A longitudinal randomized clinical trial

Masticatory function and oral health are important for maintaining cognition and quality of life (QoL), especially in elderly persons suffering from dementia. A randomized clinical trial was conducted to investigate the effect of increased masticatory activity through oral health care and adaptations in diet on cognition and QoL in elderly persons suffering from dementia. One hundred and four Dutch participants were included in the analysis. Data collection included screening global cognition, applying the Qualidem proxy questionnaire, and assessment of masticatory performance with a two-color chewing gum mixing ability test. An oral health care intervention was implemented according to national guidelines, by providing clinical lessons, and supervision. Dietary changes were designed with the staff and managers. An unplanned closing (ad hoc terminalis) data analysis was done with a mixed repeated measures ANOVA. There was a statistically significant interaction between the intervention and time on the QoL subscale ‘restless tense behavior’. Significant main effects of time were noted for global cognition, and for the QoL subscales ‘positive affect’ and ‘social isolation’. No other effects were found. During the execution of the trial, concern grew about the actual adherence to the intervention. Efforts to increase awareness and adherence were to no avail. Comparable trials reported similar results. It was therefore decided to discontinue the trial. Alternative methods to implement oral health care in nursing homes are proposed, such as a “Denticure”.

INTRODUCTION

Background

Around the globe, millions of elderly persons are suffering from dementia, and it is expected that this number will increase in the near future. Dementia is an umbrella term for a group of psychogeriatric neurodegenerative conditions; the most prevalent subtypes of dementia are Alzheimer’s disease (AD; about 60% of the cases) and vascular dementia (VaD; about 30%). The expected rise in dementia incidence is mostly due to aging of the population, since age is one of the main risk factors for dementia. One of the most prominent symptoms is the loss of cognitive function which is also a main part of the diagnosis.

Increasing physical activity improves cognition, quality of life (QoL), and mood in older persons with dementia. Many studies indicate the benefits of exercise as a protective factor, and perhaps even as a treatment for deterioration of cognition. The most likely explanatory mechanism behind this effect is the increased cerebral blood flow, which is often observed during exercise. Mastication also induces higher heart rates and increases cerebral blood flow.

In senior persons, this increase is larger when wearing their dental prosthesis, compared to not wearing it. Interestingly, rehabilitating masticatory function through the application of dental prostheses leads to both improved masticatory ability and improved cognitive function, and persons who have received prosthodontic treatment show brain perfusion associated with positive cognitive outcomes.

Although habitual mastication is not the same as intensive physical activity, it is likely that at least some of the positive effects of mastication on cognition, which will be discussed in more detail below, can be explained by exercise effects, such as increased cerebral blood flow.

A relationship between masticatory and cognitive performance has been reported for both animals and humans. Experimental animal studies show that impairing masticatory activity through modified occlusion or diet leads to deficits in spatial memory and loss of neurons in several cerebral regions. In human studies, multiple tooth loss and lower self-reported masticatory function is associated with impaired global cognitive functioning in both community dwelling individuals and institutionalized elderly persons.

Lower masticatory function is also related to lower QoL. The concept of QoL describes a person’s well-being, and comprises many variables, including physical health and function (e.g., absence of pain, independence in activities of daily life) mental health and function (e.g., absence of depression, cognitive performance), and having meaningful experiences such as maintenance of dignity and enjoyable mealtimes. All these aspects are interrelated, with presence of pain also playing an important role. Suffering from pain in the head and neck region (e.g., temporomandibular disorders (TMD), is associated with lower QoL. QoL is also
adversely affected by oral health problems such as a dry mouth. Furthermore, better oral health is associated with a lower risk for (amongst others) pneumonia, cardiovascular problems such as endocarditis, and stroke and diabetes. Oral health and available oral health care is often not adequate in the senior population, particularly in nursing home residents.

