

## Distribution Statement

Distribution A: Public Release.

The views presented here are those of the author and are not to be construed as official or reflecting the views of the Uniformed Services University of the Health Sciences, the Department of Defense or the U.S. Government.



# UNIFORMED SERVICES UNIVERSITY OF THE HEALTH SCIENCES

POSTGRADUATE DENTAL COLLEGE  
NAVAL POSTGRADUATE DENTAL SCHOOL  
8955 WOOD ROAD  
BETHESDA, MARYLAND 20889



## THESIS APPROVAL PAGE FOR MASTER OF SCIENCE IN ORAL BIOLOGY

Title of Thesis: Video effect on oral hygiene and dental IQ in active duty members

Name of Candidate: Ilona Z. Nockles  
Master of Science Degree  
April 14, 2023

THESIS/MANUSCRIPT APPROVED:

DATE:

**KIM.JEFFREY.J.** Digitally signed by  
1553853377 KIM.JEFFREY.J.1553853377  
Date: 2023.06.05 15:42:59 -04'00'

6/5/23

Jeffrey J. Kim  
RESEARCH DEPARTMENT  
NAVAL POSTGRADUATE DENTAL SCHOOL  
Committee Chairperson

**AVILLO.ANDREW.J.** Digitally signed by  
AMES.1039513079 AVILLO.ANDREW.JAMES.10395  
13079  
Date: 2023.06.22 07:58:10 -04'00'

6/22/23

Andrew J. Avillo  
PRIMARY CARE DENTISTRY DEPARTMENT  
WALTER REED NATIONAL MILITARY MEDICAL CENTER  
Committee Member

**HUBER.JAYSON.HA** Digitally signed by  
MBLIN.1273289867 HUBER.JAYSON.HAMBLIN.1273  
289867  
Date: 2023.06.21 17:20:53 -04'00'

6/21/23

Jayson H. Huber  
COMPREHENSIVE DENTISTRY DEPARTMENT  
NAVAL POSTGRADUATE DENTAL SCHOOL  
Committee Member

VIDEO EFFECT ON ORAL HYGIENE AND DENTAL IQ IN ACTIVE DUTY  
MEMBERS

by

Ilona Zbirun Nockles  
Lieutenant, Dental Corps  
United States Navy

A thesis submitted to the Faculty of the  
Comprehensive Dentistry Graduate Program  
Naval Postgraduate Dental School  
Uniformed Services University of the Health Sciences  
In partial fulfillment of the requirements for the degree of  
Master of Science  
in Oral Biology  
June 2023

**THESIS APPROVAL PAGE**  
**INTENTIONALLY LEFT BLANK**

## **DISCLAIMER**

The views presented here are those of the author and are not to be construed as official or reflecting the views of the Uniformed Services University of the Health Sciences, the Department of Defense or the U.S. Government.

## ABSTRACT

Video Effect on Oral Hygiene and Dental IQ in Active Duty Members

Ilona Zbirun Nockles, DDS, M.A., 2023

Thesis directed by: Jeffery J. Kim, DDS, PhD  
Department Chair  
Research Department  
Naval Postgraduate Dental School

**Introduction:** To prevent dental caries and emergencies, armed forces service members on active duty undergo a mandated annual periodic oral evaluation, which often includes oral hygiene instruction (OHI). Despite this annual opportunity to provide OHI, there is no armed forces standardized OHI and no accompanying motivational messaging to encourage behavioral change. **Objective:** To assess the effect of a standardized OHI and motivational messaging on dental knowledge and self-reported hygiene behavior modification. **Methods:** Active-duty service members were recruited, enrolled, and consented from the Primary Care Dentistry Clinic at the Walter Reed National Military Medical Center prior to their annual dental examination. A total of 90 subjects were enrolled, completed a baseline test of dental knowledge and assessment of motivation prior to receiving a study intervention, and randomized into three groups. Group 1 participants received a standardized OHI in written format. Group 2 received written OHI and an animated video with motivational messaging. Group 3 received written OHI, the animated video, and a dental factoid via text for fourteen days. Subjects repeated the baseline test and assessment two weeks post initial visit. **Results:** A total of 42 (46.7%) participants

