

Oral Health in a Cognitive and Behavioral Unit

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Introduction

In the 2000's, there are approximately 860 000 french persons affected by Alzheimer's diseases and dementia (ADD). This number is increasing constant because of the ageing of the population and the progress of the diagnosis. Today, about 165 000 new patients a year are diagnosed. These diseases engender later an important physical, intellectual and social dependence which impacts on the social life of the patient and people around him. It is the main cause of heavy dependence of elderly and of admission in nursing homes; at present 40% of ADD-patients live there [1-6].

So, Alzheimer's diseases and dementia became a stake in public health. In November 2007, the French government develops the plan Alzheimer (2008-2012) to organize and federate a global care for the AD-patients and his caregivers [4].

During the Alzheimer's diseases, crises can appear and can be translated by the appearance or the exacerbation of psychological and behavioral symptoms. The severity can become very disturbing for the patient, his family or the nursing home residents. The origin is multifactorial: exhaustion of helping person, acute diseases, break of the coverage care. In this situation, the resort is a necessary hospitalization; it constitutes very often the only answer. The cognitive and behavioral units (CBU) are adapted units which allow to ensure programs of specific care and to improve the quality of life [7].

The concept of the cognitive and behavioral units (CBU), inspired by the psycho-geriatric units, is created within the framework of the plan Alzheimer on 2008-2012 (measure 17) [4].

The measure 17 of the plan Alzheimer allows the creation of 120 specialized units which have the same characteristics: organization, budget, type of care, human resource, equipment. Cognitive and behavioral units (CBU) contain on average 11 beds, identified in units of following and readaptation care. Architectural and material considerations have to be in adequacy with the welcomed population. A specific project for each patient is established and contains different aspects: medical project,

care project, ethical aspect. The professionals have skills and specific training. A structured and adapted program of activities is suggested in an objective limiting the expression of the behavior disorders and if possible to decrease the use of the sedative psychotropic and the setting. At the same time, the objectives in units of following and readaptation care are maintained. Non-medical practices are proposed to these patients: psychomotricity, ergo therapy, orthophony, art-therapy... [8-11].

The general clinical context is taken into account because symptoms associated as pains, discomfort, under nutrition, dehydration; infections can deteriorate behavioral disorders in dementia. Although they can affect the quality of life of elderly with dementia, the oral health is often neglected and the oral care is considered complicated. Indeed, the behavior disorders (agitation, aggression), the lack of cooperation even the opposition, the loss of autonomy, the disturbance of the physical marks are so many brakes in the access to healthcare dental [12-25].

The Pole Geriatrics-Gerontology of the Toulouse University Hospital became aware of this fact and the oral health is a part of the global care of the hospitalized patients.

Objective

The main objective was to observe oral status of patients affected by Alzheimer's diseases and dementia (ADD) with intrusive behavior disorders. The secondary objective is to propose an adapted oral care.

Methods

A cross-sectional study of the oral status was made by a clinical observation and a data collection on group of patients hospitalized in the CBU of Toulouse (Gérontopôle - Toulouse University Hospital). 138 patients were able to be examined.

Considering the cognitive diseases, the consent was not able to be collected. The general, geriatric data were raised on computerized medical record. The oral status is systematically realized within the framework of a global health check-up.

Geriatric Examination

The age, the sex, the motives for hospitalization, the length of stay made up the demographic data. The evaluation behavioral psychology was based on the NPI-NH scale (Neuro Psychiatric Inventory Nursing Home) [27-28]. Ten behavioral and two neurovegetative areas are included in the NPI-NH. The cognitive evaluation was based on the MMS scale (Mini Mental State) [29]. The autonomy was estimated by the ADL scale (Activity daily Living) on 6 items in the entrance [30].

Oral Clinical Examination

The dentist was equipped with a photo light lamp to achieve maximum visibility within the mouth, a dental mirror. The oral assessment was elaborate and is used by the geriatric department of Toulouse. The important cognitive diseases were prevented a sharp examination. The use of periodontal probes, pain evaluation, oral hygiene index (OHI) were impossible to propose for a majority of patients. The oral status was illustrated by a quantitative dental status, a functional dental and/or prosthetic status, a gingival and mucosa status and a dental and/or prosthetic hygiene's evaluation [31]. The variables collected were listed and described in the (table 1).