An intervention aimed at improving oral health care in nursing homes might thus positively influence cognition and QoL in residential elderly. It is possible that, as a result of such an intervention, masticatory function also improves, which in turn could lead to increased masticatory activity. For example, having better masticatory function was positively related to both preservation of cognition and eating a more divers diet (mostly hard and healthy foods, such as beans and other vegetables) in cognitively healthy elderly. As masticatory activity could be considered a form of physical activity, and since exercise interventions are shown to act protective against cognitive decline and dementia, stimulating masticatory activity with a diet intervention, aimed at offering foods of increased consistency, may have additive beneficial effects on cognition and QoL.

Objectives and Hypotheses

The objective of this randomized clinical trial (RCT) was to investigate the effects of increased masticatory activity, achieved by improved oral health care and a diet of increased consistency, on cognition and QoL, in elderly persons with dementia. We hypothesized that increased masticatory activity would have a positive influence on these outcomes.

METHODS

The detailed protocol for this RCT is reported elsewhere; briefly, it encompasses the following:

Participants

Participants were Dutch persons, aged 65 years and older, suffering from dementia and receiving institutionalized psychogeriatric care. Participants were recruited in nursing homes, and approached by the nursing home manager. The entire residential population was contacted at the start of the project, and new residents were invited upon admittance to the nursing home. Figure 7.1 presents a flowchart of the sample.

From the initially included 122 participants, 104 were included in the longitudinal analysis. Participants’ dropout was either due to participant’s relocation or mortality. Missing values for (some parts of) the assessments occurred for a few
Figure 7.1: Flowchart of participants. Seven nursing homes provided 122 participants for the original sample. 104 participants were included in the longitudinal investigation; 28 in the control group and 76 in the intervention group. Each nursing home had agreed to provide an equal number of control and intervention units. One nursing home (NH2) was unable to keep the groups separate, due to interchanging staff, causing all participants in that nursing home to be included in the intervention group. One nursing home (NH3) was unable to recruit participants from the control unit. NH=nursing home; SCU=special care unit; SHA= shared housing arrangement; DC= daycare facility.
participants, sometimes temporarily. This happened for example if the participant was hospitalized. On a few occasions, a proxy requested the participant’s exclusion from parts of the assessment, out of worry for too much arousal or exhaustion. The specific participant numbers included in an analysis are provided for each variable, in the corresponding tables.

Nursing home 1 started first, after which nursing home 2 started, and so on. After a baseline assessment (T₀), a 6-week follow up assessment was conducted (T₁). Another 6 weeks later (i.e., 12 weeks since baseline) a second follow up assessment took place (T₂). Finally, 24 weeks after baseline, a third follow up assessment (T₃) was conducted. Dates defining the periods of recruitment and follow-up vary per nursing home. Baseline data are reported in Table 7.1.

Interventions

There were two intervention routes, aimed at increasing the masticatory activity: (A) improving oral health care, and (B) increasing the diet’s consistency. All nursing homes implemented route A – improving oral health care, and four nursing homes (NH₂, NH₄, NH₅, NH₆) implemented route B – increasing the diet’s consistency on top of route A. For analysis purposes, all routes have been combined into a single ‘experimental’ group. The experimental group was compared to a control group, who were receiving care as usual.

Route A: Improved oral health care was organized by offering clinical lessons to the daily nursing staff, which included a theoretical and a practical part. These lessons provided oral care instructions according to the 2007 Dutch ‘Oral health care Guideline for Older people in Long-term care Institutions’ (OGOLI)⁴⁴,⁴⁵. This guideline defines oral care for dentate, and edentate individuals, as well as for prosthesis wearers. At each assessment, and if needed in between, (intensive) counseling was offered. In two nursing homes (NH₁ and NH₃), the local dental hygienist supervised the daily implementation. Two other nursing homes (NH₂ and NH₃) had a residential dentist (i.e., visiting the nursing home and treating patients once a week) who was involved in the project. Two nursing homes (NH₄ and NH₆) had no professional oral health care workers, but had an active and enthusiastic team of nursing staff with designated persons implementing the intervention.

