

Final Report – Systematic literature search – Stroke Rehabilitation

The following is a summary of the systematic literature search conducted by the *international* Centre for Allied Health Evidence on behalf of the Australian Stroke Coalition *Rehabilitation Working Group*. The findings from this review were used to inform the Rehabilitation Assessment project. This review was funded by Bayer Healthcare.

Primary Question - What is the evidence for best practice rehabilitation after stroke?

Specific questions -

1. What is the evidence for the commencement of rehabilitation? (Timing)
2. What is the evidence for the duration of rehabilitation?
3. What is the evidence for the intensity of rehabilitation?
4. What is the evidence for the delivery of rehabilitation?
5. What evidence is there for eligibility for rehabilitation? (Are there indicators that predict some people respond better to rehabilitation than others)

Methods

Search terms:

Medline MESH Terms: Stroke	Rehabilitation	Rehabilitation Centres
Evaluation Studies	Patient Selection	Eligibility Determination
Cost Benefit Analysis	Predictive Value of Tests	

Other search terms: indicator determinant admission criteria

EMBASE Subject headings: Stroke	Stroke Patient	Stroke Unit
Rehabilitation	Rehabilitation Patient	Rehabilitation Centre
Rehabilitation Medicine	Home Rehabilitation	Cognitive Rehabilitation
Rehabilitation Research	Rehabilitation Care	Speech `Rehabilitation

Other search terms: assess* scoring system

CINAHL search terms: as for Medline terms + assess*

SCOPUS search terms: Stroke	rehab*	assess*
indicator indicat*	predict*	model*

Search strategy: databases included Medline, Embase, CINAHL, Scopus from Jan 2006 to June 2010.

Inclusion/exclusion: Studies related to rehabilitation for adults with stroke. Any level of methodology that provided quantitative data to answer the questions was included. Specific aspects of rehabilitation reported as domain specific (like language training or ADL etc) were not included, unless the responses could be generalised to rehabilitation *per se*.

Two reviewers scanned the generated list of possible studies to apply the inclusion/exclusion criteria. Papers that met the criteria were retrieved in full and specific information extracted as relevant to each question. Quality of studies was not assessed due to time constraints. Information extracted was reported narratively to provide a snap shot of evidence for each question.

Results

The list of potential papers derived from the databases included:

Database hits: Medline = 848; CINAHL = 6230; Embase = 925; Scopus = 2067

Following initial title scan to eliminate obviously inappropriate documents, 469 abstracts were reviewed by both reviewers. Following discussion regarding possible eligibility 115 papers were retrieved in full and had information abstracted where relevant to the questions.

The following is a summary of this information reported under each relevant question.

Q1. Commencement of Rehabilitation

There is growing evidence that early rehabilitation is better:

Hu 2010 – early and intensive rehabilitation leads to improved functional outcomes. Increased rehabilitation intensity also improved outcomes – the most in people with severe stroke (compared to moderate)

Gagnon 2006 – if there is a delay in transition between CSU and Rehabilitation this does not impact outcomes **IF** the CSU commences rehab. Therefore by inference early rehab is required.

Horn 2005 – factors associated with better outcomes in stroke rehabilitation were: - rehabilitation started early; increased time in rehab and newer meds (for risk factors)

Massucci 2006 – predictors of positive rehabilitation outcome – earlier rehabilitation (some negative predictors see later)

Maulden 2005 – timing of initiation of rehab after stroke – the lower the days between stroke onset and rehab admission the better the outcome.

Salter 2006 – early versus delayed admission to rehabilitation – better outcome if rehabilitation admission within 30 days.

Pasek 2009 – early rehabilitation for ischaemic stroke results in better ADL outcomes

Q2 and Q3: Duration and Intensity of rehabilitation

There is growing evidence for more intense rehabilitation in some cases for longer duration:

Jette 2005 – relationship between therapy intensity and outcomes of rehabilitation: increased intensity leads to improved outcomes).

Kwakkel 2006 – intensity of practice related to improved outcomes

Slade 2002 – increased intensity of rehabilitation led to reduced length of stay

Turner-Stokes 2007 – Longer stay rehabilitation is value for money – ie increased costs offset by improved outcomes.

Huang 2009 – impact of timing and dose of rehabilitation on functional recovery – outcome is dose dependent and there are lasting effects.

Horjan 2009 – recovery after stroke – documented recovery ongoing between 6/12 and 1 year post stroke

Saxana 2006 – increased intensity of rehabilitation decreased negative predictors (cognitive impairment, ADL dependence and neurological severity)

Q4: Delivery of rehabilitation (models)

There is growing evidence for the following models and modes of rehabilitation:

Early supported discharge model

Thorsen 2005 – ESD with home-based rehab 5 year follow-up – superior benefits in extended ADL five years later

Pessah-Rasmussen 2009 – early supported discharge that is supported and delivered by the CSU is feasible and effective (see also Askim 2001 – small numbers)

Brady 2005 – cost effectiveness of various models – ESD has moderate evidence of superior cost benefits

Bader 2008 – home based versus hospital based, former has better outcomes – need to confirm cost differences.