Statistical methods

The data were recorded and analyzed thanks to the Software Excel - version 2011 (Microsoft ®). The qualitative variables were described in term of frequency and percentage observed, and the quantitative variables in term of average and standard deviation (AND) if the distribution of the variable was normal, or in median and quartiles in case of abnormal distribution.

Results

Demographic Data

138 patients (84 women and 54 men) were recruited. The mean age of the patients was of 79.5 years with range of 47-100 years. The women were more and older than the men (table 2).

The most frequent motives for hospitalization were the behavior disorders (92.4%) associated with denutrition (24.4%), cognitive evaluation (9%), loss of autonomy (13.5%) or others (12%). In the entry, most of the patients (88%) walked. The average stay was in average of 32.8 days (range 17-41, median 25). The ADL (/6) was in average of 3.3 ± 1.8 (range 1.75-5, median 3.75). The behavioral disorders and the frequency were collected from the npi-nh (table 3).

Quantitative Dental and/or Prosthetic Status

108 patients had at least one tooth, 30 patients were edentulous (Table 4).

The dentate patients had in average 7, 9 maxillary teeth, 9,4mandibulary teeth and 2 roots (Table 5).

92 patients had at least a tooth on every arch. 25 patients had at least 25 healthy teeth (11 women, 14 men) and only 4 patients

Variables	Description
Quantitative dental and/or prosthetic status	Number of maxillary or mandibular teeth
	Number of roots
	Presence of removable dentures (partial or complete)
Functional dental and/or prosthetic status	Functional units (FU): Number of opposing natural or prosthetic tooth pairs which are going to be in contact during the chewing and during the swallowing [30].
	The maxillomandibular wedging is assured by the presence of natural or prosthetic anterior functional units (incisive or canines) and/or by the presence of natural or prosthetic posterior functional units (premolars or molars).
	If the patients have a complete dentition, they have 8 posterior functional units and a good maxillomandibular wedging, but if they are complete edentulous, they have no functional unit, no wedging.
Gingival and mucosa status	Teeth and/or prosthetic wear
	The modified sulcus bleeding index follows the periodontal inflammation (score 0 = no bleeding, score 1 = bleeding on probing, score 2 = tendency to spontaneous bleeding) Xerostomia: no xerostomia, moderate or severe
Dental and/or prosthetic hygiene	1: adequate, no visible plaque 0: inadequate, accumulation of plaque at the base of the teeth or on the removable denture

Table 2: Age groups according to gender

	Median (years)	Range (years)	n
Total	79,5	47-100	138
Women	81,8	61-100	84
Men	76	47-96	54

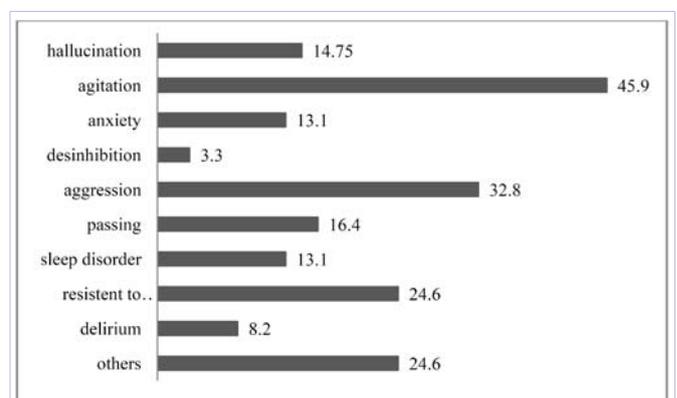


Table 3: Frequency of the behavior disorders (NPI-NH) (%)

had 2 roots and 2 patients had 1 root. 45 patients had at least an arch with 12 healthy teeth: 15 women and 17 men had at least 12 healthy maxillary teeth and 7 women and 6 men had at least 12 healthy mandibular teeth. 8 patients (4 women and 4 men) had in average 20 teeth but more than 10 teeth in the state of root (Table5).

Multiple decays and demineralizations were observed at 15 patients (11 women and 4 men).

Fixed prostheses (of the crown in the complete bridge) were present at 49 dentate patients (26 women and 23 men). Among 108 dentate patients, 32 patients (23 women and 9 men) wore removable dentures (17 patients wore one removable denture, 15 patients wore 2 removable dentures) (Table5).

46 patients (30 women and 16 men) were edentulous at least an arch (Table 6).

