

# Comparison of the effect of Er, Cr-YSGG laser and ultrasonic retrograde root-end cavity preparation on the integrity of root apices

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**Abstract:** The aim of this study was to compare the effect of Waterlase laser and ultrasonic root end cavity preparation on the integrity of root end in extracted human teeth. The canals of 60 extracted maxillary central incisors were cleaned, shaped, obturated and 3 mm of the root end was resected and examined for the presence of any cracks. Class I root-end cavities were then prepared using an ultrasonic unit or Waterlase laser. In the ultrasonic group, KIS 2D tip and medium intensity and in the laser group, 600  $\mu\text{m}$  laser tips and an output power setting of 4 W with 55% water and 65% air were used to prepare the cavity which was studied for the presence of any cracks or chippings. One crack was found in the ultrasonic group, while no cracks were observed in the laser group. There was no significant difference between the two groups ( $P > 0.05$ ). As for the chipping effect, seven cases (23%) had chipping after cavity preparation in the ultrasonic group but no chipping was found in the specimens of the laser group and the difference was statistically significant ( $P < 0.05$ ). According to the results of this in vitro study, laser preserves the integrity of root-end cavities better than ultrasonic devices from the standpoint of producing chipping. (J Oral Sci 52, 77-81, 2010)

**Keywords:** crack; chipping; Er, Cr-YSGG laser; root-end preparation; ultrasonic.

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## Introduction

The use of ultrasonic tips has become widely accepted for root-end cavity preparation as they have a number of advantages including their smaller dimensions and improved access to the resected root-end cavities (1).

Saunders et al. (2) were the first to report more crack propagation in resected root-end surface with ultrasonic root-end preparation than a round bur on a slow-speed handpiece. Furthermore, Abedi et al. (3) studied the effect of root-end cavity preparation with bur and ultrasonic and concluded that significantly fewer cracks were observed with bur compared to ultrasonic. Waplington et al. (4) found no significant difference in cracking between high power ultrasonic and bur; however, the chipping was more associated with the ultrasonic device.

Studies have demonstrated that using a higher power setting of the ultrasonic device for root-end cavity preparation creates more cracks compared with medium and low powers (5,6). In another study, De Bruyne et al. (7) investigated the root-end integrity after preparing root-end cavities with medium and low power settings of the ultrasonic unit and observed no significant difference in the cracks produced between medium and low powers.

Waterlase laser (Biolase® Technology Inc, San Clement, CA, USA), an Er, Cr:YSGG laser (Erbium, Chromium: Yttrium, Scandium, Gallium and Garnet) has been presented as an effective means to resect root ends, prepare root-end cavity, staunch blood, and sterilize root apex and surrounding tissues in endodontic surgery (8). The

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