International Journal of Early Childhood Special Education (INT-JECSE)
DOI:10.9756/INTJECSE/V14I5.370 ISSN: 1308-5581 Vol 14, Issue 05 2022

PREVALENCE OF THE USE OF LOCAL ANAESTHESIA IN CHILDREN TREATED UNDER GENERAL ANAESTHESIA - A RETROSPECTIVE COHORT STUDY

Charanya Suresh[1], Dr. Lavanya Govindaraju[2], Dr Ganesh Jeevanandan[3], Dr Satish Vishwanathaiah[4], Dr Prabhadevi C Maganur[5]

1. Research Assistant, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, Tamil Nadu, India
2. Senior Lecturer, Department of Pedodontics
Saveetha Dental College and Hospital, Saveetha Institute of Medical and Technical Science, Saveetha University, Chennai, Tamil Nadu, India
3. Associate Professor, Department of Pedodontics
Saveetha Dental College and Hospital, Saveetha Institute of Medical and Technical Science, Saveetha University, Chennai, Tamil Nadu, India
4. Associate Professor, Department of Preventive Dental Sciences
Division of Pediatric Dentistry, College of Dentistry, Jazan University, Jazan, Saudi Arabia
5. Associate Professor, Department of Preventive Dental Sciences
Division of Pediatric Dentistry, College of Dentistry, Jazan University, Jazan, Saudi Arabia

Corresponding Author: Ganesh Jeevanandan
Associate Professor, Department of Pedodontics, Saveetha Dental College and Hospital, Saveetha Institute of Medical and Technical Science, Saveetha University, Chennai, Tamil Nadu, India
Email: helloganz@gmail.com

Abstract
The goal of this study was to document current pedodontist practices regarding the use of local anaesthetic as a supplement for children receiving dental treatment under general anaesthesia. It's a single-centered retrospective study that took place in a private dental clinic in Chennai. Data on the use of local anaesthetic during dental treatment under general anaesthesia, as well as the justification for its usage, was obtained from the dental hospital management system (DIAS). Between June 2019 and March 2021, 535, 951 patient records were analysed, with 349 patients meeting the inclusion and exclusion criteria being included in the study. The use of local anaesthetic during dental treatment under general anaesthesia is preferred by the majority of dentists (91 percent).

Keywords: Local anesthesia, Hospital dentistry, General anesthesia, paediatric dentistry

Introduction

Dentists employ general anaesthesia as a behaviour modification method to provide high-quality dental care to children who would otherwise be unable to get it in an outpatient setting. The use of local anaesthetic in conjunction with general anaesthesia has sparked debate among scientists (1).

Some of the probable benefits of employing local anaesthetic throughout dental treatment include reduced postoperative discomfort, improved haemorrhage management, and less need for anesthesiologist intervention (2). In a randomised controlled research, Noble et al discovered that patients undergoing extractions under general anaesthesia without systemic analgesics were less likely to be upset upon recovery if local anaesthetic infiltration was also used (3). Patients who got extra local anaesthetic saw a considerable reduction in discomfort at the operation site, according to Atan et al (4). In a randomised controlled trial, Sammons et al found that adding local anaesthetic to extractions reduced discomfort by a statistically significant amount; however, this difference was only apparent after 5 minutes (5).

To improve physiological parameters during general anaesthesia, the use of local anaesthesia alongside general anaesthesia has been advised. The heart rate and end-tidal carbon dioxide levels were consistent for patients receiving dental treatment under supplemental local anaesthesia vs children receiving general anaesthesia without local anaesthesia, according to Watts et al. (6). Furthermore, patients who had local anaesthetic required fewer visits to the anesthesiologist. Those who received local anaesthetic had a lower decrease in heart rate and end-tidal CO2 than children who did not (7). The transient rise in heart rate and breathing rate during extraction or crown implantation may not be clinically useful in the treatment of a healthy kid, despite the statistical significance of these physiologic changes (8).

According to conflicting studies, using a local anaesthetic in conjunction with general anaesthesia has no effect on postoperative pain. Although Al-Bahlani et al did not analyse postoperative pain, they did find a clear and significant

rise in measures of discomfort in anaesthetized children who received local analgesic infiltration (9). Topical anaesthetics have also been proposed to help with postoperative pain after general anaesthesia, although Gazal et al found no difference when compared to when they weren't administered (10). Despite the concerns of certain writers, such as Flaitz et al, that adding local anaesthetic might increase lip and cheek biting, no statistically significant link between lip and cheek biting and local anaesthesia has been established (1).
The goal of this study was to describe pedodontists 'current procedures when using local anaesthetic on children undergoing dental treatment under general anaesthesia.

