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TITLE: The One Hundred and One Most Cited Oncology Articles in Orthopaedic Literature

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Background: Orthopaedic subspecialty bibliographies have recently been published on the hundred most cited papers within a discipline. Orthopaedic oncology literature presents a unique challenge as its articles are not indexed in a single subspecialty journal and are subsequently distributed throughout medical literature.

Purpose: To present a body of orthopaedic literature to guide the study of musculoskeletal oncology. To highlight a number of foundational works that have heavily influenced our current approaches to patient care in this field.

Methods: The Institute for Scientific Information (ISI) Web of Knowledge, 2012 Journal Citation Report (JCR) database was used to query orthopaedic journals for oncology literature. Article titles were screened and the bibliographic information of any orthopaedic oncology specific publication with more than fifty literature citations was recorded. The guidelines provided by the Journal of Bone and Joint Surgery (JBJS) were used to assign levels of evidence by all authors

Results: The number of citations ranged from 98 to 1061, the publication years ranged from 1967 to 2008, with the 1990s being the most represented (45 articles). All publications were represented in eight journals, with the Journal of Bone and Joint Surgery (JBJS) - American Volume being most well represented (42 articles). The most common level of evidence was IV. Spine metastases was the most common topic (14 articles), followed by giant cell tumor (13 articles).

Conclusions: Although the number of citations an article gathers is not an indicator of its merits, articles with a higher number of citations can be presumed to be foundational works for a discipline. It is our hope that this collection can efficiently guide trainees interested in oncology and provide a quick reference for established practitioners.

Level of Evidence	Number of Articles	Percentage
I	4	4%
II	6	6%
III	8	8%
IV	69	68%
V	3	3%
Basic Science	1	1%
Non-systematic Review - Basic Science	2	2%
Non-systematic Review - Clinical	7	7%
Case Report	1	1%

Table 1. Number of articles with assigned level of evidence

Article Title	Number of Citations
Enneking, W.F., et al., <i>A system for the functional evaluation of reconstructive procedures after surgical treatment of tumors of the musculoskeletal system</i> . Clin Orthop Relat Res, 1993(286): p. 241-6.	1061
Enneking, W.F., S.S. Spanier, and M.A. Goodman, <i>A system for the surgical staging of musculoskeletal sarcoma</i> . Clin Orthop Relat Res, 1980(153): p. 106-20.	972
Enneking, W.F., <i>A system of staging musculoskeletal neoplasms</i> . Clin Orthop Relat Res, 1986(204): p. 9-24.	446
Campanacci, M., et al., <i>Giant-cell tumor of bone</i> . J Bone Joint Surg Am, 1987. 69(1): p. 106-14.	428
Tomita, K., et al., <i>Surgical strategy for spinal metastases</i> . Spine (Phila Pa 1976), 2001. 26(3): p. 298-306.	343
Mankin, H.J., C.J. Mankin, and M.A. Simon, <i>The hazards of the biopsy, revisited. Members of the Musculoskeletal Tumor Society</i> . J Bone Joint Surg Am, 1996. 78(5): p. 656-63.	312
Mirels, H., <i>Metastatic disease in long bones. A proposed scoring system for diagnosing impending pathologic fractures</i> . Clin Orthop Relat Res, 1989(249): p. 256-64.	297
Goldenberg, R.R., C.J. Campbell, and M. Bonfiglio, <i>Giant-cell tumor of bone. An analysis of two hundred and eighteen cases</i> . J Bone Joint Surg Am, 1970. 52(4): p. 619-64.	265
Mankin, H.J., T.A. Lange, and S.S. Spanier, <i>The hazards of biopsy in patients with malignant primary bone and soft-tissue tumors</i> . J Bone Joint Surg Am, 1982. 64(8): p. 1121-7.	265
Tokuhashi, Y., et al., <i>Scoring system for the preoperative evaluation of metastatic spine tumor prognosis</i> . Spine (Phila Pa 1976), 1990. 15(11): p. 1110-3.	265
Tomita, K., et al., <i>Total en bloc spondylectomy. A new surgical technique for primary malignant vertebral tumors</i> . Spine (Phila Pa 1976), 1997. 22(3): p. 324-33.	238
Enneking, W.F. and W.K. Dunham, <i>Resection and reconstruction for primary neoplasms involving the innominate bone</i> . J Bone Joint Surg Am, 1978. 60(6): p. 731-46.	218
Rao, A.S. and V.J. Vigorita, <i>Pigmented villonodular synovitis (giant-cell tumor of the tendon sheath and synovial membrane). A review of eighty-one cases</i> . J Bone Joint Surg Am, 1984. 66(1): p. 76-94.	217

