



# Education regarding opioid prescription within oral and maxillofacial surgery residency programs: a survey study

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**Background:** The inappropriate use of opioids in the United States continues to pose a significant challenge to public health. For a look into how the next generation of practitioners may be trained, this survey study sought to evaluate the current opioid prescribing patterns among Oral and Maxillofacial Surgery (OMFS) residency programs in the United States.

**Methods:** A 16-question survey was sent to 100 residency program directors, with responses from 27 programs. The survey aimed to assess the program's strategies for postoperative pain management, including the use of opioids, non-opioids, and other available modalities such as localized long-acting bupivacaine.

**Results:** The results showed that 74% of the responding programs still taught the use of opioid prescriptions for third-molar removal, and 40% of the surveyed programs used prescription narcotics for other extractions as well. One-third of residency programs have adopted the use of localized long-lasting bupivacaine to limit the amount of narcotic medication required for dentoalveolar procedures.

**Conclusion:** This study highlights the implications of these prescription habits and raises questions regarding future improvements to OMFS resident training programs.

**Keywords:** Analgesics, Opioid; Drug Prescriptions; Education, Dental; Pain.



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## INTRODUCTION

The opioid crisis in the United States is a tremendous problem involving a large volume of prescribed narcotics, drug abuse, and deaths [1-4]. Many patients directly affected by opioid use were reportedly first prescribed opioids following dental extractions by oral and maxillofacial surgeons and/or residents for initial pain management [1,5,6].

Specific attempts to reduce the number of opioids

prescribed for pain management have been established [7-9]. The American Association of Oral and Maxillofacial Surgeons (AAOMS) has established a White Paper providing recommendations regarding acute and postoperative pain management, recommending to avoid opioids, if possible, as a first line pain management [7]. This can be seen as an example of oral and maxillofacial surgeons directly addressing the opioid prescription crisis. In addition, the Centers for Disease Control and Prevention have established specific guidelines for prescribing opioids for pain [8]. Prescription Drug Monitoring Programs

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established in individual states have been successful in providing practitioners with a data bank to track a patient's history regarding prescription opioids, thereby reducing the likelihood of writing additional narcotic prescriptions [6, 8-11].

Another method that may decrease opioid prescription numbers that has recently been developed is the use of pharmacogenetic testing [12-14]. Current reports have documented that there are specific genotypes that a patient may have, that specifically correlate with postoperative pain response and opioid use [12-14]. This information allows the prescribing doctor to administer patient-specific types of pain medication and the dosing amount that will work best for that patient [13]. Stucki-McCormick reported that genetic testing may also indicate which patients may be inclined to become addicted to opioids [14].

However, the opioid crisis in America is an ongoing concern [1-4]. Prescribing habits of dentists, particularly oral surgeons, have been questioned [6,10,11]. It has been found that a portion of those addicted to opioids were first exposed to medication following third-molar removal. Consequently, it is incumbent on oral surgery training programs to train residents in proper postoperative pain control strategies that may not involve opioids [1,10]. Hence, the purpose of this survey study was to evaluate the training of upcoming oral surgeons when it comes to the writing of opioid prescriptions and whether opioid alternatives such as liposomal bupivacaine and nonsteroidal anti-inflammatory drugs (NSAIDs) are routinely used as alternatives. The survey was developed based on the following criteria: are opioids prescribed following routine third-molar removal, and if so, what quantity is usually recommended? We also aimed to determine whether opioids were prescribed for other oral surgical procedures and in what quantity. Furthermore, NSAIDs, particularly ibuprofen in conjunction with acetaminophen, are widely used in today's dental practice, and we wanted to know if this protocol is also being taught to upcoming oral surgery professionals. Lastly, we hope that the survey will shed light on whether

liposomal bupivacaine is being taught and utilized in these surgery residency programs to potentially limit the number of written opioid prescriptions.

## METHODS

To evaluate the current scope of narcotic prescribing habits among Oral and Maxillofacial Surgery (OMFS) residents, soon to become a new batch of prescribing providers in the United States, a 16-question survey was created with multiple-choice response options. The postdoctoral program directors of 100 oral and maxillofacial surgery training programs were contacted via email through their listing by the AAOMS. An initial email with the survey link was sent in May 2023. Program directors who did not respond were sent follow-up emails by June 2023. After the second attempt, no further contact was made with programs that did not respond. If the program director was interested in participating in the survey, they agreed on the consent form page and were directed to the survey, which was administered online by Redcap (<https://project-redcap.org>).