completed their follow-up assessments. Groups 1 demonstrated significant median improvement in dental knowledge scores of 1.5 ( $p < 0.05$ ), compared to 0.0 and 1.0 for Groups 2 ( $p = 0.78$ ) and 3 ( $p = 0.52$ ), respectively. Although not significantly different from baseline, on average, Groups 1 and 3 saw self-reported oral behavior improvements of 3.0 ( $p = 0.29$ ) and 2.8 ( $p = 0.18$ ), respectively. **Conclusions:** Standardized OHI in written format demonstrated dental knowledge and oral behavior benefit in isolation with no additional benefit derived from motivational messaging. To validate these findings, this study should be replicated in a similar dental treatment facility.

## TABLE OF CONTENTS

LIST OF FIGURES .....	vii
LIST OF ABBREVIATIONS .....	viii
CHAPTER 1: Introduction .....	1
CHAPTER 2: Materials and Methods .....	3
Participant Selection .....	3
Study Design.....	3
CHAPTER 3: Results .....	5
Intervention Effect on Oral Hygiene Knowledge .....	5
Effect on Oral Hygiene Behavior .....	7
CHAPTER 4: Discussion.....	9
CHAPTER 5: Conclusions .....	12
APPENDIX A .....	13
REFERENCES .....	14

## LIST OF FIGURES

<b>Figure 1.</b> Oral Hygiene Knowledge IQ by Group.....	6
<b>Figure 2.</b> Oral Hygiene Behavior by Group.....	8

## LIST OF ABBREVIATIONS

BUMED	Bureau of Medicine and Surgery
IMR	Individual Medical Readiness
IQ	Intelligence Quotient
MTF	Military Treatment Facility
NPDS	Naval Postgraduate Dental School
OHI	Oral Hygiene Instruction
PCD	Primary Care Dentistry
WRNMMC	Walter Reed National Military Medical Center

## CHAPTER 1: Introduction

U.S. military service members are assessed annually for individual medical readiness (IMR) to determine their ability to deploy as part of military operations.<sup>1</sup> IMR is based on six elements specified in the U. S. Department of Defense Instruction 6025.19 Individual Medical Readiness Program. Dental readiness is a component of this process. The annual dental exam determines dental readiness for each member.<sup>1</sup> Service members cannot be cleared as fully medically ready, and thus deployable, until all urgent or emergent dental needs are met.

As part of the annual dental readiness evaluation, service members are presented with oral hygiene instruction (OHI). Despite unrestricted access to care, high caries rates and dental emergencies persist across the armed forces.<sup>2</sup> Poor oral hygiene is correlated with increased caries rates.<sup>3</sup> Individuals who have sustained poor oral hygiene have a greater caries experience and an increased incidence of new caries.<sup>4</sup> Active oral disease can make a servicemember ineligible to deploy, thus affecting military operational requirements.

OHI is provided to patients regardless of their oral health status. However, research shows a lack of correlation between OHI and improved oral hygiene or overall oral health.<sup>5</sup> In response, the importance of preventative dentistry is being emphasized by considering patient motivation and behavior modification in addition to the current OHI in the pursuit of improving clinical outcomes of disease and the quality of oral care.<sup>6</sup>

At Military Treatment Facilities (MTFs), per Navy Bureau of Medicine and Surgery (BUMED) Instruction 6600.16A, oral healthcare providers are required to provide OHI as a component of the annual periodic dental examination. This one-page

patient education tool focuses on the reduction of carbohydrate exposure, brushing with fluoride toothpaste, utilization of a fluoride mouthwash and the practice of chewing sugarless gum.<sup>7</sup> This instruction does not contain motivational messaging or behavior modification statements. Although required, OHI varies by provider and location (e.g. teaching hospital vs. recruitment facility). It may also differ in content, length and method of delivery (i.e. oral vs. written). OHI is shown to have mixed clinical results in reducing new oral disease burden. This muted effect of OHI programs is potentially confounded by a lack of standardized delivery of OHI and motivational messaging.<sup>8,9</sup>

