

## Clinical Studies with HMT Orthopaedic Shock Wave Treatment Device OssaTron

### Treatment of Nonunions of Long Bone Fractures With Shock Waves

A prospective clinical study investigated the effectiveness of shock waves in the treatment of 72 patients with 72 nonunions of long bone fractures (41 femurs, 19 tibias, seven humeri, one radius, three ulnas and one metatarsal). The doses of shock waves were 6000 impulses at 28 kV for the femur and tibia, 3000 impulses at 28 kV for the humerus, 2000 impulses at 24 kV for the radius and ulna, and 1000 impulses at 20 kV for the metatarsal. The results of treatment were assessed clinically, and fracture healing was assessed with plain radiographs and tomography. The rate of bony union was 40% at 3 months, 60.9% at 6 months, and 80% at 12 months followup. Shock wave treatment was most successful in hypertrophic nonunions and nonunions with a defect and was least effective in atrophic nonunions. There were no systemic complications or device-related problems. Local complications included petechiae and hematoma formation that resolved spontaneously. In the authors' experience, the results of shock wave treatment were similar to the results of surgical treatment for chronic nonunions with no surgical risks. Shock wave treatment is a safe and effective alternative method in the treatment of chronic nonunions of long bones.

#### Number of patients treated in the study: 72

#### Callus Formations at the Fracture Sites Before and 6 Months after Shock Wave Treatment

Callus Formations	Before Treatment	After Treatment
Number of Patients	61	61
0	12 (19.7%)	1 (1.6%)
<25%	42 (68.9%)	12(19.7%)
25% - 50%	7 (11.5%)	8 (13.1%)
50% - 75%	0	13 (21.3%)
>75%	0	27 (44.3%)

#### Callus Formation at the Fracture Site Before and 12 Months after Shock Wave Treatment

Callus Formations	Before Treatment	After Treatment
Number of Patients	55	55
0	10 (18.2%)	1 (1.8%)
<25%	39 (70.9%)	1 (1.8%)
25% - 50%	6 (10.9%)	7 (12.7)
50% - 75%	0	4 (7.3%)
>75%	0	42 (76.4%)

Ching-Jen Wang, MD\*; Han-Shiang Chen, MD\*\*; Chin-En Chen, MD\*; Kuender D. Yang, MD, PhD†  
CLINICAL ORTHOPAEDICS AND RELATED RESEARCH  
Number 387, pp. 95-101

From the \* Department of Orthopedic Surgery, the \*\* Department of Surgery, and the †Department of Medical Research, Chang Gung Memorial Hospital, Kaohsiung Medical Center, Kaohsiung, Taiwan