

# Effekt av rehabilitering for personer med hjerneslag og/eller traumatisk hjerneskade

Notat fra Kunnskapssenteret  
Systematisk litteratursøk med  
sortering  
Oktober 2013

<b>Tittel</b>	Effekt av rehabilitering for personer med hjerneslag og/eller traumatisk hjerneskade – systematisk litteratursøk med sortert referanseliste
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<b>Institusjon</b>	Nasjonalt kunnskapssenter for helsetjenesten
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Nasjonalt kunnskapssenter for helsetjenesten fremskaffer og formidler kunnskap om effekt av metoder, virkemidler og tiltak og om kvalitet innen alle deler av helsetjenesten. Målet er å bidra til gode beslutninger slik at brukerne får best mulig helsetjenester. Kunnskapssenteret er formelt et forvaltningsorgan under Helse- direktoratet, men har ingen myndighetsfunksjoner og kan ikke instrueres i faglige spørsmål.

Nasjonalt kunnskapssenter for helsetjenesten,  
Oslo, oktober 2013.

# Hovedfunn

Nasjonalt kunnskapssenter for helsetjenesten fikk i oppdrag å finne forskning om effekt av rehabilitering for personer med hjerneslag og/eller hjerneskade. Kunnskapssenteret oppsummerte funn om denne problemstillingen i en rapport i 2010. Hovedkonklusjonene i rapporten var:

”Godt planlagt og koordinert tidlig utskriving av slagpasienter fra sykehus med oppfølging i hjemmet av et tverrfaglig team fører til reduksjon i et kombinert utfall av død eller behov for opphold i institusjon etter 6 måneder, det gir kortere liggetid i sykehus, og det øker muligheten for at pasientene klarer seg i eget hjem og gjenopptar daglige aktiviteter.

Det utgjør trolig ingen forskjell i dødelighet. Tiltaket fører muligens til en viss reduksjon av kostnadene for slagpasienter med mild til moderat funksjonsnedsetting. Det er ikke holdepunkter for uheldige effekter for pasienter eller pårørende.”

Vi har nå oppdatert rapporten i form av et systematisk litteratursøk med sortering for å finne nyere, relevant oppsummert forskning om rehabilitering for pasienter med hjerneslag og/eller traumatisk hjerne-skade.

## Metode

Vi søkte etter systematiske oversikter publisert fra og med år 2009. Søket ble utført 15. mai 2013. Alle de identifiserte referansene ble vurdert for relevans i forhold til inklusjonskriteriene.

## Resultater

Vi identifiserte totalt 29 referanser. Av disse ble 17 vurdert som mulig relevante.

### Tittel:

Effekt av rehabilitering for personer med hjerneslag og/eller hjerneskade – systematisk litteratursøk med sortert referanseliste.

### Publikasjonstype:

Systematisk litteratursøk med sortering

Systematisk litteratursøk med sortering er resultatet av å

- søke etter relevant litteratur og
- sortere denne litteraturen i grupper presentert med referanser.

### Svarer ikke på alt:

- Ingen kritisk vurdering av studienes kvalitet
- Ingen analyse eller sammenfatning av studiene
- Ingen anbefalinger.

### Hvem står bak denne publikasjonen?

Kunnskapssenteret har gjennomført oppdraget etter forespørsel fra Helse Sør-Øst RHF.

### Når ble litteratursøket utført?

Søk etter studier ble utført i mai 2013.

# Key messages

The Norwegian Knowledge Centre for the Health Services was commissioned to find relevant research about the effectiveness of rehabilitation for patients with traumatic brain injury or stroke. In 2010 we published an overview of systematic reviews about the rehabilitation of patients with traumatic brain injury or stroke. In this publication we concluded that:

“Well-planned and coordinated early discharge of stroke patients from hospitals with follow-up at home by a multidisciplinary team led to a reduction in a combined outcome of death or dependency after 6 months, it reduces length of stay in hospital, and it increases the possibility that patients are living independently in their homes and have taken up daily activities. There is probably no difference in mortality. Early supported discharge is probably less costly than usual practice for stroke patients with mild to moderate strokes.

Interdisciplinary active rehabilitation of stroke patients living at home within one year after the stroke may have no impact on functioning, quality of life and readmissions compared with standard treatment, but we lack good evidence to draw a firm conclusion. We lack evidence to conclude whether the treatment provided by a multidisciplinary team improves the recovery process for patients living at home or in a community based institution one year or more after the first stroke. Patients with a recovery period of one year and more often have a more persistent disability. A multidisciplinary community based team can possibly improve functioning and increase the participation of patients with severe brain injury, but may not lead to improvement in terms of activity and mood compared with written information alone.”

This current publication is an update of the literature search, performed to find more recently published systematic reviews.

We used a previously designed search strategy and searched for systematic reviews published after 2009. We identified a total of 29 references in the database search. There were 17 potentially relevant reviews.

## Title:

Effect of rehabilitation for persons with traumatic brain injury or stroke – systematic literature search.

## Type of publication:

### Systematic reference list

A systematic reference list is the result of a search for relevant literature according to a specific search strategy. The references resulting from the search are then grouped and presented with their abstracts.

## Doesn't answer everything:

- No critical evaluation of study quality
- No analysis or synthesis of the studies
- No recommendations.

## Publisher:

Norwegian Knowledge Centre for the Health Services.

## Updated:

Last search for studies: May 15<sup>th</sup> 2013.

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# Innhold

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# Forord

Nasjonalt kunnskapssenter for helsetjenesten fikk i oppdrag fra Helse Sør-Øst RHF å besvare spørsmålet om effekten av rehabilitering for personer med hjerneslag og/eller hjerneskode (på engelsk "traumatic brain injury" eller "stroke").