Information dissemination and learning platforms have diversified in the digital age. It is possible to tap into these platforms to leverage more effective OHI and improve upon the existing BUMED instruction. Research shows that while there is no significant difference in knowledge retained when information is communicated via video, podcast or written materials, often patients have a preference for how they want to receive information.<sup>10</sup> 95% of Americans aged 19-29 use YouTube, often to watch educational videos.<sup>11</sup> Additionally, the utilization of text messaging has been shown to improve health behavior changes.<sup>12</sup> The application of these two mediums can be incorporated into OHI.

The primary objective of this study was to assess the effect of standardized delivery of oral hygiene instruction on dental intelligence quotient (IQ) and self-reported hygiene behavior modification in active-duty service members utilizing written instruction and comparing it to video instruction with motivational messaging. The null hypothesis states that there would be no significant difference in the dental knowledge or reported self-efficacy regardless of method of oral hygiene instruction utilized.

## **CHAPTER 2: Materials and Methods**

### **PARTICIPANT SELECTION**

For this randomized controlled study, subjects were recruited from the Primary Care Dentistry (PCD) Department at Walter Reed National Military Medical Center (WRNMMC) in Bethesda, Maryland from February 2022 through June 2022. Inclusion criteria consisted of active-duty service members presenting for their annual periodic dental exam who had not yet received oral hygiene instruction or a hygiene visit. This study was reviewed and approved by WRNMMC IRB (#962331).

### **STUDY DESIGN**

Participants received a study identification number that assigned them to one of three groups by a computer-generated randomizer. Subjects were given study overview documents, informed consent and a baseline dental knowledge questionnaire consisting of 35 questions to be completed in the waiting room prior to the routine exam.

Participants were given the option to opt out of the study at any time.

The questionnaire consisted of 25 multiple choice questions regarding dental knowledge developed from BUMED instruction 6600.16A describing the cause of dental caries, common risk factors and periodontal disease. The remaining 10 questions were behavioral based questions developed with the Naval Postgraduate Dental School (NPDS) Psychology department to rate subjects' confidence levels with oral hygiene and willingness to increase hygiene practices utilizing a Likert Scale from strongly disagree to strongly agree.

30 subjects were recruited into each group for a total of 90 subjects participating in the study. Group 1 Control, was asked to read the one-page BUMED 6600.16A instruction. Group 2 Video, was given a copy of the BUMED instruction as well as shown a 5:42 min oral hygiene video created by NPDS containing the same information as the instruction with motivational messaging. Group 3 Video + Text, was given the BUMED instruction, the motivational oral hygiene video and was then texted a fun dental fact once a day for 14 days. Group 3 Video + Text was messaged anonymously by the automated group text messaging service, DialMyCalls. All Group 3 Video + Text subjects were verbally reminded that they would receive texts for 14 days when they submitted their study materials at the end of their dental visit.

After completing the questionnaire and receiving their form of oral hygiene instruction the routine dental exam was conducted by PCD staff. Subjects were emailed a reminder, via Max.gov survey tool, 14 days after recruitment to fill out the same questionnaire they had received in the waiting room prior to their dental exam. All data was collected and analyzed within the NPDS Research Department.

