

# Clinical Evidence and Evidence-based Dental Treatment of Special Populations: Patients With Alzheimer's Disease

Francesco Chiappelli, PhD; Ercolano Manfrini, MD; Myeshia Edgerton, MS; Monica Rosenblum; Kristine D. Cajulis; and Paolo Prolo, MD

## ABSTRACT

This paper presents the novel domain of evidence-based research in the context of treating the dental needs of patients with special needs. A contrast is made between evidence-based dentistry and traditional dentistry, which is based on the evidence obtained by the dentist, with respect to the needs and the wants of the patient, and from the pertinent and accessible literature. By contrast, evidence-based dentistry is focused on integrating traditional dentistry with “the best available” research evidence. The aim of evidence-based dentistry is to improve clinical decision-making by its reliance on a critical analysis of the entire body of the published pertinent literature. It is a system of information management, and a system of data integration that assist clinicians in the process of meshing systemic clinical expertise, evidence provided by the patient, and the best literature evidence to enhance treatment outcomes. Evidence-based dentistry emphasizes rigorous analysis of evidence from clinical research, as the basis of sound dental practice, while discouraging intuitive and unsystematic approaches and promoting the systematic analysis and appraisal of the literature to determine the best treatment alternatives. In the case of patients with special needs, it is critical whether the dentist practices traditional dentistry or evidence-based dentistry to evaluate whether or not the patient is capable of expressing his or her needs/wants, unless, as in the more severe cases, he/she is accompanied by the caregiver. The purpose of this paper is to demonstrate the use of a simple in-house questionnaire for evaluating the patient's ability to tell the dentist his or her needs and wants accurately. In this context, the paper examines the dental needs of patients with dementia of the Alzheimer's type, DAT.



**Guest editor** / Francesco Chiappelli, PhD, is an associate professor, Division of Oral Biology and Medicine at the University of California Los Angeles School of Dentistry.

**Authors** / Ercolano Manfrini, MD, (not pictured) is on the medical staff of the neurology division at the University of Ancona, Italy. Myeshia Edgerton, MS, (not pictured) is a dental student at Tufts University School of Dentistry. Monica Rosenblum, (not pictured) is a pre-dental student at the California State University, Northridge. Kristine D. Cajulis, (not pictured) is a pre-dental student, Dental Group of Sherman Oaks, Inc. Paolo Prolo, MD, is an assistant research faculty, Division of Oral Biology and Medicine at the UCLA School of Dentistry.

**Acknowledgments** / The authors thank Drs. Janet Bauer and George Bernard, who, by serving on ME's master of sciences thesis committee guided the evidence-based research on xerostomia in patients with Alzheimer's disease presented here.

**Disclosure** / This study was supported in part by funds from the UCLA School of Dentistry (FC), the University of Ancona (EM), the Neurology Section Health District Urbino (EM), and the Alzheimer's Association (<http://www.alz.org/>) (FC).

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**A**lzheimer's disease is a progressive disease of the brain, which leads to dementia with devastating outcomes. Many other conditions can lead to similar memory loss, confusion, agitation, and metabolic disturbances of many kinds commonly observed in patients with dementia of the Alzheimer's type. Rushing to give a diagnosis of DAT is unwise and not common practice, because an absolute diagnostic test for Alzheimer's disease not being available to date, the diagnosis must depend on observing trends as the disease evolves over time. Patients with DAT typically show progressive loss of cognitive, intellectual, functional, and social abilities, and eventually become fully dependent upon their caregiver and family. The purpose of this report is to introduce a simple in-house questionnaire, which provides the dentist with a satisfactory assessment of the needs and wants of patients with DAT.

