Regaining Social Autonomy after acquired brain injury: rehabilitation of severe neurobehavioural disability

Professor Nick Alderman
Director of Clinical Services, Brain Injury Services
In this session we will...

- Highlight barriers to good psychosocial outcome after ABI, especially TBI
- Advocate neurobehavioural rehabilitation (NbR) as a solution, especially to severe cases
- Describe what it is
- Who typically gets referred
- How it works
- Outcomes from NbR
- Given TBI is a (silent) epidemic, propose the radical politicisation of ABI

March 2017
What are the barriers to good psychosocial outcome after ABI?
In studies conducted over many years, challenging behaviours have been recognized as posing a greater long-term impediment to community integration after TBI than physical disabilities.
Barriers to Good Psychosocial Outcome after ABI

- Poor inhibitory control: aggression, disinhibition
- Diminished drive, interest & motivation
- Poor social cognition
- Lack of initiative & purposeful behaviour
- Problems planning or making decisions
- Diminished awareness & poor judgement
- Unrealistic aspirations

(For example, see Tam, McKay, Sloan & Ponsford, 2015)
Neurobehavioural Disability

Symptoms of NBD

Social Handicap

- Damaged neural systems
- Neurocognitive impairment
- Environmental factors
- Pre-morbid personality traits
- Post-injury learning
Neurobehavioural disability has a major impact on long-term psychosocial outcome

- Capacity for independent living
- Employment
- Relationships
- Impact on roles & quality of life
- Contact with forensic services
- Choice in where people live

Presence of NBD = poorer prognosis
What is ‘Neurobehavioural Rehabilitation’?
Neurobehavioural rehabilitation attempts to alleviate social handicap arising from neurobehavioural disability

Delivered in context that understands ABI, determines brain-behaviour relationships, and intervenes to maximise personal autonomy
NEUROBEHAVIOURAL REHABILITATION
An approach inspired by Gavin Tennent and pioneered in the UK by Peter Eames & Rodger Wood
Components of Neurobehavioural Rehabilitation

- Post-acute
- Neuropsychological model of rehabilitation
- Slow-stream rehabilitation
- Behaviour management capability
- Structured environment (incorporating systems of feedback & reinforcement)
- Transdisciplinary Team approach (TDT)
- Behaviourally-defined rehabilitation goals
- Community-based training
Community Training

Hospitals are for ill people to be cared for; rehabilitation is about learning to do things for yourself
Components of Neurobehavioural Rehabilitation

March 2017
Who gets referred to neurobehavioural services?
Referrals to NbR Services

Is Aggression after ABI Talked Up Too Much??
Referrals to NbR Services

Percentage Admissions to NbR Services Whose SASNOS Domain Scores Are <1SD from Neurologically Healthy Norms

- Relationships: 87.8%
- Cognition: 86.3%
- Inhibition: 27.5%
- Aggression: 26%
- Communication: 19.8%

March 2017
How Characteristic is Aggressive Behaviour Typical of People Referred to Neurobehavioural Services?
Referrals to NbR Services

Behaviour Audit

OAS-MNR recordings of 28 residents in Elm Park (14) and Grafton Manor (14) recorded Nov 2013 – Jan 2014 examined

3141 episodes
(12.5% physical assaults)

March 2017
How does it work?
What’s the Minimum Required to Make It Work?

- Expertise in understanding how ABI impacts on NBD and constrains learning/adaptation
- Team approach enabling consistency and continuity of rehabilitation procedures 24/7
- System of expectations to set the social and rehabilitation context
- Time-table of activity throughout the day
- System for giving feedback, reinforcing and recording appropriate behaviour
- A basket of outcome measures to track progress
- Training programme to underpin skills
Social handicap arising from neurobehavioural disability improved through

1. The (re)acquisition of functional and social skills
2. Spontaneous and adaptive performance of these skills in the context of social behaviour

Learning theory is central to neurobehavioural rehabilitation as a means of understanding handicap and managing symptoms
Learning Theory Underpins NbR

