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A Survey of the Usage of Topical Anesthesia Among Dentist

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This is to certify that the thesis prepared by Lawrence H. Shults entitled A SURVEY OF THE USAGE OF TOPICAL ANESTHESIA AMONG DENTISTS
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May 14, 2010

A SURVEY OF THE USAGE OF TOPICAL ANESTHESIA AMONG DENTISTS

A Thesis submitted in partial fulfillment of the requirements for the degree of Masters of Science in Dentistry at Virginia Commonwealth University.

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Abstract

A SURVEY OF THE USAGE OF TOPICAL ANESTHESIA AMONG DENTISTS

By Lawrence H Shults, DDS

A Thesis submitted in partial fulfillment of the requirements for the degree of Masters of Science in Dentistry at Virginia Commonwealth University.

Virginia Commonwealth University, 2010

Major Director: Tegwyn H. Brickhouse, D.D.S., Ph.D.
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Purpose: The purposes of this study were four-fold: 1) to determine the types and effectiveness of various topical anesthetics being used among dentists currently treating children, 2) to determine the types of procedures for which topical anesthetics are being used among children, 3) to understand the awareness and use of a relatively newer compounded topical gel Oraqix (Dentsply Caulk) among children, 4) to understand the adverse reactions to topical anesthesia that are seen among children.

Methods: A cross sectional survey was designed, regarding the type, procedural use, effectiveness, and adverse reactions noted among children to various topical anesthetics. The survey sampled n=4933 actively practicing member dentists from a database of willing survey participants obtained from the American Academy of Pediatric Dentistry. The survey consisted of 14-items in multiple choice/answer format. The survey was pilot tested by a committee of

faculty, and attached via e-mail with a cover letter containing a direct survey link for the study participants. Surveys were collected, posted, and managed through www.surveymonkey.com.

Results: The study received 1255 responses from practitioners who are actively treating children giving an effective response rate of 25%. Of those that participated 94% are Pediatric dentists, 6% General dentists or "Other" specialists who treat children. The majority of respondents (95%) routinely use topical anesthetic, rating it as effective or very effective clinically. The most commonly used topical was 20%-Benzocaine gel with a reported 96% effective rate. The most common procedures topical anesthetics are being used for are pre-injection of local anesthetic and extraction of exfoliating deciduous teeth. Very few of the responding practitioners have ever heard of or used Oraqix gel prior to this survey. Many though, would consider using Oraqix if proven effective. Only 10% of respondents reported an adverse reaction to topical anesthetics, the most common being contact dermatitis or tissue sloughing from prolonged contact, followed by an allergic or aversive reaction to the dyes or flavoring in the topical anesthetic.

Conclusions: The overwhelming majority of dentists treating children routinely use topical anesthetics to reduce pain response among children. 20%-Benzocaine gel is the most widely used topical anesthetic being used for dental procedures on children. Adverse reactions to topical anesthetic noted among practitioners treating children are very low but must still be strongly considered as potential life threatening risks if not used appropriately. Many practitioners treating children are still looking for the "ideal" topical anesthetic with improvements in taste, the ability to stay localized, the method of delivery, and improved effectiveness being key areas for future research.

INTRODUCTION

The goal of providing "painless" dental care is one that has been actively sought after for decades. In the arena of pediatric dentistry, successful delivery of local anesthesia is an essential component of positive treatment outcomes. For many individuals, the experience of pain with dental procedures can lead to their future avoidance of much needed oral health care due to dental fears and anxiety. A child's early positive experiences can lead to a lifetime of healthy perceptions and attitudes towards dental health. According to the American Academy of Pediatric Dentistry the prevention of pain during dental procedures can nurture the relationship of the patient and dentist, building trust, allaying fear and anxiety, and promoting a positive dental attitude.[1] Milgrom et al. concluded that local anesthesia has become the salvation and bane of modern dentistry, it allows virtually pain free treatment, yet is associated with many anxious thoughts and misconceptions leading to patient avoidance of care.[6] Dental practitioners have the ability to do so much for the patient to alleviate these fears and misconceptions in everyday practice.

