We all know people with Alzheimer's disease and other forms of dementia. But just how big is this problem? It is estimated that 4.5 million Americans will be diagnosed with dementia in 2004. In Michigan, an estimated 24,000 people have dementia. And, seven out of 10 individuals with dementia live at home, where friends and family provide most of their care.

There is a very high probability that some of your patients will seek your help in providing care for their loved ones. Being knowledgeable about the management of the medical problems associated with dementias is important to the dental profession. Consider the following case. This is a 78-year-old woman with Alzheimer's disease.
Dementia
(Continued from page 33)

Alzheimer’s disease. She has been regular in her dental visits to the dental office until 18 months ago, when she entered an assisted living facility. About three months ago, she lost the ability to brush her own teeth. The loss of a crown precipitated an emergency, because she was so uncomfortable that she refused to eat. A panoramic X-ray revealed extensive decay in a heavily restored dentition.

What questions come to mind as you consider this X-ray? You may ask: What teeth can be salvaged? Should all remaining teeth be removed in favor of complete dentures? Should the salvageable teeth be restored with endodontics and fixed prosthetics? Can I manage this patient’s behavior in my office? To whom can I refer this patient for care?

A similar patient may present to your office tomorrow. Therefore, it is incumbent on dentists and their staffs to be knowledgeable about current treatment approaches and recommendations regarding the provision of oral health care. The purpose of this article is to provide an overview for dental professionals to encourage successful management of these patients in their practices.

Just exactly what is dementia?

Dementia is the loss of intellectual functions (such as thinking, remembering, and reasoning) to such an extent that it interferes with a person’s daily life and activities. Dementia is not a disease in itself, but a group of symptoms that often accompanies a disease or condition. Dementing conditions represent diseases and illnesses that are some of the most prevalent, serious and expensive health problems facing society. There are more than 70 different disorders that can cause dementia, some of which are treatable or curable, while others are less responsive to treatment. Table One lists dementias that are treatable and those that are less-responsive to treatment or are incurable.

The exact prevalence of people with dementia in the United States is difficult to determine. Many diseases or conditions that cause dementia have an insidious onset and may be confused with normal aging changes. The affected person and/or family may be unaware that there is a disease, so no medical attention is sought. Even when health care providers examine patients, without extensive testing many of the reversible causes of dementia can be overlooked. In some cases, the disease is not even noted.

Alzheimer’s disease (AD) is the most prevalent form of dementia and is considered progressive and incurable. Evans and colleagues in the East Boston region of Massachusetts have studied the prevalence of AD. Their study determined that 10.3 percent of the people aged 65 and older met the clinical criteria of probable AD. The prevalence of the disease increased with age of the group: 3 percent for people age 65-74; 18.7 percent for those 75-84; and 47.2 percent for those age 85 and older.

The cost of caring for a patient, either at home or in a nursing home or skilled nursing facility, was estimated to be $47,000 per year in 1996. The total cost of AD to society at present is estimated to be $80 to $100 billion.

The human costs for caring for individuals with dementing conditions are incalculable and include both health care personnel and family members who often act as the primary caregivers. Emotional burdens can be tremendous for caregivers, who struggle with symptoms from diseases that have no cure and get progressively worse. The Alzheimer's Association (www.alz.org) estimates that for every person with AD at least two to three family members see their lives significantly affected by caring for that person.

On the positive side, new modes of therapy are constantly being developed that can slow or ameliorate the symptoms of AD (and other progressive dementias). The Food and Drug Administration recently approved the drug memantine, which is a new drug to slow memory loss in moderate to severe state of AD, and will be discussed later in this paper.

Diagnosing dementia

Dementia results from the death or disability of nerve cells that store information in the brain. Since nerve cells are unable to reproduce, unless the damaged nerve cell can be repaired, the information stored on the cell is lost. Dementia patients lose memory (amnesia), communication skills (aphasia), daily living skills (apraxia), and the ability to recognize faces or things (agnosia).

Since many diseases that can cause dementia can be treated, a comprehensive assessment should be done to evaluate patients with neurologic changes. This evaluation should include a complete health history, thorough physical examination, neurologic and mental status assessments, and diagnostic tests including blood studies, urinalysis, electrocardiogram and chest X-rays. Other studies often recommended include com-

<table>
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<th>Table One</th>
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<tbody>
<tr>
<td>Dementias (Incurable/progressive)</td>
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<tr>
<td>Alzheimer’s disease</td>
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<tr>
<td>Vascular dementia</td>
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<tr>
<td>Frontotemporal dementia (FTD)</td>
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<tr>
<td>FTD with Parkinsonism linked to chromosome 17 (FTDP-17)</td>
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<tr>
<td>Pick’s disease</td>
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<tr>
<td>Supranuclear palsy</td>
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<tr>
<td>Corticobasal degeneration</td>
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<tr>
<td>Treatable causes of Dementia</td>
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<tr>
<td>Medication side effects:</td>
</tr>
<tr>
<td>Depression</td>
</tr>
<tr>
<td>Vitamin B6 deficiency</td>
</tr>
<tr>
<td>Metabolic imbalances, including thyroid, kidney, or liver disorders</td>
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<tr>
<td>Certain tumors or infections of the brain</td>
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<tr>
<td>Blood clots pressing on the brain</td>
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<tr>
<td>Chronic alcoholism</td>
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putered tomography (CT scan), electroencephalography (EEG), discontinuation of medication(s), formal psychiatric assessment, neuropsychological testing, and occasionally examination of the cerebrospinal fluid by spinal tap. All of these tests are done to detect for possible causes of a patient’s dementia.