Patients who were upper edentulous had in average 6 mandibular teeth and 1,3 roots for the women and 8,8 mandibular teeth and 3,1 roots for the men.

Table 4: Dentate and edentulous groups according to gender and age groups

	Age (years)	n (%)	Dentate (%)	Edentulous (%)
Total		138	108 (78)	30 (22)
Women	-60	-	-	-
	60-70	6	5	1
	70-80	27	24	3
	80-90	37	29	8
	90+	14	6	8
		84 (60)	64 (46)	20 (14)
Men	-60	5	5	-
	60-70	10	10	-
	70-80	11	11	-
	80-90	27	18	9
	90+	1	-	1
		54 (40)	44 (32)	10 (8)

Functional dental and/or prosthetic status

92 patients had an adequate wedging with natural teeth and/or removable denture or complete denture (Table 7).

60 patients had at least 6 posterior functional units (41 patients thanks to their natural teeth, 19 thanks to their natural and prosthetic teeth).

Among the 32 worn removable dentures, 23 were functional and adapted. 9 patients wore unsuitable, unstable prosthesis.

Facets of wear on the whole set of teeth was found at 51 patient's (24 women, 27 men).

Complete dentures were worn by 22 patients (15 women and 7 men). 6 women showed a good adaptation and a good wedging with their complete denture, 5 women wore only upper denture, 4 women had one of their complete denture which was inadequate. Among 7 men who wore complete denture, 4 men had a good adaptation and a good wedging with their complete denture, 3 men had one of their complete denture which was inadequate.

9 women and 8 men wore complete denture with facets of wear.

Gingival and mucosa status

108 patients had at least one tooth. An acute periodontal inflammation was found for 42 patients (25 women and 17 men) (table 8).

The mucosa and the tongue were healthy for 82 patients.i.e without erythema, plaque, xerostomia. 44 patients had a white tongue associated with a candidosa signs on mucosa and moderate xerostomia. 12 patients had severe xerostomia and erythema. The table 9 showed the mucosa status for dentate and edentulous patients (table 9).

Dental and prosthetic hygiene

Only 54 patients (36 women and 18 men) who had teeth or/

Table 5: Number of maxillary and mandibular teeth and number of roots according to gender and age groups

	Age (years)	n (%)	Number of teeth						Number of roots		
			Maxillary			Mandibulary			0	1-4	+7
		108	0-5	6 -10	+10	0-5	6 -10	+ 10			
Women	-60	-	-	-	-	-	-	-	-	-	-
	60-70	5	2	1	2	1	1	3	3	2	-
	70-80	24	8	7	9	4	10	10	11	10	3
	80-90	29	9	10	10	9	8	12	15	11	"
	90+	6	4	2	-	1	3	2	1	4	1
		64 (60)	23	20	21	15	22	27	30	27	7
Men	-60	5	1	2	2	1	-	4	3	7	-
	60-70	10	-	2	8	-	2	8	5	4	1
	70-80	11	5	1	5	2	2	7	9	1	1
	80-90	18	5	5	8	3	4	11	7	5	6
	90+	-	-	-	-	-	-	-	-	-	-
		44 (40)	11	10	23	6	8	30	24	12	8

and removable dentures presented an adequate state of hygiene. All the complete dentures were cleans; daily hygiene seems easier for this type of prosthesis (Table 10).

Discussion

The data in the present study were in agreement with the data from literature about Alzheimer population. The women were more and older than the men (Table 1). In spite of the high level of dependency explained by their important cognitive diseases,

Table 6: Edentulous groups according to gender and age groups

	Age (years)	n (%)	Complete edentulous	Upper edentulous	Lower edentulous
Women	60-70	2	1	1	-
	70-80	6	3	2	1
	80-90	11	8	3	-
	90+	11	8	3	-
		30 (22)	20	9	1
Men	60-70	0	-	-	-
	70-80	3	-	3	-
	80-90	12	9	3	-
	90+	1	1	-	-
		16 (11,5)	10	6	0

Table 7: Maxillo-mandibular wedging according to gender groups

	n (%)	Maxillo-mandibular wedging			Inadequate or inexistent maxillo-mandibular wedging		
		Dentate	Removable denture	Complete denture	Dentate	Removable denture	Complete denture
Total	138	51	26	15	31	2	13
Women	84 (60)	26	17	9	21	2	9
Men	54 (40)	25	9	6	10	-	4

