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Oral health status in individuals with dementia living in special facilities

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Abstract: Aim: The aim of this review was to retrieve data describing the oral health status of individuals with dementia living in special facilities. Materials and methods: A literature search on the MEDLINE database (Entrez PubMed) was performed. The literature search yielded 208 papers, of which seven publications were selected for evaluation. Results: From the available studies poorer oral hygiene, decreased saliva flow rates and a higher caries incidence were reported in individuals with dementia living in special facilities when compared with healthy individuals. Oral health problems were more pronounced in the severe stage of the disease. Conclusions: There is limited scientific data describing the oral health status of individuals with dementia living in special facilities. However, available data indicate that individuals with dementia living in special facilities have more oral health problems than individuals without dementia.

Key words: Alzheimer's disease; dementia; oral health problems; oral status; special facilities

Introduction

The proportion of individuals with dementia is increasing (1). At present approximately 130 000 individuals in Sweden suffer from moderate to severe dementia and the numbers are predicted to increase (2). The proportion of individuals diagnosed with dementia increases with age. The prevalence is calculated to be 9% between 80 and 85 years and 21% for the population aged 90 years and older (2). Most common types of dementia are classified into Alzheimer's disease (AD) and multi-infarct dementia (vascular dementia) (3). Dementia is characterized by cognitive, emotional and personality disturbances. The deterioration often progresses gradually, resulting in impairment in daily activities (4). As the disease progresses, daily routines such as eating,

Table 1. Published articles related to oral health status in individuals with dementia living	g in s	pecial facilities
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Authors	Study group	Purpose	Results
Ship et al. (1990)	28 with AD* (early stage) 35 healthy controls	To examine the saliva from the major salivary glands	Submandibular saliva flow rates were significantly lower among the group with AD. No differences in salivary flow from the parotid glands
Gordon & McLain (1991)	82 with severe dementia 52 with moderate dementia 139 with other diagnosis	 i) To examine the dental status and need for dental treatment ii) To evaluate oral hygiene as a possible explanatory factor for differences in treatment need 	Natural teeth were found in 59% of the group with dementia. More non-restorable carious teeth in individuals with severe dementia as compared to moderate dementia. Poorer oral hygiene and more calculus among individuals with severe dementia as compared to individuals with moderate dementia
Ship (1992)	41 with AD 49 healthy controls	To examine gingival, periodontal, dental, oral mucosal and salivary parameters	Patients with AD had significantly more surfaces with plaque, gingivitis and calculus, greater DMFT value, more cervical restorations and diminished submandibular salivary flow rates. No differences between the groups regarding pocket depth, attachment loss, number of teeth, number of teeth with caries
Jones et al. (1993)	23 men with AD 46 men healthy controls	Compare the incidence of coronal and root caries	No differences in coronal caries between the groups. Significant differences were found regarding root caries, filled teeth and surfaces
Ship & Puckett (1994)	21 with AD 21 healthy controls	To examine longitudinal** changes in salivary, gingival, periodontal, dental and oral muscosal parameters	Lower salivary gland flow rates in individuals with AD. More surfaces with plaque (examination 1 and 2) and gingivitis (examination 2) in individuals with AD. No significant differences regarding caries, pocket depth, attachment loss or mucosal changes between the groups
Nordenram et al. (1996)	34 with moderate and severe dementia 35 healthy controls	To determine nutritional differences and differences in dental status and oral function between the groups and disclose possible differences within the Alzheimer group depending on stage of dementia	No differences regarding dental status between the groups. In elderly with moderate dementia 14% were edentulous and 25% with severe dementia
Chalmers et al. (2002)	116 with dementia 116 healthy controls	Compare coronal and root caries incidence and increments***	Coronal and root caries incidence and increments were significantly higher in the group with dementia

AD = Alzheimer's disease

**Between the first and second examination 23 (±11) months for the individuals with AD and 36 (±1.5) months for the controls

***One year between examination 1 (baseline) and 2

bathing and dressing may be difficult to perform (5). Individuals with dementia in need of extensive support are commonly living in special facilities (6).

