

Therapeutic recreation as an intervention for persons with dementia and agitation: An efficacy study

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Abstract:

Thirty-six long term care residents with dementia and agitation were selected for participation in this eight week study. During the eight week period, the participants received two different four week therapeutic recreation interventions in a clinical crossover design. These interventions included a sensorimotor program and a traditional activity program. The effects of these two programs were evaluated in terms of the effect on strength, flexibility, overall functioning, and agitation. The analysis showed that there was a significant improvement of grip strength, flexibility, and a reduction in agitation during the sensorimotor segment of the treatment. The results of this study indicate a new direction for therapeutic recreation specialists working with older adults with dementia and agitation.

Article:

Introduction

Dementia is a brain disease that causes a loss of memory, communication skills, and judgment that is severe enough to interfere with work, community living, and social skills. It is a serious and expanding problem in this country, with over four million Americans currently affected.¹ It is estimated that by the year 2020 there may be eight million people with dementia. There are many causes for dementing illnesses, but the most common cause is Alzheimer's disease. In addition to Alzheimer's disease, there are several similar diseases such as multi-infarct dementia and Lewy body dementia that are considered related disorders.

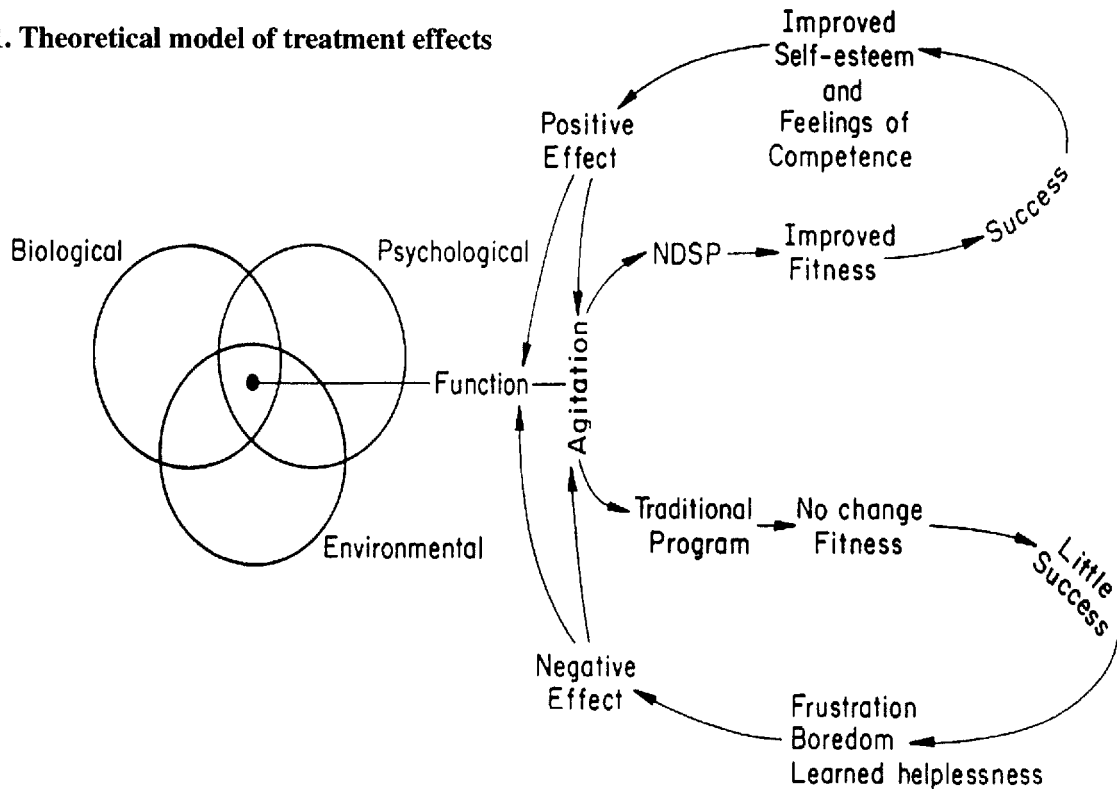
With Alzheimer's disease and the related disorders, behavior problems occur and are problematic in up to 97 percent of the cases.² For many, it is the behavior problems associated with the brain disease that cause institutionalization, and once institutionalized, it is this problem that restricts the individual's quality of life.

