Accepted for Podium Presentation at the AAOS, Anaheim, CA – February 1999

Paper No. 65
Noninvasive Nonunion Treatment by Pulsed Low-Intensity Ultrasound

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Pulsed, specifically-programmed, low-intensity ultrasound has been used successfully in the treatment of difficult nonunions by Xavier and Duarte, Duarte, Strauss, and Frankel. The nonunion provides an ideal paired-control study where the same patient's prior failed treatments are compared with the subsequent result in that patient with low-intensity ultrasound treatment. The ultrasound prescription use database maintained with physician input for the period of 10/17/94 to 10/17/96 was analyzed to assess all pertinent nonunion data including bone, bone type, last surgical procedure interval, and fracture age. Nonunions had to be a minimum of 9 months from fracture date with no progression of healing. Core group cases were required to have a minimum of 3 months from their last surgical procedure. All others were placed in the noncore group. A total of 593 nonunions met the 9-month fracture age criteria. Core group cases totaled 313 and 80% healed (healed in 169 ± 5.8 days). The noncore group had 102 healed and 14 failed (88% heal rate), 64 noncompliant, 29 withdrawals, and 58 lost to follow-up. An intention-to-treat analysis of the 593 cases provided a 67% heal rate. The mean fracture age was over 1.7 years in both groups.

Older patients had a lower healing rate than younger patients. The success rate also declined with fracture age dropping from 84% at 9 months to 64% at 5 years. However, there was no statistical healing difference based on gender, age, fracture age, days without surgery, bone involved, long bones versus other bones, metaphyseal or diaphyseal bone, and fracture type and smoking status.