Materials and Methods
It's a single-center retrospective study that took place in a private dental clinic in Chennai. Data on the use of local anaesthetic during dental treatment under general anaesthesia, as well as the justification for its usage, was obtained from the dental hospital management system (DIAS). Between June 2019 and March 2021, 535, 951 patient records were analysed, with 349 patients meeting the inclusion and exclusion criteria being included in the study.

Data analysis
The data for the study was collected from the Dental Information Archiving System (DIAS) Of Saveetha Dental College. The data was transferred to excel, tabulated and analysed. Incomplete and censored data was excluded.

Statistical analysis
The data collected from DIAS was tabulated in excel. The data was imported to SPSS. Analysis was done using SPSS version 19. Descriptive statistics and chi square test was used to compare the various procedures in which supplemental use of local anaesthesia was done more often. The level of significance was set at 0.05.

Results
With the 349 patients data that was relevant for this study from 5, 35, 951 patient details, the following results were formulated

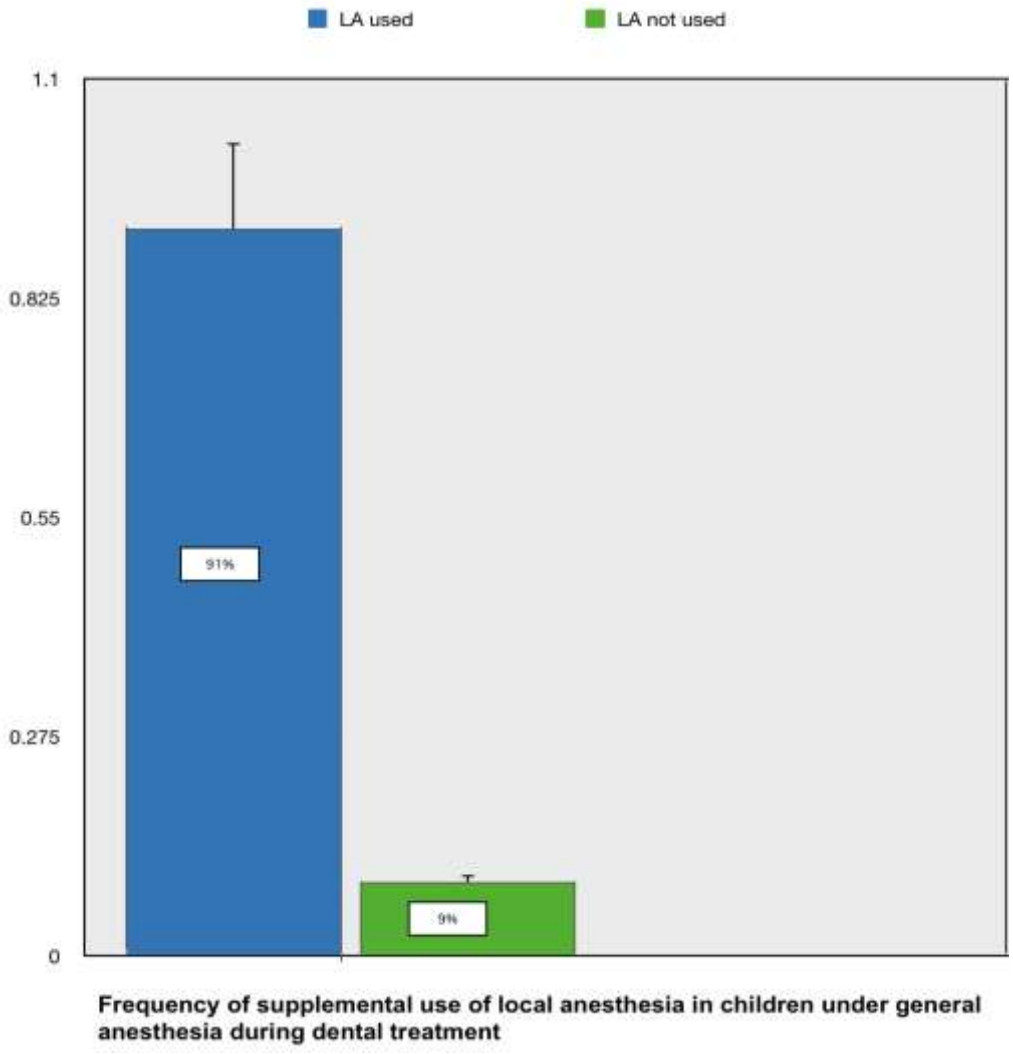

Figure 1 : Graph representing the frequency of local anesthesia being used in children under general anaesthesia during dental treatment. As the graph suggests, 91% of the children who were put under general anesthesia were also

supplementally administered with local anesthesia during dental treatment and 9% of the children who were put under general anesthesia were not supplementally administered with local anesthesia during dental treatment

