# Clinical Guide – Techniques for effective local anaesthetic administration for the paediatric patient.

## In Brief

- A review of local anaesthetics used in paediatric dentistry
- Discusses the correct doses for commonly used local anaesthetics
- Provides an overview of interventions used to facilitate pain free local anaesthetic administration and acceptability of local anaesthetic in a paediatric patient
- Describes techniques for local anaesthetic administration for the paediatric patient

## ABSTRACT

Local anaesthesia forms the backbone of pain control techniques in dentistry and has a major role in dentistry for children and adults alike. Dental anxiety is still prevalent amongst children, causing delays in seeking dental care leading to increased rates in childhood caries resulting in increased hospital admissions for dental care under general anaesthesia. There is a constant search for more comfortable means of achieving local anaesthesia to provide a more positive experience for paediatric patients when seeking dental treatment. This article aims to provide an overview of local anaesthetic techniques used in paediatric dentistry, as well as methods utilised to make local anaesthetic administration more comfortable and how to increase acceptability.

## INTRODUCTION

Dental injections are considered one of the most anxiety-provoking procedures[1], being associated with increase in dental anxiety scores[2] . Such dental anxiety amongst paediatric patients is a significant reason for non-attendance[3] leading to delays in seeking treatment, impacting on the quality of life of the child and of the treatment performed[4], often resulting in less conservative treatment.[5] Children who are dentally anxious are more likely to report pain further compounding this

---

[1] Ram D, Peretz B. Administering local anaesthesia to paediatric dental patients–current status and prospects for the future. International journal of paediatric dentistry. 2002 Mar;12(2):80-9.

[2] Humphris GM, Dyer TA, Robinson PG. The modified dental anxiety scale: UK general public population norms in 2008 with further psychometrics and effects of age. BMC oral health. 2009 Dec;9(1):20.

[3] Hallberg U, Camling E, Zickert I, Robertson A, Berggren UL. Dental appointment no-shows: why do some parents fail to take their children to the dentist?. International journal of paediatric dentistry. 2008 Jan;18(1):27-34.

[4] Milgrom P, Newton JT, Boyle C, Heaton LJ, Donaldson N. The effects of dental anxiety and irregular attendance on referral for dental treatment under sedation within the National Health Service in London. Community dentistry and oral epidemiology. 2010 Oct;38(5):453-9.

[5] Anthonappa RP, Ashley PF, Bonetti DL, Lombardo G, Riley P. Non-pharmacological interventions for managing dental anxiety in children. Cochrane Database of Systematic Reviews. 2017(6).

problem.[6] Administration of effective and pain free analgesia is vital to allow for successful management and treatment of paediatric patients.
Delivery of local anaesthesia to an anxious child is also the most stressful procedure for general dental practitioners, specialists in paediatric dentistry, and specialists in other fields irrespective of the operator's age, gender or years of clinical experience.[7]
The purpose of this paper is to provide a clinical guide for clinicians on the effective administration of local anaesthesia, including types and doses of local anaesthetics used in paediatric dentistry, methods to achieve pain free local anaesthetic administration through behaviour management techniques, and the management of post-operative complications.

**What local anaesthetic solutions are used in paediatric dentistry?**
Lidocaine and Articaine are the main local anaesthetics used in paediatric dentistry. Lidocaine has been the gold standard of local anaesthetics for many years[8] with lidocaine 2% with 1:80,000 adrenaline (epinephrine) routinely being used in paediatric dentistry due to it's low allergenic characteristics[9] Articaine 4% with 1:100,000 or 1:200000 adrenaline[10] has become more popular in recent years. Other formulations are not routinely used in paediatric dentistry.
Articaine given as an infiltration is often suggested as an effective alternative for children to an ID block with lignocaine, however there is limited evidence to support this [11].Nevertheless, Articaine may offer some advantages - in a recent Cochrane review 4% articaine, 1:100,000 epinephrine was shown to be superior to 2% lidocaine, 1:100,000 epinephrine in achieving anaesthesia for the root treatment of posterior teeth with irreversible pulpitis[11]. Contraindications of articaine include it's

[6] Nakai Y, Milgrom P, Mancl L, Coldwell SE, Domoto PK, Ramsay DS. Effectiveness of local anesthesia in pediatric dental practice. The Journal of the American Dental Association. 2000 Dec 1;131(12):1699-705.