## CHAPTER 3: Results

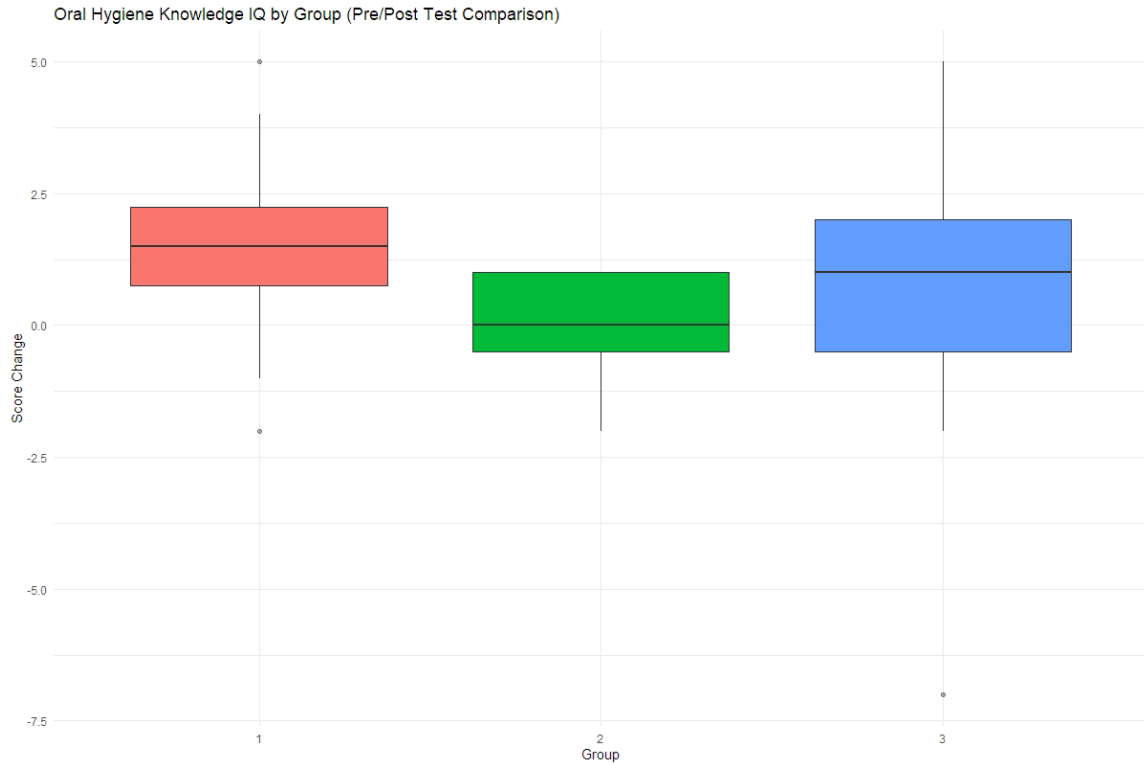
Out of the 90 identified participants who consented to the initial data intake at their annual exam, 42 participants completed the second questionnaire two weeks later. Group 1 Control, Group 2 Video, and Group Video + Text had 16, 11, and 15 complete responses respectively.

### INTERVENTION EFFECT ON ORAL HYGIENE KNOWLEDGE

Regardless of intervention, all three groups saw an increase in their oral hygiene knowledge when tested two weeks after their OHI intervention. Group 1 Control saw a mean improvement of 1.56 test questions. Group 2 Video reported a mean improvement of 1.04 test questions. While Group 3 Video + Text observed a mean improvement of 2.75 test questions (**Figure 1**).

The largest increase in test questions accuracy resulted in the combination of written instruction, motivational video, and dental factoid texts (Group 3 Video + Text), followed by written instruction alone (Group 1 Control) and then written instruction with the motivational video (Group 2 Video). However, significant increases in patient knowledge occurred only in Group 1 Control which solely received written instruction ( $p = 0.004$ ). While Groups 2 Video and Group 3 Video + Text noted increases in patient knowledge, they were not statistically significant ( $p = 0.779$  and  $p = 0.521$  respectively).

When comparing the increases between the three groups, there was no statistical difference among them ( $p = 0.07456$ , Kruskal-Wallis rank sum test). However, pairwise testing between individual groups showed a statistical difference in knowledge gained only between Group 1 Control and Group 2 Video ( $p = 0.045$ ).