Route B: Increasing the diet’s consistency, to contain more solid foods, was done depending on the local possibilities. Two nursing homes (NH₁ and NH₃) could not adapt the daily meals. The manager from NH₁ did organize a Christmas dinner for residents and staff, with a special focus on chew-engaging foods. Some institutions were able to do their own shopping and cooking, one on a daily basis (NH₅), another (NH₂) only sporadically (as they were dependent on volunteers to do the actual cooking). The nursing staff from NH₄ and NH₆ were dependent on organized food preparation centers for the hot meals, and could therefore only change the diet’s consistency by requesting it to be ‘not pureed’. They made addi-
### Table 7.1: Participants’ Characteristics at baseline for the Intervention and Control group.

<table>
<thead>
<tr>
<th>Covariates</th>
<th>Variable</th>
<th>Control group (n total=28)</th>
<th>Intervention group (n total=76)</th>
<th>Value test statistic</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>n</td>
<td>Mean±SD/ Median Range/ Ratio</td>
<td>n</td>
<td>Mean±SD/ Median Range/ Ratio</td>
</tr>
<tr>
<td>Demographics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td>28</td>
<td>86.29 ± 5.45 77–97</td>
<td>76</td>
<td>85.04 ± 5.91 67–97</td>
</tr>
<tr>
<td>Gender (m/f)</td>
<td></td>
<td>28</td>
<td>Female 3/25</td>
<td>76</td>
<td>Female 10/66</td>
</tr>
<tr>
<td>Educational level¹</td>
<td></td>
<td>16</td>
<td>2   2–6</td>
<td>52</td>
<td>4   2–7</td>
</tr>
<tr>
<td>Independence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADL</td>
<td></td>
<td>17</td>
<td>16 8–18</td>
<td>49</td>
<td>15 8–18</td>
</tr>
<tr>
<td>Physical Health</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypertension (y/n)</td>
<td></td>
<td>22</td>
<td>No 1/21</td>
<td>57</td>
<td>No 6/51</td>
</tr>
<tr>
<td>Comorbidity score³</td>
<td></td>
<td>28</td>
<td>2 0–5</td>
<td>68</td>
<td>3 0–5</td>
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<tr>
<td>Medication score³</td>
<td></td>
<td>21</td>
<td>4 1–8</td>
<td>34</td>
<td>3.5 0–7</td>
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<tr>
<td>Mood</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression (y/n)</td>
<td></td>
<td>17</td>
<td>Yes 10/7</td>
<td>45</td>
<td>Yes 26/19</td>
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<td>Agitation</td>
<td></td>
<td>18</td>
<td>41.5 29–118</td>
<td>50</td>
<td>44 29–96</td>
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<tr>
<td>Masticatory system</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dentition⁴</td>
<td></td>
<td>21</td>
<td>5 1–10</td>
<td>59</td>
<td>5 1–10</td>
</tr>
<tr>
<td>Mobility⁵‡</td>
<td></td>
<td>13</td>
<td>58.79 ± 19.35 23.5–82.0</td>
<td>31</td>
<td>56.53 ± 15.43 27–90</td>
</tr>
<tr>
<td>Pain at excursion⁶</td>
<td></td>
<td>11</td>
<td>0 0–3</td>
<td>34</td>
<td>0 0–4</td>
</tr>
<tr>
<td>Outcome variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Global cognition</td>
<td></td>
<td>24</td>
<td>10 0–24</td>
<td>61</td>
<td>9 0–24</td>
</tr>
<tr>
<td>QoL</td>
<td></td>
<td>18</td>
<td>14.5 8–21</td>
<td>49</td>
<td>13 7–21</td>
</tr>
<tr>
<td>Care relationship</td>
<td></td>
<td>18</td>
<td>13 9–18</td>
<td>49</td>
<td>14 4–18</td>
</tr>
<tr>
<td>Positive affect</td>
<td></td>
<td>18</td>
<td>4.5 0–9</td>
<td>50</td>
<td>5 0–9</td>
</tr>
<tr>
<td>Restless tense</td>
<td></td>
<td>18</td>
<td>6 3–9</td>
<td>49</td>
<td>7 1–9</td>
</tr>
<tr>
<td>Social Isolation</td>
<td></td>
<td>18</td>
<td>0.25 ± 0.04 0.20–0.32</td>
<td>32</td>
<td>0.27 ± 0.04 0.17–0.32</td>
</tr>
</tbody>
</table>