Communication and behavior guidance are critical tools for a successful pediatric treatment outcome. Age-appropriate non-threatening terminology, distraction, topical anesthetics, proper injection technique, and the use of nitrous oxide can help the patient have a positive experience during dental treatment.[2] Many advances have been made in the areas of delivery, topical anesthetics, types of anesthesia, volume, location, and pre-operative patient

management that have been used to improve overall patient care. Topical anesthetics have been shown to have both psychological and physiologic benefits in pain control although with mixed effectiveness.[4,5]

Martin et al. found that if patients thought they received topical whether they did or not, anticipated less pain.[4] Therefore, the most beneficial aspect of using topical may not be it's clinical analgesic effectiveness, but the psychological effect on the patient who feels the practitioner is doing everything possible to prevent pain. Kincheloe et al. reported that patients expecting pain fulfilled their expectations and experienced more pain even when a topical anesthetic was applied and the patient was informed of how well it worked.[5]

Dental practitioners are in constant search of improved methods of pain control in dentistry. One study found that 71% of dentists surveyed would consider using a different delivery system of topical anesthetic if it were available.[19] Oraqix (Dentsply Pharmaceutical, York, PA) is a thermosetting gel and is the first needle free FDA approved topical anesthetic for use in the oral cavity. Introduced in 2004, it has been proven safe and effective for use in periodontal scaling and root planning procedures in adults over the age of eighteen.[7-12,22] This may provide a tremendous benefit to the millions of patients that desire an alternative anesthetic that can be administered without an injection and to those that simply reject the use of anesthetic to avoid the injection. One study found that most participants were willing to pay to have a non-injectable alternative available for themselves or for others. Concern about dental pain and anxiety about needles were the main factors that determined preference and the amount they were willing to pay.[16]

In a pediatric population it is very difficult to distinguish behavior as a result of pain from behavior related to distress or fear associated with a mixture of environmental, social, parental, or developmental factors. Versloot et al. found that practitioners who routinely perform painful procedures develop a sense of "pain blindness" as the practitioner will often report pain ratings that are lower than those reported by the patient or a third party observer. They concluded that observation of a child using video recording is the most reliable method to accurately assess pain behavior and discriminate pain from distress.[3] This may be a crucial piece of information for practitioners that could determine if patients either make return appointments because they and their parents perceive a successful visit in delivering this key component of care, or they find someone else who they feel will be more sympathetic to their needs. Another study by Milgrom et al. supports this finding by reporting that children whose parents have moderate to high dental fear are twice as likely to be afraid of the dentist than children whose guardians have low or no dental fear.[15]

Although studies have been done to determine the effectiveness of various topical anesthetics none to our knowledge have surveyed the prevalence of use, perceived analgesic effectiveness for different procedures, or the adverse outcomes observed in children. The purposes of this study are four-fold: 1) to discover the most common types of topical anesthetics that are being used by practitioners treating children, 2) to determine which dental procedures topical anesthetics are being used for among children, 3) to understand the awareness and use of a relatively newer topical anesthetic, Oraqix, in the pediatric patient population, 4) to recognize any adverse outcomes to topical anesthetics that have been noted among practitioners treating children.

METHODS

A cross sectional survey was designed, regarding the type, procedural use, effectiveness, and adverse reactions noted among children to various topical anesthetics. The survey sampled n=4933 actively practicing member dentists from a database of willing survey participants obtained from the American Academy of Pediatric Dentistry. The survey consisted of 14-items in multiple choice/answer format. The survey was pilot tested by a committee of faculty, and attached via e-mail with a cover letter containing a direct survey link for the study participants. Surveys were collected, posted, and managed through www.surveymonkey.com.

The survey composite was made up of 14 questions. The first three questions inquired about demographic information, whether the dentist is actively practicing dentistry treating children, what type of dentistry they are practicing, and for how long they have been in practice treating children. Questions 4-7 asked about current use or lack of use of topical anesthetic in their practice, the types and effectiveness of various commonly used topical agents, as well as the types of procedures topical alone is being used for. Questions 8-11 asked about the awareness and use of Oraqix, and the procedures it is used for or would consider being used for if proven to be effective. Questions 12-14 asked about patient acceptance and adverse reactions noted with the use of topical anesthetics.

It was noted in a cover letter that participation in the survey is completely voluntary and they as participants had the right not to participate or not answer particular questions in the survey if they choose not to. Participants were also assured that no individual identifying

information would be used and that data collected would be in-group format only. One week after the first email request was sent, a reminder invitation was sent again via email to the entire sample. Only those responses received within two weeks from the first invitation were included in the data collection. The survey was then closed and the data was analyzed by computing the percentage response for each question.

RESULTS

The survey had an effective response rate of 25%. Only the respondents who reported to be actively treating children (n=1255 of the 4933 surveyed) were included in our study. Demographic data showed that 94% were pediatric dentists, and 6% were general dentists, or other specialists responding from a database of active practitioners obtained from the American Academy of Pediatric Dentistry. Of those, 36% have been in practice treating children 21 years or more, 23% 0-5 years, 19% 6-10 years, 11% 11-15 years, and 11% 16-20 years.