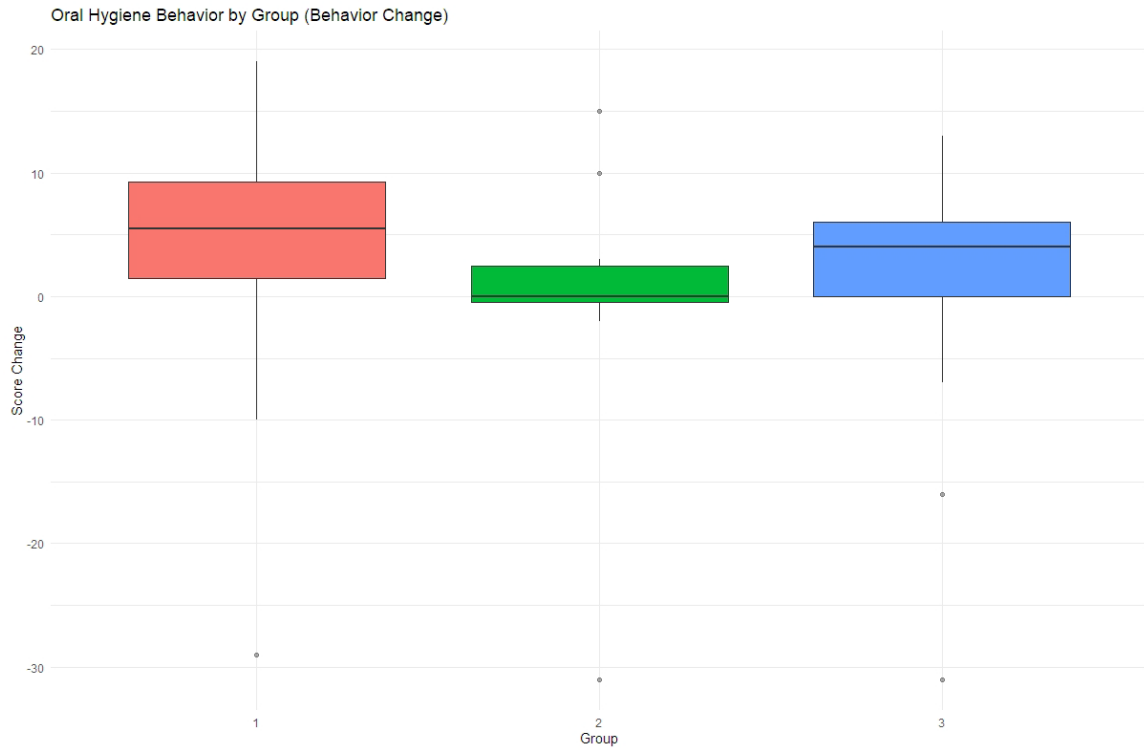


**Figure 1. Oral Hygiene Knowledge IQ.** Group 1 Control read the BUMED instruction. Group 2 Video read the instruction and watched the motivational video. Group 3 Video + Text read the instruction, watched the video and received 14 dental factoids via text.

## EFFECT ON ORAL HYGIENE BEHAVIOR

Group 1 Control and Group 3 Video + Text saw an improvement in self-reported oral hygiene behavior (mean increase of 3.00 and 2.79 respectively), while Group 2 Video regressed slightly in self-reported oral hygiene behavior (-0.27) (**Figure 2**). However, no intervention was statistically significant in improving the oral hygiene behavior of participants (Group 1 Control  $p = 0.287$ , Group 2 Video  $p = 0.938$ , Group 3 Video + Text 0.182).

When comparing oral hygiene behavioral score changes among the three groups there was no statistical difference ( $p = 0.358$ ). Moreover, pairwise comparison did not result in statistical significance (Group 1 Control vs Group 2 Video  $p = 0.70$ ; Group 2 Video vs Group 3 Video + Text  $p = 0.070$ ; Group 1 Control vs Group 3 Video + Text  $p = 0.95$ ). Group 1 Control: 3.00 (SD = 11.2,  $n=17$ ); Group 2 Video: -0.27 (SD = 11.4,  $n = 11$ ); Group 3 Video + Text: 2.79 (SD = 7.39,  $n = 14$ ).