Kunnskapssenteret har tidligere, i 2010, publisert kunnskapsoppsummeringer om dette emnet. Vi utførte derfor et systematisk litteratursøk med påfølgende sortering av mulig relevante nyere systematiske oversikter.

Prosjektgruppen har bestått av:

- Therese Kristine Dalsbø, seniorrådgiver / prosjektleder og
- Brynjar Fure, seksjonsleder.

Gro Jamtvedt  
*Avdelingsdirektør*

Brynjar Fure  
*Seksjonsleder*

Therese Kristine Dalsbø  
*Prosjektleder*

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# Innledning

I 2010 publiserte Kunnskapscenteret en kunnskapsoppsummering om effekt av rehabilitering gjennom bruk av ambulante tjenester for personer med hjerneslag og/eller traumatisk hjerneskade. Hovedfunn var basert på systematiske oversikter som var laget av Cochrane-samarbeidet og av HTA-samarbeidet.

Nedenfor er resultatene presentert slik de var beskrevet i rapporten fra 2010:

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## **Pasienter med hjerneslag**

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Godt planlagt og koordinert tidlig utskriving av slagpasienter fra sykehus med oppfølging i hjemmet av et tverrfaglig team fører til reduksjon i et kombinert utfall av død eller behov for opphold i institusjon etter 6 måneder, det gir kortere liggetid i sykehus, og det øker muligheten for at pasientene klarer seg i eget hjem og gjenopptar daglige aktiviteter. Det utgjør trolig ingen forskjell i dødelighet. Tidlig utskriving og oppfølging i hjemmet er trolig noe mindre kostnadskrevenne enn vanlig utskrivningspraksis for slagpasienter med mild til moderat funksjonsnedsetting.

Tverrfaglig aktiv rehabilitering av hjemmeboende slagpasienter innen ett år etter slaget gir muligens ingen innvirkning på funksjonsnivå, livskvalitet og reinnleggelser i forhold til standard behandling, men vi mangler god dokumentasjon for å kunne trekke en sikker konklusjon. Vi mangler dokumentasjon for å kunne konkludere om rehabilitering gitt av et tverrfaglig team bedrer rekonvalesensprosessen for pasienter bosatt hjemme eller i kommunal institusjon målt ett år eller mer etter det første slaget. Pasienter med en rekonvalesenttid på ett år og mer har ofte en mer vedvarende uførhet.

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## **Pasienter med ervervet hjerneskade**

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Et tverrfaglig kommunebasert team kan muligens bedre funksjonsevnen og gi økt deltakelse for pasienter med alvorlig hjerneskade, men det fører muligens ikke til bedring med hensyn til aktivitet og sinnsstemning.

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## Referanser til artikler som ble brukt i rapporten

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### Hjerneslag

Early Supported Discharge Trialists. Services for reducing duration of hospital care for acute stroke patients. Cochrane Database of Systematic Reviews 2005, Issue 2. Art. No.: CD000443. DOI: 10.1002/14651858.CD000443.pub2.

Outpatient Service Trialists. Therapy-based rehabilitation services for stroke patients at home. Cochrane Database of Systematic Reviews 2003, Issue 1. Art. No.: CD002925. DOI: 10.1002/14651858.CD002925.

Aziz NA, Leonardi-Bee J, Phillips MF, Gladman J, Legg LA, Walker M. Therapy-based rehabilitation services for patients living at home more than one year after stroke. Cochrane Database of Systematic Reviews 2008, Issue 2. Art. No.: CD005952. DOI: 10.1002/14651858.CD005952.pub2.

Noorani HZ, Brady B, McGahan L, Teasell R, Skidmore B, Doherty TJ. Stroke rehabilitation services: systematic reviews of the clinical and economic evidence. Ottawa: Canadian Coordination Office for Health Technology Assessment; 2003. Technology Report no 35.

### Ervervet hjerneskade

Turner-Stokes L, Disler PB, Nair A, Wade DT. Multi-disciplinary rehabilitation for acquired brain injury in adults of working age. Cochrane Database of Systematic Reviews 2005, Issue 3. Art. No.: CD004170. DOI: 10.1002/14651858.CD004170.pub2.

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## Referanser til eldre rapporter

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Den tidligere nevnte rapporten om hjerneslag og/eller hjerneskade er tilgjengelig på vår nettside [www.kunnskapscenteret.no](http://www.kunnskapscenteret.no). Nedenfor er tittel og lenke til rapporten satt inn.

2010 [Effekter av tverrfaglige ambulante tjenester for pasienter med kroniske sykdommer](#) Rapport fra Kunnskapscenteret

Kunnskapscenteret har også andre mulige relevante publikasjoner på dette feltet. Disse er listet opp nedenfor med dato, tittel og publikasjonsform.

2010 [Behandling og rehabilitering av pasienter med hjerneslag](#) Notat

2010 [Intravenøs trombolytisk behandling av hjerneinfarkt i akutfasen og sekundær blodproppforebyggende be-](#) Rapport fra Kunnskapscenteret



	<a href="#">handling (platehemmende behandling og antikoagulasjonsbehandling) etter hjerneslag</a>	
2010	<a href="#">Behandling av pasienter med akutt hjerneslag i slagenheter (med og uten tidlig støttet utskriving)</a>	Rapport fra Kunnskapssenteret
2009	<a href="#">Trening kan bedre gangfunksjonen hos slagpasienter</a>	Omtale av Cochraneoversikt
2008	<a href="#">Intensiv trening/habilitering til barn med medfødt og ervervet hjerneskade</a>	Rapport fra Kunnskapssenteret
2007	<a href="#">Orale blodfortynnere forebygger slag bedre enn platehemmere ved atrieflimmer</a>	Omtale av Cochraneoversikt

Det finnes andre organisasjoner som også har mulige relevante, nyere publikasjoner. Nedenfor er to slike referanser listet opp.

