risk of adverse outcomes [22–24]. Nevertheless, post-thrombolysis mobilisation decisions are mainly medical; consequently, we do not provide specific recommendations. However, developing a nationally standardised protocol could enhance consistency in care and potentially improve both safety and rehabilitation outcomes.

Head positioning

This guide does not provide recommendations on head positioning due to inconsistent evidence. The international HeadPoST trial with over 11,000 participants found no significant difference in disability outcomes at 3 months between patients in a flat position for 24 hours and those with head elevation $>30^\circ$, but it has faced methodological criticisms [25, 26]. It did not adequately consider evidence suggesting head positioning matters in cases of major vessel occlusion or high intracranial pressure, and may have had sampling bias limiting subgroup effect detection.

A head elevation of $30\text{--}45^\circ$ at all times post-stroke is recommended to support lung function, reduce intracranial pressure and minimise aspiration risk, especially in brainstem lesions [8].

Mobilisation intensity

Despite the recognised importance of intensity in neurorehabilitation, the included literature provides little guidance on mobilisation intensity during the acute phase of stroke. The only specific and quantifiable parameter identified was the number of movement repetitions per minute (figure 1, 5). No data were reported regarding the progression or regression of intensity. Although cadence is an improvement over time-based measures, it may not fully capture the physical and cognitive demands, which can be significant even in brief activities, such as five steps or sit-to-stand transitions. The American Congress of Rehabilitation Medicine Stroke Movement Interventions Subcommittee defines intensity as: “The amount of physical or mental work put forth by the client during a particular movement or series of movements, exercise or activity during a defined period of time” (from ESBR, page 35) [16]. We therefore recommend combining cadence with training principles and monitoring intensity using heart rate or subjective exertion scales like Borg [27]. The reference values for moderate intensity in neurology are defined as 40–60% of heart rate reserve (HRR) or 64–76% of maximal heart rate (HRmax), and a perceptual exertion level of 4–5 on the modified Borg Scale, which ranges from 0 to 10 [28]. Activities or exercises that result in a heart rate exceeding 60% of HRR or 76% of HRmax, and a perceived exertion level greater than 6, are classified as high intensity. These general reference values for high intensity were incorporated into the decision tree as extra guidance.

Standardised assessments

There is no international consensus on standardised physiotherapeutic assessments for patients in Stroke Centres or Stroke Units. Only the Dutch guideline specifies goals for physiotherapists in these units [11] (figure 2).

Figure 2: Role of physiotherapy in Stroke Centres or Stroke Units (own illustration based on the Stroke Practice Guideline of the Dutch Physiotherapy Association [11], produced with kind permission).

*Role of physiotherapy at SUs/SCs

(KGNF) B.1.2 Physical therapy at the stroke service

- The role of the physical therapist in the interdisciplinary team. The central place occupied by the physical therapist within the team of experts implies that he or she must confer with the other disciplines involved at scheduled times about the intended patient management (the physical therapy treatment plan). The physical therapist's tasks include:
- **recording data** on the care provided, including the intended functional **goals**, and reporting these to the stroke team or the referring physician;
- keeping track of the **rehabilitation management** approach agreed by the interdisciplinary team;
- **regularly objectively assessing** the patient's functioning and **changes** therein, and recording the numerical assessment outcomes in the patient's file.

The Core-Set assessment presented in the supplemental files matches the Dutch guideline but excludes assessments like the Barthel Index and Frenchay Arm Test; as in Switzerland, nursing and occupational therapy mainly handle these areas.

Take-home message

In general, early out-of-bed mobilisation is recommended within the first 24 hours after stroke. However, physically intensive therapy should be avoided during this period.

Patients should be mobilised within the first 48 hours, ideally at a moderate intensity.

For patients aged over 76 years with moderate stroke severity, or for severely affected patients of any age (NIHSS >16), prolonged mobilisation sessions (>13 minutes) should be avoided.

All recommendations must be applied with careful consideration of individual medical contraindications.