When asked about current use of topical anesthetics on children 98% of practitioners reported using topical anesthetics on children with 95% reporting routine use. Those who do not use it give the following reasons why: 3% report lack of effectiveness, 2% concerns about patient acceptance, 1% difficult to keep localized at application site, with another 1% giving other reasons such as negative patient reactions to taste, use nitrous oxide instead, believed to sensitize the child to the next step of giving an injection, believe that distraction or behavior management techniques are more effective. Surprisingly, there did not appear to be any concerns with response to this particular question with regards to methods of delivery or anesthetic overdose. For Questions 6 and 7 respondents were asked which type of topical anesthetics are currently being used on children and whether they are perceived as very effective, effective, not effective, or not used. The results are shown in figure 1 with a supportive data table included. The results show that 20%-Benzocaine gel is still the most commonly used by 88% of dentists with a rating

of effective (68%), or very effective (28%). This finding is consistent with other studies.[19,21] The second most commonly used topical is TAC gel with 99% of respondents rating it as effective (19%) or very effective (80%). An interesting finding is that dentists who use TAC, EMLA, or "other" alternatives were more likely to rate them as very effective vs. effective. Other reported use of topical anesthetics include: EMLA cream, Oraqix gel, Lidocaine pastes/patches, Cetacaine spray, refrigerant, and a compounded 10% lidocaine: 10% prilocaine: 4% tetracaine gel mixture. Respondents were also asked which procedures topical anesthetics alone were used for on children. The results of these findings are found in figure 2. The most common procedures for which topical is used were pre-injection of local anesthetic, followed by extraction of exfoliating deciduous teeth, placement of RD clamp, and palliative treatment of soft tissues. Practitioners reported many other procedural uses for topical anesthetics including: scaling and root planning, dental prophylaxis when hypersensitive, packing cord, suture removal, mini implant/screw placement, frenectomies, sensitive gag reflex, re-cementation of stainless steel crown, band seating, finishing restorations along gingival margin, using soft tissue laser, placement/removal of space maintainers, place wedges, disking interproximal spaces.

Although many practitioners are looking for more effective topical anesthetic alternatives over 80% reported not being aware of the use of Oraqix in dentistry. Only 5% of dentists responding have ever used Oraqix gel on children, and only 3% report they are currently using Oraqix for procedures on children in their practice. Oraqix when utilized among respondents was primarily used for scaling and root planning and extraction of exfoliating primary teeth. The most telling finding here was that as many as 82% (see figure 3) of dentists responding to this question would consider using Oraqix on children if it was proven procedurally effective.

Practitioners responding felt like the most significant factors in patient acceptance of topical was the taste (69%), the ability to stay localized (39%), and the method of delivery (19%). Of the 4% responding to other significant factors the written responses included effectiveness, safety, the patients age/personality, and the time of onset/duration of the topical anesthetic. Only 10% reported noting an adverse reaction to topical anesthetic. In a follow up question 88% reported not ever having noted an adverse reaction. The most common adverse reaction reported was contact dermatitis or tissue sloughing from prolonged contact grouped with urticaria and/or angioedema and has been noted among 7% of practitioners. The most commonly reported offender in this area was TAC gel and the manufacturer recommends rinsing the tissues thoroughly for 2 minutes after application to help prevent this problem. This was followed by 5% reporting an allergic or adverse reaction to the dyes, or flavoring (taste aversion, spitting, gagging, and vomiting). Practitioners reported benzocaine as most commonly causing the problems with taste mentioned above. Nearly 3% reported an allergy to the active agent used in the topical anesthetic itself. Less than 1% reported having seen more serious reactions like methemoglobinemia, CNS, or systemic complications.

DISCUSSION

The response rate of 25% in this study provides a broad range of clinical experience and knowledge. Demographic data showed that 94% were pediatric dentists, and 6% were general dentists, all listed as active members of the American Academy of Pediatric Dentistry. Of those responding, 36% have been in practice treating children 21 years or more, 23% 0-5 years, 19% 6-10 years, 11% 11-15 years, and 11% 16-20 years. New trends in topical anesthesia are constantly emerging that could make it more efficient and effective for a wide variety of procedures being utilized by those who responded.

The primary aim of all practitioners is to be able to provide treatment to the patient in the least painful way possible. This aim becomes particularly important when considering the very young, anxious, fearful, and/or needle phobic patient. There are numerous dental procedures that may require no local anesthesia at all, but may still have the potential for soft tissue stimulation or pain. Effective topical anesthesia when used appropriately can provide a safe and positive treatment outcome, improving patient behaviors and attitudes towards future care.

The most common procedures for which topical anesthetics are used include pre-injection of local anesthetic, followed by extraction of exfoliating deciduous teeth, placement of RD clamp, and palliative treatment of soft tissues. Practitioners reported many other procedural uses for topical anesthetics that don't necessarily require the use of local anesthetic including: scaling and root planning, dental prophylaxis when hypersensitive, packing cord, suture removal, mini

implant/screw placement, frenectomies, sensitive gag reflex, re-cementation of stainless steel crown, band seating, finishing restorations along gingival margin, using soft tissue laser, placement/removal of space maintainers, place wedges, disking interproximal spaces.