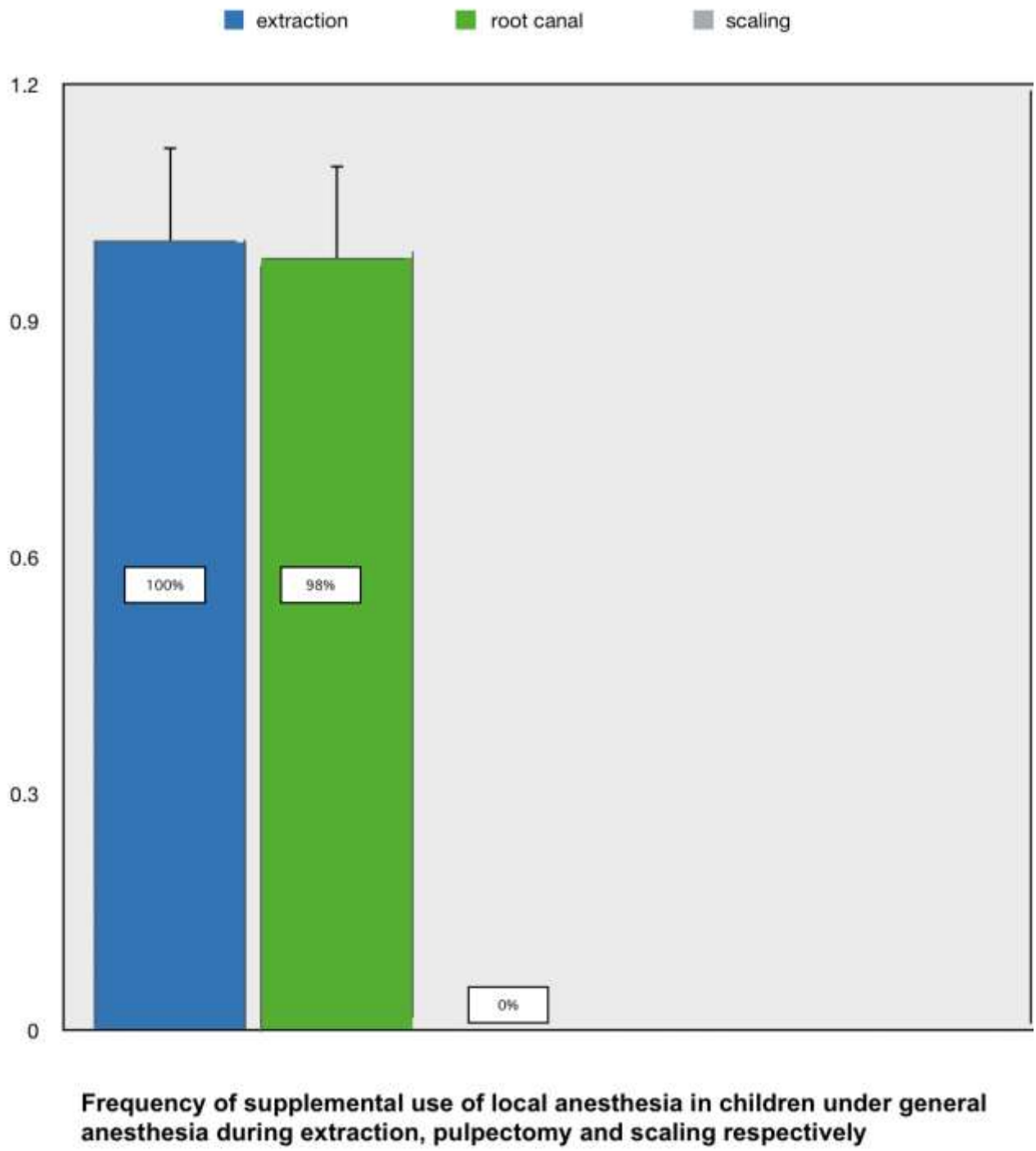

Figure 2 : Graph representing the frequency of the supplemental administration of local anesthesia during various procedures done on children under general anesthesia.