Acknowledgments

We want to thank all the members of the Stroke Therapies Network and the contributors from the Stroke Nursing Network (Tim Horn, Kantonsspital Baden; Gabriela Klaiber, Spital Wetzikon; and Alexandra Loewer, Centre Hôpitalier Universitaire Vaudois, Lausanne), as well as the Board of the Swiss Stroke Society, for their valuable feedback. We want to thank all colleagues from the various Stroke Centres and Stroke Units for taking the time to answer our questionnaire. We greatly appreciate the provision of the Core-Set assessment by its authors.

Author contributions: MB, LS and KVdKD conceptualised the idea and carried out the literature review. MB and LS drafted the manuscript. MB, JW, LS and KVdKD contributed significantly to its finalisation.

Potential competing interests

All authors have completed and submitted the International Committee of Medical Journal Editors form for disclosure of potential conflicts of interest. No potential conflict of interest related to the content of this manuscript was disclosed.

References

- Klein KE, Bena JF, Mulkey M, Albert NM. Sustainability of a nurse-driven early progressive mobility protocol and patient clinical and psychological health outcomes in a neurologic intensive care unit. *Intensive Crit Care Nurs*. 2018 Apr;11-7. <https://doi.org/10.1016/j.iccn.2018.01.005> 29396165 1532-4036
- Klein K, Mulkey M, Bena JF, Albert NM. Clinical and psychological effects of early mobilization in patients treated in a neurologic ICU: a comparative study. *Crit Care Med*. 2015 Apr; (4):865-73. <https://doi.org/10.1097/CCM.0000000000000787> 25517476 1530-0293
- Wuschke J, Sahli L, van den Keybus Deglon K, Klaiber G, Horn T, Loewer A, Betschart M. Use of mobilisation protocols across Swiss Stroke Centers and Units; a national survey from 2025. *forthcoming* 2026.
- Rethnam V, Hayward KS, Bernhardt J, Churilov L. Early Mobilization After Stroke: Do Clinical Practice Guidelines Support Clinicians' Decision-Making? *Front Neurol*. 2021 Feb;6:606525. <https://doi.org/10.3389/fneur.2021.606525> 33633667 1664-2295
- Baethge C, Goldbeck-Wood S, Mertens S. SANRA-a scale for the quality assessment of narrative review articles. *Res Integr Peer Rev*. 2019 Mar;(1):5. <https://doi.org/10.1186/s41073-019-0064-8> 30962953 2058-8615
- Powers WJ, Rabinstein AA, Ackerson T, Adeoye OM, Bambakidis NC, Becker K, et al. Guidelines for the Early Management of Patients With Acute Ischemic Stroke: 2019 Update to the 2018 Guidelines for the Early Management of Acute Ischemic Stroke: A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association. *Stroke*. 2019 Dec;(12):e344-418. <https://doi.org/10.1161/STR.0000000000000211> 31662037 1524-4628
- National Institute for Health and Care Excellence. Stroke and transient ischaemic attack in over 16s: diagnosis and initial management: NICE guideline Reference number:NG128. April 2022. <https://www.nice.org.uk/guidance/ng128>. Accessed Juni 2025.
- AWMF. S3-Leitlinie Lagerungstherapie und Mobilisation von kritisch Erkrankten auf Intensivstation. 2023-2027. <https://register.awmf.org/de/leitlinien/detail/001-015>. Accessed June 2025.
- Steiner T, Turc G, Dawson J, Sunnerhagen K, Christensen H. SAP-E Essentials of Stroke Care; European Stroke Organisation Action Plan: An overview of evidence-based interventions covering the entire chain of stroke care. https://actionplan.eso-stroke.org/wp-content/uploads/2021/07/Essential-Stroke-Care_final_20210714_CPO.pdf. Accessed April 2025.
- Australian and New Zealand Living Clinical Guidelines for Stroke Management. New Zealand Living Clinical Guidelines for Stroke Management: Chapter 5 of 8: Rehabilitation. 28.07.2023. <https://app.magicapp.org/#/guideline/6841>. Accessed June 2025.
- Veerbeek J, van Wegen E, van Peppen R, Hendriks H, Rietberg MB, van der Wees P, et al. KNGF Clinical Practice Guideline for Physical Therapy in patients with stroke: Practice Guidelines. 2014. https://www.dsnr.nl/wp-content/uploads/2012/03/stroke_practice_guidelines_2014.pdf
- Kwakkel G, Stinear C, Essers B, Munoz-Novoa M, Branscheidt M, Cabanas-Valdés R, et al. Motor rehabilitation after stroke: european Stroke Organisation (ESO) consensus-based definition and guiding framework. *Eur Stroke J*. 2023 Dec;(4):880-94. <https://doi.org/10.1177/23969873231191304> 37548025 2396-9881
- Schaller SJ, Scheffebichler FT, Bein T, Blobner M, Grunow JJ, Hamsen U, et al. Guideline on positioning and early mobilisation in the critically ill by an expert panel. *Intensive Care Med*. 2024 Aug;(8):1211-27. <https://doi.org/10.1007/s00134-024-07532-2> 39073582 1432-1238
- Rethnam V, Langhorne P, Churilov L, Hayward KS, Herisson F, Poletto SR, et al. Early mobilisation post-stroke: a systematic review and meta-analysis of individual participant data. *Disabil Rehabil*. 2022 Apr;(8):1156-63. <https://doi.org/10.1080/09638288.2020.1789229> 32673130 1464-5165
- Mariana de Aquino Miranda J, Mendes Borges V, Bazan R, José Luvizutto G, Sabrynsa Morais Shinosaki J. Early mobilization in acute stroke phase: a systematic review. *Top Stroke Rehabil*. 2023 Mar;(2):157-68. <https://doi.org/10.1080/10749357.2021.2008595> 34927568 1945-5119
- Foley N, Hussein N, Saikaley M, Iruthayarajah J, Wiener J, Speechley M, et al. The Elements of Stroke Rehabilitation: Chapter 6. <http://www.ebrsr.com/evidence-review/6-elements-stroke-rehabilitation>
- Subbe CP, Kruger M, Rutherford P, Gemmel L. Validation of a modified Early Warning Score in medical admissions. *QJM*. 2001 Oct;(10):521-6. <https://doi.org/10.1093/qjmed/94.10.521> 11588210 1460-2725
- Bernhardt J, Churilov L, Ellery F, Collier J, Chamberlain J, Langhorne P, et al.; AVERT Collaboration Group. Prespecified dose-response analysis for A Very Early Rehabilitation Trial (AVERT). *Neurology*. 2016 Jun;(23):2138-45. <https://doi.org/10.1212/WNL.0000000000002459> 26888985 1526-632X
- Norvang OP, Hokstad A, Taraldsen K, Tan X, Lydersen S, Indredavik B, et al. Time spent lying, sitting, and upright during hospitalization after stroke: a prospective observation study. *BMC Neurol*. 2018 Sep;(1):138. <https://doi.org/10.1186/s12883-018-1134-0> 30180819 1471-2377
- Waziry R, Heshmatollah A, Bos D, Chibnik LB, Ikram MA, Hofman A, et al. Time Trends in Survival Following First Hemorrhagic or Ischemic Stroke Between 1991 and 2015 in the Rotterdam Study. *Stroke*. 2020 Mar;(3):STROKEAHA119027198. <https://doi.org/10.1161/STROKEAHA.119.027198> 32078785 1524-4628