Mathews et al. found that there is an overwhelming patient preference for topical dental gel when given the choice of no anesthetic or local injectable anesthetic. Most participants were willing to pay to have dental gel available for themselves or for others. Concern about dental pain and anxiety about needles were the main factors that determined preference and how much they were willing to pay.[16] With further study this could become a viable and reimbursable option for the perceived parental anxiety as well as the anxious patient.

This current study showed that as many as 77% of practitioners were willing to try a different product if proven effective. This finding is consistent with another survey done 10 years ago, which found that 71% of pediatric dentists would consider a different delivery system of topical anesthetic if it were available. However, if the alternative method has a longer application time than the conventional method, clinicians would be less interested in using it.[19] Shorter application times comparing different topical anesthetic gels could increase provider compliance and utilization by improving clinical efficiency. Another benefit providers are asking for is the ease of application to improve delivery and localization since there is potential for the topical anesthetic gel to anesthetize areas other than the desired procedural site owing to the agent mixing with saliva and the patient swallowing it.

Malamed suggests that the occurrence of allergic reactions to esters is greater than that to amide topical anesthetics; however, since benzocaine is not absorbed systemically, allergic reactions are usually localized to the site of application. Of the amides available, only lidocaine

possesses topical anesthetic activity in clinically acceptable concentrations. The risk of overdose with amide topical anesthetics is greater than that with the esters and increases with the area of application of the topical anesthetic.[2] Although, difficulties in keeping the topical anesthetic localized was only reported by 1% of those responding as a reason for not using topical, as many as 39% later expressed concerns with patient acceptance reporting patients' dislike for the taste and feeling of numbness in sites other than those intended. Therefore, the ability/properties of being able to keep the topical anesthetics localized becomes very important for patient safety, acceptance, and effectiveness.

A study done by Primosch compared benzocaine 20% gel to EMLA cream (2.5% lidocaine and 2.5% prilocaine) comparing effectiveness in reduction palatal injection pain. Both agents showed similar pain responses by the patients, but the benzocaine gel was preferred due to better taste.[13] The authors discussed the idea that the actual efficacy of topical anesthetic in reducing pain is still in dispute and argued that acute pain can be influenced by several factors including fear, anxiety, and trust. If the patients believe that the topical anesthetic works, the anxiety felt by the patient before injection is reduced.[13]

Lim and Julliard evaluated the efficacy of topical EMLA cream during sealant placement using a rubber dam clamp placement. Their split mouth study design compared EMLA cream and a Vaseline placebo placed on opposite sides of the mouth for 5 minutes before rubber dam clamp placement. The pain response of the clamp placement was recorded after each clamp was placed using the facial pain scale. The authors found that the EMLA cream significantly reduced pain over the placebo used, validating the benefits of topical anesthetic with painful procedural dentistry.[14]

The only compounded topical anesthetic manufactured for intraoral use is Oraqix which, has been approved by the FDA and shown to be safe and effective for periodontal probing, scaling and root planing procedures in adults.[7-12] However, Oraqix might be ineffective for other painful/stimulating dental procedures, according to some studies.[20-21] The very low use and awareness data for Oraqix could be due to a number of factors. Although, it is heavily marketed in dental journals, etc. it is speculated that the lack of word of mouth marketing, as well as the lack of studies demonstrating effective use for procedures other than scaling and root planning which is uncommon in the pediatric patient population are to blame. Oraqix is currently only FDA approved for use on individuals over 18 years old. Although it would be considered "off label" use on children that does not seem to affect the use of other "off label" topical anesthetics among children noted in Figure 2, including a very close counterpart EMLA cream, which contains the same active pharmacology and has not been approved for intraoral use.

The manufacturers of Oraqix recognize the fact that their product can be used off label in pediatric dentistry to alleviate the pain and anxiety related to dental treatment. Currently, Oraqix does not have published safety information or FDA approval for its use on children under eighteen years old. There is no current data that shows how much of the drug is absorbed into the blood stream of pediatric patients. Although it is believed to be very small compared to a perioral injection, no true levels have been recorded and further study is needed. If proven to be safe and effective this study shows there could be a potentially very large market of practitioners considering the use of Oraqix in children.

One of the more telling findings of this study was that as many as 82% (see figure 3) of responding dentists would consider using Oraqix on children if it was proven procedurally effective. This finding supports the notion that practitioners are looking for more effective alternatives to currently available topical anesthetics.

