

**Q3 Evidence Profile**

**Recommendation Question 3:** What specific strategies or techniques should be recommended for the provision of oral care to improve outcomes for persons?

**Population:** Adults 18 years of age and older

**Intervention:** Care strategies or techniques for oral care (i.e., skills)

**Comparison:** No care strategies or techniques (i.e., skills) for oral care or usual care

**Outcomes:** Frequency of oral care; Person's oral health status

**Setting:** Health service organizations and academic settings

**Bibliography:** 218, 439, 734, 831, 1281, 1322, 1389, 1536

Quality assessment							Study details		No. of participants		Summary of Findings	Certainty	References
No of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Country	Strategies or techniques for oral care	Strategies or techniques for oral care	Standard Care	Reported effects/ Outcomes		
<b>Frequency of oral care</b> (assessed with: Frequency of Daily Oral Hygiene Behaviors ) (Follow up: 6 and 12 months post-baseline)													
1	Quasi-Experimental	Serious <sup>a</sup>	Not serious	Serious <sup>b</sup>	Serious <sup>c</sup>	none	United States of America	Eight individuals with tetraplegia participated in a home telecare program for oral care over three months. An occupational therapist reviewed and enforced oral hygiene instructions with persons with tetraplegia in these sessions, including demonstration, return demonstration, repeated corrective feedback, and positive reinforcement.	N=8 (baseline) N=8 (6-mth dental asst) N=7 (12-mth dental asst)  <b>Brushing:</b> <u>2 times / day:</u> Baseline n= 4 6 months n=7 12 months n=6  <u>1 time/day:</u> Baseline n=3 6 months n= 1 12 months n=1	N=No comparator	For every 1000 people who participated in an oral home telecare program, 36 more people practiced twice daily brushing at 12-month follow-up (ranges from 2 fewer people to 74 more people based on 95% confidence intervals), and 23 less people practiced once daily brushing at 12-month follow-up (ranges from 100 less people to 54 more people based on 95% confidence intervals).	⊕○○○ Very Low	1281: Yuen (2013)
<b>Oral health status</b> (assessed with: Mucosal-Plaque Score, Loe-Silness Gingival Index, Geriatric Simplified Debris Index, Plaque Index Scores, Gingival Index Scores, R-THROAT, Denture Hygiene Index (DHI), Gingival Bleeding Index (GBI), Plaque Control Record (PCR), Calculus													

