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## Current indications for cryosurgery in orthopaedic oncology

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### Background:

Local adjuvant treatment in aggressive benign or low grade malignant bone tumors is the traditional application of cryosurgery in orthopaedic oncology. Introduction of new cryosurgical devices using probes to deliver cryotreatment has made the technique safer in comparison to liquid nitrogen and is allowing new and expanding indications.

### Methods:

Since 2000 we have used cryosurgery in 42 surgical procedures with the following indications:

A - Local adjuvant treatment in (A1) aggressive benign and low grade malignant bone tumors or metastases after intralesional surgery in selected high risk lesions (wide dimensions, iuxtarticular localization). An extended application can be sterilization of margins after at risk wide excision in high grade tumors (A2). A1 (15 patients): GCT 7, epithelioid haemangioma 3, low grade chondrosarcoma 2, chondroblastoma 1, ABC 1, renal carcinoma metastasis 1. A2 (1 patient): osteosarcoma sacroiliac region 1.

B - Bleeding control (B1) and/or solidification of mucoid/myxoid tumors (B2) + adjuvant treatment during curettage in at risk anatomical sites like pelvic or shoulder girdle. B1 (20 patients): renal or thyroid carcinoma metastasis 7, GCT 4, ABC 2, metastatic hemangiopericytoma or hemangioendothelioma 2, schwannoma 1, chordoma 1, angioma 1, chondrosarcoma 1, myeloma 1. B2 (1 patient): giant myxoid chondrosarcoma 1.

C - Post-excisional sterilization (liquid nitrogen immersion) of bone segments for reconstruction by massive autologous bone grafting. 3 patients: synovial sarcoma 2, chondrosarcoma 1.

D - Percutaneous treatment of metastases or inoperable recurrent primary bone tumors. 2 patients: metastatic chordoma 1, recurrent Ewing sarcoma 1.

### Results:

No neurological or vascular damages occurred. At follow up ranging from 12 to 144 months, one deep and one superficial infection were observed. One patient developed superficial skin necrosis. In group A and B1, two recurrences occurred (GCT 1, ABC 1) in 21 patients with a follow-up longer than 12 months. No fractures of on-site treated segments were observed, may be due to a frequent use of preventive plate fixation. One fracture of a cryotreated autologous bone graft was observed.

**Conclusion:** Our series confirms safety and efficacy of cryosurgery and supports its application in a growing number of new indications in orthopaedic oncology.

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