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*a* quantitative value with normal distribution; mean ± sd and t-test reported; *b* = Mann-Whitney U test; *c* = Dichotomous variable with expected cell frequencies < 5; Fisher’s exact test, two sided significance reported; *d* = Dichotomous variable; chi square test; 10 = both dental arches natural dentition; 9 = one arch dentate, other arch partial prosthesis; 8 = one arch dentate, other arch full prosthesis; 7 = both arches partial prosthesis; 6 = one partial and one full prosthesis; 5 = two full prostheses; 4 = one arch edentate, other dentate; 3 = one arch edentate and other a partial prosthesis; 2 = one arch edentate, other full prosthesis; 1 = completely edentate; *e* = Mobility: summed score in millimeters for maximal voluntary mouth opening, moving the jaw forwards (+protrusion) and sideways (+laterotrusion to the left and right), corrected for overjet and overbite; *f* = Scores are 0=no pain; 1=mild pain; 2=moderate pain; 3=severe pain. SD= standard deviation; m/f=male female; y/n=yes/no; ADL= independence in Activities of Daily Living (a higher score indicates more dependence); QoL= Quality of Life (a higher score indicates a better quality of life); MMSE= Mini Mental State Examination; na=not applicable; *p* ≤ 0.05.
tional changes to the diet’s consistency by supplementing lunch with hard fruits such as apples. The changes in diet were listed in a notebook.

The oral health care intervention was implemented according to the aforementioned guideline, in an effort to standardize the procedures. The diet intervention was heterogeneous, without means of standardizing, as described.

Adherence to the intervention was formally and informally checked. A dental hygienist performed plaque checks at baseline and on several follow-up occasions, in NH1, NH2, and NH5. Each nursing home had a dated tick-off list mounted to the wall of every bathroom, to track whether oral care was provided (marked with an ‘X’) or not (marked with an ‘o’). The supervising researcher made surprise visits to the nursing homes to interview the members of the daily nursing staff, and performed visual inspection of bathrooms for the presence of toothbrush and toothpaste, or soap. As part of the clinical lessons, nursing staff was informed that a denture should not be cleaned with toothpaste, but with a common household soap. This is a product that is not typically found in a bathroom, and its presence on the sink, next to the toothbrush, was taken as an indicator of adherence. Attendance to clinical lessons was also noted.

Outcomes

A geriatric assessment should include, amongst others, measures for functional capacity such as cognition, and nonmedical outcomes such as QoL. Therefore, the current set of outcome variables set is multidimensional. The Mini Mental State Examination (MMSE), which assesses memory, orientation in time and place, episodic memory, naming, and visuo-constructive capacities was used to measure global cognition. QoL was assessed with the Qualidem questionnaire, which is recommended for persons residing in a special care unit (SCU) nursing home and is also appropriate for assessing QoL in persons residing in shared housing arrangements (SHA). Only the four subscales that are appropriate for a severe dementia group were used: care relationship, positive affect, restless tense behavior, and social isolation. Finally, a mixing ability test was used to measure masticatory performance, as it was expected that increased masticatory activity would also improve masticatory performance. The mixing ability test uses a fully automated computer algorithm. Blinded, trained external examiners conducted all the assessments. The examiners were calibrated, both periodically and at random.

Sample size

In the protocol for this RCT, the sample size was calculated with a power analysis based on the outcome variable QoL. The estimated sample size was \( n = 224 \); the current sample comprises 104 participants (see also Figure 7.1). However, it was decided that the trial should be discontinued, after which an unplanned (ad hoc)
closing (*terminalis*) analysis would be appropriate. This decision was made because of serious concerns with regard to adherence to the intervention.

