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Società italiana di Microbiologia

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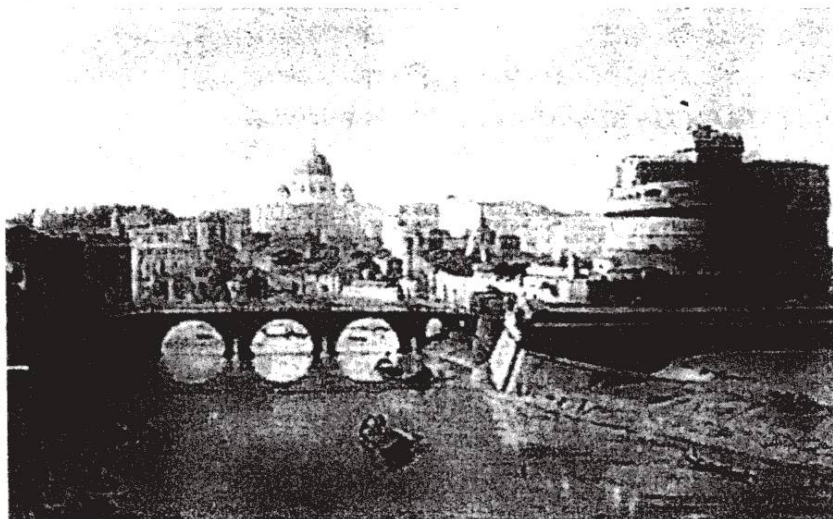
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UNIVERSITA' DEGLI STUDI DI ROMA
Tor Vergata
Università della Ricerca



31° Congresso Nazionale Società Italiana di Microbiologia



Roma, 19 - 22 Ottobre 2003

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Messa a punto di una metodica per la valutazione in vitro dell'effetto battericida dell'Endox

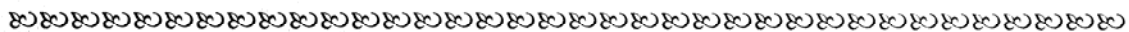
R. Armanino, S. Roveta, E.A. Debbia

Sezione di Microbiologia - DISCAT, Università degli Studi di Genova.

Largo Rosanna Benzi 10 - 16132 Genova.

L'Endox è un apparecchio utilizzato in endodonzia per curare infezioni batteriche a livello del sistema canale radicolare. Visti gli ottimi risultati clinici osservati, si è voluto verificare se i benefici riscontrati siano dovuti effettivamente alla morte della popolazione microbica presente. Il principio di funzionamento dell'apparecchio si basa sia sulla formazione di un campo elettromagnetico che su un passaggio di corrente che porta all'applicazione di un certo numero di scariche a vari livelli del dente (apice – radice). Questo studio si propone di dimostrare che il fenomeno provoca lisi cellulare per elettroporazione con conseguente morte osmotica della cellula stessa. Sono state riprodotte in vitro condizioni critiche di carica batterica superiori a quelle che si riscontrano nel reale utilizzo clinico dell'apparecchio. I parametri di cui principalmente si è tenuto conto sono stati: ceppo batterico, volume del campione, elettrolita da utilizzare come medium, numero di scariche e punto di applicazione di esse. E' stata riscontrata in ben determinate condizioni sperimentali una diminuzione della popolazione batterica superiore al 99.99% utilizzando concentrazioni iniziali di *E. faecalis* di 10^8 CFU/mL in NaCl 0.1 M, prelevando 20 µL di tale sospensione e sottoponendola a 3 scariche (2 alla radice e 1 al apice). In particolare si è raggiunta la totale sterilizzazione con una sospensione iniziale di *E faecalis* di 10^7 CFU/mL. Questo risultato preliminare indica che l'Endox causa la morte cellulare batteriche sottoposte al trattamento, il che conferma il bersaglio primario dello strumento. Sono in corso ulteriori esperimenti per verificare gli effetti su campioni più vasti di specie batteriche e si stanno sperimentando possibili nuove applicazioni dello strumento.

