

# ANCDS Bulletin Board

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## **Evidence-Based Practice Recommendations for Working with Individuals with Dementia: Montessori-Based Interventions**

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The Academy of Neurologic Communication Disorders and Sciences (ANCDS), the American Speech-Language-Hearing Association (ASHA), its Special Interest Division 2 (SID-2: Neurophysiology and Neurogenic Speech and Language Disorders), and the Veterans Administration (VA) collaborated to establish evidence-based practice guidelines to be used by speech-language pathologists who work with individuals with

dementia of the Alzheimer type (DAT). A writing committee was formed that generated a technical report with evidence tables based on a systematic review and classification of the literature related to use of direct and indirect interventions with individuals who have DAT. In this clinical report, the level of scientific evidence related to Montessori-based interventions for persons with AD and related dementias is examined, with findings and recommendations summarized. The five studies reviewed were judged to provide Class II and Class III evidence to support the use of Montessori-based interventions for persons with dementia. This article contains information about the characteristics of study participants, types of Montessori-based interventions implemented, outcomes of the interventions, methodological limitations, recommendations for clinical practice, and ideas for future research directions.

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The Dementia Practice Guidelines (DPG) Committee was formed to develop clinical practice guidelines for speech-language pathologists (SLPs) working with individuals who have dementia. This committee performed a systematic and thorough review of the literature related to assessment and management of individuals with dementia, followed by examination and classification of the literature based on predetermined criteria (see Fratalli et al., 2003 for an in-depth discussion of best practice guidelines in speech-language pathology). In this present article, which is one in a series of reports, evidence related to the use of Montessori-based interventions for persons with dementia is presented.

Grabowski and Damasio (2004) define dementia as “an acquired and persistent impairment of intellectual faculties, affecting several cognitive domains, that is sufficiently severe to impair competence in daily living, occupation, and social interaction” (p. 2). Alzheimer’s disease (AD) is one of the most common causes of irreversible dementia, currently affecting an estimated 4 million Americans and expected to affect approximately 14 million Americans by the year 2050 (National Institutes on Aging, 2000). This rapid growth in the number of people with dementia demands greater attention to effective and efficacious behavioral management techniques to maximize functioning and quality of life of affected individuals.

Behavioral interventions for persons with dementia can be of two types: direct interventions and indirect interventions. Direct interventions are those in which SLPs intervene directly with a person who has dementia individually or in groups, whereas indirect interventions are those in which SLPs train caregivers, modify the physical environment, or develop routines and activities to maximize the functioning of persons with dementia (Clark, 1995; Hopper, 2001; Mahendra, 2001). Depending on the manner in which Montessori prin-

ciples are applied, they may be used in the form of a direct or indirect intervention for persons with dementia.

The Montessori method (Montessori, 1964) has a rich history of application in child pedagogy and is widely regarded as one of the most influential sets of ideas and practices on the education of children. This method was developed by the educator Maria Montessori in the early 1900s to create structured, stimulating environments that facilitate self-paced learning and independence in children. Some general Montessori principles include:

1. Designing a prepared environment, adapted for persons with dementia, with the intent of providing meaningful stimulation and purposeful activities
2. Progressing from activities that are simple and concrete to those that are complex and abstract
3. Breaking down a task or activity into its component parts and training one component at a time using external cues to reduce errors and minimize the risk of failure
4. Allowing learning to progress sequentially, that is, having participants learn in stages through observation and recognition, ultimately followed by recall and demonstration
5. Using real-life, tangible materials that are functional and aesthetically pleasing
6. Emphasizing auditory, visual, and tactile discrimination through activities.

In recent years, researchers and clinicians have successfully applied general principles of Montessori education to structured activity programming for dementia patients. The goal of using Montessori principles to design interventions for persons with dementia is to provide these individuals with opportunities to be meaningfully stimulated, engaged, socially interactive, and involved in activities of daily

living. However, there are many remaining questions about the use of these principles with individuals who have dementia. In this article, the research evidence related to using Montessori-based interventions with persons who have dementia is reviewed and practice recommendations are made.

