



Soft Tissue Injury Prevalence in Pediatric Patients Following Local Anesthesia

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PURPOSE

This survey aims to inform best practices in pediatric pain management by guiding clinicians in the selection of methods that enhance patient safety and comfort during and after dental restorative procedures. Additionally, these findings may serve as an educational resource for parents, who are the primary observers and reporters of post-anesthetic soft tissue injuries.

INTRODUCTION

Soft-tissue injuries, such as lip, cheek, or tongue biting, are common adverse effects of local anesthesia in pediatric dentistry, particularly following nerve blocks. These injuries may result in pain, feeding difficulties, and/or emotional distress, especially in younger children who may not understand or be able to control self-biting behaviors.^{1,2}

Intraosseous injection systems, such as NuSmile's Soan[®] and SleeperOne[®], Stabident[®], X-Tip[®], Intraflow[®], and Quicksleeper 5[®], offer an alternative delivery method that delivers anesthetic directly into the bone while minimizing numbness in surrounding soft tissues, potentially reducing the incidence of self-inflicted injuries.

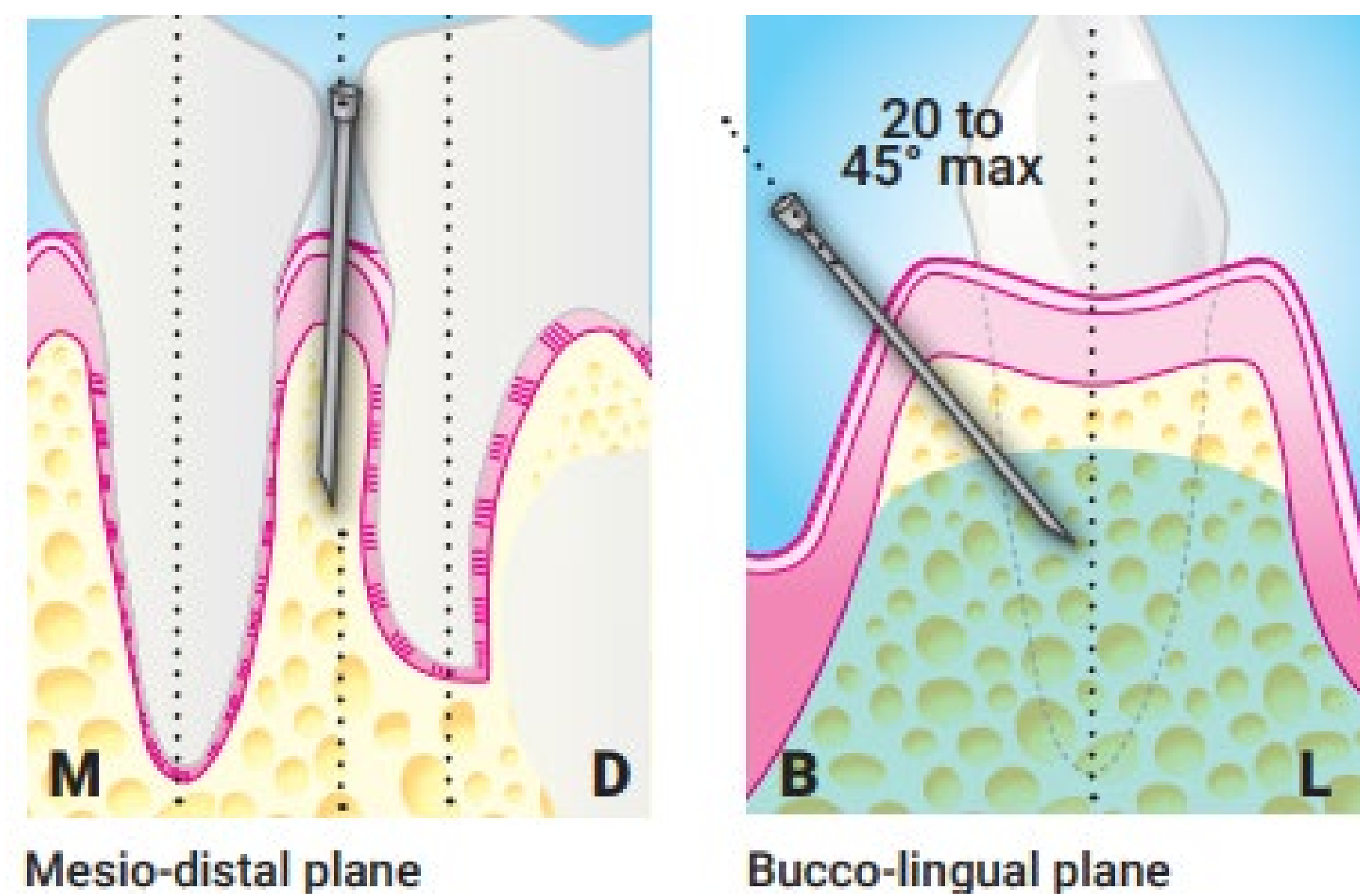


Figure 1. Anatomical Approach of Intraosseous Anesthesia.³

By comparing traditional syringes with various intraosseous systems, this survey aims to inform best practices in pediatric pain management by guiding clinicians in selecting methods that enhance patient safety and comfort.

METHODS

A survey-based study design was used to evaluate participants' attitudes within the American Academy of Pediatric Dentistry (AAPD) regarding the comparison of traditional syringes with various intraosseous systems.

A Qualtrics[®] survey was sent to members of the AAPD to assess the prevalence of soft-tissue injuries in their practice following local anesthesia, including the tissues most affected, the individuals most likely to report these injuries, and the timing of their occurrence. Additionally, the survey evaluated the use of intraosseous systems for local anesthesia, identifying the most used devices and overall provider satisfaction with these systems.

LEARNING OBJECTIVES

Upon review of this material, the observer will be able to:

1. Identify the most common anatomical sites for post-anesthetic injury and recognize the prevalence of soft-tissue injuries related to local anesthesia injections in pediatric dentistry.
2. Determine the typical timing of soft-tissue injury occurrence following local anesthesia administration and describe the critical role of caregiver education in reducing at-home injuries.
3. Identify the most prevalent intraosseous delivery systems and understand the relationship between clinical experience and adoption of intraosseous systems.
4. Assess significant clinical findings from consistent use of intraosseous systems and understand the biological process of intraosseous anesthetic delivery.

