

# The effects and side effects of lidocaine tetracaine peel off on laser-assisted hair removal

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## Abstract

**Background:** Lidocaine 7%-tetracaine 7% is one of the combinations recently offered for performing laser-assisted hair removal. The aim of this study was to compare the effects of this combination with placebo on the side effects of laser-assisted hair removal.

**Materials and Methods:** This clinical trial was carried out on 110 women who referred to Isfahan Spadana laser clinic for laser-assisted hair removal. Lidocaine 7%-tetracaine 7% was applied on one-half of the face, whereas placebo was applied on the other side to create local anesthesia, and after 30 min, the place was cleaned and investigated for complications (edema, erythema, and pallor); then laser therapy was begun. At the end of the therapy, the patients' pain was estimated using Visual Analog Scale (VAS). The data were analyzed using SPSS software by Chi-square and paired *t*-tests.

**Results:** The mean age of patients was  $27.74 \pm 10.8$  years. Average levels of anesthesia at 30 min after using lidocaine 7%-tetracaine 7% and placebo based on VAS were  $3.6 \pm 1.4$  and  $8.4 \pm 1.5$ , respectively ( $P = 0.001$ ). In other words, patients felt less pain by using lidocaine 7%-tetracaine 7%. The frequency of complications in patients was not significantly different between the two groups.

**Conclusion:** Considering the better effect of lidocaine 7%-tetracaine 7% compared to placebo and its minimal side effects, we can use it before performing laser-assisted hair removal.

**Key Words:** Hair, laser therapy, lidocaine, local anesthesia, tetracaine

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## INTRODUCTION

The use of local anesthetic is increasing rapidly with the introduction of outpatient dermatology surgical techniques such as biopsy, shave excision, local injection, cryosurgery, and laser.<sup>[1]</sup> The favorable anesthetic acts effectively without causing pain and its onset is rapid, with long-term effects and minimum topical and systemic side effects.<sup>[1,2]</sup> The injected anesthetic drugs are being gradually replaced with topical anesthetics such as creams, gels, or patches,

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and numerous studies have focused on finding a quick but effective method for providing topical anesthesia. However, there are some more effective methods such as iontophoresis, but utilization of the method requires a special machine, and it has limited usage due to lack of access to a broad surface, insufficient results from previous studies, and its short-term effect.<sup>[3,4]</sup> Vibration with massager is another way for administering topical anesthesia; however, it does not provide complete topical anesthesia and just reduces pain. Moreover, using this method requires another method to reduce the pain caused by the procedure.<sup>[4]</sup> Creams and patches are now used widely due to their comfort and ease of use, minimal systemic absorption, and high levels of safety provided by them.<sup>[5]</sup> The structure of local anesthetic is a combination of the aromatic ring, amide or ester connection bond, and the amine part. The drug is classified by its connecting bond (amide or ester group). Amide groups (such as lidocaine and prilocaine) are metabolized in the liver by liver microsomal enzymes, and ester groups (e.g., tetracaine) are metabolized by cholinesterase. Para-aminobenzoic acid (PABA) is an ester metabolite anesthetic which can lead to allergic reactions in patients with a positive history of contact dermatitis and, therefore, should not be used in patients with a history of positive allergy to PABA or hair dye. Few or no such allergic reactions have been reported with amide anesthetic agents.<sup>[2]</sup> The main mechanism of action of local anesthetics is interaction with sodium channels in the nerve endings located in dermis to cause numbness. The amine and aromatic parts are responsible for protein binding and, therefore, determine the effects and length of anesthesia.<sup>[2]</sup> The first introduced local anesthetic (TAC) was a combination of tetracaine 0.5%, epinephrine 0.5%, and cocaine 11.8%, which was effectively applied to non-musosal wounds, but later was replaced by a combination of lidocaine 4%, epinephrine 0.1%, and tetracaine 0.5% (LET) due to side effects caused by cocaine use.<sup>[1]</sup> ELMA is a combination of lidocaine and prilocaine in oil-water emulsion, which was released in 1993. This combination is US Food and Drug Administration (FDA) approved and currently the most common drug used for local anesthesia.<sup>[6]</sup> The purpose of the present study was to compare the effects of tetracaine 7% and lidocaine 7% with placebo on pain reduction in patients who had undergone hair removal by laser technique at Spadana clinic.

