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Tongue Posture and Effects on Overall Health: A Dental Hygiene Curriculum Assessment

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Abstract

Research shows that proper tongue posture can impact quality of life, stability of the mouth, and have effects on overall wellness. Dental hygienists have a unique position to be able to identify tongue placement disorders. The objective of this study was to identify to what extent dental hygiene students are being taught orofacial myofunction during dental hygiene education. A survey link was emailed to all program directors in the United States regarding the teaching of orofacial myofunction within their respective programs. Using descriptive analysis, 44%, or less than half reported that their program curriculum includes teaching students proper resting position of the tongue. The conclusion is that there may be an opportunity to enhance the standard of clinical assessment curriculum to add teaching proper tongue posture to dental hygiene students in the US and to conduct further assessment research.

Table of Contents

List of Figures

Chapter I: Introduction

Introduction

The tongue is a strong muscle and plays a significant role in how the body functions. Tongue posture refers to the position of the tongue when the mouth is at rest. This means when the mouth is not performing any function like talking or chewing, it is merely resting.[1] There are several medical issues associated with improper tongue placement. Examples of conditions associated with tongue posture are snoring and sleep apnea, bite dysfunction, improper swallowing, crowded teeth or anterior diastemas, muscular pain in the mouth, temporomandibular joint dysfunction, neck pain/tension (due to joint dysfunction), developmental problems relating to the jaw and other areas, and headaches.[2] Rarely is the tongue position assessed when identifying these conditions. Tongue posture does not always cure these associated medical conditions. However, studies have shown that tongue posture can correct mild cases and aid in improvements of severe cases. Dental hygienists have an opportunity to identify and diagnose tongue dysfunction but there is currently little to no education on orofacial myofunction. The purpose of this research is to assess the education of the dental hygienist in orofacial myofunction.

Statement of the Problem

Are dental hygienists being taught about orofacial myofunction during dental hygiene education in the United States?

Significance of the Problem

According to Moeller, some dental hygiene programs include a course or lecture in orofacial myofunctional therapy just to teach the hygienist to recognize this disorder. Other programs have adopted a program with actual clinical exercises to treat patients with a myofunctional problems. Most programs have little or no information about the field.[5] This research is crucial to the dental hygiene field in order to educate dental hygienists and change curriculum in dental hygiene programs to incorporate teaching myofunctional therapy. If dental hygienists could identify and propose treatment for tongue posture needs, this could have a significant impact on patient care and overall health.

Fried states that the profession's future rests upon acknowledging research results derived from well-conducted scientific studies and proceeding accordingly. One can hardly deny that the future of health care is growing in complexity. These complexities mandate that dental hygienists possess well-developed and multi-faceted skill sets, commanding high levels of formal education.[6] Dental hygiene educators are in the forefront of shaping the future clinicians. They must base their curricula on new, valid, and reliable scientific information.[6] Dental hygienists have the power to shape our future by demonstrating our worth to prevent disease, promote health and contribute to the overall well-being of society.[6]

The Dental hygiene profession is achieving advancements, finding new career opportunities, and paving the path for healthcare integration. In order for these advancements, integration will require changes in how dental hygienists are educated. To develop the skill sets, clinical judgment, and knowledge of future practitioners, current dental hygiene curricula must be reexamined, redirected, and enhanced.[7] The research performed in this thesis has the objective of identifying how curricula for myofunctional therapy could aid in integrating dental hygienists into healthcare.

The impact dental hygiene clinicians could have on overall health and quality of life for our patients is crucial. Tongue dysfunctions are quite frequent (10-15%) in the population.[8] Having the education and skill in orofacial myofunctional therapy (OMT), would allow clinicians to identify and diagnosis dysfunction.

The tongue is a strong organ with multiple functions, from sucking to phonation, from swallowing to postural control and equilibrium.[8] An incorrect position or mechanics of the tongue can causes issues ranging from sucking problems in the newborn to atypical swallowing and breathing in the adult.[8] These dysfunctions have a wide range of repercussions.[8]

There is plenty of clinical research and literature to review that concludes positive results of orofacial myofunctional therapy (OMT). OMT can positively influence tongue posture and behavior.[9] Although not all tongue posture dysfunctions can be cured with orofacial muscle training, research proves that it can have significant and measurable impact on a large number.

With the knowledge base to identify myofunctional needs, dental hygienists can continue to advance as knowledgeable clinicians providing elevated patient care. When Dental Hygienists expand the scope of practice and identifiable skills, the profession advances. When the profession grows and has advancements, patient care advances.

Operational Definitions

1) Orofacial Myofunctional Disorders (OMDs) - are disorders of the muscles and functions of the face and mouth. OMDs may affect, directly and/or indirectly, breastfeeding, facial skeletal growth and development, chewing, swallowing, speech, occlusion, temporomandibular joint movement, oral hygiene, stability of orthodontic treatment, facial esthetics.[10]
2) Proper Tongue Posture - Proper tongue posture involves the placement and resting position of your tongue in your mouth. The ideal position for your tongue is pressed against the roof of your mouth rather than letting it settle at the bottom of your mouth. The tongue should not touch the teeth. [11]
3) Obstructive sleep apnea (OSA) is characterized by recurring episodes of upper airway obstruction during sleep and the fundamental abnormality reflects the inability of the upper airway dilating muscles to withstand the negative forces generated within the upper airway during inspiration. [12]
4) Tongue - The tongue is a highly innervated muscular organ with functions in articulation, mastication, and taste perception.[13]

Chapter II: Literature Review

Introduction

The review of this literature aims to broaden the understanding of proper tongue posture and the relation to quality of life through analyzing previous studies and published data. The objective is to show the value a dental hygienist can have when educated on myofunctional disorders and able to identify for early intervention.

Proper tongue posture will be defined. Findings in previous studies will be discussed identifying the value of orofacial muscle training. Using PubMed/National Library of Medicine and online resources, medical and dental literature was reviewed. Keywords used to access the database were “Tongue posture”, “Myofunctional therapy”, “Sleep apnea”, “Tongue exercises”, and “orofacial muscle training”, among others.

Tongue Posture

Proper tongue posture involves the placement and resting position of the tongue in the mouth. The ideal position of the tongue is pressed against the roof of the mouth with the tip of the tongue on the palatal rugae. Complete proper posture is lips closed and teeth slightly separated.[14]

The most common improper posture is letting it settle at the floor of the mouth where the tongue can press against lower teeth. The tongue should not press against the lingual surfaces of the teeth. Signs of improper tongue posture include speech impediment, snoring and sleep apnea, tooth grinding, tongue thrust, and mouth breathing.[16]

Proper tongue posture can protect your oral health as well as your overall health. Practicing proper tongue positioning can lead to improved sleep, better breathing, and decreased neck, jaw, or head pain. To fully practice proper tongue posture, more attention is being given to the relationship between tongue placement and overall health.[15]

Poor tongue posture can affect overall wellness. Medical issues associated with improper tongue placement, including, snoring and sleep apnea, bite dysfunction, improper swallowing, crowded teeth or front gaps, muscular pain in the mouth, temporomandibular joint dysfunction, neck pain/tension (due to joint dysfunction), developmental problems relating to the jaw and other areas, and headaches.[14,20]

Poor tongue strength can also contribute to tongue posture. Weakness of the tongue muscle may result in dysphagia.[19] Therefore, adequate tongue muscle strength is essential for safe swallowing. Improper tongue posture is associated with mouth breathing. It's suggested that mouth breathing increases the risk of developing sleep disorders. Children who experience poor sleep can present as mirrored symptoms of attention deficit hyperactivity disorder (ADHD).[14]

Tongue thrust is a forward position of the tongue during rest, and a thrust against or between the teeth during swallowing and speech.[17] Tongue thrust swallowing is comprising forward tongue posture and tongue thrusting during swallowing.[17] A tongue thrust is a habit that is developed. It is poor muscle coordination and is a habit that can be fixed with tongue exercises.[18]

The Role of the Tongue in Swallowing

Weakness of the tongue muscle may result in dysphagia and increase the risk of aspiration.[19] Therefore, adequate tongue muscle strength is essential for safe swallowing. Swallowing is composed of three phases: voluntary oral phase, involuntary pharyngeal phase, and involuntary esophageal phase.[19] In the oral phase, the tongue plays an important role in food bolus mastication, formation, and transportation.[19]

The Role of the Tongue in OSA

Sleep apnea is a serious condition. It causes repeated awakening which negatively impacts restorative sleep.[16] The affect is severe daytime drowsiness, fatigue, and irritability. This can result in trouble concentrating, falling asleep at work, while watching TV or even when driving.[16] Obstructive sleep apnea comes with great risks. The more severe the obstructive sleep apnea, the greater the risk of coronary artery disease, heart attacks, heart failure and strokes.[17] Obstructive sleep apnea increases the risk of abnormal heart rhythms (arrhythmias).[17] The objective of this thesis is to identify the role dental hygienists can have in correcting and treating these conditions.