Limitations of this current study included completely voluntary and anonymous participation for all the questions asked, as well as not having the ability to ask follow up questions for given responses. The specific wording of questions may not have been clearly understood by all respondents, or the practitioner's lack of familiarity with certain survey items may have caused them not to respond creating a non-response bias. A limited number of topical anesthetic choices were included in the survey. Adverse reactions noted to topical anesthetics were self reported based on the practitioner's understanding of the reaction and willingness to report and may not reflect the true incidence of adverse reactions seen among children.

CONCLUSIONS

The overwhelming majority of dentists treating children routinely use topical anesthetics to reduce pain response among children. 20%-Benzocaine is the most widely used topical anesthetic being used for dental procedures on children. Many practitioners are interested in using a more effective topical anesthetic if proven to be safe and effective. Adverse reactions to topical anesthetic noted among practitioners treating children are very low, but must still be strongly considered as potential life threatening risks if not used appropriately. Many practitioners treating children are still looking for the "ideal topical anesthetic" with improvements in taste, the ability to stay localized, the method of delivery, and improved effectiveness being key areas for future research.

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APPENDIX

Cover Letter

VCU Medical Center
Virginia Commonwealth University

Dear Colleague,

As oral healthcare providers one of the most significant events shaping the relationship between patient and provider is the successful administration of dental anesthesia during operative care. New trends in topical anesthesia are constantly emerging that could make it's use more effective for a wide variety of procedures. One way for a dentist to discover new trends in dental anesthesia is by finding out what other dentists are doing to achieve better outcomes for their patients.

Dr. Tegwyn Brickhouse and Dr. Larry Shults 2nd year resident of the Pediatric Dentistry Department at Virginia Commonwealth University are conducting a very brief **14-question survey**. The purpose of this survey is to determine the types and effectiveness of topical anesthetics currently used by dentists who treat children. Please use the link below to access this brief **5-minute** survey asking about the use in your practice of different topical anesthetics. Please answer all questions that apply, understanding that this survey is voluntary and that you may choose not to participate. If you choose to participate, you may stop at any time without any penalty. You may also choose not to answer particular questions that are asked in the study.

Please be assured that no individual identifying information will be used. The presentation of the data collected from this questionnaire will be used in a group format only.

Please contact me if you have any questions. Thank you for your help in this aspect of care in our great profession and for supporting the dental research at the Virginia Commonwealth University School of Dentistry.

We ask that you please respond **before April 20, 2010**.

Link to Survey Now:
http://www.surveymonkey.com/s/PM585T6

Sincerely,

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Survey Instrument

A Survey of the Usage of Topical Anesthesia Among Dentists

1. Default Section

1. Are you actively providing dental services for children at this time?

- ◯ Yes
- ◯ No

2. In which field of dentistry do you currently practice treating children?

- ☐ General Dentistry
- ☐ Pediatric Dentistry
- ☐ Other Specialist

3. How long have you actively been practicing dentistry treating children?

- ◯ I do not currently treat children
- ◯ 0-5yrs
- ◯ 6-10yrs
- ◯ 11-15yrs
- ◯ 16-20yrs
- ◯ 21+ years

4. Are you currently using topical anesthetics on children?

- ◯ Yes
- ◯ No

5. If you do not use topical anesthetics what are the reason(s) why?

- ☐ I routinely use topical anesthetic
- ☐ Concerns about patient acceptance
- ☐ Methods of delivery
- ☐ Difficulties keeping it localized at application site
- ☐ Concerns about anesthetic overdose
- ☐ Don't believe it to be effective
- ☐ Other

Please specify

A Survey of the Usage of Topical Anesthesia Among Dentists

6. Which type(s) of topical anesthetics are currently being used in your practice on children? How would you rate the general effectiveness?

	Very Effective	Effective	Not Effective	Not Used
20% benzocaine gel	☐	☐	☐	☐
Oraqix gel	☐	☐	☐	☐
TAC gel	☐	☐	☐	☐
Lidocaine patch	☐	☐	☐	☐
EMLA cream	☐	☐	☐	☐
Cetacaine spray	☐	☐	☐	☐
Other	☐	☐	☐	☐

Please Specify Type

7. For which procedures are topical anesthetics alone being used on children? Which type(s) of topical is used for the procedure?