Gregory 2009 – inpatients tended to be of greater age, had increased ICU days, increased therapy needs, less poverty; home rehab tended to be younger, decreased therapy/ICU days, increased poverty

Hillier 2010 – home based superior to outpatient for community dwelling

Specialised team – multidisciplinary etc

Duff 2009 – confirm team assessment necessary for goal planning

Schouten 2008 – investigated quality improvements on stroke team effectiveness – resulted in decreased LOS

Mackenzie 2008 – investigated capacity to make decisions about DC destination after stroke – found that more success with formal assessment versus “impressions”.

Yagura 2005 – severe stroke benefit from ID rehabilitation plus regular meetings than usual care

Foley 2007 – specialised stroke rehabilitation services offered greater benefits

Planning for continuum of care

Cameron 2009 – confirms importance of transitions between services for stroke survivors and family.

Kind 2007 – more likelihood of bounce back referrals if complicated transitions (but US data)

Need for follow-up

Van Wijk 2006 – found 12% of people with stroke experienced functional decline in the first year

Dhamoon 2009 – follow-up of long term functional recovery after ischaemic stroke – found functional decline over five year period.

Siegert 2010 – goal setting and client focussed documents – need to be reinforced along care pathway to overcome early cognitive issues

Miscellaneous

Putman 2007 – confirmed admission criteria to stroke rehabilitation is ad hoc, inequitable and variable

Ilett 2010 – confirmed there are significant variations in practice for selecting patients for rehabilitation leading to inequities of access (Vic)

Cameron 2010 – ICF models of activity and participation – recommend use to confirm client focus.

Dow 2010 – model for provision of stroke rehabilitation in rural setting (*Vic - chase up*)

Taylor 2010 – “Dynamic Access Prioritisation” – decision making model in NZ – *need to chase up*.

Demain 2006 – looked at veracity of “plateaus” in recovery and concluded these are usually not based on accurate/objective assessment “more fiction than fact”

Q5: Eligibility for rehabilitation / Predictors of outcome

*No studies saying particular groups (or indicators) **do not** benefit from rehabilitation- all studies support rehabilitation for various subgroups*

Predictors of outcomes (functional recovery). Discharge destination or length of stay (LOS) as proxy outcomes indicated separately:

- Admission FIM (Ancheta 2000; Atalay 2009; Frank 2010; Oczkowski 1993; Ergeletzis 2002; Mokler 2000; Stillman 2009; Chumney 2010 SR;)
- Time since stroke (Ancheta 2000)
- Older (Bhalla 2004 – older need rehab as much as younger; Frank 2010 – age made no difference; Withall 2009 - age plus co-morbidities decreased outcomes; Black-Schaeffer 2004 – age plus AdmFIM <80 assoc with poorer outcomes; Ergeletzis 2002 older have lower outcomes **if have** co-morbid risk factors; Gosselin 2008 compared adults versus older adults and concluded both groups had equal benefits and similar LOS; Hershkovitz 2006 – stroke rehab in geriatric day hospital data supported rehab irrespective of age or OPS; Manimmanakorn 2008 – increased age connected with decreased outcomes; Denti 2008 – age not a strong predictor of outcomes/discharge destination)
- Sitting balance (Frank 2010)
- Social determinants: Living with partner (Frank 2010); Living status (Massucci 2006); marital status (Nguyen 2007); SES/family/motor function (Tan 2009)
- Stroke severity (HU 2010 – pts with severe stroke benefitted MORE than those with moderate); severe stroke benefitted from interdisciplinary team rehab and regular meetings
- Cognitive impairment (Saxena 2006; Massucci 2006)
- ADL dependence at admission (Saxena 2006)
- Severe neurological status at admission (Saxena 2006)
- Orpington prognostic scale - in elderly (Shoemaker 2006)
- Further CV events or CV risk factors (Withall 2009)
- Premorbid IQ (Withall 2009)
- FIM + BBS + postural score predicted DC destination (Agarwal 2003)
- Age, Gender and ethnicity were predictors of inpatient LOS (Al-Jadid 2010)
- Early rehab, increased time in rehab, newer meds all assoc with better outcomes (Horn 2005); for other early rehab see above

- Ischaemic versus haemorrhagic – different rates of improvement, both benefit (Kelly 2003)
- Bladder dysfunction (Massucci 2006)
- Dysphagia (Massucci 2006)
- Apathy (Santa 2008)
- Medical complications increased LOS (Saxena 2006a,b)

Conclusion

This systematic literature search has provided a basis for the planning of rehabilitation assessment and pathways in Australia. The evidence base will be incorporated with expert opinion and local consumer values and preferences.

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Further information sources

“Evidence based reviews of stroke rehabilitation” from Canada –
http://www.ebrsr.com/reviews_list.php accessed September 2010.