If all of these tests are normal, then a clinical diagnosis of progressive dementia is typically made. Depending on the type of symptoms, one of the diagnoses of progressive incurable dementia will be given. Diagnostic accuracy for AD using clinical criteria and the tests described above is approximately 90 percent. An important point regarding patients with progressive dementia is that the symptoms of dementia will continue to change over time. Since no two patients are completely alike, differences in symptoms will be inevitable. However, because AD is the most-prevalent form of progressive dementia, some generalities do exist and can be studied. The remainder of this paper will discuss dental management of progressive dementias using AD as the most prevalent example.

Diagnosing Alzheimer’s disease

Six primary criteria for the clinical diagnosis of AD have been established. These are: 1) dementia established by the clinical examination and documented by neuropsychological testing; 2) deficits in two or more areas of cognition; 3) progressive worsening of memory and other cognitive function, such as abstract thinking, judgment, problem solving, language, perception, praxis and ability to learn new skills; 4) no disturbance of consciousness; 5) onset between ages 40 and 90; and 6) absence of systemic disorders or other brain diseases that could account for the progressive memory and cognitive changes.

In order to make the diagnosis of probable AD these six criteria must be met. A diagnosis of definite AD can only be made post-mortem by a neuropathologist who identifies specific cerebral changes characteristic for this condition (neurofibrillary tangles and neuritic plaques). Although the cause of Alzheimer’s disease is not known, risk factors include being of advanced age (85 or older), having trisomy 21, having a previous history of severe head trauma, or having a first-degree relative with the disorder.

Clinical findings: systemic

The clinical course of AD is usually divided into three stages: an early or mild stage, middle or moderate stage, and late or severe stage.

The early stage is characterized by a gradual and steady deterioration in short-term memory, such as difficulty remembering names, recent events, and conversations; misplacing items; missing appointments; and repeating questions or answers during conversation. Because these mild memory difficulties are often present in older adults in the absence of disease, many of them worry that they are developing Alzheimer’s disease. However, older adults develop an age-associated memory impairment that is generally believed to be a normal aging change. Where pathologic changes apparent in Alzheimer’s disease begin is still not clear; but they tend to be based on a person’s ability to function in society. In addition to memory loss, someone in the early stage may be unable to tell what day it is, what time of day it is, or where they are. Patients may display less sparkle in the personality, and appear emotionless or less energetic or willing to begin something. In this stage, patients are likely to make errors in judgment, such as making a mistake when driving or getting lost when going to or from familiar places (such as the home of a relative, a store, or doctor’s office). Patients in this stage also have problems with orientation, emotional stability, language capacity, abstract thinking, motor skills, and ultimately, self-care. Patients in the first stage may not be able to think of certain words to use when speaking, have difficulty learning new things, and become easily angered.

More rapid declines in intellectual capacity occur during the moderate or middle stage. Continued progressive cognitive losses may advance from the early stage in as little as a few months or as long as a few years. Patients may develop perceptual problems, such as an inability to recognize themselves in a mirror or images on television. They may find it difficult to carry out purposeful movements such as eating or walking. They also may lose the ability for self-care, such as dressing, bathing, or eating independently.

(Continued on page 36)

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Dementia (Continued from page 35)

tently. They may hoard items, such as napkins or pencils. Attention may turn increasingly inward, with less interest in or sensitivity toward others. In many cases patients become restless and pace continuously during waking hours. They are easily agitated and may become anxious or tearful. Wandering, especially late in the afternoon or evening, puts the individual at risk of becoming lost if left unsupervised.  14

AD patients in this stage begin having problems recognizing friends and family members, and have difficulty organizing thoughts and thinking logically. Many AD patients in the middle stage also develop personality changes, such as becoming physically violent or displaying verbal outbursts over minor daily situations.

In the severe or late stage, a person can no longer survive without assistance.  15 Patients have great difficulty understanding instructions or simple language. Eventually they will completely lose the ability to remember and speak, uttering only meaningless phrases or repeating words or phrases endlessly. If asked questions, most patients are unable to respond appropriately and often will respond with the first thing that comes to their minds. An AD person in this stage may become apathetic, disoriented, and unable to walk. Significant body wasting may occur, and there is a tendency for the patient to touch and examine objects with the mouth (hyperorality) as well as a tendency for forced grasping and gripping (hypermetamorphosis). In addition, patients tend to become more anxious, and will display aggressive behavior, develop hallucinations and/or delusional episodes.  16, 17

Complications from AD in this stage include malnutrition, aspiration pneumonia (due to increased problems with swallowing), 18 pressure necrosis of the skin, and oral/odontogenic problems. In the late stage, patients need total care with activities of daily living, such as dressing, bathing, eating, and using the bathroom. 19

To classify AD patients into early, moderate, or late stages, mental status tests are typically used. The best-known and most widely used test is the Folstein Mini-Mental Status Exam (MMSE), 19 which contains 10 items and a maximum possible score of 30 points. A person is considered mildly impaired (early stage AD) with a score of 18 to 24. If the score is less than 18, this indicates moderate to severe dementia (AD). The MMSE does not require administration by a psychology practitioner. Dental personnel may employ the exam for referral purposes when dementia is suspected.

