

An insight into perceptions of general pathologists about the need for oral pathology services: An observational study

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Abstract

Objective: The objective of this study was to identify the degree of perception of oral pathology as a specialty among the general pathologists and the need of utilizing oral pathologists in assisting to identify oral lesions in diagnostic challenges.

Methods: A questionnaire-based survey was conducted among qualified general pathologists to collect the data. The survey items focused on various aspects, including the analysis of oral pathology as a specialty, the importance of employing oral pathologists for identifying oral lesions in diagnostic challenges, and the difficulties encountered in managing such lesions. The data collected was analyzed using descriptive and inferential statistics. For comparing the relationship between work experience and the referral of odontogenic cysts and tumors cases, a Chi-square test was employed. A significance level of $p \leq 0.05$ was deemed as statistically significant.

Results: Two hundred and fifty general pathologists responded to the questionnaire. Two hundred and thirty two (92.8%) participants showed awareness of oral pathology as a specialty. For the diagnosis of oral, jaws, and salivary glands pathologic lesions, the majority 198 (79.2%) respondents believed that oral pathologists are required for the diagnosis. Regarding the referrals of lesions to oral pathologists, 137 (54.8%), participants did not refer. In terms of training in oral pathology, all of the participants agreed that they would undertake short-term posting in oral pathology. For challenging cases, all the general pathologists believed that oral pathologists should be part of the team.

Conclusion: The general pathologists recognized oral pathology as a specialty and feel the need for an oral pathologist opinion in diagnosis. However, most of the general pathologists did not refer the complex cases to oral pathologists. Therefore, it is of paramount importance to encourage oral pathologists and their hiring at histopathology laboratories that are diagnosing complex head and neck cases.

Keywords

Histopathology, oral lesions, oral pathology, second opinion

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Introduction

The field of oral and maxillofacial pathology (OMFP) focuses primarily on clinical data, radiology, and microscopic findings of lesions that have an impact on the head and neck regions.^{1,2} The American Academy of OMFP defined OMFP as a subspecialty within the field of dentistry that focuses on the characterization, diagnosis, and treatment of diseases that involve the head and neck region.³

The OMFP encompasses the prevention, diagnosis, and treatment of diseases within the oral and maxillofacial region, utilizing both medical, and dental knowledge. One of its specialized aspects lies in the field of oral pathology.⁴ However, with the passage of time, dental pathology gradually became confined to a more delimited nonclinical domain.⁵ Oral pathologists possess the capacity not only to observe and identify visible disease symptoms but also to evaluate and comprehend their microscopic attributes. The significant expansion of molecular-based technologies, immunology, and genetics has propelled this field to a heightened prominence.^{6,7}

Oral pathologists are specialists who acquire their expertise through comprehensive experience and clinical knowledge, utilizing microscopes for oral histology purposes. Due to their focused training, oral pathologists can establish more accurate connections between pathological and clinical findings compared to general pathologists trained in broader surgical pathology, thereby enabling more precise and accurate diagnoses of facial pathologies.^{8,9} It is crucial to recognize that training and specialization in OMFP can vary among different countries. Furthermore, training programs and pathways can evolve over time. Thus, it is advisable to consult the relevant dental or medical authorities in each country for the latest and most accurate information regarding training and specialization in oral pathology.⁷ Studies have reported and emphasized on the shortage of specialists in head and neck pathology, the demand for such expertise remains high, and experienced general histopathologists are often relied upon for head and neck lesion assessments.^{2,3} These lesions have emerged as the third most frequently misdiagnosed conditions due to the scarcity of specialists.⁴ It is important to note that misdiagnosed malignancies can significantly impact patient prognosis and treatment outcomes.¹⁰

The diagnosis of oral and maxillofacial lesions may require not only prompt identification but also clinical examination to aid in treatment planning and guide subsequent surgical approaches, a task achievable only with professional help.⁸ While a substantial evidence highlights the significance of this subject, yet the available data are scarce.¹¹ The working hypothesis in this study was that, there is no significant difference in the likelihood of general pathologists referring head and neck cases to oral pathologists before arriving at a diagnosis, and there is no relationship between the recognition of oral pathology's importance and the actual referral behavior. The aim of this study was to assess the

degree of perception of oral pathology as a specialty among the general pathologists and the need of utilizing oral pathologists in assisting to identify oral lesions in diagnostic challenges.