- Den Danske Sundhedsstyrelsen: Hjerneskaderehabilitering – en medicinsk teknologivurdering 2011
- Helsedirektoratet i Norge: Nasjonal retningslinje for behandling og rehabilitering ved hjerneslag 2010

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## Fremgangsmåte

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I dette notatet har vi utført et litteratursøk for å finne mulige relevante systematiske oversikter som er publisert etter rapporten fra Kunnskapssenteret som kom i 2010. Rapporten som ble utgitt i 2009 var basert på et litteratursøk som var ferdigstilt i 2009.

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## Styrker og svakheter ved litteratursøk med sortering

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Ved litteratursøk med sortering gjennomfører vi systematiske søk i databaser for en gitt problemstilling. Vi gjennomgår treffene fra søket og sorterer ut ikke-relevante referanser. Resultatene blir i sin helhet overlevert oppdragsgiver. Dette gjøres basert på tittel og eventuelt sammendrag. Artiklene innhentes ikke i fulltekst. Det gjør at vi kan ha inkludert titler som ville vist seg ikke å være relevante ved gjennomlesning av fulltekst.

Vi benytter kun databaser for identifisering av litteratur og kan derfor ha gått glipp av potensielt relevante studier. Andre måter å identifisere studier på, som søk i referanselister, kontakt med eksperter på fagfeltet og upublisert litteratur, er ikke utført i dette oppdraget. Vi gjennomfører ingen kvalitetsvurdering av artiklene.

Ved en full forskningsoppsummering ville vi ha innhentet artiklene i fulltekst for endelig vurdering opp mot inklusjonskritene. Inkluderte studier ville så blitt kvalitetsvurdert i henhold til våre sjekklister og resultater sammenstilt og diskutert.

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## **Problemstilling**

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I prosjektet har vi søkt etter litteratur som skal belyse problemstillinger knyttet til effekt av rehabilitering av pasienter med hjerneslag og/eller hjerneskade.

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# Metode

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## Litteratursøking

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Vi utførte et litteratursøk i Cochrane-biblioteket. I dette biblioteket er det referanser både HTA-rapporter og Cochrane-oversikter. Søket bestod av emneord for "brain" og "rehabilitation" og ble avgrenset til "systematic reviews" og "technology assessments". Søket etter relevant forskning ble avsluttet 15. mai 2013.

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## Inklusjonskriterier

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<b>Populasjon:</b>	Pasienter med hjerneslag og/eller hjerneskade.
<b>Tiltak:</b>	Rehabilitering
<b>Sammenlikning:</b>	Ingen tiltak, vanlig rehabilitering eller venteliste.
<b>Utfall:</b>	Funksjon, funksjonsnivå, fungering i dagliglivet (ADL), sykehusopphold, smerter, dødelighet, livskvalitet og yrkesevne.
<b>Studiedesign:</b>	Systematiske oversikter som inkluderer effektstudier.
<b>År:</b>	Systematiske oversikter publisert eller oppdatert etter 2009.

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## Artikkelutvelging

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En person gikk gjennom alle titler og sammendrag for å vurdere relevans i henhold til inklusjonskriteriene. Utvelging av relevante artikler ble kun gjort basert på tittel og sammendrag. Vi leste ikke fulltekstversjonen av artiklene.

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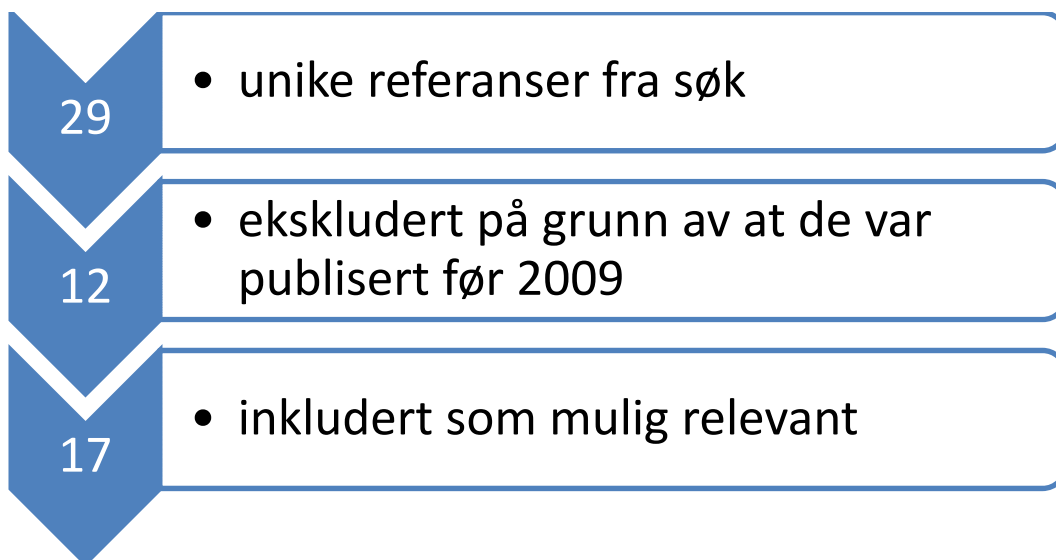
# Resultat

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## Resultat av søk

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Vi vurderte 17 av de identifiserte referansene til å være mulig relevante i henhold til inklusjonskriteriene (1-17).



Figur 1. Flytskjema over identifiserte oversikter

De inkluderte referansene var publisert mellom 2009 og 2013. I henhold til tittel og sammendrag ser det ut til at publikasjonene dekker ulike rehabiliteringsformer og ulike pasientgrupper. Vi gjør oppmerksom på at noen av siteringene til referansene er eldre enn 2009, og det betyr at oversikten er oppdatert med et nytt litteratursøk, men at konklusjonen oftest er uendret. Det kan også bety at nyere studier er inkludert.