It is estimated that about half of all nursing home residents exhibit the probable DAT diagnosis currently. By 2010, more than five million people will be diagnosed with probable DAT in the United States alone. Increasing age is the greatest risk factor for Alzheimer's disease, and one-tenth of the elderly over the age of 65 develop DAT. Nearly half of the people over the age 85 are diagnosed with probable DAT. A person with DAT is expected to live an average of eight years and up to 20 years after the onset of symptoms. There appears to be a genetic propensity for DAT since those who carry apolipoprotein polymorphism are at increased risk for DAT.<sup>1,2</sup>

Current interventions for patients with DAT include acetylcholinesterase inhibitors (AChI), which are indicated for patients with mild to moderate symptoms. Treatment with meman-

tine interferes with the glutamate neurotransmitter receptor system and is the sole intervention recommended for moderate to severe cases of DAT. A spectrum of alternative treatments for DAT has also been proposed, and must be examined judiciously in pre-clinical, clinical, and evidence-based research studies.<sup>3-6</sup>

In 1906, Alois Alzheimer first described DAT in an autopsy on the brain of a 56-year-old woman, Augusta D. Ms. D had died after several years

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of progressive mental deterioration marked by increasing confusion and memory loss. The German neurologist described an odd disorganization of the nerve cells in Ms. D's cerebral cortex, the part of the brain responsible for reasoning and memory. The cells contained clusters suggestive of a rope tied in knots. Alzheimer named them "neurofibrillary tangles." There also was an unexpected accumulation of cellular debris around the affected nerves, which are now recognized as the "senile plaques." Alzheimer speculated that the nerve tangles and plaques were responsible for the woman's dementia.<sup>7</sup> Several independent cases soon revealed similar patterns, which led the German psychiatrist Emil Kraepelin to name the disease in honor of his mentor.

Plaques and tangles eventually take

over healthy brain tissue, devastate the areas of the brain associated with intellectual function, and progressively destroy the ability to reason, remember, imagine, and learn. DAT is characteristically a progressive condition marked, at its onset, by simple forgetfulness of recent events, including recent and follow-up dental visits. Patients at the early and moderate stages of DAT have difficulties in remembering and describing their dental needs and wants.

As DAT progresses, patients experience personality changes, such as poor impulse control and judgment, agitation and aggression, distrust, increased stubbornness, confusion, restlessness, rapid mood swings, fearfulness, anger, and dependence. These changes may catch the unaware dentist off guard upon follow-up visits, when they find that a usually debonair patient has now become argumentative and violent. The disease progresses into difficulty in doing things that require planning, decision-making, and judgment, such as working, balancing a checkbook, driving a car, or remembering fundamental oral and general hygiene. Eventually, patients become passive, apathetic, and uninterested in performing usual activities. In brief, signs of clinical impairment include changes in memory, which are normal in aging. These symptoms are exacerbated in patients with probable DAT by symptoms of difficulties in communicating, learning, thinking, reasoning, and keeping up personal and oral hygiene, which are severe enough to impact on the person's work performance, social activities, and family life.<sup>1,2,5,8</sup>

Therefore, progression of DAT may render the clinical decision-making increasingly complex for the treating dentist. An accurate assessment of the patient's perceived and actual skills provide an invaluable insight with respect to the veracity of dental complaints,

**Table 1****Components of the In-house Questionnaire**

1.	Overall perception of health	Fs
2.	Perceived energy level	Ps
3.	Perceived mood	Ps
4.	Perceived lifestyle	Es
5.	Perceived memory	Ps
6.	Perceived family relationships	Es
7.	Perceived relationship with spouse	Es
8.	Perceived relationship with friends	Es
9.	Perceived sense of self	Ps
10.	Ability to perform household chores	Eo
11.	Enjoyment of leisure	Eo
12.	Ability to hold financial responsibilities	Ps
13.	Perception that own life is ending	Po
14.	Overall life satisfaction	Po
15.	Have intent to hurt self	Eo

Note: The domains listed in Table 1 can be simply used by the dentist as the questions of the in-house questionnaire (e.g., "What is your overall perception of pain: slight/severe; What is your perception of energy level: low/high). Alternatively, the dentist can develop his or her own questions within each domain, as he/she sees fit to pertain to his or her patient population. The analysis is rigorous enough to sustain these variation in content, so long as it is retained within the constraints of Fs, Ps, Es, Po and Eo listed in the domains above.

and with respect to the wants expressed by patients at the early and moderate stages of DAT.

