

Title: The Variability in Surgical Margin Reporting in Limb Salvage Surgery for Sarcoma

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**Background:** Surgical margins are a standard reported measurement in tumor surgery that has implications for functional outcome, local control, and overall survival. There is no one accepted classification and it is not clear what the dominant forms of margin reporting are in the sarcoma literature.

**Methods:** We performed a PubMed literature search to identify articles that reported surgical margins and oncologic outcomes in limb salvage surgery for sarcoma from 1980 to 2013. We recorded the margin classification (Table 1), specialty of the journal, specialty of the author, and location of the authors' institution.

**Results:** We found that 159/448 (35%) of articles included in the study did not report surgical margins. Of the 289 papers that did include data on margins, 160 (55%) of articles used Enneking's classification. There has been an increase over time in the proportion of articles reporting surgical margins by the residual tumor (R) classification and the proportion of articles reporting margins dichotomously as "positive" or "negative" (Figure 1).

**Conclusions:** We did not find a common method for reporting margins in the limb salvage sarcoma literature. Of most concern was that over 1/3 of clinical reports of oncologic outcomes did not include margin status, which substantially compromises any conclusions that readers may infer about treatment success, local recurrence, or survival. We believe there should be renewed efforts to encourage use of a common surgical margin reporting system that is simple, reproducible, and prognostic.

Table 1. Explanation of the various categories of surgical margin reporting

Name of Criteria	Values Used to Report Surgical Margins
Dichotomous	Positive or negative
Measurements	Positive or negative with closest distance to tumor
Trichotomous	Negative (or clear), close (or uncertain), or positive
Residual Tumor (R classification)	R0 (no tumor at margin), R1 (microscopic positive), or R2 (grossly positive)
Enneking	Intralesional, marginal, wide, or radical
Trovik	Adequate (wide or radical) or inadequate (intralesional and marginal)
Japanese Orthopaedic Association	Curative wide margin, wide margin, marginal margin, and intralesional margin.

Figure 1. Percent of total articles using surgical margin criteria from 1980 to 2013

