1. Pulpectomies in primary mandibular molars: a comparison of outcomes using three root filling materials


Pulpectomies for the management of irreversible pulpitis in primary teeth remain controversial for several reasons, including the complex root canal morphology of primary molars, the inherent risk of physiologic root resorption, the close proximity of deciduous teeth to the permanent successors, the difficulty in obtaining good radiographic views of the apices of primary teeth, complex diagnosis due to the patient’s immaturity, need for behavioural guidance of paediatric patients and choice of technique and root filling materials. An ideal root filling material for primary teeth should be easily placed and removed, should resorb at a rate similar to that of the primary root, should not set to a hard mass that could deflect an erupting permanent tooth, should be radiopaque and not discolour the tooth, should adhere to the walls, should not shrink and should possess antiseptic properties as well as be harmless to the periapical tissues and permanent tooth germ.

The most commonly used root filling materials for primary teeth include zinc oxide–eugenol (ZOE), iodoform-based pastes and calcium hydroxide. None of these currently available materials meet all these criteria. Pramila and colleagues (2016) reported on a prospective, double-blind, randomized controlled trial that sought to evaluate the success of the currently used root filling materials for pulpectomy in primary teeth. The trial aimed to investigate the clinical and radiographic success of three materials – RC Fill, Vitapex and Pulpdent root canal sealer – used for primary molar teeth with necrotic pulps and irreversible pulps in patients aged 6, 12 and 30 months.

MATERIALS AND METHODS

This single-centre, double-blind, randomized controlled trial conducted in India included 129 teeth in 88 children (40 girls and 48 boys aged between 4 and 9 years). Teeth with one or more of the following criteria were included for pulpectomy: (1) Caries-affected teeth with intra-oral and/or extra-oral swelling or draining sinus tract; (2) Teeth with deep caries lesions and associated inter-radicular and/or periapical radiolucencies; (3) Caries-affected teeth with abnormal mobility due to periapical pathosis, and not associated with normal exfoliation; (4) History of spontaneous pain in caries-affected teeth; and, (4) Caries-affected teeth with internal root resorption involving the cervical 1/3 of the root or external resorption (not physiologic resorption) involving less than 1/3 of the root length.

Children with systemic pathosis (any medically compromising conditions) or allergies to any of the materials used were excluded from this trial.

Patients were randomly assigned by a block randomization method with random table numbers of blocks 10 and 9. Allocation concealment was performed with sequentially numbered, opaque and sealed envelopes. The participants and outcome assessors were blinded about the filling materials used.

The selected participants were randomly divided into 3 groups:
- Group I (GI) – RC Fill (ZOE with iodoform).
- Group II (GII) – Vitapex (calcium hydroxide with iodoform) and
- Group III (GIII) – Pulpdent root canal sealer – used for primary molar teeth with necrotic pulps and irreversible pulps in patients aged 6, 12 and 30 months.

A standardised approach to the pulpectomy procedure was used in all three groups. Calcium hydroxide with iodoform (Vitapex) was available in pre-loaded syringes. The syringe was inserted into the canal near the apex. The paste was extruded into the canal, and the syringe was then slowly withdrawn as the paste filled the entire canal. The RC Fill and Pulpdent root canal sealer were available in powder and liquid form.


Mepivacaine is an amide-type anaesthetic that is recommended for cases in which systemic conditions restrict the use of other anaesthetics.1 Tramadol hydrochloride is a centrally acting drug with a mechanism that is not fully understood. Tramadol hydrochloride is used for the management of acute and chronic pain, and it is effective in moderate-to-severe pain with low addiction incidence.2

In the last decade, it has been proposed that the use of other drugs, such as nonsteroidal anti-inflammatory drugs (NSAIDs), opioids and tramadol, could be used as adjuncts to anaesthetics to obtain a higher success rate and longer duration of the anaesthetic effect under the concept of multimodal analgesic or pharmacological synergism1 However, oral administration of drugs can cause adverse systemic effects and that is why local application is an alternative that increases the concentration on the damaged tissue locally, reducing the possibility of interactions with other drugs and their adverse effects1.

The inferior alveolar nerve block (IANB) is the most common anaesthetic technique used on mandibular teeth during root canal treatment. Several studies have reported a 30–80% failure rate for IANBs in patients with symptomatic irreversible pulpitis (SIP).3 Rodríguez-Wong and colleagues (2016)1 undertook a randomized double-blinded trial to compare the success of an inferior alveolar nerve block after applying a combination of mepivacaine and tramadol or mepivacaine alone in patients with symptomatic irreversible pulpitis in mandibular permanent molars. The null hypothesis was that the combination of mepivacaine–tramadol will not increase the success of the IANB in patients with SIP.

MATERIALS AND METHODS
This Mexican study was a double-blind, randomized clinical trial. Seventy-four patients were pre-selected to participate according to a preoperative pain scale and preliminary clinical evaluation following the guidelines suggested by the CONSORT group for planning and reporting clinical trials; 56 patients were included and 18 were excluded. Inclusion criteria were as follows: age 18 years or older, acute moderate-to-severe preoperative pain in the posterior mandibular region, SIP in a first or second mandibular molar, no intake of analgesics for 12 h prior to the treatment and acceptance and signing of the consent form. The exclusion criteria were as follows: pregnancy, allergy to tramadol or mepivacaine, poor tooth integrity for restoration, periodontal disease, root resorption, root fracture, systemic diseases such as diabetes and uncontrolled hypertension, intake of drugs or narcotics and patients with sensory impairment or paraesthesia. The elimination criteria were teeth with necrotic pulps found...
Patients were monitored 24 h after the procedure to assess the duration of the anaesthetic effect, the consumption of postoperative analgesics and side effects. The patient received three tablets of ibuprofen 600 mg and one tablet of sublingual ketorolac 30 mg for emergency and rescue medication, respectively, in case they experienced pain after treatment.

RESULTS

Of the 74 patients who were evaluated, 56 patients were included and 18 excluded. No significant differences between the experimental and control groups were found for gender (P > 0.05), age (P > 0.05), duration of treatment (P > 0.05), intensity of preoperative pain (P > 0.05) and pain produced by the injection (P > 0.05). Therefore, the groups were considered homogeneous. After administration of the inferior alveolar nerve block (IANB), all of the patients reported lip numbness, except one patient in the control group. The anaesthetic success was 57.1% for the experimental group and 46.4% for the control group with no significant difference (P = 0.05). There was a significant difference (P < 0.05) in the duration of the anaesthetic effect, with higher values in the experimental group (142 min). No patient in either group reported adverse effect.

CONCLUSION

The combination mepivacaine–tramadol solution achieved similar success rates for the inferior alveolar nerve block (IANB) when compared with mepivacaine 2% epinephrine 1 : 100 000. There was no significant difference in the anaesthetic efficacy between the control and experimental solutions, and none of the solutions tested were completely successful.

IMPLICATIONS FOR PRACTICE

The addition of a pain control medication in the local anaesthetic did not improve the performance of the local anaesthetic in patients who were undergoing root canal treatment for symptomatic irreversible pulpitis (SIP).

Reference