The behavior problems associated with dementia have been classified in different ways. Disruptive behaviors are the most common and include things like repetitive questions and mannerisms that disturb the working or living milieu.³ Agitation is more severe and has been defined as inappropriate verbal, vocal, or motor activity.^{4,5} It is displayed as pacing, tearing things up, yelling, spitting, and other behaviors. The most severe type of behavior problem is known as aggression. Aggression is a threat or action that causes harm to oneself or others.^{3,4} Disruptive, agitated, or aggressive behaviors affect the quality of life of the resident and everyone in his or her immediate environment.²⁻⁵

Behaviors and activities

It is the problematic behaviors mentioned above that often precipitate removal of the resident with dementia from group activities in long term care settings.⁶ In a survey of 50 activities providers it was found that if a resident "acts up" or disrupts a group activity he or she is usually removed from the program and returned to his or her room. The exclusion from activities and the boredom that ensues frequently creates an environment

Figure 1. Theoretical model of treatment effects



in which nursing home residents with dementia generate their own, often inappropriate stimulation.⁶

This problem was confirmed by Cohen-Mansfield, Werner, and Marx.⁷ The nursing staff of a large metropolitan nursing home were surveyed to examine the link between unoccupied time of the residents and agitation. Members of the nursing staff felt that boredom triggered agitation in 54.9 percent of the 144 residents. In a more in-depth study of 24 residents with agitation these authors found that 63 percent of the time the residents were unoccupied. It was during this unoccupied time that the most agitation occurred in this sample of residents.

Though it appears residents with dementia would benefit from specialized programs of intervention targeted toward reducing or stabilizing agitation, such interventions are not well developed. The most common techniques used for management of agitation are psychotropic drugs, restraints, and environmental manipulation.⁸ In addition, programming for patients who have Alzheimer's disease or related disorders, has not focused on specific therapeutic outcomes. The main goal of such programs has been to get confused and problematic residents simply to attend activities.⁶

Although preliminary research has shown some promise in using therapeutic activities as interventions for residents with agitation and dementia⁹⁻¹¹ little efficacy work has been done to give direction to those who provide the therapeutic programs. The Alzheimer's Association advises those providing programs to render structured, supervised, and simplified activities.¹² Many of the activities specialists who plan and conduct these programs, however, have little or no training in how to design therapeutically sound programs for these high risk patients. The unfortunate result, in many cases, is that the difficult to manage resident with dementia is left out of activities programs in nursing homes because of his or her disruptive, agitated, or aggressive behaviors. This omission leads to isolation, lack of stimulation, increased disability, and a great deal of unoccupied time.^{6,7} Gerontological therapeutic recreation research is needed to investigate the theories, plan the interventions, and design appropriate outcome measures. It is time to fill the gap between needed service and therapeutically sound interventions in long term care settings.

A therapeutic direction

A key word in the definition of agitation is activity. It links the definition of agitation and recreation in an operative way. During a recreational activity a deliberate attempt is made to produce pleasure enhancing experiences. Agitation, conversely, is often the result of being isolated or being in a situation that is not desirable. The concept of using appropriate leisure time activities to reduce agitation in individuals with dementia stems from the fact that human beings are active, living organisms, who derive satisfaction from using their innate abilities.¹³

The older adult with Alzheimer's disease or a related disorder

Table 1. Main effects of treatment and order on fitness scores			
Variable	Number of cases	Adjusted mean score ¹	
		NDSP	Traditional
Right grip strength²			
Order	32	4.88	4.89 n.s.
Treatment	32	5.34	4.42 ***
Left grip strength²			
Order	32	3.86	4.11 n.s.
Treatment	32	4.36	3.61 ***
Flexibility³			
Order	32	13.14	13.25 n.s.
Treatment	32	13.66	12.73 ***

¹ means adjusted for pretest scores
 *** p < .001
² pounds of pressure
³ inches reached

der has lost many of the cognitive and social abilities needed for successful participation in traditional nursing home activities. This fact makes appropriate leisure time program planning more difficult for activities providers. The therapeutic needs and the remaining strengths are different for the older adult with dementia than for an older person who is simply physically frail. Meaningful information gained from neurological studies^{14,15} can be used as a starting point to give nursing home activities providers some guidance in designing appropriate programs and need-based interventions.

