

Why is early, integrated care important after Brain Injury?



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What is Integrated Care?

- Integrated care provides a **continuum** of health promotion, disease prevention, diagnosis, treatment, disease management, rehabilitation and palliative care that is coordinated across different levels and locations of care
- It needs to include physical, mental health and social care and be provided in an interdisciplinary way
- Traditional models of rehabilitation have multidisciplinary interventions but less commonly have integrated mental health diagnosis and interventions as part of the team
- Consultation-Liaison mental health models are separate and often in different Trusts and locations

Accessing Mental Health Services: the disconnect between brain and mind...

GETTING HELP FROM
MENTAL HEALTH SERVICES



RUB4ETC

And if you have a neurological condition it is even harder

- 50% of people with neurological conditions will have emotional, cognitive and mental health needs Neurological Alliance, 2017
- Impact on outcomes and effectiveness of rehabilitation
- Limit ability to self manage effectively
- Need to be identified early, properly diagnosed and appropriately treated and followed-up

Still a common story

John is in hospital after a road traffic accident. He has orthopaedic injuries and a brain injury. The orthopaedic surgeon has said that there is nothing more that they can do and that he is ready for discharge. The occupational therapist is concerned as he is still in post traumatic amnesia and he is also very low in mood. The visiting neurologist says that he does not see people after head injury. The regional neurosurgical team say that they do not see people who do not need surgery. The Liaison Mental Health Team say that he hasn't got a mental illness, but that his brain injury needs managing. The rehabilitation team say that he doesn't have Level 1 rehabilitation needs but that they will see him in clinic once he has started community therapy. The community therapy team have an 18-week waiting list...

Why do we need integrated care in acute cognitive rehabilitation after TBI?

- The importance of neuroscience disciplines providing integrated medical and psychiatric input in cognitive rehabilitation after TBI
 - Developing a pathway with medical input from a 'TBI Consultant'
- Why is diagnosis important?
 - Clinical management based on impairment
 - Includes accurate diagnosis and assessment of pathophysiology and psychopathology of injury and sequelae
 - The importance of a diagnostic formulation in guiding management – are you treating the right thing?
 - eg. 'Dizziness' – migraine/BPPV/cerebellar; 'agitation' – withdrawal/delirium/psychosis
- Does this approach benefit our patients in acute settings?

- Assessment of severity of TBI; Measurement of duration of PTA; Coma Score and neuroimaging
- **Are cognitive problems attributable to severity of injury?**
- Formulation utilizes all of the disciplines assessments together with medical and psychiatric assessments and investigations to inform management

Agitation – A Wide Range of differentials

- Neurological
 - e.g. Seizures; paroxysmal sympathetic hyperactivity
- Medical
 - Infections, pain, hypoglycaemia, hypoxia, withdrawal from substances and alcohol, prescribed drug effects
- Psychiatric
 - Psychosis, mood and anxiety disorders
- Post Traumatic Seizures *Vespa 2005*
 - 20% in moderate – severe injury
 - 60% non-convulsive
- Medications *Silver 2006*
 - Opiates
 - Hypnotics
 - Typical antipsychotics
 - Tricyclic antidepressants
 - Anticonvulsants e.g. LEV

Neuropsychologically Informed Prescribing

- Drug treatment of the neurobehavioural sequelae of TBI is common practice
- There is limited evidence to guide drug treatment choices
- Guidelines are based on consensus and some common principles between disorders
- Presentation based on time course and common symptoms/disorders
- Underlying cause whether medical, psychiatric or neuropsychological, informs prescribing
- See *Chew & Zafonte 2009; Warden et al. 2006; Luarte et al. 2016;*

Background – NHSE Rehabilitation in London

- Level 1 cognitive rehabilitation provided across all units
- Specialised cognitive behavioural rehabilitation provided in 24 commissioned Level 1 beds, led by neuropsychiatrists
- Oversubscribed (June 2016)
 - Lishman Brain Injury Unit (LBIU) 71%
 - Thames Brain Injury Unit (TBIU) 76%
- Median wait from referral to admission
 - 68 days
 - 105 days (LBIU)
 - 50 days (TBIU)