Findings Indicating Tongue Training Exercises Improve Tongue Posture

Orofacial myofunctional therapy (OMT) includes exercises of the cervical and facial muscles for the improvement of function, tone, and mobility.[21] OMT is neuromuscular re-education of the muscle function to improve the functions of swallowing, tongue, oral

breathing, and rest posture of lips, tongue, and cheeks.[21] It includes exercises for toning and resistance training of the oral musculature. Tongue exercises guide the patient to be aware of the faulty rest position and dynamic positions of the tongue and learn the physiological myofunctional behavior.[21]

A study on the effect of tongue strengthening exercises in older adults found the experimental group showed a statistically significant increase in tongue muscle strength and thickness in the oral phase ($P = .001$ and $<.001$, respectively).[22] In the pharyngeal phase, the experimental group showed a statistically significant increase in the mylohyoid and digastric muscles (suprahyoid muscles) ($P = .045$ and .019, respectively). The control group showed no statistically significant changes.

Sarcopenia is a condition that results in a reduction of muscular volume and size and leads to muscle weakness.[22] As a person ages, Sarcopenia occurs. Elder populations struggle with swallowing as a result of loss of tongue strength. Findings that indicate tongue strengthening exercises can lead to improvements in swallowing can significantly impact quality of life in geriatric patients.[22]

There are different tongue strengthening techniques available. Some use tongue strengthening devices, and some do not. A study on 27 healthy adults found that both endurance of tongue pressure (ETP) and maximum tongue pressure (MTP) increased significantly after 8-weeks of using the tongue-strengthening self-exercise tool.[22] The pre- and post-training comparisons of the exercise group showed a significant improvement of 4.1 kPa in MTP (an 11.53% increase) and 4.53 s in ETP (a 99.86% increase).[24]

A previous critical review and quantitative analysis was completed on 12 studies.[19] That review found that the "pooled meta-analysis demonstrated that the anterior tongue strength (ATS) (MD = 5.34 kPa; 95% CI 3.28–7.40; I^2 = 71%) and posterior tongue strength (MD = 8.12; 95% CI 3.45–12.79; I^2 = 90%) were significantly higher in the TSE intervention than that in the control group. Among healthy participants, subgroup analysis showed that TSE had improvements on ATS in all age groups, with the greatest improvement in geriatric participants (≥ 65 years) (MD = 8.01; 95% CI 4.39–11.64; I^2 = 30%). Meta-regression analysis revealed a nonsignificant trend toward greater improvement on tongue strength with increasing TSE duration. This study provides positive evidence that TSE may be beneficial in improving tongue strength and could be applied for adults, especially healthy older adults."[19]

A study comprised of 22 children (11 boys, 11 girls; age range: 7.1–10.6 years) with the presence of a transversal crossbite were randomly assigned into orofacial myofunctional therapy and non-orofacial myofunctional therapy subjects.[16] The results were OMT can positively influence tongue behavior. OMT did significantly change tongue elevation strength, tongue posture at rest, and tongue position during swallowing of solid food.[16] At T2 more OMT subjects had contact between the lower central incisors and their antagonists or palate (P = 0.036). More OMT subjects performed a physiological pattern of water swallowing than non-OMT children at T1 and T2, although the differences were not significant. Articulation of the letter sounds /s,l,n,d,t/ were not improved by OMT. No interaction between OMT and expansion was found for any of the parameters.[16]

A meta-analysis on 10 studies was reviewed and found myofunctional therapy decreased AHI (apnea-hypopnea index) by 43% in children, and increased mean oxygen saturations in children with mild to moderate obstructive sleep apnea.[18] The study found that myofunctional therapy can serve as an adjunct obstructive sleep apnea treatment. Results were, the AHI reduced from 4.32 (5.2) to 2.48 (4.0) events/hr, a 43% reduction. Random effects modeling demonstrated a mean difference in AHI of -1.54 (95% CI -2.24,-0.85)/hr, z-score is 4.36 ($p < 0.0001$). Mean oxygen saturation increased by 0.37 (95% CI 0.06,0.69) percent, z-score is 2.32 ($p = 0.02$).[18]

Importance of Identifying Tongue Placement Disorders

Dental hygienists have a unique position to be able to identify tongue placement disorders. As an overall wellness provider, the dental hygienist provides value to patients by identifying concerns. Proper tongue posture can impact quality of life, stability of the mouth for future dental work, and have effects on overall wellness.

The relationship between the facial, tongue, and throat muscles should be working in harmony. When these muscles are functioning properly, it allows the patient to breath, swallow, chew, speak and move easily and painlessly. When there is disfunction, early intervention is key. This literature review identifies how tongue exercises can improve function and placement.[18] Not only can tongue exercises help maintain important sleeping posture, but they can improve breathing and digestion. If the tongue is not functioning properly, it can restrict chewing abilities and even our mouth airways.[20]

Tongue Assessment

Assessing tongue posture during a dental hygiene comprehensive exam can be completed with this simple process. Ask the patient to relax the mouth in a comfortable resting position. Ask the patient where their tongue is sitting. Note if the patient states that the tongue is patrial or fully on the palate. The proper posture is the tongue fully on the palate. The tip of the tongue should be on the palatal rugae and not touching the lingual of the anterior maxillary incisors. A second assessment is completed by looking at the incisive rugae. If the tongue is resting in proper position, the incisive rugae will be flattened. If the incisive rugae is prominent, it is likely that the tongue is not resting in proper posture. The third assessment is called the cotton roll test. It is simply done by placing a cotton roll across the palate from tooth #3 to tooth #14. If the whole tongue is resting on the palate, the standard measurement is 38-40mm in length. Cotton rolls are 37mm. A narrow or vaulted palate may not allow for the tongue to seat in proper posture on the palate. Any findings outside of these normal limits should be noted and additional assessments should be completed by a specialist to determine if the patient is a candidate for myofunctional therapy.

Proper Tongue Posture Education

Although basic myofunctional assessments can be done during a dental hygiene exam, there is an entire profession in myofunctional therapy. The International Association of Airway Hygienists IAAH recognizes that therapy of orofacial myofunctional disorders is a

separate discipline from clinical dental hygiene, dentistry, dental and medical specialties.[26] They state that the topic of myofunctional disorders is typically absent from current dental school curriculum.[26] Therefore, the IAAH provides additional education beyond the dental hygiene curriculum in addressing intervention for orofacial myofunctional disorders.[26]

To become a myofunctional therapist, a licensed dental hygienist would need at minimum to complete myofunctional therapy introductory courses. Currently certification is not required to be a myofunctional therapist. The International Association of airway Hygienists are working towards establishing an independent board for future certification. According to the IAAH, this could be years away.[26]

Summary

Proper tongue posture can protect your oral health as well as your overall health. Practicing proper tongue positioning plays a significant role. It can lead to improved sleep, better breathing, efficient swallowing, and healthy alignment.

Improper tongue posture can lead to narrower dental arches and make you predisposed to issues with your airway. This is a high risk for developing a sleep breathing disorder like sleep apnea. It even can also affect your speech, swallowing, appearance. As advocates for overall health providers, Dental Hygienists are in an ideal position to identify malfunction and provide early intervention.

Research indicates tongue training exercises can improve tongue posture. Orofacial myofunctional therapy has provided a significant and positive influence on patients. “The joy of eating, speaking, and correct breathing can be regained along with confidence, self-

esteem, and improved quality of life." Clinically, OMT plays a positive role in treatment by not only improving swallow but also the posture of tongue, improper muscle function, and reduces relapse of previous orthodontic treatments.[21]

Although this literature review identifies studies indicating positive results of tongue training therapies, the research is limited. More research on the effects of tongue training exercises would better our knowledge to identify disfunction and provide predictable treatment plans. The dental hygienist is the ideal clinician for diagnosing and treating candidates for orofacial myofunctional therapy.

Chapter III: Methods and Materials

Introduction Methods

Dental hygienists have an opportunity to identify and diagnose tongue dysfunction, which can improve overall health. The intent of this survey was to determine if tongue posture is currently being taught to dental hygiene students in US dental hygiene programs. The study was approved by the University of New Mexico Health Research Protections Office.

Sample Description

A self-administered survey was emailed to program directors of all US dental hygiene programs to inquire if their current curriculum teaches tongue posture assessments to their dental hygiene students. The survey directions stated to forward the survey to any faculty responsible for clinical assessment curriculum with a limit of one response per program. Selecting to survey program directors of US dental hygiene programs was based on the attribute that this population would capture the desired data. The intent of the survey is to determine if tongue posture is currently being taught to dental hygiene students in US dental hygiene programs.

Research Design

The research method used was a mixed methods research approach. This included both quantitative and qualitative research strategies in a questionnaire format. Quantitative research was captured using questions with numerically rated items and qualitative research strategies were used in short answer open-ended questions on the survey. The survey type used was an online survey in Microsoft Forms format. It was emailed with the explanation this is for dental hygiene research to complete a thesis project.

The objective of the survey was to identify if dental hygiene students are being taught how to assess tongue posture. The survey consisted of eleven questions to define if tongue assessment skills are being taught and to what level. The types of survey questions used were multiple choice, ordinal scale, and open-ended. For example, a question was "Does your current curriculum include teaching the dental hygiene students how to assess healthy tongue placement on a patient?". The data collected in the survey will identify the percentage of dental hygiene programs currently teaching tongue assessments.

This cross-sectional study was a point-in-time survey. The survey provided data at a single point in time. The purpose of the study is to define the current level of tongue posture assessment being taught in US dental hygiene programs. Then identify the opportunity to adapt curriculum to teach dental hygiene students how to complete tongue assessments on dental patients.

Upon completion of the survey, data was summarized into categories and results. The results were placed into their corresponding groups with like answers. The categories were analyzed further and stratified based on percentages.