In individuals with moderate to severe stages of dementia the caregivers have the main responsibility for the daily oral care (4, 7). Performing oral care in individuals with dementia may be associated with ethical problems (8). The patients may react with anger, panic, crying and despair. Helping individuals with dementia with their oral hygiene may therefore result in frustration among the caregivers (7). Due to the difficulties in performing oral hygiene procedures in individuals with dementia, the risk of developing caries and periodontal diseases increases (9, 10). Furthermore, individuals with dementia often use medications that may result in a reduction of the saliva flow as a side effect (4). Dysfunction of the salivary glands has been reported in individuals with AD (7). A reduced saliva flow may predispose for development of caries lesions, mucosal lesions and problems in eating (11). Thus, several factors may contribute to a compromised oral health status in individuals with dementia.

The aim of this review was to search the literature for papers dealing with oral health status among individuals with dementia living in special facilities.

Materials and methods

A literature search on Medline data base (Entrez PubMed) was performed. The search was limited to include articles published between 1 January 1985 and 1 September 2002, ages 65 years and older and in the English language. The search terms 'Alzheimer's disease' and 'dementia' were combined with 'oral status', 'oral health', 'oral care', 'dental treatment need', 'oral function', 'dental caries', periodontitis', 'dental care + handicapped' and 'dental care'. A total of 208 publications were retrieved. Abstracts were examined from which information regarding oral health status in individuals with dementia living in special facilities was extracted. Seven of 208 published articles fulfilled the inclusion criteria.

Results

Seven studies published in journals between 1990 and 2002 were used for analysis. These papers are presented in Table 1.

Dental status

Presence of natural teeth was reported by Gordon and McLain (12) in 59% and by Nordenram *et al.* (13) in 80% of individuals with moderate and severe dementia. No differences were reported regarding the proportion of individuals with natural teeth between individuals with dementia and healthy individuals (13) or between dementia and other diagnosis, e.g. psychiatric diseases or stroke (12).

The number of natural teeth was reported in four papers, varying from 14.7 to 21.1 (Table 2) (12, 14–16). No statistical differences were found regarding the number of natural teeth between individuals with dementia and control groups (14–16).

In individuals with moderate dementia Nordenram *et al.* (13) reported 14% to be edentulous whereas Gordon and McLain (12) reported 46% to be edentulous. The corresponding figure in individuals with severe dementia was 25% (13) and 36% (12). Removable dentures in one or both jaws were found in 29% of individuals with AD and in 24% of the control group (14).

Caries and saliva flow

Gordon and McLain (12) reported caries in need of treatment in 59% of the individuals with moderate dementia and in 68% of individuals with severe dementia. Significantly more teeth (2.4) with non-treatable caries lesions were found in the individuals with severe dementia than in individuals with moderate dementia (0.6). Chalmers *et al.* (16) reported more surfaces

Table 2. The number of natural teeth in individuals with dementia living in special facilities

Author	Year	Number of teeth
Gordon & McLain	1991	14.7 (SD ± 8.8)
Ship	1992	21.1 (SD ± 1.2)
Jones et al.	1993	17.9 (SD ± 8.1)
Chalmers et al.	2002	18.0*

*SD was not reported

with coronal caries as well as root caries among individuals with dementia when compared with a control group, both in a baseline examination and one year after baseline. Root caries, filled teeth and surfaces differed significantly between individuals with dementia and a control group (15). Ship (14) reported significantly more cervical restorations and decayed, missed, filled teeth (DMFT) in individuals with AD compared with the controls. However, Ship (14) and Jones *et al.* (15) found no significant differences regarding coronal caries between the individuals with dementia and controls.

Ship *et al.*(17) and Ship (14) reported significantly lower submandibular saliva flow rates in a group of AD when compared with controls. However, lower rates were not found regarding parotid saliva flow rates.

Oral hygiene and periodontal health

Poor oral hygiene has been reported in individuals with dementia (12, 14). Significantly more tooth surfaces with plaque, gingivitis and calculus were demonstrated in individuals with AD when compared with a control group. Plaque was found in 68% in the individuals with AD. Sixty-five percent of the tooth surfaces were covered with plaque in 44% of the individuals with AD and in 11% of the controls (14). Gordon and McLain (12) reported poorer oral hygiene and more calculus in individuals with severe dementia when compared with individuals with moderate dementia. Plaque, debris and calculus were also correlated to teeth with caries lesions that could not be treated (12).

Ship (14) found no differences in pocket depths and attachment loss in individuals with AD when compared with a control group.

Mucosal alterations

Differences regarding mucosal alterations were not found in individuals with AD when compared with a control group. In both groups denture stomatitis was a frequent finding (50%) among individuals wearing removable dentures (14).

