
The Community Approach to Participation: Outcomes Following Acquired Brain Injury Intervention

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Objective: To investigate the participation outcomes of individuals with severe acquired brain injury (ABI) who were provided with up to 12 months of intervention based on the Community Approach to Participation (CAP). **Method:** A case series study design was undertaken with a total of 85 participants from two private practices specialising in community-based, CAP rehabilitation for people with severe ABI. Inclusion criteria were the person had sustained an acquired brain injury, was aged over 18 years and had received up to 12 consecutive months of CAP input from one of the two practices within a three-year period between January 2004 and January 2007. Twenty-six of the 85 participants were an average of 343 days post injury (Early group) and 59 of the participants were an average of 10.2 years post injury (Late group). They were living in a range of community environments and residential facilities. Initial participants were identified for the study in January 2005. Data were gathered using the Functional Independence Measure (FIM™), Community Integration Questionnaire (CIQ), and Role Checklist (RC Part 1) at two time points: prior to intervention (baseline), and after a 12-month period or at discharge (T1). Within the intervention period, all participants received a customised community occupational therapy (OT) rehabilitation program based on the key principles of the CAP. Intervention focused on participation goals of the individual, and development of the associated skills that underpinned valued role performance. **Results:** Participants each received an average of 51.01 hours of CAP OT during the 12-month period of intervention. Considerable improvement was seen in functional independence, community integration, and role participation after intervention in both the Early and Late groups. A statistically significant increase in FIM™ and CIQ total scores was found for all participants from Baseline to T1. The number of roles in which participants engaged increased on average by almost one role per participant following intervention, from a mean of 3.06 to 3.99. Increased participation in volunteer, home maintainer, participant in organisations and hobbyist roles were most common. **Conclusion:** Increased functional independence, community integration, and participation in both the Early and Late groups over a 12 month period demonstrates the potential for improved participation outcomes for people with complex needs following ABI, even many years post injury.

Keywords: community rehabilitation, occupational therapy, outcome measurement

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Studies have shown significant variability in long-term outcomes following severe brain injury (Doig, Fleming & Tooth, 2001; Tate, 2004; Winkler, Unsworth & Sloan, 2006). Although some people are able to re-engage in productive life roles and maintain a network of family and friends, others appear to have limited opportunities for meaningful activity and are socially isolated (Winkler et al., 2006). A study by Winkler, Unsworth and Sloan (2006) of 40 participants with very severe traumatic brain injury (TBI) three to 15 years post injury, identified two groups: 55% with a high level of community integration and 45% with a low level of community integration, whose lives were characterised by limited social and occupational participation. For people experiencing low community integration, participation in work or education (Avesani, Salvi, Rigoli & Gambini, 2005; Felmingham, Baguley & Crooks, 2001; Fleming, Tooth, Hassell & Chan, 1999; Olver, Ponsford & Curran, 1996; Ponsford, Olver, Curran & Ng, 1995), leisure activities (Brown, Gordon & Spielman, 2003), and other valued life roles (Davies Hallett, Zasler, Maurer & Cash, 1994; Sloan, Winkler & Anson, 2007) is significantly reduced.

Loss of life role participation often results in individuals spending large amounts of time engaged in passive activities within the home (Winkler, Unsworth, & Sloan, 2005), failing to integrate into their community (Doig et al., 2001), and experiencing social isolation (Elsass & Kinsella, 1987; Olver et al., 1996). Such individuals often report decreased life satisfaction (Burleigh, Farber, & Gillard, 1998; Pierce & Hanks, 2006; Stalnacke, 2007) and reduced quality of life (Huebner, Johnson, Bennett, & Schneck, 2003). Furthermore, it is well documented that there is an increased incidence of depression and anxiety (Kersel, Marsh, Havill, & Sleight, 2001; Ponsford, Olver, & Curran, 1995; Stalnacke, 2007), and relationship and accommodation breakdown in this population (Kersel et al., 2001). These outcomes may remain prevalent for many years after injury (Oddy, Coughlan, Tyerman, & Jenkins, 1985; Olver et al., 1996) and be further exacerbated for those living in inappropriate accommodation settings, such as residential aged care facilities (Winkler, Sloan, & Callaway, 2007).

In a comprehensive longitudinal study Olver, Ponsford and Curran (1996) compared the outcome of 103 individuals with TBI at 2 and 5 years post injury. Despite increasing independence in activities of daily living over the 3-year time-frame, employment status declined over this same period. Of the individuals who were employed at

the time of injury, 50% were employed at 2 years post injury. This figure fell to 40% at 5 years post injury. In addition, the authors found 50% of people reported having lost friends at 5 years post injury, and at 10 years this had increased, with 59% of respondents reporting loss of friendship roles (Olver et al., 1996; Ponsford, 2003). Burleigh and colleagues (1998) also found that social and community integration declined for their participants who were an average of more than 13 years post injury.