Data Collection

A survey was emailed to program directors of all US Dental Hygiene programs. The email included information on the study and the link to the Microsoft Form online survey. The survey directions stated to forward the survey to any faculty responsible for clinical assessment curriculum. The instructions included a two-week deadline. A reminder email was sent three days before the deadline and extended the deadline an additional five days. The reminder email notified recipients of the extension and the new deadline date. The surveys were submitted on-line upon completion and results were collected real-time. At the 18-day completion period, data collection was closed, and the Microsoft Forms link was deactivated. Data captured from the survey was assessed and analyzed.

Data Analysis

When data collection was complete, survey results were exported from Microsoft Forms to Microsoft Excel. Response categories were created for each survey question for descriptive purposes. Simple descriptive statistics were calculated for the multiple choice and scale questions. A bar graph was created for each question. Anomalies were identified. Results of open-ended questions were organized to read and uncover insights and trends. Similar answers were grouped into categories.

Chapter IV: Results and Conclusion

Results

At the end of the survey, 42 responses were received. Two of the respondents knew someone from their program who had completed the survey and their responses were not captured further. These two responses were excluded from the analysis. Four respondents selected that they did not know if someone from their program had completed the survey already while the remaining 36 respondents knew that they were the only ones who were completing the survey from their program. These two groups of respondents were included in the analysis of results for a total of 40 respondents.

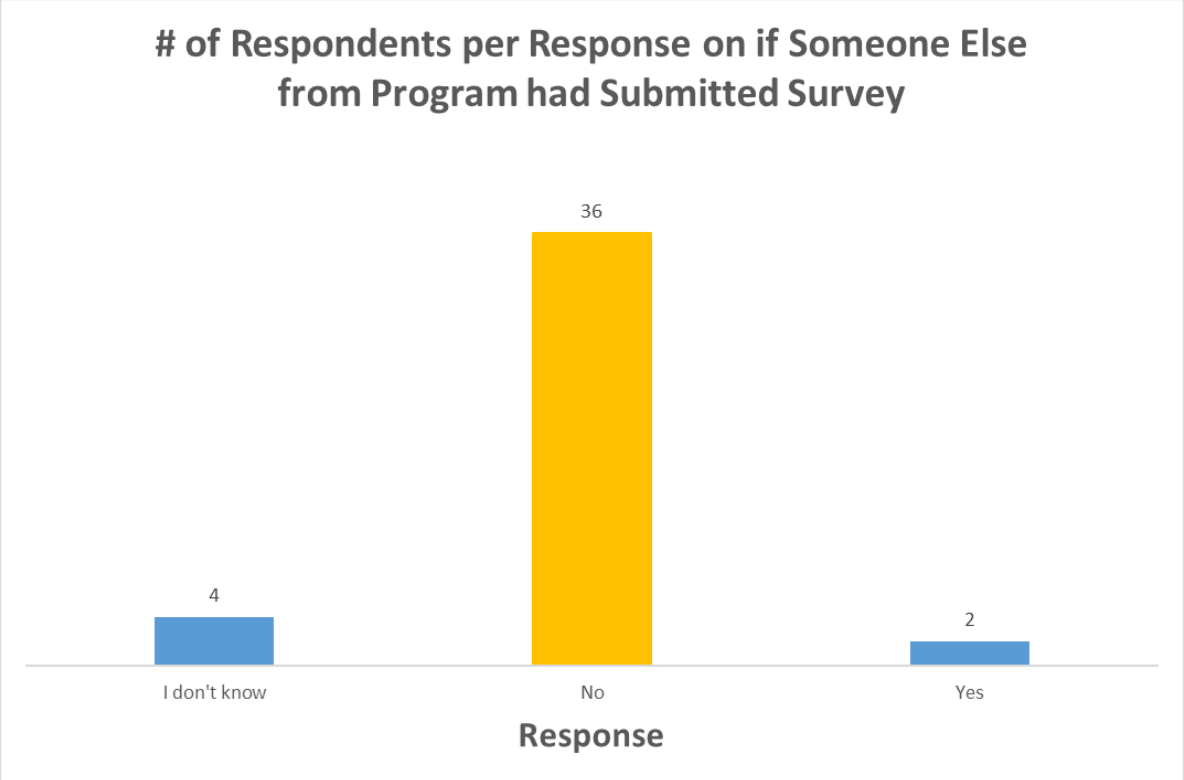

Figure 1. Number of Respondents per Response

Of the 40 respondents whose responses were included in this descriptive analysis, 33 of them were Dental Hygiene Program Directors or Deans, 4 were Full-time faculty, 2 were Adjunctive faculty/staff, and 1 was Part-time faculty.

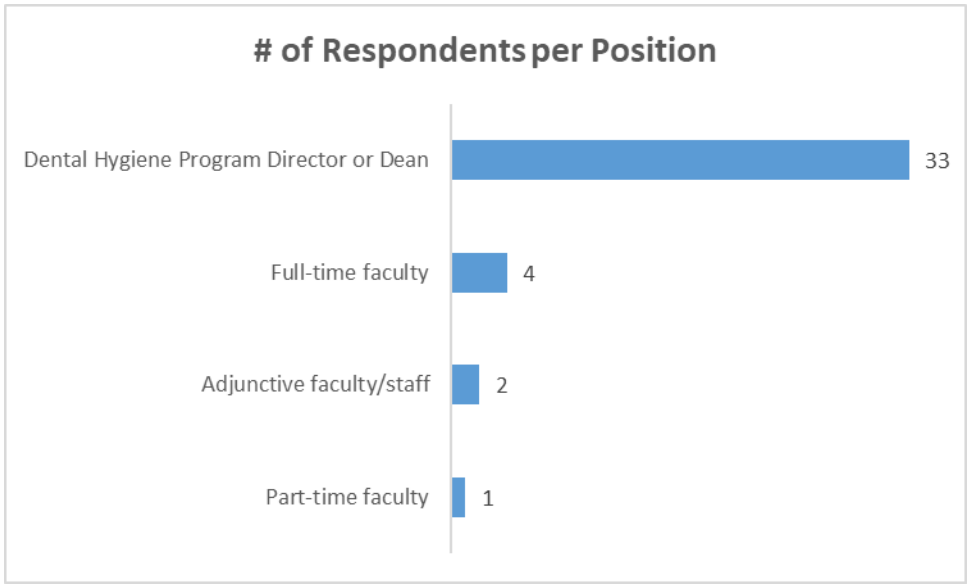

Figure 2. Number of Respondents per Position

Twenty-seven respondents said that their institutions offered an Associate Degree Dental Hygiene, 15 offered a bachelor's degree Dental Hygiene, 2 offered a Certificate of Dental Hygiene. Four respondents reported that their institution offers more than one degree program. Two respondents said that their institutions offer both Associate Degree and bachelor's degree of Dental Hygiene programs. While two other respondents said that their institutions offer both a Certificate of Dental Hygiene and an Associate Degree of Dental Hygiene. No respondent said that their institution offers both a Certificate of Dental Hygiene and a bachelor's degree nor did any respondent state that their institution offers all three academic programs.

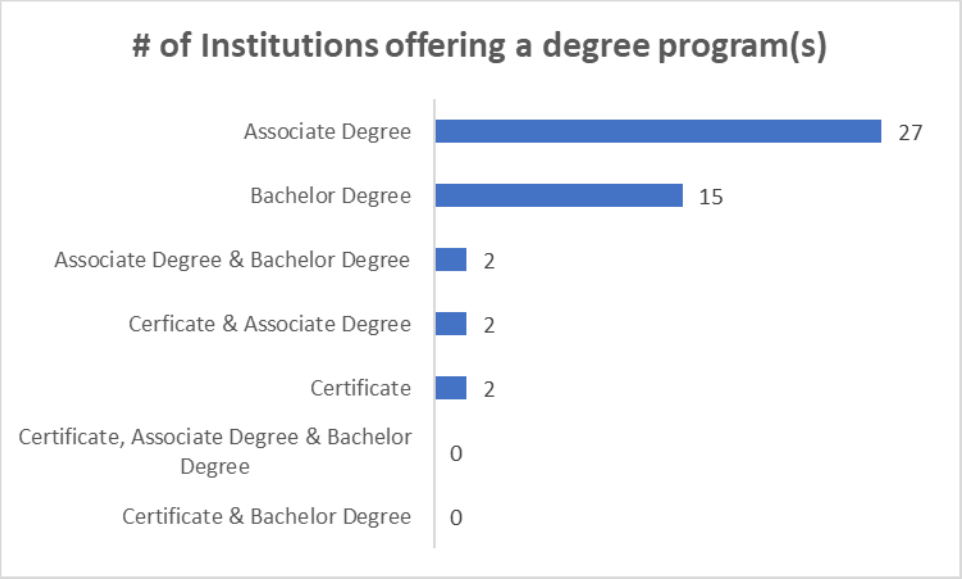

Figure 3. Number of Institutions offering a degree Program

Fifty percent (n=20) of the respondents said that they did not teach Tongue Posture in their Dental Hygiene curricula. Forty percent of the respondents said that Tongue Posture was included in their Dental Hygiene curricula. While ten percent of the respondents did not know whether Tongue Posture was included in their Dental Hygiene curricula.

