# Physiotherapy alignment with guidelines for the management of stroke in the inpatient setting

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## ABSTRACT

Clinical guidelines provide a summary of published research to aid the delivery of evidence-based health care. Although alignment with clinical guidelines is associated with positive outcomes in stroke care, there is a lack of evidence to show that physiotherapy management is aligned with the *New Zealand Clinical Guidelines for Stroke Management 2010*. A retrospective audit was performed on the clinical records of 101 patients discharged from a public hospital in the Auckland region with a diagnosis of stroke in 2012. Issues of management were identified and recorded as in alignment with the guidelines or not. Results showed wide variation in areas of alignment. The highest overall alignment was for management of shoulder pain (100%) and follow up physiotherapy (99%). The alignment with guidelines for activity related limitations (sitting balance, sit to stand, standing balance, walking/mobility, difficulties with activities of daily living, and upper limb functional deficits) were consistently addressed, with a focus on lower limb function and mobility. Recommendations with lower levels of evidence and for issues which do not appear to be a primary functional problem had lower alignment. Ongoing audit cycles would be useful to provide setting specific information of stroke management for improving stroke care.

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## INTRODUCTION

Clinical guidelines are systematically developed statements to assist the delivery of appropriate health care (Hill and Lalor 2008, Thomas et al 1999, van der Wees et al 2008). Guidelines aim to reduce inappropriate variations in practice, promote the delivery of high quality, evidence-based healthcare and improve cost effectiveness by providing a convenient, up to date and unbiased summary of published research to be implemented in clinical settings (Hill et al 2009, Otterman et al 2012, Thomas et al 1999, van der Wees et al 2008). In acute stroke, positive associations between the alignment with recommended stroke management and health outcomes have been documented (Hubbard et al 2012). Research conducted in countries such as the United Kingdom (UK) (Hammond et al 2005, Irwin et al 2005, Roberts et al 2000, Rudd et al 2007, Rudd et al 1999, Rudd et al 2001, Walsh et al 2009, Wolfe et al 1997), Australia (Cadilhac et al 2004, Harris et al 2010, Hubbard et al 2012, Luker and Grimmer-Somers 2009) and New Zealand (Gommans et al 2003, Gommans et al 2008) concludes that standards of stroke care could be more aligned with guidelines. However, these studies refer to the stroke management provided by Australian and UK rehabilitation units and cannot be easily generalised to a New Zealand setting. The results from one study (Hubbard et al 2012) highlight the value of nationally agreed clinical guidelines in relation to undertaking national audits. In 2010, the Stroke Foundation of New Zealand partnered with the National Stroke Foundation of Australia and the New Zealand Guidelines Group to revise and adapt the Australian national guidelines for New Zealand (Stroke Foundation of New Zealand and New Zealand Guidelines Group 2010). It is therefore timely to evaluate if physiotherapy in New Zealand is aligned with these new guidelines. This study aimed to audit this in one New Zealand hospital in the Auckland region.

## METHODS

Approval for this audit was obtained from the Waitemata District Health Board Awhina Research and Knowledge Centre.

### Study design and patient sample

A retrospective audit was performed of the physiotherapy clinical notes using an audit checklist (Appendix 1), based on the *New Zealand Clinical Guidelines for Stroke Management 2010* and the management issues identified by Hubbard et al (2012). The focus points of physiotherapy management included in the audit were selected based on the focus of physiotherapy assessment and treatment. After a pilot screen of three clinical records and discussion between the authors, it was decided that issues such as continence, perception, communication, vision, cognition, psychological impairments, secondary prevention, home assessment, community reintegration and post-discharge were areas of management to be excluded from the audit, as they do not fall under the sole responsibility of physiotherapy. Some issues identified as secondary complications as well as influencing secondary prevention, such as reduced cardiorespiratory fitness, were included in the audit as they have

recommendations relevant to physiotherapy management in the inpatient setting. The checklist was trialed on a randomly selected patient file. The results gathered by the Physiotherapy Professional Leader (PPL) at Waitemata District Health Board were compared with the results gathered by the auditor, which enabled any points of difference to be discussed and clarified with the PPL. Nothing was changed as a result of this process.