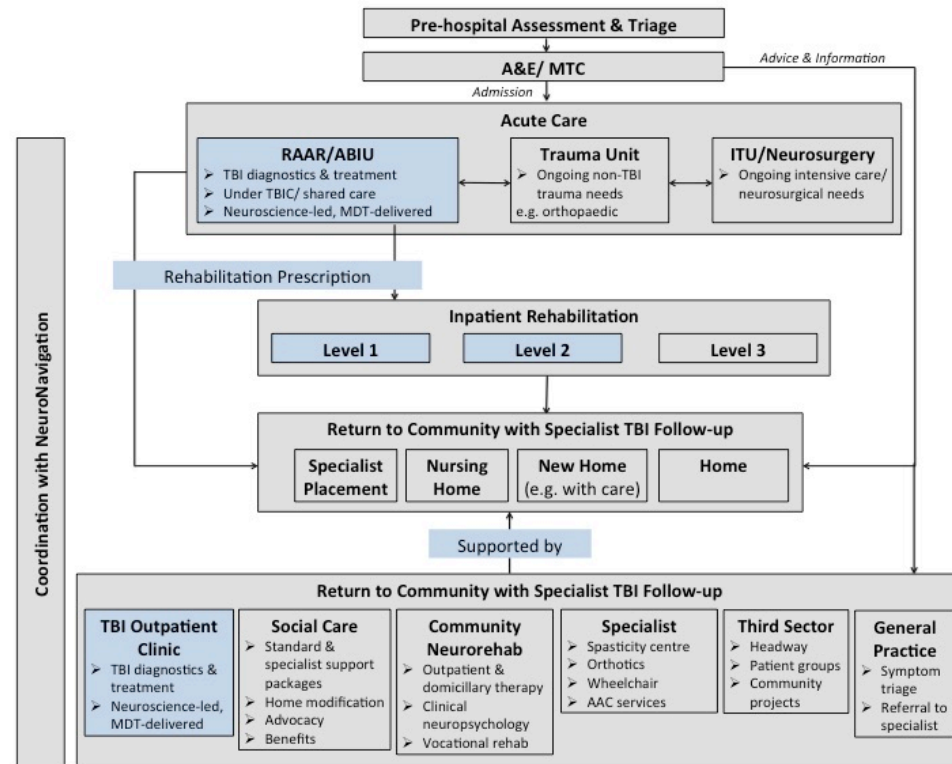
Background II

- Median length of stay over 24 month period
 - 134 days (LBIU)
 - 159 days (TBIU)
- Majority of admissions for TBI
- Inequity of TBI admissions vs. stroke across all London Level 1 services
- Cognitive behavioural referrals not well stratified according to need
 - One size fits all – acute/post acute/cognitive/neurobehavioural
- Limited number of identified Level 2 services
 - Only a few highly specialist day patient services nationally for more complex cognitive rehabilitation patients whose needs cannot be met in community teams

NHSE Working Group Recommendations

- Level 1 rehabilitation embedded in MTC; ABIU/RAAR unit
 - LOS 2-8 weeks
 - Detailed assessment and diagnostic formulation of impairments
 - Neuronavigators regular review/signposting
- Patients with primarily cognitive need can access Level 1b, Level 1c for ongoing rehab
 - Those with complex physical and neuropsychiatric need, need rehabilitation with easy access to 24 hour medical support
 - Importance of managing agitation, delirium and PTA to increase engagement and decrease length of stay and improve cognitive outcomes?

Acute TBI Pathway Model



Care Pathway II

- Patients with primarily neurobehavioural needs access Level 1c only
 - Complex and unstable psychiatric needs
 - High risk management
 - Specialist evaluation of social cognition/communication
 - Interdisciplinary cognitive assessment and behavioural management of moderate to severe behaviours
 - Interdisciplinary evaluation of neuropsychiatric symptoms
 - Complex mental capacity assessment and management
 - Assessment and treatment under MHA
 - Complex placement/housing and funding issues
 - Major family distress requiring frequent support and intervention

Early Rehabilitation for TBI

- Nothing new
 - Cope et al, 1982; Spettell et al, 1991; McKay et al, 1992; Cowen et al, 1995; Galasko Report, 1999; Shiel, et al 2001; Greenwood et al, 2004; Engberg et al, 2006; Sorbo et al, 2005; Mammi et al, 2006; Lippert-Gruner et al, 2007; Choi et al, 2008; Andelic et al, 2012; Turner-Stokes et al, 2015
- All studies show benefit of early rehabilitation after TBI and a preference for a 'continuous chain of rehabilitation'
 - Few are prospective or randomised
 - Some report significantly improved functional outcomes up to a year
 - None focus on psychiatric outcomes and many exclude this comorbidity
 - None have integrated neuropsychiatry in early intervention, but Shiel has shown that early intervention with challenging behaviour decreased difficulties with aggression at 3 years (2016)
- All identify significant decreases in total LOS