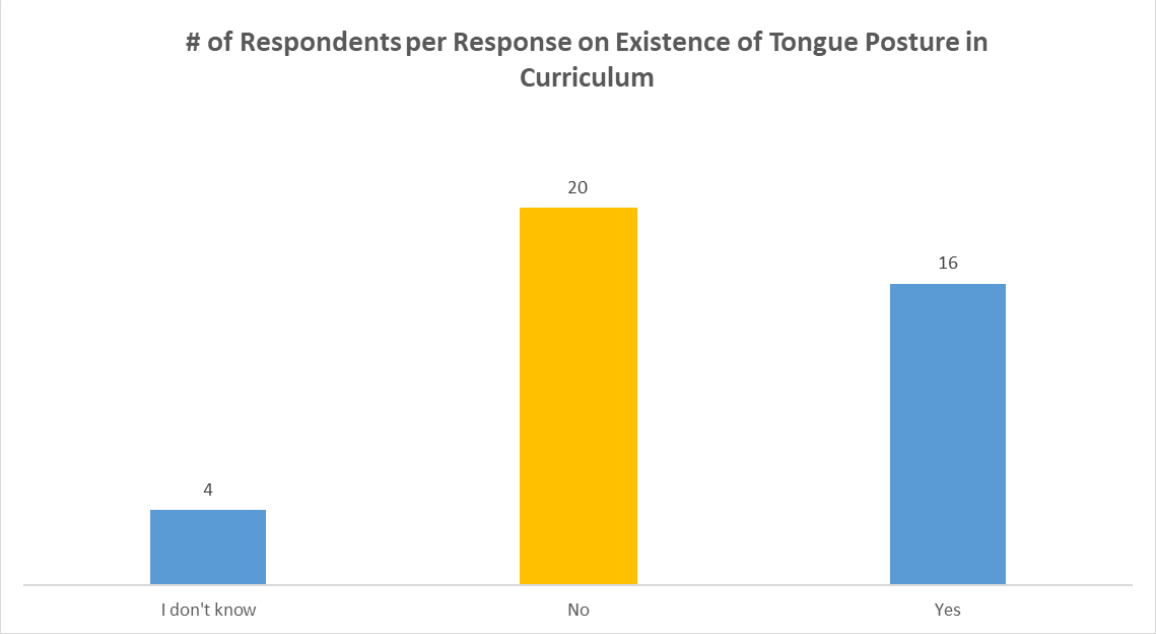

Figure 4. Number of Respondents per response of existence of tongue posture

As to whether Proper Resting Position of Tongue was included in their Dental Hygiene curricula, 17 out of the forty respondents said yes, 16 said no, 6 did not know while one of the respondents did not answer this question.

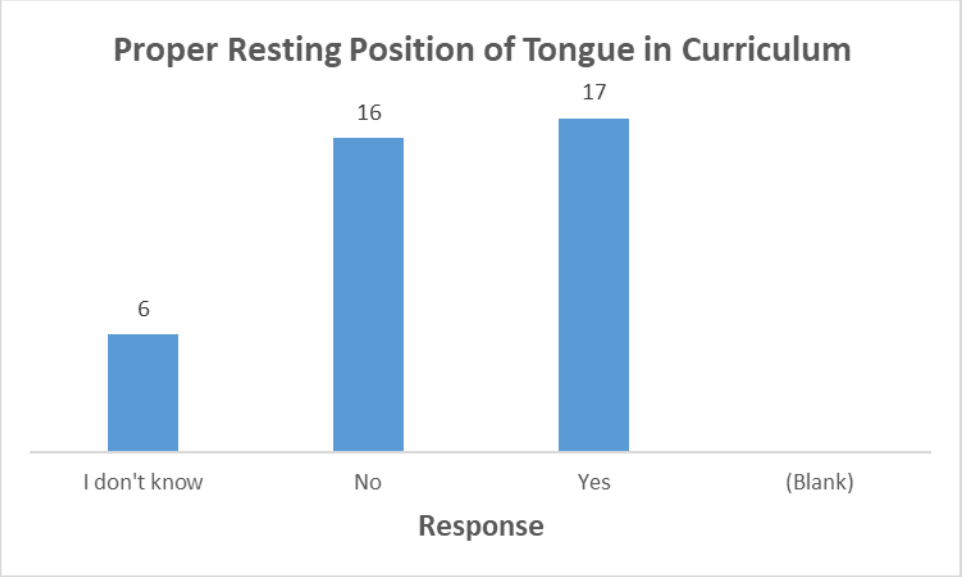

Figure 5. Proper resting position of tongue in curriculum

Of the 8 assessments listed in the survey to be performed by Dental Hygiene students in clinic, four assessments were identified by more than a half of the respondents. The four most commonly performed assessments were assessment of palate for variants of normal, clinical assessment of anterior lingual frenum attachment, evaluation of the uvula, and having patients stick their tongue out to evaluate mobility and reach out of the tongue. The cotton roll test was the least popular among the assessments. Eight of the 40 respondents selected "Other" from the list of the assessments given. The other assessments which were described include:

- Evaluation of the tongue for scalloping
- Airway assessment

- Assignment of the Mallampati Score
- Stop Bang Questionnaire
- Oral cancer screening on every patient
- Medical and Dental History review to look for tongue thrust and mouth breathing

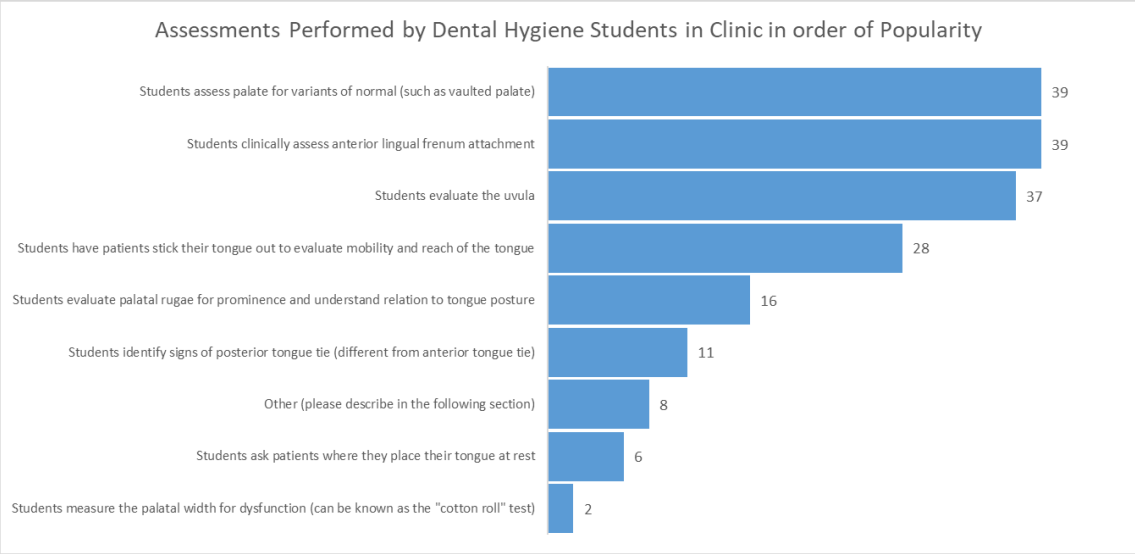

Figure 6. Assessments performed by Dental Hygiene Students in clinic

On the level to which Myofunction Disorders were taught in the Dental Hygiene curricula across schools 17 of the 40 respondents said that they do not cover myofunction at this time. While another 15 said that myofunction was lectured in a unit in our curriculum. The remaining 8 either chose the “Other” option (6 of them) or did not know if myofunction disorders were taught in their curriculum.

The 6 respondents who chose the “Other” option of the survey gave the following details: One respondent said that myofunctional disorders were taught throughout their curriculum courses and were included in Tooth Morphology, Periodontology, Head and Neck Anatomy, and Oral pathology. Another said that myofunctional disorders were taught in lecture portions and referenced in other courses. Others said that the disorders were

included in a lecture, introduced, and talked about with an occlusion lecture in dental anatomy or were covered by guest speakers and in a workshop on Myofunctional therapy.