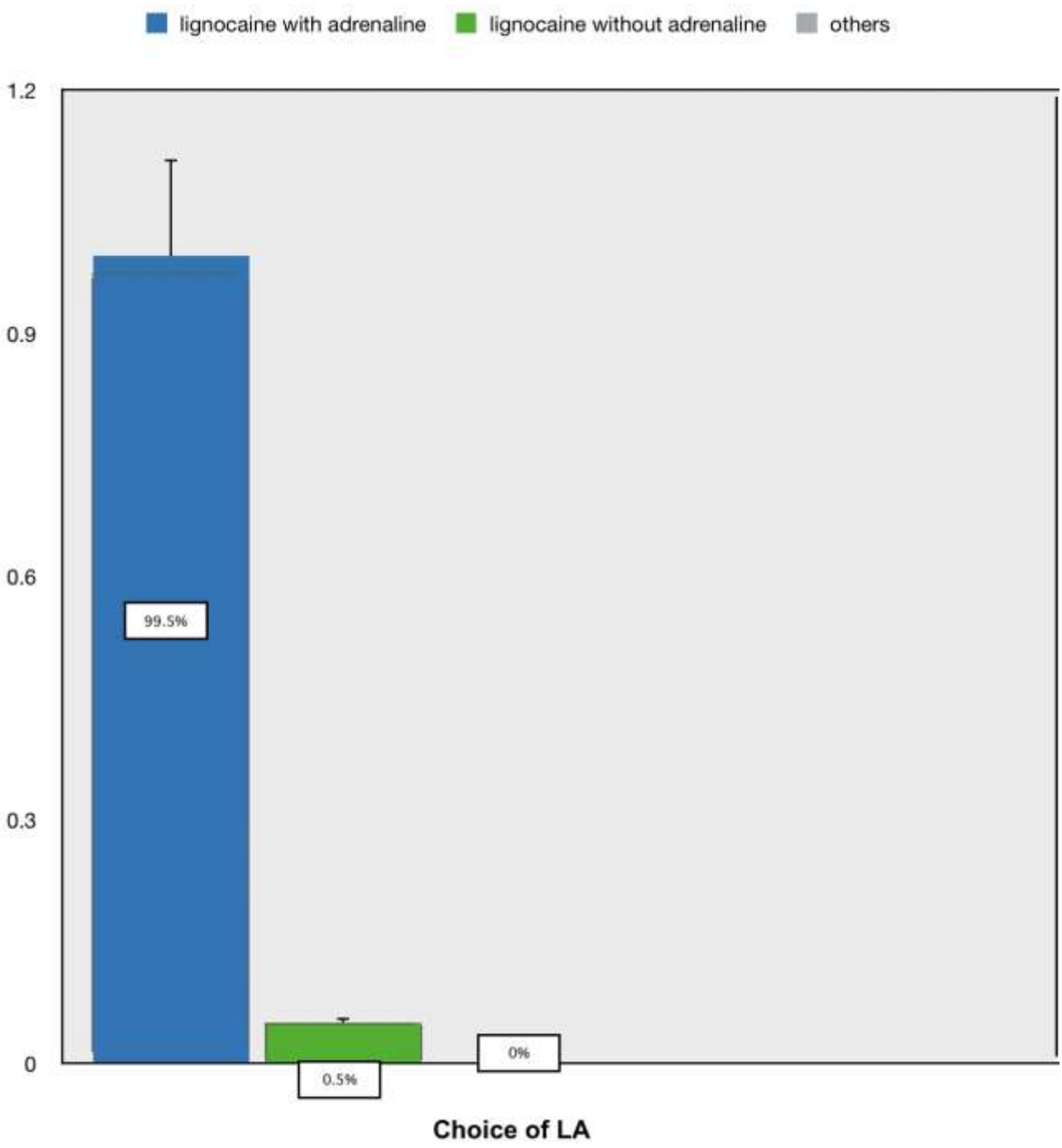

Figure 3: Graph representing the choice of local anesthesia used in case of supplemental administration of local anesthesia during various procedures done on children under general anesthesia.