[7] Davidovich E, Pessov Y, Baniel A, Ram D. Levels of stress among general practitioners, students and specialists in pediatric dentistry during dental treatment. Journal of Clinical Pediatric Dentistry. 2015 Sep;39(5):419-22.

[8] Malamed SF. Clinical action of specific agents. Handbook of local anesthesia. 2004;5:57-75.

[9] Moseby - Malamed SF. Handbook of Local Anesthesia. 5th ed. St. Louis, Mo: Mosby; 2004. Local complications; pp. 285–7.

[10] Malamed SF, Gagnon S, Leblanc D. A comparison between articaine HCl and lidocaine HCl in pediatric dental patients. Pediatric dentistry. 2000 Jul;22(4):307-11.

[11] George G, Morgan A, Meechan J, Moles DR, Needleman I, Ng YL, Petrie A. Injectable local anaesthetic agents for dental anaesthesia. Cochrane Database of Systematic Reviews 2018, Issue 7. Art. No.: CD006487. DOI: 10.1002/14651858.CD006487.pub2.

use for an ID block due to the risk of nerve paraesthesia[12] , as well as patients with an allergy to sulphites or a history of asthma which may elicit bronchospasm[13]

**What are the maximum LA doses for a paediatric patient?**

The administration of local anaesthetic agents is usually safe, however inadvertent overdoses may result in toxic effects which may be fatal. This may arise due to errors in providing the correct doses, errors in estimating patient weight and difficulties in preforming the specific calculations correctly.[14]

Calculating maximum doses for children, presents additional challenges as the British National Formulary (BNF) recommends it should be based on ideal body weight, rather than actual weight.[15] A helpful resource can be readily found from the WHO growth standards[16]. Clinicians must also take into consideration the medical status of the child, as well as volume of local anaesthetic standard UK cartridges are 2.2ml in size, however international cartridges may be 1.7ml (which may be used for electronic delivery systems).

Table 1 highlights the list of local anaesthetics commonly used in paediatric dentistry, with their maximum recommended doses for a 5 and 10 year old child weighing 20kg and 30kg, respectively.

[12] Renton T. Oral surgery: part 4. Minimising and managing nerve injuries and other complications. British dental journal. 2013 Oct;215(8):393.

[13] Kamchaisatian, W., Insorn, N., Juthacharoenwong, N. and Techapaitoon, S., 2014. An 11-year-old boy with immediate allergic reaction to articaine but not to lidocaine. *Clinical and translational allergy*, *4*(3), p.P71.

[14] Walker JD, Summers A, Williams DJ. A nomogram to calculate the maximum dose of local anaesthetic in a paediatric dental setting. British dental journal. 2015 Apr; 218(8):469.

[15] *British national formulary*. 68th ed. London: The British Medical Association and Royal Pharmaceutical Society of Great Britain, 2014.

[16]WHO Growth Child Standards.2006
https://www.who.int/childgrowth/standards/Technical_report.pdf

**Table 1 – Maximum dose calculations**

| Agent | Mg /mL | Mg/2.2mL cartridge | Max.dose (mg/kg) | Max. dose (no. of 2.2mL Cartridges):5 year old (20Kg) | Max dose (no. of 2.2mL Cartridges): 10 year old (30Kg) |
|---|---|---|---|---|---|
| **Lidocaine 2% with 1:80,000 adrenaline** | 20 | 44 | 4.4 | 2 | 3 |
| **Articaine 4% with 1:100,000 adrenaline** | 40 | 88 | 7 | 1.6 | 2.4 |

## How to minimise injection pain?

### Topical anaesthetic

The application of a topical anaesthetic helps to minimise discomfort caused during administration of local anaesthesia by providing surface analgesia[17,18] on surface tissues (up to two to three milimeters in depth) to reduce painful needle penetration of the oral mucosa.[19] Topical anaesthetic agents are available in gel, liquid, ointment, patch, and aerosol forms. Some of the most commonly used topical agents are Lidocaine 5%, EMLA 5% and Benzocaine 20%.

To provide optimum surface analgesia, the topical anaesthetic needs to be applied for a sufficient amount of time, therefore consideration of the onset times must be made: commonly used lidocaine is between 2-5 minutes; benzocaine is 30 seconds and tetracaine about 60 seconds. Topical anaesthetic should be limited to the puncture site using a cotton pellet or bud (Fig 2).

---

[17] Bågesund M, Tabrizi P. Lidocaine 20% patch vs lidocaine 5% gel for topical anaesthesia of oral mucosa. International journal of paediatric dentistry. 2008 Nov;18(6):452-60.