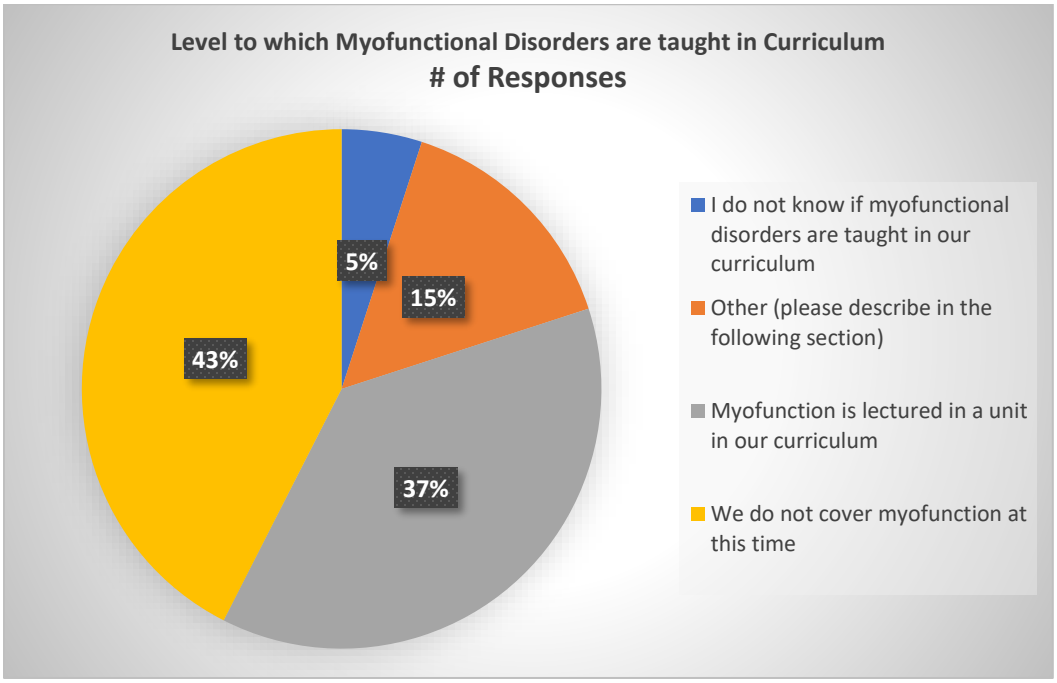

Figure 7. Level to which Myofunctional disorders are taught in curriculum

The sentiments of the respondents on the importance of a Patient's Tongue Posture to overall Health were as follows: Many of the respondents (n=16) said either that they had read some research or attended a course on myofunction and could see how it could be linked to overall health. 8 reported that they had read more than one evidence-based research article and/or attended lecture(s) on myofunction and they knew that tongue posture was linked to overall health. There were 14 respondents who said that they knew a small amount about tongue posture and/or myofunctional therapy but still needed to evaluate research before they formed their opinion. And 2 selected that they had heard about tongue posture but were unaware on any links to overall health.

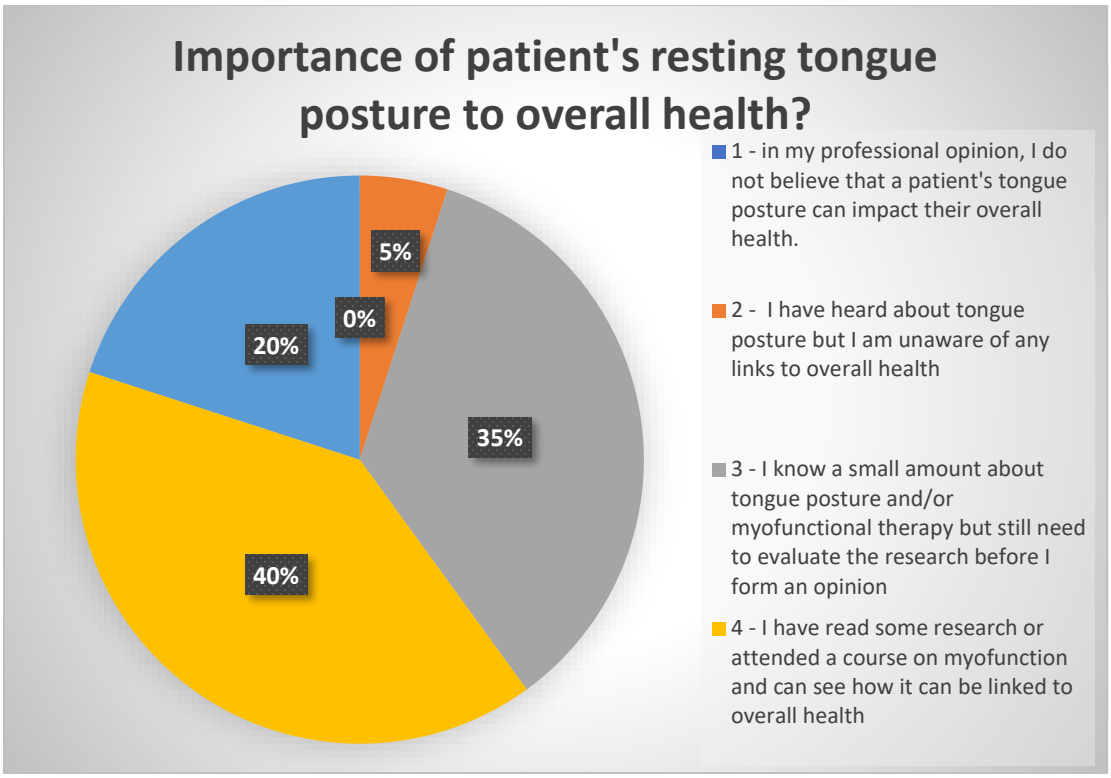

Figure 8. Importance of a patient's tongue posture to overall health

The following are responses to the open-ended questions. One of the respondents stated that Tongue Posture and Myofunctional Therapy should be taught throughout the curriculum, included in clinical practice and community and that other educators should be educated on risks. Another wondered how this could be added with an already packed curriculum. One respondent wanted to "beef up" this aspect of the Dental Hygiene curriculum to align with industry practices while another stated that they would love to get this started in their program but adding that time and expertise was needed.

One respondent stated that after completing a dissertation on the link between orofacial myofunctional disorders and sleep apnea, this respondent said that oral rest posture and sleep apnea screening were now included in their Dental Hygiene curriculum. One respondent said that it would be interesting in learning where tongue posture would

best fit in the DH curriculum and wished to know how to assess tongue position and some speech therapy exercises for correction. A respondent said their institution planned to incorporate clinical assessment that would include tongue posture and myofunctional therapy. This respondent felt that learning more about tongue therapy in more detail should be introduced within the curriculum.

Discussion

Although, valuable insight was gained on the current curricula surrounding the inclusion of tongue posture assessment in dental hygiene programs, the use of descriptive analysis limits the usefulness of the results. It is important to note that there is overlap between tongue posture assessment and other assessments such as oral cancer screenings and occlusion assessments. Both dentists and dental hygienists examine for oral lesions, abnormalities, alignment, and function. This may already involve assessing the position or movement of the tongue. The presence of overlapping assessments introduces complexities but also offers unique opportunities for making simple adjustments that would make a significant impact to health care of patients. Although tongue posture assessment has a primary focus on the resting position and function of the tongue, adding these specific assessments to the already performed clinical assessment techniques could take minimal time. Educators must navigate these overlaps by ensuring that tongue posture assessments are distinct from other evaluations and then guiding students to incorporate them into a comprehensive clinical assessment.

Despite the valuable insights gained from the survey, it's important to acknowledge the limitations. One limitation was that the survey relied on self-reported data from dental hygiene educators, which may be subject to recall bias or interpretation errors. The discrepancy outlines the need for standardization. It was interesting to note that one respondent that answered “No” in a previous question reporting that tongue posture was not included in their program’s curriculum, then reported yes proper resting position of the tongue was included in their program’s curriculum. Additionally, the survey may not have captured the full spectrum of teaching practices and curriculum content related to tongue posture, as respondents may have provided only a partial representation of their programs.

Future research could address these limitations by employing more comprehensive data collection methods, such as direct observation of curriculum delivery or longitudinal studies tracking student performance over time. Additionally, incorporating objective measures of tongue posture assessment, such as clinical examinations or diagnostic tools, could provide more insights into the prevalence and impact of tongue posture education within dental hygiene programs. The study did not explore the effectiveness of different teaching methods or assess student outcomes, which could provide further depth to our understanding of tongue posture education in dental hygiene school.

The survey results revealed the variance of perceived importance of tongue posture among dental hygiene educators. Attitudes and beliefs are essential for advocating the integration of tongue posture assessment and dysfunction in clinical education. Overall, advanced research is needed on tongue posture dysfunction and the effects on overall

health in order to further the advancement of tongue assessment in dental hygiene curriculum.

Conclusion

Although the study yielded insightful results regarding the inclusion of tongue posture assessment and myofunction therapy in Dental Hygiene curricula, the study was limited since no statistical testing was completed. Despite a diverse range of responses, it is evident that there is a gap in understanding among Dental Hygiene academics regarding the link between tongue posture and overall health.

While some institutions have integrated these elements into their programs, many others have not. However, there is a growing acknowledgment of the importance of incorporating these aspects into the curriculum. Moving forward, further research is needed to enrich the literature in this field and to influence dental hygiene practices. It is important for educators to be educated on the risks and benefits associated with proper tongue posture and myofunction therapy, and for institutions to consider integrating these elements into their curricula to align with industry practices and enhance the quality of Dental Hygiene education.

Chapter V – Journal of Dental Hygiene Manuscript

Abstract

Research shows that proper tongue posture can impact quality of life, stability of the mouth, and have effects on overall wellness. Dental hygienists have a unique position to be able to identify tongue placement disorders. The objective of this study was to identify to what extent dental hygiene students are being taught orofacial myofunction during dental hygiene education. A survey link was emailed to all program directors in the United States regarding the teaching of orofacial myofunction within their respective programs. Using descriptive analysis, 44%, or less than half reported that their program curriculum includes teaching students proper resting position of the tongue. The conclusion is that there is opportunity to enhance the standard of clinical assessment curriculum to add teaching proper tongue posture to dental hygiene students in the US and to conduct further assessment research.

Introduction

Dental hygiene educators are in the forefront of shaping the future clinicians. They must base their curricula on new, valid, and reliable scientific information. The dental hygiene profession is achieving advancements, finding new career opportunities, and paving the path for healthcare integration. In order for these advancements, integration will require changes in how dental hygienists are educated. To develop the skill sets, clinical

judgment, and knowledge of future practitioners, current dental hygiene curricula must be reexamined, redirected, and enhanced. The research performed in this thesis had the objective of identifying how curricula for myofunctional therapy could aid in integrating dental hygienists into healthcare.

