Application of Ozony Tron® to Endodontic Therapy

—Antimicrobial Effects of Ozone Gas during Infected Root Canal Treatment—

YAMADA Hirohito, UCHIYAMA Makiko, HOSOYA Akihiro*, NAKAMURA Hiroaki*, YAMAMOTO Akio and KASAHARA Etsuo

Department of Endodontics and Operative Dentistry, Matsumoto Dental University
(Chief: Prof. KASAHARA Etsuo)
*Department of Histology, Matsumoto Dental University
(Chief: Prof. NAKAMURA Hiroaki)

Abstract: In addition to the antimicrobial action produced by the oxidizing action of ozone, the tissue activation action of ozone can be applied in dentistry, with focus placed on its effectiveness as an antimicrobial, anti-inflammatory and hemostatic agent. We investigated the potential for using ozone water in the cleaning and disinfecting of artificial teeth and periodontal pockets, and as a cleaning fluid for root canal treatment.

Recently, the Ozony Tron®, an ozone generator which produces ozone from available oxygen, was developed. This device does not require an oxygen tank to produce ozone, it has good portability due to its small size and weight, and it safely degrades the ozone gas released into oxygen, making it well suited for use during house calls. In this study we evaluated the clinical application of ozone gas treatment for infected root canals.

From 155 devitalized teeth, where a positive culture was obtained in the root canal culture prior to enlargement of the root canal, there were 250 root canal samples on which the authors performed a routine root canal treatment following the enlargement standard (Yasuda’s guidelines standard). After enlargement and preparation, 130 root canal samples were confirmed to have positive cultures, and these were the sample teeth used for this investigation. The sample teeth were randomly selected, and 88 root canals received ozone gas treatment and the remaining 42 root canals were irrigated alternately with Neo Cleaner and 3% oxydol and used as control teeth. Aerobic cultures were taken immediately following treatment, and a second culture test was taken during the patient’s next visit before starting treatment, and these results were used to produce our findings. Moreover, we also used X-rays taken prior to surgery to investigate whether there was a correlation between presence of root lesions and ratio of positive cultures obtained.

Results obtained were as follows.
1. Of the 250 root canals, we obtained a positive culture solely in root canal enlargement in 120 (48.0%).
2. Among the 88 cases where ozone gas was used, 42 root canals (47.7%) indicated no microbes, and of these, 10 root canals (11.4% of all cases) continued to have a negative culture into the second test.
3. In the cases with alternate irrigating, of the 42 root canals, 36 (85.7%) showed no microbes, and of these, 21 root canals (50.0% of all cases) continued to have a negative culture into the second test.
4. The correlation between radiolucent findings of the root and the ratio of positive cultures obtained indicated that, regardless of the presence of root lesions, the positive culture ratio for cases where ozone gas was used remained at approximately 50%. In cases where alternating irrigation was used, the positive culture ratio for root lesions (−) was 100%, (±) was 91.0%, and (+) was 64.0%.

Key words: Ozone, Ozony Tron®, Antimicrobial effects