The Role of Yoga in Treating Stress-Related Symptoms in Dental Hygiene Students

Abstract

Context: Research has provided evidence for yoga’s effectiveness in the prevention and treatment of pain and stress, both of which have been implicated as significant negative moderators of student performance and experience. Aims: This study investigated the feasibility and preliminary impact of a 10-week yoga intervention with dental hygiene students to reduce perceptions of stress and stress-related symptoms. Settings and Design: Students self-selected into a yoga treatment versus control condition. They completed stress and pain measures at four time points during and after the intervention or control period of 10-weeks. Methods: Participants were students enrolled in a dental hygiene program. All 77 participants completed a 10-week study, self-selecting into an intervention or control group. They completed three self-report questionnaires assessing pain and stress, administered at baseline, mid-point, postintervention, and two follow-ups. The 10-week yoga intervention consisted of 10 90-min yoga sessions that provided check-ins, breathing exercises, sequences of postures, relaxation exercises, and closing meditations. Statistical Analysis Used: Independent samples t-tests were used to compare perceived stress levels of participants in the control versus treatment groups. Paired t-test was used to assess differences in stress-related symptom levels across time. Results: Results suggested that a yoga intervention is feasible for this group and that active yoga practice can lower perceived stress across multiple domains and across time. Conclusions: A specially adapted and designed 10-week yoga protocol appears to be an accessible option for dental hygiene programs that seek to support their students in improving overall wellbeing.

Keywords: Dental professionals, musculoskeletal pain, stress, yoga

Introduction

Dental professionals experience a wide range of occupational hazards. Perhaps most common among these are stress-related illnesses, including acute and chronic pain.[1-3] Yoga has been identified as an evidence-based treatment for such illnesses in a variety of contexts. However, little research has explored the impact of yoga with a sample of dental hygienists.

Stress and pain among dental students and professionals

Dentistry is a high-stress academic path and profession[4-7] due to long work hours, financial concerns, insufficient relaxation, inadequate family time, fear of mistakes, and chronic physical pain due to awkward positioning while working.[8-9] These stressors lead to mental health outcomes such anxiety, depression, sleep difficulties, burnout, and suicidality.[10-15] Physical health impacts include postural disturbances, pain, and breathing insufficiencies.[7,16,17] It is well documented that chronic stress leads to poor health outcomes[18,19] and that efficient, easy-to-access coping techniques are crucial to ameliorate negative psychological and physical effects of prolonged stress.[7,20] Professional stressors are already experienced by dental students during training[21-25] and predispose them to psychological problems, including exhaustion, burnout, and anxiety.[26-28] These, in turn, may negatively affect academic and clinical performance.[21,29] In addition, research also identified nonacademic stressors that affect dental students’ lives,[30,31] including socioeconomics, age, gender, social support, distractions, time constraints, and insufficient coping.

Mindfulness and yoga for work-related stress symptoms

Mindfulness[32] and meditation[33-39] have been shown to promote health among

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working professionals via overall reduction of distress, rumination, and negative affect, as well as enhancement of physical health and vitality. Positive impacts of yoga on physical health are equally well documented. Yoga can provide measurable health benefits for healthy individuals as well as for those who already suffer. Yoga is particularly effective in treating musculoskeletal pain, back pain, and chronic pain mediated by yoga’s positive impact on strength, flexibility, balance, and range of motion. Yogic breathing is an effective way to increase pain control and tolerance, contributing to yoga’s effective in reducing somatic symptoms.

Somatic symptoms are closely correlated with psychological distress, another place where yoga intervention is useful. Yoga addresses mind and body responses to stress, calming the nervous system, refining and clarifying consciousness, and easing tension. Regular yoga practice (from postures to mindfulness to meditation) improves perceptions of stress, back pain, psychological wellbeing, and productivity in workplace settings. Specific to dental professionals, among a sample of dentists, 34.5% of whom reported pain, yoga was more effective than other methods of physical activity in ameliorating pain. For example, 89% of dentists who practiced yoga were free of pain, compared to 78% using other methods of exercise. Relatedly, yoga is a popular stress management modality for college students with positive effects on mind and body. Comparing yoga to meditation and body scanning, college students improved in rumination, self-compassion, and psychological wellbeing with all modalities, but yoga produced larger improvements.