The impact dental hygiene clinicians could have on overall health and quality of life for our patients is crucial. Tongue dysfunctions are quite frequent (10-15%) in the population. Having the education and skill in orofacial myofunctional therapy (OMT), would allow clinicians to identify and diagnosis dysfunction.

There is plenty of clinical research and literature to review that concludes positive results of orofacial myofunctional therapy (OMT). With the knowledge base to identify myofunctional needs, dental hygienists can continue to advance as knowledgeable clinicians providing elevated patient care. When Dental Hygienists expand the scope of practice and identifiable skills, the profession advances. These additional skill sets can be delivered in dental hygiene school. The question was to at what level are educators currently teaching about tongue posture.

Hypothesis: Dental Hygiene Educators have not yet implemented teaching proper tongue posture in DH school.

Methods

The research study focused on determining if US dental hygiene programs currently teach tongue posture assessments to their students. The study used a mixed methods approach, combining quantitative and qualitative strategies in a survey format. The survey,

distributed via email to program directors and clinical assessment faculty, included questions about teaching tongue assessment skills. It employed multiple-choice, ordinal scale, and open-ended questions to gather data on current teaching practices. The study aimed to understand the level of tongue posture assessment taught in programs and identify opportunities for curriculum adaptation. Data collection involved sending reminders, setting deadlines, and using online tools for real-time data capture. Descriptive analysis was used categorizing responses, calculating statistics, creating graphs, and identifying trends in open-ended responses. Overall, the study sought to inform potential improvements in dental hygiene education regarding tongue posture assessments.

Results

A total of 40 usable responses were obtained from program directors and faculty in US dental hygiene programs. Respondents included Program Directors/Deans (33), Full-time faculty (4), Adjunctive faculty/staff (2), and Part-time faculty (1). Academic programs offered included Associate Degree (27 respondents), Bachelor's Degree (15 respondents), and Certificate of Dental Hygiene (2 respondents), with some institutions offering multiple programs. Fifty percent of respondents reported not teaching tongue posture in their curriculum, while 40% included it, and 10% were unsure. Proper resting position of tongue was included in the curriculum for 17 respondents, while 16 respondents said it was not, and 6 were unsure.

Commonly performed assessments by dental hygiene students included palate variants, lingual frenum attachment, uvula evaluation, and tongue mobility/reach.

Myofunction Disorders were not covered in 17 responses, taught in a unit in 15 responses, and responses from 8 others varied. Respondents expressed varying levels of awareness about the link between tongue posture and overall health, with some having read research or attended courses, while others needed more information.

Discussion

Although, valuable insight was gained on the current curricula surrounding the inclusion of tongue posture assessment in dental hygiene programs, the use of descriptive analysis limits the usefulness of the results. It is important to note that there is overlap between tongue posture assessment and other assessments such as oral cancer screenings and occlusion assessments. Both dentists and dental hygienists examine for oral lesions, abnormalities, alignment, and function. This may already involve assessing the position or movement of the tongue. The presence of overlapping assessments introduces complexities but also offers unique opportunities for making simple adjustments that would make a significant impact to health care of patients. Although tongue posture assessment has a primary focus on the resting position and function of the tongue, adding these specific assessments to the already performed clinical assessment techniques could take minimal time. Educators must navigate these overlaps by ensuring that tongue posture assessments are distinct from other evaluations and then guiding students to incorporate them into a comprehensive clinical assessment.

Despite the valuable insights gained from the survey, it's important to acknowledge the limitations. One limitation was that the survey relied on self-reported data from dental

hygiene educators, which may be subject to recall bias or interpretation errors. The discrepancy outlines the need for standardization. It was interesting to note that one respondent that answered “No” in a previous question reporting that tongue posture was not included in their program’s curriculum, then reported yes proper resting position of the tongue was included in their program’s curriculum. Additionally, the survey may not have captured the full spectrum of teaching practices and curriculum content related to tongue posture, as respondents may have provided only a partial representation of their programs.

Future research could address these limitations by employing more comprehensive data collection methods, such as direct observation of curriculum delivery or longitudinal studies tracking student performance over time. Additionally, incorporating objective measures of tongue posture assessment, such as clinical examinations or diagnostic tools, could provide more insights into the prevalence and impact of tongue posture education within dental hygiene programs. The study did not explore the effectiveness of different teaching methods or assess student outcomes, which could provide further depth to our understanding of tongue posture education in dental hygiene school.

The survey results revealed the variance of perceived importance of tongue posture among dental hygiene educators. Attitudes and beliefs are essential for advocating the integration of tongue posture assessment and dysfunction in clinical education. Overall, advanced research is needed on tongue posture dysfunction and the effects on overall health in order to further the advancement of tongue assessment in dental hygiene curriculum.

Conclusion

Although the study yielded limited results regarding the inclusion of tongue posture assessment and myofunction therapy in dental hygiene curricula, the results are limited to this target and cannot be inferred to all programs due to the absence of statistical testing. Despite a diverse range of responses, it is evident that there is a gap in understanding among dental hygiene academics regarding the link between tongue posture and overall health.

While some institutions have integrated these elements into their programs, many others have not. However, there is a growing acknowledgment of the importance of incorporating these aspects into the curriculum. Moving forward, further research is needed to enrich the literature in this field and to influence dental hygiene practices. It is important for educators to be educated on the risks and benefits associated with proper tongue posture and myofunction therapy, and for institutions to consider integrating these elements into their curricula to align with industry practices and enhance the quality of Dental Hygiene education.

Disclosures

Authors did not any outside financial support. There were no conflicts of interest.

Appendices

Appendix A – Participant Survey Questions

1.For data collection purposes, it is preferred that only one survey be submitted per program. To the best of your knowledge, has anyone else in your program completed this survey?
Yes
No
I don't know

2.Which of the following best describes your position with your dental hygiene program?
Dental Hygiene Program Director or Dean
Full-time faculty
Part-time faculty
Adjunctive faculty/staff

3. Which of the following degrees does your entry-level dental hygiene program award? (check all that apply)
Certificate
Associate Degree
Bachelor Degree

4.As a part of your clinical curriculum, are the students taught about tongue posture?
Yes
No
I don't know

5.Does your program's curriculum include teaching students the proper resting position of the tongue?
Yes
No
I don't know

6.In relation to the tongue, which of the following patient assessments are performed by your dental hygiene students in clinic (check all that apply).

Students clinically assess anterior lingual frenum attachment
Students identify signs of posterior tongue tie (different from anterior tongue tie)
Students evaluate palatal rugae for prominence and understand relation to tongue posture
Students ask patients where they place their tongue at rest
Students evaluate the uvula
Students assess palate for variants of normal (such as vaulted palate)
Students measure the palatal width for dysfunction (can be known as the "cotton roll" test)
Students have patients stick their tongue out to evaluate mobility and reach of the tongue
Other (please describe in the following section)

7.If you answered "Other" on Question #6, please describe

Enter your answer

8.To what level does your program teach Myofunctional disorders?

We do not cover myofunction at this time
Myofunction is lectured in a unit in our curriculum
Myofunction is a whole course in our curriculum
I do not know if myofunctional disorders are taught in our curriculum
Other (please describe in the following section)

9.If you answered "Other" on question #8, please describe:

Enter your answer

10.On a scale from 1 to 5, how important do you think a patient's resting tongue posture is to overall health?

1 - In my professional opinion, I do not believe that a patient's tongue posture can impact their overall health.
2 - I have heard about tongue posture but I am unaware of any links to overall health.
3 - I know a small amount about tongue posture and/or myofunctional therapy but still need to evaluate the research before I form an opinion.
4 - I have read some research or attended a course on myofunction and can see how it can be linked to overall health.
5 - I have read more than one evidence-based research article and/or attended lecture(s) on myofunction. I know that tongue posture is linked to overall health.

11.Please share any additional information or thoughts on tongue posture or your program's curriculum with Myofunctional therapy (optional).