All clinical records for patients with a discharge diagnosis of stroke, discharged from a public hospital in the Auckland region, within a consecutive three month period in 2012, were retrieved, resulting in 101 sets of records. Records were selected if the patient was admitted to an acute ward (stroke unit or medical ward) or Assessment, Treatment and Rehabilitation ward (referred to as a rehabilitation ward) at this hospital and had received physiotherapy management. Diagnoses of transient ischaemic attack (TIA) were not included as the recommended management is published separately in the New Zealand TIA Guidelines (2008). If patients had a recorded discharge diagnosis of stroke, yet the medical notes referred to the event as a TIA, they also were excluded. Clinical records were also excluded if the records stated that physiotherapy management was not indicated. If a patient was transferred from an acute ward to the rehabilitation ward, the management received on this ward was only audited if discharge from the rehabilitation ward fell within the auditing dates.

In total, seven out of 101 records were excluded, resulting in 94 notes available for auditing and analysis. This number represented 17% of the total stroke events per year at the studied hospital and is consistent with a sample of stroke population that has been used in an Australian audit (16%) (Luker and Grimmer-Somers 2009).

Patient demographic data (age, gender, ethnicity, smoking status, admission and discharge dates to and from wards, and place of residence prior to admission and after discharge) were recorded. Audit data were extracted manually from clinical records, recorded on a hard copy sheet and transferred into an Excel Spreadsheet. The data entry was checked twice for errors and audit numbers were used to ensure confidentiality.

### Data analysis

Patient data were extracted from patients' records from the point of admission to discharge, including acute ward and rehabilitation ward admissions. The following criteria were used to identify the presence of an impairment or management issue:

- Recorded in the notes as being reported by patient as a problem, or
- Patient was at a lower level of function than pre-admission (by patient or health professional identification), or
- Recorded by physiotherapist as an impairment, or
- Results from a standardised measure indicated impairment and/or loss of function.

The impairments were recorded if present at the time of physiotherapy assessment and it should be noted that some symptoms, for example weakness, may have resolved by the time the patient was seen by the physiotherapist.

If a management issue was present, the management received was dichotomously categorised as being in alignment with the guidelines or not. If no treatment was described or documentation was inadequate, it was categorised as not in alignment. An activity limitation was also recorded as present if the activity was beyond the functional capability of a patient but not explicitly recorded. Alignment was identified if the impairment was present and the intervention received was the management recommended in the *New Zealand Clinical Guidelines for Stroke Management 2010*. Alignment was considered if there were at least five records with the impairment present. The percentage of alignment with the recommended management for each specific management issue was calculated with the denominator "impairment present" and the numerator "guideline aligned management was received". All data calculations were made using Microsoft Excel and the final percentages rounded to the nearest whole number. The overall alignment was calculated as a mean of the percentage alignment of the acute ward and rehabilitation ward. The alignment was compared between the two settings but statistical tests were not carried out.

## RESULTS

Information about audited cases is presented in Table 1. Of the 94 notes audited, all received physiotherapy management in an acute ward and 24 in both an acute and a rehabilitation ward. The mean age of patients was 76 years. The average length of stay in an acute ward was 10 days and 19 days in a rehabilitation ward. The majority of patients were discharged to the same place of residence as before the stroke (74%), some were discharged to a different destination where they would receive a higher level of support (18%), a small number died (4%) and some were not stated (3%).

The recommendations for education and goal setting were relevant for all patients and therefore were a management issue for 100% of patients (Table 2). Aside from issues relevant to all patients, the most commonly identified management issues in the acute setting were loss of cardiovascular fitness (84%), falls risk (83%), and walking and mobility (72%). The most commonly identified in the rehabilitation setting were falls risk (88%), walking and mobility (88%), and loss of cardiovascular fitness (75%).