The course of the disease varies between people afflicted, but generally there is a gradual progression through the three stages over a period of 15 or more years. For many AD patients, symptoms may seem to plateau for an extended time, but death eventually occurs, typically as a result of an infection that is not identified or cannot be controlled due to a

### Table Two: Medications Used in Dementia Patients, Impact on Oral Conditions and Precautions for Dental Providers

<table>
<thead>
<tr>
<th>Category of Medication</th>
<th>Impact on Oral Condition or Oral Treatment Plan</th>
<th>Precautions for Dental Providers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetylcholinesterase inhibitors (tacrine, donepezil, rivastigmine, galantamine)</td>
<td>Bradycardia; increased gastrointestinal acid; may decrease function of local anesthetics and vice versa.</td>
<td>Awareness that bradycardia may be related to medication; nausea and vomiting may occur; caution in administering local anesthetics.</td>
</tr>
<tr>
<td>Glutamate blocking agent (memantine)</td>
<td>None known</td>
<td>None known</td>
</tr>
<tr>
<td>Vitamin E</td>
<td>None known</td>
<td>None known</td>
</tr>
<tr>
<td>Selective MAO-B Inhibitor (Selegiline)</td>
<td>None known</td>
<td>None known</td>
</tr>
<tr>
<td>Ergoloid mesylates (Hydergine)</td>
<td>Mild nausea or GI upset.</td>
<td>Nausea and vomiting may occur.</td>
</tr>
<tr>
<td>Antipsychotics and behavior altering drugs (butyrophenones i.e., halodol, benzodiazepines, phenothiazines, tricyclic antidepressants)</td>
<td>Extrapyramidal symptoms (EPS) associated with antipsychotic agents: xerostomia, orthostatic hypotension, cardiac effects, and possible tardive dyskinesia with long-term use.</td>
<td>Recognize risk for orthostatic hypotension and prevent falls by sitting chair upright for 3-5 min.; use of fluorides and salivary substitutes if no aspiration risk; when possible, ask physician to change to least-xerostomic drug.</td>
</tr>
</tbody>
</table>

(Continued on page 38)
Dementia
(Continued from page 36)

weakened immune system. In 1996, there were 29,900 deaths recorded from AD in the United States, making it the ninth-leading cause of death that year for people 65 years and older.26

Medical treatment
Medical treatment of demented patients is managed with the patient’s family’s input and based on thorough psychiatric, neurological, and general medical evaluations.21 Although there is no cure for AD, there are several guidelines that outline specific steps in managing patients with AD. These include nonpharmacological approaches as well as medications used in managing AD patients.9,10,20,23

Nonpharmacological therapies include modification of the environment and memory aids. Modifying the environment to provide a calm, nonstressful atmosphere may help reduce agitation. Maintaining a predictable, structured routine is also helpful. In the early stage, dementia patients may benefit from memory aids that provide clues that can help them remember important information. Memory aids can be as simple as a list of important telephone numbers or putting up pictures and names of family members and friends.20

Another important aspect of management is educating the patient and family about the illness, its treatment, and available sources of care and support, including the Alzheimer’s Disease and Related Disorders Association (ADRDA).8 Education will help patients and their families plan for financial and legal issues, available sources of care and support, such as local support groups, and alternative living situations, including respite care, nursing home, and other long-term care facilities.

The goal of medications in treating AD is three-fold: retarding disease progression, preventing further deterioration, and/or reducing symptoms.28 Much of the memory loss and cognitive deficits associated with AD are linked to a lack of acetylcholine, an important neurotransmitter that helps nerves communicate with each other. Currently, four existing drug treatments increase cholinergic function and retard disease progression. These are Cognex (tacrine), Aricept (donepezil hydrochloride), Exelon (rivastigmine tartrate), and Reminyl (galantamine hydrobromide). They are categorized as “acetylcholinesterase inhibitors.” Cholinesterase inhibitors are approved only for use in patients with mild to moderate AD, as studies in patients with late-stage AD have not shown significant clinical improvement.24,25 Adverse events associated with these drugs are mainly due to cholinergic effects: urinary incontinence, diarrhea, myalgia, anorexia, ataxia, postural hypotension and bradycardia. Tacrine has also been associated with hepatotoxicity, has a short half-life, cannot be taken with food, and has frequent gastrointestinal (nausea and vomiting) side effects, which makes this drug difficult to use.26

The FDA has recently approved a new drug for patients with AD, which works by a different mechanism than the cholinergic drugs listed above. Adupla (memantine) blocks the transmission of glutamate, a chemical that is overstimulated in the brains of AD patients. Memantine blocks the N-methyl-D-aspartate (NMDA) receptor and prevents the overstimulation of glutamate. The approval of this drug is significant because it has been effective in reducing the symptoms of AD patients, even of those in the moderate to severe stages. In addition, this drug seems to have very few harmful side effects. Finally, since memantine has a different mechanism, it is thought that use of this drug with AD patients already on cholinesterase inhibitors may be able to provide additional benefits.27

Other therapies used for treating cognitive decline in AD patients and other dementias include vitamin E, Selegiline (l-deprenyl) and Hydergine (ergoloid mesylate). Vitamin E has been shown to slow nerve cell damage and death in animal models and cell culture thought to be a result of its antioxidant properties.29,29,29 Vitamin E has been widely used clinically in moderately impaired AD patients in order to delay the progression of the disease. Vitamin E has not been studied in mild or severe AD patients, but given the lack of toxicity, some physicians are also recommending similar doses for moderately demented patients from 200 to 3,000 IU/day (the typical recommended dose is 1000 to 2,000 IU/day). At high doses, vitamin E has sometimes been noted to worsen blood conglutination defects in patients with vitamin K deficiency.30

