THE EFFICACY OF XYLOCAINE TOPICAL ANAESTHETIC IN REDUCING INJECTION PAIN

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SUMMARY

The efficacy of xylocaine topical anaesthetic and a placebo in reducing intraoral injection pain were tested in 72 patients. The topical agent was found to be very effective in reducing such pain and the authors recommend its use prior to intraoral injections for the benefit of the patient.

INTRODUCTION

Topical anaesthetics have been used over many years especially in dentistry, to minimise the pain associated with intraoral injection of local anaesthetics prior to dental treatments. Patients in this part of the world seem to accept and tolerate such injections better with prior use of topical anaesthetics than without. Hence many clinicians, though without any previous clinical and scientific backing, have come to assume the benefit afforded by these agents. Gill and Orr (1979) astonished the profession through their clinical trials which disclosed the absence of statistically significant difference in injection pain experienced by patients who were pretreated with topical anaesthetics and a placebo. This study was undertaken to confirm the validity or otherwise of the claim made by Gill and Orr. [1] This paper presents the findings of an investigation into the pain experience of patients subjected to infiltrations of local anaesthesia with prior treatment with topical xylocaine anaesthetic and a placebo.

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MATERIALS AND METHODS

Seventy-two patients between the ages of 20 and 35 years, who had no relevant medical history were selected for this investigation. For each patient the following procedures were carried out :

i) An area over the palatal mucosa about 3 cm away from the gingival margin of the right maxillary second molar was chosen for the site of the injection.

ii) The site was dried with gauze, and xylocaine topical anaesthetic was applied with a swab to remain at the site for 2 minutes.

iii) A 27-gauze needle was inserted into the site until it touched the palatal bone. Then the needle was slightly withdrawn and 0.3 ml of 2% Xylocaine topical anaesthetic solution was infiltrated slowly.

TABLE I
PAIN RATINGS OF 72 PATIENTS ON INJECTION WITH PRIOR 2% XYLOCAINE ANAESTHETIC APLICATION

Pain rating	No. of patient	Total pain rating
1	0	0
2	42	84
3	30	90
4	0	0
Total	72	174
Mean pain rating $\frac{174}{72} = 2.42$		

The needle was slightly withdrawn to avoid subperiosteal injection.

iv) The patient was asked to rate the pain felt on injection of the local anaesthetic agent on the scale of 1 to 4 - 1 being the least pain.

v) The whole procedure (i - iv) was repeated on similar site but on the patient's left side of the palate. Instead of using xylocaine topical anaesthetic, a placebo made of boiled starch as a thick paste was used before the injection was administered.

The nature of the two agents under test was not made known to the patient.

RESULTS

The pain ratings of the 72 patients on injection with the topical xylocaine anaesthetic and with placebo are presented in Table I and Table II respectively. Using the paired t-test, there was a very highly significant difference between the pain ratings of the patients when xylocaine topical anaesthetics and placebo was used ($P = 0.0005$).

DISCUSSION

The mean pain rating of the patients who were pretreated with xylocaine topical anaesthetic was much lower (2.42-Table I) than those with the placebo (2.69-Table II). The difference was statistically highly significant ($P = 0.0005$). This proved conclusively that the prior application of topical anaesthetic agent onto the mucous membrane was beneficial in reducing the pain caused by local infiltrations of local anaesthetics. This result contradicts that of Gill and Orr [1] who found that there was no significant difference in the

TABLE II
PAIN RATINGS OF 72 PATIENTS ON INJECTION WITH PRIOR PLACEBO TREATMENT.

Pain rating	No. of patients	Total pain rating
1	0	0
2	28	56
3	38	114
4	6	24
Total	72	194
Mean pain rating $= \frac{194}{72} = 2.69$		

pain ratings of patients pretreated with topical anaesthetics or placebo. There may be two reasons to explain the failure of Gill and Orr [1] to achieve a lower pain rating with the anaesthetics in comparison with the placebo :-

i) Gill and Orr [1] obtained the pain ratings by piercing the palatal mucosa with 25-gauge needle to a depth of the bevel of the needle only, and no local anaesthetic solution was injected into the tissues. The pain caused by this procedure must have been slight and this could have led to the difficulty in discriminating and rating the pains by the patients both under topical anaesthetic and placebo. We feel that the pain-rating scale of 1-5 given by the said authors was too large a range for the small degree of pain caused by piercing the mucosa with the needle. As the pain caused by piercing the mucosa was slight, any change in the degree of pain felt on piercing with the needle would be spread over a small range only, and thus cause difficulty for the patients to accurately place their pain ratings on the given scale. In contrast, our investigation involved the infiltration of local anaesthetic by injection into the palatal mucosa. The pain caused by this procedure was considerable, and hence any change in the degree of pain felt would have been spread over a larger range which the patients could rate with more confidence. Furthermore, the investigation was to test the ability of topical anaesthetic in reducing injection pain, and hence it would only be appropriate to administer the local anaesthetic into the mucosa rather than merely piercing it.

ii) Gill and Orr [1] applied the topical anaesthetics on his patients only for 30 seconds according to the

manufacturer's specification before the needle was pierced. Regardless of the manufacturer's recommendation, it could well be that the time was too short for the anaesthetics to express their full effect. Robert and Sowray [2] stated that the time taken for the onset of surface analgesia is at least 2 minutes, the speed of onset and depth of analgesia achieved also depend on the permeability of the mucosa and is related directly to the degree of keratinization. The chosen site was the hard palate and this well-keratinised area may retard absorption of the drug compared with other non-keratinised surfaces, and hence a suitably longer period may be required before the effect of the topical anaesthetic agent could be felt.

We have always subscribed to the opinion that topical anaesthetics are beneficial and effective in reducing pain caused by injections, and our belief is confirmed by the results of this investigation. Trouton [3] was suspicious of the placebo effect that the administration of a topical anaesthetic might have on patients, simply because something was administered to ease the patient's fear of injections. This assumption may well be true if the patients had prior information of the procedures. However, our patients in the present investigation were neither aware of the nature nor the function of the topical anaesthetic and placebo that were used. For this reason, we are convinced that the reduced pain ratings with 2% xylocaine topical anaesthetic stems from the ability of the agent to do so, and is not due to psychological effect.

REFERENCES

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