Pilot of Acute TBI Early Integrated Rehabilitation

- 6-month pilot of early TBI intensive rehabilitation with integrated neuropsychiatry/neurology
- Accepts early admission of patients after TBI including those with challenging behaviour (PTA/ACS)
- 6 beds with Level 1 specification rehabilitation MDT
 - Interdisciplinary working with Neuropsychology, OT, SLT, PT, Neuropsychiatry, Neurology
- Co-located with MTC
- Co-located with ABIU – 4 beds without Level 1 MDT
- Development of day patient cognitive rehabilitation pathway to facilitate earlier discharge and community reintegration

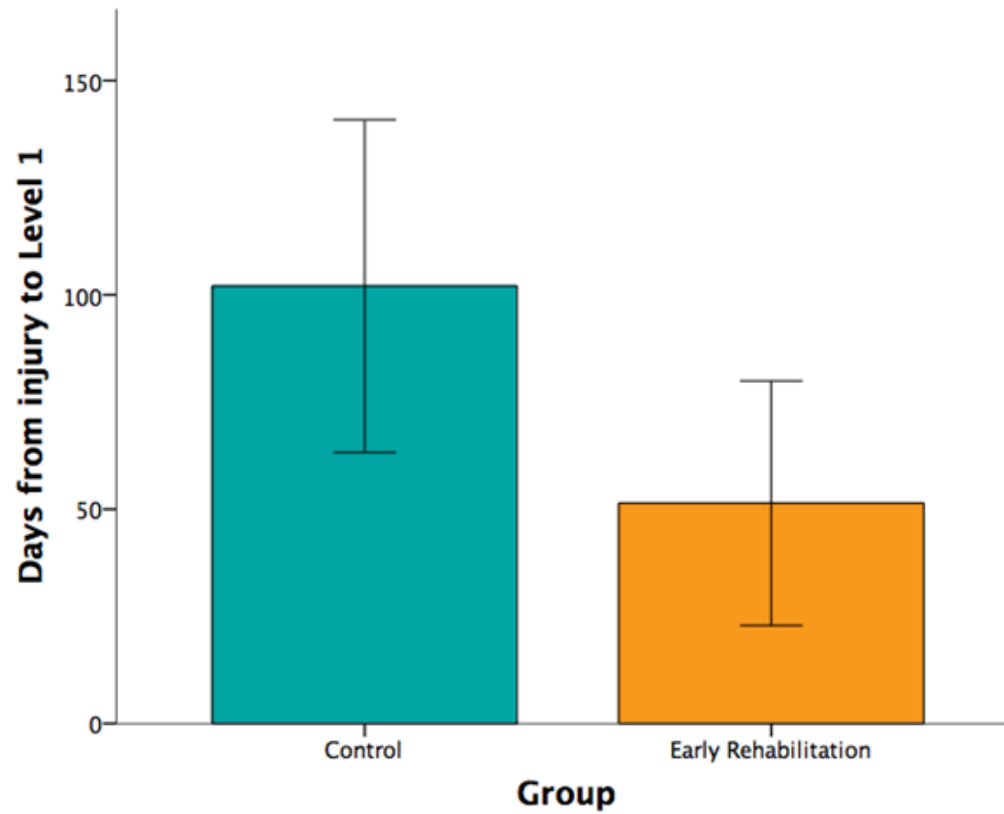
- Aim of the pilot study was to examine the effects of early access to neurorehabilitation on the recovery of patients with TBI
- In November 2017 , a commissioned change was implemented in the way neurorehabilitation services were delivered
- Two groups of patients with matched demographic and clinical profiles received tertiary specialised neurorehabilitation either 50 or 100 days post injury

- Outcomes were compared with respect to resource utilisation, cost-efficiency and functional outcomes
- The early rehabilitation group demonstrated a 37% decrease in hospital bed days compared to the late rehabilitation group