**Purpose of the study**

The largest challenge in feasibility of yoga with college student populations is ease of access. Many barriers hinder access to this useful practice, including income, lack of recreational facilities, minimal time for relaxation, lack of social activity, and long work hours. These factors have been shown to prevent dental hygiene students from engaging in self-care.

Given the many reported barriers to access and despite evidence for yoga’s therapeutic effects, further examination of yoga’s clinical feasibility and relevance for work-related injury and stress is indicated for dental professionals. The current study examines feasibility and preliminary impact of regular yoga practice in dental hygiene programs. A self-selected case-control design was utilized to evaluate feasibility and preliminary treatment effects.

**Methods**

**Participants**

Participants were students at dental schools in California and Oregon, recruited by dental hygiene faculty. Sample size comprised 98 participants; data from 77 were analyzable. The sample was predominately female (90.9%) versus male (9.1%). Participants identified as Caucasian (48.1%), Asian-American (20.8%), Hispanic (16.9%), Pacific Islander (5.2%), Mixed (5.2%), and African-American (2.6%). Ages ranged from 19 to 46 years (M = 25.64). Eleven participants reported a regular yoga practice; 66 reported no yoga practice.

**Instrumentation**

A demographics questionnaire inquired about education level, yoga practice, employment status, marital status, race, ethnicity, age, mental and physical illnesses, and gender. Several self-report questionnaires were also completed:

**Perceived Stress Scale**

The original Perceived Stress Scale (PSS) was a 14-item self-report measure assessing degree to which situations are appraised as stressful. Items are scored on a 5-point Likert scale, ranging from 0 (never) to 4 (very often). Total scores are obtained by summing (after reverse-scoring negatively-phrased) item ratings. Test-retest and internal consistency are adequate. A 10-item PSS version (used in this study) was developed via factor analysis with comparable psychometrics. A normative total score is 15.5 (standard deviation [SD] = 7.4) for men and 16.1 (SD = 7.6) for women.

**Psychological and Physical Stress Indicator**

The Psychological and Physical Stress Indicator (PPSI) measures 26 stress-related psychological and physical symptoms. Participants indicate how often they experienced each symptom over a defined time period, choosing a percentage from 0% to 100%. An overall stress symptom score is obtained by averaging all responses. Four symptom clusters are calculated by averaging responses across content-related items: Physical (eight items), Emotional (10 items), Substance Use (three items), and Behavioral (five items).

**Procedures**

Upon IRB approval, recruitment began. Volunteers completed the informed consent form and self-selected into the yoga versus control condition. Three groups of dental hygiene students self-selected to participate in yoga treatment, two in Oregon in Spring 2017 (n = 11) and Fall 2018 (n = 9), and one in California in Spring 2017 (n = 12). Control groups for each trial had 27, 26, and 12 participants. All participants completed all measures at baseline, midpoint, posttest, and follow-up. Administration happened via Qualtrix, using personal computing devices, during course time in their dental hygiene programs.

Once baseline data had been collected, intervention began, meeting weekly for 10 weeks at a clinic conveniently to dental hygiene classrooms. Rooms were stocked with
supportive yoga props, including mats, blocks, straps, foam rollers, headstand supports, wedges, therabands, eye pillows, and blankets. During implementation, rooms were kept private with “Do Not Disturb” signs and white noise machines.