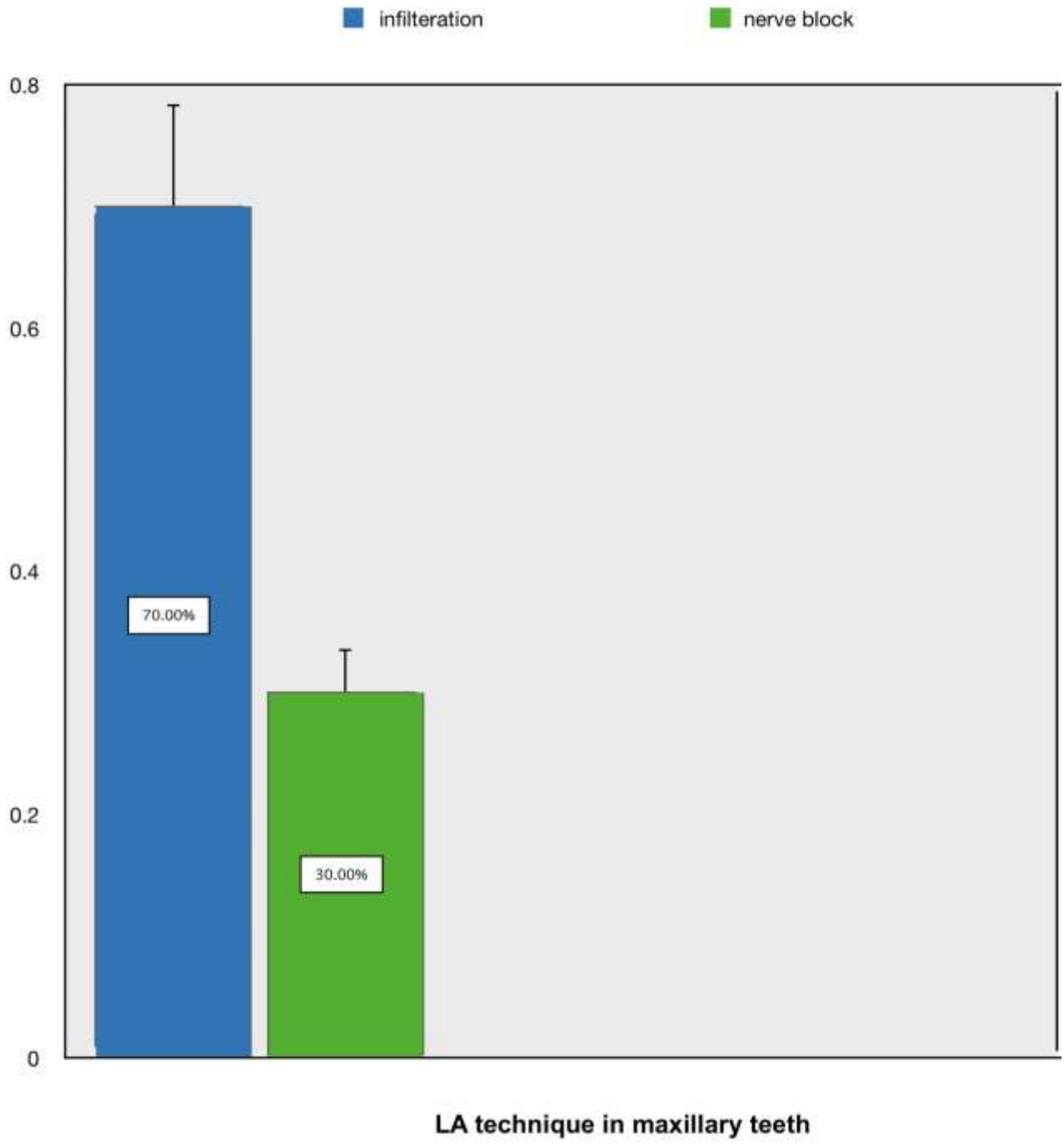

Figure 4: Graph representing the local anesthesia administration technique used in case of supplemental administration of local anesthesia during various procedures done on the maxillary teeth of children under general anesthesia.