Social isolation was one of the most frequently cited problems in Koskinen's (1998) study, with 80% of participants reporting having lost friends and 53% reporting deteriorating quality of relationships up to 10 years post injury. Research has also shown that the stability of marital relationships decreases with greater time post injury (Wood & Yurdakul, 1997). As such, people with brain injury spend more time alone and rely more on family for social contact (Eames, Cotterill, Kneale, Storrar & Yeomans, 1996; Winkler et al., 2005; Winkler et al., 2006). Thus, existing research highlights the negative impact of ABI on levels of participation in occupational and social roles.

Definition of Participation

The World Health Organisation International Classification of Functioning, Disability and Health (ICF) is a classification of health domains from body (structure), individual (activity) and societal (participation) perspectives (2001). The ICF proposes that body functions and structures or impairment, activity or activity limitations, and participation or participation restrictions are separate but interrelated domains of health condition outcomes. The ICF framework further suggests that personal and environmental contextual factors may impact, either positively or negatively, on levels of participation restriction arising from impairments and activity limitations. Hence, the ICF provides a framework for understanding the relationship between disability and participation, where participation is defined as involvement in a life situation (World Health Organization, 2001).

Participation in life situations embraces all the key roles in which an individual engages within a societal context. For the individual, it is the meaning attached to participation in life roles that is particularly important (Law, 2002). Law (2002) outlines meaningful participation as incorporating choice and control, a supportive environment, and a sense of challenge and mastery. A study of individuals with disabilities revealed that they conceptually

alised participation as a fluid construct with themes that include choice and control, meaningful engagement, responsibility, relationships with others, inclusion, access and opportunity (Hammel et al., 2008). This suggests that community rehabilitation should go beyond just placing an individual in a community situation such as a group leisure activity, but also aim to support the person to experience a sense of meaningful involvement and social inclusion to maximise participation.

Based on the ICF, numerous factors may act as facilitators or barriers to participation and, for individuals with brain injury, there are a number of factors which have been associated with participation restrictions. These include experiencing ongoing pain or depression (Hoffman et al., 2007); being from a culturally or linguistically diverse background (Saltapidas & Ponsford, 2007); exposure to physical and social environmental barriers (Whiteneck, Gerhart & Cusick, 2004); being aged over 40 (van Baalen et al., 2007); and the caregiver having a passive coping style (van Baalen et al., 2007). Higher levels of disability and presence of challenging behaviours have also been found to be significant predictors of reduced long-term community integration for people with ABI (Winkler et al., 2006). In the stroke population, quality and quantity of social support has been found to relate to participation (Beckley, 2007). The ICF model suggests that interventions to modify personal and environmental factors can lessen the impact of the disability on social role participation.

Approaches to Community-Based Practice

A review of the literature revealed that there is a lack of evidence based theory and consensus among clinicians as to the models and best practice approaches for providing community based input to increase participation following ABI. Where such intervention has been described in the literature, models of community practice have moved away from the traditional medical approach with its focus on impairment and towards a more holistic style of practice (Kuipers, Foster, Smith & Fleming, 2009). In these latter intervention models there is a greater focus on managing, rather than remediating, the residual cognitive-behavioural, physical, psychological, and social sequelae of the injury as they impact on community reintegration. More holistic approaches include Willer and Corrigan's *Whatever It Takes* (1994), Jacobs, Blatnik, and Sandhorst's approach for *Lifelong Living* (1990), and Ylvisaker's *Context Sensitive* approach (2003).

By providing rehabilitation in a normalised environment, participation restrictions can be addressed within the context of the individual's own home and community (Cope, Mayer, & Cervelli, 2005; Sloan, Winkler, & Callaway, 2004; Ylvisaker, 2003). This contextualised approach to rehabilitation focuses on helping individuals achieve their personal objectives and participate in their chosen real world activities (Ylvisaker, Hanks, & Johnson-Greene, 2002). Community-based services that are provided in a flexible and dynamic manner over an extended timeframe are increasingly being recognised as a valuable component of rehabilitation (Cope et al., 2005; Sloan et al., 2004). Such input matches the person's life stage and goals, and recognises that they may have differing needs at various times throughout their lives. It also acknowledges the need to achieve a balance between skill development, compensatory strategies, and environmental modification to ensure that the individual is able to sustain their capacity to meet the demands of daily life (Willer & Corrigan, 1994) and prevent decline in function over time (Cicerone, 2004).