NSF Stroke guidelines - <http://www.strokefoundation.com.au/clinical-guidelines>

Relevant NSF Stroke Guidelines:

1.2.2 *Ongoing inpatient rehabilitation*

- a) To ensure all stroke patients receive early, active rehabilitation by a dedicated stroke team, health systems should have comprehensive services which include and link the fundamentals of acute and rehabilitation care. (Grade B^{5,38})
- b) Patients should be transferred to a stroke rehabilitation unit if ongoing inpatient rehabilitation is required. (Grade B^{5,38})
- c) If a stroke rehabilitation unit is not available, patients who require ongoing inpatient rehabilitation should be transferred to a conventional rehabilitation unit where staff have stroke-specific expertise. (Grade B³⁸)
- d) All patients, including those with severe stroke, who are not receiving palliative care should be assessed by the specialist rehabilitation team prior to discharge from hospital regarding their suitability for ongoing rehabilitation. (GPP)

1.3.1 *Safe transfer of care from hospital to community*

- a) Prior to hospital discharge, all patients should be assessed to determine the need for a home visit, which may be carried out to ensure safety and provision of appropriate aids, support and community services. (Grade C⁵⁹)
- b) To ensure a safe discharge occurs, hospital services should ensure the following are completed prior to discharge:
 - patients and families/carers have the opportunity to identify and discuss their post-discharge needs (e.g. physical, emotional, social, recreational, financial and community support) with relevant members of the multidisciplinary team
 - general practitioners, primary healthcare teams and community services are informed before or at the time of discharge
 - all medications, equipment and support services necessary for a safe discharge are organised
 - any continuing specialist treatment required is organised
 - a documented post-discharge care plan is developed in collaboration with the patient and family and a copy provided to them. This may include relevant community services, self-management strategies (e.g. information on medications and compliance advice, goals and therapy to continue at home), stroke support services, any further rehabilitation or outpatient appointments, and an appropriate contact number for any queries. (all GPPs)

- c) A locally developed protocol may assist in implementation of a safe discharge process. (GPP)
- d) A discharge planner may be used to coordinate a comprehensive discharge program for stroke survivors (Grade D ⁶⁵)

1.4.1 Community rehabilitation and follow up services

- a) Health services with a stroke unit should provide comprehensive, experienced multidisciplinary community rehabilitation and adequately resourced support services for stroke survivors and their families/carers. If services such as the multidisciplinary community rehabilitation services and carer support services are available, then early supported discharge should be offered for all stroke patients with mild to moderate disability. (Grade A ^{68, 69})
- b) Rehabilitation delivered in the home setting should be offered to all stroke survivors as needed. Where home rehabilitation is unavailable, patients requiring rehabilitation should receive centre-based care. (Grade B ^{72, 73})
- c) Contact with and education by trained staff should be offered to all stroke survivors and families/carers after discharge. (Grade C ^{77, 81})
- d) Stroke survivors can be managed using a case management model after discharge. If used, case managers should be able to recognise and manage depression and help to coordinate appropriate interventions via a medical practitioner. (Grade C ^{89, 92})
- e) Stroke survivors should have regular and ongoing review by a member of a stroke team, including at least one specialist medical review. The first review should occur within 3 months, then again at 6 and 12 months post discharge. (GPP)
- f) Stroke survivors and their carers/families should be provided with contact information for the specialist stroke service and a contact person (in the hospital or community) for any post-discharge queries for at least the first year following discharge. (GPP)

1.4.2 Long-term rehabilitation

- a) Stroke survivors who have residual impairment at the end of the formal rehabilitation phase of care should be reviewed annually, usually by the general practitioner or rehabilitation provider to consider whether access to further interventions is needed. A referral for further assessment should be offered for relevant allied health professionals or general rehabilitation services if there are new problems not present when undertaking initial rehabilitation, or if the person's physical or social environment has changed. (GPP)
- b) Stroke survivors with residual impairment identified as having further rehabilitation needs should receive therapy services to set new goals and improve task-orientated activity. (Grade B ^{104, 105})
- c) Stroke survivors with confirmed difficulties in performance of personal tasks, instrumental activities, vocational activities or leisure activities should have a documented management plan updated and initiated to address these issues (GPP)
- d) Stroke survivors should be encouraged to participate long term in appropriate community exercise programs. (Grade C ¹⁰³)

6.1.1 Amount and intensity of rehabilitation

- a) Rehabilitation should be structured to provide as much practice as possible within the first six months after stroke. (Grade A ⁴⁷⁰)

- b) For patients undergoing active rehabilitation, as much physical therapy (physiotherapy and occupational therapy) should be provided as possible with a minimum of one hour active practice per day at least five days a week. (GPP)
- c) Task-specific circuit class training or video self-modeling should be used to increase the amount of practice in rehabilitation. (Grade B ^{471, 472})
- d) For patients undergoing active rehabilitation, as much therapy for dysphagia or communication difficulties should be provided as they can tolerate. (Grade C ^{475, 477-479})
- e) Patients should be encouraged by staff members, with the help of their family and/or friends if appropriate, to continue to practice skills they learn in therapy sessions throughout the remainder of the day. (GPP)

6.1.2 Timing of rehabilitation

- a) Patients should be mobilised as early and as frequently as possible. (Grade B ⁴⁸²)
- b) Treatment for aphasia should be offered as early as tolerated. (Grade B ⁴⁷⁸)
- c) Upper limb training should commence early. CIMT is one approach that may be useful in the first week after stroke. (Grade C ⁴⁷⁴)