BONE
AND
SOFT TISSUE
TUMORS

Front cover: Logo of the Istituto Ortopedico Rizzoli, S. Michele in Bosco, Bologna
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BONE AND SOFT TISSUE TUMORS
Clinical Features, Imaging, Pathology and Treatment

Foreword by
William F. Enneking

Second, completely revised edition

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To Giuliana
FOREWORD

to the first edition (1990)

This is an extraordinary book by an extraordinary author. Mario Campanacci first published three volumes on musculoskeletal neoplasms and other tumor-like processes in bone and soft parts in Italian in 1981-1985. This book is an update and expansion of that book, published for the first time in English. In this book Dr. Campanacci brings to the readers the vast experience in musculoskeletal oncology of the Rizzoli Orthopaedic Institute in Bologna where he has been head of the Oncology Unit for many years. As such, he has had at his disposal the patient records, radiographs and pathologic material dating back to 1905. In fact, a visitor to the Institute will be shown the radiograph made of the first tumor case on records - that of a giant cell tumor of the distal femur. The wealth of clinical material that has been accumulated at the Rizzoli Institute, with exquisite documentation and maintenance is a unique resource and testimonial to not only the author but his predecessors. Under Campanacci’s leadership, the Institute has provided care to the majority of patients with neoplasms throughout Italy. Over the past two decades a treatment team with extraordinary ability in radiology, imaging, pathology, chemotherapy, as well as orthopedic surgery has been assembled. The Institute has been a major contributor to the literature of musculoskeletal oncology, has played an important role in the Musculoskeletal Tumor Society of North America, and taken a leadership role in the establishment of the European Musculoskeletal Oncology Society. This book brings to the reader an almost unparalleled experience from one of the leading centers of musculoskeletal oncology in the world.

The book first deals with the general principles of musculoskeletal oncology in an exemplary fashion as befits their experience. It then presents an extensive series of chapters, each devoted to a particular entity. Within each chapter the lesion in question is clearly defined in its frequency, sexual predilection, age of occurrence, and the anatomic localization with a detailed discussion of each point. Figures quoted are those derived from the experience at the Institute. The reader is then presented with the clinical picture and symptoms, the imaging characteristics of the lesion, and the gross and histopathologic features, all beautifully illustrated. Following this, the differential diagnosis is discussed in detail. Next, the clinical course without treatment is outlined. The next section of each chapter is a discussion of the treatment of the lesion in question and includes both surgical, chemotherapeutic and radiotherapeutic modalities. The final portion of each chapter is devoted to a discussion of the prognosis as it is currently known. Each chapter is beautifully illustrated with exceptional clarity that allows the reader an accurate portrayal of the lesion under discussion.

The manuscript is not simply a translation from Italian into English, rather an expansion of the previous text written in English. It retains the author’s clarity of thought, conciseness, and sharp focus on the important issues, and, in this context, brings to the reader an exceptionally cosmopolitan international view of this subject. This book is a must for all those in-
volved in the care of patients with musculoskeletal neoplasms regardless of their medical speciality. To those students, residents and fellows in orthopaedic surgery, radiology, medical oncology, pathology and radiation oncology, it will provide an invaluable resource and inspiration. We are greatly in Dr. Mario Campanacci’s debt for the prodigious effort this singularly authored authoritative text has required.

W.F. ENNEKING
PREFACE

to the first edition (1990)

At the Istituto Ortopedico Rizzoli the interest on bone tumors was pioneered by V. Putti, who created a pathology laboratory and museum, successfully performed extrarticular resection of the proximal femur and acetabulum in 1914, devised and widely used a technique of resection/arthrodesis of the knee (1923) whose principles have been in use until our days. His pupil, O. Scaglietti, fostered the laboratory of pathology and the study of bone tumors up to 1941. F. Delitala introduced in 1945 the replacement of large segmental resections with original stainless steel articular endoprostheses, which functioned for decades. In 1950 R. Zanoli used intercalary massive xenografts. I.F. Goidanich founded in 1955 the Tumor Centre at the Institute, reviewing and redefining all previous cases according to the new concepts introduced by H. Jaffe in those years. I started working with Goidanich both in orthopaedic surgery and in pathology in 1958 and shortly after studied with L. Lichtenstein in San Francisco. To both those admired and beloved teachers I am indebted for everything I have been able to do thereafter and for this book.

Today the Tumor Centre of the Institute records about 15,000 cases, complete with clinical charts, original X-ray and histological slides. More than 90% of those cases have been treated at the Institute, the remaining are consultation cases.