	20% benzocaine gel	Oraqix gel	TAC gel	Lidocaine patch	EMLA cream	Cetacaine spray	Other
Pre-injection for local anesthetic	☐	☐	☐	☐	☐	☐	☐
Extraction of exfoliating deciduous teeth	☐	☐	☐	☐	☐	☐	☐
Placement of Rubber dam clamp	☐	☐	☐	☐	☐	☐	☐
Scaling and Root Planing	☐	☐	☐	☐	☐	☐	☐
Dental prophylaxis when hypersensitive	☐	☐	☐	☐	☐	☐	☐
Packing cord	☐	☐	☐	☐	☐	☐	☐
Suture removal	☐	☐	☐	☐	☐	☐	☐
Mini implant/screw placement	☐	☐	☐	☐	☐	☐	☐
Frenectomies labial/lingual	☐	☐	☐	☐	☐	☐	☐
Sensitive gag reflex	☐	☐	☐	☐	☐	☐	☐
Palliative tx of soft tissue trauma/pathology	☐	☐	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐	☐

Please Specify Procedure

A Survey of the Usage of Topical Anesthesia Among Dentists

8. Are you aware of Oraqix thermosetting topical gel (2.5% Lidocaine/ 2.5% Prilocaine) and it's uses in dentistry?

- ◯ Yes
- ◯ No

9. Have you used Oraqix gel in your practice on children?

- ◯ Yes
- ◯ No

10. Are you currently using Oraqix gel in your practice on children?

- ◯ Yes
- ◯ No

11. On children what procedures are you using Oraqix alone for? Which procedures have you used Oraqix alone for, but not found to be effective? Which procedures would you consider using Oraqix alone for?

	Currently use effectively	Used but ineffective	Would consider using if proven effective	Would not use Oraqix
Pre-injection for local anesthetic	☐	☐	☐	☐
Extraction of exfoliating deciduous teeth	☐	☐	☐	☐
Placement of Rubber dam clamp	☐	☐	☐	☐
Scaling and Root Planing	☐	☐	☐	☐
Dental prophylaxis when hypersensitive	☐	☐	☐	☐
Packing cord	☐	☐	☐	☐
Suture removal	☐	☐	☐	☐
Mini implant/screw placement	☐	☐	☐	☐
Frenectomies labial/lingual	☐	☐	☐	☐
Sensitive gag reflex	☐	☐	☐	☐
Palliative tx of soft tissue trauma/pathology	☐	☐	☐	☐
Other	☐	☐	☐	☐

A Survey of the Usage of Topical Anesthesia Among Dentists

12. What do you feel is the most important factor in patient acceptance of topical anesthetics?

- [ ] Taste
- [ ] Method of delivery
- [ ] Ability to stay localized
- [ ] Other

Please specify

13. Have you ever noted adverse reactions to a topical anesthetics among children?

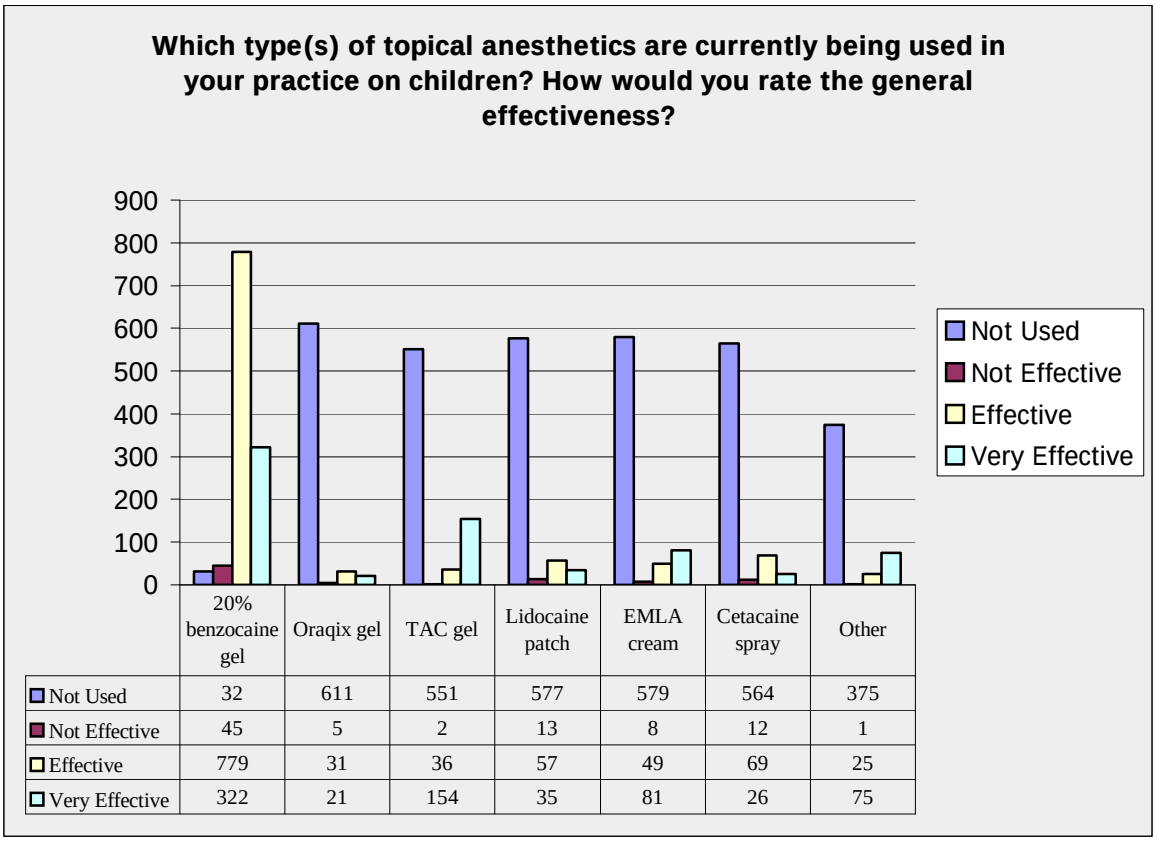
- ◯ No
- ◯ Yes, to which type?