Alignment with the guideline recommendations based on the presence of impairments is shown in Table 2. The areas with the highest overall alignment with the guidelines were shoulder pain and central pain (100%) and follow up physiotherapy (99%). The overall alignment was low (less than 50%) in areas of altered sensation (5%), goal setting (14%), education (30%), contracture (37%) and falls risks (47%).

As shown in Figure 1, there was greater alignment in the rehabilitation setting than the acute setting for all management issues except for altered sensation (0% compared to 9% respectively), difficulties with activities of daily living (ADLs) (60% compared to 61% respectively), and education (17% compared to 43% respectively). No cases of central pain were identified in the acute setting.

Alignment for the management issues of activity limitations varied between acute and rehabilitation settings. The greatest overall alignment was for walking and mobility (77%), followed by sitting balance (73%), sit to stand (71%), standing balance (71%) and then difficulties with activities of daily living (60%). The ranking of order in the rehabilitation setting was similar to

**Table 1: Characteristics of Audited Patients**

| Characteristic | n | Characteristic | n (%) |
|---|---|---|---|
| Age (years) | | Ethnicity | |
| <65 | 13 | NZ European | 61 (65) |
| 65-74 | 18 | Maori | 4 (4) |
| 75-84 | 42 | Pasifika | 4 (4) |
| >85 | 21 | Other European | 16 (17) |
| Mean (range, SD) | 76 (36-100, 12) | Chinese | 7 (7) |
| | | Middle Eastern | 1 (1) |
| | | Not stated | 1 (1) |
| Mean length of stay | days (range, SD) | Discharge destination | |
| Acute ward | 10 (1-38, 8) | Same as preadmission | 70 (74) |
| Rehabilitation | 19 (1-56, 14) | Different to preadmission | 17 (18) |
| | | Deceased | 4 (4) |
| | | Not stated | 3 (3) |
| Sex | | Smoking status | |
| Male | 55 (59%) | Current (<4 weeks) | 10 (11) |
| Female | 39 (41%) | Ex smoker | 35 (37) |
| | | Non smoker | 48 (51) |
| | | Not stated | 1 (1) |

the overall ranking of alignment, but the order of alignment in the acute setting was ranked differently. Sitting balance had the highest alignment (71%) out of activity limitations in the acute setting. Upper limb functional deficit had the lowest level of alignment out of activity limitations in both the acute and rehabilitation settings and this was reflected by an overall alignment of 52%. Weakness was also a fairly common problem as 59% of patients admitted to an acute ward and 73% of those in a rehabilitation ward were identified as having weakness; however, guideline alignment was only 39% and 75% respectively.

Although cardiovascular fitness was identified as one of the most prevalent issues in both the acute and rehabilitation settings, the overall alignment was only 51% (acute: 24%, rehabilitation: 78%). In addition, physiotherapists identified impairments with neuromuscular control and coordination, but there were no clinical recommendations in the guidelines to which management could be aligned.

## DISCUSSION

The key finding of this audit is that activity related limitations were regularly addressed but there were variations in areas of alignment. Variation was seen between settings (acute compared to rehabilitation) and also between different issues addressed, relating to the type of impairment. Barriers may have hindered the provision of management in alignment with the guidelines and consequently some management issues may appear prioritised. For example, it appears that importance is placed on enabling patients to regain their functional ability in order to manage activities of daily living once discharged from the hospital.

The literature suggests various barriers to providing care in alignment with national guidelines. These include lack of time (Bayley et al 2012, Hammond et al 2005, Heinemann et al 2003, Luker and Grimmer-Somers 2009, Otterman et al 2012, Van Peppen et al 2008), staffing issues (Bayley et al 2012, Hamilton et al 2006, Walsh et al 2009) and financial factors (Heinemann et al 2003, Otterman et al 2012, Van Peppen et al 2008, Wolfe et al 1997). In particular, barriers identified by the Ontario stroke group (Bayley et al 2008) such as lack of time, team functioning and communication and prioritisation of therapy may have challenged the direct translation of guidelines into practice in the current study. It also cannot be assumed that the recommended management was a suitable treatment, as medical stability and co-morbidities are just two factors which may influence the decision to provide an intervention. As this audit only provides data on alignment, it would be beneficial to explore what factors affect alignment to the guidelines in New Zealand.