The potential benefits of community based rehabilitation are particularly relevant in light of generally poor long-term participation outcomes that are apparent, even when the person has received hospital-based rehabilitation programs in the early stages post injury. However, with only a few exceptions (Ponsford, Harrington, Olver & Roper, 2006; Powell, Heslin & Greenwood, 2002), there is currently limited research evaluating the impact of community-based services on long-term outcomes for people with ABI. Powell and colleagues (2002) employed a randomised controlled design in their follow-up study of severely injured individuals who were 3 months to 20 years post injury. The 46 participants who received community intervention demonstrated significantly greater gains in daily living skills and psychological wellbeing when compared with a group who only received written information at discharge from inpatient rehabilitation. However, no significant differences were noted between the two groups on indices of socialising, productive employment, anxiety or depression.

Ponsford and colleagues (2006) evaluated the outcomes of a multidisciplinary community based rehabilitation program by examining 77 participants with moderate to severe TBI at an average of 2 years post injury. For comparison purposes, they selected a group of matched participants who had received centre based outpatient therapy some years before the community based rehabilitation program was available. They found no significant

differences between the two treatment groups in terms of employment, independent living skills, leisure participation, social integration, cognitive changes, and emotional adjustment. The outpatient treatment group showed significantly better outcomes for financial management, need for support from others, physical independence, and communication. However, the authors acknowledged that, compared with the outpatient treatment group, outcomes for the individuals treated in the community may have been compromised by the lower number of hours of therapist contact time.

In 2004, Sloan, Callaway and Winkler described the Community Approach to Participation (CAP). The aim of the CAP is to improve long-term, life role participation outcomes for people living with brain injury. The CAP is an individualised and interdisciplinary approach to community based practice which aims to create the environment, supports and independent living skills that maximise a person's function and potential for successful long-term community reintegration. The CAP promotes a holistic view of the myriad of complex problems individuals experience following severe ABI and integrates a structured approach to addressing persistent cognitive-behavioural impairments as well as long-term adjustment.

This study, a case series, aimed to evaluate participation outcomes for a group of 85 people with severe ABI who received up to 12 months of CAP intervention. It was hypothesised that there would be a significant increase in functional independence, community integration and role participation. To investigate the influence of time since injury, participants were split into two groups, Early and Late, to account for spontaneous recovery within the first 2 years. It was further hypothesised that there would be a relationship between role participation and outcomes in functional independence and community integration.

Method

Participants

Participants were recruited from the caseloads of two Victorian-based Occupational Therapy (OT) practices specialising in community rehabilitation for people with severe ABI. Individuals who were aged over 18 years and received up to 12 months ($M = 10.25$, $SD = 3.13$, range = 3–12 months) of CAP OT input within a 3-year period between January 2004 and January 2007 were included in the study. Some participants had also received input prior to January 2004, which is not reported on in this study. Between January 2004 and January

2007, there were 87 consecutive admissions of individuals who received the requisite length of intervention. Two people were excluded from the study, due to their diagnosis of a degenerative neurological condition. There were no other exclusion criteria. A sample of 85 individuals was identified, who all consented to intervention. Family members provided consent for those individuals unable to do so by reason of profound cognitive impairment. Participants were all aged over 18 years at the commencement of the study. To investigate the influence of chronicity, participants were split into two groups based on length of time post injury at admission to the study.

The Early group ($n = 26$) were all less than 2 years post injury with an average of 343 days, ranging from 32 to 717 days post injury. Seventy-three per cent of this group were male and 27% were female. Seventy-six per cent had sustained a traumatic brain injury, 11.5% had a hypoxic brain injury, and the remainder had experienced a cerebrovascular accident, brain tumour or infection. Participants in the Late group ($n = 59$) were all more than 2 years post injury, with an average time post injury of 10.2 years, ranging from 2.25 to 21.62 years post injury. Fifty-six per cent were male and 44% were female. Seventy-six per cent of the Late group had sustained a traumatic brain injury, 15% had a hypoxic brain injury, and the remainder had experienced a cerebrovascular accident, brain tumour, or infection. A Pearson chi-square analysis showed there were no statistically significant differences between the Late and Early groups in the frequency of males and females ($\chi^2 = 2.23$, $p = .14$) or the frequency of type of brain injury ($\chi^2 = .36$, $p = .84$).

Table 1 provides a summary of demographic details including age, length of post-traumatic amnesia (PTA), and time post injury for participants in the Early and Late groups. Findings from one-way ANOVAs indicated statistically significant differences between the Early and Late groups for these variables. Injury severity for participants for whom PTA length was known, ranged from severe to extremely severe (Jennett & Teasdale 1981). Many participants also experienced comorbid issues such as drug or alcohol use, a secondary psychiatric diagnosis, or social disadvantage.