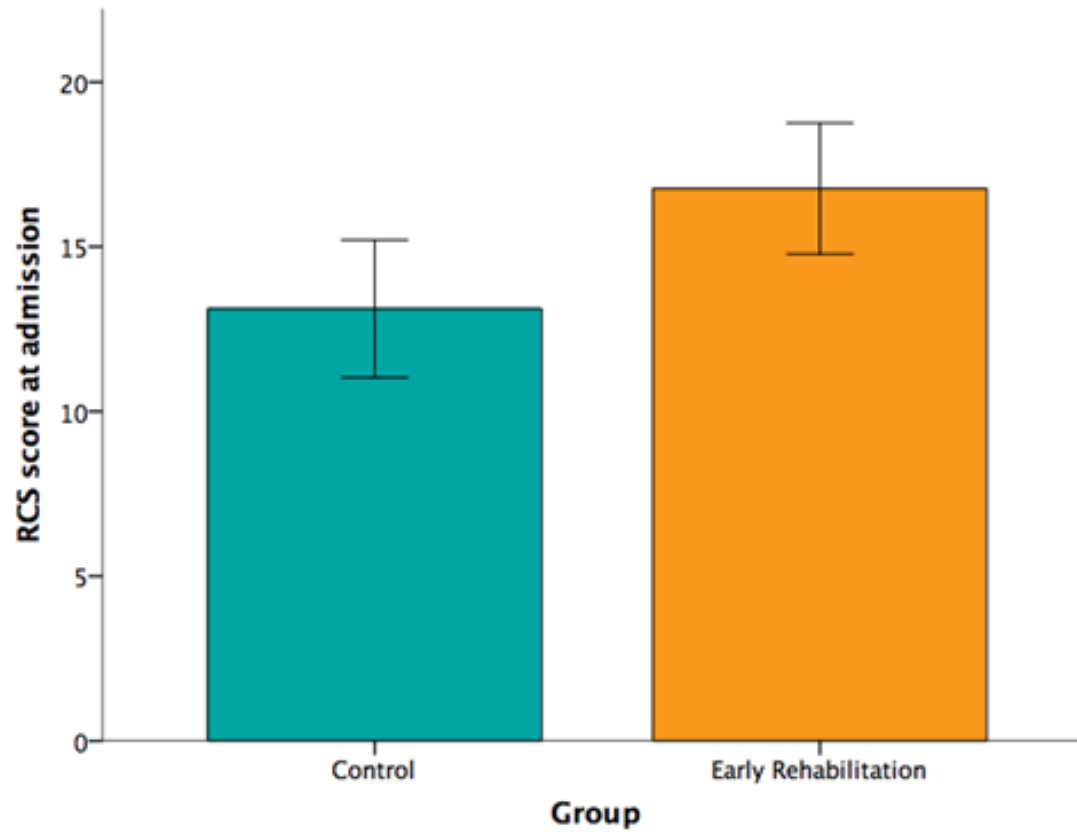
Table 1. Number of days from injury to Level 1 service access for control and early rehabilitation patients. SD=Standard Deviation; CI=Confidence Interval; LB=Lower Bound; UB=Upper Bound.

	Control	Early Rehab	Mean	95% CI		F-value	p-value
	Mean (SD)	Mean (SD)	difference	LB	UB		
Days Injury to Level 1	102.06 (38.8)	51.41 (28.5)	-50.65	-74.44	-26.86	18.80	.000**

** = difference is significant at the 0.001 level.



Mean days from injury to admission to Level 1 service for control and early rehabilitation patients. Error bars= $\pm 1SD$.

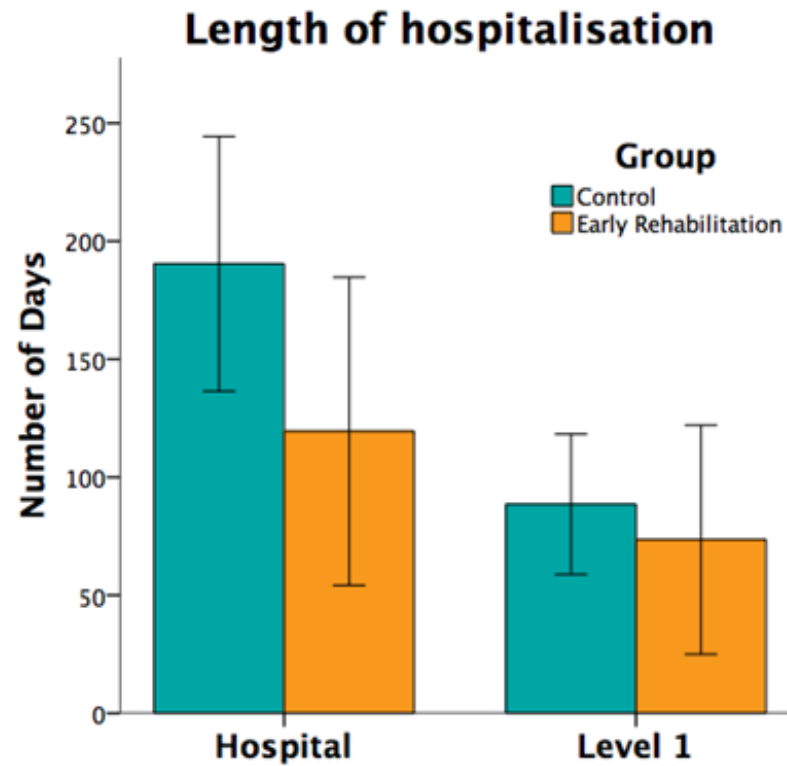


Mean RCS scores at admission to Level 1 rehabilitation for control and early rehabilitation patients. Error bars= $\pm 1SD$.