There is strong evidence that within the nervous system the cellular damage of Alzheimer's disease is selective and especially involves the hippocampal system.¹⁵ Moreover, Eslinger and Damasio found that these pathogenic changes are related to the verbal and facial memory impairments in Alzheimer's patients; that is, the person's ability to remember common words and familiar faces is lost.¹⁴ Motor learning, however, is likely to require different structures, which can operate independently from the hippocampal system. The ability to learn motor skills appears to be preserved in most individuals in the moderate to severe stages of Alzheimer's disease.¹⁴ It is important to realize that even though there is a reduction in performance in programs and activities that require verbal and facial memory, an individual with Alzheimer's disease can still perform well on many sensorimotor tasks.

Purpose of the study

Functioning is a composite of biological (strength, flexibility, health), psychological (cognitive status, depression, feeling safe and secure), and environmental (noise, group size, free movement) factors.¹⁶ Activities for individuals with dementia should carefully match these areas of functioning for the most therapeutic

outcome.⁶ This study tested the overall hypothesis that if program tasks correspond to functional levels and are sensorimotor in nature, with improved strength and flexibility as a primary goal, residents would experience more success and less agitation (Figure 1). More precisely, the prediction was that:

- Strength and flexibility could be improved in older adults with late stage dementia;
- These changes would be related to overall functioning as measured on the Timed Manual Performance(TMP) Instrument;
- Functioning (as measured on the TMP) would be related to agitation. The final premise was that agitation could be reduced through functionally based sensorimotor therapeutic recreation programs.

This study evaluated the effects of participation in two different types of programs on strength, flexibility, and levels of agitation of older adults with dementia. Specifically, the study measured the programs' effects on grip strength, flexibility, agitation during therapeutic programs, and overall agitation as perceived by nursing staff of the participants. Overall functioning was also measured to explore the relationships of agitation and fitness to overall functioning in older adults with dementia.

Methods

Subjects

Thirty-six residents of a nursing home were selected for

Variable	Number of cases	Mean score	
		NDSP	Traditional
Order	32	11.47	9.31 n.s.
Treatment	32	6.78	14.00**
** p < .01			

participation in the study. All the participants were in the late stages of dementia. The mean Mini-Mental State Examination score was six and a half with a range of four, and the mean age was 82.4 years with a range of six and a half. Education levels of the residents were diverse from having no high school education (n=3) to being doctorally prepared (n=2), with most at the some high school (n=15) or high school graduate level (n=16). Twenty-eight of the residents were female and eight were male. All of the residents had been in the nursing home for at least three months, with the average length of stay of 18 months. Eighteen of the participants resided on a specialized unit for older adults with dementia. These 18 residents were randomly placed into one of two treatment groups (Group A or Group B) by drawing names without replacement. Eighteen additional residents, who resided on various units throughout the facility, were then matched to the specialized unit residents on gender, age within three years, and cognitive status. These residents were then placed in the opposite group from the individuals with whom they were matched.

Prior to start of the study two of the subjects were hospitalized and were therefore removed from the research project. Data from both of these subjects and their matched counterparts had to be eliminated from the analysis.

Treatment groups

In this quasi-experimental design, a clinical cross-over pattern was used in which both groups received both treatments,

Figure 2. Traditional program

Statement of purpose: To facilitate opportunities for involvement in supportive, maintenance, and empowerment experiences.

Sample Goal Statements:

1. Resident will participate in sing-a-long one time weekly.
2. Resident will participate in chair exercise one time weekly.
3. Resident will sing at the monthly birthday party.
4. Resident will identify one additional activity preference in the next 90 days.
5. Resident will suggest one idea during resident council meetings in the next 90 days.
6. Resident will identify two familiar smells during sensory stimulation program.
7. Resident will stay in the casino night program for 45 minutes.
8. Resident will state time, place, or person verbally daily during morning orientation.