Oral health examined in a longitudinal study

Ship and Puckett (18), reported on caries, saliva, plaque, gingivitis, calculus, pocket depth, attachment loss and mucosal alterations examined on two occasions in a group of individuals with AD and in a healthy control group. The interval between the examinations was 23 ± 11 months for the individuals with AD and 36 ± 1.5 months for the control group (18).

No differences between the groups were found regarding coronal caries and cervical caries, pocket depth, attachment loss or mucosal alterations (19). Individuals with AD had significantly lower unstimulated and stimulated submandibular flow rates at examination 1 and lower stimulated submandibular and parotid flow rates at examination 2 when compared with the healthy controls. Stimulated submandibular and parotid flow rate decreased between examinations 1 and 2 in individuals with AD. Teeth with filled coronal and cervical surfaces and DMFT were significantly higher in the individuals with AD when compared with the control group. Individuals with AD also had more tooth surfaces with plaque at both examinations and more gingival bleeding in examination 2 when compared with the controls. Calculus increased significantly between examinations 1 and 2 in the individuals with AD (18).

Discussion

There is limited scientific data describing oral health status among individuals with dementia living in special facilities. However, available data indicate that more oral health problems, as evidenced by poor oral hygiene, higher caries incidence and lower saliva flow rates, were found in individuals with dementia when compared with individuals without dementia.

Gordon and McLain (12) reported a higher percentage of individuals with moderate and severe dementia to be edentulous than Nordenram *et al.* (13). The difference between the studies could possibly be explained by different health care and dental insurance systems in the USA and Sweden. Another possible explanation may be differences in diagnosing moderate and severe dementia (19).

Caries lesions were a frequent finding among the individuals with severe dementia. Many caries lesions were defined as non-treatable. Big caries lesions result in pain and discomfort in chewing, which may lead to nutritional problems (20). Therefore, regular dental care among the individuals with dementia is important to improve quality of life and avoid undernutrition. However, a reduced capacity to co-operate may result in difficulties performing dental treatment (21). Therefore, it is extremely important that the caregivers are observant of their patients' oral health status and thorough oral health care measures are required to prevent oral health problems.

Although the subjects examined in the studies by Ship *et al.* (17) and Ship and Puckett (18) were not taking any medication for other systemic diseases or being treated for any other disorder than dementia, a lower saliva secretion rate was

found among these individuals than in the controls. This result indicates that a reduced saliva flow rate may be an effect of the disease itself. Assessment of the saliva flow rate in individuals with dementia and development of treatment strategies is important in preventing oral health problems. A dry mouth may not only affect the oral health status but also the general health status. It has, for example, been proposed that diminished salivary function may predispose to aspiration pneumonia (22).

Differences in periodontal status between individuals with AD and controls were not found (18). This is not surprising since dementia is a disease that most commonly affects elderly who often have periodontal disease. Chronic periodontal disease progresses relatively slowly and it may therefore took years before a difference between AD and controls may be found. The time between the two examinations (23 months) in the study by Ship and Puckett (18) may be too short to detect such differences.

In future, the proportion of older people will increase and more individuals are likely to suffer from dementia. A greater percentage of the individuals will also retain their natural teeth. Due to difficulties associated with the care of individuals with dementia, early diagnosis is necessary. Patients with dementia have more plaque and gingivitis, and help with oral care is important to avoid disease progression. Based on the results of oral assessments, an individual oral health strategy can be outlined (23). Nursing personnel need to be attentive to oral health problems that otherwise may be hidden in this group of care recipients. However, assessments of oral health status and providing oral care may be difficult to perform in individuals with cognitive impairments. It is therefore important that the dental hygienist supports and co-operates consciously with the nursing personnel in this growing population. The dental hygienist may have a key position to develop and promote realistic and practical oral health strategies in individuals with dementia. To assess areas of problems in oral health, further studies with larger samples, following participants over time are needed. This will probably be easier if collaborative efforts are developed between dentistry and nursing personnel in special facilities.

Conclusions

Few studies have been performed in individuals with dementia living in special facilities. From the available studies poorer oral hygiene, decreased saliva flow rates and a higher caries incidence were found in individuals with dementia when compared with healthy individuals. It could also be concluded that the oral health problems were more pronounced in the more severe stage of the disease. It is therefore extremely important that the nursing personnel are observant of their patients' oral health status and thorough oral health care measures are required to prevent oral health problems.

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