The responses were collected and stored on a secure password-protected computer on an in-house server. The tabulated results were subjected to statistical analyses. The entire study, including the survey, was reviewed by the Midwestern University Office of Research and Sponsored Programs Institutional Review Board (IRB; IRBAZ #5421). Because the survey contained no identifying markers, no institution-specific analyses were conducted, and no private information or individuals were collected, this study was approved by the IRB with an exempt status. The survey was primarily conducted for informational purposes. For each survey question, we report the responses as frequencies and proportions.

## RESULTS

The survey was sent to 100 oral and maxillofacial

Table 1. Survey questions (n = 27)

Survey questions, n (27%)	Survey responses
1. Do you or your attendings teach your residents to prescribe opioids for pain control following third molar removal?	
Yes	20 (74.07)
No	7 (25.93)
2. If you answered "Yes" to question #1, how many tablets are typically prescribed for pain control following the removal of third molars?	
0-5 tablets	6 (30.00)
5-10 tablets	3 (15.00)
10-20 tablets	11 (55.00)
20+ tablets	0 (0.00)
3. Do you or your attendings teach your residents to prescribe opioids for pain control following the removal of teeth other than third molars?	
Yes	11 (40.74)
No	16 (59.26)
4. If you answered "Yes" to question #3, how many tablets are typically prescribed for pain control following the removal of teeth other than third molars?	
0-5 tablets	4 (36.36)
5-10 tablets	5 (45.45)
10-20 tablets	2 (18.18)
20+ tablets	0 (0.00)
5. Do you or your or your attendings teach your residents to prescribe opioids for pain control following the placement of dental implants?	
Yes	10 (37.04)
No	17 (62.96)
6. If you answered "Yes" to question #5, how many tablets are typically prescribed for pain control following the placement of dental implants?	
0-5 tablets	4 (40.00)
5-10 tablets	5 (50.00)
10-20 tablets	1 (10.00)
20+ tablets	0 (0.00)
7. If you answered "Yes" to any of the previous questions, which of the following opioids are most likely to be prescribed?	
Hydrocodone	7 (58.33)
Oxycodone	1 (8.33)
Tramadol	2 (16.67)
Codeine	2 (16.67)
8. Do you or your attendings teach your residents to recommend the use of ibuprofen OR acetaminophen for post-operative pain control as an alternative to opioids for any of the following procedures (select all that apply)?	
Third molar removal	27 (100.00)
Removal of teeth other than third molars	27 (100.00)
The placement of dental implants	27 (100.00)
None of the above	27 (100.00)
9. If you answered "Yes" to question #8, do you or your attendings teach the use of ibuprofen AND acetaminophen alternating in combination?	
Yes	27 (100.00)
No	0 (0.00)
10. If you answered "Yes" to question #9, what dose and frequency of ibuprofen do you advocate?	
200 mg q4h	0 (0.00)
400 mg q4h	1 (3.70)
600 mg q6h	21 (77.78)
800 mg q8h	5 (18.52)
None of the above	0 (0.00)

surgery residency programs in the United States. A total of 27 program directors (27% response rate, which offers significance) with their responses are listed (Table 1). At

the time of this survey, there were 100 accredited programs in the United States. To limit hesitancy on the part of the recipients to respond to the survey, all

Table 1. (continued)

Survey questions, n (27%)	Survey responses
11. If you answered "Yes" to question #9, what dose and frequency of acetaminophen do you advocate?	
650 mg q6h	14 (51.85)
1000 mg q6h	5 (18.52)
1000 mg q8h	4 (14.81)
None of the above	4 (14.81)
12. If you teach the use of ibuprofen AND acetaminophen in combination to control post-operative pain, do you also prescribe an opioid?	
Yes	16 (61.54)
No	10 (38.46)
13. Do you or your attendings teach the residents to utilize Exparel (liposomal bupivacaine) to manage postoperative pain following dentoalveolar surgery?	
Yes	9 (33.33)
No	18 (66.67)
14. If you answered yes to questions #13, for which of the following procedures do you teach the use of Exparel (liposomal bupivacaine)? Select all that apply.	
Removal of third molar	9 (33.33)
Removal of teeth other than third molars	3 (11.11)
Placement of dental implants	2 (7.41)
Bone grafting	4 (14.81)
15. If you answered "Yes" to question #13, do you teach the use of ibuprofen AND acetaminophen alternating in combination in addition to the use of Exparel?	
Yes	8 (100.00)
No	0 (0.00)
16. Do you or your attending teach your residents to prescribe opioids for pain control for patients with a history of substance abuse?	
Yes	10 (37.04)
No	17 (62.96)