## PROCEDURES

### Literature Review

An exhaustive literature search was conducted in several electronic databases: Medline (1966–August 2002), CINAHL (1982–August 2002), HealthSTAR (1980–August 2002), PsycINFO via EBSCO Host (1967–August 2002), Cochrane Database of Systematic Reviews, Health Reference Center (1980–August 2002), ERIC via EBSCO Host (1966–August 2002), the Social Sciences Citation Index (1966–August 2002), and PubMed. Manual searches were conducted of relevant textbooks, journals not available electronically, review articles, book chapters, and a published manual on Montessori approaches. The following search terms were used: Montessori-based activities, Montessori methods, Montessori education, Montessori principles, Montessori programming, Montessori materials, activity programming, environmental modification, dementia, Alzheimer's disease, dementia of the Alzheimer's type, senile dementia, and long-term care. Related to these search terms, seven articles, a published manual, and a videotaped presentation (part of a nationally telecast series, *Telerounds*) on Montessori-based interventions were identified for review. The published manual and videotape were excluded from this review because they were descriptive sources of information as opposed to original research. (Data presented in the videotape were from published research articles). Additionally, two of the seven articles were excluded for the following reasons: one dealt only with the psychiatric issues of participants with non-AD etiologies of dementia and the other was a brief descriptive article about Montessori methods and the rationale for their use with persons who have AD (Dreher, 1997), with no outcome data presented. The final set of studies reviewed and classified consisted of five articles on Montessori-based interventions for persons with AD.

### Classifying the Evidence

The DPG writing committee developed an evidence table template for classifying all research evidence

contained in articles reviewed on assessment and management of persons with dementia by SLPs. Each study was evaluated and classified based on several parameters, including the purpose of the study, characteristics of enrolled participants, factors affecting internal, external, and content validity, dose-response characteristics (frequency, intensity, and duration) of the treatment, methodological issues, treatment outcomes, and outcome measures used to document treatment effects. To ensure reliability of the coding, each article was obtained and rated independently by two members of the DPG writing committee.

Five key questions were used to frame the evidence being evaluated, consistent with the work of Sohlberg et al. (2003) and Hopper et al. (2005). These questions are:

1. Who are the participants who received Montessori-based interventions?
2. What comprised the Montessori-based interventions?
3. What are the outcomes of Montessori-based interventions?
4. What are key methodological concerns in implementing Montessori-based interventions?
5. Are there clinically applicable trends across studies in which Montessori methods were implemented?

## SUMMARY OF EVIDENCE FOR MONTESSORI-BASED INTERVENTIONS

### Who Are the Participants Who Received Montessori-Based Interventions?

Approximately 74 persons with a diagnosis of probable or possible Alzheimer's disease (pAD) participated in the five studies. Vance and Porter (2000) used the National Institute on Neurologic Communication Disorders and Stroke and/or the Alzheimer's Disease and Related Disorders Association (NINCDS-ADRDA; McKhann et al., 1984) criteria to establish a clinical diagnosis of probable AD. Orsulic-Jeras, Schneider, and Camp (2000) and Judge, Camp, and Orsulic-Jeras (2000) established a diagnosis of probable AD based on comprehensive neuropsychological evaluation. In the two remaining studies (Camp et al., 1997; Orsulic-Jeras, Judge, & Camp, 2000), investigators did not specify diagnostic criteria used to establish a clinical diagnosis of AD and instead used several measures to characterize their participant samples. For example, Orsulic-Jeras, Judge et al. (2000) administered tests to assess participants' mental status (Mini Mental

State Exam [MMSE]; Folstein, Folstein, & McHugh, 1975), affect (Cornell Scale for Depression [CSD]; Alexopoulos, Abrams, Young, & Shamoian, 1988), functional status (Multidimensional Observational Scale for Elderly Subjects [MOSES]; Helms, Csapo, & Short, 1987), and level of agitation (Cohen Mansfield Agitation Inventory [CMAI]; Cohen-Mansfield, Marx, & Rosenthal, 1989). Similarly, Camp et al. (1997) used the MMSE and the Direct Assessment of Functional Status (DAFS; Lowenstein et al., 1989) to quantify mental status and ability to perform activities of daily living, respectively. Only Vance and Porter (2000) reported on participants' number of years since onset of AD-related symptoms.