[18] Deepika A, Chandrasekhar Rao R, Vinay C, Uloopi KS, Rao VV. Effectiveness of two flavored topical anesthetic agents in reducing injection pain in children: A comparative study. Journal of Clinical Pediatric Dentistry. 2012 Sep 1;37(1):15-8.

[19] Malamed SF. Clinical action of specific agents. In: Handbook of Local Anesthesia. 6th ed. St. Louis, Mo.: Mosby; 2013:52-75.

## Figure 1 – Topical Application

### Slow administration

On local anaesthetic administration, pain can be experienced due to the expansion of subcutaneous tissues during the infiltration of LA. Injecting slowly therefore has an important role in minimising pain.[20] Local anaesthetic should always be delivered slowly at 1min/ml resulting in reduced injection pressure which have been shown to reduce pain response in adults [21,22,23]

## How to increase acceptability of LA administration?

### Distraction techniques

Distraction has been shown to reduce anxiety and pain perception for delivery of local anaesthetic to children. Such distraction techniques should include various techniques (e.g visual, auditory and kinaesthetic modalities) as this provides a greater ability to harness a child's attention and reduce anxiety.[24]

### (i) Counter stimulation:

*Stretching the oral mucosa*

The buccal mucosa around the injection site is stretched and the needle advanced simultaneously; this helps to distract the patient from the potential pain incurred on needle advancement and piercing of the buccal mucosa.

*Vibration techniques and devices*

---

[20] Quaba O, Huntley JS, Bahia H, McKeown DW. A users guide for reducing the pain of local anaesthetic administration. Emergency medicine journal. 2005 Mar 1;22(3):188-9.

[21] Primosch RE, Brooks R. Influence of anesthetic flow rate delivered by the Wand Local Anesthetic System on pain response to palatal injections. American journal of dentistry. 2002 Feb;15(1):15-20.

[22] Kudo M. Initial Injection Pressure for Dental Local Anesthesia: Effects on Pain and Anxiety. Anesth Prog. 2005 Fall; 52(3): 95–101.

[23] Whitworth JM, Kanaa MD, Corbett IP, Meechan JG. Influence of injection speed on the effectiveness of incisive/mental nerve block: a randomized, controlled, double-blind study in adult volunteers. Journal of endodontics. 2007 Oct 1;33(10):1149-54.

[24] Al-Khotani A, Bello LA, Christidis N. Effects of audiovisual distraction on children's behaviour during dental treatment: a randomized controlled clinical trial. Acta Odontologica Scandinavica. 2016 Sep

Thumb and fingers can be placed extra-orally and a gentle rubbing motion or finger vibration initiated or using electronic devices or attachments (e.g Vibraject). This provides stimulation to nerve fibres that inhibit pain signals activation.[25]

(ii) **Imagery**

Suggestion by asking the child to concentrate on a pleasant image[26]

(iii) **Audio-visual techniques**

Playing music, videos, projections or providing patients with audio-visual or virtual reality glasses can help to provide a distraction. Studies have shown it helps to reduce perception of pain during local anaesthetic administration, as well as to improve children's co-operation during treatment.[27]

---

[25] Tung 2018 Tung J, Carillo C, Udin R, Wilson M, Tanbonliong T.Clinical Performance of the DentalVibe® Injection System on Pain Perception During Local Anesthesia in Children. J Dent Child (Chic). 2018 May 15;85(2):51-57.

[26] Peretz B, Gluck GM. Assessing an active distracting technique for local anesthetic injection in pediatric dental patients: repeated deep breathing and blowing out air. The Journal of clinical pediatric dentistry. 1999;24(1):5-8.

[27] El-Sharkawi HF, El-Housseiny AA, Aly AM. Effectiveness of new distraction technique on pain associated with injection of local anesthesia for children. Pediatric dentistry. 2012 Mar 15;34(2):35E-8E.

In particular, the use of tablets for distraction has been studied in medical settings and is a commonly employed technique during induction of general anaesthesia in paediatric patients ([28,29,30,31]).

