Teaching Local Anesthesia in Dental Schools: Opinions About the Student-to-Student Administration Model

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Abstract: The student-to-student local anesthesia administration model has been an accepted part of the formal curriculum in dental schools for teaching this clinical skill. However, there is very little published literature that explores the validity of this model or examines students’ attitudes toward it. The ethics of this educational model and the value of consent also need to be explored. In this study, an online survey regarding the student-to-student administration model was used to obtain the opinions of students and faculty members at three dental schools in one state of the United States. The survey was distributed by the Office of Academic Affairs at each school. A total of 152 individuals responded to this survey: 123 (80.9 percent) dental students and twenty-nine (19.1 percent) faculty members. The respondents consistently identified the perceived strengths of this model, while a number also identified the need for consent and raised ethical concerns. These findings highlight the complex nature of the respondents’ opinions and raise the question of whether modification of this mode of instruction may be needed.

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The teaching of local anesthesia is a comprehensive and multidisciplinary part of the dental school curriculum. Various modes of instruction are used to provide dental students with relevant didactic training in anatomy, neuroscience, physiology, and pharmacology, in addition to instruction in pain and anxiety management. The clinical skill training for administration of local anesthesia often includes clinical sessions in which students administer a series of common dental injections to a human subject, commonly a fellow student.1,2 Infection control protocols, professionalism, safety, identification of anatomical landmarks, and basic techniques of dental injections are among the usual markers for assessing student competence in local anesthesia administration.3

Administration of local anesthesia is considered a safe procedure by the dental community.4-6 Given the number of local anesthetic injections administered on a daily basis by dental professionals, it is debatable whether this perceived safety is due to the infrequency of complications or the lack of a formal reporting mechanism.6 From the standpoint of educating health care professionals, the need to use appropriate instructional methods and provide adequate training opportunities must be constantly balanced with the requirements for a safe learning environment.7-9 Across the years, various teaching methodologies have been used to provide dental students with clinical training in this critical skill. While many methods have demonstrated beneficial effect, the principal method remains the student-to-student administration of local anesthesia.8,10 Some have referred to this method as a necessary rite of passage in dental school. In an attempt to identify ways to improve the teaching of local anesthesia, this study was designed around a short opinion survey to test two general hypotheses: 1) students can use their overall cognitive abilities combined with a skill set gained from one type of injection to perform other types of injections; and 2) student-to-student administration of local anesthesia is not a critical or mandatory aspect of local anesthesia training.

Materials and Methods

A six-question survey was designed using SurveyMonkey (www.surveymonkey.com). The appropriate approval was obtained from the University of California, San Francisco Committee on Human Research. The survey was sent to the deans of academic affairs at three dental schools in California.
The Office of Academic Affairs at each school then e-mailed the survey’s web link to a selected subset of predoctoral students and all the clinical faculty members at each school. The predoctoral students invited to participate had all completed their local anesthesia training, which generally meant they were either second- or third-year students. The academic deans forwarded the web link to the students who had completed anesthesia training as per my instruction.

Survey question one asked whether the respondent was a student or faculty member. Question two asked respondents to rate the frequency of utilization of various local anesthetic injections in their daily practice as students and licensed practitioners. Question three asked: “assuming you are trained only in inferior alveolar nerve block, how difficult is it for you to perform subsequent injections without additional training?” This question was meant to determine whether the students can apply skills gained from one type of injection in similar circumstances. Question four was designed to evaluate the importance of student-to-student administration of local anesthesia in clinical training for that practice. Questions five and six asked for respondents’ opinions about the value of obtaining consent and the ethics of administering local anesthesia to another student for the sole purpose of training. Each survey question included an open-ended invitation for respondents to provide comments.

Results

A determination of the response rate to this survey was not possible due to the fact that the total number of students and faculty members who were informed about this survey could not be obtained from the schools. However, a total of 152 individuals responded to the survey. Of the respondents, 80.9 percent (123) identified themselves as students, and 19.1 percent (29) identified themselves as faculty members. The respondents reported using Inferior Alveolar Nerve Block (IA) and Maxillary Infiltration (MI) very frequently (88.2 percent and 88.8 percent, respectively).
respectively) or often (9.9 percent and 9.2 percent, respectively) in everyday practice. They reported using Infraorbital Nerve Block (IO) rarely (34.2 percent) or never (44.7 percent) and using Nasopalatine Nerve Block (NP) rarely (32.9 percent) or never (12.5 percent) (Figure 1). Assuming administration of the IA block would be the only local anesthesia technique taught to the students, opinions regarding applying the cognitive and clinical skills learned in that procedure to other type of injections varied widely among the respondents. They reported that injection techniques such as MI or Papillary Injection (PI) were easy (37.5 percent and 32.9 percent, respectively) or very easy (36.2 percent and 30.3 percent, respectively) to learn without any specific training. However, they considered Posterior Superior Alveolar (PSA), IO, and Greater Palatine Nerve Block (GP) difficult or very difficult to learn without any additional training. The respondents were neutral regarding the learning of techniques of NP and Mental/Incisive Nerve Blocks (MIN) (Figure 2).

