

## Complications of recycled autograft for reconstruction after malignant musculoskeletal tumor resection

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### Background

The use of recycled autograft for reconstruction of skeletal defect after wide resection of malignant musculoskeletal tumors has been reported. While recycled autograft has advantages of using the patients' own bone, providing a good skeletal fit, less donor site morbidity, no risk of diseases transmission, and cheaper cost compared to other methods using endoprosthesis or allograft, it shows disadvantages such as mechanical frailty due to various processing for devitalization, long duration of bone union, high incidence of non-union, and potential risk of local recurrence due to residual tumor cells within the graft.

### Questions/Purposes

We evaluated clinical outcomes of reconstruction using the recycled autograft after malignant tumor resection in terms of local recurrence and bone union.

### Patients and Methods

This study was a multi-national-multi-institutional study by the Eastern Asian Musculoskeletal Oncology Group (EAMOG). We retrospectively reviewed medical records of patients who underwent skeletal reconstruction using recycled autograft after malignant tumor resection.

### Results

Four hundreds and nineteen patients from 5 institutions (China, Japan, Taiwan and Korea) were reviewed. Primary malignant bone tumors, such as osteosarcoma and chondrosarcoma were most common ones. The common tumor locations were femur, tibia, and humerus. Mean age was 26 (5 to 69) years. Mean length of autograft was 18 cm. Processing methods for recycling were alcohol soaking in 169 cases (China), liquid nitrogen soaking in 123 cases (Taiwan), autoclaving in 54 cases (Japan and Korea), extracorporeal irradiation in 53 cases (Korea), and pasteurization in 20 cases (Korea). Mean follow-up period was 76 (34 to 142) months. There were 7 (1.7%) local recurrences (2 from alcohol soaking, 2 from liquid nitrogen soaking, 2 from irradiation, and 1 from autoclaving). Twelve percent of patients showed non-union or delayed union. Mean period for bone union at graft-host junction was 6 months at metaphysis, and 11 months at diaphysis. Mean infection rate was 16 (10 to 21) %. Fifteen percent of patients reported resorption or fracture of the recycled graft.

### Conclusions

Reconstruction using recycled autograft showed considerable complications inclusive of local recurrence. There was probability of residual tumor cells within recycled autograft despite various processing. Therefore, recycled autograft could be used in cases of patients with limited amount of bone destruction or cortical involvement with malignant tumor cells. Due to relative high rates of resorption or fracture, supplementary methods, such as vascularized bone graft to enhance bone union and increase mechanical strength could be recommended.