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## Resultat av inkluderingen

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De 17 mulig relevante referansene er presentert nedenfor. Eventuelle sammendrag er med.

1. Consensus recommendations on post-traumatic brain injury (TBI) rehabilitation (Structured abstract). Health Technology Assessment Database 2010;
2. Brain injury rehabilitation - a Health Technology Assessment (Structured abstract). Health Technology Assessment Database 2011;
3. -HAYES, -Inc. Cognitive rehabilitation for traumatic brain injury (TBI) (Structured abstract). Health Technology Assessment Database 2011;
4. Abuzahra M, Piso B. Classification of disease severity for neuro- and trauma rehabilitation Part 3: Status quo in Austria (Structured abstract). Health Technology Assessment Database 2010;

5. Anderson O, Boshier PR, Hanna GB. Interventions designed to prevent healthcare bed-related injuries in patients. Cochrane Database of Systematic Reviews 2012;

**Abstract:** Background: Every patient in residential healthcare has a bed. Falling out of bed is associated with preventable patient harm. Various interventions to prevent injury are available. Bed rails are the most common intervention designed to prevent patients falling out of bed; however, their effectiveness is uncertain and bed rail entrapment can also result in injuries. Objectives: To assess the effectiveness of interventions designed to prevent patient injuries and falls from their beds. Search methods: We searched the Cochrane Injuries Group Specialised Register, Cochrane Central Register of Controlled Trials 2010, Issue 2 (The Cochrane Library), MEDLINE (Ovid), EMBASE (Ovid), CINAHL (EBSCO), ISOI Web of Science and Web-based trials registers (all to December 2010) as well as reference lists. Selection criteria: Randomised controlled trials of interventions designed to prevent patient injuries from their beds which were conducted in hospitals, nursing care facilities or rehabilitation units were eligible for inclusion. Data collection and analysis: Two review authors independently assessed the risk of bias and extracted data from the included studies. Authors contacted investigators to obtain missing information. Main results: Two studies met the inclusion criteria, involving a total of 22,106 participants. One study tested low height beds and the other tested bed exit alarms. Both studies used standard care for their control group and both studies were conducted in hospitals. No study investigating bed rails met the inclusion criteria. Due to the clinical heterogeneity of the interventions in the included studies pooling of data and meta-analysis was inappropriate, and so the results of the studies are described. A single cluster randomised trial of low height beds in 18 hospital wards, including 22,036 participants, found no significant reduction in the frequency of patient injuries due to their beds (there were no injuries in either group), patient falls in the bedroom (rate ratio 0.69, 95% CI 0.35 to 1.34), all falls (rate ratio 1.26, 95% CI 0.83 to 1.90) or patient injuries due to all falls (rate ratio 1.35, 95% CI 0.68 to 2.68). One randomised controlled trial of bed exit alarms in one hospital geriatric ward, involving 70 participants, found no significant reduction in the frequency of patient injuries due to their beds (there were no injuries in either group), patient falls out of bed (rate ratio 0.25, 95% CI 0.03 to 2.24), all falls (rate ratio 0.42, 95% CI 0.15 to 1.18) or patient injuries due to all falls (no injuries in either group). Authors' conclusions: The effectiveness of interventions designed to prevent patient injuries from their beds (including bed rails, low height beds and bed exit alarms) remains uncertain. The available evidence shows no significant increase or decrease in the rate of injuries with the use of low height beds and bed exit alarms. Limitations of the two included studies include lack of blinding and insufficient power. No randomised controlled trials of bed rails were

identified. Future reports should fully describe the standard care received by the control group

6. Bowen A, Knapp P, Gillespie D, Nicolson DJ, Vail A. Non-pharmacological interventions for perceptual disorders following stroke and other adult-acquired, non-progressive brain injury. *Cochrane Database of Systematic Reviews* 2011; Abstract: Background: Stroke and other adult-acquired brain injury may impair perception leading to distress and increased dependence on others. Perceptual rehabilitation includes functional training, sensory stimulation, strategy training and task repetition. Objectives: To examine the evidence for improvement in activities of daily living (ADL) six months post randomisation for active intervention versus placebo or no treatment. Search methods: We searched the trials registers of the Cochrane Stroke Group and the Cochrane Infectious Diseases Group (May 2009) but not the Injuries Group, the Cochrane Central Register of Controlled Trials (The Cochrane Library 2009, Issue 3), MEDLINE (1950 to August 2009), EMBASE (1980 to August 2009), CINAHL (1982 to August 2009), PsycINFO (1974 to August 2009), REHABDATA and PsycBITE (May to June 2009). We also searched trials and research registers, handsearched journals, searched reference lists and contacted authors. Selection criteria: Randomised controlled trials of adult stroke or acquired brain injury. Our definition of perception excluded visual field deficits, neglect/inattention and apraxia. Data collection and analysis: One review author assessed titles, abstracts and keywords for eligibility. At least two review authors independently extracted data. We requested unclear or missing information from corresponding authors. Main results: We included six single-site trials in rehabilitation settings, involving 338 participants. Four trials included people with only stroke. All studies provided sensory stimulation, sometimes with another intervention. Sensory stimulation typically involved practising tasks that required visuo-perceptual processing with occupational therapist assistance. Repetition was never used and only one study included functional training. No trials provided data on longer term improvement in ADL scores. Only three trials provided any data suitable for analysis. Two of these trials compared active to placebo intervention. There was no evidence of a difference in ADL scores at the scheduled end of intervention: mean difference (95% confidence interval (CI)) was 0.9 (-1.6 to 3.5) points on a self-care ADL scale in one study and odds ratio (95% CI) was 1.3 (0.56 to 3.1) for passing a driving test in the other, both in favour of active intervention. The trial that compared two active interventions did not find evidence of difference in any of the review outcomes. Authors' conclusions: There is insufficient evidence to support or refute the view that perceptual interventions are effective. Future studies should be sufficiently large, include a standard care comparison and measure longer term functional outcomes. People with impaired perception problems should continue to receive neurorehabilitation according to clinical guidelines
7. Bradt J, Magee WL, Dileo C, Wheeler BL, McGilloway E. Music therapy for acquired brain injury. *Cochrane Database of Systematic Reviews* 2010; Abstract: Background: Acquired brain injury (ABI) can result in impairments in motor function, language, cognition, sensory processing and emotional disturbances. This may severely reduce a survivor's quality of life. Music therapy has been used in rehabilitation to stimulate brain functions involved in movement, cognition, speech, emotions and sensory perceptions. A systematic review is needed to gauge the efficacy of music therapy as a rehabilitation intervention for people with ABI. Objectives: To examine the effects of music therapy with standard care versus standard care alone or standard care combined with other therapies on gait, upper extremity function, communication, mood