RESULTS

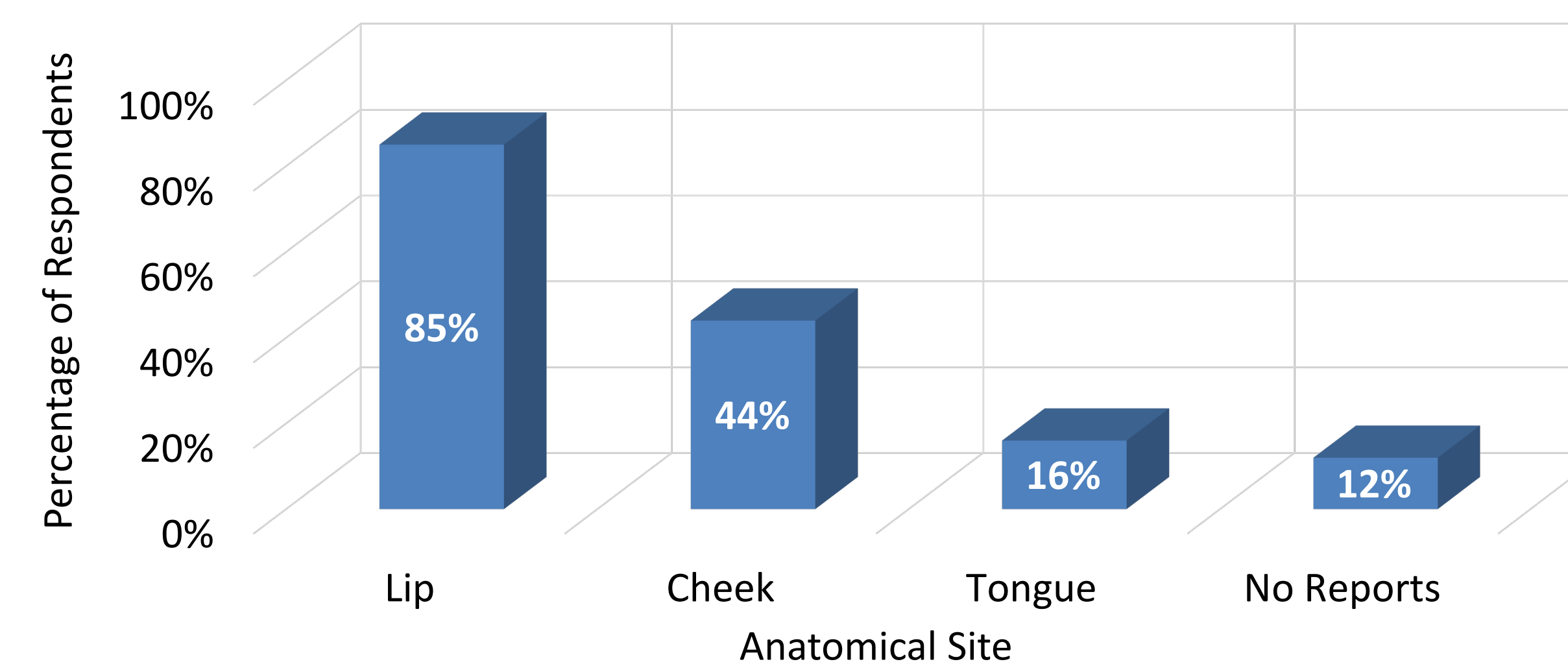


Figure 2. Distribution of Post-Anesthetic Soft-Tissue Injury Sites.