Please Specify Type

14. Which type(s) of adverse reactions have you noted among children?

- [ ] Contact dermatitis/urticaria/angioedema
- [ ] Methemoglobinemia
- [ ] Systemic complications
- [ ] CNS complications
- [ ] Allergic reaction to anesthetic
- [ ] Allergy to dyes or flavoring
- [ ] None

Other- Please specify



	20% benzocaine gel	Oraqix gel	TAC gel	Lidocaine patch	EMLA cream	Cetacaine spray	Other
Not Used	32	611	551	577	579	564	375
Not Effective	45	5	2	13	8	12	1
Effective	779	31	36	57	49	69	25
Very Effective	322	21	154	35	81	26	75

Figure 1: Types of Topical Anesthetics Currently Being Used on Children.

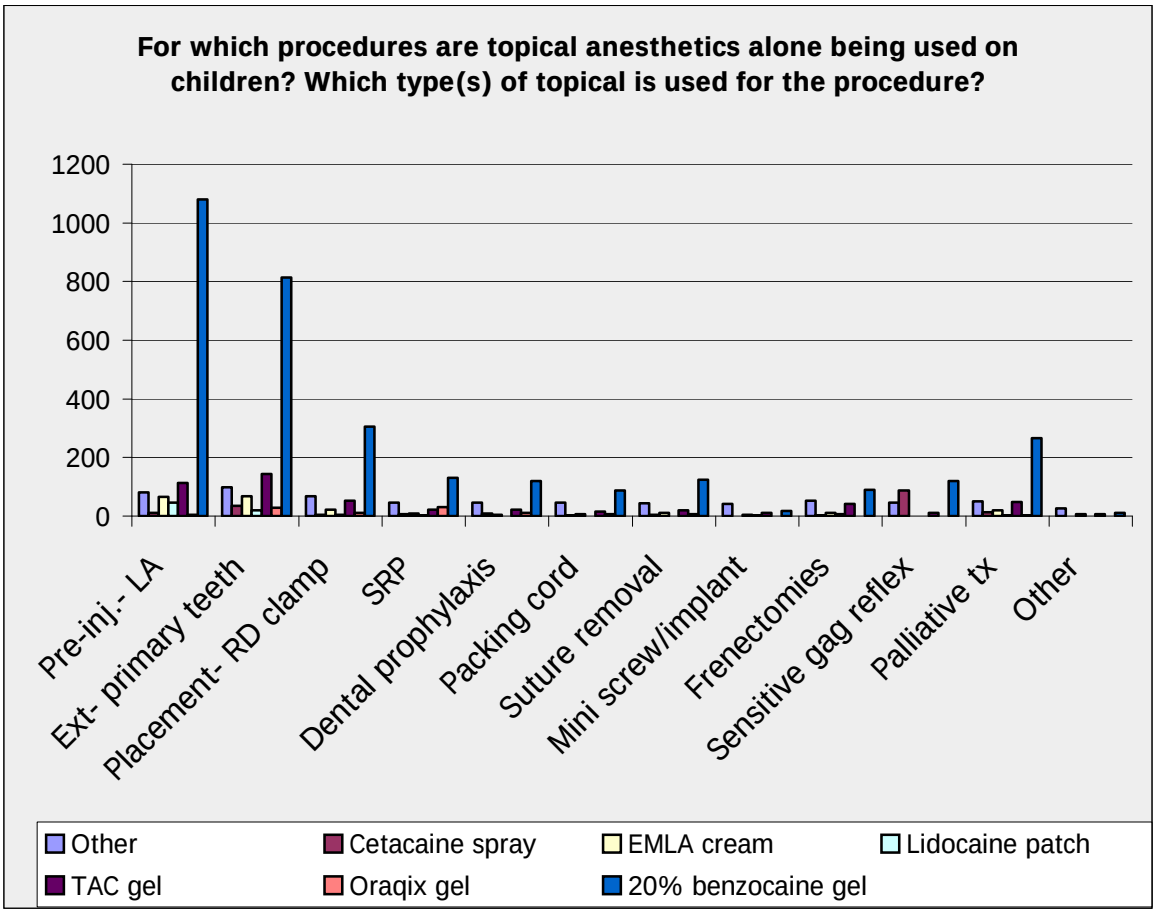


Figure 2: Procedural Usage for Different Types of Topical Anesthetics.