Participants across the five studies had mild to severe dementia, as determined by scores on the MMSE ranging from 0 to 24 out of 30. Participants were predominantly female, ranging in age from 60 to 103 years, and all participated in adult daycare programs or lived in special care units of long-term care facilities. Information about years of education was provided in two out of five studies (Vance & Porter, 2000; Orsulic-Jeras, Schneider et al., 2000). Ethnicity of participants was reported in three studies: Camp et al. (1997) and Orsulic-Jeras, Schneider et al. (2000) reported that all their participants were Caucasian. Further, Camp et al. (1997) reported that 11 out of 12 of their participants were Jewish and from middle to upper socioeconomic status. Judge et al. (2000) reported that 76% of their participants were Caucasian and 24% were African-American.

No information was provided about participants' hearing and vision abilities in any of the five studies. Two studies (Camp et al., 1997; Vance & Porter, 2000) listed specific exclusionary criteria that included a positive history of stroke, alcoholism, serious cardiovascular disease, multi-infarct dementia, head trauma, psychiatric illness, blindness, inability to speak English, or any demonstration of physical/verbal aggression. Overall, there was disparity across the reviewed studies in the type and amount of information provided about study participants. Complete information was not always provided about important factors such as time since disease onset, ethnicity, sensory function, co-morbidities, medications being taken, and so forth.

### **What Comprised the Montessori-Based Interventions?**

The primary purpose of the five studies was to investigate the effects of direct cognitive stimulation

using Montessori principles to maintain or improve behavior, cognitive function, or affect/mood of individuals with AD. All of the articles included some description of Montessori interventions that could be used individually with clients or in group settings. In addition, Camp et al. (1997) investigated the use of intergenerational Montessori activities in which adults with dementia, under supervision, teach Montessori lessons to preschool children.

The types of activities used in the Montessori-based cognitive interventions included Memory Bingo (Judge et al., 2000; Orsulic-Jeras, Judge et al., 2000; Orsulic-Jeras, Schneider et al., 2000); Question Asking Reading on common topics (Judge et al., 2000; Orsulic-Jeras, Schneider et al., 2000); and simple sensory activities such as scooping, sorting, matching, and arts and crafts (Orsulic-Jeras, Judge et al., 2000; Vance & Porter, 2000). These activities are based on the Montessori principles of seriation (simple to complex task hierarchy), object permanence, symbolic function, and auditory and visual discrimination.

The reviewed studies varied in research design, type of Montessori activity employed, dose-response characteristics of the interventions, and outcome measures used to document treatment effects. Regarding dose-response parameters, variations across studies were seen in session duration, session frequency per day and per week, total length of study, and whether interventions were administered individually or in a group. Vance and Porter (2000) provided 60-minute sessions twice a day, five times a week, for 12 weeks, leading to a total of 120 sessions. Camp et al. (1997) administered 30- to 45-minute sessions once a week for over 75 weeks, for a total of more than 75 sessions. Judge et al. (2000) administered 45- to 60-minute sessions, twice a day, for 9 months. These researchers did not provide information on weekly treatment frequency; therefore, the total number of sessions could not be determined.

In two studies (Orsulic-Jeras, Judge et al., 2000; Orsulic-Jeras, Schneider et al., 2000), researchers provided a combination of individual and group sessions at least twice a week over a period of 9 months. Orsulic-Jeras, Schneider et al. (2000) reported that individual sessions lasted from 10 to 30 minutes, and group treatment sessions lasted 25- to 45 minutes, twice a week. In this study, participants received Montessori programming at least twice a week, either only as individual sessions, only as group sessions, or as a combination of individual and group sessions. Orsulic-Jeras, Judge et al. (2000) reported that intervention sessions lasted

from 15 to 30 minutes per session, twice a week, for 9 months, resulting in an approximate total of 72 sessions.