**Yoga intervention description**

The study adapted an original protocol\(^{[73]}\) to the physical needs of dental hygiene students. The original and adapted protocols comprised ten 90-min sessions shown to be feasible and effective in addressing stress and stress-related pain among college students and faculty. All sessions focus on mindful-based practice and have a similar format to promote cognitive and physiologically-mediated learning: (a) yoga psychology (e.g., layers of self, emotional reactivity, mind states, habit), (b) breathing (e.g., diaphragmatic, alternate nostril), (c) postures (warm up, main poses, peak pose, cooldown), (d) relaxation, and (e) meditation. Sessions increase in difficulty across time progresses, building upon previous material. For this study, at the beginning of class, participants had opportunity to check in and connect with one another. Participants then engaged with yoga psychology and its applications to stress-based symptoms. Didactic presentations were adapted to address specific needs of dental hygiene student (e.g., how to integrate into the busy schedules of a dental student, use of academic planners when distracted, value of cultivating sympathetic joy for others). Following the didactics, participants were guided through breathing and posture practices, involving carefully sequenced postures. Modifications for dental hygiene student included providing additional props and multiple variations to ameliorate wrist, hand, neck, shoulder, back, hips, or experienced chronic pain. For example, downward dog was taught with options of using a wedge, chair, wall, bent knees, and more. Yoga teachers provided one-on-one attention and guidance. Posture practice ended with relaxation and guided meditation. After each session, participants assisted with tidying the yoga space and could approach teachers with questions or concerns. Table 1 shows an overview of the generic outline of each session.

Yoga classes were taught by certified yoga teachers with extensive teaching experience who had been trained to the protocol and its adaptations. They were supported by assistant teachers, all of whom had significant yoga teacher training. All yoga instructors were trained via a rigorous process to implement the original and adapted yoga protocols. As this study required adaptations specifically focused on dental hygiene students, training included commensurate changes to the original protocol. For example, trainees developed and learned about modifications to reduce strain on vulnerable areas, such as wrists, shoulders, and neck.

**Results**

**Feasibility**

Engagement in yoga practice was demonstrated via strong adherence: dropout rate of 0% and average attendance of 95.15%. Mean number of sessions attended at the Oregon site was 9.52 (range: 7–10). At the California site, 100% of participants attended all sessions.

**Impact: Baseline comparison**

Participants self-selected into intervention and control groups, potentially introducing lack of baseline equivalence. Table 2 shows PSS perceived stress did not differ between yoga and control conditions \((t (75) = -2.25, P = 0.44)\). It also shows that individuals in the yoga intervention endorsed higher stress-related symptom levels than those in the control group \((t (75) = -2.79, P = 0.007)\). This finding suggests results of stress-related symptom measures be interpreted with caution as control and intervention groups did not endorse comparable symptom levels at baseline.

**Impact: Preliminary findings**

Table 3 shows within-group comparisons of PSS and PPSI results at baseline, midpoint, posttest, and follow-up. No significant differences were observed in either yoga or control conditions on PSS perceived stress scores. For the control group no significant changes in PPSI scores were noted across time on any scales. PPSI scores for the yoga condition indicated a significant decrease in total stress symptoms from baseline to midpoint \((t = 3.77, P = 0.001)\), and baseline to posttest \((t = 5.71, P < 0.001)\). PPSI physical subscale scores indicated significant decreases in physical stress symptoms from baseline to posttest \((t = 3.225, P = 0.006)\). PPSI emotional subscale scores indicated significant decreases in emotional stress from baseline to midpoint \((t = 4.254, P < 0.001)\), baseline to posttest \((t = 6.534, P < 0.001)\), and baseline to follow-up \((t = -1.271, P = 0.233)\). PPSI behavioral subscale scores indicated significant decreases in behavioral stress from baseline to midpoint \((t = 2.946, P = 0.007)\), and baseline to posttest \((t = 4.046, P = 0.001)\). No significant differences were observed among yoga participants on PPSI substance-use related subscale. In reviewing results, it must be noted that posttest data were mistakenly not collected for one subgroup, reducing sample size.