- Therapy interventions in every discipline draw heavily from learning theory, especially operant conditioning & procedural learning.
- Practitioners need to have knowledge of these methods and supervision to devise effective rehabilitation interventions, e.g. errorless learning.
- Rehabilitation programmes therefore typically led by clinical neuropsychologists rather than medical doctors.
Learning Promoted by Highly Structured Approach

• Daily timetable, promoting routine
• Systems of feedback and reinforcement (operant learning)
• Community approach to rehabilitation
• Consistent approach and response
• Reward participation and prosocial behaviour
• ‘Play down’ challenging behaviour
• Individual programmes to reduce NBD
• Goals behaviourally defined; socially & functionally relevant
• Skill building to promote autonomy (errorless learning, procedural learning)
Learning Skills as Habits

• Procedural learning
• 'Learning-by-Doing'
• Not dependent on memory
• Knowing *how*, not why!
• Slow acquisition
• Repeated practice through routine
• Practice in a variety of social settings to promote generalisation

We learn by doing... men become builders by building and lyre players by playing the lyre
NbR In Practice

Errorless Learning
*Barbara Wilson, Jon Evans, Agnes Sheil*

Contingency Management
*Rodger Wood, Peter Eames, Nick Alderman*

Vs. (??)

Positive Behaviour Support
*Mark Ylvisaker, Tim Feeney, Gordon Muir-Giles*
Positive and Proactive Care: reducing the need for restrictive interventions

Investigations into abuses at Winterbourne View Hospital and Mind’s *Mental Health Crisis in Care: physical restraint in crisis* (2013) showed that restrictive interventions have not always been used only as a last resort in health and care. They have even been used to inflict pain, humiliate or punish. Restrictive interventions are often a major contribution to delaying recovery, and have been linked with causing serious trauma, both physical and psychological, to people who use services and staff. These interventions have been used too much, for too long and we must change this.

Prepared by the Department of Health

Publication date: April 2014
What is Positive Behaviour Support?

Includes

- Systematic gathering of relevant information
- Conducting a functional behaviour assessment
- Highlights involvement of the person concerned
- Designing support plans (proactive strategies, early warning signs, reactive strategies, managing the aftermath)
- Implementation and ongoing evaluation

Immediate response strategies for the management of serious episodes of the behaviour are also addressed, but there is a belief that the best behaviour support happens when the behaviour is not happening; hence the strong emphasis on proactive strategies.
Organic and Neuropsychological Factors
e.g. ABI details, neuropsychological assessment

Setting Events and Antecedents
e.g. OAS-MNR and SASBA data, observational data, carenotes review, discussion with parent, staff and family

Neurobehavioural Disability
e.g. OAS-MNR, SASBA and SASNOS data

Current Reactive Strategies
e.g. OAS-MNR and SASBA data

Functions
e.g. attention, escape/avoidance, self stimulation, tangible rewards

Risks
e.g. social isolation, vulnerability, contact with forensic services, independence

Review:
XX’ POSITIVE BEHAVIOURAL SUPPORT PLAN: Written and agreed with XX

PROACTIVE STRATEGIES

EARLY WARNING SIGNS

REACTIVE STRATEGIES

AFTER CHALLENGING BEHAVIOUR HAS OCCURRED
Multicomponent Interventions are the Norm

Combination of methods is ideally suited to meeting the complex needs of people with ABI
• Increases awareness and motivation
• Sets appropriate expectations
• Encourages success
• Reinforces appropriate behaviour and skills
• Increases autonomy and choice
• Manage behaviour across a range of settings
Well managed behavioural interventions:

• Change staff behaviour
• Encourage positive interaction
• Enable a consistent team approach
• Help develop a positive social climate

A positive social climate promotes therapeutic relationships and is highly predictive of good treatment outcomes
The Neurobehavioural Rehabilitation Team

- Therapy does is not limited to time-limited formal *sessions*, with qualified *therapists* during the nine-to-five working day
- Interventions are continually applied
- Effort and achievements are reinforced through interaction with *every* member of the team
- The whole team are empowered to regard their role as that of agent for behaviour change
The Transdisciplinary Team (TDT)