Selegiline is a selective MAO-B inhibitor licensed in the United States for the treatment of Parkinson’s disease. It is approved as a dementia medication in some European countries and is used by some physicians in the United States for this indication. The action of Selegiline is unclear, but in several studies it appears that Selegiline may act as an antioxidant or neuroprotective agent. Because it also has effects on catecholamine metabolism, it could also act in other ways.29,30,31,32 The principal side effect of selegiline is orthostatic hypotension, which has been reported to interfere with some patients’ tolerance of the medication. The dosage is 5 to 10 mg/day that is relatively selective for MAO-B and does not fully inhibit MAO-A, so avoidance of sympathomimetic agents (epinephrine in local anesthetics) is not required. More importantly, adverse effects of medication interactions, including changes in mental status, seizures, and even death have been observed with meperidine (Demerol), SSRIIs, and tricyclic antidepressants, and selegline is contraindicated for patients taking these agents.21

A mixture of ergoloid mesylates, known by the trade name Hydergine, is currently marketed in the United States for the treatment of nonspecific dementias.32 Hydergine has been available for at least 40 years and has been studied in at least 150 clinical trials. In general, these studies suggest that any improvement observed is in behavioral rather than cognitive (mental) measures. However, for patients with vascular dementia, there was better evidence of improve-
ment on both neuropsychological and behavioral measures. Due to the questionable efficacy of Hydergine found by extensive studies, it is not recommended for routine use in treating dementia. However, it may be appropriate to offer a trial of this agent for patients with vascular dementia. Occasionally, ergoloid mesylates cause mild nausea or gastrointestinal upset, but no significant side effects or toxicity have emerged during long-term use. Hydergine is contraindicated for patients with psychosis. Other agents including aspirin, nonsteroidal anti-inflammatory drugs (NSAIDs), estrogen replacement therapy, the hormone melatonin, and ginkgo biloba (a botanical agent), have been proposed for the treatment of dementia on the basis of epidemiologic data or pilot studies, but have not been recommended for routine use for dementia or AD patients at this time.

AD patients who experience psychotic symptoms or disruptive behavior frequently are also prescribed antipsychotic agents, such as haloperidol. While moderate doses of haloperidol improve psychotic or disruptive behavior, the risk of extrapyramidal effects or tardive dyskinesia is high. Other symptomatic problems such as anxiety, depression, insomnia, and systemic problems prevalent in this age group are also commonly treated with medications, which may lead to drug/drug, and drug/disease interactions. A summary of the medications commonly used in treating patients with dementia, their impact on the oral condition, and precautions for dental providers are presented in Table Two. Oral health providers should always take a detailed medical history and review the medications AD or dementia patients are taking to prevent adverse drug reactions or treat the sequelae of drug side effects in their practices.

**AD: oral findings**

The main oral problems of people with AD and other types of dementia result from the person’s behavioral changes. In the early stage, dental appointments and oral care instruc-

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**Table Three: Guidelines for Physical Restraint Use**

- Restraint is necessary for safe, effective treatment
- Restraint is not for punishment of the patient or for the convenience of the staff
- The least-restrictive alternative is used
- Restraint should cause no physical trauma and minimal psychological trauma
- Reasonable benefits are expected as a result of the treatment
- There is consent for the dental treatment
- There is consent for the use of restraint
- Restraint is specifically selected based on the planned treatment
- Dental staff is trained in the safe use of the restraint
- Restraint use is clearly documented, including type, duration, and reason for use

Poorer gingival health and declines in oral hygiene are seen to increase with the severity of dementia. Salivary gland dysfunction has also been shown to be greater in patients with Alzheimer’s disease and is a contributing factor to oral health decline. Saliva is essential to maintaining oral health, owing to its protective actions, including flushing plaque and bacteria from dental and oral mucosal surfaces. Therefore, patients with diminished salivary flow are more likely to develop gingivitis and cervical caries. Decreased saliva may also predispose the AD patient to systemic problems such as aspiration pneumonia, oral infections, difficulty in mastication (chewing), swallowing, speaking, and taste dysfunction. Demented patients with psychotic symptoms or disruptive behavior are frequently prescribed antipsychotic agents such as haloperidol, or antidepressants that have xerostomia as a significant extra-pyramidal effect. This further contributes to increased caries, periodontal disease, oral mucosal pathology (i.e., denture stomatitis) and difficulty with denture retention.

**Oral care recommendations**

The goal for oral care for AD patients is similar to that for other patients with neurological impairments: “to maintain oral health function and comfort and to prevent and control oral diseases.” As with other patients, dentists should thoroughly assess the patient, develop a treatment plan, initiate dental treatment, and develop a prevention plan. Due to the nature of dementing conditions, each of these steps may require some modification. This will be discussed in the following sections.

**Assessment.** Most patients with dementia will already have been diagnosed with a specific condition or disease such as AD. Patients who present to the dental provider with neurologic changes, such as a decline in recent memory, inability to follow directions, or obvious personality changes, should be referred to an appropriate physician, neurologist, psychiatrist or a tertiary medical center depending on availability or expertise in the area. Medical providers should be able to run diagnostic tests that can differentiate reversible dementias from progressive, non-reversible dementias.

In many cases, a patient with a dementia (such as AD) will present to the dental office with a number of existing dental problems, undiagnosed and unreported because of prolonged length since the last visit to a dentist. The first objective is to diagnose (Continued on page 40)
nose existing problems and eliminate any sources of pain or infection.