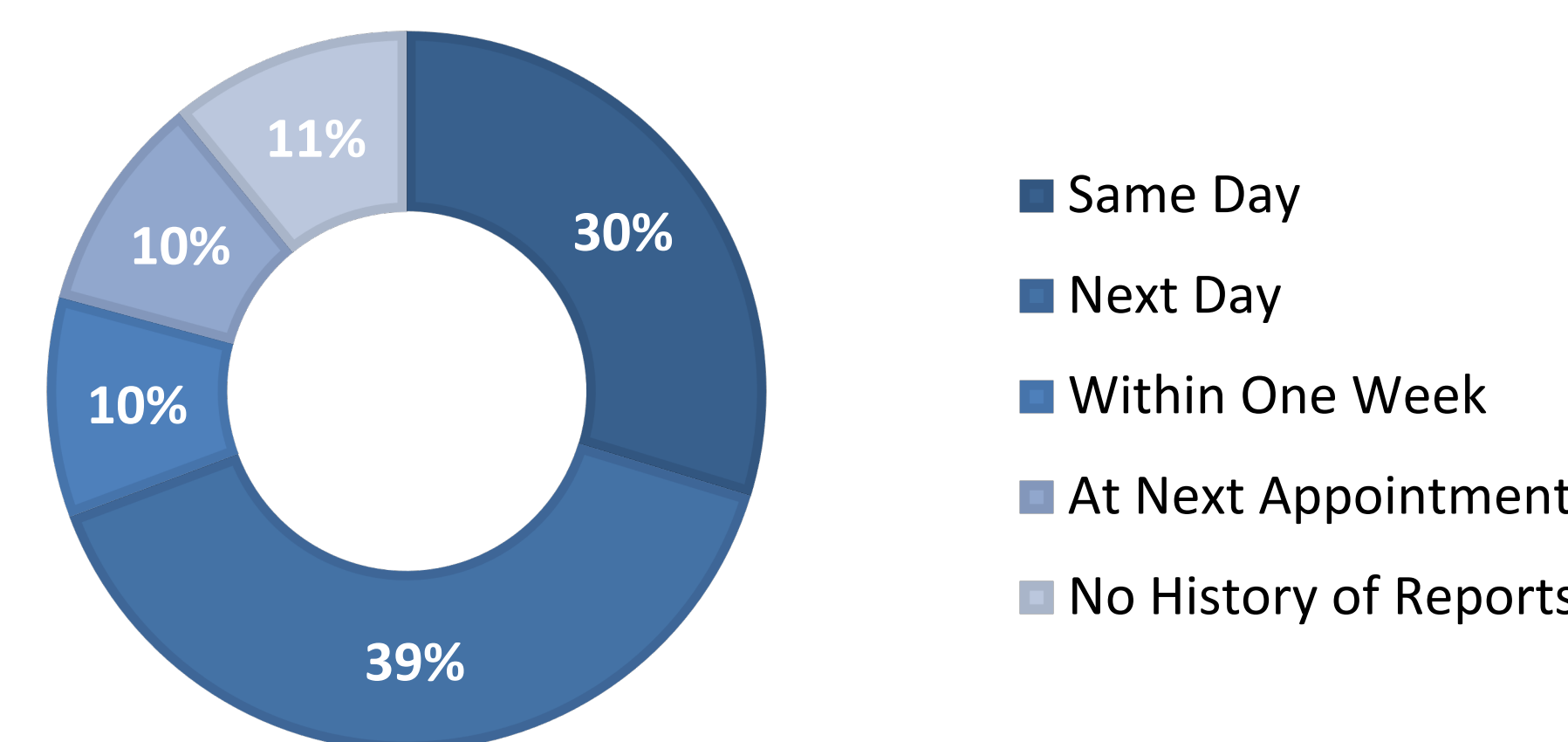


Figure 3. Timing of Soft-Tissue Injury Reports.

Table 1. Characteristics and Frequency of Intraosseous System Utilization

Category	Sub-Category	Value (N=340, n=101)
Primary Device of IO Users	Soan [®] (NuSmile)	61.3861% (n=62)
	Always	6% (n=20)
Frequency of IO Use	>50% of time	11% (n=36)
	<50% of time	13% (n=45)
	Never	70% (n=239)
Experience Analysis	Years in Practice vs. IO Use	p=0.6747 (NS)

*Abbreviations in table: IO=intraosseous, NS=non-significant, p>0.05.

Note. While N=340 responded to the survey, n = 101 reported utilizing IO systems.

Table 1. Comparative Analysis of Intraosseous Usage vs. Injury Frequency

Variable	Always Use	Inconsistent Use	P-Value
Mean Injuries/Month	0.3 ± 0.37 (SE)	1.3 ± 0.09 (SE)	0.0071
Zero Injuries	35%	10%	0.0041
Lip Injury	65%	86%	0.0222
Cheek Injury	25%	46%	0.0644
Tongue Injury	10%	16%	0.4470

*Abbreviations in table: SE=standard error.

CONCLUSION/DISCUSSION

Based on the limitations imposed by the methods of this study, the following conclusions may be made:

1. Soft-tissue injury is a common postoperative issue in pediatric dentistry. Because most injuries are reported within 24 hours of the procedure, once the patient has returned home, caregiver education is essential to reduce the risk of post-anesthetic soft-tissue injuries.
2. Among users of intraosseous injection devices, many report clinical benefits despite limited overall adoption. The Soan[®] system is the most widely used intraosseous device, and no association was detected between years in practice and the frequency of intraosseous system use.
3. Among respondents who use intraosseous devices, those who always use them, compared with those who use them inconsistently, are more likely to report fewer injuries overall, a higher rate of zero injuries, and fewer lip injuries.
4. Lip injuries remain the most common soft-tissue injury, regardless of intraosseous use.

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