Practical effects of CO\textsubscript{2} laser irradiation on tooth conservation

Kyoichi Oura\textsuperscript{a,*}, Ryutaro Oku\textsuperscript{a}, Shuitsu Harada\textsuperscript{b}

\textsuperscript{a} Oura Dental Office, 2-5-2 Meiwa, Kagoshima 890-0024, Japan
\textsuperscript{b} Oral Physiology, Kagoshima University Dental School, 8-35-1 Sakuragaoka, Kagoshima 890-8544, Japan

Abstract

Conservation of inappropriate teeth to conserve was attempted with CO\textsubscript{2} laser irradiation in our clinic. In two cases (female, 54 years old, right upper 1, and female, 39 years old, right upper 2), each tooth was diagnosed as inappropriate to conserve because of progressive internal resorption and apical periodontitis. After extraction of the teeth, the inappropriate portion of the tooth was cut and removed, surrounding tissue was removed and the root canals were filled. CO\textsubscript{2} laser irradiation was made around the root of the tooth and inside the alveolus. The teeth were then re-implanted. After the surgery, laser irradiation on the gingiva was made periodically for several weeks. Successive observation (at 3, and 5.5 years, respectively) revealed that both teeth showed no special problem, such as loosening. It has been reported that low-power irradiation with CO\textsubscript{2} laser promoted wound healing, multiplication of capillaries, and increased peripheral circulation. These effects of CO\textsubscript{2} laser irradiation, reducing inflammation and increasing surrounding peripheral circulation, might result in the effective conservation of teeth.

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1. Introduction

Conservation of inappropriate teeth to conserve was attempted with CO\textsubscript{2} laser irradiation in our clinic.

* Corresponding author. Tel.: +81-99-282-6480; fax: +81-99-282-0810.
E-mail address: kodo@tenmonkan.co.jp (K. Oura).
2. Patients and methods

In two cases (case A: female, 54 years old, right upper 1, case B: female, 39 years old, right upper 2), each tooth was diagnosed as inappropriate to conserve because of progressive internal resorption and apical periodontitis (Fig. 1A-1, B-1). In case A, after extraction of the tooth, the apical portion of the tooth was cut and removed, the surrounding tissue was removed and the root canals were filled. In case B, the apical portion of the tooth was remained after extraction of the tooth, and surrounding tissue was removed and the root canals were filled. CO₂ laser irradiation was made around the root of the tooth and inside the alveolus by Opelaser 03 S with 1.0 W, CW (YOSHIDA); the tooth was then re-implanted (Fig. 1A-2, B-2). After the surgery, laser irradiation on the gingiva was made periodically for several weeks.

3. Results

In case A, at 5.5 years after the surgery, the tooth was fixed firmly in the alveolus, bone regenerated and completely filled the apical portion of the root, and showed no special problem, such as loosening or decalcification (Fig. 1A-3). In case B, at 3 years

![Images of teeth before and after surgery](image-url)
post surgery, this tooth was fixed firmly in the alveolus and the apical portion of the conserved root was fixed, and showed no special problem, such as loosening or decalcification (Fig. 1B-3).

4. Conclusion

Successive observations revealed that both teeth showed no special problem, such as loosening. It has been reported that low-power irradiation with CO₂ laser promoted wound healing, multiplication of capillaries, and increased peripheral circulation [1]. These effects of CO₂ laser irradiation, reducing inflammation and increasing surrounding peripheral circulation, might result in the effective conservation of the teeth. These results indicate that 100% of the teeth treated with this procedure survived which was higher than those in the previous reports [2]. In conclusion, these results suggest that CO₂ laser irradiation might be effective for tooth conservation.

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References
