



**EVALUATION OF THE IMPORTANCE OF SOFT TISSUE BIOPSY
IN MILITARY DENTISTRY**



by

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A thesis submitted to the Faculty of the
Oral and Maxillofacial Oral Pathology Graduate Program
Naval Postgraduate Dental School
Uniformed Services University of the Health Sciences
in partial fulfillment of the requirements for the degree of
Master of Science
in Oral Biology

June 2019

Distribution Statement

Distribution A: Public Release.

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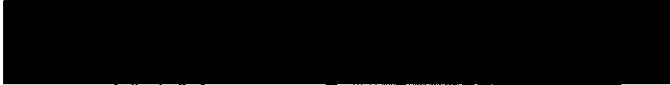
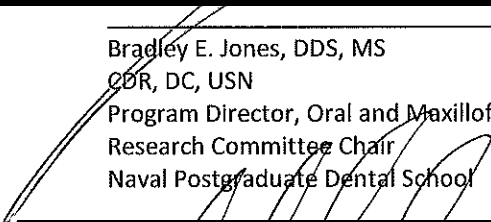
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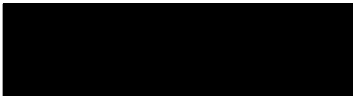
ACKNOWLEDGEMENTS

The author thanks CAPT James T. Castle, CAPT Steven M. Stokes, CAPT Andrew J. Avillo, and CDR Ling Ye for their assistance with the implementation and dissemination of the survey.

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2019

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ABSTRACT

“EVALUATION OF THE IMPORTANCE OF SOFT TISSUE BIOPSY IN MILITARY DENTISTRY”

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Introduction: The gold standard for establishing a definitive diagnosis of head and neck disease is biopsy. Despite the established importance of this procedure, several civilian dental surveys have determined that general dentists feel unprepared to perform biopsies.

Purpose: The purpose of this research study was to determine whether military dentists perform soft tissue biopsies during their educational and professional careers and factors influencing the decision to perform them.

Methods: All active duty military dentists from the Air Force, Army, and Navy were provided the opportunity to participate in an anonymous survey hosted on MAX.gov from September 2017 to September 2018.

Results: The survey was completed by 562 military dentists (response rate = 17.5%). The overwhelming majority of respondents (76%, n=427) reported they attended a dental school without a soft tissue biopsy requirement. Of those who remained general dentists (n=329), 70% performed zero biopsies in dental school and 99% performed less than five. Furthermore, 81% of participants performed less than five biopsies throughout their post dental school careers. Interestingly, a majority of general dentists (n=213; 65%) and specialists (n=122; 52%)

responded that general dentists should perform soft tissue biopsies. However, 82% of general dentists reported that dental school did not adequately prepare them to perform soft tissue biopsies, with 78% (n=257) citing lack of experience as a major factor preventing them from performing soft tissue biopsies in practice.

Conclusions: The results suggest that soft tissue biopsy is not adequately taught in dental school programs and subsequently not performed in the practice of general dentistry, although most dentists feel that they should be capable of performing this procedure. Updating pathology and biopsy curriculums in dental school and postgraduate education may address these findings and lead to increased utilization rates among general dentists, thereby enhancing early disease detection in the head and neck.

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I. REVIEW OF THE LITERATURE

The American Dental Association outlines dentists' responsibilities to include, "when appropriate, perform[ance] of procedures such as biopsies, diagnostic tests for chronic or infectious diseases, salivary gland function, and screening tests for oral cancer."¹ The gold standard for establishing a definitive diagnosis of head and neck disease is biopsy.^{2,3} Several civilian dental surveys have determined that general dentists feel unprepared to carry out biopsy procedures primarily due to a lack of education and experience.⁴⁻⁶ Past research surveys have also shown that the great majority of civilian general dentists opt to refer all oral lesions requiring biopsy to a specialist rather than performing the biopsy themselves, citing concerns of inadequate experience and a lack of faith in diagnostic and practical skills.⁴⁻⁹ Another concern is a lack of information about pathology services available⁶ and lack of instruments required for biopsy.⁷ However, the referral process for biopsy can lead to delays in diagnosis¹⁰⁻¹⁵ and is not an adequate solution for the lack of direct utilization of the biopsy service by general dentists.