**Assessing Skills in Patients with DAT**

Staging systems have been developed that provide useful frames of reference for the process of diagnosis by exclusion, and for clinical decision-making. The stages are artificial benchmarks in a continuous process that can vary greatly from one person to another. For lack of better measures, the Global Deterioration Scale and other similar instruments are reliable diagnostic tools to generate clinical evidence toward

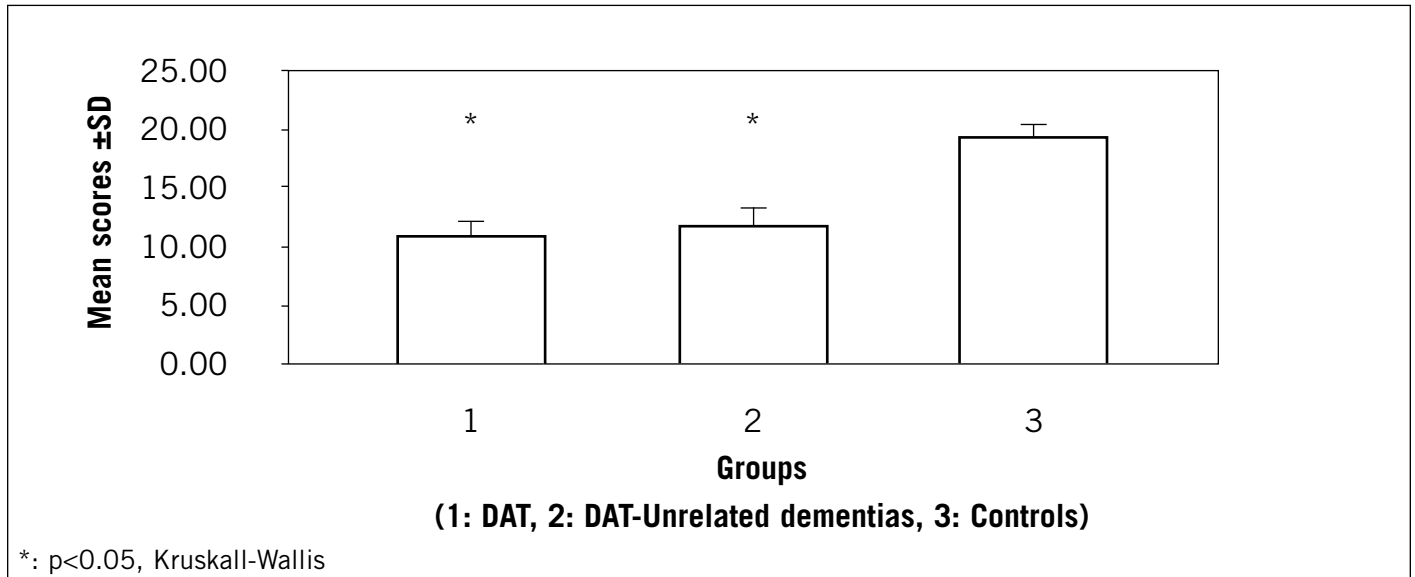
an outline of key symptoms characterizing seven stages ranging from unimpaired function to very severe cognitive decline. They are also rather cumbersome in their administration and interpretation. These instruments are useful to outline key symptoms characterizing the progression of the disease, and the efficacy of treatment interventions aimed at slowing its course. Stages 1-3 describe no cognitive decline to mild signs of DAT; stages 4 and 5 refer to moderate and "moderately severe" DAT-associated cognitive decline; and stages 6 and 7 point to the terminal severe and very severe stages of DAT.<sup>1,2,5,8</sup>

A key principle of clinical intervention in the early-moderate stages of DAT (stages 1-5), is to redirect the patient's attention. Effective treatment of patients with mild-to-moderate DAT depends upon the correct assessment of their adjustment abilities, and in aiding the patients to develop and utilize more effective coping skills.<sup>9</sup> In the realm of dental prevention, effective clinical decision-making relies not only upon the Clinical Practice Guidelines and the dentist's expertise, but also on an accurate assessment of the patients needs and wants. Because patients with probable DAT at the early-moderate stages (stages 1-5) maintain enough independence to be able to visit their dentist without the assistance of a caregiver, it is critical that the dentists identify and characterize the patient's ability to describe their symptoms and their desires accurately. In order to obtain that piece of evidence in a quick and reliable manner, a simple in-house questionnaire was designed, which provides important information to the dentist about the patient's actual and perceived level of skills at every follow-up visit.