Information about who administered the Montessori interventions was provided in four of the studies. Vance and Porter (2000) reported that daycare staff and “aides/teachers,” trained in the use of Montessori materials, administered the interventions. In both studies conducted by Orsulic-Jeras and colleagues, the interventions were administered by trained activities therapists, volunteers, nursing assistants, or research assistants. The training focused on presenting Montessori activities to participants and learning to use a Montessori-based assessment system to individualize activities for residents. Multiple training methods were used to train personnel administering the interventions. These included using videotapes, providing trainees opportunities to directly observe Montessori activity programming, role playing, and supervising trained personnel during individual and group sessions with dementia participants. Camp et al. (1997) mentioned that prior to initiating their intergenerational programming study, experienced research staff directly trained older adults with dementia to teach Montessori lessons to preschoolers.

### **What Are the Outcomes of Montessori-Based Interventions?**

Outcome measures used in the five studies varied considerably depending on target behavior of interest. For example, Vance and Porter (2000) used a composite change score based on participants’ performance on 22 cognitive measures to determine the effects of Montessori versus regular activity programming on overall cognitive function. Outcome measures included performance on psychometric tests (Vance & Porter, 2000), ratings on observational scales for assessing only engagement (Judge et al., 2000) or both affect and engagement (Orsulic-Jeras, Judge et al., 2000; Orsulic-Jeras, Schneider et al., 2000), and descriptive data such as the number of lessons taught by persons with dementia to preschoolers in the intergenerational programming context (Camp et al., 1997).

### **What Are Key Methodological Concerns in Implementing Montessori-Based Interventions?**

Methodological concerns identified in the five studies were related to specific factors affecting internal, external, and construct validity. In evaluating

internal validity, reviewers focused on factors affecting the strength of causal inference, for example, the type of research design, presence of a control group, whether participants were randomized, and the presence/treatment of missing data. In evaluating external validity, the emphasis was on determining whether:

1. the five studies contained sufficient information to allow replication,
2. the treatment was clearly described and consistently administered to all participants,
3. measured outcomes were causally related to the treatments implemented, and
4. participant samples were well characterized

Finally, in assessing construct validity, reviewers focused on the appropriateness of the outcome measures used to assess treatment effects. These concerns pertaining to internal, external, and construct validity are described below.

### ***Internal Validity***

Of the five studies reviewed, two (Judge et al., 2000; Orsulic-Jeras, Schneider et al., 2000) included treatment (Montessori activities) and control groups (regular activities). Random assignment of participants to groups was not reported in either of these studies; however, Judge et al. (2000) did match participants on MMSE scores. Camp et al. (1997) employed a one-group design, with participants being observed and their behavior documented over time while involved in intergenerational Montessori activities and during similar time periods on days when they did not work with the children. Orsulic-Jeras, Judge et al. (2000) and Vance and Porter (2000) used within-subjects research designs in which participants served as their own controls, taking part in both Montessori and regular activity programming.

Missing data were not uniformly reported. In only two of the five studies (Vance & Porter, 2000; Orsulic-Jeras, Schneider et al., 2000) did authors report missing data resulting from subject attrition (e.g., death, transfer from facility, or irregular attendance during treatment sessions). In summary, across the five studies several threats to internal validity were identified (e.g., use of single-group designs, lack of randomization in two-group designs, lack of information on missing data) that necessitate caution in interpreting a strict cause-effect relationship between the Montessori treatment and the observed outcomes.