Living situation post injury prior to CAP intervention included, living with parents and/or siblings (32.9%), with partner and/or children (18.8%), supported accommodation including those with 24-hour staffing (18.8%), residential aged care (9.4%), alone with carer support (7.1%), a locked neuropsychiatric unit (5.9%), with friends

TABLE 1Demographic Data for Age at Injury, Injury Severity, and Time Post Injury at Baseline for Early ($n = 26$) and Late ($n = 59$) groups

	Early group		Late group		<i>p</i>
	<i>n</i>	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>	
Age at injury (years)	26	35.7 (18.85)	59	24.71 (12.72)	*
Length of PTA (days) ^a	17	73.65 (61.20)	35	116 (65.27)	*
Time post injury (days)	26	343 (202.33)	59	3732 (2036.10)	**

Note: ^a PTA not applicable for 20 participants. PTA data missing for 13 participants with TBI.* $p < .05$, ** $p < .01$

(2.4%), with others in a separate area such as a bungalow (2.4%), or in a rehabilitation centre (1.2%). Prior to CAP intervention, only 1.2% of participants were living alone without any carer support.

There was a mix of compensable and non-compensable participants. In the state of Victoria, individuals who experience severe brain injury may receive funding for rehabilitation from a number of sources, including the Transport Accident Commission (TAC) and the Victorian Workcover Authority (VWA). Individuals may also receive compensation for their injuries through the legal system, with the Supreme Court or State Trustees typically providing financial administration of these funds. People without compensation from these sources may be eligible for therapy and disability support from the state government funded Acquired Brain Injury Slow to Recover (ABI:STR) program if they are less than 2 years post injury when registered with the program. In this study, 62% of participants were funded by the TAC, 20% were funded by the ABI:STR program, 7% were funded through compensation controlled by a financial administrator, 5% were privately self funded, 4% were funded by the VWA, and 2% were funded by other sources, such as the Victorian Department of Human Services.

Most participants (85%) received at least one other type of therapy within the intervention period. Fifty-three per cent of the sample received physiotherapy, 46% received case management, 41% received psychology, 34% received speech therapy, 8% received recreation input, and 8% received other therapies such as dietetics, social work, and vocational rehabilitation. The intensity and duration of input of other therapies as well as medical input varied considerably and is beyond the scope of this study.

Measures

FIM™. The FIM™ (UDS Data Management Service, 1990) measures the level of assistance or

environmental, task, or equipment modification required to complete daily activities in six broad areas: self-care, sphincter control, transfers, locomotion, communication, and social cognition. There are 18 items across these six areas which are rated on a scale from one to seven, where a score of one indicates that the person requires total assistance to complete the task, and a score of seven indicates complete independence. The total FIM™ score ranges from 18 to 126, with higher scores indicating greater levels of independence.

Community Integration Questionnaire (CIQ).

The CIQ (Willer, Rosenthal, Kreutzer, Gordon & Rempel, 1993) has a total of 15 items across three subscales: home integration, social integration and productivity. A rating of the level of involvement in a range of community activities including financial management, grocery shopping, child-care, meal preparation, housework, community access, social activities, employment, study and volunteer work is undertaken. Scores on the home integration subscale range from zero to 10, scores on the social integration subscale range from zero to 12, and scores on the productivity subscale range from zero to seven. The total CIQ score ranges from zero to 29, with higher scores indicating greater integration.

Role Checklist (RC).

The RC (Oakley, Kielhofner, Barris & Reichler, 1986) elicits information regarding the person's past, present and future participation in life roles (Part 1), and the level of importance attributed to each of the roles (Part 2). This study used a modified version of the Role Checklist, detailing a list of 10 common life roles (student, worker, volunteer, caregiver, home maintainer, friend, family member, religious participant, hobbyist and participant in organisations) and a category of 'other'. Data were only gathered from Part 1 to obtain the number of current life roles. Total scores ranged from zero to 11, with a higher score indicating higher number of roles participated in.

Procedure

Data were collected at two time points, prior to the commencement of CAP OT (Baseline), and at discharge or 12 months following the commencement of intervention (TI), whichever came first. Initial participants were identified in January 2005. Data for participants who had received CAP OT input between January 2004 and January 2005 were collected retrospectively from client records, reports, progress notes and the treating clinician’s knowledge of the individual and their program of activities. Data for participants who began receiving CAP OT after this period, and who met the inclusion criteria, were collected prospectively via assessment by the treating OT. Data for the FIM™, CIQ and RC were collected by self-report, proxy or OT assessment.