**Discussion**

This study investigated feasibility and preliminary impact of a 10-week yoga intervention with dental hygiene students to reduce perceptions of stress and stress-related symptoms. Results suggested yoga is feasible and successful as a stress-related symptom management practice, especially among individuals who present with significant symptoms of stress-related illness at enrolment. Participants in the yoga intervention showed significant improvement on emotional,
**Table 1: Overview of the generic outline of each session**

| Session module | Purpose | Brief summary or examples by session¹⁻¹⁰ |
|---------------|---------|----------------------------------------|
| Check-In      | Giving students a chance to share their life with one another | S1: Identify student stressors  
S2: Explore how students balance multiple roles  
S3: Check in about how students incorporated yoga principles in daily life  
S4: Explore how yoga principles can be used to manage work stress on site  
S5: Identify ways to bring yoga principles into family relationships  
S6: Explore habitual response to student stressors  
S7: Explore how yoga principles can be applied to work with patients  
S8: Check in about changes to mindful awareness  
S9: Identify valuable life connections  
S10: Closing thoughts and remarks |
| ~5-10 min     | Allowing students to bring in real life experience  
Helping students learn to apply yoga principles in daily life - off the mat  
Building group cohesion and mutual support  
Engaging students on a more personal level |  
| Didactic presentation | Present the theme for the class, outlining it in terms of yoga psychology and modern neuroscience  
Themes: Koshas, 8 limbs of yoga  
Principles learning off the mat and during dental work  
Specific benefits of certain movements for the unique context of dental students | S1: Koshas  
S2: Yamas  
S3: Niyamas  
S4: Gunas  
S5: Kleshas  
S6: Vrittis  
S7: Fives states of mind  
S8: Karma  
S9: Brahma viharas  
S10: Eight limbs of yoga |
| ~10 min       | | S1: Diaphragmatic breath  
S2: Ujjayi breath  
S3: Sama vritti pranayama  
S4: Nadi shodhana  
S5: Sama vritti rechaka kumbakha  
S6: Viloma II  
S7: Dirga pranayama  
S8: Nadi shodhana  
S9: Sama vritti with antara kumbhaka  
S10: Kapalabhati |
| Pranayama     | Breath as the link between body, mind, wisdom, and spirit  
Breathe to bring awareness  
Find present centeredness in the breath  
Breathe mindfully and introspectively as a way of recognizing sensation and calming physiological and mental reactions |  
| Asana sequence: Class 1 | Asanas focused on physical needs of dental professionals and student populations  
Physical and mental engagement in asana  
Postures accessible off-the-mat and to can be used in dental student context  
Grounding and expansion in postures  
Discussing the specific benefits of certain movements for dental student context  
Promoting emotional regulation through asana  
Using modifications for postures that inherently may strain the risk areas for dental student population | Warm-up sequence  
Wrist movements (i.e., wrist rolls, wrist stretches)  
Hands (i.e., press-through hands, open-to-fist movements)  
Fingers (i.e., gentle self-massages, press fingers together)  
Neck (i.e., ear-to-shoulder, chin-to-shoulder movements)  
Shoulders (i.e., shoulder rolls, shoulder shrugs)  
Main theme/peak pose  
Tadasana  
Urdhva hastasana  
Uttanasana  
Utkatasana |
Table 3: Contd...

| Session module | Purpose | Brief summary or examples by session* |
|----------------|---------|--------------------------------------|
| Posture cuing focus | Providing adaptations to relieve pressure on hands, wrist, shoulders, neck, and back | Virabhadrasana II  
Uthita Trikonasana  
Adho mukha svanasana  
Cool-down  
Side Balasana  
Utkatasana  
Side Balasana  
Bharadvajasana  
Argha jathara parivartanasana  
Supta matsyendrasana variation  
Viparita Karani  
Closure  
Savasana  
Giving additional verbal cuing to support proper alignment, especially if challenges were noted and for high risk body regions  
E.g., Relax the shoulders  
E.g., Breathe into back tension  
E.g., Release the jaws  
E.g., Strengthen core muscles  
Regularly used cues focused on awareness to body sensations  
E.g., bring Awareness to the shoulders  
E.g., Explore what is happening in the wrists  
E.g., Note how the low back is responding  
E.g., Direct caring attention to the hands  
E.g., Notice sensations in the neck |
| Meditation | Encouraging proper relaxation | Body scan  
Guided imagery  
Stillness  
Open-heart integration |