In the acute setting, activity limitations had a higher alignment than impairments such as weakness, in contrast to the rehabilitation wards, where the management of weakness and activity limitations had similar rates of alignment. This may be because in the acute setting, functional activities need to be prioritised to facilitate discharge. A shorter length of stay in an acute ward implies time constraints and so one intervention may have been used to address multiple issues. Interventions recommended by the guidelines for one issue, for example repeated sit to stand practice for limitations with sit to stand, could have been used with the aim of also addressing weakness, even though this activity does not explicitly meet the recommendation for weakness. This explanation could not be substantiated as the rationale for treatment selection was not documented.

**Table 2: Alignment with Recommended Management**

| Management issue | Acute | | | Assessment, Treatment and Rehabilitation | | | Overall alignment (%) |
|---|---|---|---|---|---|---|---|
| | Impairment present (n) | Guidelines met (n) | Alignment (%) | Impairment present (n) | Guidelines met (n) | Alignment (%) | |
| Sensorimotor impairment | | | | | | | |
| Weakness | 55 | 22 | 40% | 17 | 13 | 76% | 58% |
| Altered sensation | 22 | 2 | 9% | 3 | 0 | 0% | 5% |
| NMC/coordination* | 16 | - | - | 5 | - | - | - |
| Activity limitations | | | | | | | |
| Sitting balance | 24 | 17 | 71% | 4 | 3 | 75% | 73% |
| Sit to stand | 36 | 24 | 67% | 12 | 9 | 75% | 71% |
| Standing balance | 59 | 36 | 61% | 17 | 13 | 76% | 69% |
| Walking/mobility | 68 | 46 | 68% | 21 | 18 | 86% | 77% |
| Upper limb functional deficit | 26 | 12 | 46% | 7 | 4 | 57% | 52% |
| Difficulties with ADLs† | 28 | 17 | 61% | 5 | 3 | 60% | 60% |
| Secondary complications | | | | | | | |
| Contracture | 12 | 4 | 33% | 5 | 2 | 40% | 37% |
| Subluxation | 7 | 5 | 71% | 2 | 2 | 100% | 86% |
| Shoulder Pain | 7 | 7 | 100% | 1 | 1 | 100% | 100% |
| Central Pain | 0 | 0 | - | 1 | 1 | 100% | 100% |
| Swelling | 1 | 0 | 0% | 1 | 0 | 0% | 0% |
| Loss of cardiovascular fitness/decreased exercise tolerance | 79 | 19 | 24% | 18 | 14 | 78% | 51% |
| Fatigue | 37 | 16 | 43% | 8 | 5 | 63% | 53% |
| Other | | | | | | | |
| Education | 94 | 40 | 43% | 24 | 4 | 17% | 30% |
| Falls risk | 78 | 22 | 28% | 21 | 14 | 67% | 47% |
| Follow up physiotherapy | 41 | 40 | 98% | 6 | 6 | 100% | 99% |
| Goal setting | 94 | 6 | 6% | 24 | 5 | 21% | 14% |

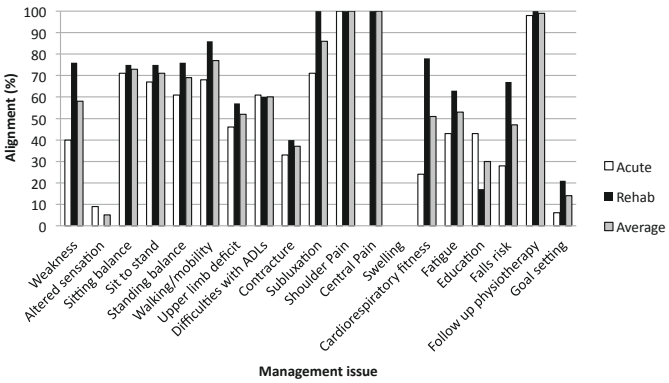
Notes. There are no recommendations for the management of neuromuscular control and coordination therefore no data was gathered on alignment. *NMC: Neuromuscular control. †ADLs: Activities of daily living.