Intervention

Intervention based on the Community Approach to Participation (CAP) was provided to all participants. The CAP has previously been described in Sloan and colleagues (2004). The CAP is a model of community based rehabilitation that aims to create the living environment, supports and skills to maximise a person’s long-term participation in valued life roles. Role participation is enhanced by supporting the development of social relations

and networks, as well as increasing the individual’s level of independence in activities that underpin role performance. Overall, an outcome is sought where the individual experiences a sense of inclusion in their home and community life, feels empowered to make everyday decisions and life choices, and achieves a level of adjustment and satisfaction with their changed life.

Rehabilitation programs based on the CAP integrate six key principles, namely:

- participation-oriented assessment
- a life role and meaningful occupation focus
- development of a therapeutic relationship
- collaborative and integrated approach
- individualised, flexible support models
- a long-term view.

In this study, intervention programs were specifically tailored to address the varying needs and life goals of each individual, but in all cases the CAP principles guided the therapists’ clinical reasoning and decision-making.

Figure 1 represents the specific areas of focus for therapy intervention to promote role participation. In supporting or expanding participation, the therapists began by isolating the key life roles identified as important by, and to be addressed with, each individual. Then, the range of interests

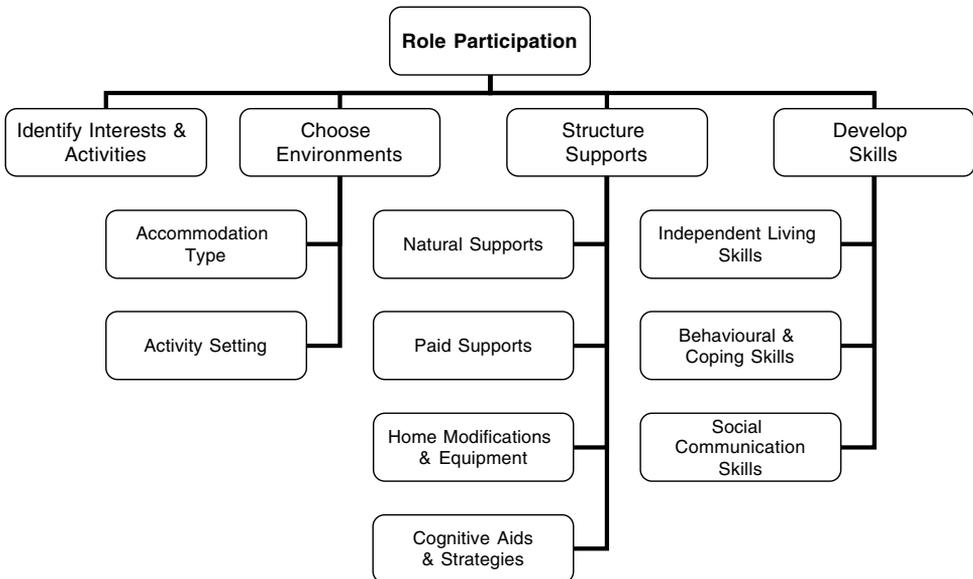


FIGURE 1
Areas of focus of the community approach to participation.

and activities that contributed to performance in this role area were identified. For individuals engaging in a relative paucity of everyday activities, this step often involved expanding the person's interests and repertoire of activities. Selecting the appropriate environments and settings in which the activities take place and matching the person's skills to the demands of these situations were crucial steps to build successful participation. Identification of opportunities for skill development and the provision of support to expand necessary skills built on strengths and residual fragments of past abilities. Tasks were often simplified and structured to promote success and compensate for very severe and ongoing impairments. As an individual's level of skill and confidence increased, challenges were upgraded. Opportunities to practise skills were embedded into structured daily routines, providing a meaningful context and repeated opportunities to learn. Where possible, therapists built on established routines rather than imposed entirely new ones. Individuals were not expected to generalise their learning from one setting to another. Instead, therapists generalised the knowledge they had acquired as to how to structure the environment and positively support the individual to maximise participation in a range of settings.

Skill development focused largely on three areas: independent living skills (e.g., toileting, money handling, and accessing transport); behavioural and coping skills (e.g., to manage frustration, stress, and anxiety); and social communication skills (e.g., listening, topic selection, and greetings). Each phase of intervention focused on a small number of core skills that were directly linked to enhancing the individual's goals for participation in identified roles.

In the present study, CAP intervention was provided by seven occupational therapists. All therapists were trained in the CAP and received regular clinical supervision from the principal therapists who developed the approach. The number of hours of CAP OT input each participant received during the intervention period was obtained from the practices' computerised accounting systems. Participants each received an average of 51.01 ($SD = 47.81$) hours of CAP OT during the 12-month period of intervention.