21. Namale G , Kamacooko O , Makhoba A , Mugabi T , Ndagire M , Ssanyu P , et al. Predictors of 30-day and 90-day mortality among hemorrhagic and ischemic stroke patients in urban Uganda: a prospective hospital-based cohort study. *BMC Cardiovasc Disord.* 2020 Oct;(1):442. <https://doi.org/10.1186/s12872-020-01724-6> 33032527 1471-2261
22. Arnold SM , Dinkins M , Mooney LH , Freeman WD , Rawal B , Heckman MG , et al. Very early mobilization in stroke patients treated with intravenous recombinant tissue plasminogen activator. *J Stroke Cerebrovasc Dis.* 2015 Jun;(6):1168–73. <https://doi.org/10.1016/j.jstrokecerebrovasdis.2015.01.007> 25869770 1532-8511
23. Momosaki R , Yasunaga H , Kakuda W , Matsui H , Fushimi K , Abo M . Very Early versus Delayed Rehabilitation for Acute Ischemic Stroke Patients with Intravenous Recombinant Tissue Plasminogen Activator: A Nationwide Retrospective Cohort Study. *Cerebrovasc Dis.* 2016;(1-2):41–8. <https://doi.org/10.1159/000444720> 26986718 1421-9786
24. Silver B , Hamid T , Khan M , Di Napoli M , Behrouz R , Saposnik G , et al. 12 versus 24 h bed rest after acute ischemic stroke thrombolysis: a preliminary experience. *J Neurol Sci.* 2020 Feb;(116618). <https://doi.org/10.1016/j.jns.2019.116618> 31837536 1878-5883
25. Anderson CS , Arima H , Lavados P , Billot L , Hackett ML , Olavarría VV , et al.; HeadPoST Investigators and Coordinators . Cluster-Randomized, Crossover Trial of Head Positioning in Acute Stroke. *N Engl J Med.* 2017 Jun;(25):2437–47. <https://doi.org/10.1056/NEJMoa1615715> 28636854 1533-4406
26. Alexandrov AW , Tsivgoulis G , Hill MD , Liebeskind DS , Schellinger P , Ovbiagele B , et al. HeadPoST: rightly positioned, or flat out wrong? *Neurology.* 2018 May;(19):885–9. <https://doi.org/10.1212/WNL.0000000000005481> 29643083 1526-632X
27. Borg GA . Psychophysical bases of perceived exertion. *Med Sci Sports Exerc.* 1982;(5):377–81. <https://doi.org/10.1249/00005768-198205000-00012> 7154893 0195-9131
28. MacKay-Lyons M , Billinger SA , Eng JJ , Dromerick A , Giacomantonio N , Hafer-Macko C , et al. Aerobic Exercise Recommendations to Optimize Best Practices in Care After Stroke: AEROBICS 2019 Update. *Phys Ther.* 2020 Jan;(1):149–56. <https://doi.org/10.1093/ptj/pzz153> 31596465 1538-6724

