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Oral hygiene and oral health in older people with dementia

a comprehensive review with focus on oral soft tissues

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Supplementary Table 1a: Methodological quality assessment of the included cohort studies with the Newcastle Ottawa Scale

Cohort study	Selection				Comparability		Outcome		Follow up long enough	Adequacy of follow up	Total
	Representativeness of cases	Selection of controls	Ascertainment of exposure	Demonstration outcome of interest not present at start of study	Age	Gender	Assessment of oral health				
Chalmers et al. 2002 [1]	+	-	-	-	+	+	+	+	-	5	
Chalmers et al. 2003 [2]	+	-	-	+	+	+	+	+	+	7	
Chen et al. 2010 [3]	-	+	+	+	-	+	+	+	-	6	
De Souza Rolim et al. 2014b [4]	+	n/a	+	-	-	-	+	-	-	3	
Hatipoglu et al. 2011 [5]	-	-	-	+	-	-	+	+	?	3	
Hoben et al. 2016 [6]	+	+	-	+	+	?	-	+	+	5	
Ide et al. 2016 [7]	+	-	+	+	-	-	+	+	+	6	
Ship et al. 1994 [8]	+	+	+	-	+	-	+	+	-	6	
Sumi et al. 2012 [9]	+	n/a	+	-	-	-	+	+	?	4	
Zenthöfer et al. 2015 [10]	+	+	+	+	+	+	+	+	+	9	

NB: + met, - unmet, ? unclear, n/a not applicable

Supplementary Table 1b: Methodological quality assessment of the included case-control studies with the Newcastle Ottawa Scale

Case-control study	Selection				Comparability		Exposure		Non response rate	Total
	Definition of cases	Representativeness of cases	Selection of controls	Definition of controls	Age	Gender	Assessment of oral health	Same method cases & controls		
Chu et al. 2014 [11]	-	-	-	+	+	+	+	-	+	5
De Souza Rolim et al. 2014a [12]	+	+	+	+	+	+	+	+	-	8
Gil-Montoya et al. 2016a [13]	+	+	-	+	-	-	+	+	-	5
Hoeksema et al. 2016 [14]	+	+	?	-	-	?	+	+	-	4
Kossioni et al. 2012 [15]	+	+	n/a	n/a	+	+	+	+	-	6
Leal et al. 2010 [16]	-	+	+	+	-	-	+	+	-	5
Ship et al. 1990 [17]	+	-	+	+	+	-	+	+	-	6
Warren et al. 1997 [18]	+	+	-	-	+	+	+	+	+	7
Zenthöfer et al. 2014 [19]	-	-	+	-	+	-	+	+	-	4
Zenthöfer et al. 2016a [20]	-	+	+	-	-	+	+	+	-	5

NB: + met, - unmet, ? unclear, n/a not applicable

Supplementary Table 1c: Methodological quality assessment of the included cross-sectional studies with the Newcastle Ottawa Scale

Cross-sectional study	Selection		Comparability		Exposure			Nonresponse rate	Total	
	Definition of cases	Representativeness of cases	Selection of controls	Definition of controls	Age	Gender	Assessment of oral health Same method cases & controls			
Adam et al. 2006 [21]	-	+	+	-	-	-	+	-	?	3
Chapman et al. 1991 [22]	-	+	n/a	n/a	-	-	+	n/a	-	2
Chen et al. 2013a [23]	-	-	-	-	+	+	-	+	-	3
Chen et al. 2013b [24]	-	-	-	-	-	+	-	+	-	2
Chen et al. 2013c [25]	-	-	-	-	-	+	-	+	+	3
Cohen Mansfield et al. 2002 [26]	-	-	n/a	n/a	-	-	+	n/a	-	1
Elsig et al. 2013 [27]	+	+	+	-	-	-	+	+	-	5
Gil-Montoya et al. 2016b [28]	+	+	-	+	+	?	?	+	-	4
Kossioni 2013 [29]	+	+	n/a	n/a	+	+	+	+	-	6
Lee et al. 2013 [30]	+	-	-	+	+	-	+	+	?	5
Philip et al. 2012 [31]	-	-	-	+	-	-	+	+	-	3
Ribeiro et al. 2012 [32]	+	+	-	+	-	-	+	+	-	5
Srisilapanan et al. 2013 [33]	-	+	n/a	n/a	-	-	+	n/a	-	2
Syrjala et al. 2012 [34]	+	+	+	+	+	+	+	+	-	8

NB: + met, - unmet, ? unclear, n/a not applicable

Supplementary Table 2: Methodological quality assessment of the included Controlled Trials with the Delphi list

Controlled trial	Randomization	Concealed treatment allocation	Groups similar at baseline	Eligibility criteria specified	Outcome assessor blinded	Care provider blinded	Patient blinded	Point estimates and measures of variability	Intention to treat analysis
Fjeld et al. 2014 [35]	yes	yes	yes	yes	yes	?	?	yes	no
Zenthöfer et al. 2016b [36]	yes	yes	no	yes	yes	no	?	yes	No

Supplementary Table 3: Assistance need for oral hygiene care of older people with dementia, compared with older people without dementia