and emotions, social skills, pain, behavioral outcomes, activities of daily living and adverse events. Search methods: We searched the Cochrane Stroke Group Trials Register (February 2010), the Cochrane Central Register of Controlled Trials (The Cochrane Library Issue 2, 2009), MEDLINE (July 2009), EMBASE (August 2009), CINAHL (March 2010), PsycINFO (July 2009), LILACS (August 2009), AMED (August 2009) and Science Citation Index (August 2009). We handsearched music therapy journals and conference proceedings, searched dissertation and specialist music databases, trials and research registers, reference lists, and contacted experts and music therapy associations. There was no language restriction. Selection criteria: Randomized and quasi-randomized controlled trials that compared music therapy interventions and standard care with standard care alone or combined with other therapies for people older than 16 years of age who had acquired brain damage of a non-degenerative nature and were participating in treatment programs offered in hospital, outpatient or community settings. Data collection and analysis: Two review authors independently assessed methodological quality and extracted data. We present results using mean differences (using post-test scores) as all outcomes were measured with the same scale. Main results: We included seven studies (184 participants). The results suggest that rhythmic auditory stimulation (RAS) may be beneficial for improving gait parameters in stroke patients, including gait velocity, cadence, stride length and gait symmetry. These results were based on two studies that received a low risk of bias score. There were insufficient data to examine the effect of music therapy on other outcomes. Authors' conclusions: RAS may be beneficial for gait improvement in people with stroke. These results are encouraging, but more RCTs are needed before recommendations can be made for clinical practice. More research is needed to examine the effects of music therapy on other outcomes in people with ABI

8. Brasure M, Lamberty GJ, Sayer NA, Nelson NW, MacDonald R, Ouellette J, et al. Multidisciplinary postacute rehabilitation for moderate to severe traumatic brain injury in adults (Structured abstract). Health Technology Assessment Database 2012;

9. Chung-Charlie SY, Pollock A, Campbell T, Durward BR, Hagen S. Cognitive rehabilitation for executive dysfunction in adults with stroke or other adult non-progressive acquired brain damage. Cochrane Database of Systematic Reviews 2013;

Abstract: Background: Executive functions are the controlling mechanisms of the brain and include the processes of planning, initiation, organisation, inhibition, problem solving, self monitoring and error correction. They are essential for goal-oriented behaviour and responding to new and novel situations. A high number of people with acquired brain injury, including around 75% of stroke survivors, will experience executive dysfunction. Executive dysfunction reduces capacity to regain independence in activities of daily living (ADL), particularly when alternative movement strategies are necessary to compensate for limb weakness. Improving executive function may lead to increased independence with ADL. There are various cognitive rehabilitation strategies for training executive function used within clinical practice and it is necessary to determine the effectiveness of these interventions. Objectives: To determine the effects of cognitive rehabilitation on executive dysfunction for adults with stroke or other non-progressive acquired brain injuries. Search methods: We searched the Cochrane Stroke Group Trials Register (August 2012), the Cochrane Central Register of Controlled Trials (The Cochrane Library, August 2012), MEDLINE (1950 to August 2012), EMBASE (1980 to August 2012), CINAHL (1982 to August 2012), PsycINFO (1806 to August 2012), AMED

(1985 to August 2012) and 11 additional databases. We also searched reference lists and trials registers, handsearched journals and conference proceedings, and contacted experts. Selection criteria: We included randomised trials in adults after non-progressive acquired brain injury, where the intervention was specifically targeted at improving cognition including separable executive function data (restorative interventions), where the intervention was aimed at training participants in methods to compensate for lost executive function (compensative interventions) or where the intervention involved the training in the use of an adaptive technique for improving independence with ADL (adaptive interventions). The primary outcome was global executive function and the secondary outcomes were specific components of executive function, working memory, ADL, extended ADL, quality of life and participation in vocational activities. We included studies in which the comparison intervention was no treatment, a placebo intervention (i.e. a rehabilitation intervention that should not impact on executive function), standard care or another cognitive rehabilitation intervention. Data collection and analysis: Two review authors independently screened abstracts, extracted data and appraised trials. We undertook an assessment of methodological quality for allocation concealment, blinding of outcome assessors, method of dealing with missing data and other potential sources of bias. Main results: Nineteen studies (907 participants) met the inclusion criteria for this review. We included 13 studies (770 participants) in meta-analyses (417 traumatic brain injury, 304 stroke, 49 other acquired brain injury) reducing to 660 participants once non-included intervention groups were removed from three and four group studies. We were unable to obtain data from the remaining six studies. Three studies (134 participants) compared cognitive rehabilitation with sensorimotor therapy. None reported our primary outcome; data from one study was available relating to secondary outcomes including concept formation and ADL. Six studies (333 participants) compared cognitive rehabilitation with no treatment or placebo. None reported our primary outcome; data from four studies demonstrated no statistically significant effect of cognitive rehabilitation on secondary outcomes. Ten studies (448 participants) compared two different cognitive rehabilitation approaches. Two studies (82 participants) reported the primary outcome; no statistically significant effect was found. Data from eight studies demonstrated no statistically significant effect on the secondary outcomes. We explored the effect of restorative interventions (10 studies, 468 participants) and compensative interventions (four studies, 128 participants) and found no statistically significant effect compared with other interventions. Authors' conclusions: We identified insufficient high-quality evidence to reach any generalised conclusions about the effect of cognitive rehabilitation on executive function, or other secondary outcome measures. Further high-quality research comparing cognitive rehabilitation with no intervention, placebo or sensorimotor interventions is recommended