Methodology

Study setting and ethical consideration

In this questionnaire-based survey, the data was collected from different histopathology centers. The study was carried out among the national pathologists. The ethical approval was granted by the ethical review committee of Altamash Institute of Dental Medicine (AIDM), Karachi, Pakistan (AIDM/ERC/02/2022/04).

Sample size and study design

The survey was conducted over a period of 4 months. The Open-Epi software. was used to determine a sample size of 250 pathologists, with a mean score of 34.5% and a 95% confidence interval. The power of test 80% was used to evaluate the awareness of oral pathology as a specialty.¹² The study was as a descriptive observational questionnaire-based survey consisting of 13 multiple-choice and open-ended questions. The questionnaire was adapted and modified from the survey developed by Barret and Speight.¹⁰

Subject criteria

The participants were asked about their profession and their willingness to participate in the study. Once they agreed, the questionnaire link was shared with them. The participation of respondents in this study was dependent upon the following predetermined criteria.

Inclusion criteria for participants:

- Participants were required to have a background in general pathology and be actively involved in the practice of pathology to ensure their insights and perspectives were informed by their professional experience.
- Participants from various cities of Pakistan were included to capture diverse perspectives and account for potential regional variations in the need for oral pathology services.

Exclusion criteria for participants:

- The pathologists who did not practice in laboratories were excluded from the study, to ensure that the participants' perspectives were specifically based on their expertise and experience in general pathology.
- To ensure accurate comprehension and interpretation of the questions as well as reliable data collection,

people who did not possess a sufficient command on English were excluded.

Questionnaire design and distribution

A well-structured questionnaire was disseminated electronically among the general pathologist all over the country between the time period of May to August 2022 through email and online applications such as WhatsApp®, Facebook®, Instagram®, Skype®, IMO messenger®, Snapchat®, and LinkedIn®. The survey comprised of 13 questions, involving asking the pathologists regarding their knowledge of oral and maxillofacial pathologist services, the need of oral pathologist to identify lesions, during surgical procedures, and for treatment planning. The pathologists were further asked about the need of referral to oral pathologist when they encounter oral and maxillofacial lesions for second opinions. The questionnaire is attached as Supplemental File 1. The participants who did not respond to the initial invitation for participation were sent daily reminders after a week through emails and online applications, subsequent to the first-time invitation.

Reliability and validation of the questionnaire

The author team and two general pathologists conducted face and content validity for the questionnaire before administering the study. A pilot study was conducted for the construct validation and its application in Pakistani population. For this, 30 participants were invited to complete the questionnaire. This helped to identify any issues with item clarity, response options, or overall questionnaire structure. During filling of the questionnaire, the feedback was acquired from the participants regarding their perception and understanding of the questionnaire. The pilot data was used to assess the reliability of the questionnaire and identify any necessary modifications. The reliability or internal consistency of the questionnaire items was assessed using Cronbach's alpha, revealing a strong consistency with a value of $\alpha=0.82$.

Consent from participants

For recruiting participants in this study, the nature of this study was explained to the participants. The participants were instructed that their data would remain confidential and anonymous to ensure their privacy. After a careful explanation, participants were asked to give a written informed consent to ensure voluntary participation in this study.

Statistical analysis

The data obtained was analyzed using SPSS software, version 25 (IBM, Chicago Inc., IL, USA). Descriptive statistics were used and the results are presented as number and percentage. The comparison of work experience with the

Table 1. Sociodemographic attributes of the respondents ($n=250$).

Variables	N	%
Designation		
Professor	43	17.2
Associate professor	36	14.4
Assistant professor	56	22.4
Senior resident	45	18.0
Private practitioner	70	28.0
Location of practice		
Karachi	73	29.2
Islamabad	47	18.8
Lahore	61	24.4
Multan	21	8.4
Peshawar	15	6.0
Hyderabad	33	13.2
Work experience		
0–5 years	83	33.2
6–10 years	67	26.8
11–15 years	70	28.0
>16 years	30	12.0

N: frequency; %: percentage.

referral of odontogenic cysts and tumors cases was analyzed with Chi-square test. A p -value of ≤ 0.05 was considered significant.