Results

The normality assumption was tested for all variables for both the Early and Late groups with the Kolmogorov-Smirnov Goodness of Fit Test. The RC and total scores on the CIQ were normally dis-

tributed for both groups at both time points. The FIM scores were normally distributed for the Early group at both time points, but not the Late group at either Baseline (median = 98; IQR = 35) or at T1 (median = 101; IQR = 35). However, ANOVA is quite robust and can tolerate violations of the normality assumption (Aron & Aron, 1994; Refinetti, 1996). A series of mixed model ANOVAs was conducted, with the between subjects factor of group (Early or Late) and within subjects factor of time (Baseline and T1) for each of the outcome variables. Where a significant interaction effect was observed, separate repeated measures ANOVAs were conducted for the Early and Late groups to investigate the extent of change for each of the groups. Pearson correlations and multiple regression analyses were conducted to establish relationships with, and predictors of, role participation.

Functional Independence

Results for the FIMTM total score for Early and Late groups, at Baseline and T1 are shown in Table 2. A mixed model ANOVA showed an overall significant increase in FIMTM total scores for the group of 85 participants from Baseline ($M = 89.88$, $SD = 30.99$) to T1 ($M = 92.21$, $SD = 29.84$), $F(1, 83) = 17.64$, $p < .001$. There was no significant difference in FIMTM total scores between the Early ($M = 93.92$, $SD = 30.53$) and Late ($M = 89.78$, $SD = 30.32$) groups, $F(1, 83) = 0.336$, $p = .56$. However, there was a significant group by time interaction effect, $F(1, 83) = 6.90$, $p = .01$, with the Early group showing a greater increase in FIMTM total scores over time. Further analyses showed that the increase in FIMTM total scores was statistically significant for both the Late group, $F(1, 58) = 4.83$, $p = .03$, and Early group, $F(1, 25) = 7.15$, $p = .01$.

Community Integration

Results for the CIQ total score for Early and Late groups, at Baseline and T1 are shown in Table 2. A mixed model ANOVA showed a highly significant increase on the CIQ score for the total group of 85 participants from Baseline ($M = 8.88$, $SD = 4.73$) to T1 ($M = 11.83$, $SD = 5.23$), $F(1, 83) = 66.91$, $p < .001$. There was no significant difference in CIQ scores between the Early ($M = 9.52$, $SD = 4.74$) and Late ($M = 10.73$, $SD = 5.35$) groups, $F(1, 83) = 1.22$, $p = .27$; however, there was a significant group by time interaction effect, $F(1, 83) = 6.36$, $p = .01$, with the Early group showing a greater increase in CIQ scores over time. Further analyses showed that the increase in CIQ scores was significant for both the Late

group, $F(1, 25) = 25.60, p < .001$, and Early group, $F(1, 25) = 43.48, p < .001$.

For the CIQ subscales, the mean total score for home integration following intervention increased from 0.79 ($SD = 1.03$) to 1.83 ($SD = 1.72$) for the Early group, and from 1.87 ($SD = 1.98$) to 2.97 ($SD = 2.62$) for the Late group. For social integration, the Early group mean scores increased from 5.35 ($SD = 2.70$) to 7.04 ($SD = 2.55$), and the Late group mean scores increased from 5.33 ($SD = 2.49$) to 6.19 ($SD = 2.59$). For productivity, the Early group mean scores increased from 1.19 ($SD = 0.85$) to 2.85 ($SD = 1.95$), and the Late group mean scores increased from 2.37 ($SD = 1.68$) to 2.73 ($SD = 1.68$).

Role Participation

Results for role participation for Early and Late groups, at Baseline and T1 are presented in Table 2. The number of roles in which participants engaged increased on average by almost one role per participant following intervention, from a mean of 3.06 ($SD = 1.64$) to 3.99 ($SD = 1.71$). A mixed model ANOVA showed a highly significant increase on the Role Checklist from Baseline to T1, $F(1, 83) = 44.59, p < .001$. There was no significant difference in RC scores between the Early ($M = 3.31, SD = 1.41$) and Late ($M = 3.62, SD = 1.85$) groups, $F(1, 83) = 0.73, p = .40$. There was no significant group by time interaction effect, $F(1, 83) = 2.04, p = .16$.

Table 3 shows that participation in all roles increased, with exception of the ‘other’ role.

There was a significant increase in participation in the roles of volunteer, home maintainer, hobbyist, and participant in organisations. Before intervention, 7% of the sample did not participate in any roles, after intervention this reduced to 3.5%. Prior to intervention 39% of the sample were participating in four or more roles, following intervention this increased to 66%.