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Index, Augsburger and Elahi to assess denture plaque) (Follow up: 5 days to 12 months)													
7	Randomized Controlled Trials	Serious <sup>d</sup>	Not serious <sup>e</sup>	Serious <sup>f</sup>	Serious <sup>g</sup>	none	<p><u>218</u>: China</p> <p><u>439</u>: Taiwan</p> <p><u>831</u>: USA</p> <p><u>1322</u>: Netherlands</p> <p><u>1389</u>: Germany</p> <p><u>1536</u>: India</p> <p><u>1789</u>: Canada</p>	<p><u>218</u>: Watched video, performed brushing technique under guidance from dental hygienist (close examination and necessary corrections) until hygienist satisfied with performance. Repeated at end of 1st and second month, after oral health measurements made</p> <p><u>439</u>: Education was provided to informal caregivers, including: overview of oral care; educational pamphlet and didactic teaching of oral care procedures, risks and products; planning and assessment of the oral care of</p>	<p><u>218</u>: N= 46</p> <p><b>Plaque Index Scores</b></p> <p>Baseline: 2.51 (0.05)</p> <p>2<sup>nd</sup> month: 1.92 (0.04)</p> <p>3<sup>rd</sup> month: 1.82 (0.04)</p> <p><b>Gingival Index Scores</b></p> <p>Baseline: 1.98 (0.04)</p> <p>2<sup>nd</sup> month: 1.45 (0.04)</p> <p>3<sup>rd</sup> month: 1.36 (0.04)</p> <p><u>439</u>: N=48</p> <p><b>Dental Plaque (Mean (SD))</b></p> <p>Baseline: 12.5 (5.7)</p> <p>One month: 6.2 (4.1)</p> <p>2 month: 2.4 (2.7)</p> <p><u>831</u>: N= 21</p> <p><b>R-THROAT (Mean, SD)</b></p> <p>Baseline: 10.8 (2.6)</p> <p>Day 5: 10.3</p> <p>Day 10: 10.1</p>	<p><u>218</u>: 43</p> <p><b>Plaque Index Scores:</b></p> <p>Baseline: 2.47 (0.05)</p> <p>2<sup>nd</sup> month: 2.43 (0.04)</p> <p>3<sup>rd</sup> month: 2.32 (0.04)</p> <p><b>Gingival Index Scores</b></p> <p>Baseline: 1.89 (0.05)</p> <p>2<sup>nd</sup> month: 1.91 (0.05)</p> <p>3<sup>rd</sup> month: 1.81 (0.04)</p> <p><u>439</u>: N=46</p> <p><b>Dental Plaque Mean (SD))</b></p> <p>Baseline: 12.6 (4.9)</p> <p>One month: 10.5 (4.0)</p> <p>2 month: 10.7 (3.7)</p> <p><u>831</u>: N= 21</p> <p><b>R-THROAT (X, SD)</b></p> <p>Baseline: 12.3 (2.1)</p> <p>Day 5: 10.5</p> <p>Day 10: 10.9</p>	<p>Overall, studies suggest that educating and training caregivers and health providers about oral health and oral hygiene practices appears to improve the oral hygiene status of persons who require assistance with their care</p> <p>Specifically, interventions that were: multi-faceted, allowed caregivers to practice oral hygiene techniques while supervised, and were reinforced at regular intervals led to optimal oral hygiene for patients.</p> <p>Study 218 showed a statistically significant improvement in plaque and gingival index scores in the intervention group who received comprehensive oral care instruction at both 2 mth and 3 mth follow-up.</p> <p>Study 439 showed that when compared to baseline, dental plaque scores improved at both one and two-months (<math>p &lt; 0.01</math>). Compared to the control group, there was a significant decrease in dental plaque scores in the experimental group (<math>p &lt; 0.01</math>).</p> <p>Study 831 demonstrated a slight improvement in oral health status at both Day 5 and Day 10 of the intervention. However, revised THROAT scores were not affected by group assignment over time (<math>p = 0.08</math>).</p>	⊕⊕○○ Low	<p><u>218</u>: Yu, Fu, Shi, Tao, Pang, Chen &amp; Liu (2016)</p> <p><u>439</u>: Kuo, Fetzer, Lee &amp; Chiang (2015)</p> <p><u>831</u>: Chippis et al. (2014)</p> <p><u>1322</u>: van der Putten, Mulder, de Baat, Visschere, Vanobbergen &amp; Schols (2013)</p> <p><u>1389</u>: Schwinding, Krisam, Hassel, Rammelsberg &amp; Zenthofer (2017)</p> <p><u>1536</u>: Khanagar, Naganandini, Tuteja, Naik, Satish &amp; Divya (2015)</p>

Quality assessment							Study details		No. of participants		Summary of Findings	Certainty	References
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								<p>stroke survivors; face to face training in techniques, including demonstration and return demonstration.</p> <p><b>831:</b> Registered nurses (RN) received education, training, and demonstrations from dental faculty and were given opportunity for return demonstrations. Training included: timed tooth brushing, tongue brushing, flossing, mouth rinse, and lip care. Staff were asked to provide this care twice per day.</p> <p><b>1322:</b> Train the trainer model used to implement practice guidelines for oral care (Guideline for</p>	<p><b>1322:</b> N=177 <b>Silness and Loe (Dental Plaque);</b> N=29 <i>Baseline:</i> 2.36 (0.47) <i>6 months:</i> 1.58 (0.81) (-0.43 95% CI: -0.09, -0.77)</p> <p><b>Augsburger and Elahi (Denture Plaque);</b> N=102 <i>Baseline:</i> 2.82(0.74) <i>6 months:</i> 2.27(0.85) (-0.38 95% CI: -0.13, -0.66)</p> <p><b>1389:</b> <b>Plaque Control Record (Group difference (mean (SD)))</b> <i>Baseline to 6-months (N=140):</i> -14.9 (26.3) <i>Baseline to 12-mths (N=99):</i> -15.5 (27.8) [-16.2 (95% CI:-27.7; -4.7]</p>	<p><b>1322:</b> N=165 <b>Silness and Loe (Dental Plaque);</b> N=39 <i>Baseline:</i> 2.03 (0.63) <i>6 months:</i> 1.78 (0.42)</p> <p><b>Augsburger and Elahi (Denture Plaque);</b> N=90 <i>Baseline:</i> 2.87(0.95) <i>6 months:</i> 2.70 (1.02)</p> <p><b>1389:</b> <b>Plaque Control Record (Group difference (mean (SD)))</b> <i>Baseline 6-months (N=140):</i> -0.5 (19.0) <i>Baseline to 12-months (N=99):</i> 3.5 (18.5)</p> <p><b>Denture Hygiene Index</b></p>	<p>Study 1322 measured dental and denture plaque scores in residents. Between baseline and 6-mth follow-up, there was a significant improvement in dental plaque scores (<math>p = 0.13</math>) and denture plaque scores (<math>p = 0.004</math>) in the intervention group, compared to the control group.</p> <p>Study 1389 measured plaque control record scores, denture hygiene index scores and gingival bleeding scores. The intervention group demonstrated statistically significant improvements in comparison to the control group between baseline and 12 months for plaque control scores (<math>p=0.006</math>) and denture hygiene index (<math>p=0.024</math>). There was no significant improvement in gingival bleeding scores at 12 mths..</p> <p>Study 1536 measured dental and denture plaque index scores. There were statistically significant improvements in the dental and denture plaque scores in the intervention group when compared to the control group at 6 mth follow-up (<math>p&lt;0.001</math> and <math>p&lt;.001</math>, respectively).</p>		