Seventy-five (49 percent) of the respondents strongly agreed and forty-six (30.3 percent) agreed that students must practice dental injections on each other prior to giving their first injections to a patient; seventeen (11.2 percent) were neutral, and only ten (6.6 percent) disagreed and four (2.6 percent) strongly disagreed. Of the respondents, forty (26.3 percent) strongly agreed and forty-five (29.6 percent) agreed that the students should be “consented” (i.e., required, as patients, to give consent) prior to administration of local anesthesia, while thirty-four (22.4 percent) were neutral, eighteen (11.8 percent) disagreed, and fifteen (9.9 percent) strongly disagreed. In response to the question whether it is ethical to administer local anesthesia to an individual for the sole purpose of practice and training, 128 (84.2 percent) responded yes, and twenty-four (15.8 percent) responded no.

The respondents provided many comments to each question, reflecting their general attitudes about the topics (see Appendix). These comments were not coded or analyzed.
Discussion

The results of this survey suggest that although it is desirable for students to receive training in all commonly described dental injections, in reality only very few types of injections are performed in day-to-day practice. Furthermore, the respondents seem to be open to the possibility of extrapolating their cognitive and clinical skills learned from one technique and applying them to another technique using similar principles. This may indicate that predoctoral dental students are indeed capable of critical thinking and independent learning processes that will diminish the need for training them in every single clinical skill regardless of its relevance or educational value.

While it is quite interesting that the respondents overwhelmingly agreed with the statement that students should practice dental injections on each other, it was beyond the scope of this study to analyze the reasons for this opinion. Empirically, a number of factors may explain this result. First, from the behavioral aspect of learning, the student-to-student practice model provides a teacher-based compartmentalized approach to learning the local anesthesia technique with ample opportunity to practice and receive feedback. Students receiving positive or negative feedback from their faculty and peers may thus perceive themselves prepared to perform the same procedure on a real patient, who may be more reserved in providing feedback. Second, from the cognitive aspects of learning, during the student-to-student practice sessions, the students rely little on their own ability to apply prior knowledge and experiences to a new skill set. This may explain their perceived comfort when concentrating only on the technical aspect of an injection rather than juggling external distracters such as various aspects of patient management. This situation is further complicated by a general lack of affordable and practical technology to provide students with a meaningful way to practice their skills in a safe environment away from human subjects. Of course, a third possible factor should not be overlooked: the culture of learning in dentistry considers the student-to-student practice format as a rite of passage and an inherent part of dental training to help them better appreciate what patients may experience during a local anesthetic injection.

Perhaps the most curious response in this survey regards obtaining consent for participating in student-to-student local anesthesia injection practice. Admittedly, the awkward wording of the question may have confused some respondents, as indicated in their written comments. Nevertheless, considering the general lack of recognition in dentistry for the importance of informed consent process for administration of local anesthesia, it is surprising that a majority of the respondents to this survey indicated that students should be given the opportunity to opt in or out of such an exercise. A didactic curriculum including topics on patient communication, practice management, ethics, and risks and complications associated with local anesthetic injection may have some impact on the perceived value placed on the informed consent process. In the dental literature, some authors have advocated that local anesthesia injections, if administered properly and competently, carry minimal to no risk. Extrapolating this opinion to the student-to-student administration of local anesthesia raises the concern that this practice may potentially carry a higher risk due to the inexperience of the student providers. Lack of an organized reporting mechanism generates further concern regarding the true incidence of complications that may occur.

The most troubling finding of this study, in my opinion, is the fact that 15.8 percent of the respondents expressed an option that it is not ethical to give an injection of local anesthesia to an individual for the sole purpose of practice and training. If this number is indeed accurate and in any way a reflection of the total population of dental students, it would indicate that this training method is placing some individuals in a position of performing procedures they consider unethical. Further, it raises the concern that some dental curricula may have failed to provide learner-specific methods of teaching and the opportunity for the students to have a nurturing learning environment. The most obvious weakness of this survey is the limited number of participants and inability to define the cohort. This survey was intended to function as an opinion poll in advance of modifying local anesthesia training in the author’s institution. Therefore, it lacks the rigor and breadth of a large survey needed for such an important and complex issue. Another weakness of this survey design is that, beyond giving the respondents the opportunity to provide comments, it did not provide a way for the respondents to elaborate on their responses, which would have helped in interpreting the data.
REFERENCES


APPENDIX

Comments Provided in Response to Survey Questions

Question #3 Assuming you are trained only in inferior alveolar nerve block, how difficult is it for you to perform the following injections without additional training?

