Eye Safety Practices in U.S. Dental School Restorative Clinics, 2006

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Abstract: This study was conducted to determine how much progress U.S. dental schools have made in providing eye protection during restorative (adult operative and fixed prosthodontic) procedures since a 1979 survey. A seven-question survey was placed at a website, and fifty-five different U.S. dental schools were asked to complete the survey. Thirty-one schools responded (56 percent). Eighty-four percent of schools had safety glasses available for patients, but only 77 percent required usage during restorative procedures. Similarly, while 87 percent of schools required dental students working in restorative clinics to wear safety glasses, just 73 percent enforced the policy. Additionally, 84 percent provided blue light protection on curing lights and required students to wear eye protection while doing lab procedures. Compared to the 1979 survey, considerable progress has been made over the last twenty-seven years in protecting dental school patients and students from ocular injuries. Because one would hope to have 100 percent compliance on this issue, there is room for improvement in promoting patient eye safety and teaching good habits to dental students.

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In the modern dental practice, safety concerns must be paramount to avoid injury and litigation. The principle of “do no harm” must also apply to patient injury prevention. Similarly, dentists must be vigilant in wearing personal protective equipment to ensure their own personal safety and thus remain healthy and active in their profession. Dental students are taught many basic safety practices and learn about the importance of personal protective equipment prior to reaching the clinic floor and, hopefully, continue to employ safety practices well past graduation. Because the vast majority of dental procedures are accomplished with instruments being passed over or near the patient’s face and with aerosols and chemicals frequently in close proximity, both patients and dental students should wear eye protection. Curing lights are also a potential hazard to those who place restorative resins due to phototoxic and photoallergic reactions originating from absorbed radiation.¹

In 1979, Casey and Casey² reported the results of a survey involving sixty U.S. and ten Canadian dental schools, which were asked what was being taught regarding the use of eye protection during restorative procedures. Just 12.7 percent of the fifty-five respondents required patients to wear eye protection for restorative procedures, whereas 61.8 percent required dental students to use protective eyewear. In 1986, the U.S. Centers for Disease Control (CDC) recommended infection control practices in dentistry³

that encouraged the use of protective eyewear with side shields for dentists. In 1991, the U.S. Occupational Safety and Health Administration (OSHA) mandated protective eyewear usage to reduce the risk from bloodborne pathogens during procedures in which splatter or the use of aerosols might occur.⁴ The CDC’s latest update simply states, “Protective eyewear for patients can shield their eyes from splatter and debris during dental procedures.”⁵ Although not a frequent topic, the dental literature^{2,6,7,8} supports the use of safety eyewear during restorative procedures to reduce the risk of ocular injuries. This study was conducted to see what progress U.S. dental schools have made in providing eye protection during restorative (adult operative and fixed prosthodontic) procedures since the 1979 survey.

Methods

The original 1979 survey had only three questions, which were repeated verbatim in my study (questions 1, 6, and 7). Four additional questions were used to broaden the scope of this survey. The survey was placed on a website where questions could be electronically answered and submitted. The individual in charge of restorative dentistry (adult operative and fixed prosthodontic clinics only) or associate dean of clinical affairs at fifty-five U.S. dental

schools (identified using the American Dental Education Association directory) was contacted via email with a request to go to the website and complete the survey. A follow-up email was sent after three weeks to encourage maximum participation. The website was closed six weeks after the initial request.

Results

Of the fifty-five dental schools asked to complete the online survey, thirty-one responded (approximately 56 percent; only thirty answered

questions two and seven). Figure 1 displays the seven survey questions along with the response frequency expressed as a percentage and the actual number of respondents selecting each answer option. Respondents indicated that 87 percent required students to wear protective eyewear while operating, but only 73 percent enforced the policy; 84 percent required students to wear protective eyewear while doing lab procedures and had blue light protective shields on curing lights; and although 84 percent provided protective eyewear for patients, only 77 percent required usage. Patients wearing prescription eyeglasses were not always asked to remove their glasses.