Relationships With and Predictors of Increased Role Participation

With regard to the influence of demographic variables on the outcomes, Pearson correlations showed that time since injury was not correlated with number of roles on the RC before ($r = .17, p = .12$) or after intervention ($r = -.01, p = .91$). Age at injury was not associated with change on any of the outcome variables. For 52 of the 85 participants, injury severity was measured by PTA length (Jennett & Teasdale, 1981). Length of PTA was not correlated with change on the RC ($r = -.02, p = .29$) or FIM™ ($r = .25, p = .08$) following intervention, but was correlated with change on the CIQ ($r = -.30, p = .03$).

Predictors of change in role participation over the 12-month period of intervention were identified by regression analysis. Number of roles at baseline, change in CIQ score, change in FIM™ score, and time since injury were found to account for 44.3% (41.6% adjusted) of the variance in RC change. As shown in Table 4, increased role participation was independently and significantly

TABLE 2
Scores for FIM, CIQ and Role Checklist at Baseline and Time Point 1 for the Early and Late Groups

	Early group (n = 26)							
	Baseline				Time Point 1			
	M	SD	Min	Max	M	SD	Min	Max
FIM	91.42	33.42	31	124	96.42	27.73	35	125
CIQ	7.33	3.59	1	14	11.71	4.80	3	18.75
RC	2.69	1.16	1	6	3.92	1.38	1	6
	Late group (n = 59)							
	Baseline				Time Point 1			
	M	SD	Min	Max	M	SD	Min	Max
FIM	89.20	30.13	18	122	90.36	30.77	18	122
CIQ	9.57	5.03	0	21	11.89	5.45	0	24
RC	3.22	1.79	0	7	4.02	1.84	0	8

Note: FIM™ = Functional Independence Measure
 CIQ = Community Integration Questionnaire
 RC = Role Checklist

TABLE 3
Analysis of Individual Roles on Role Checklist ($n = 85$)

Role	Baseline	T1	p
Student	6 (7.1%)	10 (11.8%)	
Worker	8 (9.4%)	14 (16.5%)	
Volunteer	7 (8.2%)	16 (18.8%)	*
Caregiver	10 (11.8%)	14 (16.5%)	
Home maintainer	33 (38.8%)	50 (58.8%)	***
Friend	48 (56.5%)	55 (64.7%)	
Family member	70 (82.4%)	73 (85.9%)	
Religious participant	10 (11.8)	12 (14.1%)	
Hobbyist	45 (52.9%)	59 (69.4%)	**
Participant in organisations	21 (24.7%)	34 (40%)	**
Other	2 (2.4%)	2 (2.4%)	

Note: $p < .05$, ** $p < .01$, *** $p < .001$

TABLE 4
Summary of Multiple Regression Analysis for Variables Predicting Increased Role Participation on the Role Checklist ($n = 85$)

Variable	B	SE B	β	p
Roles at baseline	-0.12	0.07	-.15	
Change on CIQ	0.19	0.03	.53	***
Change on FIM TM	0.04	0.02	.21	*
Time since injury	-0.00	0.00	-0.04	

Note: $R^2 = .443$. Adjusted $R^2 = .416$.

* $p < .05$, ** $p < .01$, *** $p < .001$

CIQ = Community Integration Questionnaire

FIMTM = Functional Independence Measure

predicted by increased levels of independence (as measured on the FIMTM) and increased engagement in activities underpinning participation in life roles (as measured on the CIQ). Time since injury and the number of roles undertaken at baseline did not significantly and independently predict increased role participation, indicating that the number of roles the individual had prior to intervention and amount of time since injury did not strongly influence the capacity for an increase in roles.

Discussion

This study demonstrated that following a 1-year period during which 85 individuals received OT intervention based on the CAP, statistically significant improvement on each of the activity and participation measures occurred, for both Early and Late groups. Improvements were seen in independence within basic daily activities, such as transfers and toileting, and participation in community activities, such as shopping and socialisation.

While both Early and Late groups demonstrated a significant increase in FIMTM and CIQ scores, the Early group showed a greater increase over time, suggesting that gains are slower with longer times post injury. However, it is also noted that the Late group had a significantly longer period of PTA, and this factor may partly explain the slower rate of change in this group. Results also demonstrated significant gains in role participation, with the adoption of an average of one additional life role, relative to their starting point. For some participants, these new roles of volunteer or home maintainer replaced, or expanded, to fill the gaps created by the loss of other roles, such as worker or student, and offered the individual routine opportunities for social interaction and community engagement. On this measure, both Early and Late groups showed the same rate of change, suggesting that chronicity does not limit the potential for increased role participation.