**Figure 2. Oral Hygiene Behavior.** Group 1 Control read the BUMED instruction. Group 2 Video read the instruction and watched the motivational video. Group 3 Video + Text read the instruction, watched the video and received 14 dental factoids via text.

## CHAPTER 4: Discussion

We found that a single source of information was more effective at improving patient's knowledge than multiple sources using different mediums. While all three interventions showed an improvement in number of test questions answered correctly, it was not beneficial to repeat the information with a motivational video or to prime the participant to maintain that knowledge with daily texts of dental factoids. Walsh et al. studied how to enhance learning and retention and found that repetition over multiple sessions was more effective than repetition of material in a session.<sup>13</sup> Less material is more effective if repeated over several visits rather than presenting the same material repeated in different mediums in a single session.

This study is consistent with previous research indicating that information alone is insufficient in changing behaviors. Thus, motivational messaging and texting were incorporated into OHI to test if the combined effort would be more meaningful to our participants. However, the motivational message and the text communication did not significantly influence behavioral change. It appears that an inherent desire to change must exist first in people. People are then self-motivated and/or influenced by others, environment or circumstances to change. And finally, people armed with accurate information can change their habits. Providers could not effectively create motivation by changing how oral hygiene instruction was disseminated.<sup>14</sup>

As reported in 1984 in *Self-Education in Oral Hygiene*<sup>15</sup>, providing a patient with information is insufficient to improve oral hygiene. Our results are consistent with this finding almost 40 years later. A systemic review from 1975 to 2017 found that there was no consistent long-term influence on improving patient oral hygiene regardless of

interventions and methods utilized to disseminate OHI.<sup>16</sup> Going forward, it would be important to focus on identifying which patients are motivated to improve their oral hygiene prior to their OHI and then assess which of our three interventions best improve their dental IQ.

The first limitation of this study is related to the environment in which the study was conducted. The patient waiting room has a high traffic and as a result is extremely busy and moderately noisy. Patients are called multiple times to different rooms for the same appointment (i.e. x-ray, exam, hygiene). It is possible that the noisy environment was not an ideal place to take a questionnaire which requires concentration. Some participants may have been distracted and/or disrupted during their questionnaire or oral hygiene instruction.

The second limitation of the study was potential selection bias. During the month of June, a high number of study participants were people who are new to the military and/or to the command as the incoming class of Uniformed Services University of Health Sciences was onboarding. The stress of moving to a new place and starting a new job while learning how to be in the military could contribute to a distracted state of mind during their dental appointment.

The third limitation of the study was the fatigue in completing the baseline 35-question survey followed by reading one page and possibly then watching a 5:42 min video. As participants were observed completing the intake materials, many were content to answer the first page of questions and became visibly tired or distracted with each additional page.

For future studies, it is recommended to set aside a single operator for study participants which provides participants a quiet place to complete the questionnaire prior to obtaining x-rays, and to have participants returned for the oral hygiene instruction prior to the dental exam. This will allow them to have a mental break between the two requirements of the study without disrupting the questionnaire or the instruction time. This may limit how many participants can be followed at one given time, however it could produce more accurate responses. By informal feedback from participants, it is recommended to shorten the questionnaire to no more than one page with a maximum of 15 questions.

## **CHAPTER 5: Conclusions**

This study rejects the null hypothesis that there is no significant difference in dental IQ regardless of method of oral hygiene instruction. Written instruction is still the most effective medium to communicate basic dental oral hygiene information.

Ultimately, a patient's attention span is finite and multiple sources of information at the same session lend themselves inconsequential in improving dental knowledge.

Dissemination of information is more effective when limited to one medium.

The study does support the null hypothesis that there is no significant difference in reported self-efficacy regardless of method of oral hygiene instruction utilized. If patients, independently, are not self-motivated in improving or changing their oral hygiene habits, the method of educating them is minimally effective in the weeks following a dental hygiene encounter.