Gerszten, P.C., et al., <i>Radiosurgery for spinal metastases: clinical experience in 500 cases from a single institution.</i> Spine (Phila Pa 1976), 2007. 32(2): p. 193-9.	217
Campanacci, M., R. Capanna, and P. Picci, <i>Unicameral and aneurysmal bone cysts.</i> Clin Orthop Relat Res, 1986(204): p. 25-36.	215
Tokuhashi, Y., et al., <i>A revised scoring system for preoperative evaluation of metastatic spine tumor prognosis.</i> Spine (Phila Pa 1976), 2005. 30(19): p. 2186-91.	204
Gustafson, P., <i>Soft tissue sarcoma. Epidemiology and prognosis in 508 patients.</i> Acta Orthop Scand Suppl, 1994. 259: p. 1-31.	193
Boriani, S., J.N. Weinstein, and R. Biagini, <i>Primary bone tumors of the spine. Terminology and surgical staging.</i> Spine (Phila Pa 1976), 1997. 22(9): p. 1036-44.	193
McDonald, D.J., et al., <i>Giant-cell tumor of bone.</i> J Bone Joint Surg Am, 1986. 68(2): p. 235-42.	191
O'Donnell, R.J., et al., <i>Recurrence of giant-cell tumors of the long bones after curettage and packing with cement.</i> J Bone Joint Surg Am, 1994. 76(12): p. 1827-33.	190
Lee, F.Y., et al., <i>Chondrosarcoma of bone: an assessment of outcome.</i> J Bone Joint Surg Am, 1999. 81(3): p. 326-38.	190
Wong, D.A., V.L. Fornasier, and I. MacNab, <i>Spinal metastases: the obvious, the occult, and the impostors.</i> Spine (Phila Pa 1976), 1990. 15(1): p. 1-4.	189
Connor, J.M. and D.A. Evans, <i>Fibrodysplasia ossificans progressiva. The clinical features and natural history of 34 patients.</i> J Bone Joint Surg Br, 1982. 64(1): p. 76-83.	176
Dahlin, D.C. and M.B. Coventry, <i>Osteogenic sarcoma. A study of six hundred cases.</i> J Bone Joint Surg Am, 1967. 49(1): p. 101-10.	175
Kneisl, J.S. and M.A. Simon, <i>Medical management compared with operative treatment for osteoid-osteoma.</i> J Bone Joint Surg Am, 1992. 74(2): p. 179-85.	172
Enneking, W.F., S.S. Spanier, and M.A. Goodman, <i>Current concepts review. The surgical staging of musculoskeletal sarcoma.</i> J Bone Joint Surg Am, 1980. 62(6): p. 1027-30.	170
Lindner, N.J., et al., <i>Percutaneous radiofrequency ablation in osteoid osteoma.</i> J Bone Joint Surg Br, 2001. 83(3): p. 391-6.	162
Harrington, K.D., <i>Metastatic disease of the spine.</i> J Bone Joint Surg Am, 1986. 68(7): p. 1110-5.	159
Gebhardt, M.C., et al., <i>The use of bone allografts for limb salvage in high-grade extremity osteosarcoma.</i> Clin Orthop Relat Res, 1991(270): p. 181-96.	158
Withrow, S.J., et al., <i>Comparative aspects of osteosarcoma. Dog versus man.</i> Clin Orthop Relat Res, 1991(270): p. 159-68.	157
Tomita, K., et al., <i>Total en bloc spondylectomy for solitary spinal metastases.</i> Int Orthop, 1994. 18(5): p. 291-8.	155
Malawer, M.M., et al., <i>Cryosurgery in the treatment of giant cell tumor. A long-term followup study.</i> Clin Orthop Relat Res, 1999(359): p. 176-88.	151
Schwartz, H.S., et al., <i>The malignant potential of enchondromatosis.</i> J Bone Joint Surg Am, 1987. 69(2): p. 269-74.	150
Link, M.P., et al., <i>Adjuvant chemotherapy of high-grade osteosarcoma of the extremity. Updated results of the Multi-Institutional Osteosarcoma Study.</i> Clin Orthop Relat Res, 1991(270): p. 8-14.	149
Coley, W.B., <i>The treatment of malignant tumors by repeated inoculations of erysipelas. With a report of ten original cases. 1893.</i> Clin Orthop Relat Res, 1991(262): p. 3-11.	144
Byers, P.D., et al., <i>The diagnosis and treatment of pigmented villonodular synovitis.</i> J Bone Joint Surg Br, 1968. 50(2): p. 290-305.	142
DiCaprio, M.R. and W.F. Enneking, <i>Fibrous dysplasia. Pathophysiology, evaluation, and treatment.</i> J Bone Joint Surg Am, 2005. 87(8): p. 1848-64.	141
Capanna, R., et al., <i>Modular uncemented prosthetic reconstruction after resection of tumours of the distal femur.</i> J Bone Joint Surg Br, 1994. 76(2): p. 178-86.	140
Marcove, R.C., et al., <i>The treatment of aneurysmal bone cyst.</i> Clin Orthop Relat Res,	140