**Design**

The trial was designed as a prospective longitudinal matched cluster randomized single-blind multicenter study. Nursing homes enrolled at least two similar care units (*matched clusters*); typically a unit was an entire geriatric ward. One unit would be the control group, and the other unit the intervention group. Ideally, the allocation of clusters to either the control group or the intervention group would be done at random (*cluster randomized*). However, in the majority of the cases, the nursing home manager was forced to assign a priori a care unit to either the control condition or the experimental condition. This was for example due to rapid staff turnover in one unit, or the presence of team members who were enthusiastic to be part of the project. There was no allocation concealment since the study was single blind. As the primary goal of the intervention was changing the daily care, it was impossible to keep the nursing staff blind. They had to either provide care as usual, or attend clinical lessons and change their daily routine. Equally, participants might have been aware of increased oral care, or different foods being added to their daily routine. A placebo condition was not possible, as it was not clear whether this should be for example, a pleasant condition (social interaction) or a mild stressful interaction (perhaps mild grooming such as cutting nails, or brushing hair), and, in the latter case, whether this would be ethically acceptable. Therefore, ‘care as usual’ was taken as the control condition.

**Statistical methods**

Normality was investigated with the Kolmogorov-Smirnov test. Baseline comparisons were made between the control and intervention group, using independent t-tests if the data were quantitative and normally distributed. If this was not the case, nonparametric tests were used, *viz.*, Mann-Whitney U tests, and for dichotomous variables Chi square tests, unless the expected cell frequencies were <5, in which case Fisher’s exact test was used. Differences found between the groups at baseline were included as covariates in the subsequent analyses. An intention-to-treat analysis was done, meaning that data from all nursing homes that had agreed to implement the intervention were included, whether or not the implementation was successfully done. Missing values occurred due to the nature of dementia and the type of assessment (requiring a participant’s active participation).

In the study design, a mixed linear model analysis (also known as multilevel linear model) which is able to analyze unbalanced datasets, with (large amounts of) missing data \(^{53,54}\) was planned. The initial step in analyzing such a dataset for longitudinal assessments is a repeated measures ANOVA \(^{55}\). Therefore, a mixed-design
Table 7.2: Results for the Mixed Analysis of Variance.

<table>
<thead>
<tr>
<th>Outcome variable</th>
<th>Effect of time</th>
<th>Effect of group</th>
<th>Interaction effect</th>
<th>Partial $\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$nC$</td>
<td>$nI$</td>
<td>$F$</td>
<td>$p$</td>
</tr>
<tr>
<td>Global Cognition</td>
<td>17</td>
<td>39</td>
<td>3.693</td>
<td>0.019*</td>
</tr>
<tr>
<td>QoL-Care Relationship</td>
<td>13</td>
<td>13</td>
<td>0.995</td>
<td>0.400</td>
</tr>
<tr>
<td>QoL-Positive Affect</td>
<td>13</td>
<td>12</td>
<td>3.790</td>
<td>0.014*</td>
</tr>
<tr>
<td>QoL-Restless Tense</td>
<td>13</td>
<td>13</td>
<td>0.588</td>
<td>0.625</td>
</tr>
<tr>
<td>QoL-Social Isolation</td>
<td>13</td>
<td>13</td>
<td>3.288</td>
<td>0.025*</td>
</tr>
<tr>
<td>Masticatory performance$^a$</td>
<td>8</td>
<td>17</td>
<td>0.446</td>
<td>0.721</td>
</tr>
</tbody>
</table>

$^a$ quantitative value with normal distribution; mean ± standard deviation and t-test reported; $nC$ = n control group; $nI$ = n intervention group; $Df$ (i;e) = Degrees of freedom (interaction, error); *$p \leq 0.05$.