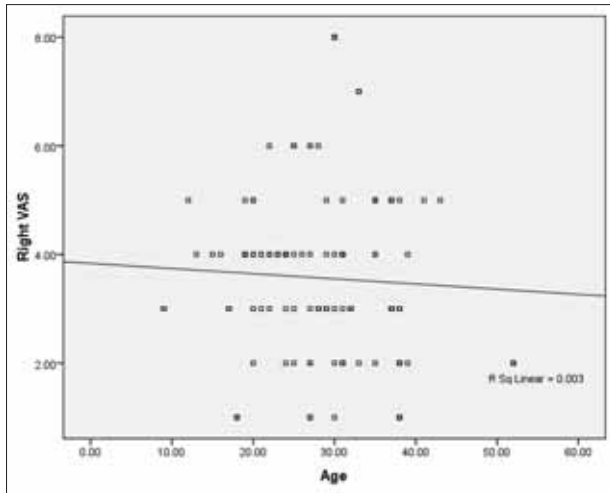
## MATERIALS AND METHODS

In this prospective, double-blind clinical trial, the study population consisted of the female patients who referred to the Spadana laser clinic for laser-assisted hair removal from 2009 to 2010. The inclusion criteria

were: No prior history of allergic reaction to anesthetic agents (tetracaine or lidocaine) and not taking analgesics during the 24 h before the procedure. We also excluded pregnant and breast feeding patients from the study. The number of participants in the study was calculated as 110 patients in each group (control and case). All patients who referred for laser-assisted hair removal to Spadana clinic and satisfied the inclusion criteria were enrolled in the study until the required sample size was obtained. After the participants filled the written consent, the combination of tetracaine 7% and lidocaine 7% was applied on the right side of face for administering topical anesthesia, and placebo was utilized on the left side. After about 30 min, the face was cleaned and patients were examined by a third person (not associated with the project) for any potential side effects including edema, pallor, redness, and itching. The examination was repeated immediately after the laser treatment in both sides of the face, and patients were asked to rate their pain based on the Visual Analog Scale (VAS) from 1 to 10. In this study, both physician and patient were blinded to local anesthetic drug or placebo cream. VAS is an analog scale by which the patients can estimate and report their pain by using a 10-cm horizontal line on which patients can mark the extent of their pain.<sup>[7]</sup> Data forms were reviewed for each patient individually. This information included age, hair removal area on the face, and the VAS measures. Data were analyzed by SPSS 0.18 and in some cases by using regression test.

## RESULTS

In this study, 110 female patients were enrolled in each group. The mean age of the patients was  $27.4 \pm 8.1$  years. The mean anesthesia level based on VAS at 30 min after application of tetracaine 7% and lidocaine 7% was  $1.4 \pm 3.6$ , while the mean level of anesthesia based on VAS at 30 min after placebo application was  $1.5 \pm 8.4$ , which was statistically significant ( $P = 0.001$ ). Effects of lidocaine 7% and tetracaine 7%, and placebo occurred in one and three cases, respectively, after 30 min. Statistical analysis showed that the frequency of complications in patients (erythema, edema, pallor) in the two groups was not statistically significant ( $P = 0.372$ ). Figures 1 and 2 demonstrate the relationship between the amount of anesthesia and age groups. Pearson coefficient showed the correlation between age and anesthesia in the lidocaine 7% and tetracaine 7% group to be 0.053 ( $P = 0.58$ ) and for placebo to be equal to 0.098. There was no significant relationship between age and average anesthesia level ( $P = 0.30$ ). Multivariate regression test showed there was no relationship between age and the degree of pain reduction in any of the groups [Table 1].