Diagnosis should begin with a careful medical and dental history including a thorough review of medications. Regardless of the stage of dementia a patient presents with, communication should always take place in the presence of a family caregiver (spouse, children or responsible adult). If the patient is able to understand and respond to questions, the dental provider should address the patient directly. Verbal directions should be presented in short, simple phrases, giving only one direction at a time. It is important to remember that the adult with a dementing condition has a disease and should be spoken to with appropriate respect, not as a child. In moderate- to late-stage AD, it may be appropriate to address the patient by his or her first name instead of the surname, because some dementia patients will forget their own last name, but usually will not forget their first name. The presence of a family member or caregiver will often alleviate a dementia patient's anxiety. Because dementia interferes with the patient's ability to communicate, it is important to have the caregiver's input, as well as other sources of information (such as a registered nurse, nursing assistant, or medical record if from a nursing home) to verify reported symptoms. For example, perception and localization of dental pain may be distorted in dementia patients. Symptoms of dental pain which are well-known to dental care providers may be manifested instead by a sudden worsening of behavior, moaning or shouting, refusal to do certain things, or increased restlessness.

Clinicians who are trying to determine if there is a dental cause for agitated behavior must use the AD patient's baseline behavior as a gauge. The caregiver who knows the AD patient best (spouse, child, nurse, etc.) is the ideal person to elicit specific symptoms that may be an indicator of the presence of dental pain.

Even though dementia patients may be confused, dental providers should avoid speaking about the patient in his or her presence to the caregiver or staff member, as if the dementia patient does not exist, hear, or understand. Even in late-stage AD, patients may have moments of windows of lucidity, when they may understand briefly, with amazing clarity, what is said or done.

In addition, nonverbal communication techniques can also have a comforting effect on a dementia patient's responsiveness. A message of calmness, confidence, and kindness, especially in cases of bizarre or difficult-to-manage behaviors, should be consistently communicated verbally and non-verbally. Some suggestions include maintaining eye contact, firm but gentle touching on the person's arm or shoulder as a sign of encouragement, and using positive facial expressions with a smile and good sense of humor. Other communication techniques are described in Steps to Enhancing Communication: Interacting with Persons with Alzheimer's Disease, published in 1997 by the Alzheimer's Disease and Related Disorder Association.

A complete oral assessment should minimally include the following 10 areas: face and neck, lips, inside cheeks and lips, roof of mouth, tongue, floor of mouth, gums, teeth, saliva, and dentures/partial. To successfully complete an exam an extraoral mouth-prop (surgical Molt) may be essential to help control the patient's head position and maintain the oral opening. Panoramic radiographs should be possible in mild-stage dementia patients, but will not be in moderate or severe patients. Dentists who treat patients with progressive dementias should consider purchasing an additional lead apron and a pair of lead gloves to protect the extra person who may be needed to hold a patient's head still during the exposure of dental periapical or bitewing radiographs.

**Treatment planning.** In patients with progressive dementia, treatment planning should be done with the expectation of deteriorating oral hygiene and declining ability to maintain natural teeth or complex restorations. The progressive deterioration of cognition can cause agitation, disorientation, and inappropriate behavior, especially in such unfamiliar surroundings as a dental office, and can interfere with the patient's ability to participate in their treatment.

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**Table Four: Recommendations for Oral Sedation**

For patients already taking oral sedatives for anxiety or cooperative problems:
- Schedule dental treatment to coincide with the regularly scheduled drug dosage;
- If scheduled drug is a PRN (take as needed), order this before dental treatment;
- Consult with physician about increasing the dosage of the scheduled drug prior to dental procedure if you have tried the drug at regular dose without success.

For patients not taking an anxiolytic/antagonization medication, a short acting benzodiazepine can be used. The two recommended benzodiazepines are:
- Triazolam/Halcion — dose: 0.25-0.5mg; onset: 0.5-1.5 hours; half-life: 2-3 hours;
- Lorazepam/Ativan — dose: 0.5-2 mg; onset: 1.5-2 hours; half-life: 10-20 hours.

For those who are allergic or have an adverse reaction to benzodiazepines, an alternative drug which has the same effect as Triazolam, but works by a different mechanism is recommended: Ambien (Zolpidem) — Dose: 5.0-10 mg; onset: 1.5 hours; half-life: 2.5 hrs.

*Oral sedation agents should be tried at the lowest dose. If not effective, then the dose can be adjusted upwards at another visit after consultation with the patient's physician, until the desired effect is achieved. If oral sedation is still not effective after a number of visits, then parenteral (intravenous) conscious sedation may be indicated.

(Continued on page 42)
Dementia (Continued from page 40)

tolerate most therapeutic interventions. If a patient is seen in the early stage, definitive treatment should be done as soon as possible because of diminishing oral self-care and ability to cooperate. Appointment times should be scheduled when the dental office and waiting room are not busy, so as not to distract and disorient the AD patient. In general, late afternoons are not good appointment times, especially toward dusk, because many AD patients may show signs of “sundowning,” an exaggerated confusion and disorientation that occurs as light levels change and fatigue sets in. To the extent possible, background noise and activity level should be kept to a minimum to reduce agitation.

Caregivers need to be involved at the first visit an AD patient is seen, and every visit thereafter. Whoever the caregiver may be — spouse, son, daughter, or nurse — should be asked to accompany the patient into the operatory, to sit and converse, or to hold the patient’s hand(s) if needed. The importance of caregiver participation cannot be overstated. As mentioned previously, in most cases, loving caregivers alleviate stress and anxiety experienced by the patient and may also be able to, if necessary, translate the patient’s needs or wants to the dentist. An indirect benefit of having the caregiver present is that the family member recognizes the dentist’s caring approach as well as appreciates the dentist’s struggles when trying to provide good dental care. The caregiver soon becomes another member of the dental team and does all he or she can do to ensure that treatment is successful. This becomes extremely important when the caregiver is asked to assume responsibility for the AD patient’s oral health care program.