Enter your answer

Appendix B - Raw Survey Data

ID	Start time	Completion time	Email	Name	Last modified time	For data collection purpo	Which of the following be	Which of the following de	As a part of your clinical cu	Does your program's curri	In relation to the tongue,	If you answered "Other" o	To what level does your pr	If you answered "Other" o	On a scale from 1 to 5, how	Please share any addition
1	3/12/24 14:17:19	3/12/24 14:19:52	anonymous			No	Dental Hygiene Program D	Associate Degree;	Yes	Yes	Other (please describe in t	Students evaluate the ton	Myofunction is lectured in a unit in our curriculum		5 - I have read more than one evidence based research	
2	3/12/24 14:18:31	3/12/24 14:20:26	anonymous			No	Dental Hygiene Program D	Associate Degree;	No	No	Students clinically assess	anterior lingual frenum att	We do not cover myofunction at this time		4 - I have read some research or attended a course on	
3	3/12/24 14:27:32	3/12/24 14:36:45	anonymous			No	Dental Hygiene Program D	Associate Degree;	Yes	Yes	Students clinically assess a	Airway Assessment, Assign	Other (please describe in t	Myofunctional disorders	5 - I have read more than o	Taught throughout the cu
4	3/12/24 14:39:28	3/12/24 14:41:56	anonymous			No	Full-time faculty	Associate Degree;Certifica	No	No	Students evaluate the uvu	Students perform an oral e	We do not cover myofunction at this time		3 - I know a small amount about tongue posture and/	
5	3/12/24 15:17:54	3/12/24 15:19:06	anonymous			No	Dental Hygiene Program D	Associate Degree;	I don't know	I don't know	Students clinically assess	anterior lingual frenum att	We do not cover myofunction at this time		3 - I know a small amount about tongue posture and/	
6	3/12/24 16:54:13	3/12/24 16:57:56	anonymous			No	Dental Hygiene Program D	Bachelor Degree;	No		Students clinically assess	anterior lingual frenum att	We do not cover myofunction at this time		3 - I know a small amount about tongue posture and/	
7	3/12/24 17:00:04	3/12/24 17:04:07	anonymous			No	Dental Hygiene Program D	Associate Degree;	Yes	Yes	Students clinically assess	anterior lingual frenum att	We do not cover myofunction at this time		3 - I know a small amount	With an already packed cu
8	3/12/24 15:45:30	3/12/24 18:30:04	anonymous			No	Dental Hygiene Program D	Associate Degree;	No	No	Students clinically assess	anterior lingual frenum att	Myofunction is lectured in a unit in our curriculum		4 - I have read some researc	Would love to "beef up" th
9	3/12/24 19:01:34	3/12/24 19:03:45	anonymous			No	Dental Hygiene Program D	Bachelor Degree;	No	No	Students clinically assess	anterior lingual frenum att	We do not cover myofunction at this time		4 - I have read some researc	would love to get this sta
10	3/12/24 19:03:25	3/12/24 19:06:17	anonymous			No	Dental Hygiene Program D	Bachelor Degree;	Yes	Yes	Students clinically assess	anterior lingual frenum att	Myofunction is lectured in a unit in our curriculum		4 - I have read some research or attended a course on	
11	3/13/24 7:41:28	3/13/24 7:44:45	anonymous			No	Full-time faculty	Bachelor Degree;	No	No	Students clinically assess	anterior lingual frenum att	Myofunction is lectured in a unit in our curriculum		3 - I know a small amount about tongue posture and/	
12	3/13/24 8:43:41	3/13/24 8:45:18	anonymous			No	Dental Hygiene Program D	Associate Degree;	Yes	Yes	Students clinically assess	anterior lingual frenum att	Myofunction is lectured in a unit in our curriculum		4 - I have read some research or attended a course on	
13	3/13/24 9:11:54	3/13/24 9:14:06	anonymous			No	Dental Hygiene Program D	Associate Degree;	Yes	Yes	Students clinically assess	anterior lingual frenum att	Myofunction is lectured in a unit in our curriculum		4 - I have read some research or attended a course on	
14	3/13/24 10:44:31	3/13/24 10:47:34	anonymous			No	Dental Hygiene Program D	Associate Degree;	Yes	Yes	Students clinically assess a	Medical and Dental Histor	Myofunction is lectured in a unit in our curriculum		5 - I have read more than o	I completed my dissertatio
15	3/13/24 12:20:54	3/13/24 12:23:30	anonymous			No	Dental Hygiene Program D	Associate Degree;	No	No	Students clinically assess	anterior lingual frenum att	We do not cover myofunction at this time		4 - I have read some research or attended a course on	
16	3/12/24 14:41:15	3/13/24 14:41:22	anonymous			No	Dental Hygiene Program D	Associate Degree;Bachelor	No	No	Students clinically assess	anterior lingual frenum att	We do not cover myofunction at this time		3 - I know a small amount about tongue posture and/	
17	3/13/24 17:03:24	3/13/24 17:11:16	anonymous			No	Dental Hygiene Program D	Bachelor Degree;	Yes	I don't know	Students clinically assess a	Malampati Score	We do not cover myofunction at this time		4 - I have read some researc	I would be intersea in learn
18	3/13/24 21:05:27	3/13/24 21:17:19	anonymous			No	Dental Hygiene Program D	Bachelor Degree;	No	No	Students clinically assess	anterior lingual frenum att	Myofunction is lectured in a unit in our curriculum		3 - I know a small amount	I wish I know how to asses
19	3/14/24 16:03:21	3/14/24 16:06:26	anonymous			No	Dental Hygiene Program D	Certificate;Associate Degre	Yes	Yes	Students clinically assess a	Students evaluate the pres	Other (please describe in t	portion of a lecture and ref	5 - I have read more than o	
20	3/15/24 10:49:13	3/15/24 10:51:12	anonymous			No	Dental Hygiene Program D	Associate Degree;	Yes	Yes	Students evaluate the uvula	Students clinically assess	Myofunction is lectured in a unit in our curriculum		4 - I have read some resear	Leaning more about it and
21	3/18/24 10:51:38	3/18/24 10:54:58	anonymous			No	Dental Hygiene Program D	Associate Degree;	No	Yes	Students clinically assess	anterior lingual frenum att	We do not cover myofunction at this time		5 - I have read more than o	We plan to incorporate cli
22	3/21/24 11:59:45	3/21/24 11:59:54	anonymous			Yes										
23	3/21/24 12:08:05	3/21/24 12:11:30	anonymous			No	Dental Hygiene Program D	Bachelor Degree;	Yes	Yes	Students clinically assess	anterior lingual frenum att	Other (please describe in t	Included in a lecture	5 - I have read more than one evidence based research	
24	3/21/24 12:15:28	3/21/24 12:17:29	anonymous			No	Dental Hygiene Program D	Bachelor Degree;	No	No	Students clinically assess	anterior lingual frenum att	We do not cover myofunction at this time		3 - I know a small amount about tongue posture and/	
25	3/21/24 12:39:11	3/21/24 12:41:55	anonymous			No	Full-time faculty	Associate Degree;	Yes	Yes	Students clinically assess	anterior lingual frenum att	Myofunction is lectured in a unit in our curriculum		5 - I have read more than one evidence based research	
26	3/21/24 12:28:27	3/21/24 12:46:13	anonymous			I don't know	Dental Hygiene Program D	Associate Degree;	No	No	Students clinically assess	anterior lingual frenum att	We do not cover myofunction at this time		4 - I have read some research or attended a course on	
27	3/21/24 14:12:29	3/21/24 14:15:44	anonymous			I don't know	Full-time faculty	Associate Degree;	No	No	Students assess palate for	variants of normal (such as	Other (please describe in t	It is introduced and talked a	4 - I have read some research or attended a course on	
28	3/21/24 14:44:00	3/21/24 14:45:35	anonymous			No	Dental Hygiene Program D	Associate Degree;	No	No	Students clinically assess	anterior lingual frenum att	Myofunction is lectured in a unit in our curriculum		2 - I have heard about tongue posture but I am unawa	
29	3/21/24 15:32:40	3/21/24 15:34:25	anonymous			No	Dental Hygiene Program D	Associate Degree;	Yes	Yes	Students clinically assess	anterior lingual frenum att	Myofunction is lectured in a unit in our curriculum		4 - I have read some research or attended a course on	
30	3/21/24 16:47:17	3/21/24 16:49:04	anonymous			No	Dental Hygiene Program D	Bachelor Degree;	Yes	Yes	Students clinically assess a	Students are educated by t	Myofunction is lectured in a unit in our curriculum		5 - I have read more than one evidence based research	
31	3/21/24 18:17:03	3/21/24 18:21:39	anonymous			No	Part-time faculty	Bachelor Degree;	I don't know	Yes	Students clinically assess	anterior lingual frenum att	We do not cover myofunction at this time		4 - I have read some researc	I plan to become a certifie
32	3/21/24 18:27:33	3/21/24 18:29:44	anonymous			No	Dental Hygiene Program D	Associate Degree;	No	I don't know	Students clinically assess	anterior lingual frenum att	Other (please describe in t	guest speaker	3 - I know a small amount about tongue posture and/	
33	3/21/24 22:31:56	3/21/24 22:35:13	anonymous			No	Dental Hygiene Program D	Bachelor Degree;	I don't know	I don't know	Students clinically assess	anterior lingual frenum att	Myofunction is lectured in a unit in our curriculum		4 - I have read some research or attended a course on	
34	3/22/24 13:09:42	3/22/24 13:14:02	anonymous			No	Dental Hygiene Program D	Associate Degree;	No	I don't know	Students clinically assess	anterior lingual frenum att	Myofunction is lectured in a unit in our curriculum		2 - I have heard about tongue posture but I am unawa	
35	3/22/24 13:05:43	3/22/24 13:16:19	anonymous			No	Dental Hygiene Program D	Associate Degree;	No	No	Students clinically assess	anterior lingual frenum att	We do not cover myofunction at this time		3 - I know a small amount about tongue posture and/	
36	3/22/24 21:32:17	3/22/24 21:36:29	anonymous			No	Dental Hygiene Program D	Associate Degree;Bachelor	No	No	Students evaluate the uvula	Students clinically assess	We do not cover myofunction at this time		3 - I know a small amount about tongue posture and/	
37	3/25/24 9:29:39	3/25/24 9:31:52	anonymous			I don't know	Adjunctive faculty/Staff	Bachelor Degree;	Yes	Yes	Students clinically assess a	anterior lingual frenum att	I do not know if myofunctional disorders are taught i		3 - I know a small amount about tongue posture and/	
38	3/25/24 9:32:29	3/25/24 9:36:31	anonymous			I don't know	Adjunctive faculty/Staff	Bachelor Degree;	No	No	Students clinically assess a	n/a	I do not know if myofuncti	n/a	3 - I know a small amount	n/a
39	3/25/24 15:00:01	3/25/24 15:01:02	anonymous			No	Dental Hygiene Program D	Associate Degree;	No	Yes	Students clinically assess	anterior lingual frenum att	We do not cover myofunction at this time		4 - I have read some research or attended a course on	
40	3/25/24 15:14:27	3/25/24 15:14:33	anonymous			Yes										
41	3/25/24 15:39:31	3/25/24 15:45:17	anonymous			No	Dental Hygiene Program D	Associate Degree;	I don't know	I don't know	Students clinically assess	anterior lingual frenum att	We do not cover myofunction at this time		3 - I know a small amount about tongue posture and/	
42	3/26/24 8:50:03	3/26/24 8:53:12	anonymous			No	Dental Hygiene Program D	Associate Degree;	Yes	No	Students clinically assess a	Mallampati	Other (please describe in t	Workshop on Myofunctio	4 - I have read some research or attended a course on	