(iv) **Breathing exercises**

Instructing the child to breathe deeply in before and during the administration of the injection and to blow the air out or to blow bubbles of air before and/or during LA delivery[32]

(v) **Leg exercises**:

A simple and effective active distraction technique is the “WITAUL technique” - (Writing In The Air Using Leg). During the administration of the injection, ask the patient to draw letters of their name using one leg. This has shown to be an effective distraction technique to managing pain during local anaesthesia administration.[33]

**Hypnosis**

Hypnosis helps to reduce anxiety during LA by redirecting children's attention away from the procedure while influencing their feelings, perception and behaviour[34]

---

[28] Aminabadi NA, Erfanparast L, Sohrabi A, Oskouei SG, Naghili A. The impact of virtual reality distraction on pain and anxiety during dental treatment in 4-6 year-old children: a randomized controlled clinical trial. Journal of Dental Research, Dental Clinics, Dental Prospects 2012;6(4):117-24.

[29] Chow CH, Van Lieshout RJ, Schmidt LA, Buckley N. Tablet-based intervention for reducing children's preoperative anxiety: a pilot study. Journal of Developmental & Behavioral Pediatrics. 2017 Jul 1;38(6):409-16

[30] Barreiros D, de Oliveira DS, de Queiroz AM, da Silva RA, de Paula-Silva FW, Küchler EC. Audiovisual distraction methods for anxiety in children during dental treatment: A systematic review and meta-analysis. Journal of Indian Society of Pedodontics and Preventive Dentistry. 2018 Jan 1;36(1):2.

[31] Liu Y, Gu Z, Wang Y, Wu Q, Chen V, Xu X, Zhou X. Effect of audiovisual distraction on the management of dental anxiety in children: A systematic review. International journal of paediatric dentistry. 2019 Jan;29(1):14-21.

[32] Sridhar S, Suprabha BS, Shenoy R, Shwetha KT, Rao A. Effect of a relaxation training exercise on behaviour, anxiety, and pain during buccal infiltration anaesthesia in children: Randomized clinical trial. International journal of paediatric dentistry. 2019 Mar 19.

[33] Lee SH, Lee NY. An alternative local anaesthesia technique to reduce pain in paediatric patients during needle insertion. European Journal Paediatric Dentistry 2013;14(2):109-112.

[34] Ramírez-Carrasco A, Butrón-Téllez Girón C, Sanchez-Armass O, Pierdant-Pérez M. Ramírez-Carrasco A, Butrón-Téllez Girón C, Sanchez-Armass O, Pierdant-Pérez M. Effectiveness of hypnosis in combination with conventional techniques of behavior management in anxiety/pain reduction during dental anesthetic infiltration. Pain Research and Management. 2017;2017.

Hypnosis is particularly effective in children ages 8–12 years, although as young as children 4 years of age can be responsive. Advantages include the need for no specialist equipment, patient remains conscious, no side effects therefore safe and can be used as an adjunct to inhalation sedation.[35]

### Systematic needle desensitisation

In older children and adolescents, systematic desensitisation aims to promote a relaxed state, while progressively exposing children to fear-inducing stimuli, from the least fear inducting to the most.[36]

For local anaesthetic administration, the technique of needle desensitization can be used.This may be achieved by initially helping the child to relax, then slowly and progressively exposing the child to each step. The initial stage would be to the topical gel on a cotton roll or tray liner, then apply to the mucosa for the patient to become familiar with the sensation, then patient holding a cartridge, followed by holding the syringe, then seeing the assembled LA components, then “practicing” administration with the cap on the needle, followed by administration.[37]

At each stage the child is encouraged to keep their relaxed status (Fig 3). The clinician should only proceed when the child is able to tolerate the previous stimuli.[38]

**Figure 2 – Needle Desensitisation**

### How to clinically administer LA for a paediatric patient?

Anatomic differences between adults and children should be taken into account when delivering local anaesthesia. Reduced density allows for better diffusion of the

---

[35] Al-Harasi S, Ashley PF, Moles DR, Parekh S, Walters V. Hypnosis for children undergoing dental treatment. The Cochrane database of systematic reviews 2010: CD007154

[36] Levitt JO, McGoldrick PA, Evans DA. The management of severe dental phobia in an adolescent boy: a case report. International journal of paediatric dentistry. 2000 Dec;10(4):348-53.

[37] Taylor GD, Campbell C. A clinical guide to needle desensitization for the paediatric patient. Dental update. 2015 May 2;42(4):373-82.

[38] Fayle SA, Tahmassebi JF. Paediatric Dentistry in the new millennium: 2. Behaviour management–Helping children to accept dentistry. Dental update. 2003 Jul 2;30(6):294-8.

anaesthetic solution which allows for effective use of infiltration techniques in the mandible for smaller children. As children are smaller, decreased depth of needle penetration is required.