### *External Validity*

Factors affecting external validity include replicability, treatment fidelity, and sample and causal generalizability. Based on the information provided in the articles, reviewers judged four studies (Camp et al., 1997; Judge et al., 2000; Orsulic-Jeras, Judge et al., 2000; Orsulic-Jeras, Schneider et al., 2000) as being replicable. Reviewers noted that a training manual (Camp, 1999) on implementing Montessori activities for residents with dementia, was available for purchase on two websites as well as directly from the author. Additionally, a commercially available videotape produced by the National Center for Neurogenic Communication Disorders at the University of Arizona (Camp & Brush, 1999) features the work of Cameron Camp and provides detailed information on Montessori activities and exercises for dementia patients, including sample activity plans. The availability of these resources further supported reviewers' judgments of the four studies being replicable. Even with information in these supplemental resources, the study methods of Vance and Porter (2000) did not include enough specific information to be judged as replicable.

Treatment fidelity was rated on a 4-point scale with 0 being the lowest rating indicating that little or no information about the treatment was provided, 1 indicating that investigators made some effort to ensure that all participants received the same treatment but did not do manipulation checks, 2 indicating clear evidence that all participants received the same treatment with one or more manipulation checks, and 3 indicating that researchers provided a detailed description of the treatment and a manual or treatment guide plus one or more manipulation checks (Bayles et al., 2005). Reviewers evaluating the five studies on Montessori-based interventions identified treatment fidelity as an area of concern. For three of the five studies (Vance & Porter, 2000; Camp et al., 1997; Judge et al., 2000), treatment fidelity was rated as being 1. Two remaining studies (Orsulic-Jeras, Judge et al., 2000; Orsulic-Jeras, Schneider et al., 2000) received a rating of 2, indicating moderate treatment fidelity. Importantly, in the four studies in which regular activities were used as a control condition, specific information about the nature of these activities was lacking (Judge et al., 2000; Orsulic-Jeras, Judge et al., 2000; Orsulic-Jeras, Schneider et al., 2000; Vance & Porter, 2000). Routine or control activities were described as encompassing a variety of "materials and tasks" and included "listening to music, socializing and coloring" (Vance & Porter,

2000; p. 8). Orsulic-Jeras, Judge et al. (2000) provided only slightly more detail, stating that regular activities included storytelling, trivia, current events, movies, musical programs, sensory stimulation (e.g., hand massage, aromatherapy and tai chi), and puzzles (p. 108) conducted in large and small groups, as well as individual sessions.

None of the studies provided sufficient information regarding manipulation checks to allow the reviewers to determine whether the Montessori-based interventions were being administered as planned. Also, information on measurement reliability was provided only in two studies (Judge et al., 2000; Orsulic-Jeras, Judge et al., 2000). Judge et al. (2000) reported inter-rater agreement to be 90%, assessed over 25 instances of behavioral observation (each lasting 10 minutes) to determine type and amount of engagement. Orsulic-Jeras, Judge et al. (2000) reported that the engagement scale (MRI-ES) "has achieved interrater agreement levels of more than 95%" (p. 109); however, the authors did not report interrater agreement levels specifically for data collected in their study.

Sample generalizability was judged to be good for three studies (Vance & Porter, 2000; Judge et al., 2000; Orsulic-Jeras, Schneider et al., 2000) because precise clinical criteria were used to establish diagnosis of probable or possible AD. Thus, these studies are generalizable to populations of persons with mild to moderate DAT. Judge et al. (2000) reported that 14 of their 19 participants had AD, 5 had a related dementia (3 with vascular dementia, 2 with mixed dementia). Similarly, Orsulic-Jeras, Schneider et al. (2000) reported that 17 of their 25 participants had probable/possible AD, 6 had vascular dementia, and 2 had mixed dementia. Because information on the etiology of dementia was not provided in the remaining two studies, sample generalizability is considered limited.

For all five studies, causal generalizability, or the degree to which a causal relation exists between the treatment and observed outcomes, was rated as 1 on a 3-point scale (where 0 indicated the definite presence of one or more confounding variables influencing treatment outcomes, 1 indicated the possibility that a confounding variable existed, and 2 indicated that there were no discernible confounding variables). Factors such as the inclusion of participants with mixed diagnoses, the general lack of specific information on participant characteristics (e.g., vision, hearing, co-morbidities), and large variations in dose-response characteristics of the interventions resulted in ratings being fair, rather than good.