The rationale for the management of sensation was unclear and although alignment was good for the consensus recommendation of assessing and informing the patient, the grade C evidence supporting interventions was not always followed. Because there was no documentation to justify that the sensation intervention was not appropriate, management was recorded as not aligned. Thus more evidence is required to enable appropriate management.

Once patients were able to mobilise independently or were at a functional level similar to their preadmission status, they were discharged from acute physiotherapy. If a patient was identified as having the potential to benefit from further rehabilitation they were usually discharged to a rehabilitation ward. Although it is important to start rehabilitation as early as possible, the consistently higher alignment of management in the rehabilitation setting indicates the consideration of whether it is feasible to expect care 100% aligned with guidelines in the acute setting or to focus on providing care according to clinical risk.

When patients are in hospital for a prolonged period of time for rehabilitation and are of low clinical risk, cardiovascular fitness must not be overlooked. A loss of cardiovascular fitness was documented as an impairment in 84% (acute) and 75% (rehabilitation) of cases but has been identified as a precursor of stroke as well as a secondary complication. Severe cardiovascular deconditioning occurs

**Figure 1: Physiotherapy alignment with stroke guidelines at a public Hospital, Auckland Region.**




as a result of the immobility imposed after early stroke (Kelly et al 2003), which implies all patients would benefit from addressing this issue. There is grade A evidence to support that interventions should be provided to increase cardiovascular fitness once the person with stroke has sufficient strength in the large lower limb muscle groups, and regular ongoing fitness training should be encouraged. This would consequently address what the guidelines identify as a secondary complication, as well as addressing secondary prevention of subsequent cardiovascular events (Saunders et al 2009, Stroke Foundation of New Zealand and New Zealand Guidelines Group 2010). Only half the patients identified as having reduced cardiovascular fitness received management in alignment with the guidelines, so this may be an area to focus on for change.

The focus of physiotherapy management for activity limitations appeared to be on lower limb function and mobility, as upper limb functional deficits had the lowest overall alignment of the activity limitations. The audit performed by Hubbard et al (2012) found that alignment for this management issue was 60%, compared to an average 52% in the current study. Hubbard et al (2012) gathered data from hospitals that included management from all disciplines rather than focusing specifically on physiotherapy. When gathering the data for the current audit, it was observed that the alignment of management for this issue occurred when a physiotherapist performed a joint therapy session with an occupational therapist and did repetitive task related training. Thus, a lower alignment of physiotherapy management to guidelines may be owing to team functioning, with another profession taking a lead role in providing the management. It would be beneficial to conduct further research into factors such as role overlap, which may affect the implementation of guidelines.

The low alignment for issues such as education of the patient and goal setting appears to be a cause for concern and requires further investigation. Both goal setting and patient education are key competencies of physiotherapists; however, a lack of alignment may also be a result of role overlap or paucity of documentation. Goal setting is not only relevant to physiotherapy and consequently may not have been documented in the physiotherapy notes if it occurred in a team setting. Education and strategies for fatigue management was not clearly provided which was also reflected in the low alignment for fatigue management. It is also important for physiotherapists to clearly provide ongoing education tailored to patients' needs regarding exercise and secondary prevention, and also managing with their impairments once discharged.

Management of patients with falls risk also had low alignment. The guidelines recommend, based on consensus, that a valid tool should be used for screening and identifying patients at risk of falls. The audit indicated that the "patient handling profile" or a Morse Falls Risk score card was used in this study's hospital to assess a patient on admission. Some patients did receive an individual exercise programme but although a referral may have been made to receive care in the community, it was not possible for our audit to determine if this guideline had been met.

