ZUSAMMENSTELLUNG VON WISSENSCHAFTLICHEN PUBLIKATIONEN ZUR WIRKUNG VON PULSIERENDER MAGNETFELDTHERAPIE BEI FRAKTUREN

1990

A double-blind trial of pulsed electromagnetic fields for delayed union of tibial fractures

Abstract

A total of 45 tibial shaft fractures, all conservatively treated and with union delayed for more than 16 but less than 32 weeks were entered in a double-blind multi-centre trial. The fractures were selected for their liability to delayed union by the presence of moderate or severe displacement, angulation or comminution or a compound lesion with moderate or severe injury to skin and soft tissues. Treatment was by plaster immobilisation in all, with active electromagnetic stimulation units in 20 patients and dummy control units in 25 patients for 12 weeks. Radiographs were assessed blindly and independently by a radiologist and an orthopaedic surgeon. Statistical analysis showed the treatment groups to be comparable except in their age distribution, but age was not found to affect the outcome and the effect of treatment was consistent for each age group. The radiologist's assessment of the active group showed radiological union in five fractures, progress to union in five but no progress to union in 10. In the control group there was union in one fracture and progress towards union in one but no progress in 23. Using Fisher's exact test, the results were very significantly in favour of the active group ($p = 0.002$). The orthopaedic surgeon's assessment showed union in nine fractures and absence of union in 11 fractures in the active group. There was union in three fractures and absence of union in 22 fractures in the control group. These results were also significantly in favour of the active group ($p = 0.02$). It was concluded that pulsed electromagnetic fields significantly influence healing in tibial fractures with delayed union.

1992

Treatment of ununited tibial fractures: a comparison of surgery and pulsed electromagnetic fields (PEMF)

Abstract

The use of pulsed electromagnetic fields (PEMF) is gaining acceptance for the treatment of ununited fractures. The results of 44 articles published in the English language literature have been compiled to assess the effectiveness of PEMF vs

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surgical therapy. For ununited tibial fractures, 81% of reported cases healed with PEMF vs 82% with surgery. After multiple failed surgeries, the success rate of PEMF is reported to be greater than with surgery; this discrepancy increases with additional numbers of prior surgeries. In infected nonunions, the results of surgical treatment decreased by 21% and were less than the results utilizing PEMF (69% vs 81%). In open fractures, surgical healing exceeded PEMF (89% vs 78%), whereas in closed injuries PEMF cases healed more frequently (85% vs 79%). In general, PEMF treatment of ununited fractures has proved to be more successful than noninvasive traditional management and at least as effective as surgical therapies. Given the costs and potential dangers of surgery, PEMF should be considered an effective alternative. Experience supports its role as a successful method of treatment for ununited fractures of the tibia.

1993

The electrical stimulation of tibial osteotomies - double-blind study

Abstract

The effect of electromagnetic field stimulation was investigated in a group of 40 consecutive patients treated with valgus tibial osteotomy for degenerative arthrosis of the knee. All patients were operated on by the same author and followed the same postoperative program. After surgery, patients were randomly assigned to a control group (dummy stimulators) or to a stimulated one (active stimulators). Four orthopedic surgeons, unaware of the experimental conditions, were asked to evaluate the roentgenograms taken 60 days postoperatively and to rate the osteotomy healing according to four categories (the fourth category being the most advanced stage of healing). In the control group, 73.6% of the patients were included in the first and second category. In the stimulated group, 72.2% of the patients were included in the third and fourth category. On a homogeneous group of patients, electromagnetic field stimulation had positive effects on the healing of tibial osteotomies.

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