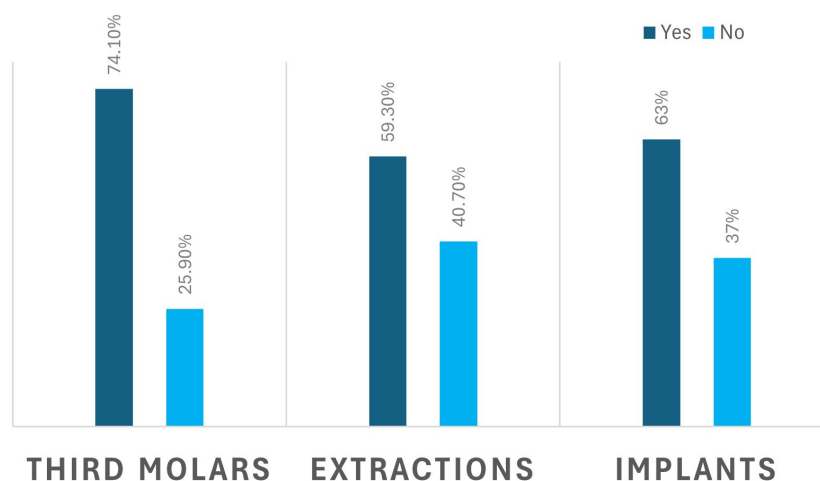


Fig. 1. Opioids prescribed post-operatively.

collected data were kept anonymous. No names or institutions correlated with the survey responses. Additionally, keeping the responses anonymous removed any bias that may have occurred, knowing from what region of the United States the responses came from.

When asked if residents are taught to prescribe opioids

for pain control following third molar removal, 74.1% (20 respondents) answered "Yes," while 25.9% (7 respondents) answered "No" (Fig. 1). Among those who were prescribed opioids, 40.7% (11 respondents) typically prescribed 5–10 tablets, 22.2% (6 respondents) prescribed 0–5 tablets, 11.1% (3 respondents) prescribed 10–20

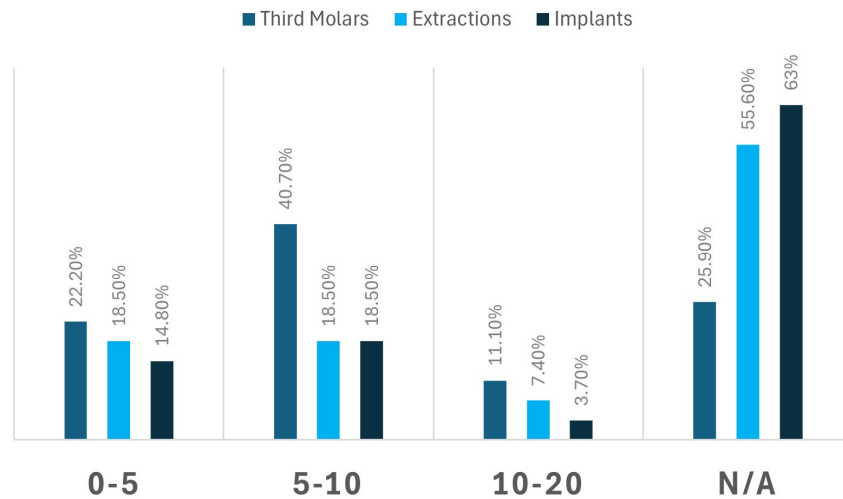


Fig. 2. Number of prescribed tablets per procedure.