Another role caregivers play in treatment planning is acting as the legal authority who will sign permission for their loved one to undergo dental treatment. Caregivers of dementia patients in moderate to late stages should be legally appointed (adjudicated) to act as “guardians” who can sign consents for whatever treatment is needed. Note that the consent for an examination, dental prophylaxis, and minor treatment may differ from consent required for more-invasive procedures, such as surgery, sedation, and general anesthesia. A review of the applicable state dental laws should be done prior to the appointment.

In many cases, AD patients may not be adjudicated incompetent by the courts, yet clinically they exhibit obviously impaired decision-making capability. Caregiver involvement is critical, particularly when the patient verbalizes difficult, sometimes contradictory wishes. For example, an abscessed tooth requires extraction, but what should be done if the AD patient who has not been adjudicated incompetent clearly refuses treatment? Ethical issues involving competency, informed consent, and decision-making capacity are common with AD patients and their families. Each dental situation must be dealt with individually, but should include a careful review of the severity of the oral-dental problem, consultation and communication with all concerned parties (i.e., family members and others on the health care team), and determination of the risk and benefit of the proposed treatment.

Some general guidelines for treatment planning for the most-common dental procedures are discussed next.

General dentistry. In general, time-consuming and complex dental treatment should be avoided in people with severe dementia. The emphasis should be on keeping patients pain-free and able to maintain adequate nutritional intake, particularly if the patients are no longer able or willing to wear their dentures.

Oral surgery. As long as the patient’s dentition does not compromise physical well-being, oral surgery should be the last resort. Dentists should consider all available conservative techniques before resorting to oral surgery procedures. Prophylactic extraction of teeth for the convenience of caregivers is not appropriate.

Restorative. Composite restorations for anterior teeth and amalgam restorations for posterior teeth are the accepted norm. There is apparently no correlation between the number of amalgam restorations and brain concentrations of mercury. Other options that are beneficial for patients at high risk for caries, especially for root surfaces, include resin-modified glass ionomer or compomer (composite/glass ionomer material such as Dyract/Dentsply/Caulk), restorative materials. These materials leach fluoride and also help to protect the tooth structure adjacent to the restorations.

For dementia patients with extensive loss of tooth structure, the use of stainless steel, polycarbonate, or resin composite crowns may be appropriate. These alternatives allow the retention of teeth with guarded prognosis for a finite period of time or it may provide long-term management solutions in patients in the debilitated final stage of the disease.

Periodontics. Frequent recall, including scaling and root planing, is the cornerstone of nonsurgical treatment and is appropriate for periodontal maintenance in the dementia patient. For patients who have pocket depths greater than 4 mm, corrective periodontal surgery is usually not an option, since the patient cannot control plaque pre- or post-operatively. Systemic antibiotics, such as metronidazole, may be justified for the treatment of acute episodes of generalized periodontitis if the disease cannot be controlled by home care, scaling and root planing, and if surgical treatment is contraindicated. In patients with one or a few sites of deep pocketing, local antimicrobial treatment (doxycycline hyclate; Atrigel, Atrix; Atrix Laboratories) as an adjunct to scaling and root planing may be beneficial.

(Continued on page 44)
Dementia patients who have gingival hyperplasia are candidates for ginvectomy but may not be able to tolerate periodontal packs. The use of electrosurgery or laser surgery done in an operating room setting may be an appropriate alternative.

**Endodontics.** If the indicated tooth is restorable and essential to maintain function, endodontic treatment may be appropriate. If patients are irradiated or are immunocompromised, root canal therapy may be the only alternative therapy to extractions.

In all patients being treatment-planned, swallowing water or fluids during treatment can lead to aspiration pneumonia, particularly in late, moderate-severe stage dementia patients. Procedures involving high volumes of water, (i.e., Cavitrone, high-speed handpiece/restorative with water spray) should be avoided, or minimized.

**Table Five: Preventive Products Useful in AD Patients**

<table>
<thead>
<tr>
<th>Product category</th>
<th>Indication</th>
<th>Example of product</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mouth-prop</td>
<td>Helps hold mouth open</td>
<td>Open-Wide Plus</td>
<td>Specialized Care Co.</td>
</tr>
<tr>
<td>Modified tooth brush</td>
<td>Removes plaque on teeth</td>
<td>Collis-Curve Brush</td>
<td>Collis Curve Inc.</td>
</tr>
<tr>
<td>Electric brush</td>
<td>Removes plaque on teeth</td>
<td>Sonicare sonic toothbrush</td>
<td>Sonicare</td>
</tr>
<tr>
<td>Interproximal brush</td>
<td>Removes plaque between teeth</td>
<td>Proxy Brush</td>
<td>Butler, Inc.</td>
</tr>
<tr>
<td>Fluoride rinse</td>
<td>Prevents dental caries/decay (must be able to swish/spit)</td>
<td>Fluorigard, (0.5% NaF) (OTC)</td>
<td>Colgate</td>
</tr>
<tr>
<td>Fluoride gel</td>
<td>Prevents dental caries/decay</td>
<td>Prevident, (1.1% NaF) (prescription)</td>
<td>Colgate</td>
</tr>
<tr>
<td>Fluoride varnish</td>
<td>Prevents dental caries/decay (applied by dentist/clinician)</td>
<td>Duraphat (5.0% NaF) (prescription)</td>
<td>Colgate</td>
</tr>
<tr>
<td>Topical agents</td>
<td>Prevents gingivitis and periodontal pathogens</td>
<td>Peridex (0.018% Chl Gluconate)</td>
<td>Procter &amp; Gamble</td>
</tr>
<tr>
<td>Saliva substitute-rinse</td>
<td>Keeps mouth moist (Must be able to swish and swallow)</td>
<td>MouthKote</td>
<td>Unimed, Inc.</td>
</tr>
<tr>
<td>Saliva substitute-gel</td>
<td>Keeps mouth moist</td>
<td>Oral Balance Gel</td>
<td>Laclede</td>
</tr>
<tr>
<td>Saliva stimulant-gum</td>
<td>Stimulates salivary glands</td>
<td>Biotene gum (Laclede)</td>
<td>Laclede</td>
</tr>
<tr>
<td>Saliva stimulant-pill</td>
<td>Stimulates salivary glands (radiation &amp; Sjörgen’s only)</td>
<td>Salagen (pilocarpine tabs) (prescription)</td>
<td>MGI Pharma</td>
</tr>
</tbody>
</table>