Meditation  
Focusing the mind to remember mindfulness in day-to-day life  
Integrating experience  
Body scanning to promote body awareness  
Promoting interoception  
Withdrawing the senses  
~ about 5-10 minutes

Table 2: Results of independent samples t-test and descriptive statistics for Perceived Stress Scale and Psychological and Physical Stress Indicator total score

| Group | Mean (SD) | 99.9% CI for mean difference | t | Df | P |
|-------|-----------|-----------------------------|---|----|---|
| Yoga  | 18.75 (4.02) | -6.4-1.87 | -2.25 | 75 | 0.440 |
| Control | 16.49 (4.57) | -2.79 | 75 | 0.007 |

| Group | Mean (SD) | 99.9% CI for mean difference | t | Df | P |
|-------|-----------|-----------------------------|---|----|---|
| Yoga  | 27.77 (12.23) | -19.62-2.02 | -2.79 | 75 | 0.007 |
| Control | 18.97 (14.59) | -2.79 | 75 | 0.007 |

SD=Standard deviation, CI=Confidence interval, PSS=Perceived Stress Scale, PPSI=Psychological and Physical Stress Indicator

behavioral, and physical stress-related symptom levels whereas control group participants showed no changes.

Feasibility

Recruitment and adherence data present yoga as a feasible practice for dental hygiene students. Students with higher levels of stress-related symptoms self-selected into the yoga intervention group, indicating they believed yoga to be of potential benefit and that the demands of participation were not too high to make this commitment. The yoga intervention was implemented free of charge on campus following academic classes, improving accessibility.
## Table 3: Within-groups comparisons of Perceived Stress Scale and Psychological and Physical Stress Indicator across time