1995(311): p. 157-63.	
Schwartz, H.S., K.K. Unni, and D.J. Pritchard, <i>Pigmented villonodular synovitis. A retrospective review of affected large joints.</i> Clin Orthop Relat Res, 1989(247): p. 243-55.	139
Jackson, R.P., F.W. Reckling, and F.A. Mants, <i>Osteoid osteoma and osteoblastoma. Similar histologic lesions with different natural histories.</i> Clin Orthop Relat Res, 1977(128): p. 303-13.	138
Bauer, H.C. and R. Wedin, <i>Survival after surgery for spinal and extremity metastases. Prognostication in 241 patients.</i> Acta Orthop Scand, 1995. 66(2): p. 143-6.	137
Blackley, H.R., et al., <i>Treatment of giant-cell tumors of long bones with curettage and bone-grafting.</i> J Bone Joint Surg Am, 1999. 81(6): p. 811-20.	137
Stener, B. and B. Gunterberg, <i>High amputation of the sacrum for extirpation of tumors. Principles and technique.</i> Spine (Phila Pa 1976), 1978. 3(4): p. 351-66.	135
Wise, J.J., et al., <i>Complication, survival rates, and risk factors of surgery for metastatic disease of the spine.</i> Spine (Phila Pa 1976), 1999. 24(18): p. 1943-51.	135
Weigel, B., et al., <i>Surgical management of symptomatic spinal metastases. Postoperative outcome and quality of life.</i> Spine (Phila Pa 1976), 1999. 24(21): p. 2240-6.	134
Boriani, S., et al., <i>Chordoma of the mobile spine: fifty years of experience.</i> Spine (Phila Pa 1976), 2006. 31(4): p. 493-503.	131
Kaplan, F.S., et al., <i>The histopathology of fibrodysplasia ossificans progressiva. An endochondral process.</i> J Bone Joint Surg Am, 1993. 75(2): p. 220-30.	130
Yazawa, Y., et al., <i>Metastatic bone disease. A study of the surgical treatment of 166 pathologic humeral and femoral fractures.</i> Clin Orthop Relat Res, 1990(251): p. 213-9.	130
O'Connor, M.I. and F.H. Sim, <i>Salvage of the limb in the treatment of malignant pelvic tumors.</i> J Bone Joint Surg Am, 1989. 71(4): p. 481-94.	126
Turcotte, R.E., et al., <i>Giant cell tumor of long bone: a Canadian Sarcoma Group study.</i> Clin Orthop Relat Res, 2002(397): p. 248-58.	125
Horowitz, S.M., et al., <i>Prosthetic and extremity survivorship after limb salvage for sarcoma. How long do the reconstructions last?</i> Clin Orthop Relat Res, 1993(293): p. 280-6.	125
Carroll, R.E. and A.T. Berman, <i>Glomus tumors of the hand: review of the literature and report on twenty-eight cases.</i> J Bone Joint Surg Am, 1972. 54(4): p. 691-703.	120
Rock, M.G., D.J. Pritchard, and K.K. Unni, <i>Metastases from histologically benign giant-cell tumor of bone.</i> J Bone Joint Surg Am, 1984. 66(2): p. 269-74.	120
Berrettoni, B.A. and J.R. Carter, <i>Mechanisms of cancer metastasis to bone.</i> J Bone Joint Surg Am, 1986. 68(2): p. 308-12.	117
Okada, K., et al., <i>Parosteal osteosarcoma. A clinicopathological study.</i> J Bone Joint Surg Am, 1994. 76(3): p. 366-78.	117
Campanacci, M., et al., <i>Osteoid osteoma. Direct visual identification and intralesional excision of the nidus with minimal removal of bone.</i> J Bone Joint Surg Br, 1999. 81(5): p. 814-20.	117
Mirra, J.M., et al., <i>A new histologic approach to the differentiation of enchondroma and chondrosarcoma of the bones. A clinicopathologic analysis of 51 cases.</i> Clin Orthop Relat Res, 1985(201): p. 214-37.	115
Gustafson, P., K.E. Dreinhofer, and A. Rydholm, <i>Soft tissue sarcoma should be treated at a tumor center. A comparison of quality of surgery in 375 patients.</i> Acta Orthop Scand, 1994. 65(1): p. 47-50.	112
Rougraff, B.T., J.S. Kneisl, and M.A. Simon, <i>Skeletal metastases of unknown origin. A prospective study of a diagnostic strategy.</i> J Bone Joint Surg Am, 1993. 75(9): p. 1276-81.	112
Wunder, J.S., et al., <i>The histological response to chemotherapy as a predictor of the oncological outcome of operative treatment of Ewing sarcoma.</i> J Bone Joint Surg Am, 1998. 80(7): p. 1020-33.	112