Programming/Modalities Provided:

1. Sing-a-long/Rhythm band
2. Chair Exercise
3. Bingo
4. Sewing Club
5. Ceramics
6. Monthly Birthday Parties
7. Casino Night
8. Nails and News (for women)
9. Sports News (for men)
10. Resident Council
11. One-to-One Sensory Stimulation
12. Morning Orientation Program

Sample status statement that would be found in a model traditional activity therapy progress note:

"Resident continues to be dependent in mobility. She has refused to learn to propel her wheelchair independently. She continues to be dependent on staff for tasks she can accomplish herself and demands frequent attention. Continues to be unable to state situation, time, place, and person verbally."¹⁸

Table 3. Incidents of program agitation by week

Week of treatment	Treatment	
	NDSP	Traditional

Table 4. Multiple regression summary of overall functioning with fitness scores

Source	df	SS	MS	F	R	Adj. R ²
Regression	3	1865989.65	621996.55	32.87***	.79	.60
Residual	60	1135066.35	18917.77			

Variables entered	Unstandardized coefficients	Beta coefficients	t values
Flexibility	-41.09	-.71	8.13***
Right grip strength	-34.50	-.45	2.22*
Left grip strength	14.53	.19	.92

* p < .05 *** p < .001

but in a different order. Group A, which consisted of nine residents from the specialized unit and nine counterparts from other units, received four weeks of a sensorimotor program called the Neuro-developmental Sequencing Program (NDSP) followed by four weeks of traditional programs. Group B, which consisted of nine other residents from the specialized unit and nine counterparts, received the Traditional Program first followed by the NDSP treatment. All residents were involved in 12 programs per week for a total of eight weeks.

Instruments and analysis

Two measures of agitation were used in this study. Cohen-Mansfield's Agitation Survey (long form) was completed by nursing staff to evaluate overall agitation prior to any intervention, after the first four weeks of programs, and at the end of eight weeks of programs. In addition, program agitation was observed charted by a certified recreation therapist research assistant during all therapeutic recreation sessions during the study using the Behavior section of the Agitation Behavior Mapping Instrument.¹⁷ Validity correlations on the agitation measures with independent psychometric and mental status tests were acceptable, ranging from .88 to .93. Interrater reliabilities were reported as .92.

Overall function as measured on one part of the Timed Manual Performance (TMP) instrument known as the "doors test."¹⁸ Subjects are timed with a stopwatch as they open a variety of fasteners which are mounted on a 2 x 3 foot wood panel.

The author's computation of a validity correlation between the TMP and actual outcomes measures indicating level of care needed in a nursing facility, yielded a correlation of .95.¹⁸ The interrater reliability achieved with staff using the instrument was .98.

Strength as measured using a research grade bulb-type hand dynamometer, was expressed in pounds of pressure. Flexibility was measured on the Modified Wells Sit-and-Reach test. Research on the sit-and-reach test yielded a validity coefficient of .90, with the standing bobbing test for flexibility as the criteria.¹⁹ All tests were administered to both groups as a pre-test, mid-test, and post-test. The data were analyzed using a two-way analysis of covariance, two-way analysis of variance, and multiple regression analysis. Competency of raters

Raters were certified therapeutic recreation specialists and licensed nursing staff. To evaluate the competency and consistency of the raters a 20 minute video tape of older adults during a therapeutic program was used. The raters were asked to map the agitation on a specific subject using the ABMI. Two days later the same tape was shown and ratings were repeated. Test-retest and interrater reliabilities were then estimated from their ratings. The reliabilities were found to be .95.

Limitations

The following factors may limit the generalizability of the findings of this study. The sample size (n=32 completed the study) was small. Participants were a select population with severe cognitive impairments. Subjects who were not stable medically or psychiatrically were omitted from the study. However, this researcher was not able to control if the participants refused their medications on a given day. One of the measures of agitation used was based on nurses perception. This researcher was not able to control for residents who left treatment programs before a particular program ended.

Intervention

All participants received 12 programs per week during each intervention. The traditional program consisted of attendance in group activities that are typically offered in long term care facilities. This was a new schedule of activities set up for the research project. It included entertainment, social, and diversional activities that were not previously provided to the residents (see Appendix A). Some of the programs contained this section of the treatment were: Sensory stimulation, Sewing club, Ceramics Group, Adapted Bingo and Table Games, Sports and News, Morning Orientation, Chair Exercise, Arts and Crafts, Birthday Parties, Sing-a-longs and Rhythm Band.