This research surveyed active duty Air Force, Army and Navy dentists regarding their perceived value, knowledge of, and ability to perform soft tissue biopsies, to identify barriers contributing to why active duty military general dentists do not perform soft tissue biopsies, and to identify where education deficiencies may occur in the perceived value, knowledge of, and ability to perform soft tissue biopsies from dental school to postgraduate training and beyond. A military dental survey like this has not been conducted before, and it was anticipated that findings from the survey used in this study would mirror the findings in civilian dental surveys as published in the literature. In addition, it was hypothesized that the majority

of dentists do not perform biopsies in dental school or in their post dental school careers primarily due to lack of education and experience.

II. MATERIALS AND METHODS

The research survey protocol was approved by the Walter Reed National Military Medical Center Department of Research Programs Institutional Review Board (WRNMMC-EDO-2017-0037). A web link to the anonymous research survey questionnaire (**see Figs. 1-3**) securely hosted by MAX.gov was emailed to all active duty military dentists in the Air Force, Army, and Navy via each branch's respective weekly dental newsletter. In addition, paper copies of the research survey were made available to attendees at the Naval Postgraduate Dental School continuing education courses. Survey participation was completely voluntary and participants did not receive any compensation. Data was collected over the duration of one year, from September 2017 to September 2018.

All participating dentists were instructed to answer three general demographic questions (**see Fig. 1**). General dentists were then instructed to answer eight additional questions (**see Fig. 2**), while specialists answered seven additional questions (**see Fig. 3**); each pertaining to soft tissue biopsies. For purposes of this research survey only, the definition of soft tissue biopsy was as follows: any incisional or excisional removal of epithelial and/or connective tissue for submission for pathological review; not including tooth extraction-associated lesions.

Figure 1. General Demographic Questions

(1) For what uniformed service do you practice?

Air Force
 Army
 Navy

(2) Have you completed a specialty residency program?

Yes
 No

(3) If yes, please specify (if multiple, please select most current practicing specialty):

Comprehensive Dentistry (2-Year AEGD)
 Orthodontics
 Endodontics
 Periodontics
 Pediatric Dentistry
 Prosthodontics
 Oral and Maxillofacial Surgery
 Oral and Maxillofacial Pathology
 Oral and Maxillofacial Radiology
 Orofacial Pain
 Other (please specify):

Figure 2. Soft Tissue Biopsy Questions For General Dentists (including 1-Year AEGD and GPR)

(1) Have you completed either of the following?

1-Year AEGD
 GPR
 N/A

(2) Did your dental school, 1-Year AEGD, and/or GPR have biopsy requirements? (please circle)
 If yes, what were they (optional)?

Dental School: Yes / No
1-Year AEGD: Yes / No / N/A
GPR: Yes / No / N/A

(3) How many soft tissue biopsies did you perform in dental school?

0 <5 5-10 10-50 >50

(4) Did your dental school, 1-Year AEGD and/or GPR adequately prepare you to perform soft tissue biopsies?

Dental School: Yes / No
1-Year AEGD: Yes / No / N/A
GPR: Yes / No / N/A

(5) How many soft tissue biopsies have you performed in your post-dental school military career?

0 <5 5-10 10-50 >50

(6) Do you think soft tissue biopsies are valuable in the detection of head and neck disease?

Yes
 No

(7) Do you think general dentists should perform soft tissue biopsies?

Yes
 No

Please comment on why or why not (optional):

(8) In your current practice, what may prevent you from performing soft tissue biopsies?
 (select all that apply):

Lack of experience
 Unsure of how to manage paperwork
 Procedure too time-consuming
 Biopsy tools/materials not available
 Not a skill I will be utilizing when I am in private practice
 Other (please comment):

Figure 3. Soft Tissue Biopsy Questions For Specialists

(1) Did your dental school and residency program have biopsy requirements? If yes, what were they (optional)?

Dental School: Yes / No

Residency: Yes / No

(2) How many soft tissue biopsies did you perform in dental school?