## APPENDIX A

BUMEDINST 6600.16A

23 Aug 2010

### HOW TO REDUCE YOUR RISK OF TOOTH DECAY

Tooth decay ("dental caries") is a complex disease process, caused by bacteria, and mediated by other important factors. Nearly everyone has the bacterium (mutans streptococci) that causes tooth decay. The two primary factors that influence the ability of these bacteria to cause tooth decay are diet and exposure to fluoride. There are some important things you can do to reduce the ability of these bacteria to cause cavities:

**1. Reduce the number of times per day that you eat refined carbohydrates ("sugars").**

People who have more than three to five exposures to sugars per day tend to develop a greater number of cavities. What are exposures? They are "eating occasions" separated by at least 20 minutes. For example, a bowl of Frosted Flakes at 0900, followed immediately by a handful of M&Ms is considered *one* exposure; a bowl of Frosted Flakes at 0900, followed by the M&Ms at 0920 or 0930 is considered *two* exposures. Why 20 minutes? Because, whenever you eat, the bacteria in your mouth eat too; they metabolize refined carbohydrate to acid, and it takes about 20 minutes for the acid to clear from your mouth. The more frequently this acid is produced, the more likely it becomes that you will develop tooth decay. So, don't keep soda (there are 12 teaspoons of sugar per can) or coffee with sugar on your desk and sip on it throughout the day – this provides the bacteria with a continual supply of sugar!

Sweets aren't the only foods that promote acid formation and tooth decay. Many foods that people generally consider "healthy" – fruit juices, sports drinks, and dried fruit (like raisins) – contain high levels of refined carbohydrates. So do snack foods such as potato chips, pretzels, and crackers (even saltines). Diet sodas, although they contain artificial sweeteners, can be harmful because they contain phosphoric acid. On the other hand, fresh fruits and many cheeses do not promote tooth decay. You cannot and should not eliminate all carbohydrate from your daily diet. Instead, try to reduce your number of between meal snacks and limit your refined carbohydrate intake to mealtimes.

**2. Brush your teeth three times a day with fluoride toothpaste.** Fluoride helps make your teeth more resistant to the decay process. Whenever possible, brush immediately after meals and snacks. This removes food particles and helps clear the bacterial acids more quickly. Incidentally, contrary to popular belief, rinsing with water after meals has very little effect on bacterial acids, although it may help clear food debris. For maximum benefit, your teeth need frequent exposure to fluoride – brush for at least 2 minutes, three times each day. Always use a soft toothbrush and floss your teeth at least once each day.

**3. Use a fluoride mouth rinse at bedtime.** While you're asleep, your salivary flow diminishes, leaving your teeth less protected from bacterial acids. This is the most beneficial time of day to expose your teeth to fluoride. So, just before you go to bed, after you've brushed and flossed, rinse with a 0.05% sodium fluoride rinse (Act<sup>®</sup> and Fluoriguard<sup>®</sup> are examples – available in supermarkets, drug stores, etc.), and then don't have anything else to eat or drink. This gives your teeth a "boost" of fluoride protection.

**4. Chew sugarless gum.** Chewing sugarless gum increases your salivary flow, which helps to neutralize and clear bacterial acids. If you chew gum, use a sugarless gum such as Trident<sup>®</sup>, Extra<sup>®</sup>, or Carefree<sup>®</sup> since the bacteria in your mouth generally cannot metabolize "non-sugar" sweeteners.