The experience with these cases constitutes the matter of this book. Any case where diagnosis was debatable was excluded. No mention will be made of exceptional lesions which we never saw, nor of lesions of the jaws, with which we have hardly any experience. Some illustrations will present cases where the treatment adopted is incorrect according to our present standards; those cases are decades old.

We think that a book has to be simple to be readable. We therefore avoided all unnecessary details and not well-established facts. The bibliography has also been limited to the most significant and recent publications.

Musculo-skeletal oncology is a multidisciplinary speciality. Our work and consequently this book would not have been possible without the joint effort of the pathologists (P. Bacchini, F. Bertoni, P. Picci), the medical oncologist (G. Bacci), the general surgeons (A. Briccoli, N. Guernelli), the orthopaedic surgeons (S. Boriani, R. Capanna, A. Giunti, F. Gherlinzoni, A. Guerra, C. Leonessa, M. Mercuri, G. Padovani, A. Toni). To all these friends I am greatly in debt because I profited greatly from their work, enthusiasm and ingenuity. A special acknowledgment to doctors M. Laus, E. Lorenzi, P. Ruggieri and N. Fabbri for their precious and essential help in the preparation of the pictures.

M. CAMPANACCI
The first English edition of Bone and Soft Tissue tumors appeared in 1990. This was a translation, although up-dated, of a previous book published in Italian in 1986.

This second English edition, on the contrary, is an entirely new book. Indeed, we found the text of the first edition so uncomplete in informations, so unbalanced in the distribution, and so poor in the language, that it immediately appeared more practical or, better, necessary to write everything again and directly in English. This edition in fact has been thoroughly rewritten, from the first to the last word. About 30% of the pictures are new.

The new book incorporates the accumulated personal experience of the Author, covering over 20000 inpatients and many more outpatients, the perusal of the literature of the last 10 years, the recent developments in imaging (particularly MRI), microscopic diagnosis (especially immunohistochemistry and electron microscopy) and the ultimate progress in surgical and non surgical treatment modalities.

We have followed, for each tumor or tumor-like lesion, the rule of starting the study in the outpatient clinic and hospital wards (clinical findings and imaging), continuing it at the operating table and on the entire and cross-sectioned resected specimen (gross surgical pathology), than at the microscope (histopathology), and finally reviewing the long-term results of surgical and combined surgical + local and/or general adjuvant therapies. All these observations are substantially based on the personal experience of the Author.

The text has been further digested to the essential, and the strict and uniform distribution, for each entity, in paragraphs (from definition to prognosis) is meant to avoid any overlapping or repetition, and to facilitate the study and the consultation. Also the references have been trimmed to the more recent and significant papers. Infact, notwithstanding the accrued new informations, the text is shorter as compared to the previous first English edition. The number of pages is slightly increased because of the pictures, which were 2249 in the first edition, and 2820 in this second edition.

In comparison with all the other books published until now on the same subject, it can be noticed that some chapters (for instance hemangioma and angiodysplasias, simple bone cyst, aneurysmal bone cyst, “brown tumors” in primary hyperparathyroidism, “myositis ossificans” and exuberant bone callus, synovial chondromatosis, pigmented villo-nodular synovitis) have a more extensive description. This reflects the personal experience of the Author and the importance that such lesions have in the orthopedic practice and differential diagnosis with tumors. We have also described together the hamartomas, dysplasias, and benign tumors, including instead in a section of tumor-like lesions those caused by hyperplastic (reparative), or metaplastic, or degenerative processes which may mimic a tumor.

The subject of this book reflects the experience of an Orthopedic Hospital. Therefore, bone tumors cover two thirds, and soft tissue tumors one third of the volume. For the same
reason, the lesions of the skull, jaws, ribs, cutis and subcutis are largely underestimated. The
tumors of the retroperitoneum, mucosae, and visceral organs are not represented. Systemic tu­
mors as multiple myeloma and lymphoma are also underestimated.

Our epidemiology charts are influenced by other bias. Because we have considered, in the
preparation of these charts, the inpatients only, mostly operated on and having a histological
confirmation, the frequency of some lesions is widely underestimated: histiocytic fibroma,
exostosis, chondroma, simple bone cyst, fibrous dysplasia, myositis ossificans, and others.
The age indicated in the charts refers to the age at the time of diagnosis. In the cases of ha­
martomas, or developmental abnormalities which initiate during childhood, and in the case of
slow-growing tumors, the age of inception of the lesion is presumably much younger than in­
dicated here.

We are deeply grateful to prof. Franco Bertoni and dr. Patrizia Bacchini for the contribu­
tion to the histological illustrations, and to dr. Piero Picci for the preparation of the epidemiol­
ogy charts.

M. CAMPANACCI