The Neuro-developmental Sequencing Program^{9,20} is a method of treatment for older adults with serious mental disorders and (or) cognitive impairments. It is based on the idea that

Source	df	SS	MS	F	R	Adj. R ²
Regression	4	23538.03	5884.51	102.68***	.93	.86
Residual	59	3381.40	57.31			
Variables entered	Unstandardized coefficients		Beta coefficients		t values	
Function (TMP ₂ -TMP ₁)		.10		.11		2.22*
Pretest ABMI (control)		.88		.95		19.04***
Pretest TMP (control)		.00		.02		.28
MMSE ₁ (control)		.17		.03		.61
* p < .05 *** p < .001						

functional losses in persons with dementia occur in the reverse order of their development. The program uses a developmental approach to exercise and motor skills, and specialized equipment to promote movement and success experiences. All tasks are planned to match the functional abilities of the participants and are provided in small groups (see Appendix B). Programs are planned around familiar themes, for example, "Back to Nature" "Going Seaside" or "State Fair Days" to make the activities interesting and meaningful. Therapeutic recreation and nursing staff teamed up to provide the sensori-motor activities collaboratively. The programs comprising this section of the study included: Sensory Air Mat Therapy, Sensory Stim Box Program, Geri-Exercise to Music, Sensory Cooking Groups, Build your Own Games, Special Event Preparation Program, and Sensory Special Events to culminate each week of programs.²¹ Residents were prescribed the different therapy groups based on level of cognitive and overall functioning.

Results

The data was analyzed using SPSS for Windows. A variety of statistical procedures were used in this study. Two-way analysis of covariance, and multiple regression techniques were used in the description and interpretation of the data. The alpha level for acceptance of difference was .05 in this study.

Variables for analysis of covariance. In this study the independent variables were order of the intervention and treatment used. The dependent variables included: right and left grip strength, flexibility, agitation. Pretest scores were used as covariates to adjust for the order effect in each group.

Strength and flexibility

During the eight week segment of the treatment there was a significant ($p < .001$) positive change in both right and left grip strength during the NDSP segment. During the traditional segment of the study no positive change in either right or left grip occurred. In fact, those individuals who received NDSP followed by traditional programming showed a decline in right and left grip strength scores during the traditional segment of the study. Flexibility scores were also significantly improved during the NDSP segment of the study ($p < .001$), while during the traditional segment of the study no positive change in flexibility occurred. Again, those individuals who received NDSP followed by the traditional program showed a decline in flexibility scores. The main effects of treatment and order on strength and flexibility scores can be seen on Table I.

Agitation

While overall agitation as perceived by the nurses was not significantly reduced during either segment of the study ($p < .08$) agitation during programs was. There was a significant difference between Group 1 and Group two at mid-test and post-test in programmatic agitation as observed by the research assistant. During the NDSP segment of the treatment, programmatic agitation was 50 percent less than during the traditional segment. The main effects of treatment and order on agitation during programs can be seen on Table 2. A breakdown of weekly incidents of program agitation is found on Table 3.

Multiple regression

To examine the combined effects of strength, flexibility, and overall functioning as measured on the TMP on agitation while controlling for cognitive status a multiple regression analysis was completed. There was a significant relationship between flexibility, right grip strength, and overall functioning as measured on the doors section of the TMP instrument. Sixty percent of the variance was accounted for by right grip strength and flexibility score. As right grip and flexibility improved, measures of overall functioning were enhanced. Table 4 shows the summary from the multiple regression analysis.

Overall functioning and overall agitation

A second multiple regression analysis was completed to

Figure 3. Neurodevelopmental sequencing program

Statement of Purpose: To facilitate the acquisition and (or) improvement of physical and psychosocial abilities as they relate to recreation participation and overall functioning. To facilitate an improved quality of life for older individuals with cognitive impairments and psychiatric disabilities.

Sample Goal Statements (goals are developed based on level of functioning):

1. Resident will improve strength as evidenced by an increase in monthly grip strength test score.
2. Resident will improve flexibility as evidenced by an increase in monthly sit-and-reach test score.
3. Resident will improve functioning during therapeutic recreation programs as evidenced by increased attention span.
4. Resident will improve self-mobility skills as evidenced by an improved ability to walk or wheel self to daily programs.
5. Resident will show improved means of emotional expression as evidenced by sharing objects/feelings in a small group, and (or) expressing herself through creative media one time per session.
6. Resident will display a decrease in agitated behavior during therapeutic recreation programs as evidenced by the weekly ABMI score.
7. Resident will experience success and contentment during therapeutic recreation programs as evidenced by a pleasant expression and calm demeanor.
8. Resident will improve independent functioning in decision making and initiation of meaningful recreational activities as evidenced by an improved score on the R.T. observation chart in the next 30 days.