ANOVA (2*4) was used for the current analysis. Time and group were the independent variables, time (4 levels) was the within-subjects factor and group (2 levels, intervention vs. control) was the between-subjects factor. It was checked whether the assumptions for ANOVA were met. In case of a significant interaction of time and intervention, the differences between the groups were further investigated for each time-point, with univariate (one way) ANOVA. In case of a significant main effect, this was further investigated with post-hoc pairwise comparisons.

The partial $\eta^2$ was used as a measure of estimated effect size; partial $\eta^2 = 0.01$: small effect; partial $\eta^2 = 0.06$: moderate effect; partial $\eta^2 = 0.14$: large effect.

RESULTS

Participants

The characteristics of the participants are shown in Table 7.1. Both demographic and clinical characteristics are provided. The groups were not different at baseline assessment. For each variable, the number of participants for which the data were available is presented.
Outcomes

The main effects for time, intervention, and the interaction effects from the mixed ANOVA are presented in Table 7.2.

For the QoL subscale ‘restless tense behavior’, a statistically significant interaction between the intervention and time was found ($F(3, 72) = 3.203, p = 0.028$, partial $\eta^2 = 0.118$). Further analysis of the between-group differences showed that the intervention group had significantly lower scores than the control group at 12 weeks and 24 weeks after baseline ($F(1, 24) = 4.744, p = 0.039$, partial $\eta^2 = 0.165$, and $F(1, 24) = 4.240, p = 0.050$, partial $\eta^2 = 0.150$, respectively).

For three outcomes variables, a main effect of time (i.e., independent of group) was found. There was a negative main effect of time on global cognition ($F(2.54, 137.26) = 3.693, p = 0.019$, partial $\eta^2 = 0.064$). The post-hoc pairwise comparisons showed that this was due to a significant ($p = 0.032$) decline in MMSE score between the 6-week and 24-week assessments.

There was a negative main effect of time on the QoL subscale ‘positive affect’ ($F(3, 69) = 3.790, p = 0.014$, partial $\eta^2 = 0.141$). The post-hoc pairwise comparisons showed that this was due to a significant ($p = 0.048$) decline in score between the baseline assessment and the 24-week follow up assessment.

There was a positive main effect of time on the QoL subscale ‘social isolation’ ($F(3, 72) = 3.288, p = 0.025$, partial $\eta^2 = 0.120$). The post-hoc pairwise comparisons showed no significant contrasts, due to the Bonferroni adjustment for multiple comparisons. However, the main effect was most likely the result from a difference between scores from the 6-week and 24-week assessment, as this is the contrast closest to significance ($p = 0.089$). The scores for the outcome variables and the main and interaction effects are shown in Figure 7.2 (A-F).

DISCUSSION

The current investigation was an ad hoc terminalis analysis; i.e., both the trial’s discontinuation as well as the subsequent analysis were deviations from the original study protocol. The main reason to perform an early analysis with participant recruitment at its halfway mark, was the fact that serious concerns with regards to implementation success of the intervention arose during the site visits. After preliminary inspection of the adherence checks (i.e., the attendance to the clinical lessons, the tick-off lists, and the plaque scores), it was felt that the trial should be discontinued, after which an final analysis would be performed on the outcome variables. There were several indicators that suggested that adherence to the planned intervention was suboptimal.

First of all, attendance to clinical lessons was low, temporary workforce staff was
Figure 7.2: A-F: Outcomes and main/interaction effects. Bar graphs of the median scores (for F; mean) of the outcome variables for both groups, plotted against assessment moment (0, 6, 12, and 24 weeks). Error bars indicate 25–75 percentiles (for F; standard deviations). In case of an interaction effect, the significant between-group differences are indicated with diamond-ended lines (D). Significant main effects of time are indicated with arrows. Dotted arrows indicate an insignificant post-hoc pairwise comparison from a significant main effect. Note: a lower score for masticatory performance indicates better performance.
never enrolled, and managers rarely attended. This was most unfortunate because management support and active leadership is related to intervention success. 