## REFERENCES

1. DODI 6025.19: Individual Medical Readiness Program. 13JUL2022.
2. Simecek JW, Colthirst P, Wojcik BE, et al. The incidence of dental disease nonbattle injuries in deployed U.S. Army personnel. *Mil Med* 2014;179(6):666-73.
3. Bakradze M, Japaridze F, Gogotishvili M, Japaridze L, Gvarishvili S. ANALYSIS OF RISK FACTORS FOR MAJOR DENTAL DISEASES IN THE STUDENT POPULATION. *Georgian Med News*. 2022 Dec;(333):42-45. PMID: 36780621.
4. Benn AML, Heng NCK, Thomson WM, Broadbent JM. Plaque and Dental Caries Risk in Midlife. *Caries Res*. 2022;56(5-6):464-476. doi: 10.1159/000527255. Epub 2022 Oct 21. PMID: 36273463.
5. Brignardello-Petersen R. Oral hygiene instruction does not seem to have a distinct effect in patients with chronic periodontitis and high caries experience. *J Am Dent Assoc*. 2019 Jan;150(1):e2. doi: 10.1016/j.adaj.2018.06.020. Epub 2018 Aug 7. PMID: 30097159.
6. Chan CCK, Chan AKY, Chu CH, Tsang YC. Theory-based behavioral change interventions to improve periodontal health. *Front Oral Health*. 2023 Jan 25;4:1067092. doi: 10.3389/froh.2023.1067092. PMID: 36762002; PMCID: PMC9905735.
7. BUMED Instruction 6600.16A 23AUG2010
8. Preus HR, Maharajasingam N, Rosic J, Baelum V. Oral hygiene phase revisited: How different study designs have affected results in intervention studies. *J Clin Periodontol*. 2019 May;46(5):548-551. doi: 10.1111/jcpe.13109. PMID: 30974490.
9. Weiß K, König LM. Does the medium matter? Comparing the effectiveness of videos, podcasts and online articles in nutrition communication. *Appl Psychol Health Well Being*. 2022 Sep 30. doi: 10.1111/aphw.12404. Epub ahead of print. PMID: 36178031.
10. Auxier, B., and Anderson, M. "Social Media Use in 2021." Pew Research Center. 7APR2021. <<https://www.pewresearch.org/internet/2021/04/07/social-media-use-in-2021/>>20FEB2023.
11. Pathak LE, Aguilera A, Williams JJ, Lyles CR, Hernandez-Ramos R, Miramontes J, Cembali AG, Figueroa CA. Developing Messaging Content for a Physical Activity Smartphone App Tailored to Low-Income Patients: User-Centered Design and Crowdsourcing Approach. *JMIR Mhealth Uhealth*. 2021 May 19;9(5):e21177. doi: 10.2196/21177. PMID: 34009130; PMCID: PMC8173396.
12. Brignardello-Petersen R. Oral hygiene instruction does not seem to have a distinct effect in patients with chronic periodontitis and high caries experience. *J Am Dent Assoc*. 2019 Jan;150(1):e2. doi: 10.1016/j.adaj.2018.06.020. Epub 2018 Aug 7. PMID: 30097159.
13. Walsh MM, Krusmark MA, Jastremski T, Hansen DA, Honn KA, Gunzelmann G. Enhancing learning and retention through the distribution of practice

- repetitions across multiple sessions. *Mem Cognit.* 2023 Feb;51(2):455-472. doi: 10.3758/s13421-022-01361-8. Epub 2022 Oct 3. PMID: 36190659.
14. Woelber JP, Bienas H, Fabry G, Silbernagel W, Giesler M, Tennert C, Stampf S, Ratka-Krüger P, Hellwig E. Oral hygiene-related self-efficacy as a predictor of oral hygiene behaviour: a prospective cohort study. *J Clin Periodontol.* 2015 Feb;42(2):142-9. doi: 10.1111/jcpe.12348. Epub 2015 Jan 21. PMID: 25472523.
  15. Glavind L, Zeuner E, Attström R. Self-Education in Oral Hygiene: Oral cleanliness and gingival health following oral hygiene instruction by self-educational programs. *J Clin Periodontol.* 1984 Apr;11(4):262-73. doi: 10.1111/j.1600-051x.1984.tb02216.x. PMID: 6584452.
  16. Preus HR, Maharajasingam N, Rosic J, Baelum V. Oral hygiene phase revisited: How different study designs have affected results in intervention studies. *J Clin Periodontol.* 2019 May;46(5):548-551. doi: 10.1111/jcpe.13109. PMID: 30974490.