Participation in roles offers a vehicle for skill development, whereby practice can be embedded within a meaningful context for the individual.

The improvements shown on the FIM™ and CIQ and the significant relationship of this change to increased role participation supports the focus of CAP intervention on the skills and routines underpinning role performance. An improvement in skills and abilities enhances opportunities for the individual and provides a platform for engagement in valued roles. In turn, the experience of engaging in a role provides a context for consolidating the skills necessary for successful participation. This reciprocal relationship can assist to enrich the experience and learning opportunities associated with community re-integration.

It is important to note that the significant changes in functional independence, community integration, and role participation were seen many years post injury. It is possible that individuals have a greater readiness for therapy input after a period of time spent living in the community during which awareness of persistent participation restrictions grows. Increased insight creates opportunities for addressing cognitive-behavioural impairments, social communication skills, and psychological adjustment in the context of goals for role participation. The limitations of the study design requires caution in drawing causal relationships between the CAP intervention provided and demonstrated outcomes; however, the substantial length of time post injury in the Late group makes spontaneous recovery an unlikely explanation for the measured improvements. Further, previous long-term outcome studies have shown deterioration in role participation over time when targeted intervention is not provided (Davies Hallett et al., 1994; Olver et al., 1996; Sloan et al., 2007), a finding that lends weight to the possible beneficial effects of CAP intervention.

The results suggest it is important that individuals are able to access community-based rehabilitation on discharge from acute inpatient services. Intervention at this early stage of community re-entry positively supports the individual as they embark on the process of rebuilding their life. It is recommended that therapists working in the community adopt a model of practice suited to this context. The CAP advocates a participation-focused, rather than an impairment-focused approach, as is traditionally more common in a medical model of practice (World Health Organization, 2001). Directly focusing on participation as the desired outcome of intervention enables the therapist to address not only the injury-related factors, but also the environmental and personal factors that may facilitate or impede role performance. When combined with a program of skill development grounded in the functional con-

text of the person's own home and community, there is a reduced need for generalisation of learning, which has been shown to be a limitation of decontextualised interventions (Ylvisaker, 2003).

Methodological issues make quantitative research in the field of community-based brain injury intervention extremely challenging. This study encountered many of the complexities involved in rigorously examining outcomes of intervention with a group of people who varied on many dimensions, had unique personal goals for their return to community living, and thus required an individualised approach to planning rehabilitation intervention. The heterogeneity of the participants in the sample, particularly in terms of time post injury and comorbidities, coupled with their varied access to compensation and resources, influenced the nature and intensity of the intervention each participant received. This study did not attempt to control for these factors and had only one exclusion criteria, which was the presence of a degenerative neurological condition. Although the group data reflected significant change overall, it is acknowledged that there were substantial variations in outcomes within the group, serving to illustrate the unique and individual needs of each person living in the community following severe ABI.

The large range in OT hours provided should also be noted, and highlights the need to individually tailor intervention to the specific needs of the client. Decisions regarding the nature of the treatment provided, as well as the timing and length of the intervention, relied on the clinical judgment of the individual therapist. From the results of this study alone, we are unable to determine specifically whether the intervention caused the improvements and if so, what components of the intervention were vital to the gains achieved. Nor is the minimum amount of intervention necessary to achieve this change evident. These issues require further empirical investigation.

There were also limitations relating to the outcome measures utilised. Particularly, the Role Checklist does not account for participation in multiple roles within a category. For instance in the 'carer role' an individual may care for their own children and also for an elderly parent, but in this study this only counted as one role. Thus, the RC may underestimate the number, or diversity of roles a person is participating in. Further, it does not consider time use within each role. For example, a person may spend substantially more time in a student role than another person is spending in their hobbyist role, or they may return to work post injury, but on a part-time rather than full-time

basis. Limitations relating to the CIQ and FIM™ have been discussed elsewhere (Corrigan & Deming, 1995; Dijkers, 1997; Sander et al., 1999; Winkler et al., 2006).

Replication of this intervention study across larger samples will assist in refining and establishing a theoretical framework from which client outcomes following ABI will be able to be measured and maximised. The impact of the community based intervention on long-term support needs, cost of care, living situation, and accommodation transition is an important area for future research.

Conclusion

This study supports clinical observations that, given participation focused intervention which is personally meaningful and contextualised, people with severe ABI can achieve positive changes in their functional independence, integration, and participation in meaningful life roles within the community. Gains in role participation are possible, irrespective of injury severity or time post injury. The provision of long-term rehabilitation for people with ABI is critical for the resumption and maintenance of life roles.

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