| Measure/subscale       | Condition                  | Within-group comparison | Mean (SD) | n  | t   | p    |
|------------------------|----------------------------|-------------------------|-----------|----|-----|------|
|                        |                            | Time 1                  | Time 2    |    |     |      |
| **PSS**                | Yoga                       | Baseline - Midpoint     | 18.63     | 27 | 1.537 | 0.136|
|                        |                            | Baseline - Posttest     | 17.80     | 15 | 1.235 | 0.237|
|                        |                            | Baseline - Follow-up    | 18.52     | 23 | 1.441 | 0.164|
|                        |                            | Posttest - Follow-up    | 16.36     | 11 | −0.602 | 0.561|
|                        | Control                    | Baseline - Midpoint     | 16.41     | 39 | −1.106 | 0.276|
|                        |                            | Baseline - Posttest     | 15.75     | 24 | −0.725 | 0.476|
|                        |                            | Baseline - Follow-up    | 16.49     | 37 | −0.747 | 0.460|
|                        |                            | Posttest - Follow-up    | 16.53     | 19 | 0.715 | 0.486|
| **PPSI total**         | Yoga                       | Baseline - Midpoint     | 26.05     | 27 | 3.77  | 0.001|
|                        |                            | Baseline - Posttest     | 26.95     | 15 | 5.71  | <0.001|
|                        |                            | Baseline - Follow-up    | 25.53     | 23 | 1.88  | 0.074|
|                        | Control                    | Baseline - Midpoint     | 18.11     | 39 | 0.077 | 0.939|
|                        |                            | Baseline - Posttest     | 14.44     | 24 | 0.399 | 0.694|
|                        |                            | Baseline - Follow-up    | 18.83     | 37 | 0.860 | 0.396|
|                        |                            | Posttest - Follow-up    | 13.26     | 19 | 1.035 | 0.314|
| **PPSI physical**      | Yoga                       | Baseline - Midpoint     | 20.76     | 27 | 1.798 | 0.084|
|                        |                            | Baseline - Posttest     | 21.08     | 15 | 3.225 | 0.006|
|                        |                            | Baseline - Follow-up    | 19.48     | 23 | −0.075 | 0.941|
|                        | Control                    | Baseline - Midpoint     | 16.60     | 39 | 0.213 | 0.832|
|                        |                            | Baseline - Posttest     | 13.01     | 24 | 0.184 | 0.856|
|                        |                            | Baseline - Follow-up    | 17.53     | 37 | 0.099 | 0.921|
|                        |                            | Posttest - Follow-up    | 12.37     | 19 | 0.251 | 0.805|
| **PPSI emotional**     | Yoga                       | Baseline - Midpoint     | 36.44     | 27 | 4.254 | <0.001|
|                        |                            | Baseline - Posttest     | 35.87     | 15 | 6.534 | <0.001|
|                        |                            | Baseline - Follow-up    | 36.65     | 23 | 2.422 | 0.024|
|                        | Control                    | Baseline - Midpoint     | 25.36     | 39 | −0.238 | 0.813|
|                        |                            | Baseline - Posttest     | 19.97     | 24 | −0.112 | 0.912|
|                        |                            | Baseline - Follow-up    | 26.14     | 37 | 1.354 | 0.184|
|                        |                            | Posttest - Follow-up    | 19.53     | 19 | 1.385 | 0.183|
| **PPSI substance-use** | Yoga                       | Baseline - Midpoint     | 7.90      | 27 | 1.334 | 0.194|
|                        |                            | Baseline - Posttest     | 11.11     | 15 | 2.103 | 0.054|
|                        |                            | Baseline - Follow-up    | 10.14     | 23 | 1.725 | 0.099|
|                        | Control                    | Baseline - Midpoint     | 7.27      | 11 | 1.456 | 0.176|
|                        |                            | Baseline - Posttest     | 6.15      | 39 | 1.486 | 0.146|
|                        |                            | Baseline - Follow-up    | 6.81      | 23 | 1.270 | 0.217|
| **PPSI behavioral**    | Yoga                       | Baseline - Midpoint     | 24.59     | 27 | 2.946 | 0.007|
|                        |                            | Baseline - Posttest     | 28.00     | 15 | 4.046 | 0.001|
|                        |                            | Baseline - Follow-up    | 22.17     | 23 | 1.369 | 0.185|
|                        | Control                    | Baseline - Midpoint     | 13.23     | 11 | 0.369 | 0.719|
|                        |                            | Baseline - Posttest     | 9.65      | 23 | 0.874 | 0.392|
|                        |                            | Baseline - Follow-up    | 13.03     | 37 | −1.074 | 0.290|
|                        |                            | Posttest - Follow-up    | 8.11      | 19 | −0.076 | 0.940|

PSS=Perceived Stress Scale, PPSI=Psychological and Physical Stress Indicator, SD=Standard deviation
Adherence data demonstrated excellent retention, with 100% of participants staying enrolled throughout the study. Engagement was high, with intervention participants presenting for 9.5 of 10 session; no participant missed more than three classes. These findings are important given dental students’ significant stress while dealing with a heavy clinical and academic workload.[189] Offering students a feasible, efficacious intervention that can help them manage stress-related symptoms has the potential to enhance quality of education and experience of the academic journey.