0 <5 5-10 10-50 >50

(3) How many soft tissue biopsies did you perform while in your residency program(s)?

0 <5 5-10 10-50 >50

(4) Did your dental school and residency program adequately prepare you to perform soft tissue biopsies?

Dental School: Yes / No

Residency: Yes / No

(5) How many soft tissue biopsies have you performed in your post-residency military career?

0 <5 5-10 10-50 >50

(6) Do you think soft tissue biopsies are valuable in the detection of head and neck disease?

Yes
 No

(7) Do you think general dentists should perform soft tissue biopsies?

Yes
 No

Please comment on why or why not. (optional)

III. RESULTS

There were 562 respondents out of a total of 3204 active duty military dentists, for an overall response rate of 17.5%. The number of respondents for each branch were as follows: 75 out of 925 Air Force, 221 out of 1100 Army, and 262 out of 1179 Navy active duty dentists. No branch of service was identified by four respondents. Of note, all respondents attended national Commission On Dental Accreditation-recognized dental schools and the military does not have a dental school of its own. Of the 562 respondents, 329 (59%) dentists remained general dentists (including those who had completed a 1-year AEGD and/or GPR; roughly 50% of the general dentist respondents) and 233 (41%) went on to become specialists currently practicing a board-recognized specialty.

Overall, there was nearly complete agreement (99% of respondents) that soft tissue biopsies are valuable in the detection of head and neck disease. The majority (76%) of respondents did not have a biopsy requirement in dental school, with 70% of general dentists performing zero biopsies and 99% performing less than five biopsies during dental school. Of those who would go on to become specialists, 58% did not perform any biopsies in dental school, while 98% performed less than five. Of the 12% of respondents who did have biopsy requirements in dental school, the requirements varied widely. Requirements ranged from observation only to complete work-up of at least one biopsy; from performing the incisional/excisional biopsy, or submitting the tooth extraction-associated tissue, to receiving and delivering the diagnosis to the patient. A few respondents participated in hands-on biopsy technique workshops in dental school using chicken, animal tongue, or a tissue simulating substance. Some respondents noted that biopsies were only required in an honors program or

to achieve a higher grade. One respondent stated that they were not allowed to perform biopsies in dental school or in their AEGD. The remaining 12% did not state whether or not they had requirements. Out of 134 respondents who completed a 1-year AEGD, 107 (80%) did not have biopsy requirements. Out of the thirty-one respondents who completed a GPR, five stated that they had biopsy requirements. For the specialists, biopsy procedures were only routinely required to complete Oral and Maxillofacial Surgery, Periodontics, and Oral Medicine residencies.

The majority (76%) of dentists overall felt that dental school did not adequately prepare them to perform soft tissue biopsies, with an overwhelming majority (n=270, 82%) of general dentists feeling that dental school did not adequately train them to perform soft tissue biopsies. Less than half of those who had completed 1-year AEGDs (47%) and GPRs (39%) felt that their postgraduate general dentistry program prepared them to perform soft tissue biopsies.

The majority (65%) of respondents did not perform any biopsies in dental school, with 98% performing less than five. More importantly, around half (n=151, 47%; confidence interval of 42% - 53%) of general dentists have not performed a soft tissue biopsy in their entire military careers, with an additional 42 specialists also noting that they have not performed a soft tissue biopsy in their entire military careers. Overall, the majority (65%) of respondents reported having performed less than five soft tissue biopsies in their military careers, with 81% of general dentists reporting that they have performed less than five biopsies throughout their entire military careers.