### ***Construct Validity***

Construct validity is critically linked to treatment outcome measures. Data on treatment effects are only as meaningful as the outcome measures chosen and whether these measures are appropriate for the target outcome behavior. Further, outcome measures must be selected with the knowledge that older adults with AD will experience decline in functional abilities over time.

Vance and Porter (2000) compared AD participants' changes in scores on 22 cognitive measures when engaged in regular stimulation activities versus Montessori activities. These 22 cognitive measures were subtests derived from eight standardized tests including the MMSE, the Dementia Rating Scale (Mattis, 1988), the Boston Naming Test (Kaplan, Goodglass, & Weintraub, 1978), the Visual Discrimination Form Test (Benton, Hamsher, Varney, & Spreen, 1983), the Parachek Geriatric Behavior Rating Scale (PGBRS; Miller & Parachek, 1974), the Ordinal Scales of Psychological Development (OSPD; Auer, & Reisberg, 1995), subtests of the Wechsler Memory Scale (3rd edition; Wechsler, 1981) and the Wechsler Intelligence Scale (3rd edition; Wechsler, 1981). Based on the change in scores on these 22 measures, a composite Montessori Benefit Score was computed. An increase in this score was interpreted to reflect greater benefit of Montessori activities over regular activities.

Camp et al. (1997) administered the MMSE to obtain a measure of global cognitive status, and the Direct Assessment of Functional Status (DAFS; Lowenstein et al., 1989) to assess participants' ability to perform activities of daily living. They used two outcome measures to document the effectiveness of Montessori-based intergenerational programming. The first outcome measure was the number of lessons that AD participants successfully taught to preschool children (based on the children then successfully completing the activity that was taught). The second outcome measure was the number of times apathy (disengagement and lack of involvement with physical and social environment) was observed in 5-minute behavioral observations of AD participants before, during, and after teaching the Montessori-based lessons. Information was not provided about when or how frequently these observations were conducted over the course of the study.

Judge et al. (2000) used levels of engagement (type and amount) as their primary outcome measure. They analyzed constructive and passive engagement measures using a mixed model analysis of variance (ANOVA) with group assignment (treatment vs. con-

trol) as the between subjects factor and test time (baseline vs. midtest vs. posttest) as the within-subjects factor. Orsulic-Jeras, Judge et al. (2000) used the amount and type of engagement and affect as their main outcome measures. They tracked positive types of engagement (constructive engagement, passive engagement), negative types of engagement (nonengagement, self-engagement), and four affective states (pleasure, sadness, anger, anxiety/fear) while residents participated in Montessori versus regular activities. For each type of engagement and affect, repeated measures ANOVA was used to examine the effects of Treatment (Montessori vs. routine) and Time (midtest vs. posttest). Identical to the previous study, Orsulic-Jeras, Schneider et al. (2000) tracked frequency and duration of the same four levels of engagement (as observed using the Myers Research Institute Engagement Scale) and of the four affective states of pleasure, anger, sadness, and anxiety/fear (as measured on the Affect Rating Scale by Lawton et al., 1996).

In summary, the outcome measures used in all five studies were appropriate for assessing the effects of the interventions on the dependent variables of interest. Standardized tests were not frequently used as outcome measures. In fact, only Vance and Porter (2000) utilized standardized tests along with published rating scales to measure treatment outcomes.

### **Are There Clinically Applicable Trends Across Studies in Which Montessori Methods Were Implemented?**

Vance and Porter (2000) reported a significant increase in mean Montessori Benefit Scores (computed from change scores on 22 cognitive measures) for 11 of their 15 AD participants, reflecting a greater benefit of Montessori activities (as compared to routine activities) on cognitive performance. Camp et al. (1997) reported that the number of Montessori lessons that AD participants successfully taught preschool children increased over approximately 75 sessions. Further, no instances of disengagement were observed when AD participants were teaching children Montessori activities. In direct contrast, when older adults with dementia were not engaged in intergenerational Montessori activities, they displayed disengagement on 53% to 71% of observed instances. More episodes and greater duration of disengagement were observed in the early morning and midmorning. On 25% to 37% of these recorded instances, disengagement lasted the entire duration of the observation period.