**In-house Questionnaire for Obtaining Evidence About Patients With Early Stages DAT**

An in-house questionnaire was constructed to assess well-being, that is, "goodness of fit between the characteristics of the person and the properties of the environment," in a manner similar as that done recently for the elderly.<sup>10,11</sup> The ability of the patient to evaluate his or her actual or perceived well-being, the actual or perceived fit between person and the environment is an essential component of the patients' quality of physical health, memory loss, lifestyle and habits, and independent living skills (Table 1).

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**Figure 1.** Overall perception of well-being and coping.

The construct of overall well-being was conceived as a measure of coping and adjustment on the part of the patient. It consisted of 13 psychosocial domains, which represented the person's subjective assessment of self (Ps), the subjective evaluation of the environment (Es), the objective environment (Eo), and the person's objective assessment of his or her abilities to meet the demands of the environment (Po) (Table 1, Appendix).

The validity and the reliability of the instrument were tested in 200 subjects stratified, based on clinical exam among the groups of senile DAT of stages 1-5 on the Global Assessment Scale (age range: 55-70), of age-matched non-DAT dementias that included vascular dementias, Parkinson's dementia, and dementia with Lewy bodies. Control subjects with no signs of dementia and of the same age range were also used (Appendix). Diagnostic criteria for dementia were established by the Mini-Mental State Examination, the Drowning Clock test, and the Assessment of Daily Living, and

supplemented by a full neurological status exam, sensorimotor evaluation, and muscular tone assessment. In patients with probable DAT, the clinical evaluation was confirmed by diagnostic CT or MRI scans. Patients with DAT who scored on the Global Assessment Scale at stages 5 and 6 (severe DAT) were excluded. Patients with DAT met the criteria for Alzheimer's disease-associated dementia (as per *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition [DSM-IV]), and/or the probable Alzheimer's disease criteria based on the National Institute of Neurological and Communicative Disorders and Stroke-Alzheimer's Disease and Related Disorder's Association. The calculated intra-rater reliability for the questionnaire across the three populations was  $0.81 \pm 0.085$  ( $p < 0.05$ ). The calculated Cronbach  $\alpha$  internal consistency of the instrument was computed to be  $0.78 \pm 0.09$  ( $p < 0.05$ ) across the populations tested. The internal consistency for the assessment of fit of the patients with DAT was  $0.875 \pm 0.06$ . That the

domains listed in Table 1 overlap with widely used criteria for the quantification of Alzheimer's disease-associated as well as non-Alzheimer's disease-associated demented state confirms its construct and content validity.

The evidence generated by this instrument is summarized in Figure 1. The overall construct of perception of well-being was statistically lower ( $p < 0.001$ ) in patients with DAT and with non-DAT dementia, compared to control subjects (Figure 1). The inferences derived from this simple instrument provide a critical element for adherence to the customary clinical practice guidelines for dental, medical, and pharmacological intervention, and to ensure optimal clinical intervention for patients with DAT.

### Additional Evidence for Patients With DAT: Dental Needs

As DAT progresses, patients become increasingly incapable of completing even the simplest forms of oral care. Primary disease symptoms include a

**Table 2**

### Dental Treatment for Patients With Alzheimer's Dementia

- If possible, the same dentist should see the patient.
- Dental appointments should not be prolonged.
- Schedule appointments in the morning when the patient is usually at his or her most alert and cooperative.
- Dentists should use simple words, short sentences, repeat instructions if necessary, and speak slowly and clearly when communicating.
- Medication should be reduced or discontinued if side effects will interfere with dental treatment.
- If medication is needed, it should be used when it reaches its maximum effect.
- Most importantly, a caregiver should always be present to comfort and reassure the patient.

