



O3:101

The Role of Structural Allografts in Limb Salvage Surgery - A 22 Year Perspective

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A number of studies evaluating limb salvage surgery have reported a higher complication rate with allografts compared to endoprostheses, especially as regards the rate of infections, fractures and non-unions. However unique anatomic and structural conditions continue to present themselves for which structural allografts are particularly suited. The authors therefore reviewed the senior surgeons 22+ years of personal experience in orthopedic oncologic and similar limb salvage reconstructions to compare the results of structural allografts and endoprostheses in complex reconstructions requiring structural bone restoration.

The surgical case logs of the senior surgeon over a 22+ year period was queried. There were 224 massive bone reconstructions (188 bone tumors, 36 other entities) employing massive tumor-type endoprostheses (172) or major cortical structural allografts (52). The records were reviewed to determine the ultimate outcome in these reconstructions in terms of joint preservations, reoperations, major revisions and subsequent amputations.

The reoperation rate was 50% for the allografts compared to 29% in the endoprostheses ($p=0.005$), the major revision or conversion rate was 23.1% for allografts and 7% for endoprostheses ($p=0.001$), and the amputation rate was 3.8% for massive allografts and 4.1% for massive endoprostheses. Use of allografts allowed preservation of the entire native joint in 25 (48%) the majority of the native joint (all but one condyle) in 8 joints (15%) and allowed 16 hemi joint preservations (31%) compared to 2 complete joint preservations (1%) and 99 hemi joint preservations (58%) with endoprostheses ($p=0.001$).

The revision rate for allograft reconstruction was much higher than that for endoprosthetic reconstruction: however, the allograft reconstructions in the majority of these specific cases allowed bone stock restoration and greater native joint preservation in ways that no endoprosthesis could accomplish without further bone or joint loss or compromise. The ultimate long-term limb salvage rate of 96% with either method of reconstruction confirms the applicability of allograft reconstruction in selected cases. The additional benefit of preserved growth plates was occasionally also accomplished with allograft reconstructions. Specific examples will be presented.

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