Appendix C - Survey Approval Letter UNM

SCHOOL OF MEDICINE
DEPARTMENT OF DENTAL MEDICINE

FROM: Dr. Nate Boyd, Interim Chair

TO: HRPO

RE: Survey Research

DATE: April 11, 2023

This is to assert that Christine Nathe and Kelly Brackeen have requested and been approved to distribute a survey on the Proper tongue posture and effects on overall health: A dental hygiene curriculum assessment in the US via email upon receipt of the UNM HSC IRB Approval. Please feel free to contact me with any questions at nhboyd@salud.unm.edu. Thank you.

1 University of New Mexico, Novitski Hall, MSC09 5020, Albuquerque, NM 87131

Appendix D - Consent and Authorization

The University of New Mexico Health Sciences Center

Consent and Authorization to Participate in a Research Study

Dear Prospective Participant,
Researchers at the University of New Mexico are inviting you to take part in a survey about an assessment of orofacial myofunctional education in dental hygiene curriculum. The purpose of the survey is to determine if dental hygiene students are currently learning to assess tongue posture or to identify other dysfunctions associated with the tongue.

WHAT ARE THE KEY REASONS YOU MIGHT CHOOSE TO VOLUNTEER FOR THIS STUDY?

- *Your responses may help us to further advance our dental hygiene profession by identifying opportunities for growth.*
- *Your participation will impact the results to aid in providing the most accurate data collection.*

Although you may not get personal benefit from taking part in this research study, your participation could have an impact on the advancement of our dental hygiene profession.

WHAT ARE THE KEY REASONS YOU MIGHT NOT CHOOSE TO VOLUNTEER FOR THIS STUDY?

- *Although we have tried to limit the number of questions, the time dedication to completing the survey may be a barrier*
- *Although the surveys are anonymous, participants may be concerned with sharing information*
- *The participant may not know the curriculum details being asked about and will need to seek out the faculty/adjunct responsible for the course content*

The survey/questionnaire will take about *7* minutes to complete.

There are no known risks to participating in this study.

Your response to the survey is anonymous which means no names will appear or be used on research documents or be used in presentations or publications. The research team will not know that any information you provided came from you, nor even whether you participated in the study. Your response to the survey will be kept confidential to the extent allowed by law. When we write about the study and its results you will not be identified.

We hope to receive completed questionnaires from all dental hygiene programs in the US, so your answers are important to us. Of course, you have a choice about whether to complete the survey/questionnaire, but if you do participate, you are free to discontinue at any time.

If you have questions about the study, please feel free to ask; my contact information is given below. If you have questions regarding your legal rights as a research subject, you may call the UNM Human Research Protections Office at (505) 272-1129.

Thank you in advance for your assistance with this important project. To ensure your responses/opinions will be included, please submit the digital survey using the provided link and completed survey/questionnaire [Date]. By returning this survey **OR** by clicking on the link below, you will be agreeing to participate in the above-described research study.

Sincerely,

Christine Nathe
Professor and Director Division of Dental Hygiene Vice Chair Department of Dental Medicine
University of New Mexico
PHONE: (505) 272-8147
E-MAIL: cnathe@salud.unm.edu

Appendix E - Recruitment E-mails

The University of New Mexico Health Sciences Center

Consent and Authorization to Participate in a Research Study

Dear Prospective Participant,

Researchers at the University of New Mexico are inviting you to take part in a survey about orofacial myofunctional disorders (OMDs) and the crucial role of tongue posture assessment in dental hygiene education.

Research indicates that early diagnosis and intervention of OMDs can improve oral and systemic health. Dental hygienists are in a unique position to play a key role in identifying improper tongue posture and implementing interventions. The extent to which tongue posture assessment is taught in dental hygiene programs varies, and there may be opportunities to enhance education in this area to further advance our profession.
The purpose of this survey to understand the current level of awareness among dental hygiene educators regarding tongue posture assessment and the extent to which it is integrated into dental hygiene curricula.

Although you may not get personal benefit from taking part in this research study, your responses may help us understand more about the education of dental hygienists in oral myofunctional therapy. There are no known risks to participating in this study. The survey should take about 10 minutes to complete.

Your response to the survey is anonymous, which means no names will appear or be used on research documents or be used in presentations or publications. The research team will not know that any information you provided came from you, nor even whether you participated in the study.

We hope to receive completed questionnaires from about 50 people, so your answers are important to us. Of course, you have a choice about whether or not to complete the survey/questionnaire, but if you do participate, you are free to skip any questions or discontinue at any time. Here in this link [survey link] [survey ID] you will find a 11-question survey.

If you have questions about the study, please feel free to ask; my contact information is given below. If you have questions regarding your legal rights as a research subject, you may call the UNM Human Research Protections Office at (505) 272-1129.

Thank you in advance for your assistance with this important project. To ensure your responses/opinions will be included, please submit your completed survey/questionnaire by [date] By clicking on the link below, you will be agreeing to participate in the above-described research study.

Sincerely,

Christine Nathe, Professor and Director
Kelly Brackeen, MSDH©
University of New Mexico Health Sciences Division of Dental Hygiene
PHONE: 505-272-8147
E-MAIL: CNathe@salud.unm.edu

Follow-up email:

Dear [Program Director's Name],

I hope this email finds you well. I am writing to follow up on my previous message regarding the research survey on tongue posture assessment in dental hygiene programs.

Researchers at the University of New Mexico are inviting you to take part in a survey about orofacial myofunctional disorders (OMDs) and the crucial role of tongue posture assessment in dental hygiene education.

Research indicates that early diagnosis and intervention of OMDs can improve oral and systemic health. Dental hygienists are in a unique position to play a key role in identifying improper tongue posture and implementing interventions. The extent to which tongue posture assessment is taught in dental hygiene programs varies, and there may be opportunities to enhance education in this area to further advance our profession.
The purpose of this survey to understand the current level of awareness among dental hygiene educators regarding tongue posture assessment and the extent to which it is integrated into dental hygiene curricula.

Although you may not get personal benefit from taking part in this research study, your responses may help us understand more about the education of dental hygienists in oral myofunctional therapy. There are no known risks to participating in this study. The survey should take about 10 minutes to complete.

Your response to the survey is anonymous, which means no names will appear or be used on research documents or be used in presentations or publications. The research team will not know that any information you provided came from you, nor even whether you participated in the study.

We hope to receive completed questionnaires from about 50 people, so your answers are important to us. Of course, you have a choice about whether or not to complete the survey/questionnaire, but if you do participate, you are free to skip any questions or discontinue at any time. Here in this link [survey link] [survey ID] you will find a 11-question survey.

If you have questions about the study, please feel free to ask; my contact information is given below. If you have questions regarding your legal rights as a research subject, you may call the UNM Human Research Protections Office at (505) 272-1129.

Thank you in advance for your assistance with this important project. To ensure your responses/opinions will be included, please submit your completed survey/questionnaire by [date]. By clicking on the link below, you will be agreeing to participate in the above-described research study.

Sincerely,

Christine Nathe, Professor and Director
Kelly Brackeen, MSDH©
University of New Mexico Health Sciences Division of Dental Hygiene
PHONE: 505-272-8147
E-MAIL: CNathe@salud.unm.edu

Appendix F - HRPO Approval Letter F

Human Research Protections Program

March 12, 2024
Christine Nathe
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Dear Christine Nathe:

On 3/11/2024, the HRRC reviewed the following submission:

Type of Review:	Initial Study
Title of Study:	Proper tongue posture and the effects on overall health, a dental hygiene curriculum assessment
Investigator:	Christine Nathe
Study ID:	24-099
Submission ID:	24-099
IND, IDE, or HDE:	None
Submission Summary:	Initial Study
Documents Approved:	• Consent form for survey • Letter of Approval • Participant Survey • Protocol • Recruitment Email
Review Category:	EXEMPTION: Categories (2)(i) Tests, surveys, interviews, or observation (non-identifiable)
Determinations/Waivers:	Provisions for Consent are adequate. HIPAA Authorization addendum not applicable.
Submission Approval Date:	3/11/2024
Approval End Date:	None
Effective Date:	3/11/2024

The HRRC approved the study from 3/11/2024 to inclusive. If modifications were required to secure approval, the effective date will be later than the approval date. The "Effective Date" 3/11/2024 is the date the HRRC approved your modifications and, in all cases, represents the date study activities may begin.

Because it has been granted exemption, this research is not subject to continuing review.

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