Secondly, although spontaneous and unstructured, the interviews with the daily nursing staff consistently revealed recurring difficulties. Often mentioned was a lack of time, to offer oral health care, to adapt the diet, or to assist to eat foods with a harder consistency. A lack of money, to buy toothbrushes, toothpaste or harder foods was also reported regularly.

Third, the plaque checks that were performed by the dental hygienist at some of the locations indicated that there was no improvement at any time, and the tick-off lists, if filled out, also indicated low levels of oral care (data not shown). Other aspects that were cause of concern were: major changes in staff (nursing staff, dentists, dieticians, and management); the crossover of nursing staff in a particular nursing home, contaminating the control group, and a sometimes indifferent or perhaps reluctant attitude of nursing staff towards oral health care and mastication. A final decision was made to discontinue the study, based on the findings of these adherence checks. Comparable outcomes from oral health care interventions emerging in literature supported this decision further.

Subsequent data analysis showed one (moderate) interaction effect; a negative effect of the intervention on the QoL ‘restless tense behavior’ subscale. This result could indicate that being submitted to oral health care, when done irregularly by inexperienced or reluctant staff, is unsettling. There was a negative main effect of time on ‘global cognition’, which is fitting with the clinical presentation of dementia. There was also a negative main effect of time on ‘positive affect’; the participants where less often happy, content, or cheerful. Mood disturbances such as depression are also often part of the disorder, thus, these results are not surprising. The positive main effect of time on ‘social isolation’ indicates that social interaction with others was less often rejected, and participants called out fewer times. The most influential contrast, albeit nonsignificant, was between the 6-weeks and 24-weeks assessment. It might be possible that when the intervention started, participants initially became resistant and uncooperative, and later on, they either grew accustomed to the new routine, or perhaps, as the intervention was not successfully implemented, their initial resistance subsided and their behavior returned to baseline levels.

The implementation of the OGOLI guideline has also been longitudinally studied in an intensively supervised and counseled program in The Netherlands and Belgium. Results were disappointing; the plaque levels remained high in both intervention and control group. In another study, it was found that even though training nursing staff improved denture hygiene, oral health remained poor in almost half of the residents. Although nurses’ attitudes towards oral health care may improve following training, this is not enough to produce a clinically significant effect. A key aspect of the OGOLI guideline is the use of a designated nurse who is specifically trained in and dedicated to oral health care. In the current
study, however, no such local coordinator was made available for any of the nursing homes, despite efforts made by the research team. This could explain the lack of implementation success, because the presence of a local oral care professional can improve nurses’ attitude towards oral care. In fact, the introduction of a designated oral health coordinator had a positive effect on the oral health of institutionalized elderly, with intervention success being more influenced by charisma and engagement of the coordinator, than by clinical lessons. Designating daily oral care providers and supplying them with practical and educational tools can be effective in improving oral health in residents suffering from dementia. In one of these studies, oral care training was supplemented by counseling on managing adverse behaviors, a strategy that others found to be effective as well. Clearly, this is a promising addition; studies confirm that resistant and uncooperative behavior play a major role in the oral health of dependent residents. Based on these clinical and literature findings, it is recommended to commit dedicated oral health nurses to providing the daily oral care. These oral health nurses, the name ‘Denticure’ might be appropriate and may help in establishing its unique position, should receive specialized training in both offering oral health care to elderly persons with dementia, and perhaps more importantly, in dealing successfully with resistant behaviors. If a nursing home decides to employ a Denticure, this person can become a recognizable part of the daily routine, and facilitate communication between nursing staff and dental professionals. Since the Denticure is expected to fully focus on performing oral care, (s)he can be held accountable for this task. Trying to assimilate oral health care into the daily nursing staff’s tasks, ‘since it only takes two minutes’, means failing to appreciate both the importance and challenges of oral health care. The coming cohorts of nursing home residents are likely to offer new oral care challenges, such as oral implant supported dentures, further stressing the need for a specialized, daily oral health care professional, such as the Denticure.
REFERENCES


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