

## The effects of pre-operative blockade with 4% prilocaine on the post-operative pain experienced by patients undergoing removal of impacted mandibular third molars

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### Abstract

Local anaesthetic nerve blockade had been suggested as being useful in controlling per-operative afferent stimulation and sensitisation of the central nervous system. This measure should contribute to pre-emptive analgesic regimes and reduce the awareness of pain post-operatively. A double-blind placebo-controlled, randomised study was undertaken to assess the effectiveness of a moderate-duration local anaesthetic (prilocaine 4% plain solution) in controlling pain after the surgical removal of impacted mandibular third molar (wisdom) teeth. The local anaesthetic reduced patients' pain scores during the first 45 min post-operatively, whilst the block was effective. No prolonged effect on post-operative analgesia was noted, suggesting that per-operative blockade alone was an ineffective method of providing pre-emptive analgesia. © 1998 Elsevier Science B.V. All rights reserved.

*Keywords:* Pre-operative blockade; Post operative; Prilocaine

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### 1. Introduction

Adequate post-operative pain control remains an essential, but often inadequate [1], component of surgical management. Pain after surgery is believed to arise during the procedure and post-operatively from the damaged tissues where the local inflammatory response sensitises receptors and may additionally be enhanced by sensitisation of the central nervous system [2].

Pre-emptive analgesic regimes seek to modify the pain response by interfering with the mechanisms responsible for the generation of pain. Per-operative local anaesthetic blockade should prevent impulses being transmitted to the central nervous system during surgery [3], preventing central sensitisation and thereby, reducing the level of pain experienced throughout the post-operative period [4].

In this study, a short acting local anaesthetic block was used, which was effective for the duration of surgery. Pain was recorded post-operatively as the effects of the local anaesthetic resolved and normal sensation returned.

### 2. Method

The study was conducted as a double blind parallel comparison of local anaesthetic blockade and placebo injections. The study was approved by the local ethical committee and forty patients gave written consent to participate. Patients requiring the surgical removal of impacted mandibular third molar teeth (with or without the non-surgical extraction of upper third molars) under general anaesthesia, were recruited. Pre-operatively, each patient was instructed in the use of a visual analogue scale (VAS) to record their pain.

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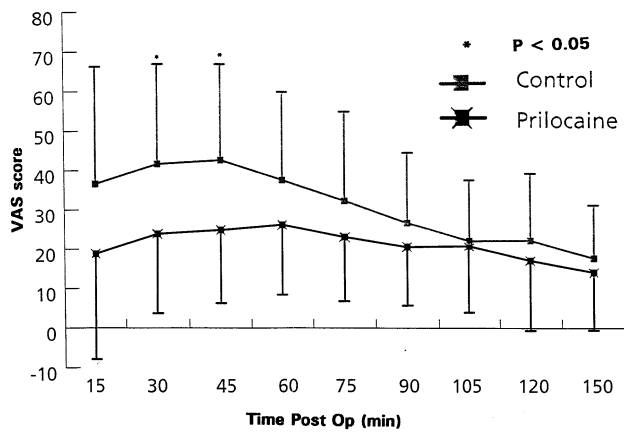


Fig. 1. Post-operative pain scores.

A standardised general anaesthetic regime was adopted, excluding the use of per-operative analgesics. The patients were randomly allocated to receive either the active local anaesthetic or placebo injection, using a 'minimisation' method to ensure equal distribution to each group of male and female subjects and patients requiring bilateral or unilateral surgery. After intubation, each patient was given injections of either 4% prilocaine solution (Citanest plain–Astra) or placebo (normal saline) delivered from identical coded syringes. For each impacted lower tooth, an inferior alveolar nerve block was administered using 2.0 ml of solution; in addition 1.0 ml of the same solution was administered as a buccal infiltration. Where the ipsilateral upper third molar was to be extracted, appropriate infiltrations of the same solution were administered. A total of 5 min was allowed for the injections to become effective before surgery commenced. The impacted third molar teeth were removed using standard techniques, bone removal being achieved primarily using chisels and a drill, when necessary.

Each patient recorded their pain using a VAS during the immediate post-operative period at 15 min intervals after the end of surgery for 1.5 h; then at 2 and 2.5 h.

### 3. Results

There were no differences between the groups with respect to sex, age and duration of surgery (mean 25 min).

For each time point, the mean VAS (and S.D.) was calculated. The differences between the means of the two groups were then compared, applying the *t*-test for equality of means. The results were tabulated and displayed graphically.

In the control group, the maximum pain was experienced at 45 min, whereas the patients who received the local anaesthetic injections reported lower pain scores, with the greatest pain at 60 min.

The reported pain scores differed significantly between the groups only at 30 and 45 min post-operatively ( $P < 0.05$ ).

### 4. Discussion

Prilocaine is a local anaesthetic agent with moderate duration [5] and in 4% concentration (without vasoconstrictor) has a duration of dental analgesia of ~30 min [6], although soft tissue symptoms may persist for up to 2 h [7] in some cases. The nerve block would have been effective throughout the period of surgery, sometimes extending into the post-operative period. Reduced pain scores were evident 1 h and 1 h 15 min after the injection (30 and 45 min post-operatively) Fig. 1, but thereafter, there was no effective benefit. The apparent lack of effect at the first 15 min post-operative reading was considered most likely to be due to inaccurate recording, whilst many patients were still affected by the general anaesthetic.

An effective nerve blockade during the operation did not induce long lasting reduction of post-operative pain. The effects appear to have been limited to the immediate post-operative period. Effective pre-emptive analgesia with local anaesthetics has only been demonstrated previously when long acting drugs have been used and a reduction of pain scores was noted many hours later [8].

An effective nerve block which terminates at the end of surgery does not induce prolonged reduction in the post-operative pain experience. Pre-emptive analgesia from local anaesthesia probably requires effective nerve block during surgery and also during the post-operative period, whilst pain is generated from the site of tissue damage [9].

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