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PRELIMINARY REPORT ON  
TREATMENT OF BONE TUMORS  
WITH MICROWAVE-  
INDUCED HYPERTHERMIA

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## KEYWORDS

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skeletal neoplasm; thermotherapy; surgery; limb sparing; knee joint

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## ABSTRACT

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Between July, 1992, and February, 1995, 62 patients with various bone tumors were treated with microwave-induced hyperthermia. The series had 47 cases of malignant tumors and 15 cases with benign tumors; most of the tumors occurred at or near knee joints (53/62 = 85.4%). The surgical procedure consisted of separating the tumorous segment from surrounding normal tissues with a safe margin, cooling the normal tissues (including the vital neurovascular bundle and the intrajoint structures) with a water circulation system while heating the tumor simultaneously with the microwave antenna array, and providing an adequate soft-tissue cover for the dead bone. The tumor core temperature and the surface temperature reached 108 and 65°C, respectively. The duration of microwave irradiation was usually 40-50 minutes. Meanwhile, the temperature of the normal tissues was kept under 39°C. The minimal and maximal periods of clinical observation were 3 months and 36 months, respectively, and the mean follow-up period was 17 months. The 62 cases were evaluated from both oncological and orthopedic points of view. Five cases had local recurrence and required amputation. The 57 other cases had excellent local control. Six malignancy cases died of lung metastasis during a period of 1-2 years. Pathological fracture occurred at devitalized bone in five cases. In most of the cases, the knee joints functioned well, were stable and painless, and had almost full range of motion. Single-photon emission-computed tomography study in 16 cases revealed that revascularization of the devitalized tumorous bone segment could be accomplished in 1 year or more. These results show that the use of microwave hyperthermia for the treatment of bone tumors can be considered to be a definitive operation procedure that is safe and is well tolerated by patients. The oncological and orthopedic results are very encouraging. © 1996 Wiley- Liss, Inc.