Judge et al. (2000) reported that AD participants involved in Montessori interventions displayed more constructive engagement (CE; a motor or verbal response directly related to a target activity, e.g., clapping during a music session) and passive engagement (PE; listening or looking behavior related to a target activity, e.g., watching others paint during art therapy) as compared to control participants. Further, the amount of CE and PE increased over time as participants continued to be involved in Montessori-based interventions. Orsulic-Jeras, Judge et al. (2000) reported that AD participants' scores on engagement measures did not change significantly from baseline to midtest (3 months) to posttest (6 months) when participants were involved in regular activities. On the other hand, significantly greater CE and significantly lesser PE were noted during Montessori activities. Additionally, no self-engagement or nonengagement (apathy) was noted during Montessori activities and exclusively occurred in regular activities. AD participants also had significantly higher pleasure scores and lower anxiety scores during Montessori activities. Interestingly, levels of anxiety and pleasure declined from midtest at 3 months to posttest at 6 months during both Montessori and regular unit activities. The authors stated uncertainty as to the reason for this decline. The affective states of anger and sadness were rarely seen in study participants, but did occur during regular activities.

Orsulic-Jeras, Schneider et al. (2000) replicated their earlier findings (reported in Orsulic-Jeras, Judge et al., 2000) and found significantly increased CE when participants were involved in Montessori activities as compared to routine activities. Although treatment and control groups did not differ significantly in baseline performance on CE, following introduction of Montessori activities, the treatment group improved significantly in amount of CE measured. The authors also reported reduced levels of PE over time for the treatment group, but not for the control group. Finally, like the previous study, identical findings of significantly enhanced pleasure over time for the treatment group was reported but not for the control group.

In summary, results from these five studies suggest that Montessori activities were more beneficial than regular or routine activities in improving performance on cognitive measures (Vance & Porter, 2000), engagement levels (Judge et al., 2000; Orsulic-Jeras, Schneider et al., 2000), affective states (Orsulic-Jeras, Judge et al., 2000), and social interaction (Camp et al., 1997). However, more information is necessary regarding the nature and implementation of regular activities and how these

differ from Montessori activities before strong conclusions can be drawn regarding the relative effects of Montessori-based interventions.

### WHAT CAN BE LEARNED FROM THIS REVIEW OF THE EVIDENCE ON MONTESSORI-BASED INTERVENTIONS?

The five studies reviewed here provide Class II and Class III evidence to support the use of Montessori principles for activity programming and designing interventions for persons with dementia. Four of the five studies were rated and classified as Phase II studies, with investigators focusing on refining their specific research hypotheses and methodology. One study was classified as Phase I research (exploratory stage with initial observations), being a pilot program to determine feasibility of residents with dementia participating in a Montessori-based intergenerational program. Ongoing research is needed to add to the existing evidence base for using Montessori-based interventions with dementia patients. Some recommendations for clinical practice and future research on Montessori-based interventions are outlined below, relative to treatment candidacy, implementation, and expected treatment outcomes.

#### Candidacy for Montessori-Based Interventions

Persons with the following characteristics could be candidates for Montessori-based interventions.

- Individuals with episodic memory impairments resulting from dementia but who have some capacity for motor learning, verbal communication, socializing, and no history of physical aggression (particularly important in intergenerational programming)
- Individuals with mild to moderate dementia and the ability to attend to and participate in intervention sessions
- Functional auditory and visual abilities to participate in Montessori activities that frequently involve sensory discrimination and reading.