Three essential, unique operational features:

1. **Arena assessment** – *professionals from multiple disciplines assess the person simultaneously*

2. **Intensive, ongoing interaction among team members** - *enabling them to pool and exchange information, knowledge, and skills, and work together cooperatively*

3. **'Role Release'** – *intervention strategies are carried out by any team member, under the supervision and support of team members whose disciplines are accountable for those practices*
Rehabilitation Process

- Therapists conduct assessments and devise interventions
- Interventions largely carried out by therapy assistants & rehabilitation support workers under the guidance and supervision of clinicians
- Originally this was a departure from the traditional division of hospital labour between doctors, nurses, therapists on one hand, and auxiliaries or healthcare assistants who were allocated domestic responsibilities
The overall effect of these structures is creation of a ‘prosthetic environment’ within which a person’s awareness and capacity for social learning are optimised.

(Wood & Worthington, 2001)

- Increases awareness
- Improves motivation
- Shapes behavioural responses into acceptable forms

(Wood, 1990)
What are the outcomes?
Outcomes from NbR

Robust evidence base supports effectiveness of NbR

Medical rehabilitation in 2011 and beyond

Report of a joint working party of the Royal College of Physicians and the British Society of Rehabilitation Medicine

November 2010
Outcomes from NbR

Single Case Studies

Group Studies

Table 1. Comparison of median frequency and AAS Pls for the first and most recent 3 month periods of admission within ABI and PNC services

<table>
<thead>
<tr>
<th>PI</th>
<th>First 3 months</th>
<th>Penultimate 3 months</th>
<th>Last 3 months</th>
<th>Friedman Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>PNC Frequency</td>
<td>16.0</td>
<td>28.0</td>
<td>23.0</td>
<td>3.522</td>
</tr>
<tr>
<td>AAS</td>
<td>90.0</td>
<td>126.0</td>
<td>55.9</td>
<td>6.652</td>
</tr>
<tr>
<td>ABI Frequency</td>
<td>104.5</td>
<td>66.5</td>
<td>61.0</td>
<td>5.250</td>
</tr>
<tr>
<td>AAS</td>
<td>407.5</td>
<td>233.4</td>
<td>212.7</td>
<td>6.619</td>
</tr>
</tbody>
</table>

*P<0.05

Figure 1. Reduction in the frequency of JH’s aggressive behaviour using DRL. Key: ‘A’ - number of staff to earn increased from four to five, and increase in functional/physical expectations; ‘B’ - Clopixol reduced from 10mg three times a day to twice a day; ‘C’ - transferred from the neurorehabilitation unit to a satellite group home. (Note: pre-treatment frequency count compiled from the last 7 of the 11 day period behavioural analysis conducted in; frequency aggression taken from all recordings made on the OAS-MNR.)

Figure 1. Change in performance indicator scores derived from the OAS-MNR demonstrating service level efficacy in managing aggressive behaviour for ABI and PNC patients.
Applications of Operant Learning Theory to the Management of Challenging Behavior After Traumatic Brain Injury

Rodger L. Wood, PhD, Nick Alderman, PhD

For more than 3 decades, interventions derived from learning theory have been delivered within a behaviorally focused framework to manage challenging behavior after traumatic brain injury with the aim of providing treatment in the rehabilitation process and improving social skills. Learning theory provides a conceptual framework that facilitates our ability to understand the relationship between challenging behavior and environmental contingencies, which ultimately can influence the success of interventions designed to manage challenging behavior.

STATE OF THE ART REVIEW

Rehabilitation Approaches to the Management of Aggressive Behaviour Disorders after Acquired Brain Injury

Nick Alderman,1,2,3,4 Caroline Kipling,2,3 and Jennifer Brooks2

1 Brain Injury Research Group, College of Health and Science, Swansea University, Swansea, UK
2 Brain Injury Research Group, College of Health and Science, Swansea University, Swansea, UK
3 Kings College London, St Andrews Academic Centre, London, UK
4 Brain Injury Services, Partnerships in Care, Gorseinon, UK

Abstract

BACKGROUND: Neurobehavioural disability (NBD) follows traumatic brain injury (TBI) and is associated with impaired cognitive abilities and social and emotional functioning. This paper reviews the existing literature to identify the effectiveness of strategies for managing challenging behavior after TBI.