Programming/Modalities Provided:

1. Sensory Air Mat Therapy
2. Sensory Stim Box Program
3. Sensory Special Events
4. Geriatric Exercise/Relaxation Program
5. Build Your Own Games
6. Sensory Herb Garden/Adapted Garden
7. Sensory Cooking Program
8. The Price is Right Cognitive Therapy
9. Special Event Prep Program (Gross Motor Arts)
10. Wanderer's Leisure Lounge (Area set up for independent leisure pursuits).

Figure 4. Sample status statement that would be found in a NDSP recreational therapy progress note:

"Resident attended 100 percent of scheduled programs this 30 days. She was able to ambulate 30 feet to and from each program with the assistance of this therapist. This is an improvement of 10 feet. Her strength on the grip test improved from 1.5 pounds to 2.5 pounds bilaterally during this reporting period. Flexibility remained unchanged at 12.5 inches on the sit-and-reach test. The resident interacted with two other residents during sensory cooking program, sharing ingredients and utensils without incident. After each exercise/relaxation group the resident was directed to the leisure lounge, in which she browsed through magazines and played dominoes for approximately 10 minutes."

Specialized equipment—Sensory air flow mat & sensory stim box.

examine the combined effects of overall function (TMP) and cognitive status on agitation while controlling for pre-test scores. There was also a significant relationship ($p < .05$) between change in overall functioning and overall agitation when controlling for cognitive status and pre-test scores of functioning and agitation. Pre-test agitation was the most significant control variable ($p < .001$) in the model. Eighty-six percent of the variance in overall agitation was accounted for in this statistical model. As scores on the TMP (overall functioning) improved, scores on the Agitation Survey also improved. Table 5 shows the summary from this analysis.

Discussion

Nursing home residents with dementia have an enormous amount of unoccupied time.

One study of time usage estimated that nursing home residents with dementia spent 63 percent of the day with nothing to do.⁷ This same study found that it was during this unoccupied time that most behavior problems occurred.

It therefore, makes good sense to provide regularly structured activities programs for individuals with dementia to prevent boredom and problematic behaviors. Aronstein and colleagues found recreational activities and interventions to be useful adjuncts in the handling of the agitation and boredom of nursing home residents with dementia.²² Another recent study has demonstrated the importance of providing adequate programming for nursing home residents with dementia." This research found that those residents in an enriched program of activities experienced much less agitation than the control group.

Although previous research has indicated the need for programming, it failed to indicate the type of programming needed, or the therapeutic outcomes that could possibly be expected. The results of this study concur with Rovner's finding, and show a similar reduction in agitation. This study, however, goes beyond earlier work to add a therapeutic direction for practitioners. First of all, programs should include sensorimotor activities that promote free movement. Secondly, attainable goals in the areas of strength, flexibility, and agitation should be included in the care of individuals with dementia. Thirdly, the activities provided should match the individuals' levels of functioning for the most benefit to occur. Finally, the therapeutic outcomes of improved strength and flexibility are related to the individual's functional abilities. It appears from this study that the field of therapeutic recreation can have a major positive impact on the lives of individuals with dementia.

Conclusion

In conclusion, the results of this study have powerful ramifications for all healthcare providers caring for older adults with dementia and agitation. Not only were strength and flexibility scores significantly improved in only four weeks of treatment, but when active, sensorimotor activities ended there was a dramatic decline in scores. This result shows the importance of consistent, well-planned sensorimotor activities to maintain and (or) improve quality of life for older adults with dementia. With further study, researchers may be able to show that with sufficient strength and flexibility older adults can continue to perform ADLs, independently move from place to place, and seek out appropriate stimulation in the form of leisure activities.

It is now clear that health care providers can do more than offer a safe environment and medications to the residents with dementia and agitation. Therapeutic interventions can be used to treat the disuse, boredom, and agitation accompanying dementia in the later stages of the disease. The low level of activities programs typically provided to those residents should therefore no longer be seen as acceptable. Older adults with dementia do have potential for improvement and deserve the opportunity for quality therapeutic activity programs.

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