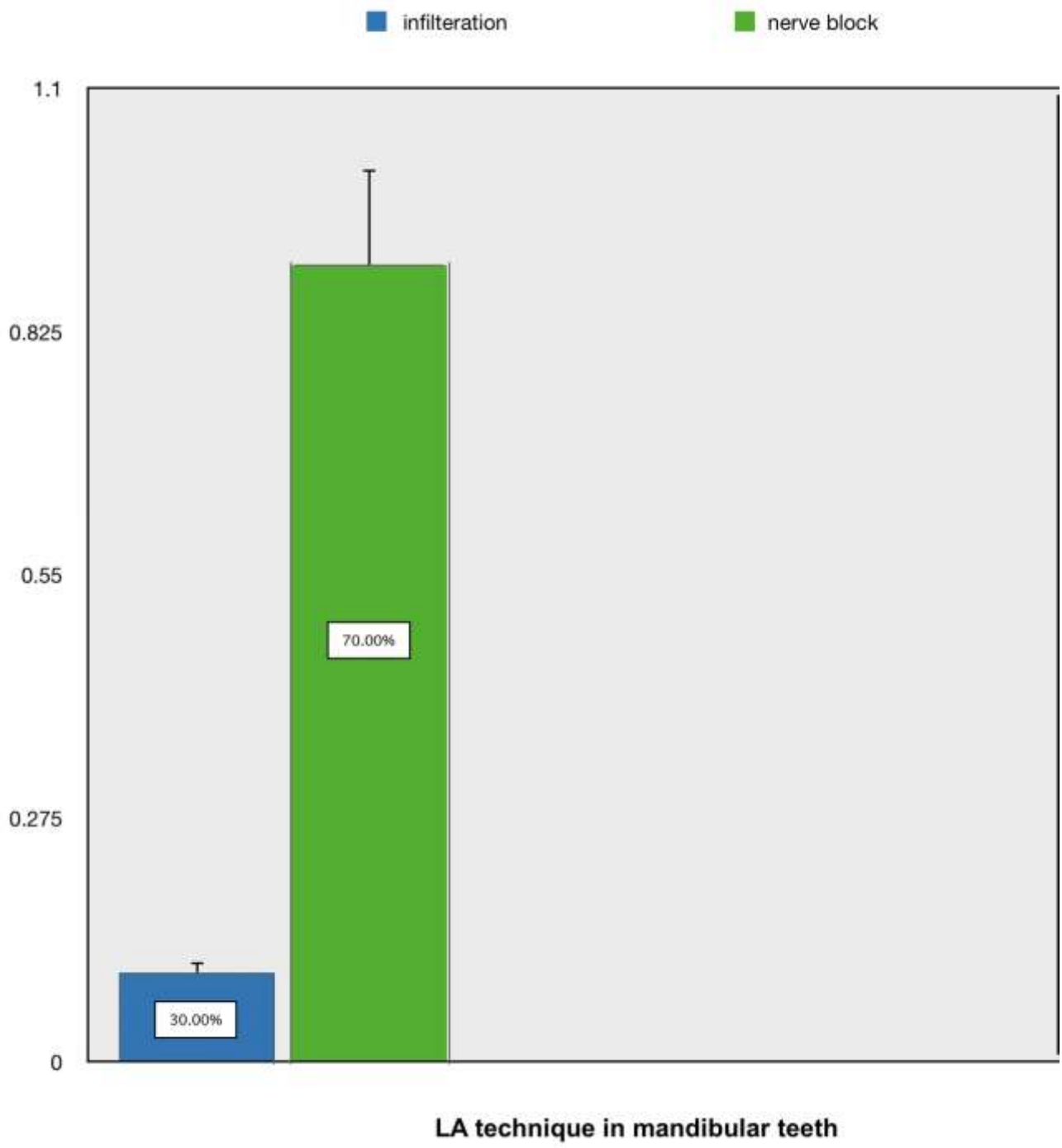

Figure 5 : Graph representing the local anesthesia administration technique used in case of supplemental administration of local anesthesia during various procedures done on the mandibular teeth of children under general anesthesia.

Discussion

Our team has a wealth of research and knowledge that has resulted in high-quality publications. (11–23)(24–30). In the present study it was noticed that 91% of the children treated under general anesthesia were supplemented with Local anesthesia and were mostly given for extraction followed by root canal treatment. According to the findings of the present study, a vast majority of dentists prefer local anaesthesia. Despite the fact that half of them make this decision on a case-by-case basis, some of them favour it with a few exceptions. The other most common reasons for this choice were improved patient recovery and stabilisation of vital signs. Other factors, such as avoiding deep pain pathways, were also a major reason (1).

Woolf et al speculated that noxious stimuli that cause tissue damage may cause long-term sensory disturbances, such as enhanced sensitivity to potential noxious stimuli or discomfort after seemingly harmless stimuli (31). Preemptive

regional or local anaesthesia can avoid the activation of deep pain receptors, according to research in the medical field based on this hypothesis of neuroplasticity contributing to postoperative pain.
Also, according to Needleman et al., children who had extractions in dental recovery under general anaesthesia were 7 times more likely than other participants to have pain after coming home (32). According to Ashkenazi et al., individuals who had stainless steel crowns with or without pulpotomy experienced significantly more discomfort than those who received extractions, restorations, or sealants (33).
Also In the present study it was noticed that 99.5% of the dentists preferred lignocaine with adrenaline to lignocaine without adrenaline, probably due to its hemostatic effect post extraction. In the present study, a further analysis of what technique was preferred by the dentists for delivering local anesthesia during general anesthesia was assessed and it was seen that 70% of the dentist preferred infiltration for maxillary teeth and 90% of the dentists preferred a nerve block for mandibular teeth.
In contrast to the findings of this investigation, a recent study indicated that AAPD members who were surveyed were significantly less likely (P.001) to always provide local anaesthetic and significantly less likely (P =.018) to administer local anaesthesia at least some of the time. Analgesia and postoperative pain control are critical components of the treatment plan, particularly when dental rehabilitation is performed under general anaesthesia. To anticipate and limit postoperative discomfort, the dentist and anaesthetic provider should work together. There have been no prospective double-blind trials to definitively prove the importance of employing local anaesthetic for all or any clinical dental operations performed on a child who is under general anaesthesia to date. (7). As a result, more research should be done to support the use of local anaesthetic for children who are being treated under general anaesthesia and to provide guidelines for doing so.

Conclusion

According to the findings of the study, 91 percent of dentists prefer to utilise local anaesthetic during dental procedures that need general anaesthesia. The extraction of primary and permanent teeth in children was reported to be the most common dental treatment for which local anaesthesia was utilised.

Acknowledgement: Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Science, Saveetha University.