Initiating dental treatment. Dementia patients frequently display symptoms of restlessness, anxiousness, or become uncooperative in an unfamiliar environment. Ideally, the patient should be seen during his or her most-relaxed time of day, and when the clinic is the least hectic (this may be first appointment of the day, or first appointment of the afternoon). The office staff and clinicians should convey a genuine sense of caring and make an effort not to act hurried or rushed. They should use a familiar operatory, or one in which the surroundings look comfortable (such as pictures or home-like decorations), along with decreasing the time the patient spends in the waiting room. If the patient is especially anxious, the dentist should try to determine the cause of anxiety. It may mean the person needs to urinate, or is hungry.

If demented patients become angry or are evaluated as likely to become angry or uncooperative at the evaluation appointment, the dental team should first understand that the anger results from the confusion and manifestation of the underlying disease. In some cases, the dentist may be able to distract the patient in order to change the direction of the anger. The idea behind distraction is to refocus the patient’s energy long enough to allow the completion of the exam or treatment. Demented patients who remain angry or uncooperative are best managed by rescheduling for a time when they can be sedated or during a time of day when they are calmer.

Physical and/or chemical restraints may be necessary to control voluntary or involuntary movements to prevent injury in dementia patients. Guidelines for physical restraint use, developed by Shuman and BeBau, are listed in Table Three. These 10 guidelines are appropriate for dementia patients to preserve safety and dignity when physical restraints are needed.

For most dental practitioners, oral sedation will be the preferred method to manage anxiety or control undesirable behavior seen in demented
patients, particularly those in moderate to late stages. Oral sedatives should be used only after reviewing the patient’s medication and medical history or in consultation with the patient’s physician. Consultation with the physician will help identify sedatives currently in use and the best agent and dose to use. All oral sedatives are unpredictable, in that the pharmacokinetics (absorption, distribution, metabolism, and excretion), vary from person to person, and what works for one person, may not work for another. Given this constraint, Table Four summarizes a recommended approach for oral sedation use in the management of behavior problems seen in dementia patients.

In general, benzodiazepines are the best choice for oral sedation in dementia patients who do not have a standing order for an anxiolytic medication. They have very predictable sedative effects in most patients; they have skeletal muscle relaxant properties, are anticonvulsants, and have a wide safety margin between therapeutic and toxic doses. Finally, benzodiazepines do not produce clinically significant hepatic microsomal enzyme induction and do not interact with other drugs, as do many other drug classes. For any sedative drug given, pre- and postoperative vital signs should be taken and the patient and caregiver should be cautioned about drowsiness after the sedation and dental appointment as well as the increased risk of the patient falling. Monitoring, training, and licensure will impact the utilization of oral sedation in clinical dental practice.

Intravenous conscious sedation is the best alternative available to treat uncooperative demented patients in the moderate to late stages if trained personnel and monitoring equipment are available. Advantages include the most rapid onset of action, ability to titrate the drug to effect, predictable blood levels, shorter duration of effects, and immediate access to treat complications. The disadvantages are obvious in that venipuncture is necessary, venipuncture complications can occur, more-intensive monitoring is required, reversal of intravenous agents is not instantaneous, and more-expensive malpractice insurance may be required. In addition, complications associated with intravenous sedation can also occur, such as respiratory depression, cardiac rhythm disturbances, and possible nausea or gastrointestinal disturbances. The techniques for IV sedation are beyond the scope of this article. Readers are encouraged to become certified/licensed in their state if they are interested in providing dental care to demented patients using intravenous sedation.

For some moderate- to late-stage dementia patients, intravenous sedation may not be enough to control the movements or agitation that occurs. For these patients, general anesthesia or deep sedation may be needed. Training and hospital privileges are needed before dentists can see these patients in the operating room in the hospital, surgical centers, or ambulatory care facilities where these patients can be managed with the help of anesthesiologists and trained medical professionals.

In general, management approaches should be attempted using the least-restrictive and least-invasive techniques first. Not only are less-invasive techniques generally effective, but also they are more widely available to general dental practitioners, and they can be used long-term for general dental treatment as well as recall appointments.

Prevention. Since the most-significant dental problems of patients with dementia result from a progressive decline in oral self-care ability, there is an increasing dependence on caregivers to provide oral hygiene. For this reason, during the time when the patient is in the early stages of the disease, the caregiver (whether family member or nurse) should be trained to provide daily oral hygiene. The dental team needs to explain to the primary caregivers that as the dementia progresses, the caregiver will eventually need to assume the oral hygiene role completely. Initially, the caregiver may have a very small role in treatment planning or oral care.