Table 3. Number of days in Level 1 rehabilitation and days in hospital for control and early rehabilitation patients. SD=Standard Deviation; CI=Confidence Interval; LB=Lower Bound; UB=Upper Bound.

	Control Mean (SD)	Early Rehab Mean (SD)	Mean difference	95% CI		F- value	p- value
				LB	UB		
				Days in Level 1	88.53 (29.71)		
Days in hospital	190.41 (53.93)	119.47 (65.30)	-87.61	-144.82	-30.40	9.76	.004**

** = difference is significant at the 0.01 level. NOTE: confront p-value against alpha = 0.025 (Bonferroni correction).



Mean number of days in hospital and mean number of days receiving Level 1 rehabilitation for control and early rehabilitation patients. Error bars= $\pm 1SD$.

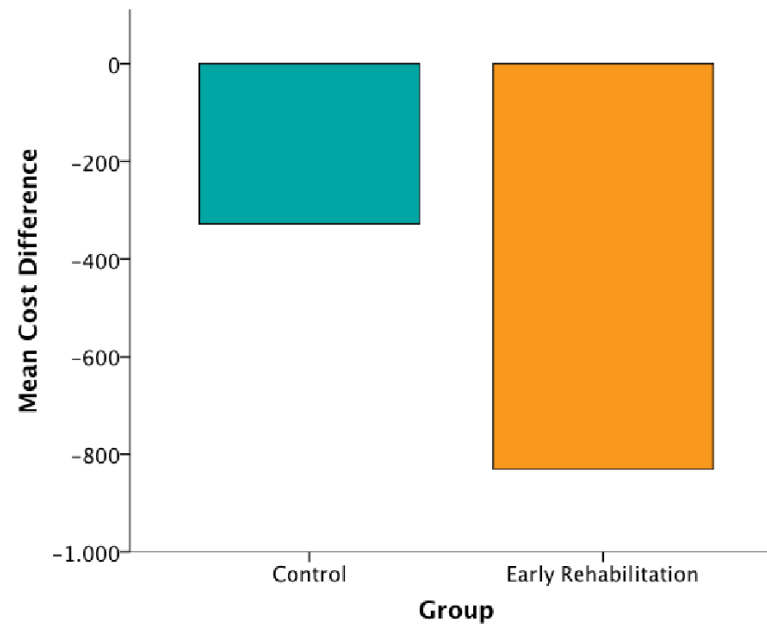
Table 4. Admission-to-discharge NPCNA-estimated reductions in care cost, for control and early rehabilitation patients. SD=Standard Deviation; CI=Confidence Interval; LB=Lower Bound; UB=Upper Bound.

	Control Mean (SD)	Early Rehab Mean (SD)	Mean difference	95% CI		F- value	p- value
				LB	UB		
Admission Cost	824.70 (725.08)	1497.88 (760.92)					
Discharge Cost	508.59 (451.83)	639.06 (555.60)					
Cost difference	-316.12 (675.62)	-858.82 (625.18)	-542.70	-997.46	-87.95	5.90	.021*
ANOVA							
ANCOVA			-532.30	-1161.70	97.10	2.97	.095

* = difference is significant at the 0.05 level.

Care costs

- Mean care cost difference between admission and discharge was -£327.62 (SD = 696.25) for the control group, and -£830.50 (SD = 634.31) for the early rehabilitation group i.e.£500 per patient/week – 61% decrease



- The primary conclusion of this study is that Level 1 neurorehabilitation is more cost-efficient when commenced at an earlier time point post-injury
- This has significant advantages in terms of decreased cost of care, improved bed utilisation, service capacity and earlier community reintegration

Summary

- Early rehabilitation after brain injury has repeatedly been shown to decrease LOS and improve outcomes
- Very limited development of early integrated rehabilitation in pathways
- 'One size fits all' approach to pathways for cognitive and neurobehavioural rehabilitation resulting in oversubscribed services but with few alternatives, limiting access when most needed
- Integrated interdisciplinary approach to early rehabilitation that includes patients with post traumatic delirium and amnesia and mental health needs
- Importance of diagnostic formulation in guiding interventions – that needs to include neuroscience and mental health specialties
- Opportunities for developing best evidence for pharmacological management in acute recovery

Questions

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