#### Implementing Montessori-Based Interventions for Persons With AD and Other Dementias

Clinicians and researchers investigating Montessori-based interventions with dementia patients should do the following:



- Screen for visual and auditory impairments
- Document difficulty with sensory integration of information from varied sources, problems holding objects, or poor arm and hand motor control
- Observe ability to socialize with other residents and participate in group activities with other residents
- Provide practice trials with Montessori materials and activities and be willing to repeat instructions and/or tasks until residents can do them independently
- Focus on treatment tasks that are relevant to the individual's daily life
- Probe for maintenance of improvement in affect and engagement over time both with and without ongoing participation in Montessori activities
- Compare learning and retention of tasks or skills taught using Montessori principles with those taught without using Montessori principles
- Document if residents self-initiate trained Montessori-based activities/tasks outside of treatment sessions

#### **Anticipated Outcomes of Montessori-Based Interventions for Persons With Dementia**

The following intervention outcomes are possible for persons with AD.

- Enhanced engagement and participation in a target activity
- Improved ability to independently perform a task taught using Montessori principles
- Enhanced positive affect and reduced negative affect
- Improved ability to participate in group activities and intergenerational activities
- Little to no change in performance on psychometric tests of global cognitive status or specific domains of cognitive function, such as orientation, attention, or memory.

#### **CURRENT AND FUTURE RESEARCH DIRECTIONS ON MONTESSORI-BASED INTERVENTIONS**

During the time that this literature base on Montessori interventions was reviewed and this clinical article prepared, some additional studies on using Montessori-based interventions with dementia patients were published. These studies were not in-

cluded in the evidence table but will be summarized here as they further support the use of Montessori methods for persons with dementia.

Vance and Johns (2002) compared the effects of Montessori versus routine activities on the cognitive performance of 15 adults (3M, 12F) with AD in a daycare setting. Participants met the NINCDS-ADRDA criteria for a clinical diagnosis of probable AD and had a mean MMSE of 10.6 out of 30. Researchers used a within-subjects design in which participants received 3 months of routine activities followed by 3 months of Montessori activities. Cognitive performance was assessed before and after each phase of the study on eight cognitive measures, similar to those used by Vance and Porter (2000). Results indicated that, following Montessori activities, participants showed significant improvements on four out of eight cognitive measures that assessed attention, memory, and object permanence. No improvements were observed in activities of daily living or cognitive skills such as vocabulary, abstract reasoning, and spatial attention/reasoning.

Camp and Skrajner (2004) conducted a recent study to investigate the feasibility of "resident-assisted Montessori programming" or RAMP, in which four women with early-stage dementia (MMSE: 16–30) were trained to lead Memory Bingo for a small group of nine residents (7F, 2M) with more advanced dementia (MMSE: 1–13). Of interest was whether persons with dementia could learn the skills to lead Montessori-based activities and be satisfied with their role as trainers and whether RAMP activities increased residents' level of enjoyment and engagement, as compared to routine activities. Two to eight training sessions were followed by role playing and supervised leading of sessions with staff. The results showed that all four participants successfully learned procedures to lead Memory Bingo independently during nearly 60% of all group sessions. Minimal assistance was needed from staff in the remaining 40% of sessions. When interviewed, leaders reported enjoying their roles and reported a greater sense of self-worth as a result of leading activities for other residents. Participants responded to RAMP activities with significantly greater levels of constructive engagement than during routine activities. Because one goal of the Montessori approach is to teach social independence and skills, these results provide important evidence that serving as activity leaders provides persons with dementia a unique opportunity to play a meaningful role in their environment.

Additional research is required on Montessori activities for persons with dementia to:

- Determine specifically what daily and weekly treatment frequency or session length is practically possible and needed to ensure satisfactory clinical outcomes
- Determine the duration of positive effects from Montessori interventions once treatment is stopped
- Compare outcomes from individual versus group Montessori-based interventions
- Compare outcomes of Montessori activities facilitated by trained staff versus trained family members
- Compare the effectiveness of Montessori activities with and without an intergenerational component
- Compare the relative benefits of treatment on affect, engagement, social interaction, or general cognitive function.
- Compare treatment outcomes in individuals who differ in severity and type of dementia and document whether and how activity programming needs to be altered
- Extend the findings on outcomes of Montessori techniques to a more ethnically diverse group of participants with AD.

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