Table 8: Periodontal inflammation according to gender and age groups

	Age (years)	n	Periodontal inflammation (SBI = 1-2)	No periodontal inflammation (SBI = 0)
		108	42	56
Women	-60	-	-	-
	60-70	5	3	2
	70-80	24	9	15
	80-90	29	12	17
	90+	6	1	5
		64 (60)	25	39
Men	-60	5	3	2
	60-70	10	4	6
	70-80	8	5	3
	80-90	11	5	6
	90+	-	-	-
		54 (40)	17	27

Table 9: Mucosa status for dentate and edentulous patients according to gender and age groups

	Age (years)	n	Normal mucosa Normal tongue		Candidosa signs White mucosa Moderate Xerostomia		Severe xerostomia Erythem	
			Dentate	Edentulous	Dentate	Edentulous	Dentate	Edentulous
		138	64	18	38	6	6	6
Women	-60	-	-	-	-	-	-	-
	60-70	6	2	1	3	-	-	-
	70-80	27	12	3	9	-	3	-
	80-90	37	17	5	12	1	-	2
	90+	14	4	5	1	1	1	2
		84	35	14	25	2	4	4
Men	-60	5	3	-	2	-	-	-
	60-70	10	10	-	-	-	-	-
	70-80	11	5	-	6	-	-	-
	80-90	27	11	4	5	3	2	2
	90+	1	-	-	-	1	-	-
		54	29	4	13	4	2	2

Table 10: Dental and prosthetic hygiene according to gender and age groups

	Age (years)	n	adequate, no visible plaque			inadequate, accumulation of plaque		
			Teeth	Teeth + Prosthetic	Complete denture	Teeth	Teeth + Prosthetic	Complete denture
		130*						
Women	-60	-	-	-	-	-	-	-
	60-70	6	-	-	1	4	1	-
	70-80	25	6	3	1	10	5	-
	80-90	35	6	4	6	12	7	-
	90+	13	1	1	7	2	2	-
		79	13	8	15	28	15	0
Men	-60	5	1	-	-	4	-	-
	60-70	10	3	-	-	7	-	-
	70-80	11	3	2	-	4	2	-
	80-90	24	2	-	6	11	5	-
	90+	1	-	-	1	-	-	-
		51	9	2	7	26	7	0

*3 men and 5 women have no teeth and no denture

the participants of this study were younger than the patients usually hospitalized in long term units [15-16].

Quantitative Oral Status

The dental status was good; 78% had 19 teeth (with 2 roots). 50% of patients had no root. A quarter of patients had an excellent dental status (in average 25 teeth exist); around 1/3 of women and 3/4 of men had more than 10 maxillar or mandibular teeth. For these patients, it is essential to ensure daily hygienic oral care, examination and scaling regularly to preserve this good oral status for a long time. The patients who had 1 to 3 roots (40% of dentate patients) seem have an oral health which is damaging. These patients must be care and supervise. 15 patients had more

than 7 roots; they were exposed to infectious risks; they needed avulsions

58 % of patients wore satisfactory and good quality prosthesis (fixed partial denture, partial removable denture, coping). A periodic supervision is necessary to keep these prosthesis for a long time.

The men had a better dental status than women. The age group is not correlated with the dental status; the oldest have not a less good oral health [32].

The number of edentulous is less as the institutionalized patients, only 21% patients are edentulous and a majority 73% wear complete denture. Under 34% patients have only one edentulous arch.

The study carried out by Gluhak et al. A similar population (institutionalized old patients with moderate to severe cognitive decline) shows a more damaged dental status than the studied population who is younger and has been undergone periodic oral aftercares during their life [15-16].

Oral function

A majority of patients (66%) had an adequate maxillomandibular wedging; 43% patients had 6 posteriors unit. They could eat and swallow without difficulties.

Under 1/3 of removable dentures and half of complete denture were unfunctional (maladjusted, unstable); they needed adjustment or repairing. However, these dentures were worn by the patients without complaint [33-34].

The attrition (generalized dental wear) of the natural and/or prosthetic teeth was observed among 1/3 of dentate patients. These patients were younger and strolled; the attrition could be explained by a neuromuscular disease due to Alzheimer's decline and not by an occlusal instability. This phenomenon was more common among the men (61%) than the women (37%). The prosthetic wear was observed among 2/3 of edentulous patients wearing complete denture (80% among men and 45% among women). Except the neuromuscular diseases, the prosthetic wear could be explained by the age of the dentures [35].