The majority of general dentists (n=213, 65%) felt that general dentists should perform soft tissue biopsies, while 122 (52%) of specialists felt that general dentists should perform soft tissue biopsies. General dentists in favor of performing biopsies highlighted the access to care and the convenience it provides to patients. Many pointed out that established rapport and routine scheduled visits may allow for a greater chance for the general dentist to pick up on changes and for higher likelihood of patient compliance than if the patient was referred. Several remarked that general dentists performing biopsies can aid in early detection of disease and that biopsies are necessary for a definitive diagnosis. Most in favor did caveat their responses however, with a yes, general dentists should perform soft tissue biopsies, but depending on their comfort level, training, and the nature of the lesion (size, location, anatomy). Specialists in favor also qualified their responses with the same case-dependent concerns. Many agreed that simple soft tissue biopsies (ex. punch or superficial/easily accessible incisional/excisional biopsies) should be within the scope of a general dentist. Both general dentists and specialists not in favor of general dentists performing soft tissue biopsies cited lack of training, experience, and general knowledge of the procedure. Of the minority of general dentists opposed to performing soft tissue biopsies, a few remarked on ease of referral to a specialist, lack of biopsy supplies, and difficulty in post diagnosis management and communication with the pathologist if the case required further workup. These reasons were echoed again in responses to Question 8 on the general dentist survey (**see Table 1**).

**Table 1. Responses to Question 8 - (From Questions for General Dentists)
In your current practice, what may prevent you from performing soft tissue biopsies?**

Response Option	N	% of General Dentists
Lack of experience	257	78
Unsure of how to manage paperwork	160	48
Procedure too time consuming	20	6
Biopsy tools/materials not available	127	39
Not a skill I will be utilizing when I am in private practice	25	8
Other	48	14

Note. Respondents may have provided a positive response to more than one choice.

IV. DISCUSSION

The American Dental Association defines dentists' responsibilities to include care of "not only their patients' teeth and gums but also the muscles of the head, neck and jaw, the tongue, salivary glands, the nervous system of the head and neck and other areas. During a comprehensive exam, dentists examine the teeth and gums, but they also look for lumps, swellings, discolorations, ulcerations — any abnormality. When appropriate, they perform procedures such as biopsies, diagnostic tests for chronic or infectious diseases, salivary gland function, and screening tests for oral cancer."¹

Unfortunately, failure to diagnose oral disease is a leading cause of legal action against dentists, indicating that this failure occurs frequently.^{2,6} Early detection of head and neck cancers and oral pathologies is imperative to prevent patients from suffering avoidable morbidity due to progression of unchecked pathology. In addition to primary oral cavity disease, lesions found in the mouth can also be among the first signs of underlying systemic illnesses such as nutritional deficiencies, inherited disorders, and autoimmune diseases. For

benign but locally aggressive pathologies, detection of an early lesion results in a much smaller treatment resection area than if the lesion was allowed to progress.

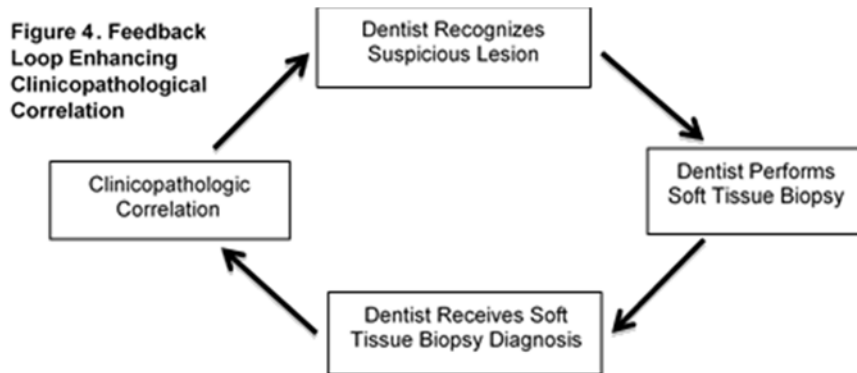
According to the National Cancer Institute Surveillance, Epidemiology, and End Results Program statistics, detection of early head and neck cancer limited to a local area can mean anywhere from a 60-90 percent 5-year survival rate compared to only a 20-50 percent 5-year survival rate for cancer with distant metastasis. Unfortunately, 65% of oral cavity and pharynx cancers are initially diagnosed at stages already demonstrating regional or distant metastasis, a statistic that has remained relatively constant for decades with no signs of improving. The death rate associated with this cancer is high, not because it is difficult to diagnose, but due to the cancer often being biopsied late in its development.¹⁶