- How would people know how to give a new/different injection without training, landmarks, etc.? Not the best question IMO.
- Brief training at least. Someone needs to tell me where to put it and what gets numb!
- Most of us use injections we are most familiar with more comfortably.
- Training is needed in all of these areas.
- This question assumes we only learned IA, but we also learned GG. It forced me to answer anyway.
- How can anyone know or understand how to give any other injection if they are only trained for the IA? No beginning dental student would understand how to give any other injection (anatomical landmarks, depth of penetration, amount of anesthetic) if all they knew was the IA.
- This should not be an issue. All common injections should be taught. It is improper to only teach the IAB. It is unsafe and unethical for students to only be taught the IAB.
- If I wasn’t trained on using these injections, I wouldn’t know how to do them.
- I would have been uncomfortable with anything other than infiltration at the beginning, but after getting comfortable with injections, it would be easy to pick up on the clinic floor. I learned Gow-Gates at my externship and was very comfortable with it.
- Judgment of depth of insertion is essential to proper administration.
- The most “difficult” part of the other injections is the initial hesitation of doing something for the first time.

Question #4 What is your opinion of the following statement: “Students must practice dental injections on each other to demonstrate competence in order to safely administer local anesthesia to their first patient.”

- It lets the dentist feel what they will be inflicting on patients, especially infiltration in bony palate or if hit the bone. Gives first-hand perspective to being thoughtful and careful with one of the most important impressions of the dental practitioner: “first impressions are key to building a patient-doctor relationship.”
- What alternatives do you propose?
- With one-on-one faculty supervision. That is demonstrating how to safely administer LA.
- Students should demonstrate an understanding of 1) head and neck anatomy as it pertains to injections, and 2) reasoning behind giving anesthetic where it is delivered before practicing on each other or anyone else.
- Many students have never rec’d anesthesia. Understanding the patient experience is important.
- It also helps them to understand what the patients are feeling when receiving an injection and the feeling of anesthia.
- Students should, not must practice. It is less stressful on each other.
- Don’t know if the recipient has to be another dental student, but students should show competence in injections in some very realistic scenario. If there was a very realistic “dummy” with all the right intraoral anatomy, then I’d be okay with that.
- Or even multiple times prior to first patient.

Question #5 What is your opinion of the following statement: “Students should be consented prior to administration of local anesthesia for training purposes.”

- Does the question mean “give their consent to have anesthesia administered to them”?
- Just like for anyone else, risk and benefits should be outlined, and student should sign consent. Statistically, some injury can be expected, or at least if they will not let anyone else give them anesthetic, a trained faculty member should administer them for the above reason of letting the student know what it feels like.
Their attendance in the course is implied consent.

The students’ presence implies consent. But if students are required to administer local anesthetic to each other before doing so with clinical patients, does any student have the option of refusal?

However, if they do not believe risk outweighs benefits for themselves, providing anesthesia for patients will be tough.

If students are not willing to receive an injection, they should not be a dentist. I consider it unethical to tell a patient to hold still, relax, breathe through nose, etc. during an injection if the dentist himself/herself has not had that experience.

If they can opt out of Hepatitis B immunization, they should be able to opt out of being injected. Hopefully, this would be a rare occurrence.

There is no major harm done by this procedure.

I’m not sure I understand the question: students should sign consent prior to administration of LA?

If you are going to give injections, you need to know what your patient is experiencing.

Do students have option to reject receiving injections?

Question #6 In your opinion is it ethical to administer local anesthesia to an individual for the sole purpose of practice and training?

If they know and consent, it is ethical.

To other dental students, yes.

The anesthetic is proven to have negligible long-term and side effects, so it is ok to administer the chemical for training purposes so long as the “patient” has given or implied consent.

See my answer to #4. Please note....I actually teach the students to administer local anesthesia to each other.

LA is the most important thing we do in dentistry. I’m a future OMFS and regard all these local anesthesia procedures as extremely important and that I must experience them.

Unless they are a student and in a training program.

I think it is okay, but if there were a BETTER solution (not just a substitute solution, but a better one) to teach the clinical aspects of injection technique, then that would be great.

But then again we got to do what needs to be done!

Just like we do exams on each other, pulp tests on each other, learn to take pulse on each other, etc.

Need consent.

This is essential to our training and should not be changed.

They must get used to the needle in their hand actually penetrating into someone. I would like to see the IA not done on students because of the higher risk of complications. Infiltrations should be practiced.

As a student, I enjoyed the experience of injecting on my classmates and getting injections from them.

With consent and proper training, I believe it is ethical.