Feasibility data suggest integrating yoga into a college setting provides dental hygiene students with such ready access to stress-management skills that they remain engaged despite time investment. The fact that 100% of participants were retained and average attendance was excellent compares well to other feasibility data.[77,78,90,91] Integrating yoga on campus likely removed barriers to yoga related to transportation, location, time, cost, and comradery.[77]

**Impact: Perceived stress**

Participants’ quantitative data demonstrated significant levels of perceived stress throughout the study. This finding is consistent with a large body of literature indicating students in dental hygiene programs experience higher levels of perceived stress and related cognitive, physical, and emotional symptoms.[84,92] Data also revealed significant decreases in stress-related symptoms with regular yoga practice. This reduction in symptoms is particularly noteworthy as levels of perceived stress were not reduced during this time. In other words, participants reduced symptomatology without reducing their perception of stress exposure. Results indicated a positive symptom-reduction effect in behavioral, emotional, and physical realms of functioning. These findings are consistent with research demonstrating yoga positively affects individuals across multiple domains of wellness.[93] The lack of significant reduction of substance-use-related stress is likely due to low levels at baseline among this sample.

**Impact: Behavioral stress symptom reduction**

PPSI behavioral stress symptoms include disordered eating, crying spells, angry outbursts, and social withdrawal. A significant decrease in behavioral stress symptom was revealed. As behavioral stress has a significant interpersonal component, the fact that each intervention group developed a unique and supportive community during yoga classes likely contributed to these positive findings. The yoga class structure provided space for students to connect in an environment not focused on academics, which in and of itself may have contributed to reduction in stress-related symptoms (though perceived stress levels did not change across the study period). The development of social relationships was frequently commented on by yoga participants and appears likely to have assisted students in reducing behavioral stress symptoms. Across the 10 weeks, yoga participants become increasingly connected to one another, offering mutual support and advice to distressed peers. The yoga protocol was designed for working with participants in a group setting and highlights the importance of the growth and support that occurs while in community. The protocol includes philosophy about the eight limbs of yoga, which encourages positive interactions with others. For example, the second class theme is yoga’s ethical principles, promoting right action towards others. Further, at the beginning of each class, participants were invited to find comradery by sharing experiences from their academic program and lives. Participants were also encouraged to practice yoga together before their clinic rotations.

**Impact: Physical stress symptom reduction**

PPSI physical stress symptoms include body pains, heart palpitations, high blood pressure, and gastric upset. The ameliorative effects of active yoga practice on physical stress symptoms demonstrated in this study are likely
not only to reduce physical health issues in the present, but also to prevent development of problems during later dental careers. Physical symptom amelioration is hypothesized to be mediated by the yoga protocol’s heavy focus on interoception and proprioception, helping students become increasingly aware of internal body states. Once internal states were noted, yoga participants were encouraged to explore how bodily responses could change through modifications and perceptions. Also integrated into the protocol were deliberate posture (e.g., a 5-min set of forearm and wrist stretches), breathing (e.g., diaphragmatic), and mindfulness (e.g., awareness of proper alignment and proprioception) for use while engaging in dental work. Application of these practices during clinical practice was discussed and students were empowered to use internal cues to help them determine when and how to relieve physical stress during their workday.

Limitations
This study utilized a quasi-experimental design in which participants self-selected into intervention versus control groups. Although this approach provided important feasibility data, it limited the generalizability of efficacy data in that preintervention levels of stress-related symptoms were confounded with yoga participation. Participants developed unique identifiers to link survey responses across time. These unique identifiers were not always kept consistent, resulting in lost data. Additionally, posttest measures (immediately upon protocol completion) were missed after the first intervention in Oregon, resulting in further lost data for baseline-posttest comparisons. More data points may have rendered additional comparisons significant.

Future Directions and Conclusions
This study demonstrated the feasibility of implementing a yoga protocol into curricula for dental hygiene students. Generalizability is limited by self-selection and loss of some outcome data. Future researchers might explore whether random assignment to yoga conditions garners similar results. Studies focusing on recruiting male participants may reveal important gender differences in yoga impacts for this population. Longitudinal studies exploring effects of long-term yoga practice on development of symptoms later in dental careers might provide suggestions for dental hygienists regarding maintaining an active yoga practice throughout their careers.

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Conflicts of interest
There are no conflicts of interest.

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