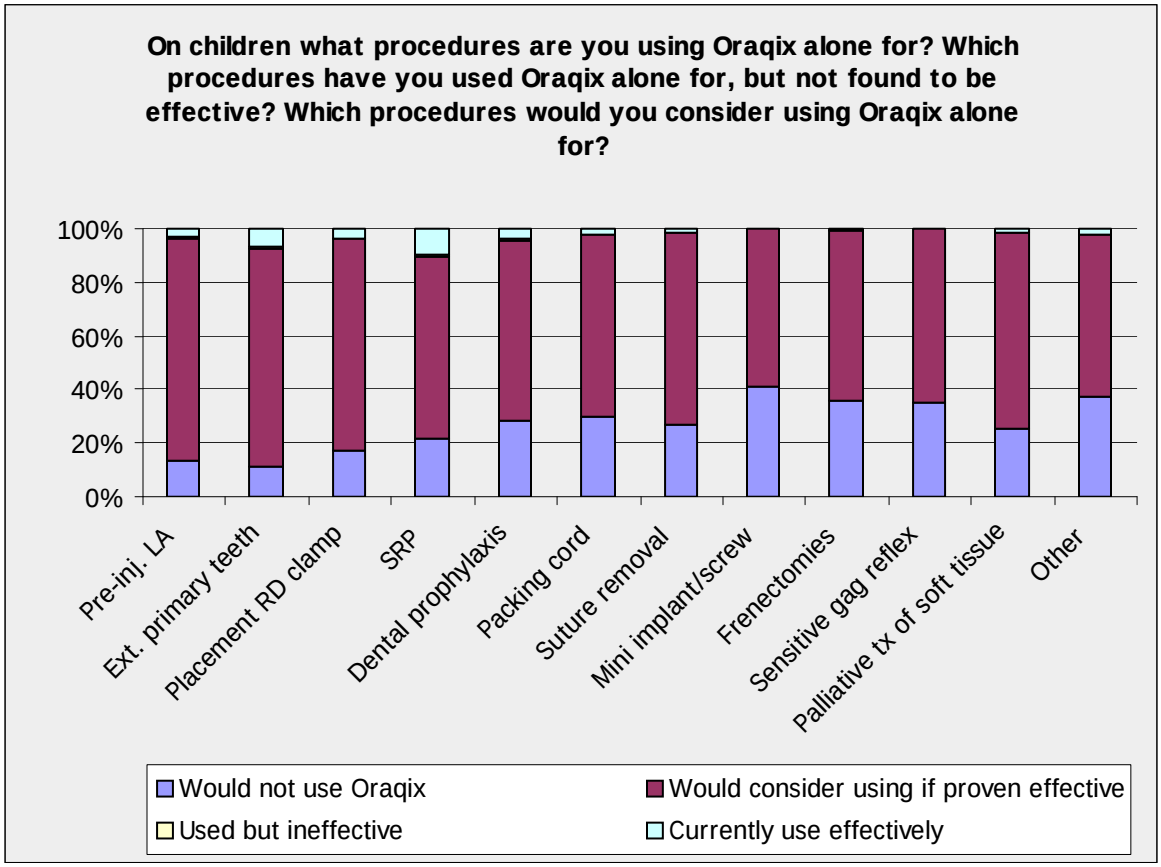


Figure 3: Procedural Usage/Consideration for Use of Oraqix Gel.

VITA

Dr. Lawrence H. Shults was born in October of 1975 in Maricopa County, Arizona. He spent most of his life growing up in his hometown of Mesa, Arizona. Dr. Shults received his bachelor's degree in Biology from Arizona State University in 1999. He continued his education and dream when in 2006 Dr. Shults graduated from the University of Colorado School of Dentistry Health Science Center with a degree of Doctor of Dental Surgery. After graduation he practiced dentistry in Sierra Vista, Arizona for two years doing what he is most passionate about treating the oral health care needs of children. On June 25, 2010, Dr. Shults will be honored to receive his specialty Certificate to practice Pediatric Dentistry and, his Masters of Science in Dentistry degree from Virginia Commonwealth University School of Dentistry.