Results

In this cross-sectional study, we enrolled a total of 250 general pathologists practicing in major cities of Pakistan. Out of 250 general pathologists, most of the participants had the following designations: 70 (28%) private practitioners, 56 (22.4%) assistant professors, and 45 (18%) senior residents. About the location of practice, most of the participants were from Karachi (29.2%) and Lahore (24.4%). Furthermore, regarding years of work experience, most of the participants had 0–5 years (33.2%) and 11–15 years (28%) of work experience, illustrated in Table 1.

Two hundred and thirty (92.8%) participants were aware of the specialty of oral pathology; however, a small number of 18 (7.2%) were unaware. For the diagnosis of oral, and salivary glands pathologic lesions, the majority of the 198 (79.2%) respondents believed that oral pathologists are required for the diagnosis of oral lesions, but 52 (20.8%) disagreed with it. Furthermore, many of the participants believed that their labs received 2000–5000 (38.4%) and <2000 (33.2%) total specimens in a year. Of these total specimens, the majority of the participants (66.4%) agreed that less than 100 specimens were dental-related, as presented in Figure 1.

Regarding the referrals of oral lesions to oral pathologists, 137 (54.8%) did not refer; however, 113 (45.2%) did refer. Of the participants that referred to oral pathologists, 71

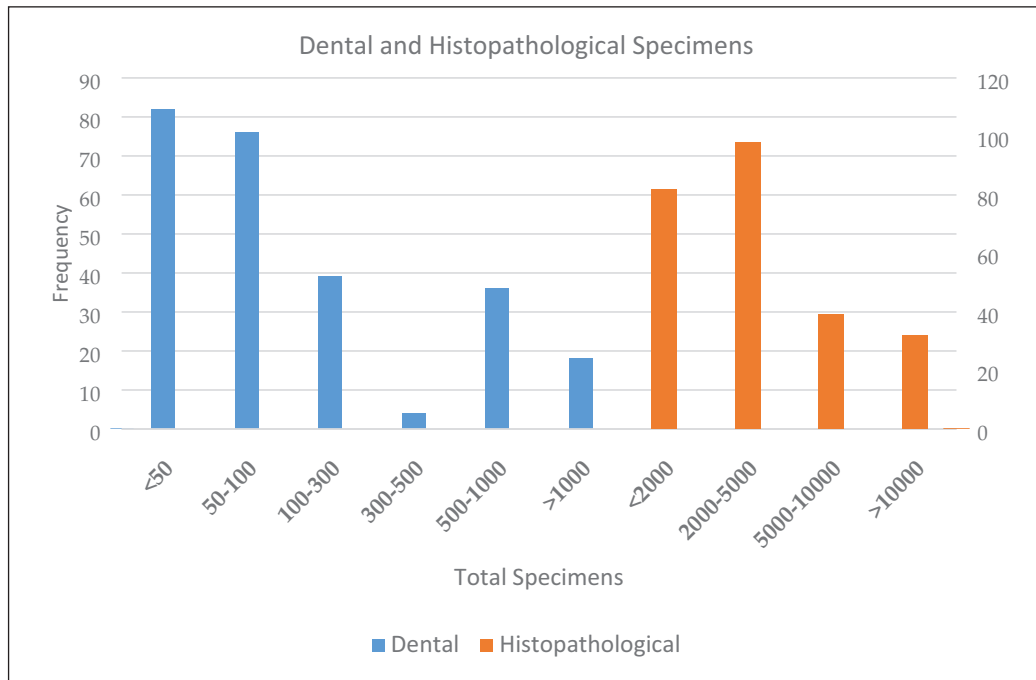


Figure 1. Distribution of dental and histopathological specimens per year ($n=500$).

(28.4) general pathologists referred more than 10 cases in a year. About the diagnosis of odontogenic cyst, 142 (56.8%) general pathologists did not refer the case to an oral pathologist; on the other hand, 108 (43.2) did refer it. Moreover, for the diagnosed cases of odontogenic tumor, the majority of the 143 (57.2%) participants did not refer the patient to oral pathologists; however, 107 (42.8%) did refer to an oral pathologist, as presented in Figure 2. In terms of training in oral pathology, all of the participants agreed that they would undertake short-term posting in oral pathology. For complex head and neck cases, all the general pathologists believed that oral pathologists should be part of the team.