Appendix

Recommendations for a Core Set of Standardised Physiotherapeutic Assessments in the Acute Stroke Unit

Janne M. Veerbeek,¹ Sandrine Bärtschi², Steven Rieger³

1 Clinic for Neurology and Neurorehabilitation, Lucerne Cantonal Hospital, University Teaching and Research Hospital of the University of Lucerne, Lucerne, Switzerland

2 Department of Physiotherapy and Occupational Therapy, University Hospital Zürich, Zürich, Switzerland

3 Department of Therapies, Clinic Hirslanden Zurich, Zurich, Switzerland

Unpublished work on behalf of the Stroke Therapy Network, Committee of the Swiss Stroke Society

This core assessment set is proposed as a national recommendation for standardised physiotherapeutic evaluations in Swiss Stroke Units and Stroke Centres. The aim is to ensure consistency, enhance data quality, and facilitate multicentre comparability of physiotherapy outcomes in the acute phase following stroke. The following aspects were included in the selection of standardised assessments:

- Which constructs are most relevant to physiotherapy in acute stroke care?
- Which assessments demonstrate adequate validity and reliability?
- Which assessments have predictive value, particularly regarding walking ability?
- Which assessments are recommended by existing clinical guidelines outside of Switzerland and international consensus-based recommendations?
- Which assessments are feasible and practical to conduct in the acute stroke setting based on our clinical experience?

Table 1. Recommended core set of assessments

Construct (ICF-Classification)	Assessment
Lower limb strength (b730)	Motricity Index – Lower Extremity Subscale (MI-LE)
Trunk control (d410, d415)	Trunk Control Test (TCT)
Walking ability (d450)	Functional Ambulation Categories (FAC)
Walking speed (b770)	10-Meter Walk Test at comfortable speed (for patients with FAC ≥ 3)

Keys: b730 Muscle power functions; d410 Changing basic body position; d415 Maintaining a body position; d450 Walking; b770 Gait pattern functions.

Box 1. Recommended time point of assessment

It is recommended to perform and document the assessments of the core set within 72 hours of admission.