1. Are undergraduate dental students working in restorative clinics at your school required to wear eye protection (safety glasses with side shields) while operating?	No	Yes	
	13%	87%	
	4	27	
2. If yes, is the policy enforced?	No	Yes	
	27%	73%	
	8	22	
3. Are undergraduate students required to wear eye protection (safety glasses with side shields or full coverage face shields) while doing laboratory procedures?	No	Yes	
	16%	84%	
	5	26	
4. Are blue light (orange) protective shields on light curing units used by students?	No	Yes	
	16%	84%	
	5	26	
5. Is protective eyewear available for patients in restorative clinics at your school?	No	Yes	
	16%	84%	
	5	26	
6. Are all patients undergoing restorative dental treatment at your school required to wear eye protection during the restorative procedure?	No	Yes	
	23%	77%	
	7	24	
7. Are patients wearing prescription glasses asked to remove their glasses prior to restorative procedures?	No	Yes	Sometimes
	23%	17%	60%
	7	5	18

Figure 1. Eye safety practices at thirty-one U.S. dental schools, 2006: responses by percentage of total and number

Discussion

The response rate was 56 percent for the fifty-five U.S. dental schools contacted whereas Casey and Casey's response rate was 78.6 percent for a mailed survey of seventy U.S. and Canadian dental schools in operation at that time.² Surveys are more popular today than in the past, and compliance may be a problem due to the increased exposure to this information-gathering tool. An electronic survey was selected to provide convenience for the person answering the survey and to minimize cost although the response rate for a web-based survey may differ from that of a mailed paper survey.⁹ To maintain institutional privacy as required by the Institutional Review Board approving this study, no identifiers were used, so follow-up for nonparticipation was not possible and, as such, responses were not divided by region or into public versus private groupings. As stated previously, a follow-up request for survey completion was sent to each school urging maximum participation.

Most responding dental schools were aware of the importance of patient eye protection because 84 percent had patient safety glasses available and 77 percent required usage during restorative procedures (compared to 12.7 percent required usage reported by Casey and Casey²). These findings indicate that considerable progress has been made in recognizing the need to consider patient eye safety in the academic setting. Realistically, the responses are somewhat dependent on who answered the survey and may not be a true reflection of what occurs on the clinic floor daily. Associate deans and department chairs who do not spend a lot of time in student clinics might tend to be overly optimistic about adherence to whatever best practice is being measured. The primary observation to be made from the responses is that there is still a considerable need for improvement since almost a quarter of schools responding (23 percent) either did not require or enforce the use of patient eye protection and 16 percent did not have safety eyewear available.

The response to question 7 indicated that dental school patients were being asked to remove prescription glasses less often today than in 1979 (17 percent compared to 23.6 percent "Yes" responses reported by Casey and Casey²). It could be that patients are sometimes being allowed to wear their own prescription glasses as eye protection rather than exchanging them for stronger industrial-strength polycarbonate glasses with side shields,⁸ which would provide bet-

ter protection against projectiles and debris. A 2001 survey indicated that patients prefer to wear safety glasses when offered and that patient attitudes are affected positively when infection control procedures coincide with expectations.¹⁰

Although 87 percent of the respondents required dental students working in restorative clinics to wear safety glasses (which was a vast improvement from the 38.2 percent reported by Casey and Casey²), only 73 percent enforced the policy. Similarly, 84 percent required use of eye protection while doing laboratory procedures. Ideally, one would expect near 100 percent compliance in both areas, considering the risk for eye injury or infection posed by repeated exposure to grinding debris and aerosols experienced by dental providers.¹¹ The improvement observed (a 49 percent increase in student safety eyewear usage since the 1979 survey) may be due in part to current CDC mandates for personal protective equipment to protect against bloodborne pathogens.

For schools with a protective eyewear policy, enforcement may be passive (signs or written guidelines, etc.) or active, which is more desirable and necessitates clinic faculty commitment in the form of support and monitoring. To my knowledge, there is no recent record of legal action against a dental school for ocular injury or failure to provide eye protection. The lack of legal action for injury in the past does not diminish the importance of having an active clinical safety program.

Only 84 percent of respondent schools provide blue light protective shields on dental lights used to cure a vast variety of newer restorative materials. Operator eyes are at risk from both acute and cumulative effects of back reflection of blue light, which can cause phototoxic and photoallergic reactions. Even though many polymerization units are factory equipped with filters that reduce undesirable light, simple precautionary measures such as radiation filtering protective goggles, glasses, or shields are highly recommended.¹¹

Conclusion

Considerable progress has been made since 1979 in protecting dental school patients and students from potential ocular injury during restorative procedures. Common sense dictates that 100 percent usage of safety eyewear should be the goal. Although it is impossible to watch every patient and every student all the time, there is still a definitive

need for improvement in the degree to which dental schools provide safe patient treatment and educate students to help ensure the longevity of their ability to practice dentistry.

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