**Figure 1:** Average anesthesia at 30 min after using tetracaine 7% and lidocaine 7% in relation to age

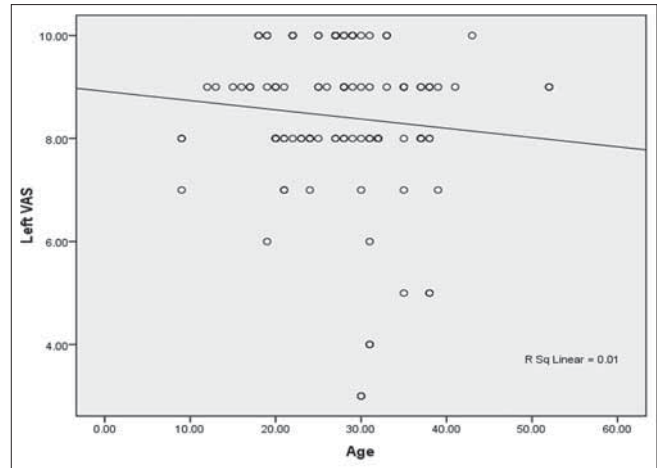
**Table 1: Relation between patients' age and pain reduction in the two groups**

Variable	Non-standard coefficient (in comparison with age)		$\beta$ standard coefficient (in comparison with age)	P value
	$\beta$	Standard deviation error		
VAS placebo	-0.551	0.526	-0.101	0.297
VAS treatment group	-0.325	0.540	-0.058	0.549

VAS: Visual analog scale

## DISCUSSION

Our results showed that patients felt less pain at the time of lidocaine 7% and tetracaine 7% application compared to the placebo. This study showed that the combination of lidocaine 7% and tetracaine 7% can be used as a local anesthetic before the laser-assisted hair removal. Previous studies reported that using the combination of tetracaine and lidocaine before treatment procedures (in which local anesthesia is needed) led to effective local anesthesia and showed better performance compared to ELMA and placebo.<sup>[6]</sup> In a study presented in the 63<sup>rd</sup> Annual Congress of the Academy of Dermatology in 2005 in the United States, lidocaine 7% and tetracaine 7% and placebo were applied randomly to a separate area in 50 adult patients before laser-assisted hair removal, and hair removal was performed 30 min after using local anesthetic and placebo. The results of the study showed that VAS was significantly lower than when placebo was applied for the patients.<sup>[8]</sup> Chen *et al.* conducted a study on patients referred for laser-assisted tattoo removal. In this study, the effect of lidocaine 7% and tetracaine 7% was compared with placebo, and the results showed that the anesthetic combination could significantly and effectively reduce the pain in patients than placebo.<sup>[9]</sup> Bryan *et al.* compared the effects of lidocaine 7% and



**Figure 2:** Average anesthesia at 30 min after using placebo in relation to age

tetracaine 7% and placebo in pain control and their side effects in a randomized, double-blind clinical trial. The results of their study showed that the mentioned combined anesthetic agent was good for pain control with minimal side effects.<sup>[10]</sup> Our results show that the side effects were reported only in three patients after the use of lidocaine 7% and tetracaine 7%, which was not significantly different than the placebo group. Thus, this combination has minimal side effects and proper anesthetic action. On the other hand, prolonged time taken by the currently used local anesthetics to exert their effect (average 1-2 h)<sup>[11,12]</sup> causes discomfort for both patient and the physician. In a study by Alster *et al.* on the effect of lidocaine/tetracaine (LT) peel in topical anesthesia prior to laser-assisted hair removal, the results showed that VAS scores were significantly lower for LT peel (26.7 for LT peel vs. 44.3 for placebo), and for that study and ours, subjects'/investigators' ratings favored LT peel were evaluated which are in accordance.<sup>[13]</sup> Therefore, the combination of lidocaine 7% and tetracaine 7% provides rapid anesthesia onset with minimal side effects, and could be a practical alternative for older local anesthetic agents used before laser-assisted hair removal and also improves patient satisfaction.

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