decrease in oral hygiene, inability to control or retain dentures, difficulty in presenting for treatment and purposelessness chewing.<sup>12</sup> To alleviate these symptoms, the principal solution is for both patient and caregiver to consult with a dentist in order to devise a specialized dental treatment plan, as well as an oral hygiene program. This promotes and facilitates prevention and early detection of dental problems, and is best accomplished while the patient is still in the early stages of Alzheimer's disease.<sup>13</sup> As the disease progresses, it becomes increasingly difficult for the dentist to obtain sound information for the development of a stringent treatment based on the evidence. Traditionally, this evidence comprises the following three domains: a) treatment solely based on the dentist's own clinical assessment – this is the normative need, b) perceived treatment need expressed by the patient; and c) expressed need, which refers to the verbalized request for treatment.<sup>12</sup>

The current paradigm of dental intervention shifts the emphasis to the concerns and needs of its patients, and preventive measures including improved oral hygiene products and practices, better nutrition, dietary modification and improved socioeconomic status. These factors are single-handedly responsible for a decline in dental diseases, overall improved oral health, and an evolution from procedure-oriented care, therapies and treatments, to patient-centered care and prevention.<sup>13</sup>

Following this model, a study examined the normative dental treatment needs of patients with DAT.<sup>14</sup> Of the 85 participants, 72.9 percent needed normative treatment of some sort. Treatment included scaling, prophylaxis, extractions, prosthetic services, denture repairs, relines, and denture adjustments. Another study of 149 people 85-years-old and over found that 37 percent of males and 60 percent of females reported dry mouth. Data showed a significant correlation between the number of medications

taken and dry mouth.<sup>15</sup> These patients complained of oral pain, poor tolerance of dentures, loss in taste acuity, and increased incidence of oral infections: gingivitis, periodontitis, oral candidiasis, infectious sialadenitis, and multiple dental caries, which are all associated with xerostomia.<sup>15</sup>

Prescribed drugs for patients with DAT make it difficult to perform smoothly routine dental tasks (e.g., oral hygiene) and have serious side effects that increase the risk for root caries and periodontal disease. The anti-convulsant drug phenytoin may lead to gingival hyperplasia in the presence of plaque. Several antipsychotic agents (e.g., phenothiazines), while controlling behavioral problems, aggression and emotional instability, also lead to xerostomia (i.e., dry mouth).<sup>14</sup> As dementia progresses, partial dentures become an unsuitable solution for patients with DAT because of an increased risk of decay of the abutment teeth caused by a below satisfactory level of oral hygiene. Cognitive impairment makes denture-wearing almost impossible because of corresponding deficiencies in oral neuromotor function, such as chewing.<sup>16</sup> As degeneration continues, patients become increasingly unsuitable for dental work (Table 2).

Anticholinergics, antihypertensives, antihistamines, antipsychotics, anorectics, narcotic analgesics, anticonvulsants, antineoplastics, sympathomimetics, antidepressants, and diuretics, which are commonly used in patients with DAT from the earliest stages, all cause drug-induced xerostomia. Xerostomia is the major side effect of patients with early-moderate DAT, increases the rate of oral decay, and carries elevated risk for need of further dental treatment.<sup>14-17</sup> The symptoms of xerostomia include soreness or burning mouth, which manifests clinically as red inflamed mucosa,

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**Table 3**  
**Computations of Subjective Fit (Fs) and Objective Fit (Fo)**

	Patients with AD	Other dementias	Caregivers
Ps	13.50	13.50	18.25
	10.50	10.50	21.25
	10.00	10.00	18.25
	7.75	10.50	18.25
	11.00	11.25	18.50
<i>mean</i>	<i>10.55</i>	<i>11.15</i>	<i>18.90</i>
<i>SD</i>	<i>2.06</i>	<i>1.39</i>	<i>1.32</i>
Es	13.00	15.50	20.25
	14.25	17.25	20.75
	14.50	13.60	21.25
	13.00	14.75	19.50
<i>mean</i>	<i>13.69</i>	<i>15.28</i>	<i>20.44</i>
<i>SD</i>	<i>0.80</i>	<i>1.53</i>	<i>0.75</i>
T	0.025009	0.003847	0.077769
Fs=Ps-Es	-3.14	-4.13	-1.54
Po	-	-	-
	10.50	11.75	19.00
	18.00	13.50	19.00
<i>mean</i>	<i>14.25</i>	<i>12.63</i>	<i>19.00</i>
<i>SD</i>	<i>5.30</i>	<i>1.24</i>	<i>0.00</i>
Eo	12.00	11.00	21.75
	12.00	12.00	18.50
	15.50	14.50	21.50
<i>mean</i>	<i>13.17</i>	<i>12.50</i>	<i>20.58</i>
<i>SD</i>	<i>2.02</i>	<i>1.80</i>	<i>1.81</i>
T	0.699235	0.923767	0.226038
Fo=Po-Eo	1.08	0.13	-1.58