This core set contains assessments that objectively quantify key constructs relevant to physiotherapy during the (hyper)acute poststroke phase. By focusing on a limited number of reliable and validated assessments, this approach promotes consistency, allows for the comparability of patient data, and improves the quality and utility of collected data across sites.

In cases where deficits are identified in the recommended assessments—or in other domains relevant to physiotherapy—additional targeted assessments may be indicated to guide treatment planning.

While upper limb and cognitive functioning are often part of physiotherapy management, formal standardised assessment in these areas falls under the primary responsibility of occupational therapy. Therefore, no recommendations are made regarding these constructs within the current framework.

Discharge planning is an interdisciplinary process. Accordingly, interdisciplinary assessments that support decisions on discharge destination—such as the Short Version of the Lucerne ICF-Based Multidisciplinary Observation Scale (Short-LIMOS)—are beyond the scope of this document.

References:

- [1] [Canadian Stroke Best Practices | Home, BPR08 Introduction \(strokebestpractices.ca\)](#).
- [2] Collin C, Wade D. Assessing motor impairment after stroke: a pilot reliability study. *J Neurol Neurosurg Psychiatry*. 1990 Jul;53(7):576-9. doi: 10.1136/jnnp.53.7.576.
- [3] Ottiger B, Vanbellingen T, Cazzoli D, Nyffeler T, Veerbeek JM. Development and Validation of the Short-LIMOS for the Acute Stroke Unit-A Short Version of the Lucerne ICF-Based Multidisciplinary Observation Scale. *Front Rehabil Sci*. 2022 Apr 5;3:857955. doi: 10.3389/fresc.2022.857955. PMID: 36189034; PMCID: PMC9397680.
- [4] Pohl J, Held JPO, Verheyden G, Alt Murphy M, Engelter S, Flöel A, Keller T, Kwakkel G, Nef T, Ward N, Luft AR, Veerbeek JM. Consensus-Based Core Set of Outcome Measures for Clinical Motor Rehabilitation After Stroke-A Delphi Study. *Front Neurol*. 2020 2;11:875. doi: 10.3389/fneur.2020.00875.
- [5] Rugters-Koolstra M, Kwakkel G. Nederlandse Vereniging voor Ziekenhuisfysiotherapie. Behandelprotocol fysiotherapie bij patiënten met een herseninfarct of hersenbloeding op de ziekenhuis stroke unit. Amersfoort, Koninklijk Nederlands Genootschap voor Fysiotherapie (KNGF). June 2021.
- [6] Van Criekinge T, Heremans C, Burrige J, Deutsch JE, Hammerbeck U, Hollands K, Karthikbabu S, Mehrholz J, Moore JL, Salbach NM, Schröder J, Veerbeek JM, Weerdesteyn V, Borschmann K, Churilov L, Verheyden G, Kwakkel G. Standardized measurement of balance and mobility post-stroke: Consensus-based core recommendations from the third Stroke Recovery and Rehabilitation Roundtable. *Neurorehabil Neural Repair*. 2024;38(1):41-51. doi: 10.1177/15459683231209154.
- [7] Veerbeek JM, Ottiger B, Cazzoli D, Vanbellingen T, Nyffeler T. Speed up discharge planning at the acute stroke unit: A development and external validation study for the early prediction of discharge home. *Front Neurol*. 2022 Sep 16;13:999595. doi: 10.3389/fneur.2022.999595. PMID: 36188378; PMCID: PMC9523004.
- [8] Winstein CJ, Stein J, Arena R, Bates B, Cherney LR, Cramer SC, Deruyter F, Eng JJ, Fisher B, Harvey RL, Lang CE, MacKay-Lyons M, Ottenbacher KJ, Pugh S, Reeves MJ, Richards LG, Stiers W, Zorowitz RD; American Heart Association Stroke Council, Council on Cardiovascular and Stroke Nursing, Council on Clinical Cardiology, and Council on Quality of Care and Outcomes Research. Guidelines for Adult Stroke Rehabilitation and Recovery: A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association. *Stroke*. 2016;47(6):e98-e169. doi: 10.1161/STR.0000000000000098.