The management of shoulder pain and central pain were closely aligned with the guidelines, but these results should be interpreted with caution as there were only a small number of cases with these impairments. Furthermore, the evidence to support the management of these impairments is grade B, C or consensus, which provides less clear direction for clinical practice. The recommended management often involved referring to a specialist or not providing an intervention, such as ultrasound for shoulder pain, so alignment with the guidelines did not necessarily reflect active treatment.

This audit provides a comprehensive picture of stroke care provided by physiotherapists at a public hospital in the Auckland region, based on clinical documentation. Future research could extend this audit to other hospitals in New Zealand and explore what facilitates or hinders alignment to guidelines in the New Zealand. It would be beneficial to perform qualitative research to explore the barriers to implementation of the stroke guidelines in New Zealand.

## Limitations

The results of this study are limited to the findings of one New Zealand hospital which may be different to clinical practice at other New Zealand hospitals. Additionally, alignment with management may have been under-reported because data were retrospectively extracted from clinical records. The results were limited by the quality of documentation, so it is not possible to say whether patients actually received the intervention recorded or whether they received interventions which were not recorded. For the purposes of this audit, it had to be assumed that if an intervention was not recorded it was not received. Impairments may have been present but not assessed and therefore also have been under-reported. The scope of this study was limited to the interventions provided by physiotherapists. A lack of alignment with the guidelines therefore may also have been a result of another profession providing management for the impairment. An advantage of working in a multidisciplinary team is that roles overlap and therefore different professions can focus on different impairments. However, a risk when working in a multidisciplinary team can arise if assumptions are made about another discipline providing an intervention which then does not occur at all. This risk can be minimized by effective communication and use of clinical pathways.

This study was an audit of alignment but not outcomes. The content may have appeared to be the recommended management but it is not possible to determine how effective the management was, as the focus was on content of management and not duration, frequency or intensity. In order to get reliable data for these parameters, an observational study would have to be conducted.

## CONCLUSION

This audit provides an initial picture of the current alignment of physiotherapy management with the New Zealand Guidelines for Stroke Rehabilitation (2010) at a public hospital in the Auckland region. The results show variation in areas of alignment, with activity related limitations being addressed fairly consistently.

Clinical services can use these data to inform their practice. Implications from this study include the importance of continuing to address activity limitations to achieve function and mobility. However, recommendations regarding goal setting and education are supported by strong evidence and therefore should be provided and clearly documented in physiotherapy clinical notes. Issues which may not appear to be a primary functional problem should not be overlooked, especially if the evidence can support interventions to support secondary complications and prevention. Despite the need for stronger evidence to guide management of some issues, there is scope to improve alignment of physiotherapy management, particularly in areas where there is robust evidence.

## KEY POINTS:

- Physiotherapists' management of activity limitations to enable function and mobility are consistently aligned with the guidelines.
- Physiotherapists' provision and documentation of goal setting and patient education showed poor alignment to the guidelines despite strong evidence.
- There was less alignment to stroke guidelines when recommendations were supported by lower level evidence, and further research on how to best manage these issues (such as sensation and neuromuscular control) would be beneficial.
- Further detailed audits of physiotherapy management of stroke in other settings are also likely to provide useful and setting-specific information to improve stroke care.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## CONFLICT OF INTEREST

The authors identify no conflicts of interest.

## PERMISSIONS

Approval for this research was obtained from the Waitemata District Health Board Awhina Research and Knowledge Centre.


