

ELECTROTHERAPY FOR CHRONIC GUM AND PERIAPICAL ABSCESSSES

Pages with reference to book, From 161 To 162

Noori S. Al-Waili (Private Clinic, House 34, Street 42, Section 729, Al-Mashtel, New Baghdad, Baghdad, Iraq.)

INTRODUCTION

It is well known that living cells have bioelectrical phenomena which could be affected by electric field alterations. Exposure to an electric field causes considerable changes in metabolic, immunologic and physiologic aspects of biological systems. The possible effect of electrical stimuli on various tissues, in vitro and in vivo, have been anticipated. In this regard, electrotherapy with the use of a low intensity external direct current has been found to enhance bone fracture healing, the repair of pseudoarthrosis and prompt skin wound healing with stronger scar tissues^{1,2}. Direct current has also antibacterial and antifungal properties^{3,4}. Recently, electrical stimulation has also been used for the treatment of various types of headache including that due to migraine or muscular contraction⁵. It was used for treatment of indolent ulcers and pain⁶. Perthes disease was managed successfully with the use of electromagnetic fields⁷. These observations encouraged the use of direct current therapy in patient with chronic gum and periapical abscess.

CASE REPORT

A 30-year-old male presented with chronic gum and periapical infection and an abscess at the left upper second premolar tooth. His complaint had started seven years ago as a simple dental caries of the second premolar tooth which had been treated by removal of infected tissues and the replacement by silver amalgam. Three years later, the patient had developed pain, tenderness on percussion and occasional bleeding at site of the same tooth. Removal of amalgam had revealed extensive secondary caries reaching the pulp. Root canal treatment had been performed. Within one year, swelling, pain and tenderness had developed with a sinus discharge noted at the apical region of the tooth. The roots had been reopened and drained which resulted in the amelioration of clinical signs and symptoms. Nevertheless, the same clinical complaint re-appeared and on x-ray showed an area of radiolucency with ill-defined margins round the apex of the affected tooth. Therefore, apicoectomy had been performed and after one month the apical sinus had re-appeared with discharge of pus. Another apicoectomy with retrograde root filling had been done. Nevertheless within the following few months, a sinus and granulation tissue swelling had been noted on the apical area of the tooth (from the buccal surface of the gum). A nodular of granulation tissues forms in response to the irritation by pus discharge and marks the opening of the sinus. Antibiotic therapy was of no value and tooth extraction had been decided. Meanwhile, the low intensity direct current has been used after informed consent was obtained. A small portable direct current stimulator was used. The unit delivered (at maximum capacity) 20 volts with use of 1.5 V batteries as a power source. The unit contained a voltmeter and an ammeter. Two stainless steel electrodes were used. The exposed ends of the wires (electrodes) were covered by cotton or lint saturated with normal saline. The two covered ends were applied on alveolar and buccal surfaces of the gum and apical region of the tooth. Power output from the stimulator was set at 5 V and 3-5 mA. The application of electrical stimulation was scheduled for 20 minutes three times weekly. Decreased pain and discomfort followed the stimulation immediately. Within one month pus discharge and granulation tissue swelling disappeared. The gum then looked healthy with complete absence of inflammatory signs and symptoms. The radiolucency area around the tip of the infected

tooth had disappeared within two months of direct current therapy. No side effects were noticed apart from mild dizziness appeared upon removal of the electrodes. A one year follow-up was uneventful.

DISCUSSION

Dental caries is one of the commonest diseases affecting human beings. It causes irreversible damage to the tooth and creates a path for pathogenic bacteria to infect surrounding and underlying tissues. The ultimate effect is inflammation of pulp and later periapical tissues. This causes severe pain that can be treated by tooth extraction. However, root canal filling is used to preserve the infected tooth. This method is not always effective and may cause periodontitis and apical abscess. When pus is formed and reaches the surface through an opening made by resorption of bone, the treatment is usually by tooth extraction or sometimes by root canal filling. Persistence chronic periodontitis and apical abscess may be dealt with by apicoectomy. In the patient reported, there was persistent chronic periodontitis and an apical abscess which failed to respond to root canal, antibiotics and repeated apicoectomies. Tooth extraction was advised to eliminate this pathological entity. Nevertheless, a two months course of direct current therapy resulted in complete resolution of infection and healing of sinus and bone resorption. No recurrence was noted during a period of one year post-treatment. The exact mechanism behind this result is not evident. However, electrotherapy could increase DNA and collagen synthesis, neural regeneration, repair of osteotomies, activation of osteoclasts and osteoblasts and reduction of microbial growth⁸⁻¹⁰. Recently, direct current therapy was found to be effective in the treatment of chronic osteomyelitis and to decrease pain and disability in most of the treated patients with osteoarthritis (Al-Waili unpublished data). The use of electrotherapy for the treatment of a chronic periapical abscess has not been reported before. The importance of this method is obvious in view of its lack of side effects, ease of application and its efficacy in eradication of infection. It appears, therefore, that external direct current may be of therapeutic value in such diseases. It is anticipated that a more efficient way of electrical stimulus can be developed by conducting controlled and large studies in special centres.

REFERENCES

1. Carey, L. C. and Lepley, D. Jr. Effect of continuous direct electric current on healing wounds. *Surg. Forum*, 1962; 13:33.
2. Spadaro, A. Electrically stimulated bone growth in animals and man; review of the literature. *Clin. Orthop.*, 1977; 122:325.
3. Rowley, A., McKenna, M., Chase, R. and Wolcott, E. Influence of electrical current on infecting microorganism in wounds. *Ann. N.Y. Acad. Sci.*, 1974; 238:543.
4. Berger, J., Spadaro, J., Bierman, R., Chaplin, S. and Becker, S. Anti-fungal properties of electrically generated metallic ions. *Antimicrob. Agents Chemother.*, 1976; 10:856.
5. Solomon, S. and Guglielmo, KM. Treatment of headache by transcutaneous electrical stimulation. *Headache*, 1985; 25:12.
6. Carely, P. and Wainpel, S. Electrotherapy for acceleration of wound healing low intensity direct current. *Arch. Phys. Med. Rehabil.*, 1985; 66:443.
7. Harrison, M. and Bassett, C. Use of pulsed electromagnetic fields in Perthes disease; report of a pilot study. *Pediatr. Orthop.*, 1984; 4:579.
8. Bassett, C. and L{errmann, I. The effects of electrostatic fields on macromolecular synthesis by fibroblasts in vitro. *J. Cell. Biol.*, 1968; 39:9a.
9. Alvarez, O., Mertz, P., Smerbeck, I. and Eaglstein, W. The healing of superficial skin wounds is stimulated by external electrical current. *Invest. Dermatol.*, 1983; 81:144.
10. Noda, M. and Sato, A. Appearance of osteoclasts and osteoblasts in electrically stimulated bones

cultured on choriollantoic membranes. *Clin. Orthop.*, 1985; 193:288.