10. Hillier SL, McDonnell M. Vestibular rehabilitation for unilateral peripheral vestibular dysfunction. Cochrane Database of Systematic Reviews 2011; Abstract: Background: This is an update of a Cochrane Review first published in The Cochrane Library in Issue 4, 2007. Unilateral peripheral vestibular dysfunction (UPVD) can occur as a result of disease, trauma or postoperatively. The dysfunction is characterised by complaints of dizziness, visual or gaze disturbances and balance impairment. Current management includes medication, physical manoeuvres and exercise regimes, the latter known collectively as vestibular rehabilitation (VR). Objectives: To assess the effectiveness of vestibular rehabilitation in the adult, community-dwelling population of people with symptomatic unilateral peripheral vestibular dysfunction. Search methods: We searched the Cochrane Ear, Nose and Throat Disorders Group Trials Register;



the Cochrane Central Register of Controlled Trials (CENTRAL); PubMed; EMBASE; CINAHL; Web of Science; BIOSIS Previews; Cambridge Scientific Abstracts; ISRCTN and additional sources for published and unpublished trials. The most recent search was 1 July 2010, following a previous search in March 2007. Selection criteria: Randomised trials of adults living in the community, diagnosed with symptomatic unilateral peripheral vestibular dysfunction. We sought comparisons of VR versus control (placebo etc.), other treatment (non-VR, e.g. pharmacological) or another form of VR. We considered the outcome measures of frequency and severity of dizziness or visual disturbance; changes in balance impairment, function or quality of life; and measure/s of physiological status with known functional correlation. Data collection and analysis: Both authors independently extracted data and assessed trials for risk of bias. Main results: We included 27 trials, involving 1668 participants, in the review. Trials addressed the effectiveness of VR against control/sham interventions, medical interventions or other forms of VR. Individual and pooled data showed a statistically significant effect in favour of VR over control or no intervention. The exception to this was when movement-based VR was compared to physical manoeuvres for benign paroxysmal positional vertigo (BPPV), where the latter was shown to be superior in cure rate in the short term. There were no reported adverse effects. Authors' conclusions: There is moderate to strong evidence that VR is a safe, effective management for unilateral peripheral vestibular dysfunction, based on a number of high quality randomised controlled trials. There is moderate evidence that VR provides a resolution of symptoms and improvement in functioning in the medium term. However, there is evidence that for the specific diagnostic group of BPPV, physical (repositioning) manoeuvres are more effective in the short term than exercise-based vestibular rehabilitation; although a combination of the two is effective for longer-term functional recovery. There is insufficient evidence to discriminate between differing forms of VR

11. Khan F, Amatya B, Ng L, Drummond K, Olver J. Multidisciplinary rehabilitation after primary brain tumour treatment. Cochrane Database of Systematic Reviews 2013;
 

Abstract: Background: Brain tumours can cause significant disability, which may be amenable to multidisciplinary rehabilitation. However, the evidence base for this is unclear. Objectives: To assess the effectiveness of multidisciplinary rehabilitation in adults after primary brain tumour treatment, especially the types of approaches that are effective (settings, intensity) and the outcomes that are affected. Search methods: We searched the Cochrane Neuromuscular Disease Group Specialized Register (March week 2, 2012), The Cochrane Central Register of Controlled Trials (CENTRAL, The Cochrane Library Issue 3, 2012), MEDLINE (1966 to March week 2, 2012), EMBASE (1980 to March week 2, 2012), PEDro (1982 to March 2012) and LILACS (1982 to March week 2, 2012). We checked the bibliographies of papers identified and contacted the authors and known experts in the field to seek published and unpublished trials. Selection criteria: Controlled clinical trials (randomised and non-randomised clinical trials) that compared multidisciplinary rehabilitation in primary brain tumour with either routinely available local services or lower levels of intervention, or studies that compared multidisciplinary rehabilitation in different settings or at different levels of intensity. Data collection and analysis: Three review authors independently assessed study quality, extracted data and performed a 'best evidence?' synthesis based on methodological quality. Main results: No randomised controlled trials (RCTs) or controlled clinical trials (CCTs) were identified. Authors' conclusions: No RCTs or CCTs were available for synthesis of 'best evidence' for multidisciplinary rehabilitation after treatment for brain tumour patients. However, this does not suggest the in-

effectiveness of multidisciplinary rehabilitation but rather highlights the challenges in trial design and rigour, outcome measurement and complexities of care in this population. For completeness of literature, 12 observational studies (with high risk of bias) involving patients with brain tumours were included. These studies provided 'very low level' evidence suggesting that multidisciplinary rehabilitation (inpatient, home-based) may improve functional outcomes, and ambulatory programmes (outpatient and home-based) may improve vocation and quality of life. These conclusions are tentative at best, given gaps in current research in this area. Further research is needed into appropriate and robust study designs, outcome measurement, caregiver needs, evaluation of optimal settings, type, intensity, duration of therapy, and cost-effectiveness of multidisciplinary rehabilitation in the brain tumour population