hyperkeratosis and atrophic and shiny tongue.<sup>15</sup> A decreased salivary flow rate leads to dry mouth when the salivary flow rate is less than the sum of the rates of water absorption and evaporation. As a result of xerostomia, root caries, muco-

sitis, halitosis, and periodontitis develop at increased prevalence.<sup>15-18</sup>

A best-case study, that is to say a pilot systematic review, was conducted following the standard protocol outlined elsewhere.<sup>19</sup> The focus of

the investigation of the best available evidence was to examine xerostomia as a side effect in the pharmacological intervention for patients with DAT. The overall search process revealed more than 14,000 published reports, and 21 remained following inclusion and exclusion criteria. The quality of the reports was examined by acceptable sampling, and when appropriate, meta-analysis examined overarching statistical significance. The number needed to treat (NNT) for the side effect of xerostomia was evaluated as described.<sup>19</sup> The consensus statement from this analysis indicated that the best available evidence supports xerostomia as a significant undesirable side effect from pharmacological treatment of DAT.

**From Dentistry Based on the Evidence to Evidence-based Dentistry Pilot**

In conclusion, the fundamental elements of dental practice for patients with DAT based on the evidence consists of the integration of the dentist's expertise, evidence of the patient's expressed needs and wants, and available published research. The authors have described simple in-house instruments that permit reliable evidence from patients with early-moderate DAT to be obtained. Feedback from the caregiver is needed only for patients with the more advanced stages.

The American Dental Association has described dentistry based on the evidence as that approach to dental practice that incorporates the elements of dentist's expertise, evidence obtained from the patient, and any relevant published report. It has contrasted that traditional approach to dental practice with evidence-based dentistry, which incorporates all the elements above with a systematic evaluation of the entire body of pertinent research. That

is to say, evidence-based dentistry consists of the integration of the traditional model of dental practice based on the evidence with the “best available” research evidence. In brief, guiding the model of evidence-based dental practice postulates that it is necessary and timely to improve quality of care by the utilization of efficacious methods, and by controlling or minimizing the elimination of the harmful ones.<sup>13,19-21</sup> This is particularly relevant for dental patient populations with special needs, such as patients with DAT. **CDA**

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**To request a printed copy of this article, please contact /** Francesco Chiappelli, PhD, CHS 63-090, University of California Los Angeles School of Dentistry, Los Angeles, CA 90095.

## Appendix: Conceptualization and Analysis of the Data Obtained From the Questionnaire

The precise quantification of coping and adjustment depends upon its articulated conceptualization. One successful effort in that domain has led to the definition of adjustment as the goodness of fit between the abilities of person and the demands of the environment: the person-environment fit.<sup>10,11</sup> According to this conceptualization, the construct of adjustment consists of two domains: the subjective fit, which represents the person's subjective evaluation of his or her own coping with the demands of the environment; and the objective fit, the real extent of the person's coping with the environmental demands. French and collaborators further demonstrate that subjective person-environment fit (Fs) is the

result of the interdependent relationship between the person's subjective assessment of self (Ps) and his or her subjective evaluation of the environment (Es).<sup>10</sup> In a parallel fashion, the objective environment (Eo) and the objectively assessed person's abilities to meet its demands (Po) yield a quantification of the objective person-environment fit (Fo).<sup>10,11</sup>

These relationships are summarized quantitatively as  $Fo = Eo - Po$  and  $Fs = Es - Ps$ , and reflect the demand, or need on the part of the person (Np) or the environment (Ne) to actualize fit; and the given abilities of the person (Gp) or the given attributes of the environment (Ge) that facilitate fit. The objective person-environment fit (Fo) is a complex function of the difference (delta,  $\Delta$ ) between the attributes of the environment (Ge) and the need on the part of the person (Np) or the environment (Ne) to actualize fit.