**1. Maxillary Anaesthesia**

**Infiltration**

Infiltration is the technique of choice for the anaesthesia in the maxilla. As the apices of primary teeth are at the level of the mucobuccal fold, there is little need of further needle advancement after penetration into soft tissues. Pulling the mucosa towards the needle will help with initial superficial mucosa analgesia. After a few seconds the needle should be slowly advanced to a depth of approximately 2 mm (Figure 3). The thick zygomatic process overlying the buccal roots of the second primary molars may dictate the need for another injection posterior to the maxillary tuberosity area (posterior superior alveolar nerve).

About 1 cm of buccal bone covers the roots of permanent molars, therefore, for these teeth infiltration should be given above and distal to the buccodistal root and above the mesiobuccal root.

**Figure 3: Infiltration technique**

**Palatal Anaesthesia**
After successful buccal infiltration, the needle is inserted into the buccal papilla just above the interdental septum (intrapapillary injection) and advanced towards the palatal aspect (indirect palatal injection). This is often enough in young children. If an additional palatal injection is necessary the needle should be directed into the incisive papilla (anterior teeth) or palatal mucosa (for greater palatine nerve anaesthesia in posterior teeth). Direct palatal injections are is more painful and should not be routinely used for restorative procedures.

**Figure 4: Indirect palatal**

**Figure 5: Blanching of mucosa**

**Figure 6: Palatal Anaesthesia**

**2. Mandibular Anaesthesia**

**Infiltration**

Lower mandibular infiltrations are indicated to produce anaesthesia of the anterior segment of the mandible, whereby local anaesthetic solution is deposited supra-periostially close to the apex of the tooth you aim to anaesthetise.

Recently studies in adult populations have suggested the use of articaine infiltration as an alternative to IANB with lidocaine for analgesia of lower teeth, however at present, there is insufficient conclusive evidence in support of any injection technique being superior compared to another. [39]

**Inferior alveolar nerve blocks (IANB)**

Anatomic variations, needle deflection and inadequate anaesthetic techniques lead to high reported failure rates of IANB[40]. Success rates are, however, higher in children due to the easier location of the mandibular foramen. Shorter needles (10mm or 20mm) are adequate for dental block anaesthesia in children.
As the mandibular foramen lies distal and more inferior to the occlusal plane the injection must be slightly lower than in adults and more posteriorly to the occlusal plane[41]. Aspiration should be employed in order to avoid intravascular injection. Long buccal anaesthesia is necessary for most procedures. It is achieved by depositing a small quantity of local anaesthetic agent in the mucobuccal fold buccally to the tooth requiring treatment.

**Figure 7: inferior alveolar block**

**Figure 8: long buccal nerve block**

**Electronic devices – "The Wand"**

Electronic devices have been developed in order to control rate, pressure and injection delivery times. 'The wand' (Fig 9) is the first computer-controlled local anaesthetic delivery system (CCLAD) introduced in 1997, consisting of a lightweight handpiece, shaped like a pen, with delivery of LA solution controlled with a foot-activated control. The flow rate is computer-controlled and remains constant, with

[39] Bartlett G, Mansoor J. Articaine buccal infiltration vs lidocaine inferior dental block–a review of the literature. British dental journal. 2016 Feb;220(3):117.

[40] Kennedy S, Reader A, Nusstein J, Beck M, Weaver J. The significance of needle deflection in success of the inferior alveolar nerve block in patients with irreversible pulpitis. Journal of endodontics. 2003 Oct 1;29(10):630-3.

[41] Benham NR. The cephalometric position of the mandibular foramen with age. ASDC journal of dentistry for children. 1976;43(4):233-7.

continuous positive pressure, which delivers an anaesthetic drip that precedes the needle [42].

Anxiety levels have been shown to be less using the wand, in comparison to conventional syringes, attributed to it's less frightening appearance. However there is currently no sufficient evidence to confirm lower pain perceived between the wand and conventional syringe or onset of anaesthesia.[43] The disadvantages associated with the system include high cost, complexity and space needed to store equipment[44]

**Figure 9: The wand**

**Movement control**

Clinicians should aim to minimise movement during injection to avoid injury to the patient and clinician. A stop signal should be agreed and the nurse or parents can gently place their hands over the child's arms or hold the child's hand to prevent sudden movements that may inflict injury to the child or the dental staff. Having a finger rest may be helpful to stabilise the needle and reduce pain of insertion[32].