12. Lane BA, Tate R. Interventions for apathy after traumatic brain injury. Cochrane Database of Systematic Reviews 2009;  
Abstract: Background: Apathy is a deficiency in overt behavioural, emotional and cognitive components of goal-directed behaviour. It is a common occurrence after traumatic brain injury (TBI), with widespread impact. We have systematically reviewed studies examining the effectiveness of interventions for apathy in the TBI population. Objectives: To investigate the effectiveness of interventions for apathy in adults who have sustained a TBI. This was evaluated by changes in behavioural, cognitive and emotional measures of apathy. Search methods: We searched the following databases up to January 2008: CENTRAL (The Cochrane Library 2008, Issue 1), Database of Abstracts of Reviews of Effects, ACP Journal Club, MEDLINE (1950 to Jan 2008), EMBASE (1980 to Jan 2008), PsycINFO (1806 to Jan 2008), CINAHL (1982 Jan 2008), PsycBITE, AMED (1985 to Jan 2008), www.controlled-trials.com, www.clinicaltrials.gov and www.actr.org.au. The Cochrane Injuries Group's Specialised Register was searched to Jan 2009. Additionally, we examined key conference proceedings and reference lists of included trials to identify further studies meeting the inclusion criteria. Selection criteria: Randomised controlled trials (RCTs) of interventions specifically targeting apathy for people with TBI. Data collection and analysis: Two authors (ALB and RLT) independently assessed studies for inclusion. We rated the methodological quality of included studies and extracted data. Main results: We identified one trial that satisfied the inclusion criteria for this review. This trial (N = 21) showed that cranial electrotherapy stimulation (CES) decreased inertia, which is a component of apathy, while no changes were seen in the sham treatment or no treatment control groups. Given that no between-group analysis was reported, it was not possible to determine if the CES treatment group improved significantly more than the control group. Authors' conclusions: No evidence was provided to support the use of CES treatment for inertia, a component of apathy. Between-group statistical analyses were not conducted and it was therefore not possible to determine the efficacy of the treatment relative to no treatment or sham treatment. Results regarding the effectiveness of treatment can only be inferred, and this evidence is based on only one trial with a small sample size. More randomised controlled trials evaluating different ways of treating apathy would be valuable. Trials should have larger sample sizes and use rigorous research designs and statistical analyses appropriate for examining between-group differences
13. Langhorne P, Dennis M, Kalra L, Shepperd S, Wade DT, Wolfe-Charles DA. Services for helping acute stroke patients avoid hospital admission. Cochrane Database of Systematic Reviews 2012;  
Abstract: Background: Stroke patients are usually admitted to hospital for their acute care and rehabilitation. Services to help acute stroke patients avoid admission to hospital ('hospital-at-home') have now been developed. Objectives:

To establish the costs and effects of such services compared with conventional services. Search methods: We searched the Cochrane Stroke Group Trials Register in March 1999 and supplemented this through discussion with colleagues and trialists. Selection criteria: Controlled clinical trials recruiting stroke patients who have not been admitted to hospital and compare (1) services which provided support with an aim of helping prevent admission to hospital with (2) conventional services (which could include hospital admission). Data collection and analysis: Two independent review authors determined the eligibility and methodological quality of trials. Trialists were then contacted to obtain standardised descriptive and outcome data. Main results: Four trials are included in the review, of which three currently have outcome data available (921 patients; 857 from one controlled trial, 64 from two randomised trials). There were no statistically significant differences between the patient and carer outcomes of the intervention and control groups either within individual trials or in pooled analyses. There was a trend toward greater hospital bed use and increased costs in the intervention groups. Authors' conclusions: There is currently no evidence from clinical trials to support a radical shift in the care of acute stroke patients from hospital-based care

14. Lombardi-Francesco FL, Taricco M, De TA, Telaro E, Liberati A. Sensory stimulation for brain injured individuals in coma or vegetative state. *Cochrane Database of Systematic Reviews* 2002;  
 Abstract: Background: Coma and vegetative state follow traumatic brain injury in about one out of eight patients, and in patients with non traumatic injury the prognosis is worse. The use of sensory stimulation for coma and vegetative state has gained popularity during the 1980's but beliefs and opinions about its effectiveness vary substantially among health professionals. Objectives: To assess the effectiveness of sensory stimulation programmes in patients in coma or vegetative state. Search methods: We searched the Injuries Group specialised register, the Cochrane Controlled trials register, EMBASE, MEDLINE, CINAHL and PSYCHLIT from 1966 to January 2002, without language restriction. Reference lists of articles were scanned and we contacted experts in the area to find other relevant studies. Selection criteria: Randomised or controlled trials that compared sensory stimulation programmes with standard rehabilitation in patients in coma or vegetative state. Data collection and analysis: Abstracts and papers found were screened by one reviewer. Three reviewers independently identified relevant studies, extracted data and assessed study quality resolving disagreement by consensus. Main results: Three studies were identified with 68 patients in total. The overall methodological quality was poor and studies differed widely in terms of outcomes measures, study design and conduct. We therefore did not carry out any quantitative synthesis but reviewed results of available studies qualitatively. Authors' conclusions: This systematic review indicates that there is no reliable evidence to support, or rule out, the effectiveness of multisensory programmes in patients in coma or vegetative state
15. Pammer C, Abuzahra M, Wild C. Classification of disease severity for neuro- and trauma rehabilitation. Part 1: instruments for stroke and traumatic brain injury (Structured abstract). *Health Technology Assessment Database* 2009;
16. Turner SL, Nair A, Sedki I, Disler PB, Wade DT. Multi-disciplinary rehabilitation for acquired brain injury in adults of working age. *Cochrane Database of Systematic Reviews* 2005;  
 Abstract: Background: Evidence from systematic reviews demonstrates that multi-disciplinary rehabilitation is effective in the stroke population where older adults predominate. However, the evidence base for the effectiveness of