In the same vein, subjective person-environment fit (Fs) is a function of the delta between the attributes of the person (Gp) and the need of the environment (Ne) to facilitate fit.<sup>10</sup>

As stated in the text, the instrument was tested for reliability and was validated with three groups of subjects stratified among the groups of senile DAT, age-matched non-DAT dementias, and control subjects with no signs of dementia in the same age range. Subjects signed informed consent approved by the Institutional Review Board.

Summary descriptive statistics (mean and standard deviation, SD) were obtained across questions pertaining to the person's subjective assessment of self (Ps), the subjective evaluation of the environment (Es), the objective environment (Eo), and the objective assessment by the person's abilities to meet the

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demands of the environment (Po). The normality and the independence of the Ps vs. Es data, and of the Po vs. Eo data were established and verified. Student t tests (or Wilcoxon non-parametric tests, when homogeneity of variance was violated) were used to establish the statistical position of the Ps vs. Es, and the Po vs. Eo means. The data were analyzed statistically (Analyze-It, version 1.72). The level of significance was set at  $\alpha=0.05$ .

The data in **Table 3** indicate that the person's subjective assessment of self for patients with DAT (Ps:  $10.55\pm 2.06$ ) was significantly lower than his or her subjective evaluation of the environment (Es:  $13.69\pm 0.80$ ;  $p=0.03$ ), which was reflected by a relatively large negative value for the computed fit (Fs:  $10.55-13.69=-3.14$ ). Similarly, patients with aging-unrelated dementias also showed a large negative Fs value, and significantly larger Es values compare to Ps ( $15.28\pm 1.53$  vs.,  $11.15\pm 1.39$ ;  $p=0.004$ ). By contrast, the values of Ps and Es in controls were not significantly different ( $p=0.08$ ).

Control subjects' perceived abilities to meet environmental demands (Ps) are less than the perceived environmental requirements (Es) ( $18.90\pm 1.32$  vs.,  $20.44\pm 0.75$ ;  $p=0.077$ ) to an extent that would have attained significance, had the number of the items in the questionnaire dedicated to assessing Ps and Es been larger by two items. These data provide independent confirmation that the control group obtained for this study, which was composed of caregivers of patients with DAT or with non-DAT dementias, are under significant psycho-emotional stress and would benefit from counseling and training aimed at increasing the level of their skills for providing care to patients with DAT.

The data in **Table 3** present a similar

analysis for the objective person-environment fit (Fo). Computations show that the abilities to meet demands of the surrounding environment (Po) and the objective environment (Eo) are essentially identical in both patients with DAT ( $14.25\pm 5.30$  vs.,  $13.17\pm 2.02$ ;  $p=0.70$ ), and in patients with DAT-unrelated dementias ( $12.63\pm 1.24$  vs.,  $12.50\pm 1.8$ ;  $p=0.92$ ). The values of Po and Eo in controls are also not significantly different ( $p=0.22$ ).

The data further permit to contrast Eo and Es, and to quantify the construct of reality contact ( $Rc=Eo-Es$ ) in the groups under study. In patients with DAT ( $13.17\pm 2.02$  vs.,  $13.69\pm 0.80$ ,  $p=0.70$ ;  $Rc=-0.52$ ), the subjective report of the attributes in reality given by the environment (Ge) was determined to be satisfactorily accurate. In patients with DAT-unrelated dementias ( $12.50\pm 1.80$  vs.,  $15.28\pm 1.53$ ,  $p=0.078$ ;  $Rc=-2.78$ ), by contrast, the large difference between the objective environment (Eo) and the patient's subjective assessment of the environment (Es) unmasks a clinically important disjointed evaluation of environmental demands. Control subjects manifest strong reality contact ( $20.58\pm 1.81$  vs.,  $20.44\pm 0.75$ ,  $p=0.88$ ;  $Rc=0.14$ ).