In the present study, most respondents agreed that soft tissue biopsies are valuable in the detection of head and neck disease. However, many general dentists, as well as certain specialists reported that they do not perform soft tissue biopsies in practice. About half of general dentists indicated that they have not performed a soft tissue biopsy in their entire military careers, with many specialists also noting that they have not performed a soft tissue biopsy in their entire military careers. The majority of dentists overall have performed less than five soft tissue biopsies in their military careers, with an overwhelming majority of general dentists reporting that they have performed less than five biopsies throughout their entire military careers. Our survey did not request participants to report years of military service performed in an effort to protect respondent anonymity, however, it would have been a worthwhile distinction to make, as years in service can range from one to thirty years.

While the ADA lists biopsies as procedures within the scope of a general dentist,¹ and biopsies are recognized as the gold standard for establishing a definitive diagnosis,^{2,3} biopsy education and requirements are not standard in dental schools. The majority of respondents did not perform any biopsies in dental school. This is likely due to the fact that the majority of respondents did not have a biopsy requirement in dental school. Of those few respondents who did have biopsy requirements, the requirements varied widely, from observation only, to submission of at least a tooth extraction associated lesion, to incisional/excisional biopsy. As a result, the majority of dentists overall felt that dental school did not adequately prepare them to perform soft tissue biopsies, with an overwhelming majority of general dentists reporting that dental school did not adequately train them to perform soft tissue biopsies. In addition, in post-graduate dental education programs, the majority reported that there was not a biopsy requirement as part of their training program.

Similar to several civilian studies,⁴⁻⁶ this survey revealed that lack of experience and education is an overwhelming reason why dentists do not perform soft tissue biopsies. “Discovering” this lack of education is not surprising considering that failure to diagnose oral disease is a frequent cause of legal action against dentists.^{2,6} Along with the results from this survey noting where these deficiencies originate, this suggests that introducing standard biopsy procedure education in dental schools, to include enhanced clinicopathologic correlation (**see Fig. 4**) teaching methods and proper practical case management could be highly beneficial. In a feedback-loop model, the more comfortable dentists are in performing soft tissue biopsies and in correlating the soft tissue biopsy results to what is seen upon clinical examination, the

more aware they will be in identifying and detecting suspicious lesions early and providing better patient care.



Paperwork management and biopsy tools/material availability were also identified as issues preventing general dentists from performing biopsies, indicating that improved communication between pathology labs and dentists and streamlining of the submission and report process could be of great benefit. Perceived ease of referral to a specialist was also a factor preventing general dentists from performing biopsies. Unfortunately, the referral process for biopsy can lead to delays in diagnosis,¹⁰⁻¹⁵ and is not an adequate solution for the lack of direct utilization of the biopsy service by general dentists. Fortunately, according to the present survey, many general dentists do recognize the value and access to care that performing in-house biopsies would provide their patients, citing the established rapport and routine visits that allow for a greater chance for the general dentist to pick up on changes and for higher likelihood of patient compliance than if the patient was referred.

From this survey, the majority of general dentists and specialists are interested in and believe that general dentists should perform soft tissue biopsies. Many not in favor of general dentists performing biopsies again went back to highlight the lack of training and experience on this topic. Thus, it seems vital that soft tissue biopsy education and clinicopathologic

correlation should be improved in dental schools and residencies. Over time, this could aid in bettering the poor statistic that the majority of oral cavity and pharynx cancers are initially diagnosed already having metastasized, a statistic which has remained relatively constant for decades.¹⁶

V. CONCLUSION

Early disease detection away from the teeth and gums is not being adequately accomplished in our profession. Under the current educational model, the basic gold standard procedure for disease detection is not required to be performed in the majority of dental schools. A greater emphasis should be placed on teaching practical clinical oral pathology beginning in dental school and beyond; from recognition and effective communication of abnormal findings with patients and colleagues, to performing and submitting soft tissue biopsies, and managing basic workflow. Curriculum changes, to include incorporation of hands-on biopsy education, may be beneficial in improving confidence and utilization rates. The general dentist armed with the ability and desire to perform soft tissue biopsies would greatly enhance early disease detection in the head and neck.

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