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								Older people in Long-term care Institutions (OGOLI). Nurses and nurse assistants received education (via lecture and practice sessions) from trained unit leadership (i.e. supervisors, ward heads, managing director).  <u>1389:</u> Education was provided to professional caregivers related to oral health and the prevention of oral disease, common oral problems, brushing techniques and tools. The education was provided using PowerPoint and video. Practical training was also provided to practice handling of removable prostheses and	<b>Denture Hygiene Index (mean (SD))</b>  <i>Baseline to 6-months (N=165): -26.0 (28.3)</i> <i>Baseline to 12-months (N=114): -27.4 (29.3)</i> [-13.3 (95% CI: -24.9; -1.8)]  <b>Gingival Bleeding Index (mean (SD))</b>  <i>Baseline to 6-months (N=140): -6.8 (34.8)</i> <i>Baseline to 12-months (N=94): -11.7 (33.9)</i> [-6.9 (95%CI: -21.7; 7.9)]  <u>1536:</u>  <b>Dental Plaque Index</b> <i>Baseline (N = 97): 3.17 (0.40)</i> <i>6 months: 1.57 (0.35)</i>  <b>Denture Plaque (mean (SD))</b> <i>Baseline (N=65): 3.15 (0.47)</i> <i>6 months:1.21 (0.27)</i>	(mean (SD))  <i>Baseline to 6-months (165): -6.0 (18.7)</i> <i>Baseline to 12-months (N=114): -8.3 (24.7)</i>  <b>Gingival Bleeding Index (mean (SD))</b>  <i>Baseline to 6-months (N=140): -4.0 (31.4)</i> <i>Baseline to 12-months (N=94): -4.0 (36.1)</i>  <u>1536:</u>  <b>Dental Plaque Index</b> <i>Baseline (N=100): 3.03 (0.36)</i> <i>6 months: 3.01 (0.30)</i>  <b>Denture Plaque (mean (SD))</b> <i>Baseline (N=60): 2.85(0.54)</i> <i>6 months: 2.83</i>			

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								brushing techniques for both teeth and dentures. Moreover, dental care was provided to volunteer residents under the supervision of the dentist.  <u>1536:</u> Education was provided to informal caregivers using PowerPoint, a health education CD and manual. Education was reinforced at 3 months.		(0.43)			
2	Quasi-Experimental	Serious <sup>h</sup>	Serious <sup>i</sup>	Serious <sup>j</sup>	Serious <sup>k</sup>	none	<u>734:</u> Brazil  <u>1281:</u> United States of America	<u>734:</u> Health providers received a theoretical and practical lecture on oral and body hygiene from dental students and a professor. Video was also shown covering how to perform oral hygiene on dependent persons.	<u>734:</u> N=80 <b>Mucosal Plaque Score</b> [2-4 (acceptable), 5-6 (unacceptable), 7-8 (poor)]  <i>Baseline</i> MPS 2-4 (N=26, 47.3%) VS. <i>Baseline</i> MPS 5-8 (N=29, 52.7%)  <i>12 mth</i> MPS 2-4 (N=42, 76.4%) VS. <i>12 mth</i> MPS	<u>734:</u> No comparator  <u>1281:</u> No comparator	Two studies assessed oral health status after participating in oral health education.  For every 1000 health providers who received theoretical and skills training from a dental student and professor, 29 fewer nursing home residents would have poor MPS score (ranges from 53 fewer to 5 fewer based on confidence intervals).  Overall, statistically significant improvements in the oral hygiene status of patients who are physically	⊕○○○ Very Low	<u>734:</u> Portella, Rocha, Haddad, Fortes, Hugo, Padilha & Samuel (2015)  <u>1281:</u> Yuen (2013)