METHODS: A comprehensive literature review was undertaken using a search of electronic databases and hand-searching of reference lists.

RESULTS: The effectiveness of various strategies for managing challenging behavior is reviewed, highlighting the importance of individualized approaches and the need for ongoing monitoring and evaluation.

CONCLUSIONS: The management of challenging behavior after TBI is a complex and challenging area, with a range of strategies being effective in different contexts. Further research is needed to identify best practices and improve the overall management of challenging behavior after TBI.

Keywords: neurobehavioural disability, challenging behavior, aggression, management, rehabilitation

1. Introduction

Neurobehavioural disability (NBD) comprises elements of executive and attentional dysfunction, poor insight, problems of awareness and social judgment, labored mood, altered emotional expression, poor impulse control and a range of personality changes (Wood, 1987, 1990; Kozak, 1999). The complex pattern of disability is the product of an interaction between damaged neural systems, neurocognitive impairment, and environmental factors.

2. State of the Art Review

Rehabilitation approaches to managing challenging behavior after TBI are reviewed, highlighting the importance of individualized approaches and the need for ongoing monitoring and evaluation.

3. Conclusion

The management of challenging behavior after TBI is a complex and challenging area, with a range of strategies being effective in different contexts. Further research is needed to identify best practices and improve the overall management of challenging behavior after TBI.
Outcomes from NbR

- Eames, Cotterill et al (1996)
- Followed up 55 patients 19-101 months after discharge from Grafton Manor
- Rehabilitation had improved functional skills and social behaviour
- Consequence of less restrictive placements and improved quality of life
- Improvements continued after discharge
Outcomes from NbR

Oddy & Ramos (2013)

Cost-benefits per individual lifetime demonstrated of £1.13 million for those admitted to NbR services within 1 year of injury and £0.86 million when admitted more than a year after injury.
## Outcomes from NbR

<table>
<thead>
<tr>
<th></th>
<th>SRM Total Sample</th>
<th>SRM ABI Cases</th>
<th>SRM Discharged Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>HoNOS-ABI</td>
<td>.72 Moderate</td>
<td>.81 Large</td>
<td>.78 Moderate</td>
</tr>
<tr>
<td>FIM+FAM Total</td>
<td>.64 Moderate</td>
<td>.61 Moderate</td>
<td>1.42 Large</td>
</tr>
<tr>
<td>SASNOS Total</td>
<td>.48 Small</td>
<td>.52 Moderate</td>
<td>.52 Moderate</td>
</tr>
<tr>
<td>MPAI-4 Total</td>
<td>.69 Moderate</td>
<td>.63 Moderate</td>
<td>1.31 Large</td>
</tr>
<tr>
<td>SRS</td>
<td>NA</td>
<td>NA</td>
<td>.78 Moderate</td>
</tr>
<tr>
<td>AAS</td>
<td>.63 Moderate</td>
<td>.88 Large</td>
<td>1.51 Large</td>
</tr>
</tbody>
</table>

**Change in Outcome Measures in BIS NbR Services 2016**

March 2017
Outcomes from NbR

Reduction in Aggression on the OAS-MNR

- Percentage reduction in the AAS was 75.6% (61.7% last year)
- Percentage reduction for discharged cases was just under 90%.
- Remains superior to the benchmark figure of 53.2% for another major NbR provider
The Future...
Future for NbR

- Technology
- Training
- Early intervention
- Extended care pathways
- Appropriate rehab for ‘offenders’
Increased Awareness,
Increased Resources
For ABI
Increased Awareness, Increased Resources For ABI

The Case for Radical Politicisation of ABI?
Future for NbR

KEEP LEARNING
AND
ASK FOR FEEDBACK

nick.alderman@partnershipsincare.co.uk

March 2017