Study	Dementia Number of participants Mean age (SD)	No dementia Number of participants Mean age (SD)	Assistance need	Dementia Prevalence %	No dementia Prevalence %
Chalmers et al. 2002	MiD 21 MoD 50 SeD 132	21	Cleaning dentures ¹	MiD: 88.3% MoD: 97.3% SeD: 100.0%	73.4%
			Cleaning teeth	MiD: 66.7% MoD: 57.2% SeD: 100.0%	11.1%
Chalmers et al. 2003	103 <79y: 82 80+y: 21	113 <79y: 88 80+y: 25	Cleaning dentures	25.0%**	0.0%
			Cleaning teeth	24.1%**	0.0%
Chen et al. 2013a and Chen et al. 2013c	46	138	Oral care	56.5%*	8.8%*
Hoben et al. 2016	1606 85.0 (7.5)	1105 83.4 (10.5)	Daily oral health care by staff	94.4%	92.7%
Hopcraft et al. 2012	105	170	Cleaning teeth; some	35.7%***	14.7%
Philip et al. 2012	84 85.7 (9.6)	102 84.3 (9.9)	Cleaning teeth; total	21.4%	11.3%
			Oral care	60.3%*	37.3%
Srisilapanan et al. 2013	69 75.5 (7.0)	0	Oral care	50.7%	-

*p≤.05, **p≤.01, ***p≤.001, CI: Cognitive Impairment, MiD: Mild Dementia, MMSE: Mini-Mental State Examination, MoD: Moderate Dementia, SeD: Severe Dementia

Supplementary Table 4: The oral mucosal status of older people with dementia, compared with older people without dementia

Study	Dementia Number of participants Mean age (SD)	No dementia Number of participants Mean age (SD)	Oral mucosal outcome measure	Dementia Prevalence %	No dementia Prevalence %
Chalmers et al. 2003	116	116	Denture stomatitis maxilla	28.6%	-
			Angular cheilitis	5.8%	-
Chu et al. 2014	59 Mild AD 79.8 (7.4)	59 79.8 (7.4)	Candidiasis	3.6%	3.6%
			Lichen planus	1.8%	0.0%
De Souza Rolim et al. 2014a&b	29 Mild AD 75.2 (6.7)	30 61.2 (11.2)	Candidiasis	10.3%**	0.0%
Gil-Montoya et al. 2016b	73 MiD 76.4 (7.5) 66 MoD 77.6 (7.3) 36 SeD 80.4 (6.5)	156 77.4 (6.9)	Drug-induced xerostomia	MiD 68.5% MoD 68.5% SeD 72.2%	36.5%
				Overall***	
Hatipoglu et al. 2011	31 AD 67.6 (9.1)	47 65.3 (7.0)	Stomatitis Maxilla	59.1%***	7.4%
			Stomatitis Mandibula	18.1%***	0.0%
Kossioni et al. 2012	27 76.5 (6.8)	0	Stomatitis	26.0%	-
Kossioni et al. 2013	23 76.3 (7.1)	0	Xerostomia	34.8%	-
			Sialorrhea	0.0%	-
			Burning mouth	8.7%	-
			Dysgeusia	26.1%	-
			Oral malodor	13.0%	-
Leal et al. 2010	20 MiD with Medication 69.6 (5.9)	20 without medication 68.3 (8.3)	Dry and cracked lips	70.0%*	30.0%
			Fissured tongue	40.0%*	20.0%
			Candidiasis	30.0%	5.0%
			Ulcerated mucosa	5.0%	5.0%
			Burning mouth	30.0%	0.0%
			Dry Mouth	45.0%*	20.0%
Warren et al. 1997	45 AD 81.6 (6.9) 52 OD 81.4 (7.3)	133 80.3 (6.8)	Xerostomia	AD 9.1% OD 22.0%*	8.4%
			Soft tissue pathology	AD 20.4% OD 20.4%	16.8%

*p≤.05, **p≤.01, ***p≤.001, AD: Alzheimer's disease, MiD: Mild Dementia, OD: Other dementia's

Supplementary Table 5: Salivary flow in older people with dementia, compared with older people without dementia

Study	Dementia Number of participants Mean age (SD)	No dementia Number of participants Mean age (SD)	Salivary flow	Dementia Mean (SD)	No dementia Mean (SD)
Chu et al. 2014	59 79.8 (7.4)	59 79.8 (7.4)	Unstimulated (ml/min)	0.30 (0.17)	0.41 (0.28)*
Leal et al. 2010	20 MiD with medication 69.6 (5.9)	20 without medication 68.3 (8.3)	Stimulated (ml/min) Unstimulated (ml/min) Buffering capacity pH	0.69 (0.39) 0.17 (0.17) 0.02 (0.00) 6.71 (0.55)	0.90 (0.67) 0.73 (0.35)** 0.17 (0.05)*** 6.95 (0.42)
Ship et al. 1990 2-3y cohort	28 AD 68.0 (10.0)	35 70.0 (10.0)	Submandibular Unstimulated (ml/min/gland), mean (SEM) Submandibular Stimulated (ml/min/gland), mean (SEM) Parotid Unstimulated (ml/min/gland), mean (SEM) Parotid Stimulated (ml/min/gland), mean (SEM)	0.04 (0.00) 0.16 (0.03) 0.06 (0.01) 0.46 (0.06)	0.09 (0.01)*** 0.30 (0.03)*** 0.10 (0.02) 0.54 (0.05)

*p≤.05, **p≤.01, ***p≤.001, **AD:** Alzheimer's Dementia, **MiD:** Mild Dementia, **OD:** Other Dementia's

ⁱ With increasing severity of cognitive impairment, residents required significantly more assistance with oral hygiene care and gave caretakers more difficulties with the provision of this care

5 Supplementary Tables 'Oral health in older people with dementia'

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