[42] Friedman MJ, Hochman MN. A 21st century computerized injection system for local pain control. Compendium of continuing education in dentistry (Jamesburg, NJ: 1995). 1997 Oct;18(10):995-1000.
[43] Tahmassebi JF, Nikolaou M, Duggal MS. A comparison of pain and anxiety associated with the administration of maxillary local analgesia with Wand and conventional technique. European Archives of Paediatric Dentistry. 2009 Jun 1;10(2):77-82.

[44] Friedman MJ, Hochman MN. A 21st century computerized injection system for local pain control. Compendium of continuing education in dentistry (Jamesburg, NJ: 1995). 1997 Oct;18(10):995-1000.

## What are the post-operative complications of LA administration in a paediatric patient and how to prevent them?

The safety record of local anaesthetic agents is high, however rare complications may occur. These may be systemic reactions to the local anaesthetic itself or to the vasoconstrictor. More regional complications, usually due to faulty technique, may be immediate or delayed. Among the former are pain, haematoma formation, motor nerve paralysis, and failure of local anaesthesia. The delayed regional complications include self-inflicted, prolonged anaesthesia or paraesthesia, trismus, infection, sloughing and ulceration.[45]

Careful planning to avoid these complications, especially in the paediatric patient are paramount and are outlined in table 3 & 4.

**Table 3 – Post operative complications of LA**

| **GENERALISED COMPLICATIONS** | |
|---|---|
| **Complication** | **Precautions** |
| Psychogenic (fainting, syncope) | Clear communication with the patient to prepare them and reduce anxiety. Administer LA in a semi-supine position |
| Allergy (rash to anaphylaxis) | A thorough medical history should be taken to assess for any pre-existing allergies to LA or it's components. If there are allergy concerns, refer to their GMP for patch testing. |
| Toxicity (overdose) | Correct dose calculations, taking into account patient's weight. Use LA solutions with a vasoconstrictor due to reduced risk of drug circulation. |
| **LOCALISED COMPLICATIONS** | |
| **Complication** | **Precaution** |
| Pain | Pain of LA can be attributed to ineffective technique, injecting too fast or in an inappropriate site. To reduce pain, apply topical to puncture site and administer LA slowly |

[45] Laskin DM. Diagnosis and treatment of complications associated with local anaesthesia. International dental journal. 1984 Dec;34(4):232-7.

| | |
|---|---|
| Intravascular injection | Aspirate or use self-aspirating syringe prior to injecting LA |
| Failure of local anaesthesia | Ensure correct local anaesthetic techniques are used, whilst considering anatomical differences.. |
| **POST-OPERATIVE COMPLICATIONS** | |
| **Complication** | **Precaution** |
| Self-inflicted trauma | Patient bites the soft tissue which is anaesthetized. The most common site is the lower lip, causing lip trauma. After LA administration, ensure full post-op instructions are explained to patient and parent, and advise to avoid lip biting. |
| Ulceration | Patients may presents with ulceration at the injection site or surrounding areas due to trauma. If this occurs, keep the area clean, and advise salt-water mouth rinses. |
| Long-lasting anaesthesia | Long-lasting anaesthesia can result from direct trauma to a nerve trunk from the injection of the LA solution into the nerve. Careful consideration of anatomical landmarks must be made to allow for safe LA administration. |

**Table 4 - General considerations for LA administration**

| |
|---|
| ➢ **Take a thorough medical history from parent and child and note down any allergies/medications taken** |
| ➢ **Never use more anaesthetic than necessary – take into considerations patients age and weight** |
| ➢ **Aspirate** |
| ➢ **Inject slowly** |
| ➢ **Use clear and calm communication** |
| ➢ **Continuously observe any reaction of the patient during the injection** |
| ➢ **Ensure you have a medical emergency kit with required emergency mediation with oxygen available in the event of an adverse reaction** |

## CONCLUSION

Local anaesthesia is the backbone of pain control in dentistry. If administered incorrectly it can be a painful and anxiety provoking procedure for the patient as well as the treating clinician, causing future delays in seeking dental treatment. Use of correct methods for effective and pain free LA administration is therefore vital, whilst employing distraction methods to increase a child's acceptance of local anaesthesia. This creates a more pleasant experience for both the paediatric patient and treating clinician, resulting in more successful treatment outcomes and positive patient/clinician relationships in the long-term.