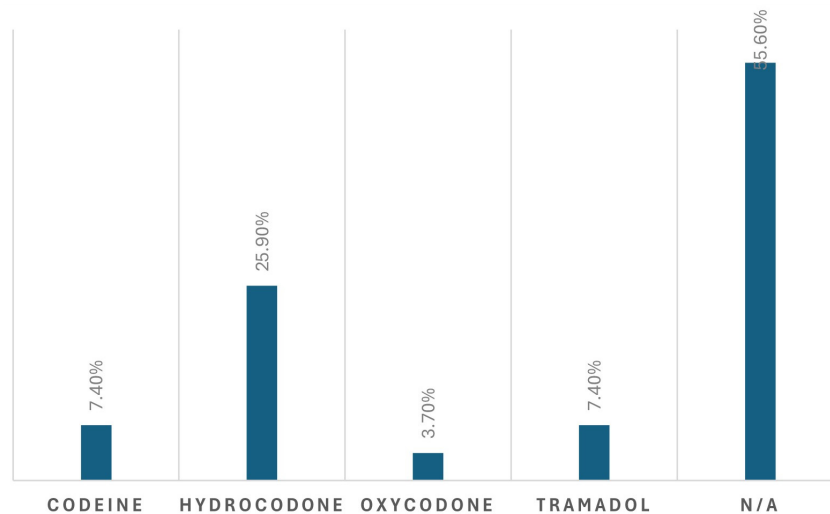


Fig. 3. Type of drug prescribed.

tablets, with 25.9% (7 respondents) indicating that the question was not applicable (Fig. 2).

Regarding the prescription of opioids for pain control following the removal of teeth other than third molars, 59.3% (16 respondents) did not teach this practice, whereas 40.7% (11 respondents) did. Of those who did, 18.5% (5 respondents) prescribed 5–10 tablets, 18.5% (5 respondents) prescribed 0–5 tablets, and 7.4% (2 respondents) prescribed 10–20 tablets, with 55.6% (16 respondents) indicating that the question was not applicable.

Regarding pain control following the placement of dental implants, 63.0% (17 respondents) did not teach

about opioid prescriptions, while 37.0% (10 respondents) did. Among those who did, 18.5% (5 respondents) prescribed 5–10 tablets, 14.8% (4 respondents) prescribed 0–5 tablets, 3.7% (1 respondent) prescribed 10–20 tablets, and 63.0% (17 respondents) indicated that the question was not applicable.

When asked which opioids were most likely to be prescribed, 25.9% (7 respondents) indicated hydrocodone, 7.4% (2 respondents) indicated codeine and tramadol, 3.7% (1 respondent) indicated oxycodone, and 55.6% (15 respondents) indicated that the question was not applicable (Fig. 3).

All respondents (100%) taught their residents to

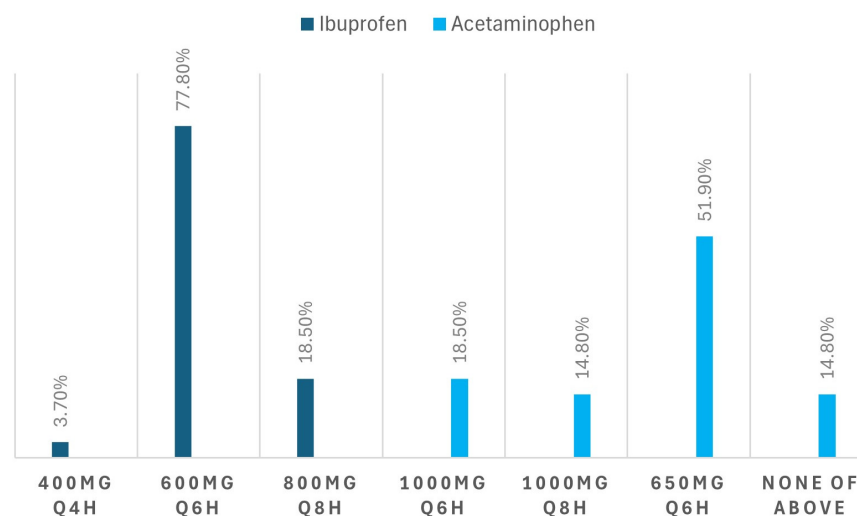


Fig. 4. Dosing of drug.