rehabilitation following acquired brain injury (ABI) in younger adults is not yet established, perhaps because there are different methodological challenges. Objectives: To assess the effects of multi-disciplinary rehabilitation following ABI in adults aged 16 to 65 years. To explore approaches that are effective in different settings and the outcomes that are affected. Search methods: We searched CENTRAL (The Cochrane Library 2008, Issue 2), MEDLINE (Ovid SP), EMBASE (Ovid SP), ISI Web of Science: Science Citation Index Expanded (SCI-EXPANDED), ISI Web of Science: Conference Proceedings Citation Index-Science (CPCI-S), and Internet-based trials registers: ClinicalTrials.gov, Current Controlled Trials, and RehabTrials.org. We also checked reference lists of relevant papers and contacted study authors in an effort to identify published, unpublished, and ongoing trials. Searches were last updated in April 2008. Selection criteria: Randomised controlled trials (RCTs) comparing multi-disciplinary rehabilitation with either routinely available local services or lower levels of intervention; or trials comparing an intervention in different settings or at different levels of intensity. Quasi-randomised and quasi-experimental designs were also included provided that they met pre-defined methodological criteria. Data collection and analysis: Two authors independently selected trials and rated their methodological quality. A third review author arbitrated when disagreements could not be resolved by discussion. We performed a 'best evidence' synthesis by attributing levels of evidence based on methodological quality. We subdivided trials in terms of severity of brain injury, the setting, and type of rehabilitation offered. Main results: We identified 11 trials of good methodological quality and five of lower quality. Within the subgroup of predominantly mild brain injury, 'strong evidence' suggested that most patients made a good recovery with provision of appropriate information, without additional specific intervention. For moderate to severe injury, there was 'strong evidence' of benefit from formal intervention. For patients with moderate to severe ABI already in rehabilitation, there was strong evidence that more intensive programmes are associated with earlier functional gains, and 'moderate evidence' that continued outpatient therapy could help to sustain gains made in early post-acute rehabilitation. There was 'limited evidence' that specialist in-patient rehabilitation and specialist multi-disciplinary community rehabilitation may provide additional functional gains, but the studies serve to highlight the particular practical and ethical restraints on randomisation of severely affected individuals for whom there are no realistic alternatives to specialist intervention. Authors' conclusions: Problems following ABI vary. Consequently, different interventions and combinations of interventions are required to suit the needs of patients with different problems. Patients presenting acutely to hospital with moderate to severe brain injury should be routinely followed up to assess their needs for rehabilitation. Intensive intervention appears to lead to earlier gains. The balance between intensity and cost-effectiveness has yet to be determined. Patients discharged from in-patient rehabilitation should have access to out-patient or community-based services appropriate to their needs. Those with milder brain injury benefit from follow up and appropriate information and advice. Not all questions in rehabilitation can be addressed by randomised controlled trials or other experimental approaches. Some questions include which treatments work best for which patients over the long term, and which models of service represent value for money in the context of life-long care. In future, such questions will need to be set alongside practice-based evidence gathered from large systematic, longitudinal cohort studies conducted in the context of routine clinical practice

17. Wong V, Cheuk-Daniel KL, Lee S, Chu V. Acupuncture for acute management and rehabilitation of traumatic brain injury. *Cochrane Database of Systematic Reviews* 2013;

**Abstract:** **Background:** Traumatic brain injury (TBI) can be life threatening depending on the severity of the insult to the brain. It can also cause a range of debilitating sequelae which require cognitive, motor, communication, emotional, or behavioral rehabilitation of varying intensity and duration. A number of studies conducted and published in China have suggested that acupuncture may be beneficial in the acute treatment and rehabilitation of TBI. **Objectives:** To determine the efficacy and safety of acupuncture in the acute management or rehabilitation (or both) of patients with a TBI, including cognitive, neurological, motor, communication, emotional, or behavioral complications, or a combination of such complications. **Search methods:** We searched the Cochrane Injuries Group Specialised Register, Cochrane Central Register of Controlled Trials (The Cochrane Library), MEDLINE, EMBASE, CINAHL, AMED, PsycINFO and others. We also searched the Chinese Acupuncture Studies Register, the Studies Register of the Cochrane Complementary Medicine Field, NCCAM, and NIH Clinical Studies Database. Three major Mainland Chinese academic literature databases (CNKI, VIP and Wang Fang Data) were also searched using keywords in simplified Chinese. We searched all databases through December 2009, and some searches have been updated to October 2012. **Selection criteria:** Randomized controlled studies evaluating different variants of acupuncture and involving participants of any age who had suffered a TBI. Included trials compared acupuncture with placebo or sham treatment, or acupuncture plus other treatments compared with the same other treatments. We excluded trials that only compared different variants of acupuncture or compared acupuncture alone against other treatments alone, as they did not yield the net effect of acupuncture. **Data collection and analysis:** Two review authors identified potential articles from the literature search and extracted data independently using a data extraction form. We performed methodological assessment of included studies using the Cochrane Collaboration's tool for assessing risk of bias. We were unable to perform quantitative data analysis due to insufficient included studies and available data. **Main results:** Four RCTs, including 294 participants, reported outcomes specified by this review. Three investigated electro-acupuncture for TBI while one investigated acupuncture for acute TBI. The results seem to suggest that acupuncture is efficacious for these indications, however the low methodological quality of these studies renders the results questionable. No adverse effects of acupuncture were reported in any of the studies. **Authors' conclusions:** The low methodological quality of the included studies does not allow us to make conclusive judgments on the efficacy and safety of acupuncture in either the acute treatment and/or rehabilitation of TBI. Its beneficial role for these indications remains uncertain. Further research with high quality trials is required

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