Ringraziamenti: gli autori sono indebitati con Clara Cassanelli per l'aiuto dato durante alcune fasi di questo studio.



translation by Mary Lila Beach, 30 January 2004

Summary from "Bollettino della SIM" società Italiana di Microbiologia

Year 5 – N. 1 October 2003

31° Congresso Nazionale Società Italiana di Microbiologia Roma, 19 – 22 October 2003

Set up of a method for evaluating in vitro the effect of Endox on bacteria

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Endox is used in endodontics to cure bacterial infections at the radicular canal level. Given the excellent clinical results observed, it was our desire to verify whether the benefits found were in effect due to the extermination of the microbe population present. The principal of functioning of the equipment is based on the formation of an electromagnetic field around the passage of a certain number high frequency current discharges at various levels of the tooth (apex – root canal). This study proposes to demonstrate that the phenomena provokes cellular destruction through electroporation with the consequential osmotic death of the same cell. Critical conditions were recreated in vitro of bacterial charge superior to that found in the real clinical use of the equipment. The parameters that were principally considered were: bacterial family, volume of the sample, electrolytic to be used as a medium, number of discharges and the point of application of each. It was found in well defined experimental conditions a reduction of the bacterial population of 99.99% using initial concentrations of *E. faecalis* of 10^8 CFU/mL in NaCl 0.1 M, taking 20 µL of such suspension and applying 3 discharges (2 in the root canal and 1 at the apex).

In particular a total sterilization was reached with the initial suspension of *E faecalis* of 10^7 CFU/mL. This preliminary result indicates that Endox causes the bacterial cellular death with its application, which confirms the primary contention of the instrument. Further experiments are being conducted on samples of a vaster variety of bacteria as well as new applications of the instrument.

Treatment of Acute Pulpitis with HFAC – A Clinical Study

Vögele, H. ¹, Hickel, R. ² (¹ German Air Force, Department of Dentistry, Lagerlechfeld ²
Department of Restorative Dentistry, LM-University, Munich, Germany)

ABSTRACT

A fast and effective endodontic treatment regimen is especially important in patients suffering from acute pulpal inflammation. In-vitro studies were able to show that a novel device is very effective in eliminating the content (bacteria and soft tissue) of root canals. This electronic device (*Endox®-Endodontic System*, Orange Dental, Germany) sends high-frequency alternating current (HFAC) through an active electrode placed in the root canal.

The aim of this clinical study was to evaluate the effect of HFAC-treatment in comparison to a conventional endodontic scheme on the pain perception during early stages of the treatment of acute pulpal inflammation. Sixty patients (60 teeth) were randomly allocated either to the HFAC or the conventional group. After local anesthesia and insertion of rubber dam the pulp chamber was opened and soft tissue was removed. In the conventional group the root canals were then instrumented up to ISO size 25. After rinsing with NaOCl (5,25%) and CHX, NaOCl was left for an additional period of 30 minutes. Finally the canals were rinsed and dried and an anti-inflammatory agent (Ledermix-paste) was placed. In the HFAC group the length of the canal was determined endometrically and, depending on the clinical situation, up to three HFAC-impulses were applied. After rinsing (NaOCl and CHX) and drying, CaOH was placed inside the canal. In both groups the cavities were then closed using a GI restorative material (*Ketac molar*, ESPE, Germany). During treatment as well as one and two days later the patients rated their pain perception on a visual analogue scale. In the conventional group patients reported an average pain level above zero during treatment and the first postoperative day. In the HFAC-group pain perception was reported zero from the moment of the application of the HF-current on. The treatment time in the conventional group averaged 44 minutes and 21 minutes in the HFAC-group.

The results of this study indicate that the use of high-frequency alternating current in the treatment of acute pulpal inflammation may reduce pain perception as well as treatment time in comparison to a conventional endodontic scheme.

PURPOSE

ABSTRACT

The purpose of this study was the evaluation of the HFAC-treatment compared to a conventional endodontic treatment scheme on cases with acute pulpitis, regarding pain perception and treatment-time.

Treatment of Acute Pulpitis with HFAC – A Clinical Study

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Department of Restorative Dentistry, LM-University, Munich, Germany)

MATERIALS & METHODS

Sixty patients (sixty teeth) were randomly allocated either to the HFAC-, or to the conventional group. The following listings are showing the treatment-procedures in both groups.

HFAC – treatment:

- anesthesia with Ultracain DS forte (1:100000) 10 min. before treatment
- placing of rubber dam
- preparation of access cavity
- endometric working-length determination with Endox
- first HFAC-impulse in the coronal third of the root canal
- second HFAC-impulse in the middle third of the root canal
- third HFAC-impulse in the apical third of the root canal
- shaping of the root canal to ISO 25
- irrigation with NaOCl (5,25%) and CHX
- placing of CaOH as intracanal medication for 7 days
- temporary restoration with GIC (Ketac molar, ESPE)

Conventional treatment:

- first three steps as listed above
- radiographic working-length determination
- shaping of the root canals to ISO 25
irrigation with NaOCl (5,25%) and CHX, with NaOCl remaining at least 20-30 min. inside the root canal and being changed every five minutes.
- Ledermix paste as intracanal medication for two days
- temporary filling as above

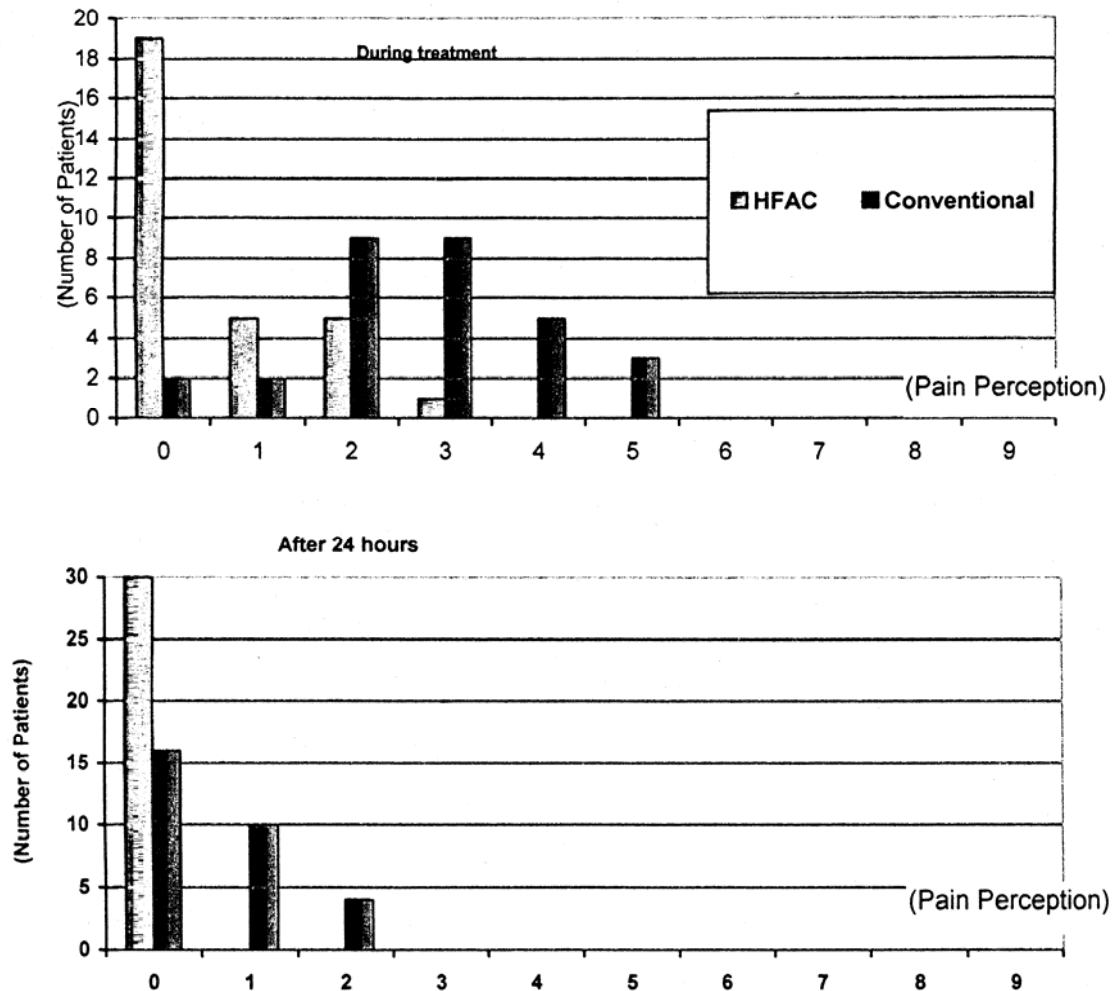
RESULTS

All thirty patients of each group were asked to rate their pain perception on a visual analogue scale during treatment, as well as one and two days later. The scale offered a graduation from zero to nine, with:

- 0: not painful at all
- 1-3: slightly painful
- 4-6: painful
- 7-9: extremely painful

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After 48 hours, all patients of both groups reported any pain perception on the treated teeth.

The average treatment-time in the conventional group was 44 minutes, compared to 21 minutes in the HFAC-group.

Conclusion

The study shows the treatment of acute pulpitis with HFAC, to be a simple and adequate endodontic therapy. Compared to a conventional treatment scheme, it is painless and time-saving. Both aspects are not only of interest in the predictability of endodontic treatment, but also have economic effects.