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Cheng, E.Y., et al., <i>Lumbosacral chordoma. Prognostic factors and treatment.</i> Spine (Phila Pa 1976), 1999. 24(16): p. 1639-45.	112
Lewis, R.J. and A.S. Ketcham, <i>Maffucci's syndrome: functional and neoplastic significance. Case report and review of the literature.</i> J Bone Joint Surg Am, 1973. 55(7): p. 1465-79.	111
Simon, M.A. and W.F. Enneking, <i>The management of soft-tissue sarcomas of the extremities.</i> J Bone Joint Surg Am, 1976. 58(3): p. 317-27.	111
Schaberg, J. and B.J. Gainor, <i>A profile of metastatic carcinoma of the spine.</i> Spine (Phila Pa 1976), 1985. 10(1): p. 19-20.	111
Boriani, S., et al., <i>Aneurysmal bone cyst of the mobile spine: report on 41 cases.</i> Spine (Phila Pa 1976), 2001. 26(1): p. 27-35.	111
Bell, R.S., et al., <i>The surgical margin in soft-tissue sarcoma.</i> J Bone Joint Surg Am, 1989. 71(3): p. 370-5.	110
Weinstein, J.N. and R.F. McLain, <i>Primary tumors of the spine.</i> Spine (Phila Pa 1976), 1987. 12(9): p. 843-51.	110
Gitelis, S., et al., <i>Intralesional excision compared with en bloc resection for giant-cell tumors of bone.</i> J Bone Joint Surg Am, 1993. 75(11): p. 1648-55.	109
Sundaresan, N., et al., <i>Surgery for solitary metastases of the spine: rationale and results of treatment.</i> Spine (Phila Pa 1976), 2002. 27(16): p. 1802-6.	109
Aboulaflia, A.J., et al., <i>Reconstruction using the saddle prosthesis following excision of primary and metastatic periacetabular tumors.</i> Clin Orthop Relat Res, 1995(314): p. 203-13.	108
Marcove, R.C., et al., <i>Osteogenic sarcoma under the age of twenty-one. A review of one hundred and forty-five operative cases.</i> J Bone Joint Surg Am, 1970. 52(3): p. 411-23.	107
Boriani, S., et al., <i>En bloc resections of bone tumors of the thoracolumbar spine. A preliminary report on 29 patients.</i> Spine (Phila Pa 1976), 1996. 21(16): p. 1927-31.	107
Pritchard, D.J., A.G. Nascimento, and I.A. Petersen, <i>Local control of extra-abdominal desmoid tumors.</i> J Bone Joint Surg Am, 1996. 78(6): p. 848-54.	107
Noria, S., et al., <i>Residual disease following unplanned excision of soft-tissue sarcoma of an extremity.</i> J Bone Joint Surg Am, 1996. 78(5): p. 650-5.	107
Hillmann, A., et al., <i>Malignant tumor of the distal part of the femur or the proximal part of the tibia: endoprosthetic replacement or rotationplasty. Functional outcome and quality-of-life measurements.</i> J Bone Joint Surg Am, 1999. 81(4): p. 462-8.	107
Tang, N., et al., <i>Osteosarcoma development and stem cell differentiation.</i> Clin Orthop Relat Res, 2008. 466(9): p. 2114-30.	107
Alman, B.A., A. De Bari, and J.I. Krajchich, <i>Massive allografts in the treatment of osteosarcoma and Ewing sarcoma in children and adolescents.</i> J Bone Joint Surg Am, 1995. 77(1): p. 54-64.	106
Fuchs, B., et al., <i>Operative management of sacral chordoma.</i> J Bone Joint Surg Am, 2005. 87(10): p. 2211-6.	106
Sung, H.W., et al., <i>Giant-cell tumor of bone: analysis of two hundred and eight cases in Chinese patients.</i> J Bone Joint Surg Am, 1982. 64(5): p. 755-61.	105
Gitelis, S., et al., <i>Chondrosarcoma of bone. The experience at the Istituto Ortopedico Rizzoli.</i> J Bone Joint Surg Am, 1981. 63(8): p. 1248-57.	105
Ghogawala, Z., F.L. Mansfield, and L.F. Borges, <i>Spinal radiation before surgical decompression adversely affects outcomes of surgery for symptomatic metastatic spinal cord compression.</i> Spine (Phila Pa 1976), 2001. 26(7): p. 818-24..	105
Eckardt, J.J. and T.J. Grogan, <i>Giant cell tumor of bone.</i> Clin Orthop Relat Res, 1986(204): p. 45-58.	105
Hipp, J.A., D.S. Springfield, and W.C. Hayes, <i>Predicting pathologic fracture risk in the management of metastatic bone defects.</i> Clin Orthop Relat Res, 1995(312): p. 120-	104