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**APPENDIX 1**

| Audit checklist for management issues and alignment with the New Zealand Clinical Guidelines for Stroke Management 2010 | | | | | | Audit # | |
|---|---|---|---|---|---|---|---|
| **Management issue** | Acute | | Rehabilitation | | Measurement used | | |
| | Impairment present | Guidelines met | Impairment present | Guidelines met | | | |
| *Sensorimotor impairment* | | | | | | | |
| Weakness | | | | | | | |
| Altered sensation | | | | | | | |
| NMC*/coordination | | | | | | | |
| *Activity limitations* | | | | | | | |
| Sitting balance | | | | | | | |
| Sit to stand | | | | | | | |
| Standing balance | | | | | | | |
| Walking/mobility | | | | | | | |
| Upper limb functional deficit | | | | | | | |
| Difficulties with ADLs** | | | | | | | |
| *Secondary complications* | | | | | | | |
| Contracture | | | | | | | |
| Subluxation | | | | | | | |
| Shoulder Pain | | | | | | | |
| Central Pain | | | | | | | |
| Swelling | | | | | | | |
| Loss of cardiovascular fitness/decreased exercise tolerance | | | | | | | |
| Fatigue | | | | | | | |
| *Other* | | | | | | | |
| Education | | | | | | | |
| Identified falls risk | | | | | | | |
| Referral for follow up physiotherapy | | | | | | | |
| Goal setting | | | | | | | |
| **Notes**<br>*NMC: Neuromuscular control **ADLs: activities of daily living | | | | | | | |

**APPENDIX 2**

| Management issue | Guideline recommendations |
|---|---|
| *Sensorimotor impairment* | |
| Weakness | One or more of the following interventions should be used for people who have reduced strength: Progressive resistance exercise, EMG biofeedback with conventional therapy, Electrical stimulation. |
| Altered sensation | People with stroke should be assessed by an appropriate health practitioner for loss of or reduction or alteration of sensation, including hypersensitivity. This information should be shared with patients, their family/carers and the interdisciplinary team in order to implement specific strategies for optimising function and safety. Sensory-specific training can be provided. Sensory training designed to facilitate transfer can also be provided. |
| *Activity limitations* | |
| Sitting balance | Sitting practice with supervision/assistance should be provided for people who have difficulty sitting |
| Sit to stand | Practising standing up should be undertaken for people who have difficulty in standing up from a chair |
| Standing | Practising standing up should be undertaken for people who have difficulty in standing up from a chair |
| Walking | After thorough assessment and goal setting by a trained clinician, all people with difficulty walking should be given the opportunity to undertake tailored, repetitive practice of walking (or components of walking) as much as possible. One or more of the following interventions can be used in addition to conventional walking therapy:<br>cueing of cadence<br>mechanically assisted gait (via treadmill, automated mechanical or robotic device)<br>joint position biofeedback<br>virtual reality training<br>Ankle-foot orthoses can be used for people with persistent drop foot. If used, the ankle-foot orthosis should be individually fitted |
| Upper limb functional deficit | For people with difficulty using their upper limb one or more of the following interventions should be given in order to encourage using their upper limb as much as possible:<br>constraint-induced movement therapy<br>mechanical assisted training<br>repetitive task-specific training<br>One or more of the following interventions can be used in addition to interventions listed above:<br>mental practice<br>mirror therapy<br>EMG biofeedback in conjunction with conventional therapy<br>electrical stimulation<br>bilateral training |
| Difficulties with ADLs | Patients with difficulties in performance of daily activities should be assessed by a trained clinician<br>Patients with confirmed difficulties in personal or extended activities of daily living should have specific therapy (e.g., task-specific practice and trained use of appropriate aids) to address these issues<br>Other staff members, the person with stroke and carer/family should be advised regarding techniques and equipment to maximise outcomes relating to performance of daily activities and life roles, and to optimise sensorimotor, perceptual and cognitive capacities.<br>People with difficulties in community transport and mobility should set individualised goals and undertake tailored strategies such as multiple escorted outdoor journeys (i.e., up to seven) which may include practice crossing roads, visits to local shops, bus or train travel, help to resume driving, aids and equipment, and written information about local transport options/alternatives<br>Administration of amphetamines to improve activities of daily living is NOT currently recommended<br>The routine use of acupuncture alone or in combination with traditional herbal medicines is NOT currently recommended in stroke |