Table 2 presents the comparison of work experience with the referral of odontogenic cysts and tumors cases. The obtained p -value of 0.001 indicates a statistically significant association between work experience and both the referral of odontogenic cysts and odontogenic tumors. It indicates that work experience has an impact on whether patients are referred for these conditions.

Discussion

Oral pathological lesions, whether benign or malignant, hold significant diagnostic importance for the oral health of patients. While general pathologists are trained in diagnosing lesions throughout the body, including oral pathological lesions, the specific expertise of an oral pathologist may be essential. In our research, we aimed to assess the awareness of general pathologists in Pakistan regarding the need for an oral pathologist, focusing on the unique context of oral health and pathology in the country. The

survey results indicate that there is no significant relationship between the awareness of general pathologists about oral pathology as a specialty and their actual referral behavior when encountering challenging oral, jaws, and salivary glands pathologic lesions.

Oral pathology holds immense significance in the field of dentistry, with dental graduates and specialist oral pathologists undergoing dedicated training for 4 years to develop expertise in diagnosing lesions related to the jaws, salivary glands, teeth, and adjacent structures.¹² This specialized training equips them with the knowledge and skills required to accurately diagnose and manage oral pathological conditions, ensuring optimal oral health care for patients. As per our findings, a significant proportion of general pathologists demonstrated awareness of the specialized field of oral pathology. The study conducted by Binmadi and Almazrooa² reported a high level of awareness of the oral pathology specialty among general pathologists. This finding indicates that general pathologists have a good understanding of the importance and scope of oral pathology as a distinct specialty within the field of pathology. The study's findings contribute to our understanding of the recognition and acknowledgment of oral pathology expertise among general pathologists, emphasizing the value of collaboration between general pathologists and oral pathologists in providing comprehensive care for patients with oral pathological conditions. Contrarily, a study conducted by Uma Mudaliar et al.¹³ reported a low level of awareness of oral pathology in their study, indicating the need for interventions to improve the knowledge and understanding of oral pathology among general pathologists.

The findings of this study provide strong support for the belief held by many general pathologists regarding the importance of oral pathologists in the diagnosis of oral pathological lesions. These results align with the study conducted by Salian and Natarajan,³ which emphasized the importance of oral pathologists in the diagnosis of oral pathological lesions, as perceived by general pathologists. One of the key

reasons for this preference is that oral pathologists undergo comprehensive training for a period of 2–4 years specifically in the field of oral pathology, which equips them with extensive knowledge and advanced skills necessary for accurate diagnosis in this specialized area.

In our study, we observed that the number of dental specimens analyzed by general pathologists was relatively small compared to the overall number of specimens. This finding could be attributed to low referral rates for dental cases. One possible reason for this could be a lack of awareness among dental professionals regarding the potential benefits of consulting with general pathologists for the diagnosis of oral pathological lesions. It is important to address this issue by increasing awareness among dentists about the value of involving general pathologists in the diagnostic process, thereby ensuring that dental specimens are appropriately referred for pathological analysis. Additionally, we observed that more than half of the general pathologists did not refer cases of odontogenic cysts and tumors to oral pathologists. This contrasts with a previous study³ where these pathologies were frequently referred for consultation with oral pathologists. The limited exposure of general pathologists to oral and maxillofacial region pathologies could explain this discrepancy, leading to uncertainty and a lower rate of referrals in such cases.

Barret et al.¹⁰ conducted a study, which revealed a noteworthy finding, that histopathology consultants exhibited a receptive stance toward the inclusion of dental graduates without a medical degree for training posts within their departments. Conversely, Binmadi and Almazrooa² presented a contrasting perspective, highlighting that a lower percentage of pathologists demonstrated a willingness to engage oral pathologists within their departments. This dichotomy in viewpoints underscores the complexity of the issue, where differing considerations might influence the decisions of medical professionals when it comes to hiring non-medical dental graduates or specialized oral pathologists. Factors such as cross-disciplinary collaboration, skill compatibility, and departmental needs likely contribute to the varying attitudes observed between these studies. As the medical field continues to evolve, understanding these nuances becomes imperative in shaping inclusive and effective histopathologic teams.