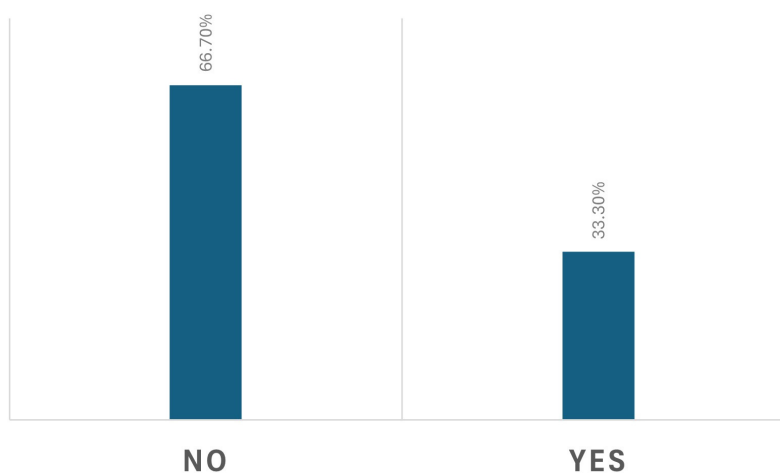


Fig. 5. Exparel prescribed after dentoalveolar surgery.

recommend ibuprofen or acetaminophen for postoperative pain control as an alternative to opioids for third-molar removal, removal of teeth other than the third molars, and placement of dental implants. Moreover, all respondents (100%) were taught the use of ibuprofen and acetaminophen in combination.

For ibuprofen, 77.8% (21 respondents) advocated a dose of 600 mg every 6 h, 18.5% (5 respondents) advocated 800 mg every 8 h, and 3.7% (1 respondent) advocated 400 mg every 4 h. Regarding acetaminophen, 51.9% (14 respondents) advocated 650 mg every 6 hours, 18.5% (5 respondents) advocated 1000 mg every 6 hours, 14.8% (4 respondents) advocated 1000 mg every 8 hours, and

14.8% (4 respondents) indicated none of the above (Fig. 4).

Regarding the use of Exparel (liposomal bupivacaine; Pacira Pharmaceuticals, San Diego, CA, USA) for managing postoperative pain following dentoalveolar surgery, 66.7% (18 respondents) did not teach about its use, while 33.3% (9 respondents) did (Fig. 5). Among those who did, 33.3% (9 respondents) used it for third-molar removal, 14.8% (4 respondents) for bone grafting, 11.1% (3 respondents) for the removal of teeth other than third molars, and 7.4% (2 respondents) for the placement of dental implants (Fig. 6). Additionally, 29.6% (8 respondents) were taught the use of ibuprofen

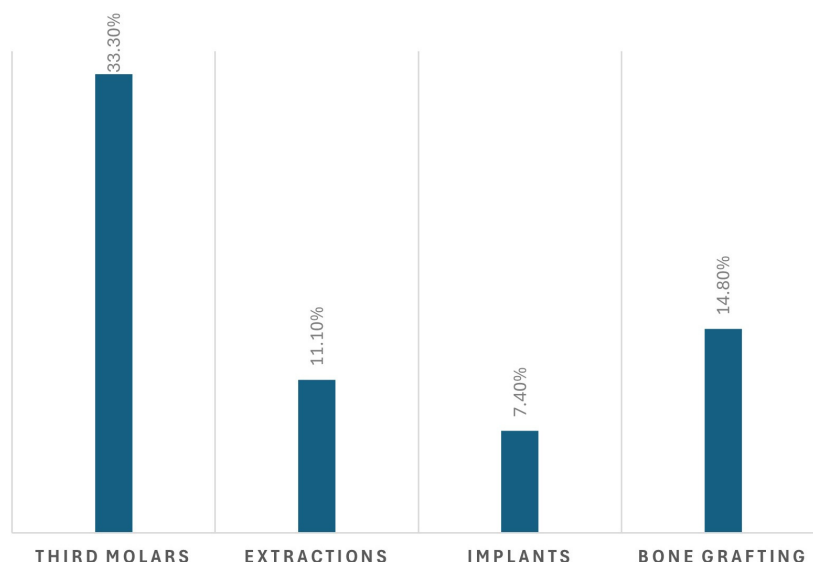


Fig. 6. Exparel recommended per type of procedure.

and acetaminophen in combination with Exparel, whereas 70.4% (19 respondents) indicated that the question was not applicable.

Finally, when asked if they teach residents to prescribe opioids for patients with a history of substance abuse, 63.0% (17 respondents) answered “No,” while 37.0% (10 respondents) answered “Yes.”

