Effect of pulsed electromagnetic field on mandibular fracture healing: A randomized control trial, (RCT).

Randomized controlled trial
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Abstract

INTRODUCTION: Currently, the pulsed electromagnetic field (PEMF) method is utilized for the treatment of nonunion long bone fractures. Considering the established effect of the PEMF on the acceleration of the bone healing process, we conducted this study to evaluate the effect of PEMF on the healing process in mandibular bone fractures.

MATERIAL AND METHODS: This research was a randomized control trial (RCT) study. The sample consisted of patients with a mandibular fracture who were hospitalized in order to receive closed reduction treatment. The participants were randomly selected and then sequentially divided into two groups of 16 participants each (controls = 16, cases = 16). The patients in the control group received conventional therapy without any extra treatment, while the patients in the case group received PEMF therapy in addition to conventional therapy. For the PEMF therapy, patients in the case group received immediate post-surgery PEMF therapy for 6 h. Next, they received 3 h of exposure for the next 6 d, and finally, the same process was repeated for 1.5 h for post-surgery days 8-13. The maxillomandibular fixation (MMF) device was removed at post-surgery week 4. The patients in the control group, however, did not receive any extra treatment. The efficiency of the

treatment modalities was evaluated clinically and radiographically. For the radiographical assessment, we employed a direct digital panoramic machine to calculate the computerized density of the bone, and those measurements were used for comparison of the results between the control group and the study patients.

RESULTS: There was no significant difference in the mean bone density values between the two groups ($P > 0.05$). However, the percentage of changes in bone density of the two groups revealed that the case group had insignificant decreases at post-surgery day 14 and a significant increase at post-surgery day 28 compared with the control group ($P < 0.05$). After releasing the MMF, a bimanual mobility test of the fractured segments showed the stability of the segments in all patients. In the case group, the mouth opening was significantly more stable than that of the control group ($P < 0.05$).

CONCLUSION: PEMF therapy postoperatively leads to increased bone density, faster recovery, increased formation of new bone, a further opening of the mouth, and decreased pain.