A 10years study conducted at John Hopkins University revealed that 7% of patient’s head and neck lesions which

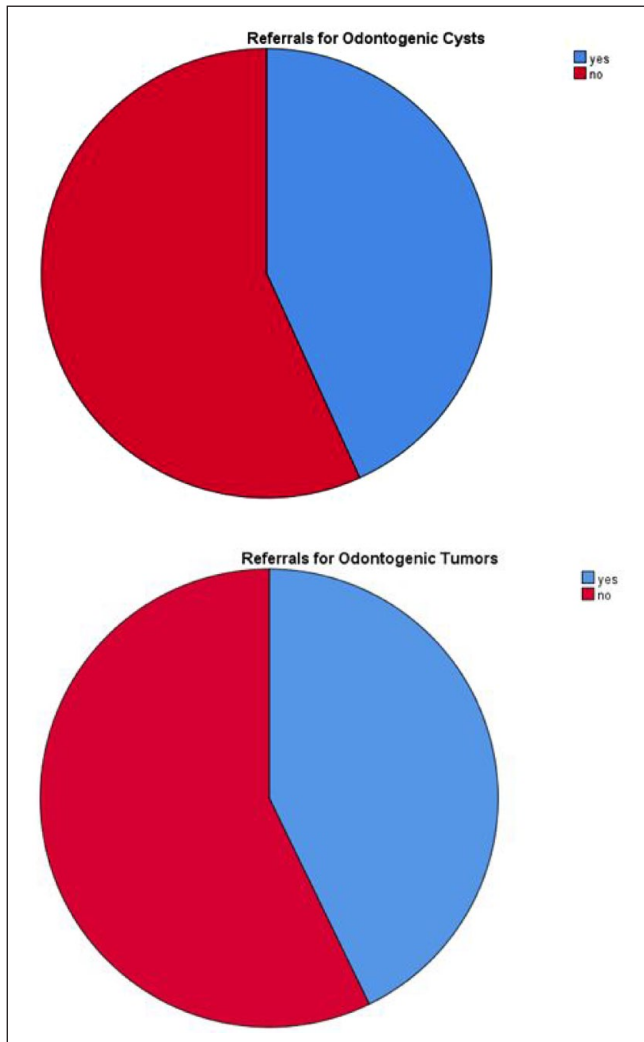


Figure 2. (a) Referral for odontogenic cysts and (b) referral for odontogenic tumors.

Table 2. Comparison of work experience with referral of odontogenic cysts and tumors cases (n = 250).

Work experience	Referral of odontogenic cysts		p-Value	Referral of odontogenic tumor		p-Value
	Yes	No		Yes	No	
0–5 years	18	65	0.001	16	67	0.001
6–10 years	32	35		32	35	
11–15 years	42	28		42	28	
>16 years	16	14		17	13	
Total	108	142		107	143	

were first diagnosed as benign were later reclassified as malignant.¹⁴ Such results display the difficulties faced by general pathologists in the diagnosis of lesions associated with oral and maxillofacial regions. Studies have suggested that many cases with doubts or second opinions regarding the diagnosis are frequently encountered by oral pathologists.^{14,15} Manion and colleagues conducted a study in which cases showing discrepancies in diagnoses made by histopathologists from external institutions and the Mayo Clinic were referred for a definitive diagnosis. The study found that the disagreement rates between the diagnoses made by histopathologists from external institutions and the Mayo Clinic were 18% for gastrointestinal pathology, 16% for lymphoid pathology, 10% for breast pathology, and 7% for head and neck pathology.¹⁶ Moreover, in a study by Cheng et al.,⁴ they reported a shortage of oral pathologists in their respective country, even though demands remain high.

Scarcity of general pathologists' exposure to disorders of the oral and maxillofacial region is highlighted in this study. They are the major contributors in the field but diagnosis of oral lesions is not covered in depth in their curriculum. The categorization of odontogenic cysts, tumors, and salivary gland disorders is a complex topic that is not well comprehended by pathologists who do not specialize in these areas. For the better management of oral pathological lesions diagnosis, general pathologists should be trained in oral pathology or such cases should be referred to oral pathologists since a high number of cases are either misdiagnosed or not able to be diagnosed. This will lead to an increase in the accuracy, proficiency, and efficacy of the work of pathologists.¹⁷ As a result, it is crucial to promote the referral and/or employment of specialists in OMFP in histopathology laboratories that diagnose intricate head and neck cases. Additionally, there is a necessity to modify postgraduate oral pathology education to help bridge the gap between these two fields.