Conflict of Interest: Nil

Source of Funding:
The following study was supported by the following agencies :
- Saveetha dental College
- Saveetha institute of medical and technical sciences
- Saveetha University
- 3 states pharmaceuticals

References

1. Townsend JA, Hagan JL, Smiley M. Use of Local Anesthesia During Dental Rehabilitation With General Anesthesia: A Survey of Dentist Anesthesiologists [Internet]. Vol. 61, Anesthesia Progress. 2014. p. 11–7. Available from: http://dx.doi.org/10.2344/0003-3006-61.1.11
2. American Academy of Pediatric Dentistry. The Reference Manual of Pediatric Dentistry. 2019.
3. Tetzlaff JE. Clinical Pharmacology of Local Anesthetics. Butterworth-Heinemann Medical; 2000. 258 p.
4. Atan S, Ashley P, Gilthorpe MS, Scheer B, Mason C, Roberts G. Morbidity following dental treatment of children under intubation general anaesthesia in a day-stay unit [Internet]. Vol. 14, International Journal of Paediatric Dentistry. 2004. p. 9–16. Available from: http://dx.doi.org/10.1111/j.1365-263x.2004.00520.x
5. Sammons HM, Unsworth V, Gray C, Choonara I, Cherrill J, Quirke W. Randomized controlled trial of the intraligamental use of a local anaesthetic (lignocaine 2%) versus controls in paediatric tooth extraction [Internet]. Vol. 17, International Journal of Paediatric Dentistry. 2007. p. 297–303. Available from: http://dx.doi.org/10.1111/j.1365-263x.2007.00832.x
6. Urman RD, Gross WL, Philip BK. Anesthesia Outside the Operating Room. Oxford University Press; 2018. 440 p.
7. Townsend JA, Ganzberg S, Thikkurissy S. The Effect of Local Anesthetic on Quality of Recovery Characteristics Following Dental Rehabilitation Under General Anesthesia in Children [Internet]. Vol. 56, Anesthesia Progress. 2009. p. 115–22. Available from: http://dx.doi.org/10.2344/0003-3006-56.4.115
8. Fink GJ. The Present Status of Local Anesthesia in Dental Surgery.* [Internet]. Vol. 21, Anesthesia & Analgesia. 1942. p. 173???176. Available from: http://dx.doi.org/10.1213/00000539-194201000-00037
9. Khader YS, Al Habashneh R, Al Malalheh M, Bataineh A. The effect of full-mouth tooth extraction on glycemic control among patients with type 2 diabetes requiring extraction of all remaining teeth: a randomized clinical trial