Inflammation and infectious risk

39% of patients were exposed to an inflammatory risk because of generalized periodontal inflammation associated with dental plaque. The presence of roots increases the infectious risk and that needs dental care as avulsions and scaling.

8 patients had an important risk of infection because they had more than 10 roots and a periodontal inflammation [36-38].

60% of patients had no candida signs on the mucosa and the tongue and no xerostomia. In the literature, the prevalence of candida for the institutionalized elderly patients is behind 65% [39].

Dental and Prosthetic Hygiene

Around 75% of the patients who had teeth and/or removable dentures had an inadequate hygiene. The medical staff, particularly the nurses must be careful because without hygiene care, the patients are exposed to oral diseases (decay, parodontosis, pain...) and nutritional difficulties. Patients with complete denture were correctly taken care of hygiene; all wore clean complete denture and had healthy mucosa. Because of the cognitive dysfunction and the behavioral abnormalities of the patients, the nurses have difficulties to perform appropriate oral hygiene. Also, there is a lack of knowledge on the subject of oral care by the nursing staff, especially for the patients with Alzheimer's disease [19, 22-26].

Required Treatment and Dental Management

The literature shows the importance to take care of the oral status at the beginning of the disease to avoid the development of pathologies, to maintain the quality of life and to protect a good nutrition. The patients with cognitive diseases have to benefit from a specialized care [40-44].

All the patients need hygienic oral care (teeth, mucosa and/or removable denture) every day to prevent oral damages in the future [18-19, 45]. The Alzheimer's decline would increase for these patients and it would be very difficult to administer safe and efficient oral treatment for the dentists. Daily hygienic oral care is essential. The medical team and the caregivers help the patient hospitalized in the CBU with appropriate protocols. It is frequent that the patient is aggressive, opposing, refuses to open the mouth. The correct installation of the patient and the caregiver is one of keys of the success of the care. The patient is installed in side position of 3/4, head tilted near the nurse. The caregiver (right-hander) is next to the patient (in his right), her arm (left) props up the head of the patient and her hand (left) supports the mandible of the patient. Such an installation is going to contribute to reassure the patient, to assure the nurse's care and to avoid any fit. Reassuring words will accompany the patient during all the care, this is essential for the most opposing or distressed patients. The caregiver slides his index by the lip's corner even if the mouth remains closed. He comes to mass above the gumline. Indeed, when the mouth is big open, lips and cheeks are firmly stuck to the external faces of teeth. This "forced" position can establish a fatigue even or an aggression for the patient. When the mouth is closed, cheeks and lips are supple and allow the access to the external face of the dental arches, the tongue does not hamper anyway. The massage was pulled a relaxation of the joint, then the patient half-opens the mouth without strain and the oral care can start [46-47].

The needs for avulsion, scaling and restoring carious lesions are necessary to prevent infectious risk. The dentists can use the techniques of sedation (oxygen/ nitrous oxide) to facilitate dental care. The stabilization and the adjustment of prosthesis allow restoring adequate mastication and swallowing.

For this population, the infectious risks were identified for

21% of patients, the mastication and swallowing difficulties were identified for 22% of patients and the both problems were identified for 15 % of patients. But, it is uneasy to do a global treatment for all. Before starting an appropriate oral care, the dentist must evaluate with the medical staff the cognitive ability, the drug regimen, other medical conditions (valvular heart disease for example), the nutrition conditions and the disease prognosis.

Conclusion

Patients with Alzheimer's disease lose progressively the ability to care themselves. It is true for oral care, especially for dental and/or prosthetic hygiene. The study shows an adequate oral health among the majority of patients and a deficient oral aftercare, particularly the daily oral and/or prosthetic hygiene. In a CBU, the oral health care is essential to improve a good general health, a good quality of life and nutrition. This population with important behavioral disorders must benefit from specific oral care: hygienic care every day and dental aftercare every year. Because it is very important to preserve a best oral health.

Ethical Statement

The Ethics Committee of the Gérontopôle accepted this study of collection of data. Considering the cognitive diseases, the consent was not able to be collected directly. The close relations of the patient were informed. The general, geriatric data were raised on computerized medical record. The oral status is systematically realized within the framework of a global health check-up.

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