This study demonstrates a statistically significant association between work experience and the referral of both odontogenic cysts and tumors. The work experience plays a crucial role in determining whether someone will be referred for odontogenic cysts and tumors. A study by Okoh et al.¹⁸ found similar results, reporting a significant correlation between work experience and the likelihood of individuals being referred for odontogenic tumors. Their study, conducted on a larger sample size of 990 cases, reinforced the concept that work experience is a crucial factor in the referral process for these conditions.

Additionally, Schuch et al.¹⁹ examined 2497 isolated cases of odontogenic keratocysts and identified a consistent trend of work experience being positively associated with referrals. Their findings further support the idea that work experience plays a significant role in determining the likelihood of referral for these conditions.

This study findings interestingly revealed that a unanimous consensus was reached among all participants, with

each expressing a strong willingness to enthusiastically undergo short-term postings in the realm of oral pathology as an integral facet of their comprehensive training experience. Therefore, current study recommended focusing on modifying postgraduate general pathology training to address the identified gaps and challenges in collaboration between the two specialties. These amendments may involve incorporating interdisciplinary components into the curriculum, facilitating joint training programs or rotations with oral pathology departments, adopting regular communication, and collaboration between them.

The study's main strength is its diverse sample of general pathologists practicing in various cities of Pakistan. Furthermore, this study provides valuable insights into the perspectives of general pathologists, shedding light on their understanding and opinions regarding the need for oral pathology services. The observational nature of the study allows for the collection of real-world data, enhancing the external validity and applicability of the findings to clinical practice.

Despite these strengths, this study has some limitations. Firstly, the study was restricted to a specific group of participants, namely general pathologists, which may restrict the generalizability of the findings to other healthcare professionals or regions. Secondly, the study relied on self-reported data, which may introduce recall or response biases. Additionally, the study did not explore the perspectives of other stakeholders, such as oral pathologists, dental professionals, or patients, which could provide a more comprehensive understanding of the topic. Therefore, there is a need for further research to investigate the knowledge, attitudes, beliefs, perceptions, and expectations of oral pathologists on a larger scale to broaden the study's scope. In future, it would be beneficial to conduct a multi-center study involving a diverse range of healthcare professionals, including oral pathologists, to obtain a more holistic view of the need for oral pathology services. Incorporating qualitative methods, such as interviews or focus groups, could provide in-depth insights into the perspectives and experiences of different stakeholders. Furthermore, investigating the impact of access to oral pathology services on patient outcomes and healthcare resource utilization would be valuable for guiding policy and resource allocation decisions. Finally, exploring the potential barriers and facilitators to the implementation of oral pathology services could inform strategies to improve their accessibility and utilization in clinical practice.

Conclusion

The findings of this study suggest that general pathologists have knowledge of oral pathology as a specialty and they recognize the importance of seeking an oral pathologist's opinion. However, most of the general pathologists did not refer the head and neck cases to oral pathologists. Given the study's findings, it is crucial to encourage the referral and hiring of oral pathology specialists in histopathology

laboratories that diagnose complex head and neck cases. To close the gap between the two disciplines, modifications in postgraduate oral pathology training are also required.

Author contributions

Conceptualization: AM, SF, DM, NA, SA, ZQ, and AH; Methodology: AM, SF, DM, NA, AL, and ZQ; Validation: AM, SF, NA, ZQ, SA, and AH; Formal analysis: AM, NA, AL, SA, and AH; Investigation: AL, NA, and MA; Data curation: NA, AM, SF, AL, and DM; Writing – original draft preparation: AM, AL, SF, AH, and NA; Writing – review and editing: NA, AL, AH, ZQ, DM, and AH; Supervision: AM, and SF; Funding acquisition: NA and AH. All authors have read and agreed to the published version of the manuscript.

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Informed consent

The written informed consent was obtained from all participants, ensuring voluntary participation prior to the administration of the study.

Trial registration

N/A.

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Supplemental material

Supplemental material for this article is available online.

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