A number of specially adapted products are available for patients with disabilities, and two are particularly useful in neurologically impaired or dementia patients. A foam mouth prop called the Open-Wide Plus (Specialized Care Col, Edison, N.J.; 800/722-7375) is designed for caregivers to use to keep the mouth open during oral hygiene or for lengthy procedures. The prop has a unique design of high-density foam that is safe and comfortable for the patient. Although disposable, one mouth prop can last for 50 to 100 uses, is dishwasher-safe, and inexpensive.

A specialized toothbrush, called the Collis Curve (Collis Curve, Inc., Brownsville, Texas, 800/948-6665) has been designed with three rows of bristles that, when placed correctly, can clean the lingual, facial, and occlusal surfaces at the same time. The technique required with this brush is a simplified scrub motion, and caregivers may find this brush simpler to use than either conventional or electric brushes.

Electric brushes such as the Rotadent (Pro-Dentac, Batesville, Ark.), Sonicare (Sonicare, Snoqualmie, Wash.) and Interplak (Bausch and Laumb, Eatontown, N.J.), are helpful for patients who have limited dexterity. Unfortunately, AD patients are generally unable to use these brushes effectively in moderate to severe stages, although caregivers may still find them helpful.

Other conventional products (see Table Five), may be helpful for the caregiver in maintaining oral hygiene and preventing dental diseases. For cleaning between the teeth, an interproximal cleaner such as a Proxabrush (Butler, Chicago, Ill.) may be easier to use by caregivers than
floss or even floss-holding devices, since Proxabrushes do not require fingers to be placed intraorally. 

The use of fluorides through toothpaste should be part of the daily oral hygiene protocol, although only a small amount (pea-sized) is recommended, due to likelihood of patients swallowing the paste. Fluoride rinses may be appropriate for patients with xerostomia, a high risk or incidence of dental caries, and if the patient is able to rinse and spit without risk of aspiration. One brand, Fluorigard (Colgate, Canton, Mass.), contains 0.05 percent NaF and can be obtained over-the-counter (OTC) for use as a daily rinse. Topical fluorides in the form of a gel such as Prevident (Colgate, Canton, Mass.) may be brushed on for AD patients with the same risk for caries but who cannot rinse and spit. The use of gels minimizes ingestion, but such gels cannot be obtained OTC and must be prescribed by a physician or dentist. The application of fluoride varnish, such as Duraphat (5 percent NaF, Colgate, Canton, Mass.) at the close of dental visits is highly recommended as an effective preventive therapy for patients at high risk for dental decay.

Antimicrobial agents such as chlorhexidine gluconate are useful to combat gingivitis and periodontal pathogens. Once again, these products, (Periex, Procter & Gamble, Cincinnati, Ohio), must be prescribed, and patients must be able to swish and spit to use them effectively. However, in some situations, caregivers could apply the product to the patient's teeth with a toothbrush, a sponge applicator, or a cotton swab while suctioning the mouth to remove the excess.

Patients who have oral xerostomia should first be evaluated for adequate fluid intake. Drinking water can prevent dehydration and correct dry mouth and related problems. Assuming fluid intake is appropriate, oral dryness can be treated by salivary substitutes or salivary stimulants. Substitutes include MouthKote (Unimed Inc, Buffalo Grove, Ill.) and Xerolube (Scherer Laboratories, Inc., Dallas, Texas) and may provide symptomatic relief for some patients. Due to the fluid viscosity there is a risk of aspiration, particularly with the moderate to severe AD patient.

Another salivary substitute, Oral Balance (Laclede, Rancho Dominguez, Calif.), comes in a gel. Increased viscosity permits its use to coat the mouth of severely xerostomic patients (mouth-breathers, denture wearers) with diminished risk of aspiration. A small amount can be applied with a gloved finger to the affected areas. Patients with xerostomia whose salivary glands can respond to stimulation can benefit from oral stimulation, such as eating carrots or celery, or chewing sugarless gum or candy. The use of a pilocarpine hydrochloride (Salagen, MGI Pharma) as a salivary stimulant is currently approved for use only in patients with radiation-induced xerostomia and those with Sjogren's syndrome.

Throughout the life of a patient with dementia, a caregiver will need to continue to help provide preventive mouth care. While the focus here has been for those patients with natural dentition, oral care is also important for those who are edentulous wearing dentures, or partially edentulous with or without replacements. Some suggestions for the caregiver include:

- establishing a regular time each day for mouth care;
- breaking up the steps for cleaning into small, simple steps for the patient, reminding the person one step at a time;
- explaining what you are doing in a gentle, calm manner;
- placing a simple list of step-by-step instructions on a piece of paper and posting it in the bathroom, if the person can still read;
- keeping labeled mouth care supplies in the same place all the time;
- not assuming that the person will remember the next day what he or she did today.

Conclusions

Because progressive dementia patients have cognitive and behavioral changes that are different from typical healthy, ambulatory, and cooperative adults, seeing these patients in a traditional dental practice can be a challenge. However, as the number of patients with dementia increases, the need for dentists to evaluate and treat these patients will also increase. In some cases, patients with AD or other dementias may have acute needs, or may need to be managed with sedation or general anesthesia. In these cases, oral surgeons or dentists who have hospital privileges should be contacted.

For most dentists, treating patients with dementing conditions like Alzheimer's disease will be a difficult situation, particularly for the first time and without knowledge of what to expect and what can be done. As with other complex, medically compromised patients, working together with the patient's family (and primary caregiver), primary care physician, psychologist, pharmacist, and social worker as a member of the patient's health care team will undoubtedly provide the best outcome for the patient and increase the chance for continued collaboration with demented patients in the future.

References
Dementia
(Continued from page 47)