| *Secondary complications* | |
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| Contracture | For people at risk of developing contractures undergoing active rehabilitation, the addition of prolonged positioning of muscles in a lengthened position to maintain range of motion is NOT recommended<br>Overhead pulley exercise should NOT be used to maintain range of motion of the shoulder<br>For people who have contracture, management can include the following interventions to increase range of motion:<br>electrical stimulation<br>casting/serial casting |
| Subluxation | For people with severe weakness who are at risk of developing a subluxed shoulder, management should include one or both of the following interventions to minimise subluxation:<br>electrical stimulation<br>firm support devices<br>For people who have developed a subluxed shoulder, management can include firm support devices (e.g., lap trays, arm troughs and triangular slings) to prevent further subluxation<br>People with stroke, carers and staff should receive appropriate training in the care of the shoulder and use of support devices to prevent/minimise subluxation. |
| Shoulder Pain | For people with severe weakness who are at risk of developing shoulder pain, management can include:<br>shoulder strapping<br>interventions to educate staff, carers and people with stroke to prevent trauma to the shoulder.<br>For people with severe weakness who are at risk of developing shoulder pain or who have already developed shoulder pain, the following interventions are NOT recommended:<br>Ultrasound<br>As there is no clear evidence for effective interventions once shoulder pain is already present in people with stroke, management should be based on other guidelines for acute musculoskeletal pain |
| Central Pain | People with stroke found to have unresolved central post stroke pain should receive a trial of:<br>tricyclic antidepressants (e.g., trial amitriptyline first followed by other tricyclic agents or venlafaxine)<br>anticonvulsants (e.g., carbamazepine)<br>Any patient whose central post stroke pain is not controlled within a few weeks should be referred to a specialist pain management team.<br>Other muscular skeletal conditions should be considered as a cause for the patient's pain. |
| Swelling | For people who are immobile, management can include the following interventions to prevent swelling in the hand and foot:<br>dynamic pressure garments for the upper limb<br>electrical stimulation<br>elevation of the limb when resting<br>For people who have swollen extremities, management can include the following interventions to reduce swelling of the hand and foot:<br>dynamic pressure garments for the upper limb<br>electrical stimulation<br>continuous passive motion with elevation<br>elevation of the limb when resting |
| Loss of cardiovascular fitness | Rehabilitation should include interventions to increase cardiorespiratory fitness once the person with stroke has sufficient strength in the large lower limb muscle groups. People with stroke should be encouraged to undertake regular, ongoing fitness training. |
| Fatigue | Therapy sessions should be scheduled and paced to coincide with periods of the day when the person with stroke is most alert and least likely to be physically or cognitively fatigued.<br>People with stroke and their families/carers should be provided with information and education about fatigue including potential management strategies. |

| *Other* | |
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| Education | Where change is required, initial and ongoing education is essential and is relevant for all recommendations in this guideline. All people with stroke and their families/carers should be offered information that is tailored to meet their needs and provided using relevant language and communication formats.<br>Information should be provided at different stages in the recovery process.<br>Routine, follow-up opportunities should be provided to people with stroke and their families/carers with opportunities for clarification or reinforcement of the information provided. |
| Screening: falls risk | Falls risk assessment should be undertaken using a valid tool on admission to hospital. A management plan should be initiated for all those identified as at risk of falls.<br>Multifactorial interventions in the community, including an individually prescribed exercise programme, should be provided for people who are at risk of falling. |
| Referral for follow up physiotherapy | Patients should be transferred to a stroke rehabilitation unit (where available) if ongoing inpatient rehabilitation is required. All patients with severe stroke, who are not receiving palliative care, should be assessed by the specialist rehabilitation team regarding their suitability for ongoing rehabilitation prior to discharge from hospital. |
| Goal setting meeting | Where it is the wish of the persons with stroke (and their family/carer), carers should be actively involved in the recovery process by assisting with goal setting, therapy sessions, discharge planning, and long-term activities. All persons with stroke and their family/carer involved in the recovery process should have their wishes and expectations established and acknowledged.<br>All persons with stroke and their family/carer should be provided with the opportunity to participate in the process of setting goals unless they choose not to or are unable to participate.<br>Health practitioners should collaboratively set goals with the patient for rehabilitation. Goals should be prescribed, specific and challenging. They should be recorded, reviewed and updated regularly.<br>People with stroke should be offered training in self-management skills, which include active problem-solving and individual goal setting. |