These analyses indicate that both patients with DAT and patients with DAT-unrelated dementias perceive themselves as substantially inadequate to face the demands of their environment, as they perceive it. Reminiscent of the assessment of self-concept, these analyses of fit as a function of Ps and Es provide a grasp of the patients' perception of the environment as well as the perception of themselves. Both patients with DAT and patients with DAT-unrelated dementias view themselves as ill-equipped to face the challenges they perceive in their surrounding environment. The analysis of subjective fit (Fs) delivers to the clinicians the view of the patients'

perception of his or her given (Gp) abilities to face the needs and the demands of the environment (Ne).

That patients with mild-to-moderate DAT perceive to lack the necessary coping skills to be well-adjusted in their present environment, as evidenced by this P-E fit analysis, is an important piece of evidence in assessing the patients' ability to relate to the dentist his or her dental needs and wants. The analysis of the objective sense of fit (Fo) reveals that the objective person-environment fit in both two populations of patients under study, as well as the controls, does not deviate appreciably from 0. This outcome indicates that, within their present life situation, the attributes given by the environment (Ge) do not greatly diverge from the need on the part of the person (Np) to actualize and optimize adjustment and fit. This evidence suggests that patients with early-moderate DAT are capable of recognizing the benefit their environment (i.e., home, dental office), and can provide them with respect to their dental needs.

The quantification of the construct of reality contact ( $Rc=Eo-Es$ ) confirms that patients with DAT accurately assess the demands of the environment, but recognize themselves to be inadequately equipped to fulfill them. Patients with DAT-unrelated dementias harbor an altered contact with reality, that when coupled with their estimation of being ill-equipped to meet the demands of the environment, suggests that dental intervention cannot rely on the evidence for needs and wants provided by these patients. When designing dental treatment interventions for patients with DAT-unrelated dementias. Dentists should rely on the information provided by the caregivers, not the patients. This analysis indicates that this is not the case for patients with mild-moderate DAT, who show as strong reality contact as control subjects.

With respect to the accuracy of self-assessment ( $A_s = P_o - P_s$ ), the data in **Table 3** reveals that the person's actual abilities to meet environmental demands ( $P_o$ ) is greater, albeit not statistically significantly, than his or her subjective assessment of self ( $P_s$ ) patients with DAT ( $14.25 \pm 5.30$  vs.,  $10.55 \pm 2.06$ ,  $p=0.48$ ;  $A_s=3.70$ ), and in patients with DAT-unrelated dementias ( $12.63 \pm 1.24$  vs.,  $11.15 \pm 1.39$ ,  $p=0.32$ ;  $A_s=1.48$ ). Controls also have unwavering accuracy of self-assessment ( $19.00 \pm 0.01$  vs.,  $18.90 \pm 1.32$ ,  $p=0.99$ ;  $A_s=0.1$ ).

Diminished well-being and impaired awareness of self and one's own abili-

ties among patients, as revealed by the analysis of this questionnaire, are important pieces of evidence for clinical diagnosis, which permit from the evidence presented by the patients, to that offered by the caregiver in order to maintain firmly the precepts of dental practice based on the most accurate evidence. This evidence provides a critical element for the psychiatric interventions following the customary clinical practice guidelines.<sup>1,2,4,10</sup>

Because of the simplicity of the questionnaire, it can be administered reliably at every follow-up visit. In this manner, the dentist can monitor the

progress of the dementia, and optimize intervention. Dentists can evaluate the delta change ( $\Delta$ ) over time during treatment obtained, and a  $\Delta F_o$  will indicate changes in actual coping abilities, and a  $\Delta F_s$  will quantify perceived adjustment. Change in the mastery of the patient under treatment with respect to the handling the demands of the environment ( $N_e$ ) will be quantified as  $\Delta E_o$ , and  $\Delta E_s$  will signify change in mastery in the person's needs ( $N_p$ ) to handle the environment. Similarly,  $\Delta P_o$  will give the change in the person's skills to actualize fit, and  $\Delta P_s$  will represent changes of the patient's self-concept. **CDA**