[Internet]. Vol. 45, Journal of Periodontal Research. 2010. p. 741–7. Available from: http://dx.doi.org/10.1111/j.1600-0765.2010.01294.x
10. Gazal G, Bowman R, Worthington HV, Mackie IC. A double-blind randomized controlled trial investigating the effectiveness of topical bupivacaine in reducing distress in children following extractions under general anaesthesia [Internet]. Vol. 14, International Journal of Paediatric Dentistry. 2004. p. 425–31. Available from: http://dx.doi.org/10.1111/j.1365-263x.2004.00587.x
11. Subramanyam D, Gurunathan D, Gaayathri R, Vishnu Priya V. Comparative evaluation of salivary malondialdehyde levels as a marker of lipid peroxidation in early childhood caries. Eur J Dent. 2018 Jan;12(1):67–70.
12. Ramadurai N, Gurunathan D, Samuel AV, Subramanian E, Rodrigues SJL. Effectiveness of 2% Articaine as an anesthetic agent in children: randomized controlled trial. Clin Oral Investig. 2019 Sep;23(9):3543–50.
13. Ramakrishnan M, Dhanalakshmi R, Subramanian EMG. Survival rate of different fixed posterior space maintainers used in Paediatric Dentistry – A systematic review [Internet]. Vol. 31, The Saudi Dental Journal. 2019. p. 165–72. Available from: http://dx.doi.org/10.1016/j.sdentj.2019.02.037
14. Jeevanandan G, Thomas E. Volumetric analysis of hand, reciprocating and rotary instrumentation techniques in primary molars using spiral computed tomography: An in vitro comparative study. Eur J Dent. 2018 Jan;12(1):21–6.
15. Princeton B, Santhakumar P, Prathap L. Awareness on Preventive Measures taken by Health Care Professionals Attending COVID-19 Patients among Dental Students. Eur J Dent. 2020 Dec;14(S 01):S105–9.
16. Saravanakumar K, Park S, Mariadoss AVA, Sathiyaseelan A, Veeraraghavan VP, Kim S, et al. Chemical composition, antioxidant, and anti-diabetic activities of ethyl acetate fraction of Stachys riederi var. japonica (Miq.) in streptozotocin-induced type 2 diabetic mice. Food Chem Toxicol. 2021 Jun 26;155:112374.
17. Wei W, Li R, Liu Q, Devanathadesikan Seshadri V, Veeraraghavan VP, Surapaneni KM, et al. Amelioration of oxidative stress, inflammation and tumor promotion by Tin oxide-Sodium alginate-Polyethylene glycol-Allyl isothiocyanate nanocomposites on the 1,2-Dimethylhydrazine induced colon carcinogenesis in rats. Arabian Journal of Chemistry. 2021 Aug 1;14(8):103238.
18. Gothandam K, Ganesan VS, Ayyasamy T, Ramalingam S. Antioxidant potential of theaflavin ameliorates the activities of key enzymes of glucose metabolism in high fat diet and streptozotocin - induced diabetic rats. Redox Rep. 2019 Dec;24(1):41–50.
19. Su P, Veeraraghavan VP, Krishna Mohan S, Lu W. A ginger derivative, zingerone-a phenolic compound-induces ROS-mediated apoptosis in colon cancer cells (HCT-116). J Biochem Mol Toxicol. 2019 Dec;33(12):e22403.
20. Mathew MG, Samuel SR, Soni AJ, Roopa KB. Evaluation of adhesion of Streptococcus mutans, plaque accumulation on zirconia and stainless steel crowns, and surrounding gingival inflammation in primary molars: randomized controlled trial [Internet]. Vol. 24, Clinical Oral Investigations. 2020. p. 3275–80. Available from: http://dx.doi.org/10.1007/s00784-020-03204-9
21. Sekar D, Johnson J, Biruntha M, Lakhmanan G, Gurunathan D, Ross K. Biological and Clinical Relevance of microRNAs in Mitochondrial Diseases/Dysfunctions. DNA Cell Biol. 2020 Aug;39(8):1379–84.
22. Velusamy R, Sakthinathan G, Vignesh R, Kumarasamy A, Sathishkumar D, Nithya Priya K, et al. Tribological and thermal characterization of electron beam physical vapor deposited single layer thin film for TBC application. Surf Topogr: Metrol Prop. 2021 Jun 24;9(2):025043.
23. Aldhuwayhi S, Mallineni SK, Sakhamuri S, Thakare AA, Mallineni S, Sajja R, et al. Covid-19 Knowledge and Perceptions Among Dental Specialists: A Cross-Sectional Online Questionnaire Survey. Risk ManagHealthc Policy. 2021 Jul 7;14:2851–61.
24. Sekar D, Nallaswamy D, Lakshmanan G. Decoding the functional role of long noncoding RNAs (lncRNAs) in hypertension progression. Hypertens Res. 2020 Jul;43(7):724–5.
25. Bai L, Li J, Panagal M, M B, Sekar D. Methylation dependent microRNA 1285-5p and sterol carrier proteins 2 in type 2 diabetes mellitus. Artif Cells NanomedBiotechnol. 2019 Dec;47(1):3417–22.
26. Sekar D. Circular RNA: a new biomarker for different types of hypertension. Hypertens Res. 2019 Nov;42(11):1824–5.
27. Sekar D, Mani P, Biruntha M, Sivagurunathan P, Karthigeyan M. Dissecting the functional role of microRNA 21 in osteosarcoma. Cancer Gene Ther. 2019 Jul;26(7-8):179–82.
28. Duraisamy R, Krishnan CS, Ramasubramanian H, Sampathkumar J, Mariappan S, NavarasampattiSivaprakasam A. Compatibility of Nonoriginal Abutments With Implants: Evaluation of Microgap at the Implant-Abutment Interface, With Original and Nonoriginal Abutments. Implant Dent. 2019 Jun;28(3):289–95.
29. Parimelazhagan R, Umapathy D, Sivakamasundari IR, Sethupathy S, Ali D, Kunka Mohanram R, et al. Association between Tumor Prognosis Marker Visfatin and Proinflammatory Cytokines in Hypertensive Patients. Biomed Res Int. 2021 Mar 16;2021:8568926.
30. Syed MH, Gnanakkan A, Pitchiah S. Exploration of acute toxicity, analgesic, anti-inflammatory, and anti-pyretic activities of the black tunicate, Phallusia nigra (Savigny, 1816) using mice model. Environ Sci Pollut Res Int. 2021 Feb;28(5):5809–21.

31. Woolf CJ. Evidence for a central component of post-injury pain hypersensitivity [Internet]. Vol. 306, Nature. 1983. p. 686–8. Available from: http://dx.doi.org/10.1038/306686a0
32. Needleman HL. Local anesthesia during dental rehabs, "To use, or not to use: that (still) is the question." Pediatr Dent. 2010 Jan;32(1):7.
33. Ashkenazi M, Blumer S, Eli I. Post-operative pain and use of analgesic agents in children following intrasulcular anaesthesia and various operative procedures. Br Dent J. 2007 Mar 10;202(5):E13; discussion 276–7.