## DISCUSSION

Recent national data show that, overall, opioid prescriptions by dentists and oral and maxillofacial surgeons has decreased by 41% and 20%, respectively, from 2016 to 2019 [15,16]. Interestingly, 25% of programs do not teach residents the use of opioids for third molar extractions, perhaps reflecting a growing trend toward opioid-free postoperative care, and 100% of programs recommend the use of ibuprofen or acetaminophen as non-opioid alternatives. This may reflect a general trend toward minimizing opioid use where possible. Yet, other work has shown that even though this prescribing trend is downward, oral and maxillofacial surgeons remained in the moderately and consistently high prescribing groups [16]. In a 2017

retrospective study, it was shown that the vast majority of opioid prescriptions written were well under the recommended thresholds, and it was the top 1% of prescribers accounting for 49% of all opioid doses [17]. When analyzed, the type of providers found in that top centile of opioid prescribers were in family medicine (24%), pain medicine and rehabilitation (14%), and anesthesiology (14%) [18]. Dentists, and particularly oral surgeons, were not found in the top centile of prescribers.

Our survey seems to support these conflicting data in that all residency programs teach residents to recommend ibuprofen or acetaminophen for patients; however, most (74%) OMFS residency programs still teach doctors to use opioids for pain control following oral surgery.

Although 74% of our respondents taught residents to use opioids for pain control, 100% taught residents to recommend the use of ibuprofen or acetaminophen for post-operative pain control in all surgical procedures. However, our survey revealed that there is still a significant trend in oral surgery residency programs in the United States to teach opioid prescriptions as a part of pain management for third molar removal. Furthermore, 40% of the responding programs prescribed opioids for the removal of teeth other than third molars, suggesting that opioids are still considered necessary in

certain cases. This highlights the challenges faced by OMFS programs in effectively managing postoperative pain while responding to the overall opioid crisis. On a positive note, a quarter of the surveyed programs did not use opioids for third molar extraction.

In our survey, 66.7% did not teach residents to utilize liposomal bupivacaine to help manage postoperative pain, which is somewhat surprising given its potential to provide up to 72 hours of pain relief [19,20]. Regional local anesthesia or regional block anesthesia has long been considered a positive adjunct for postoperative care [21]. Le et al. reported that supplemental regional block anesthesia reduced opioid utilization following free-flap oral reconstruction [21]. Other researchers have found, specifically with the bilateral removal of impacted mandibular third molar extractions, significant improvement in pain scores with local infiltration, and a longer release time of liposomal bupivacaine [21-23].

Ho et al. reported in their study that most people are interested in liposomal bupivacaine as a postsurgical analgesia [19]. However, the cost of liposomal bupivacaine, at \$376 for a 20-mL vial is a deterrent to its use [19,20]. In OMFS residency programs, teaching hospitals or dental schools, the added expense to the patient for the liposomal bupivacaine injections may not be affordable when compared to the cost of an opioid, ibuprofen or acetaminophen pill. However, a recent study comparing pain relief from liposomal bupivacaine vs standard bupivacaine following third molar extractions, found no difference between the two types of bupivacaine [22]. Bupivacaine is less expensive, only about \$3 per dose. Liposomal bupivacaine can last up to 72 hours and bupivacaine, 3-4 hours [19,22].

An alternative method that is currently used to address the opioid crisis is the use of individual genomic testing, providing individualized pain management [12-14]. Genomic testing is an approach to individualize post-operative pain management and can reduce the use of opioids as a primary approach to third-molar pain therapy [12]. Genomic testing can determine whether an individual has specific genes that respond well to a

specific opioid or have bad or addictive reactions to opioids [12]. Although pharmacogenetic testing is not yet widely implemented in OMFS residency programs, its potential to minimize opioid use makes it an area worth exploring. This could change postoperative pain management and reduce the amount of opioid used by patients [12]. Along with alternative pain protocols, like the PainPack Protocol<sup>TM</sup>, utilizing Tylenol plus Ibuprofen, it has been shown to provide adequate pain relief while avoiding the risk associated with opioid use [23]. Such strategies, when integrated into residency training, could be the future of pain management.

In conclusion, this survey highlights the continued teaching of opioid prescription writing for routine dentoalveolar surgery and the ongoing efforts within OMFS residency programs to reduce opioid use by incorporating non-opioid alternatives, such as ibuprofen and acetaminophen. Although long-lasting local anesthetics are available for such procedures, cost and resource limitations remain as obstacles. The continued development and adoption of personalized pain management techniques and alternative protocols may play a crucial role in addressing opioid-related public health issues.

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**Trever Siu:** Formal analysis, Writing - review & editing

**Chase Irwin:** Formal analysis, Methodology, Writing - review & editing

**Mackenzie Andrews:** Data curation, Investigation



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