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Schreuder, H.W., et al., <i>Aneurysmal bone cysts treated by curettage, cryotherapy and bone grafting</i> . J Bone Joint Surg Br, 1997. 79(1): p. 20-5.	103
Fiorenza, F., et al., <i>Risk factors for survival and local control in chondrosarcoma of bone</i> . J Bone Joint Surg Br, 2002. 84(1): p. 93-9.	103
Frassica, F.J., et al., <i>Dedifferentiated chondrosarcoma. A report of the clinicopathological features and treatment of seventy-eight cases</i> . J Bone Joint Surg Am, 1986. 68(8): p. 1197-205.	102
Flandry, F. and J.C. Hughston, <i>Pigmented villonodular synovitis</i> . J Bone Joint Surg Am, 1987. 69(6): p. 942-9.	102
Boriani, S., et al., <i>Chordoma of the spine above the sacrum. Treatment and outcome in 21 cases</i> . Spine (Phila Pa 1976), 1996. 21(13): p. 1569-77.	101
Scaglietti, O., P.G. Marchetti, and P. Bartolozzi, <i>Final results obtained in the treatment of bone cysts with methylprednisolone acetate (depo-medrol) and a discussion of results achieved in other bone lesions</i> . Clin Orthop Relat Res, 1982(165): p. 33-42.	101
Turcotte, R.E., <i>Giant cell tumor of bone</i> . Orthop Clin North Am, 2006. 37(1): p. 35-51.	100
Gerrand, C.H., et al., <i>Classification of positive margins after resection of soft-tissue sarcoma of the limb predicts the risk of local recurrence</i> . J Bone Joint Surg Br, 2001. 83(8): p. 1149-55.	100
Grimer, R.J., et al., <i>Endoprosthetic replacement of the proximal tibia</i> . J Bone Joint Surg Br, 1999. 81(3): p. 488-94.	100
Bini, S.A., K. Gill, and J.O. Johnston, <i>Giant cell tumor of bone. Curettage and cement reconstruction</i> . Clin Orthop Relat Res, 1995(321): p. 245-50.	100
Peterson, H.A., <i>Multiple hereditary osteochondromata</i> . Clin Orthop Relat Res, 1989(239): p. 222-30.	100
Scaglietti, O., P.G. Marchetti, and P. Bartolozzi, <i>The effects of methylprednisolone acetate in the treatment of bone cysts. Results of three years follow-up</i> . J Bone Joint Surg Br, 1979. 61-B(2): p. 200-4.	99
Crawford, A.H., Jr. and N. Bagamery, <i>Osseous manifestations of neurofibromatosis in childhood</i> . J Pediatr Orthop, 1986. 6(1): p. 72-88.	99
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Widhe, B. and T. Widhe, <i>Initial symptoms and clinical features in osteosarcoma and Ewing sarcoma</i> . J Bone Joint Surg Am, 2000. 82(5): p. 667-74.	98
Wirganowicz, P.Z., et al., <i>Etiology and results of tumor endoprosthesis revision surgery in 64 patients</i> . Clin Orthop Relat Res, 1999(358): p. 64-74.	98

Table 2. Contains the bibliographic information as well as the number of citations for the 101 most cited oncology articles in orthopaedic literature