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								<p>Practical sessions included training on oral hygiene using toothbrushes and denture brushes. Group discussion also took place after lecture. Posters were developed to illustrate oral hygiene practices for caregivers.</p> <p><u>1281:</u> Eight individuals with tetraplegia participated in a telecare home program for oral care over three months. An occupational therapist reviewed and enforced oral hygiene instructions with participants in these sessions, including demonstration, return demonstration, repeated corrective feedback, and positive</p>	<p>5-8 (N=13, 23.6%)</p> <p>OVERALL: <i>Baseline</i> (N=55): 4.2 (1.5)</p> <p><i>12 mths:</i> 3.6 (1.4)</p> <p><u>1281:</u> N=8</p> <p><b>Loe-Silness gingival index (LSGI) (Mean (SD))</b></p> <p><i>Baseline</i> (n=8): 1.25 (0.47)</p> <p><i>6 months</i> (n=8): 1.03 (0.52)</p> <p><i>12 months</i> (n=7): 1.2 (0.47)</p>		<p>impaired were found after educational and training interventions with patients (1281). Specifically, gingival inflammation decreased from baseline at both 6- (<math>p=0.03</math>) and 12-months (<math>p=0.04</math>) in a group of patients with tetraplegia after education and training via a home telecare program (1281).</p>		

CI: Confidence interval

#### Explanations

- a. There were no control of the confounding variables (e.g., baseline characteristics, mobility, attitude toward oral hygiene) with either a statistical method or randomization. There were moderate concerns with deviations from intended interventions because it was not possible to ascertain participant adherence to oral hygiene regime, and only one participant was left at the 12-month follow-up assessment. Downgraded by 1 for risk of bias.
- b. Although the population and intervention was relevant to the PICO question, a surrogate outcome was required because there was no study identified that included frequency of oral care received from caregivers as an outcome of interest. Moreover, the study was conducted in the United States of America, which may not be generalizable to a Canadian context. Downgrade by 1.
- c. There were only 8 participants at baseline and 6-month follow-up, and 7 participants at the 12-month follow-up, which is considerably less than the optimal 300 events. Moreover, the confidence intervals were not calculated. Downgraded by 1 for imprecision.
- d. Two studies were assessed to have a high risk of bias overall, and five studies were assessed to have some concerns overall. After calculating the weighted averages of each study based on sample size, it was determined that the five studies assessed to have some concerns were more heavily weighted than those deemed to have a high risk of bias; thus, the body of evidence was downgraded by 1.
- e. Although the seven randomized controlled trials had different objectives, interventions, and outcomes assessed (i.e., heterogeneity was present), the results suggest improvements in oral hygiene status after an educational intervention was implemented.
- f. Participants, interventions, and outcomes across the seven studies provide direct evidence to the clinical question of interest. However, the types of educational interventions, the patient populations with limited physical ability, and the outcomes assessed differ across studies. Downgraded by 0.5 for heterogeneity.
- g. Although the total number of participants was large (976), and most of the studies provided confidence intervals or estimates of effects, heterogeneity across studies precluded the ability to accurately compare the effectiveness of educational interventions on the outcomes of interest. Downgraded by 0.5.
- h. There was no control of the confounding variables in either 734 or 1281. Although there were moderate concerns regarding deviations from intended interventions in 1281, there were serious concerns for 734 because only 69% of the baseline sample was assessed at follow-up and an appropriate statistical analysis was not used to compensate. Downgraded by 1 for risk of bias.
- i. Although 734 and 1281 both assessed the effect of an intervention on the oral hygiene status of dependent patients, there was heterogeneity in terms of the interventions and patient populations. 1281 used a home telecare program to educate 8 individuals with tetraplegia, and assessed oral hygiene status with Loe-Silness Gingival Index. Alternatively, 734 provided caregivers in a long term care facility with education and guidelines for oral hygiene which they were to adopt with dependent elderly. Mucosal-plaque scores were used to evaluate the oral hygiene status in 734. Despite differences in population and intervention, both studies demonstrated a positive effect of the intervention on oral hygiene status. Downgraded by 0.5 due to heterogeneity.
- j. Participants (patients with tetraplegia and dependent elderly), interventions, and outcomes in 734 and 1281 provided direct evidence to the clinical question of interest. However, the type of intervention and patient population differed across studies. Additionally, each study used a different measurement for the outcome of oral hygiene status. Downgraded by 0.5 for heterogeneity.
- k. There were only 63 individuals that were included in the analyses in 734 and 1281, which is considerably less than the optimal 400 participants. Moreover, we were unable to calculate the 95% CI for 734 as only percentages were provided. Downgraded by 1 for imprecision.

\*\*As per weighted averages – serious studies weigh heavier than critical ones